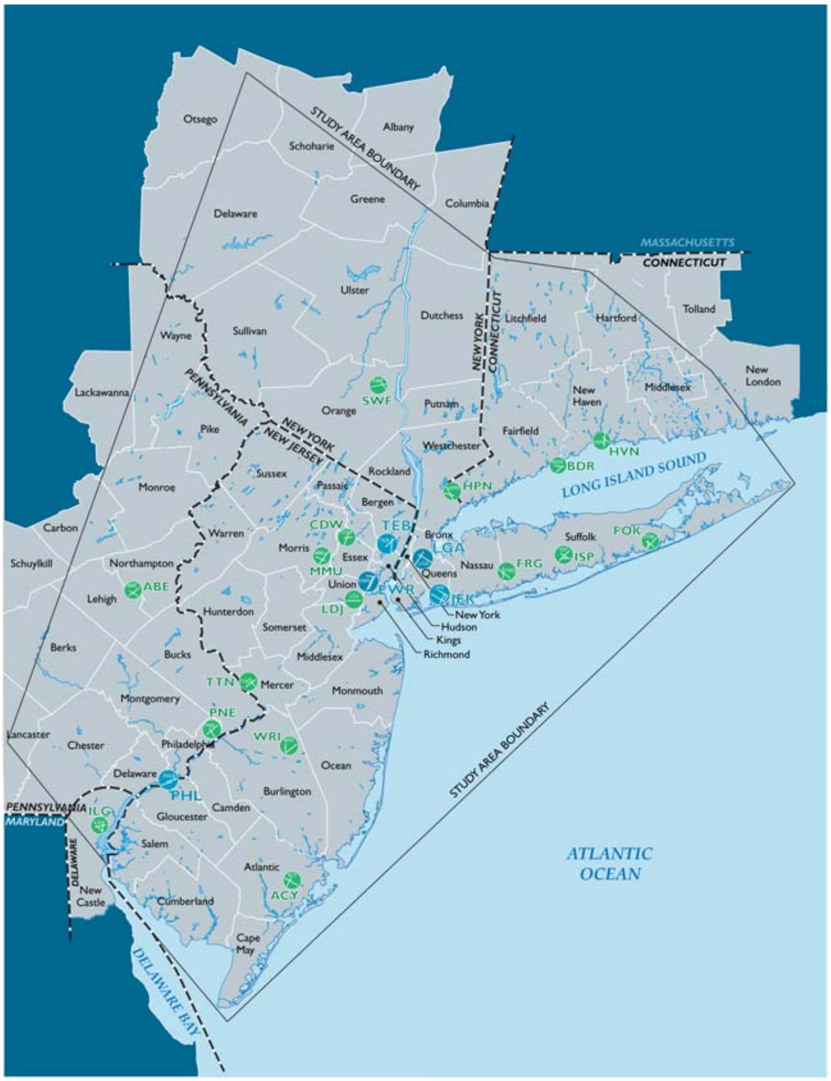
FINAL ENVIRONMENTAL IMPACT STATEMENT

NEW YORK/NEW JERSEY/PHILADELPHIA METROPOLITAN AREA AIRSPACE REDESIGN



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July 2007

Prepared by:

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This Environmental Impact Statement is submitted for review pursuant to the requirements of Section 102(2)(C) of the National Environmental Policy Act (NEPA) of 1969 (PL 91-190, 42 U.S.C. 4321 et seq.); the Federal Aviation Act of 1958 (Recodified as 49 U.S.C. Section 40101 et seq.); the Airport and Airway Improvement Act of 1982, as amended by the Airport and Airway Safety and Capacity Expansion Act of 1987 (Recodified as 49 U.S.C. Section 47101, PL 97-238): and other laws as applicable. Additionally, the format and subject matter included in this report conform to the requirements and standards of the FAA as set forth in FAA Order 1050.1E, "Policies and Procedures for Considering Environmental Impacts." Guidance provided in FAA Order 5050.4B, the "Airport Environmental Handbook," has also been relied on where relevant. This Environmental Impact Statement assesses Federal actions associated with airspace redesign which is needed to accommodate growth while maintaining safety and mitigating delays, and to accommodate changes in the types of aircraft using the system. Major airports affected by this airspace redesign include John F. Kennedy International Airport, Newark International Airport, Teterboro Airport, Philadelphia International Airport, and LaGuardia Airport. The proposed action is not dependent on development at any of the airports in the study area.

The airspace redesign study encompasses the NY/NJ/PHL Metropolitan Area, including the entire State of New Jersey and portions of Delaware, New York, Pennsylvania, and Connecticut.

The purpose of this project is to increase the efficiency and reliability of the airspace structure and air traffic control system.

After careful and thorough consideration of the facts contained herein and following consideration of the views of those Federal agencies having jurisdiction by law or special expertise with respect to` the environmental impacts described, the undersigned finds that the proposed Federal action is consistent with existing national environmental policies and objectives as set forth in section 101(a) of the National Environmental Policy Act of 1969.

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EXECUTIVE SUMMARY

The Federal Aviation Act of 1958 delegates various responsibilities to the Federal Aviation Administration (FAA) including controlling the use of the navigable airspace and regulating civil and military operations in that airspace in the interest of maintaining the safety and efficiency of both of these operations. In its effort to continually maintain safety and increase efficiency of the airspace, the FAA is proposing to redesign the airspace in the NY/NJ/PHL Metropolitan Area.

This redesign was conceived as a system for more efficiently directing Instrument Flight Rule (IFR) aircraft to and from major airports in the NY/NJ/PHL Metropolitan Area, including John F. Kennedy International Airport (JFK) and LaGuardia Airport (LGA) in New York, Newark Liberty International Airport (EWR) and Teterboro Airport (TEB) in New Jersey, and Philadelphia International Airport (PHL) in Pennsylvania.

The purpose of this Environmental Impact Statement (EIS) is to evaluate the environmental effects of the NY/NJ/PHL Metropolitan Area Airspace Redesign (Airspace Redesign) in accordance with the National Environmental Policy Act of 1969 (NEPA).[1] This EIS was officially initiated when the FAA issued a Notice of Intent (NOI) to prepare an EIS on January 22, 2001. The format and subject matter in this environmental study conform to the requirements and standards of the Council on Environmental Quality (CEQ) regulations[2] and the FAA as set forth in FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*.

[1] P.L. 91-190, 32 USC Section 3321 et. seq.

[2] 40 CFR Part 1500

ES.1 PURPOSE AND NEED

The basic air traffic environment for the NY/NJ/PHL Metropolitan Area airspace was designed and implemented in the 1960s. Since that time, the volume of air traffic and the type of aircraft that use the air traffic control (ATC) system have changed significantly. However, the basic structure of the NY/NJ/PHL airspace has essentially remained the same and has not been adequately modified to address changes in the aviation industry, including increasing traffic levels and the use of new aircraft types. Therefore, the Airspace Redesign is needed to accommodate growth while maintaining safety and mitigating delays, and to accommodate changes in the types of aircraft using the system (e.g., smaller aircraft, more jet aircraft). The purpose of the Airspace Redesign is to increase the efficiency and reliability of the airspace structure and ATC system.

ES.2 PROPOSED ACTION

The Proposed Action for this EIS is to redesign the airspace in the NY/NJ/PHL Metropolitan Area. This involves developing new routes and procedures to take advantage of improved aircraft performance and emerging ATC technologies.

The Proposed Action does not include any physical changes or development of facilities, nor does it require local or state actions. Therefore, no physical alteration to any environmental resource would occur and no permits/licenses would be required. Additionally, the Airspace Redesign would not require changes to any Airport Layout Plan and infrastructure funding is not expected to be necessary.

Since the Airspace Redesign involves modifications to airspace configuration and air traffic management procedures, the project requires direct FAA action in order to be implemented. This consists of the design, development, implementation, and use of new or modified ATC procedures and reconfigured airspace.

ES.3 ALTERNATIVES

The examination of alternatives is of critical importance to the environmental review process. Those alternatives that meet the Purpose and Need are included for detailed environmental analysis for the study years of 2006 and 2011.

The range of alternatives considered in EIS include those within the following categories: (1) alternative modes of transportation and communication, (2) changes in airport use, (3) congestion management programs, (4) improved air traffic control technology, and (5) airspace redesign. Of the five categories of potential alternatives considered, alternatives one through four are not carried forward for detailed analysis because they do not meet the Purpose and Need. Airspace Redesign is the only category that offers the potential to meet the Purpose and Need because the airspace redesign can result in an air traffic system with enhanced safety, reduced delays, and the ability to accommodate growth.

This EIS considers four airspace redesign alternatives including:

- **Future No Action Alternative**, which assumes no changes to the existing airspace;
- **Modifications to Existing Airspace Alternative**, which includes modifications to current routes and procedures to improve efficiency in the current airspace system;
- **Ocean Routing Airspace Alternative**, proposed by the NJ Citizens for Environmental Research (NJCER), which moves all flights departing from Newark International Airport over the Atlantic Ocean before turning in the direction of their final destinations; and
- **Integrated Airspace Alternative,** integrates the New York Terminal Radar Approach Control's (New York TRACON's) airspace with portions of surrounding Air Route Traffic Control Centers' airspace to operate more seamlessly.

These alternatives are described in the sub-sections that follow. Descriptions of each alternative are followed by a summary of the Purpose and Need evaluation. The alternatives are evaluated based on Purpose and Need, operational viability, and operational efficiency criteria. Operational viability refers to whether a particular airspace redesign is workable and thus, safe. Operational viability criteria include reduced airspace complexity and reduced voice communications. Operational efficiency refers to how well a particular design works. Operational efficiency criteria include: reduced delay; balanced controller workload; meeting system demands; improved user access to the system; expedited arrivals and departures; increased flexibility in routing; and maintaining airport throughput.

ES.3.1 Future No Action Airspace Alternative

Although it does not meet the Purpose and Need of the Proposed Airspace Redesign Project, the Future No Action Airspace Alternative is analyzed as required by NEPA and CEQ regulations. Note that under the Future No Action Airspace Alternative, the airspace will operate as it did during existing or baseline conditions (2000), with the exception of two procedural changes (i.e., the Dual Modena and the Robinsville-Yarley Flip-Flop) that have been implemented and have independent utility with regards to the Airspace Redesign. As these changes have been implemented, they are included as part of the Future No Action Airspace Alternative. The only major difference between this alternative and present day operations will be in the type and quantity of aircraft operations otherwise known as the flight schedule.

ES.3.2 Modifications to Existing Airspace Alternative

This alternative takes the current routes and procedures and modifies them to improve efficiency in the current airspace system. The differences between this alternative and the Future No Action Airspace Alternative include additional departure headings as well as shifting of the NY Metropolitan Area airports' South departure gate and the PHL East departure gate.

New departure headings for LGA, EWR, and PHL would be implemented as part of this alternative. For example, a more direct LGA Ocean departure procedure would be added.

In this alternative, the South departure gate is shifted 10 miles to the west. Departures to the south originating from JFK, LGA, TEB, and EWR, would be shifted to the new South departure gate. In addition, the PHL East departure gate would be shifted to the east; PHL departures to the east would have to continue farther east before tuning to the northeast.

Arrivals in the Modifications to Existing Airspace Alternative would not be changed from today's configuration.

The Modifications to Existing Airspace Alternative enhances safety by reducing complexity. This alternative improves efficiency by increasing flexibility, maintaining airport throughput, and expediting departures. Therefore, this is a reasonable alternative for meeting the Purpose and Need of the Airspace Redesign and is carried forward for a detailed environmental analysis.

ES.3.3 Ocean Routing Alternative

The Ocean Routing Airspace Alternative is a proposal that was originally developed by the NJ Citizens for Environmental Research, Inc. (NJCER) at the request of the NJ Coalition Against Aircraft Noise (NJCAAN).[3]

The Ocean Routing Airspace Alternative proposes to move EWR departures out over the Atlantic Ocean prior to turning them west to their final destinations. This alternative proposes significant changes to EWR and JFK departures. It also creates a new JFK arrival post which is located approximately 10 miles east of Mantoloking Shores, NJ. In addition, LGA departures flying to the North gate remain east of the Hudson River for a longer distance prior to

[3] "Development of Air Traffic Routings for the Mitigation of Aircraft Noise in New Jersey," submitted to New Jersey Citizens for Environmental Research, Inc.; June 1993; Section 1.0 – Executive Summary, p. 1.

turning toward the North gate than in the Future No Action Airspace Alternative.

The purpose of the Ocean Routing Airspace Alternative is to reduce noise impacts on the citizens of New Jersey. The purpose of the Proposed Action is to increase the efficiency and reliability of the entire NY/NJ/PHL Metropolitan Airspace. Therefore, because the Ocean Routing Airspace Alternative is focused on reducing noise in one specific area and not on increasing the efficiency and reliability of the entire NY/NJ/PHL Metropolitan Airspace, it was apparent that from its inception this alternative did not meet the Airspace Redesign Purpose and Need. The evaluation of the Purpose and Need Criteria supported this finding. The Ocean Routing Airspace Alternative would not: reduce delay, balance controller workload, meet system demand, improve user access, expedite arrivals and departures, increase flexibility, nor maintain airport throughput.

Although it was apparent that the Ocean Routing Airspace Alternative would not meet the Purpose and Need, the FAA elected to include this alternative for a detailed environmental analysis due to the long standing concerns of the NJCAAN.

ES.3.4 Integrated Airspace Alternative

The Integrated Airspace Alternative integrates the NY TRACON airspace with portions of surrounding Center's airspace to operate more seamlessly in either a standalone (existing facilities) or consolidated manner. The Integrated Airspace Alternative could be accomplished either with standalone or consolidated facilities because the key component is a common automation platform.[4] The consolidated facility is called the Integrated Control Complex (ICC).

The Integrated Airspace concept would expand the airspace in which terminal separation rules could be used. Where en route airspace separation rules of five nautical miles are typically used today, this concept would allow for the use of three nautical mile terminal airspace separation rules. This would permit less restrictive separations to be used over a larger geographical area and at higher altitudes.

The initial phase of the Integrated Airspace Alternative involves modifications to a departure gate, as well as to close-in departure procedures. This phase is called the Integrated Airspace Alternative Variation without ICC. The final phase will have two variations. The first variation maintains the same changes that were implemented in phase one, supporting future traffic growth. This, again, is called the Integrated Airspace Alternative Variation without ICC because the airspace structure does not change from phase one. The second variation of phase two involves full airspace consolidation as previously described, as well as modifications to multiple departure gates, additional arrival posts, and additional close-in departure procedures. The second variation is known as the Integrated Airspace Alternative Variation with ICC. Each variation of the Integrated Airspace Alternative is presented below and each is evaluated separately for the potential to meet the Purpose and Need of the Proposed Airspace Redesign Project.

[4] A common automation platform includes shared displays on screens, radar, data processing and presentation, and communications.

ES.3.4.1 The Integrated Airspace Alternative Variation without ICC

The major changes associated with this variation versus the Future No Action Airspace Alternative involve departures to the West gate from EWR, TEB, and LGA flights, and departure headings at EWR, LGA, and PHL. The West gate has been extended. The departure headings changes are the same as those in the Modifications to Existing Airspace Alternative, but how the aircraft transition to the expanded West departure gate will vary due to the movement of the gate. In addition, a new turboprop arrival route to TEB would be established as part of this alternative. No major changes would be made to JFK arrival or departure routings as a result of this design.

The Integrated Airspace Alternative Variation without ICC enhances safety by reducing complexity and voice communications. It improves efficiency by reducing delay, balancing controller workload, meeting system demands, improving user access to the system, expediting departures, increasing flexibility in the West gate area, and maintaining airport throughput primarily at EWR.

Therefore, this is a reasonable alternative for meeting the Purpose and Need of the Proposed Airspace Redesign Project and is carried forward for environmental analysis.

ES.3.4.2 The Integrated Airspace Alternative Variation with ICC

The second variation of the Integrated Airspace Alternative involves full airspace consolidation, as well as modifications to multiple departure gates, additional arrival posts, and additional departure headings. The second variation is called the Integrated Airspace Alternative Variation with ICC.

This variation represents a full airspace consolidation and is a new approach to the redesign of airspace from NY to Philadelphia. Where current en route airspace separation rules of five nautical miles are typically used, this airspace redesign alternative would use three nautical mile terminal airspace separation rules over a larger geographical area and up to 23,000 feet MSL in some areas (as opposed to 19,000 feet MSL with current airspace structure).[5] The airspace would be comprised of the majority of current NY TRACON and NY Center airspace, in addition to several sectors from Washington Center and Boston Center.

This variation would lead to reduced complexity, reduced voice communications, reduced delays, more balanced controller workload, increased ability to meet system demand, improved user access to the system, expedited arrivals and departures, greater flexibility in routing, and the ability to maintain greater airport throughput. Therefore, this is a reasonable alternative for meeting the Purpose and Need of the Proposed Airspace Redesign Project and is carried forward for a detailed environmental analysis.

ES.3.5 Comparison of the Airspace Redesign Alternatives

The Future No Action Airspace Alternative was carried forward as required by CEQ Regulations to provide a benchmark, enabling decision makers to compare the

[5] Many air traffic control altitudes are given in flight levels representing altitude above mean sea level (MSL) in increments of 100 feet (i.e., flight level 230 equates to 23,000 feet above MSL).

magnitude of environmental effects of the other alternatives. Two airspace redesign alternatives meet the Purpose and Need for the Airspace Redesign: Modifications to Existing Airspace Alternative and Integrated Airspace Alternative Variations with and without ICC. These alternatives were carried forward for detailed environmental analysis. Although the Ocean Routing Airspace Alternative did not meet the Purpose and Need, it was carried forward for environmental analysis to address long standing public concerns.

Each Airspace Redesign Alternative is qualitatively and quantitatively evaluated and compared based on the Purpose and Need Evaluation Criteria. The results of this analysis will be used by the decision makers as a means of comparing the alternatives to assist in selecting a preferred alternative.

The qualitative analysis is based on the expected results of a particular change relative to the existing airspace structure. For example, when a departure gate is added it is expected that the ability of that alternative to meet system demands will improve. The existing airspace structure is equivalent to that of the Future No Action Airspace Alternative; therefore, all qualitative discussions relate changes to an alternatives' airspace design to the Future No Action Airspace.

The quantitative analysis is based on operational metrics obtained through the use of computer modeling of the Alternatives. Flight paths for each alternative are modeled using the Total Airspace and Airport Modeler (TAAM) fast-time simulation tool, which is used to calculate metrics. These metrics provide a basis for comparison of the Alternatives.

A summary of the quantitative evaluation of the Airspace Redesign Alternatives in terms of the Purpose and Need Criteria is presented in **Table ES.1**. The following paragraphs summarize the qualitative discussions of each of the Proposed Action Alternatives.

Table ES.1

Operational Comparison of Alternatives

(The most advantageous operational metric has been shaded and boldfaced)

Purpose & Need Evaluation Criteria	**How Measured**	**Alternative**				
		Future No Action	**Modifications to Existing Airspace**	**Ocean Routing Airspace**	**Integrated Airspace**	
					without ICC	**with ICC**
Reduce Complexity	Jet route Delays + time below 18,000 feet (minutes)	12	12	12	11	**10**
	Arrival Distance below 18,000 feet (nautical miles)	96	**95**	99	96	102
Reduce Voice Communications	Maximum Inter-facility handoffs per hour	525	525	521	529	**382**

Table ES.1 (continued)
Operational Comparison of Alternatives
(The most advantageous operational metric has been shaded and boldfaced)

Purpose & Need Evaluation Criteria	**How Measured**	**Alternative**				
		Future No Action	**Modifications to Existing Airspace**	**Ocean Routing Airspace**	**Integrated Airspace**	
					without ICC	**with ICC**
Reduce Delay	Traffic weighted arrival delay 2011 (minutes)	22.9	22.6	23.6	22.8	**19.9**
	Traffic weighted departure delay 2011 (minutes)	23.3	20.9	29.5	20.8	**19.2**
Balance Controller Workload	Equity of West gate fix traffic counts	0.37	0.37	0.37	0.34	**0.30**
Meet System Demands & Improve User Access to System	End of day's last arrival push (time)	23:54	23:54	23:54	23:54	**23:00**
Expedite Arrivals and Departures Expedite Arrivals and Departures	Time below 18,000 ft (minutes)	18.5	**18.2**	18.8	18.2	18.6
	Change in route length per flight (nautical miles) (1)	0.0	0.0	4.5	**-1.2**	3.7
	Change in block time (minutes per flight) (1)	0.0	-0.9	3.9	-1.0	**-1.4**
Flexibility in Routing	Delay saved per flight per day (minutes)	0	0	0	0	**12.6**
Maintain Airport Throughput	Arrival Maximum Sustainable Throughputs	223	223	223	223	**238**
	Departure Maximum Sustainable Throughputs	238	239	221	240	**245**

Notes:
(1) A negative value indicates a net decrease in the category.

Source: Operational Analysis of NY/NJ/PHL Metropolitan Area Airspace Redesign Alternatives (MITRE Technical Report - MTR 05W0000025, March 2005, Table ES-1. Summary of Operational Impacts, p. ix.).

The Modifications to Existing Airspace Alternative increases departure efficiency to the west by fanning headings and by splitting the major westbound airway (J80) into two independent airways. This alternative has small benefits.

The Ocean Routing Airspace Alternative will increase route distance and flying time for EWR, LGA, and JFK. Departure efficiency at EWR is greatly reduced. JFK arrivals and departures share one part of the airspace, thereby increasing complexity. The reroute of departures from EWR and JFK increases airspace complexity above PHL which is already a bottleneck in the en route system. These drawbacks are not offset by operational benefits.

Like the Modifications to Existing Airspace Alternative, the Integrated Airspace Alternative Variation without ICC increases departure efficiency to the west by fanned headings and by splitting the major westbound airway (J80) into two independent airways. In addition, this variation reduces congestion on the South departure gate. This variation shows a slight increase in required interfacility voice communications.

The Integrated Airspace Alternative Variation with ICC provides the most substantial operational benefit of any of the designs. It is a wholesale restructuring of arrival and departure routes. Efficiency is increased by more use of available runways and departure headings. Airspace delays are reduced and route flexibility is enhanced. Flying distances are increased for many flights, but the delay reductions are large enough to make this a net benefit to traffic.

ES.4 Study Area

The Study Area is defined as the geographic area potentially environmentally impacted by the proposed action. The Proposed Airspace Redesign Project Study Area encompasses the entire state of New Jersey and portions of four other states: Connecticut, Delaware, New York, and Pennsylvania (See **Figure ES.1**). The Study Area is comprised of approximately 31,180 square miles and encompasses all or portions of 64 counties, 490 independent cities, as well as other municipal areas.

Criterion from FAA Order 1050.1E was used to determine the Study Area for the Proposed Airspace Redesign. According to FAA Order 1050.1E, the altitude ceiling for environmental considerations regarding airspace studies is 10,000 feet above ground level AGL. The highest point in the Study Area is 4,000 feet MSL at Hunter Mountain, New York, making the overall altitude ceiling of the Study Area 14,000 feet MSL (resulting in 10,000 feet AGL). Thus, using input from the Airspace Redesign Team, the Study Area was created to encompass the geographic areas where proposed changes to aircraft routes occurred below 14,000 MSL. This Study Area is then the basis for the analysis of the alternatives and their potential impacts associated with alternative routings for aircraft flying IFR at altitudes up to 14,000 feet MSL.

ES.5 Study Area Airports

Because there are many public and private airports in the Study Area, the air traffic flows to and from these airports are highly interrelated. The NY/NJ/PHL Metropolitan Area Airspace Redesign focuses on five major airports and 16 satellite airports in the Study Area. The five major airports are as follows:

- John F. Kennedy International (JFK),
- LaGuardia (LGA),

Airports within the Study Area

Figure ES.1

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- Newark Liberty International (EWR),
- Teterboro (TEB), and
- Philadelphia International (PHL).

The 16 satellite airports are as follows:

- Allentown/Lehigh Valley International (ABE),
- Atlantic City International (ACY),
- Bridgeport/Igor I. Sikorsky Memorial (BDR),
- Caldwell/Essex County (CDW),
- Westhampton Beach/ The Francis S. Gabreski (FOK),
- Islip Long Island MacArthur (ISP),
- Linden (LDJ),
- Morristown Municipal (MMU),
- Newburgh/Stewart International (SWF),
- New Haven/Tweed-New Haven (HVN),
- Northeast Philadelphia (PNE),
- Republic (FRG),
- Trenton/Mercer County (TTN),
- White Plains/Westchester County (HPN),
- Wilmington/New Castle County (ILG), and
- McGuire Air Force Base (WRI).

The five major airports and 16 satellite airports in the Study Area are depicted in Figure ES.1.

While there are many satellite airports physically located within the Study Area, they were not included in the operational modeling or noise analysis. The decision to include or exclude airports was based on the fact that the Airspace Redesign applies to IFR operations. Airports without a significant amount of IFR traffic were not modeled because there will be little or no change to their operations as a result of the Proposed Action. Additionally, aircraft (including helicopters) operating under visual flight rules (VFR) are not part of the airspace redesign because they are unaffected by the proposed alternatives. Further, VFR aircraft operating outside controlled airspace are not required to be in contact with air traffic control (ATC). Since these aircraft operate at the discretion of the pilot on the "see and be seen" principal and are not required to file flight plans, FAA has very limited information for these operations. The resulting list of airports to be modeled was reviewed and found to be consistent with the airports that may be impacted based on the Proposed Action.

ES.6 ENVIRONMENTAL CONSEQUENCES

The Proposed Airspace Redesign Project does not include construction of any infrastructure, and as such is not expected to cause adverse environmental impacts to most resource categories relating to the physical environment. Thus, the following resource categories would not be affected by the Proposed Airspace Redesign Project:

- Coastal Resources,
- Construction Impacts,

- Farmlands,
- Floodplains,
- Hazardous Materials, Pollution Prevention, and Solid Waste,
- Water Quality,
- Wetlands, and
- Wild and Scenic Rivers.

The following resource categories were also evaluated for potential impacts, but further analysis was not deemed necessary for the reasons stated:

- Air Quality - Since the issuance of the DEIS, the FAA was advised by the EPA that it should not use the Preamble to the final rule for Determining Conformity of General Federal Actions to State and Federal Implementation Plans to determine de minimis actions for "air traffic control activities and adopting approach, departure, and en route procedures for air operations." In the past, the EPA has agreed that airspace redesign produced de minimis emission changes. Recently, the FAA has determined that it can not rely on the preamble and on February 12, 2007 issued a Draft Federal Notice Federal Presumed to Conform Actions Under General Conformity [Federal Register[6]: February 12, 2007 (Volume 72, Number 28)] which formally defines these types of actions above 1,500 feet above ground level (AGL) as de minimis. FAA received comments on the notice for 45 days and is in the process of developing the Final Notice. It is expected that air traffic operations will be included in the Final Notice. To reinforce the FAA presumption that the Proposed Action would be de minimis a fuel burn analysis was completed for the FAA's Preferred Alternative with and without mitigation, both versions of the Preferred Alternative reduced fuel burn when compared to the Future No Action Alternative. Additionally, the Airspace Redesign will not increase traffic over the Future No Action. Lastly the project will not cause a new violation, worsen an existing violation, or delay meeting the National Ambient Air Quality Standards.

- Light Emissions and Visual Impacts – Radar data indicates that areas where lower altitude airspace changes would take place are likely already exposed to aircraft lights and aircraft flights; therefore, no light emissions or visual impacts would be expected in these areas. In addition, because of the unique cultural qualities of Tribal Lands, additional analysis of potential visual impacts on Native American Tribes located in the Study Area was completed. It was determined that Tribal Lands were either subject to minor changes in aircraft routes or were already exposed to regular overflights. Therefore, the implementation of any of the Airspace Redesign alternatives would not result in significant visual impacts to Tribal lands within the Study Area.

- Natural Resources and Energy Supply – The proposed changes in air traffic procedures are intended to improve air

[6] The US National Archives' website describes the Federal Register as follows; "Published every Federal working day, the Federal Register is the official gazette of the United States Government. It provides legal notice of administrative rules and notices and Presidential documents in a comprehensive uniform manner." See http://www.archives.gov/federal-register/the-federal-register/.

traffic flow and enhance the safe operation of aircraft within the airspace structure. With the exception of the Ocean Routing Airspace Alternative, the Proposed Action Airspace Redesign alternatives propose changes in air traffic procedures that would result in more direct routing and less delay. When compared to the Future No Action Airspace Alternative, these alternatives would result in reduced fuel consumption; therefore, significant impacts to natural resources and energy supply are not expected.

Resource categories that would potentially be impacted by the Proposed Airspace Redesign Project are discussed in the following subsections.

ES.6.1 Noise/Compatible Land Use

Noise increases resulting from implementation of the Proposed Action may affect the quality of the human environment and are analyzed in this EIS. Noise impacts are analyzed by modeling the community exposure to aircraft noise attributable to each of the Proposed Action Airspace Redesign alternatives. The analysis focuses on the change in aircraft noise associated with each Proposed Action Airspace Redesign alternative as compared to the Future No Action Airspace Alternative conditions. The change in aircraft noise is compared to the noise impact criteria to determine the level of potential noise impacts. The results of the noise analysis are also used to determine whether the existing and planned land use is compatible with the change in noise exposure.

The analysis includes determination of aircraft noise exposure in the Study Area as forecast for the years 2006 and 2011. The analysis focuses on the noise conditions for specific locations at the population centroids (i.e., centers of census blocks) using the Day/Night Average Sound Level (DNL). The number of people exposed to various noise levels is estimated based on the number of people residing in the census block corresponding to the centroid being evaluated. The noise exposure results are presented in terms of noise level and change criteria set forth by the FAA in Order 1050.1E.

The FAA has established 65 DNL as the threshold above which aircraft noise is considered to be incompatible with residential areas. In addition, the FAA has determined that a significant impact occurs if a proposed action would result in an increase of 1.5 DNL or more on any noise-sensitive area within the 65 DNL exposure level.[7]

Three categories of impacts are examined in this analysis, based on FAA Order 1050.1E:

- Significant Impacts: 1.5 DNL minimum increase resulting in 65+ DNL noise exposure, or 1.5 DNL minimum increase where noise exposure already exceeds 65 DNL
- Slight to Moderate: 3 DNL minimum increase resulting in noise exposure between 60 and 65 DNL, or 3.0 DNL minimum increase where noise exposure is already between 60 and 65 DNL
- Slight to Moderate: 5 DNL minimum increase resulting in noise exposure between 45 and 60 DNL, or 5 DNL minimum increase where noise exposure is already between 45 and 60 DNL

[7] FAA Order 1050.1E; 14 CFR Part 150 Section 150.21(a)(2)(d); FICON 1992, Pp. 3-5.

Tables ES.2 and ES.3 present a summary of the affected population projected in 2006 and 2011 for each alternative in terms of the FAA threshold criteria. The table is color coded based on the centroid mapping scheme presented in **Figures ES.2 through ES.5**. The analysis indicates that each of the alternatives would result in some changes where noise exposure is increased to within one of the FAA criterion thresholds.

In terms of significant noise impact changes (+1.5 DNL in 65 DNL) the noise analysis indicates that with the exception of the Ocean Routing Airspace Alternative, each airspace alternative is expected to generate significant noise impacts in the future. This is largely due to the fact that the Modifications to Existing Airspace and the Integrated Airspace Alternatives include departure heading changes at the major airports while the Ocean Routing Airspace Alternative uses the current headings. The Modifications to Existing Airspace Alternative tends to create the fewest significant impacts and has the best aggregate significant impact totals. The Integrated Airspace Alternative Variations both generated similar levels of significant impacts in the future.

Therefore, it may be concluded that the implementation of the Modifications to Existing Airspace or the Integrated Airspace Alternatives would result in significant noise impacts. These significant noise impacts to noise sensitive areas would also be considered a significant impact in terms of land-use compatibility. Mitigation measures to avoid, minimize, rectify, reduce, eliminate, or compensate were considered for the Preferred Alternative. See Section ES.7 and Chapter Five, *Preferred Alternative and Mitigation*, of the FEIS.

ES.6.2 Socioeconomic Impacts and Environmental Justice

According to FAA Order 1050.1E, the proposed changes in air traffic procedures should be evaluated for their potential to result in the relocation of residences and businesses; alter surface transportation patterns; divide established communities; disrupt orderly; planned development; or to create an appreciable change in employment.

The proposed alternatives would not result in the construction of facilities. Therefore, the alternatives considered would not result in a direct impact causing the relocation of residences or businesses; alteration of surface transportation patterns; division of established communities; disruption of orderly; planned development; or creation of an appreciable change in employment.

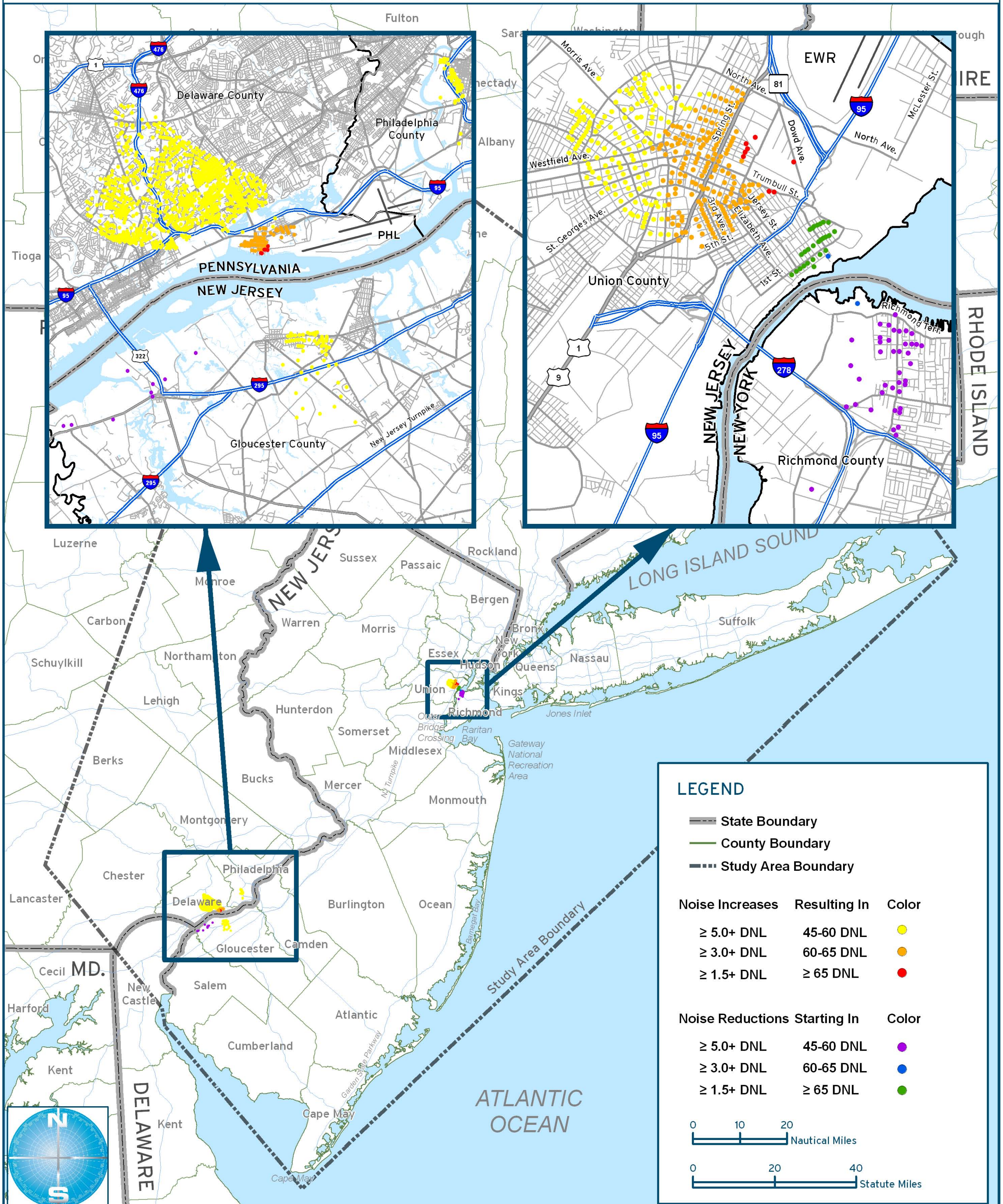
Although direct socioeconomic impacts would not be expected, there is the potential for indirect impacts because all of the Proposed Action Airspace Redesign alternatives except the Ocean Routing Airspace Alternative would potentially result in significant noise impacts. All of the significantly impacted census blocks are located in the vicinity of LGA, EWR, and PHL. With mitigation applied to the Preferred Alternative all significant noise impacts are eliminated by 2011. Therefore, socioeconomic impacts are not likely as a result of the mitigated Preferred Alternative.

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations*, and the accompanying Presidential Memorandum and Order DOT 5610.2, *Environmental Justice in Minority and Low-Income Populations*, require the FAA to identify and address disproportionately high

2011 Modifications To Existing Airspace Alternative Change In Noise Exposure

Figure ES.2

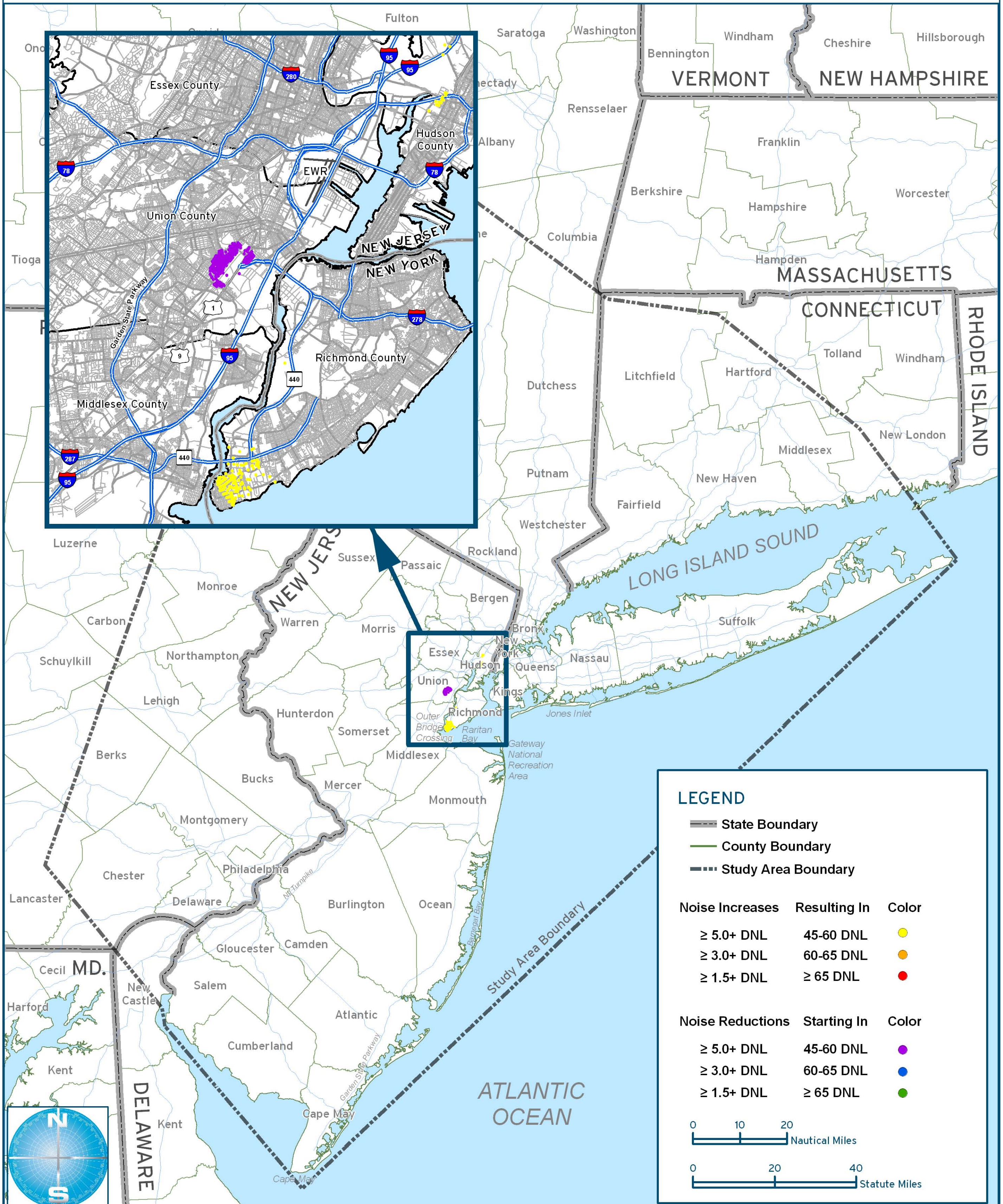
ENVIRONMENTAL IMPACT STATEMENT



2011 Ocean Routing Airspace Alternative Change In Noise Exposure

Figure ES.3

E N V I R O N M E N T A L   I M P A C T   S T A T E M E N T

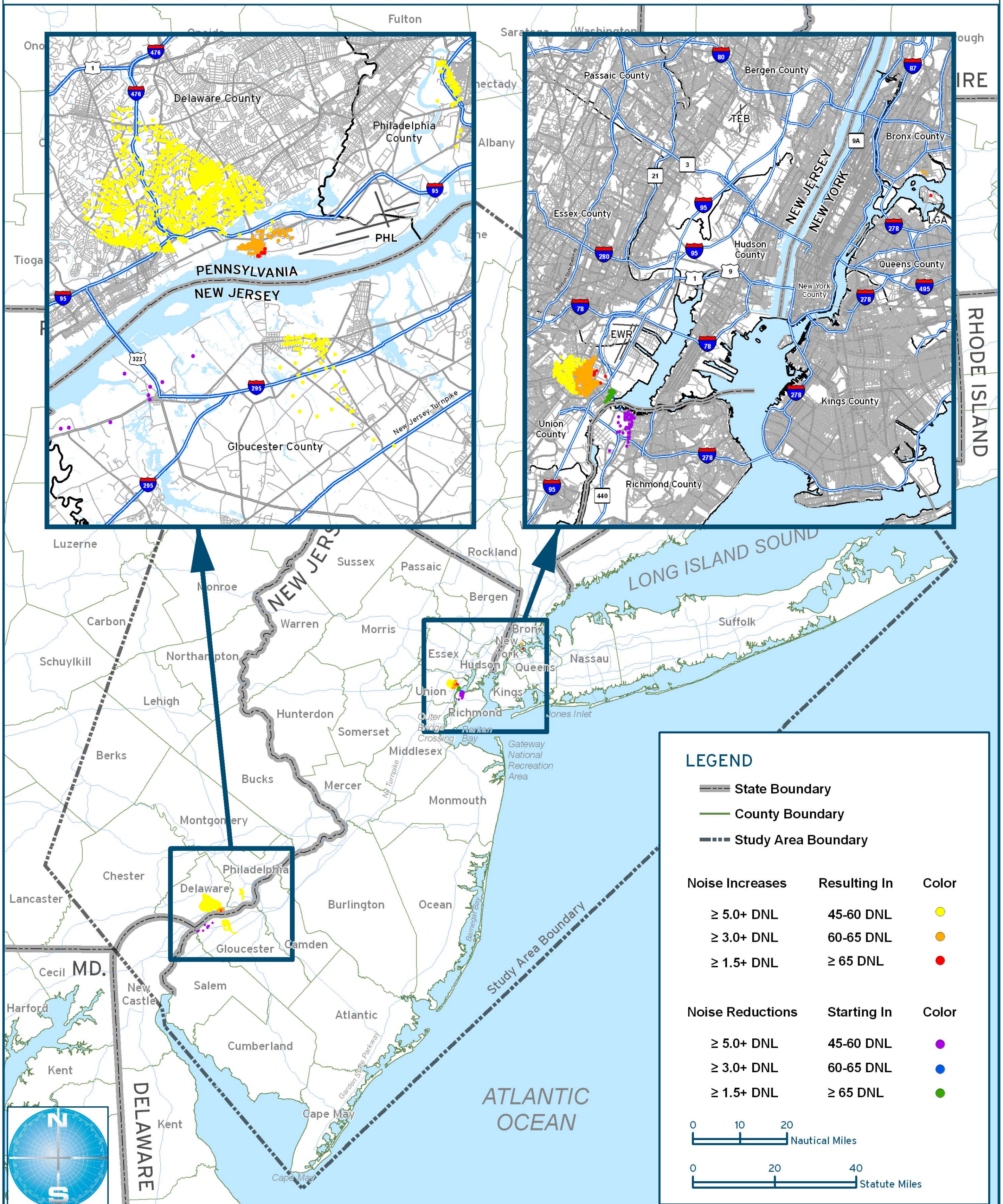


N E W   Y O R K   /   N E W   J E R S E Y   /   P H I L A D E L P H I A   M E T R O P O L I T A N   A I R S P A C E   R E D E S I G N   P R O J E C T

2011 Integrated Airspace Alternative Variation Without ICC Change In Noise Exposure

Figure ES.4

ENVIRONMENTAL IMPACT STATEMENT



2011 Integrated Airspace Alternative Variation With ICC Change In Noise Exposure

Figure ES.5

ENVIRONMENTAL IMPACT STATEMENT

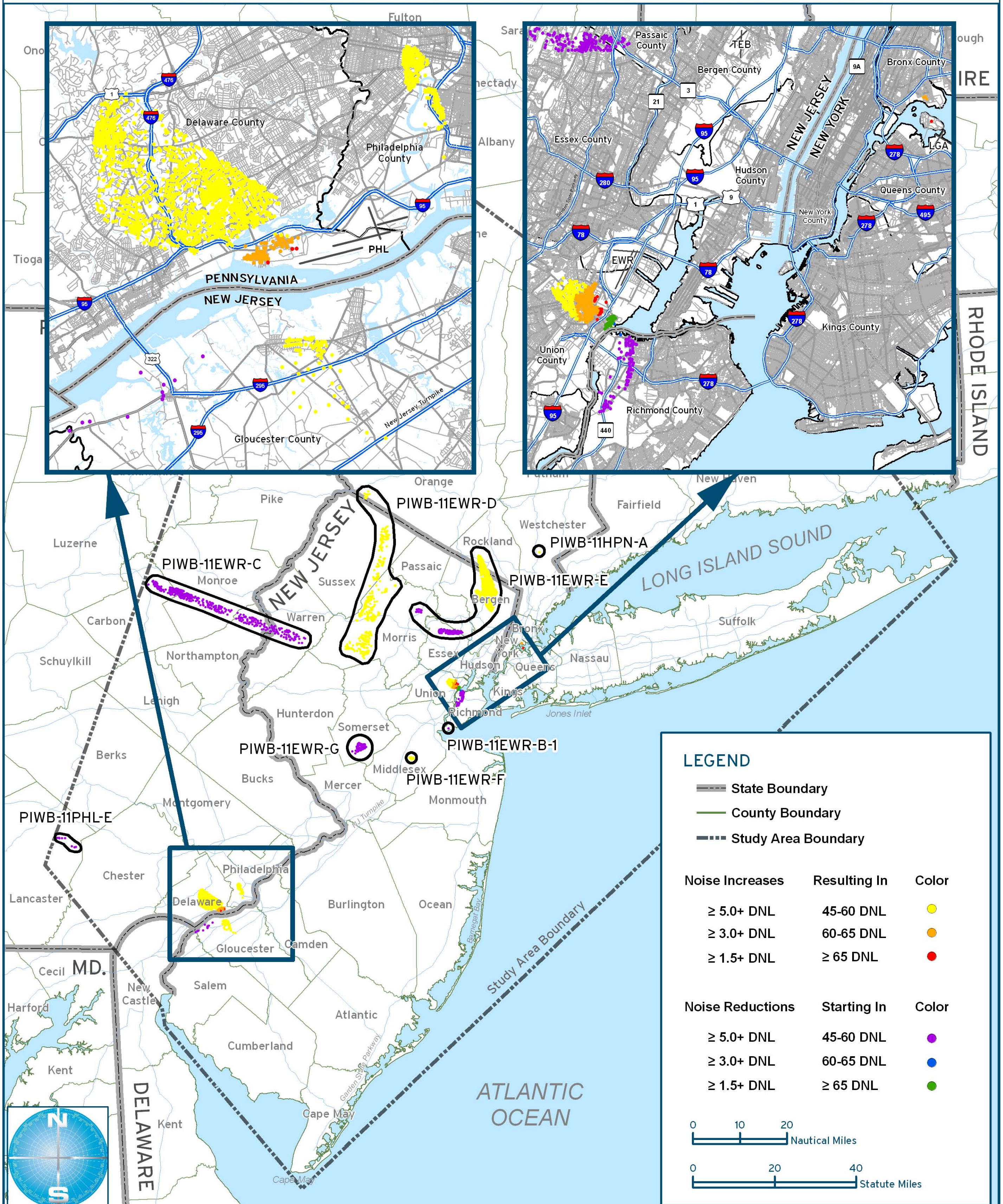


Table ES.2

Project Alternative Comparison – 2006 Population Impact Change Analysis Summary

	DNL Noise Exposure With Proposed Action		
	65 DNL or higher	60 to 65 DNL	45 to 60 DNL
Minimum Change in DNL With Alternative	1.5 DNL	3.0 DNL	5.0 DNL
Level of Impact	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
Modifications to Existing Airspace	8,755	37,627	146,056
Ocean Routing Airspace	0	0	26,498
Integrated Airspace Variation without ICC	21,399*	37,558	142,517
Noise Decreases			
Modifications to Existing Airspace	5,970	1	39,426
Ocean Routing Airspace	0	675	51,108
Integrated Airspace Variation without ICC	5,970	1	39,400

*Note that 12,834 persons of this total are transient population passing through the jail on Rikers Island.
Source: NIRS Analysis, Landrum & Brown/Metron Aviation Inc. 2007.

Table ES.3

Project Alternative Comparison – 2011 Population Impact Change Analysis Summary

	DNL Noise Exposure With Proposed Action		
	65 dB or higher	60 to 65 dB	45 to 60 dB
Minimum Change in DNL With Alternative	1.5 dB	3.0 dB	5.0 dB
Level of Impact	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
Modifications to Existing Airspace	1,010	34,279	110,720
Ocean Routing	0	0	18,748
Integrated without ICC	13,856*	34,140	111,413
Integrated with ICC	15,,826*	34,824	290,758
Noise Decreases			
Modifications to Existing Airspace	5,094	22	8,588
Ocean Routing	0	0	15,525
Integrated without ICC	5,094	22	9,895
Integrated with ICC	6,984	22	62,537

*Note that 12,846 persons of these totals are transient population passing through the jail on Rikers Island.
Source: NIRS Analysis, Landrum & Brown/Metron Aviation Inc. 2007.

and adverse human health or environmental impacts on low-income and minority populations in the communities potentially impacted by the Proposed Action. In order to comply with Order DOT 5610.2, the FAA must conduct meaningful public involvement with minority and low-income populations and analyze the potential for disproportionate adverse impacts to these communities.

Public involvement included informal pre-scoping meetings and formal scoping meetings. Pre-Scoping meetings were held from September 1999 to May 2000. Scoping meetings were held between January and June 2001. FAA presentations at these meetings included project information such as the Purpose and Need for the Proposed Action and the potential alternatives to accomplish the Proposed Action. During the pre-scoping and scoping meetings, the public was encouraged to comment on issues regarding the EIS.

All these meetings were designed with sensitivity to low-income and minority populations. To conduct meaningful public involvement, the FAA considered the special needs of the low-income and minority communities. Special needs were accommodated by holding meetings in locations accessible by public transit, providing translators, advertising meetings in specialized local foreign language media, and contacting community and church leaders.

After the publication of the DEIS, the FAA conducted DEIS public information meetings. These meetings allowed the public to ask questions of the FAA and submit comments regarding the content of the DEIS. As with the Pre-Scoping and Scoping meeting, the DEIS information meetings were designed with sensitivity to low-income and minority populations.

The FAA continued to conduct meaningful public involvement by again holding public information meetings after the publication of the *Noise Mitigation Report*. The FAA conducted seven public information meetings to discuss the Preferred Alternative and the proposed mitigation measures. Prior to the meetings the FAA undertook an extensive “grass roots” public announcement effort. In terms of environmental justice, it is important to note that the meeting held in Newark, NJ was near the community subject to significant environmental justice impacts as disclosed in the DEIS.

The environmental justice analysis in the DEIS examined the areas significantly impacted by noise for disproportionate adverse impacts to low income and minority communities. Areas near LGA and EWR were found to be significantly impacted by noise resulting from the Airspace Redesign alternatives.

Mitigation measures to avoid, minimize, rectify, reduce, eliminate, or compensate for these significant impacts were considered for the Preferred Alternative. With mitigation applied to the Preferred Alternative all significant noise impacts are eliminated by 2011. Therefore, environmental justice impacts are not likely as a result of the mitigated Preferred Alternative.

ES.6.3 Secondary or Induced Impacts

Major development proposals have the potential to produce induced or secondary impacts on surrounding communities. Induced impacts could include shifts in population and growth, increased (or decreased) demand for public services, and changes in business and economic activity within the confines of the Study Area.

Significant induced impacts would normally result from significant impacts to other impact categories especially noise, compatible land use and social impacts. Therefore, potential secondary impacts were considered based on analysis of noise, land use, and social impacts. There is potential for significant noise impacts with all of the proposed alternatives with the exception of the Ocean Routing Alternative, however, with mitigation applied to the Preferred Alternative all significant noise impacts are eliminated by 2011. Therefore, it is not expected that the Preferred Alternative would result in shifts in population and growth; increased demand for public services; or changes in business and economic activity.

ES.6.4 Historical, Architectural, Archaeological, and Cultural Resources

Historical, architectural, archaeological, and cultural resources that will be affected by federally funded and licensed undertakings come under the protection of the National Historic Preservation Act of 1966 (16 U.S.C. 470), as amended. This act, in Section 106, requires Federal agencies to consider the effects of such undertakings on properties listed, or eligible for listing, in the National Register of Historic Places (NRHP). Regulations related to this process are described in 36 CFR Part 800, Protection of Historic Properties.

Ten historic and potentially historic sites were identified in the APE: the Inwood Country Club near JFK; the Unification Chapel, the residences at 34 E. Fourth Street, and 406 Marshall Street, the John Marshall School, the Bronx Powder Company and the Jenkins Rubber Company buildings, and the Singer Factory District all located just south of EWR; and the Lazaretto, the Printzhof, and the Westinghouse Industrial Complex all located just to the east of PHL. The increase in noise associated with the Airspace Alternatives would not alter the historic characteristics which made these sites eligible for listing in the National Register therefore, is no adverse effect.

ES.6.5 Department of Transportation Act: Section 4(f)

Section 303(c), Title 49 USC, commonly referred to as Section 4(f) of the DOT Act,[8] states that the "…Secretary of Transportation will not approve a project that requires the use of any publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from a historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land…and [unless] the project includes all possible planning to minimize harm resulting from the use."[9]

In regard to 4(f) properties the term use encompasses both physical use of the property as well as constructive uses. Indirect adverse impacts, such as noise, that prevent the use of Section 4(f) properties for their intended purpose are considered as constituting a constructive use. In determining whether there is a constructive use, the FAA must determine if the impacts would substantially impair the property. A Section 4(f) property is determined to be substantially impaired when the activities, features, or attributes of the site that contribute to its significance or enjoyment are substantially diminished. According to

[8] Department of Transportation Act of 1966, § 4(f) [recodified at 49 USC 303 (c)].

[9] FAA Order 1050.1E, Appendix A, page A-19.

FAA Order 1050.1E, the Part 150 land use compatibility guidelines may be used to determine if there is a constructive use of a Section 4(f) property, if the guidelines are relevant to the value, significance, and enjoyment of that particular property.

The Airspace Redesign alternatives do not require land acquisition or facility construction. Therefore, the Airspace Redesign alternatives do not result in a physical use of any Section 4(f) property. However, because the Proposed Action Airspace Redesign alternatives would potentially result in significant changes in noise, constructive use of Section 4(f) properties is also addressed.

Two methods were initially used to evaluate noise impacts to the Section 4(f) properties. The first method was to input location data (latitudes and longitudes) for Section 4(f) properties within these census blocks into the noise model and calculate noise values at the specific Section 4(f) locations. The results of this analysis may be found in Appendix J, *Section 4(f) and 6(f) Properties.* The second method was to determine which Section 4(f) properties were located within the significantly impacted census blocks by using the ESRI Geographic Names Information System database.

Based on these analyses it was determined that the noise level would potentially increase significantly at ten 4(f) sites: the Inwood Country Club near JFK; the Unification Chapel, the residences at 34 E.Fourth Street, and 406 Marshall Street, the John Marshall School, the Bronx Powder Company and the Jenkins Rubber Company buildings, and the Singer Factory District all located just south of EWR; and the Lazaretto, the Printzhof, and the Westinghouse Industrial Complex all located just to the east of PHL.

When Part 150 land use compatibility guidelines are used to determine if there is a constructive use of a Section 4(f) property, the noise impacts associated with the Airspace Redesign Alternatives do not substantially impair any Section 4(f) sites. However, based on further consultation with the National Park Service and other interested parties, there are 4(f) properties within the Study Area where the noise is very low and where Part 150 guidelines may not adequately address the expectations and purposes of people visiting areas within these parks and wildlife refuges. These 4(f) properties include the national parks and national wildlife refuges in the Study Area, Catskill State Park, Minnewaska StatePark, and the Shawangunk Ridge State Forest. Additional analysis of these 4(f) properties is included in Chapter 5, *Preferred Alternative and Mitigation.* In consultation with the U.S. DOI, the FAA is conducting further evaluation of the potential noise increases in several areas to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

Many Section 4(f) lands are also subject to the Land and Water Conservation Fund (LWCF) Act Section 6(f). Section 6(f) states that no public outdoor recreation areas acquired or developed with any LWCF assistance can be converted to non-recreation uses without the approval of the Secretary of the Interior. No 6(f) properties were determined to be significantly impacted by noise associated with the Proposed Action Airspace Redesign alternatives.

ES.6.6 Fish, Wildlife, and Plants: Specifically, Migratory Birds

Potential impacts to fish, wildlife, and plants were evaluated in accordance with FAA Order 1050.1E. Since the Proposed Action includes changes in aircraft routes, the analysis of potential impact was focused on the potential for the Proposed Action to result in additional bird strikes. Based on bird strike statistics and FAA guidance, refined Bird Study Areas were developed. The potential impacts to avian species within these Bird Study Areas were considered. The Proposed Action Airspace Alternatives would include redesign of arrivals/departures within the bounds of the Bird Study Areas at the following airports: HPN, ISP, JFK, LGA, EWR, and PHL. To consider the potential impacts to avian species within the Bird Study Areas a qualitative analysis was conducted. For each of the subject airports, the Proposed Action Airspace Alternatives flight tracks were overlayed on the applicable Bird Study Areas. The resulting figures were developed for two purposes: to show the location of the changed tracks relative to the avian resources within the Bird Study Areas and to consider the changed flight tracks in relationship to the Future No Action Airspace tracks. Through this analysis it was determined that either the changed flight tracks were above 3,000 feet AGL and therefore above the altitude where most bird strikes occur or there were no discernable changes in the relationships of the flight tracks to resources within the bird study areas.

Based on this analysis it was concluded that impacts to various bird categories would be expected to continue, but not necessarily increase as a result of the Proposed Airspace Redesign. Therefore, no significant impacts to bird species would be expected to result from any of the Airspace Redesign Alternatives.

ES.6.7 Cumulative Impacts

Consideration of cumulative impacts applies to the impacts resulting from the implementation of the Proposed Action as well as other actions. The concept of cumulative impacts addresses the potential for individually minor, but collectively significant, impacts to occur over time. Council on Environmental Quality Regulations, Section 1508.7, defines "Cumulative Impact" as the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of the agency, Federal or non-Federal, undertaking such actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time.

Projects within the vicinity of the Study Airports were reviewed to evaluate the potential for cumulative impacts. Airport improvement projects and other construction projects were considered and potential for cumulative impact is not anticipated.

Other airspace redesign projects were also considered during the evaluation of potential cumulative impacts. EISs for the Chicago Terminal Airspace Project (CTAP) and the Potomac Consolidated TRACON Airspace Redesign have been completed and the FAA issued Records of Decisions for both projects. Neither of the Study Areas for these projects overlaps the NY/NJ/PHL Metropolitan Area Airspace Redesign Project's Study Area and the projects themselves do not induce growth or increase capacity; therefore, significant cumulative impacts are not anticipated. The FAA is in the process of completing an EA for the Midwest Airspace Enhancement Airspace

Redesign in the Cleveland/Detroit Metropolitan Areas. The environmental study area for this project does not overlap the Study Area for the NY/NJ/PHL Metropolitan Airspace Redesign and the project itself does not induce growth or increase capacity; therefore, significant cumulative impacts are not anticipated. Therefore, no cumulative impacts from the implementation of the NY/NJ/PHL Metropolitan Airspace Redesign and other airspace redesign projects are anticipated.

Summary of Environmental Impacts

As determined in the DEIS, the potential for significant impacts associated with each alternative is summarized in **Table ES.4.** Potential significant impacts were determined for Noise/Compatible Land Use and Socioeconomic Impacts/Environmental Justice. There was no potential for significant impacts associated with the Ocean Routing Airspace Alternative.

Table ES.4
Summary of Potential for Significant Environmental Impacts

Environmental Impact Category	**Alternative**							
	Modifications to Existing Airspace		**Ocean Routing Airspace**		**Integrated Airspace**			
					without ICC		**with ICC**	
	2006	**2011**	**2006**	**2011**	**2006**	**2011**	**2006**	**2011**
Noise / Compatible Land Use	**Yes**	**Yes**	No	No	**Yes**	**Yes**	N/A	**Yes**
Socioeconomic Impacts / Environmental Justice	**Yes**	**Yes**	No	No	**Yes**	**Yes**	N/A	**Yes**
Secondary or Induced Impacts	No	No	No	No	No	No	N/A	No
Department of Transportation Act: Sections 4(f) and 6(f)	No	No	No	No	No	No	N/A	No
Historical, Architectural, Archaeological and Cultural Resources	No	No	No	No	No	No	N/A	No
Wild and Scenic Rivers	No	No	No	No	No	No	N/A	No
Fish, Wildlife, and Plants	No	No	No	No	No	No	N/A	No
Light Emissions and Visual Impacts	No	No	No	No	No	No	N/A	No
Air Quality	No	No	No	No	No	No	N/A	No
Natural Resources and Energy Supply	No	No	No	No	No	No	N/A	No
Construction Impacts	No	No	No	No	No	No	N/A	No
Farmlands	No	No	No	No	No	No	N/A	No
Coastal Resources	No	No	No	No	No	No	N/A	No
Water Quality	No	No	No	No	No	No	N/A	No
Wetlands	No	No	No	No	No	No	N/A	No
Floodplains and Floodways	No	No	No	No	No	No	N/A	No
Hazardous Materials and Solid Waste	No	No	No	No	No	No	N/A	No

Source: Landrum & Brown, Metron and HNTB analysis, 2005.

ES.7 PREFERRED ALTERNATIVE AND MITIGATION

The following sections identify the FAA's Preferred Alternative, the mitigation applied to the alternative, and the results of mitigation for noise reduction.

ES.7.1 Preferred Alternative

On March 23, 2007, after extensive analysis and public hearings in five states — New York, New Jersey, Pennsylvania, Delaware and Connecticut — the Integrated Airspace Alternative Variation with ICC was identified as the Preferred Alternative for the NY/NJ/PHL Metropolitan Area Airspace Redesign Project. Among the alternatives studied, the Integrated Airspace Alternative Variation with ICC best meets the purpose and need of the project, which is to improve the efficiency and reliability of the airspace structure and air traffic control system from southern Connecticut to eastern Delaware.

ES.7.2 Mitigation

Each of the Airspace Alternatives described in ES.3, *Alternatives*, was analyzed to determine its operational effects. The Integrated Airspace Alternative Variation with ICC would result in the following benefits:

- A reduction in the complexity of the current air traffic system operation in New York and Philadelphia;
- A reduction in delays, and the expeditious arrival and departure of aircraft;
- Improved flexibility in routing aircraft;
- A more balanced controller workload; and
- An increase in the FAA's ability to meet system demands.

Throughout the course of the public meetings and the comment period, the FAA committed to the development of a noise mitigation package to alleviate, to the extent possible, the impacts associated with the preferred alternative. Upon identification of the Preferred Alternative, the FAA proceeded with the design of the noise mitigation package.

Mitigation measures are those designed to avoid, minimize, rectify, reduce, eliminate, or compensate for significant impacts. Since the Preferred Alternative would result in significant noise and noise associated impacts (environmental justice), mitigation measures were developed to reduce the significant noise impacts where possible.

After the public comment period closed for the DEIS in July of 2006, all comments received were organized and categorized for response in the FEIS document. As part of this process, any comment that discussed a potential noise mitigation measure was flagged. There were over 450 such comments considered. At the same time, the FAA identified potential mitigation measures by reviewing not only the threshold-based noise impacts presented in the DEIS but also the noise changes throughout the Study Area. Many of the public mitigation comments focused on similar issues and techniques and some of these were similar to the ideas that were generated separately by the FAA.

Initial screening as to whether each measure was operationally viable or presented a safety concern was conducted. While some mitigation measures were eliminated immediately because of readily apparent operational or safety problems, detailed operational analysis was required for others.

Through the qualitative and quantitative analysis it was determined whether a measure was operationally viable. The quantitative operational analysis also revealed key findings related to developing mitigation measures that would not impact operational efficiency. These findings are summarized as follows:

- EWR - Three departure headings are necessary to maintain operational efficiency.
- EWR – The use of the three headings could be varied throughout the day to minimize noise impact.
- EWR – A modified ocean routing could be used for some late-night departures.
- EWR - Some of the arrival routes could be raised to reduce noise.
- EWR – Continuous Descent Approach (CDA) procedures could be used for some arrival routes during the nighttime hours.
- PHL – A minimum of three departure headings are necessary to maintain operational efficiency.
- PHL – The current single heading departure procedure could be used during the nighttime hours given the forecast traffic levels.
- PHL – The river approach to Runway 9L could be used more to reduce noise.
- PHL – CDA procedures could be used for some arrival routes during the nighttime hours given the forecast traffic levels.
- LGA – The use of the new departure headings could be varied throughout the day to minimize noise impact.
- LGA – The LDA approach procedure to Runway 22 could be used more often.
- HPN – Departures to the northwest could be routed more like the No Action Airspace Alternative to reduce noise impacts.

These factors provided a general framework in which the specific mitigation measures could be developed for noise reduction.

Table ES.5 presents a list of the mitigation measures that withstood the operational screening and were ultimately included in the final mitigation package for the Preferred Alternative.

ES.7.3 Mitigation Results

The mitigation designed for the 2011 Preferred Alternative reduced the noise levels below the threshold of significance. **Table ES.6** summarizes the estimated change in population exposed to aircraft noise levels that meet the FAA criteria resulting from the mitigated Preferred Alternative airspace design. The cells in the table are color-coded similar to the scheme used on the figures so that specific numbers of persons can be related to the maps illustrating the noise change.

Based on the NIRS analysis it is estimated that only 545 persons would be exposed to a significant (+1.5 DNL at 65 DNL or higher) change in noise in 2006 resulting from the mitigated Preferred Alternative. This number would decrease in 2011 to zero persons. The alternative would, at the same time, provide noise reduction of 1.5 DNL or more in other areas exposed to 65 DNL or

Table ES.5

Mitigation Measures to be Included in the Final Mitigation Package

Airport/ Runway/ Procedure	**Mitigation Measure**
EWR 22 Departures	Use 3 departure headings based on demand during daytime hours. - Light Demand use single 190 heading like current conditions - Moderate Demand use 2 departure headings of 215 and 239 - Heavy Demand use 3 departure headings of 215, 239, and 263 At night (10:30 pm – 6:00 am)use 190 heading only and Modified Ocean Routing
EWR 4 and 22 Arrivals	Raise all arrival altitudes as much as possible.
EWR Arrivals	Use Continuous Descent Approach procedures at night for arrivals from the Northwest and Southwest
HPN Departures	Move departure routes to be more like No Action routes NW of the airfield
LGA 31 Departures	Adjust the usage of the new headings dependant on departure demand during the day.
LGA 22 Arrivals	Increase arrivals using the LDA.
PHL 9R/27R Arrivals	Develop CDA routes from three primary arrival fixes.
PHL 9R Arrivals	Increase use of the visual approach to Runway 9R (the River Approach).
PHL 27L/R Departures	Use 3 departure headings of 230, 245, and 268 during daytime hours. At night use 1 departure heading of 255 like current conditions.
PHL 9L/R Departures	Use 4 departure headings of 081, 096, 112, and 127 during daytime hours. At night use 1 departure heading of 085 like current conditions.

Table ES.6

Estimated Population Impact

Change Analysis Summary – Mitigated Preferred Alternative

	DNL Noise Exposure With Proposed Action		
	65+ DNL	60 to 65 DNL	45 to 60 DNL
Minimum Change in DNL With Alternative>	1.5 DNL	3.0 DNL	5.0 DNL
Level of Impact>	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
2006 – Mitigated Preferred Alternative	545	21,626	15,509
2011 – Mitigated Preferred Alternative	0	16,803	50,392
Noise Decreases			
2006 – Mitigated Preferred Alternative	310	1	35,684
2011 – Mitigated Preferred Alternative	3,201	1	207,629

Source: NIRS Analysis, Landrum & Brown/Metron Aviation, Inc. 2007.

greater in the Future No Action Airspace Alternative. In 2006, this level of reduction would be experienced by 310 persons and would increase in 2011 to just over 3,000 persons.

Slight to moderate impacts are also evident at lower noise levels resulting from the mitigated Preferred Alternative. In the 60 to 65 DNL range, it is expected that 21,626 persons would experience an increase in noise levels of greater than or equal to 3.0 DNL or more in 2006. This number is expected to decrease slightly to 16,803 persons by 2011. There would essentially be no decreases of greater than or equal to 3.0 DNL at noise levels of 60 to 65 DNL expected as a result of the mitigated Preferred Alternative in either 2006 or 2011. At the lowest analyzed noise levels (45 to 60 DNL), where slight to moderate (±5.0 DNL) impacts were identified, the mitigated Preferred Alternative is expected to result in potential noise increases of greater than or equal to 5.0 DNL for 15,509 persons in 2006. This potential impact is expected to increase in 2011 to some 50,392 persons. Conversely, a reduction in noise exposure at these lower noise levels is also expected from the implementation of the mitigated Preferred Alternative. In 2006, 35,684 persons exposed to between 45 and 60 DNL would experience a noise level reduction of greater than or equal to 5.0 DNL. By 2011, the noise relief at these same levels is expected to be experienced by some 207,629 persons. The table is color coded based on the centroid mapping scheme presented in **Figure ES.6.**

ES.8 PUBLIC AND AGENCY INVOLVEMENT

In accordance with NEPA guidelines, the FAA has involved the public and other agencies in the impact assessment process. During the informal pre-scoping and formal scoping period for the EIS, the public and agencies were given the opportunity to assist in determining the scope of issues to be addressed in this EIS. After the scoping meetings, the FAA held a number of agency meetings, distributed newsletters, and created a website to educate, inform, and receive feedback from concerned citizens and organizations.

The pre-scoping process included a series of airspace redesign workshops. Thirty-one workshops were held throughout the Study Area between September 22, 1999, and February 3, 2000. A total of 1,174 people attended the workshops and 712 comments were received.

The formal scoping period was January 22, 2001 through June 29, 2001. The scoping process consisted of 28 public meetings and three agency meetings held in various locations throughout the Study Area. A total of 1,031 people attended the scoping meetings and 901 comments were received.

In addition to formal scoping meetings, the FAA met with agencies with jurisdiction or special knowledge relative to the Airspace Redesign project on an as needed basis. Typically, each meeting consisted of introductions, a slide show presentation, and a video on the NY/NJ/PHL Metropolitan Airspace Redesign project. The agencies were encouraged to share their concerns or comments regarding the Airspace Redesign. The agency comments and concerns were used by the FAA in assembling the materials needed for the Draft EIS.

Throughout the development of the EIS, the FAA consulted with interested agencies and organizations. **Table ES.7** provides a sampling of the agencies and organizations consulted. (See Appendices L and M for additional information regarding agency consultation.) Periodic briefings were also

2011 Mitigated Preferred Alternative Change In Noise Exposure

Figure ES.6

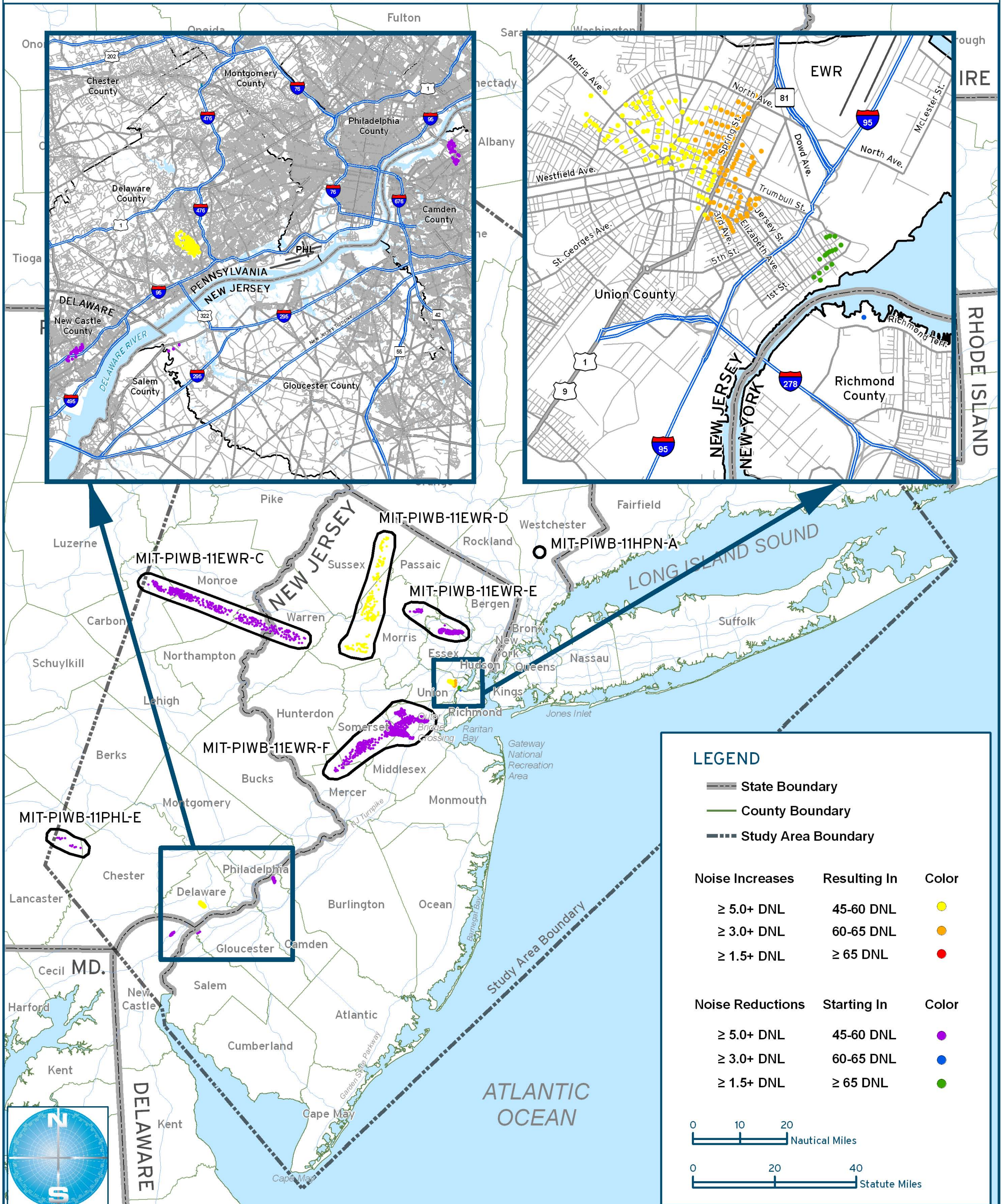


Table ES.7
Sampling of Agencies and Organizations Consulted

Airline Pilots Association
Brandywine Hundred, Delaware
Connecticut State Department of Transportation
Connecticut State Historic Preservation Officer
Delaware Department of Natural Resources and Environmental Control
Delaware State Historic Preservation Officer
Delaware Valley Regional Planning Commission
Eastern Region Helicopter Council
Environmental Protection Agency Regions 1, 2, and 3
Manhattan Borough President, Manhattan Borough President's Helicopter Task Force
Metropolitan New York Aircraft Noise Mitigation Committee (Governor's Group of Nine)
Mid-Atlantic Federal Partners for the Environment
NBAA Users Forum
New England Airspace/Range Council
New Jersey Coalition Against Aircraft Noise
New Jersey Department of Environmental Protection
New Jersey Department of Transportation
New Jersey State Commerce Department
New Jersey State Historic Preservation Officer
New York Department of Transportation
New York State Department of Environmental Conservation
New York State Historic Preservation Officer
Newark International Airport Aircraft Advisory Committee
New Jersey Acting Governor and Director of Aeronautics
Pennsylvania Department of Environmental Protection
Pennsylvania Department of Transportation
Pennsylvania State Historic Preservation Officer
Philadelphia Airport Authority
Port Authority of New York/New Jersey
Queens Borough President's Aviation Advisory Committee
State Aviation Directors
Town and Village Aviation Safety/Noise Abatement Committee
Transportation Research Board
US Department of Homeland Security
US Department of Interior, National Park Service and Fish and Wildlife Service

given to members of Congress, the New Jersey and Delaware Congressional delegations, and various Governors' offices.

The Draft EIS was distributed to interested federal, state, and local agencies, and citizens for review and comment. (See Chapter Nine for a comprehensive list.) Public information meetings were held for the DEIS from February 2006 through May 2006. On February 16, 2006 emails were sent to over 580 residents listing the specific meeting locations and on February 24, 2006 postcards were sent to over 3,200 residents with specific meeting locations. Each meeting was publicized through multiple local newspapers and radio stations. The public meeting process consisted of 30 meetings held in various locations throughout the Study Area. A total of 1,166 people attended the public meetings, and a total of 321 written and oral comments were received. The FAA reviewed and responded to all comments received during the comment period.

On April 6, 2007, the FAA published its Noise Mitigation Report, providing detailed information on mitigation measures for its Preferred Alternative. FAA informed the public of its availability through the FAA website and provided copies of the report to 71 libraries within the Study Area. FAA conducted seven public information meetings to discuss the Preferred Alternative and the proposed mitigation measures. The FAA accepted comments on the Noise Mitigation Report through May 11, 2007. Comments were also accepted at the Mitigation public information meetings held in June. Over 2,200 people attended the meetings, and approximately 1,700 written and oral comments were received.

The FAA engaged in several other initiatives to educate and involve the public in the Airspace Redesign Project. One of the primary initiatives was the project website. The project website was established in 2002 and provided both important project related information and the opportunity to submit comments to the FAA.

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APPENDICES

Chapter One
PROJECT BACKGROUND AND PURPOSE AND NEED FOR THE ACTION

This Chapter provides background on the Federal Aviation Administration's (FAA) proposal to consider airspace changes in the New York/New Jersey/Philadelphia (NY/NJ/PHL) Metropolitan Area, along with the purpose and need for airspace redesign in this area.

1.1 INTRODUCTION

The Federal Aviation Act of 1958, codified as 49 U.S.C. Sections 40101 et seq., delegates various responsibilities to the FAA, including controlling the use of the navigable airspace and regulating civil and military operations in that airspace in the interest of maintaining the safety and efficiency of these operations.[1] In its effort to continually maintain safety and increase efficiency of the airspace, the FAA is proposing to redesign the airspace by making modifications to aircraft routes and air traffic control (ATC) procedures used in the NY/NJ/PHL Metropolitan Area. This redesign was conceived as a system for more efficiently directing Instrument Flight Rule (IFR) aircraft to and from major airports in the NY/NJ/PHL Metropolitan Area, which include John F. Kennedy International Airport (JFK) and LaGuardia Airport (LGA) in New York, Newark Liberty International Airport (EWR) and Teterboro Airport (TEB) in New Jersey, and Philadelphia International Airport (PHL) in Pennsylvania. In total, 21 airports are included in the Airspace Redesign Project.

The purpose of this Environmental Impact Statement (EIS) is to evaluate the environmental effects of the NY/NJ/PHL Metropolitan Area Airspace Redesign (Airspace Redesign) in accordance with the National Environmental Policy Act of 1969 (NEPA).[2] This EIS was officially initiated when the FAA issued a Notice of Intent (NOI) to prepare an EIS on January 22, 2001. The format and subject matter in this environmental study conform to the requirements and standards of the Council on Environmental Quality (CEQ) regulations[3] and FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*.

- Chapter One defines the proposed action and the purpose and need for the Airspace Redesign.

- Chapter Two evaluates alternatives to determine whether they are reasonable and meet the purpose and need of the project. Airspace redesign alternatives were developed for analysis in accordance with NEPA, including the required No-Action Alternative. This chapter also briefly describes FAA consideration of integrating the New York Terminal Radar Approach Control (TRACON) and the Air Route Traffic Control Center (ARTCC) into a common facility, independent of Airspace Redesign. Any required environmental analysis for that effort will be handled

[1] Title 49 United States Code (USC) Section 40101(d)(4).

[2] 42 U.S.C. § 4321 et. seq.

[3] 40 CFR Part 1500.

separately. This EIS evaluates changes in airspace usage that could occur with or without the physical integration of these two facilities.

- Chapter Three identifies the project Study Area and the associated existing environment. It provides a baseline for considering the environmental impacts of the Proposed Action. The Study Area is comprised of New Jersey and portions of four other states—Connecticut, Delaware, New York, and Pennsylvania. The Study Area encompasses approximately 31,180 square miles, from ground level to 14,000 feet above Mean Sea Level (MSL). By policy, the altitude ceiling for environmental considerations regarding airspace studies is 10,000 feet Above Ground Level (AGL).[4] To account for the highest point in the Study Area, 14,000 feet MSL was used as a ceiling in this study. **Figure 1.1** illustrates the Study Area. A detailed description of the Study Area and of the airports modeled is included in this chapter.

- Chapter Four discloses the potential environmental impacts associated with the range of reasonable alternatives as required by Federal law and regulations. A total of 19 impact categories are considered. Chapter Four also includes a discussion of cumulative impacts, mitigation, and DOT Section 4(f).[5]

- Chapter Five begins with the identification of the Preferred Alternative. The next section describes the development of the mitigation measures designed to address the significant environmental impacts associated with the Preferred Alternative. Chapter Five concludes with a discussion of the environmental impacts of the Preferred Alternative with the mitigation.

- Chapter Six provides a summary of public and agency involvement.

- Chapter Seven provides a list of study acronyms, abbreviations, and a glossary of terms used in this EIS.

- Chapter Eight lists the document's preparers.

- Chapter Nine provides the distribution list for the DEIS and the FEIS.

- Supportive material is provided in Appendices A through R.

1.2 BACKGROUND

This section provides background information relevant to the airspace redesign, including an overview of the National Airspace System (NAS, or the System), air traffic control (ATC) facilities and airports within the Study Area, as well as the history of the airspace system in the NY/NJ/PHL Metropolitan Area.

1.2.1 National Airspace System

The function of the NAS is to provide a safe and efficient environment for civil, commercial, and military aviation. It is made up of a network of airspace, airports, air navigation facilities, ATC facilities, communication, surveillance, supporting technologies, and operating rules and regulations (see **Figure 1.2**). The following subsections provide an overview of the NAS; additional information is provided in **Appendix A**.

[4] Vol. 65 Federal Register [FR] Page 76339.
[5] Department of Transportation Act of 1966, section 4(f) [codified at 49 USC 303 (c)].

1.2.1.1 Aircraft Separation

In the early days of aviation, aircraft only flew during good weather conditions (referred to as Visual Meteorological Conditions or VMC) when a pilot could maintain orientation (e.g., up/down, turning, etc.) by reference to the horizon and visual ground references. Flight through clouds (i.e., poor weather with low ceilings or restricted visibility, referred to as Instrument Meteorological Conditions or IMC) was not possible, as the aircraft instruments of the time did not provide orientation information. A pilot could easily lose orientation and control of the aircraft. In a visual-only airspace environment, it was possible to see other aircraft and avoid a collision – and thus, maintain aircraft separation.

Flight through clouds became possible with the use of gyroscopic flight instruments. Because it is not possible to see other aircraft in the clouds, ATC was established to coordinate aircraft positions and maintain separation between aircraft. Aircraft separation is the physical distance, both vertically and laterally, between two aircraft. Today, maintaining separation between aircraft is a fundamental mission of ATC. The evolution of the NAS and existing ATC procedures can be directly tied to this requirement.

During VMC, aircraft may operate under Visual Flight Rules (VFR) and the pilot is primarily responsible for seeing other aircraft and maintaining safe separation. Aircraft operating under VFR typically navigate by orientation to geographic and other visual references. During IMC, aircraft operate under Instrument Flight Rules (IFR). ATC exercises positive control (i.e., separation of all air traffic within designated airspace) over all aircraft in controlled airspace, and is primarily responsible for aircraft separation. IFR aircraft fly assigned routes and altitudes, and use a combination of radio navigation aids (NAVAIDs) and vectors from ATC to navigate. Air carrier aircraft operate under IFR at all times, regardless of weather, as required by FAA regulations.

Specific aircraft separation standards, and the flight procedures used to maintain separation, are set forth in FAA Order 7110.65P, *Air Traffic Control*. Separation standards vary depending upon multiple factors, including availability of radar service, location of radar antenna sites, aircraft type and weight, type of airspace, operating rules of specific aircraft (i.e., IFR or VFR), weather conditions, aircraft altitude, and/or runway configuration.

Inside TRACON airspace, commonly known as terminal airspace, aircraft are separated by a distance of three nautical miles (NM) laterally and 1,000 feet vertically. Terminal airspace consists of regional areas of airspace used by aircraft climbing after takeoff or descending for landing.

Inside Center airspace, which is used by aircraft traveling at high altitude during the cruise potion of their flight, aircraft below 41,000 feet MSL are separated by a distance of five NM laterally and 1,000 feet vertically per the implementation of Domestic Reduced Vertical Separation Minimum (DRVSM) Standards in January 2005 (see **Figure 1.3**). At, and above, 41,000 feet, vertical separation increases to 2,000 feet while lateral separation remains at five NM.

The short-range radar used by TRACONs to manage smaller volumes of airspace updates more frequently than the long-range radar used by Centers and as a result, the lateral separation can be reduced in the terminal airspace. As will be discussed in Chapter Two, *Alternatives*, the different separation standards that exist in terminal versus Center airspace are an important factor in the Airspace Redesign Alternatives.

Visual separation (i.e., see and avoid) is more flexible than IFR radar separation. Visual separation standards may be used by some IFR aircraft during good weather conditions which results in reduced separation. There are two ways to achieve visual separation: (1) the tower controller sees the aircraft involved and issues instructions to ensure the aircraft maintain separation from each other; or (2) a pilot sees the other aircraft involved and is instructed by ATC to maintain visual separation.

In addition to the basic separation standards, additional separation standards apply for avoidance of aircraft wake turbulence. These “in-trail” separation standards apply when one aircraft is behind another aircraft and the trailing aircraft must maintain safe separation from the hazardous wake vortices produced by the leading aircraft. Wake vortices are the result of the airflow around and about an aircraft’s wing during flight. The vortices rotate rapidly and increase in intensity with heavier aircraft. As a result, the vortices from heavy and large aircraft can be hazardous to smaller aircraft. The in-trail separation standards, shown in **Figure 1.4** are based on an aircraft’s maximum takeoff weight and provide for safe distances between aircraft due to the effect of wake vortices.

1.2.1.2 Air Traffic Control Facilities

As shown in **Figure 1.5** and described in the following subsections, the ATC system is composed of several types of facilities with different areas of responsibility. Airport Traffic Control Towers (ATCTs or Towers) manage the takeoff and landing of aircraft, as well as ground flows. TRACONs manage regional areas of airspace that are used by aircraft climbing after takeoff or descending for landing. Air Route Traffic Control Centers (ARTCCs, commonly called Centers) manage the largest areas of airspace that are used by aircraft traveling at high altitude during the cruise portion of flight.

In ATC facilities, ATC specialists function in teams to provide for the safe, orderly, and expeditious flow of air traffic. These teams use specific procedures designed for safe and efficient traffic flow while ensuring that applicable separation standards are met. Using a variety of tools, air traffic controllers maintain these standards by issuing specific routes with altitude and speed assignments. Control responsibility for an aircraft operating under IFR is transferred from facility to facility from its point of origin until it reaches its destination.

Air Traffic Control System Command Center

A key component of the NAS is the Air Traffic Control System Command Center (Command Center), located in Herndon, Virginia. The Command Center receives data from NAS facilities across the country and maintains a real-time electronic picture of flights and the operational status of NAS components. Figure 1.2 illustrates the role of the Command Center in the NAS. The Command Center is responsible for ensuring the efficient use of all NAS resources through interaction with the other ATC facilities and airline operations centers. This interaction allows the Command Center to manage a collaborative decision making process that serves to implement alternative procedures so that the NAS remains efficient during inclement weather, equipment outages, and/or periods of congestion. The procedures may include arrival and departure restrictions (e.g., ground holds) or alternative routings.[6]

Air Route Traffic Control Centers

As shown in **Figure 1.6**, the FAA has established 20 Centers in the continental United States to manage IFR aircraft operating within controlled airspace during the en route phase of flight. Using long-range radar, Centers track aircraft and assign specific routes and altitudes in order to maintain separation and provide for the orderly flow of air traffic. Center airspace is divided into multiple sectors (i.e., portion of airspace having defined lateral and vertical boundaries) that are each managed by a controller or team of controllers. Each sector has its own discrete radio frequency which is used by controllers and pilots to communicate. As an aircraft travels through the Center airspace, ATC management of the aircraft is transferred from one sector to another. Centers also provide approach and departure control services to airports that are not served by TRACONs, as described in the next section.

Five Centers, including the New York Center, provide Oceanic Control for management of aircraft flying across the oceans. These centers manage flights over the portions of the Atlantic, Pacific, and Arctic Oceans that are delegated to the United States. Handling oceanic operations is different from controlling aircraft over land. Once an aircraft is outside radar range, controllers must rely on periodic radio communications of position reports to determine the aircraft's location (i.e., non-radar procedures). The United States is responsible for almost 80 percent of the world's controlled oceanic airspace.[7] The majority of this airspace is on the west coast and is managed by the Anchorage and Oakland Centers.

Terminal Radar Approach Control

Centers delegate specific airspace to local terminal facilities, known as TRACONs, which assume responsibility for the orderly flow of air traffic arriving and departing from major airports. Using short-range radar, TRACONs use radar vectoring, published routes, and procedures to manage the sequencing of IFR aircraft during the transition to/from the ATCT and the overlying Center airspace. TRACONs also provide air traffic service to aircraft operating from non-major airports within their airspace and traffic advisories for VFR aircraft operating in the area. Like Centers, a TRACON's airspace is divided into a number of different sectors to make the workload of air traffic controllers manageable. TRACON airspace is often referred to as terminal airspace.

There are 160 TRACONs in the United States.[8] They can be stand alone facilities such as the New York TRACON, or combined with a tower facility as in the co-located Philadelphia TRACON and ATCT.

Airport Traffic Control Towers

Traffic at busy airports is controlled by an ATCT. ATCTs are the most recognizable symbol in the NAS, as tower controllers are located in the glass booth at the top of the

[6] Federal Aviation Administration. Air Traffic Control System Command Center (ATCSCC), 2005, <http://www.fly.faa.gov/ sitemap.html>.

[7] Federal Aviation Administration. *Blueprint for NAS Modernization, 2002 Update*, page 26. October 2002, available online at <http://www.faa.gov/nasarchitecture/blueprnt/2002Update/PDF/2002Update_complete.pdf>.

[8] FAA ATO Locator Tool. <http://www.ato.faa.gov/locator>.

tower at airports. Using visual sighting and radar, ATCT controllers provide air traffic control services to aircraft operating in the immediate vicinity of an airport (i.e., within approximately five miles and below 3,000 feet AGL). The ATCT is responsible for ensuring that the runways are clear for all takeoffs and landings. ATCTs also control the ground movement of aircraft and any vehicles that need access to runways or taxiways, as well as aircraft in the aircraft parking areas.

1.2.2 Aircraft Navigation

Aircraft operating under IFR use both ground- and satellite-based navigation systems. Navigation systems essentially allow an aircraft to determine its existing location and the heading needed to reach the next point on the route. These systems are critical for aircraft that are in IMC or at high altitude and cannot use visual landmarks for navigation. Navigation systems are also used by ATC to manage and separate aircraft. VFR aircraft use the same navigation systems, but do not necessarily rely on them for primary navigation.

Aircraft navigate via a network of fixes. Fixes are geographic locations that are referenced with a single five-letter name. The location of a fix is defined by latitude/longitude coordinates and by reference to navigation facilities, known as NAVAIDs, which are described later in this section. The location of a fix is known to both air traffic controllers and pilots, and is identified on aeronautical charts. The flight plan is a series of fixes that establish a route that will be used to navigate from one airport to another.

The most common and important ground-based NAVAID is the VHF omni-directional radio range (VOR) station. The VOR is a ground-based NAVAID that transmits high frequency radio signals (known as radials) 360 degrees in an azimuth from the station. A pilot can select a VOR and use this to fly to or from another point. A pilot can also use distance measuring equipment (DME) to measure an aircraft’s distance from a DME-equipped VOR. Some VORs are also co-located with TACAN (tactical air navigation equipment) which is used by the military. These installations are known as a VORTAC and operate in the same way as a VOR station. Intersecting radials from two VORs, or DME and a specific radial, can be used to define a fix. The location of a VOR station can also be used as a fix. The straight line between two VORs is often designated as a federal airway. Federal airways include both low altitude (Victor, 18,000 feet and below) and high altitude (jet route) airways.

A non-directional beacon (NDB) is a general purpose, low-frequency radio beacon that transmits a non-directional signal. An aircraft equipped with direction finding equipment can determine a bearing to or from the radio beacon and use this to navigate. The location of an NDB station can also be used as a fix.

Area navigation (RNAV) is a hybrid navigation system that uses multiple ground and/or satellite based NAVAIDs to accurately provide aircraft location and navigational guidance to pilots. The RNAV equipment installed on aircraft has a database with the name and location of fixes used in the NAS. Without RNAV equipped aircraft, pilots fly from one ground based NAVAID to another. RNAV makes possible point-to-point navigation using both ground based and/or satellite fixes. Point-to-point navigation uses waypoints, which are fixes defined by latitude and longitude references rather than by sole reference to a ground-based NAVAID. Using point-to-point navigation allows pilots to take the most advantageous flight path directly between any two points (e.g., fixes or airports). Therefore, this type of navigation promotes a more efficient use of congested airspace.

The Global Positioning System (GPS) is an RNAV satellite-based navigation system that provides precise three-dimensional location, speed, and time information to aircraft. The system is compromised of 24 satellites and is operated by the U.S. Department of Defense. GPS receivers installed in aircraft use signals from at least four satellites to determine aircraft position. An internal database in the receiver is used to plot the aircraft's position relative to fixes, airports, and waypoints and then to plot courses to the aircraft's destination. Compared to many ground-based NAVAIDs, GPS has improved reliability, usability, and accuracy, as well as lowered costs. GPS is also more flexible than ground based systems, as it permits the location of fixes to be established without the constraints inherent in ground-based systems.

The Wide Area Augmentation System (WAAS) and the Local Area Augmentation System (LAAS) improve the accuracy, availability, and integrity of GPS signals to provide precise positioning service for supporting aviation use. WAAS currently provides RNAV/RNP operations and lateral path with vertical (LPV) approaches to over 95 percent of the United States. LAAS is currently a research and development program intended to provide precision approach and landing service in near zero visibility conditions. The FAA envisions that GPS with WAAS and LAAS will become the primary navigation system used in the United States.

NAVAIDs are also used to guide aircraft to landing at an airport during the arrival portion of flight. The procedures used with these NAVAIDs are known as Instrument Approach Procedures (IAP), and are used to guide aircraft to a specific runway for landing in IMC. IAPs that use VORs and NDBs as the primary NAVAID are known as non-precision approaches because they only provide lateral guidance and do not provide precise altitude guidance. An Instrument Landing System (ILS) is known as a precision approach because it provides both precision lateral and altitude guidance for an aircraft during landing. ILSs also have more precise lateral guidance than available from VORs or NDBs.

1.2.3 Phase of Flight: ATC Procedures, Navigation, and Aircraft Flight Routes

An aircraft traveling from one airport to another goes through three phases of flight: departure (i.e., takeoff), en route (i.e., cruise), and arrival (i.e., landing). As shown in Figure 1.2, different components of the NAS are used during each phase of flight. All of the components of the NAS, including airports, NAVAIDs, ATC, and pilots must be able to interact so that aircraft can travel safely and efficiently from one airport to another.

Due to high traffic demand and the frequent use of multiple runways, large airports operate in a safe, systematic departure and arrival configuration that is based on the prevailing winds and the physical layout of the runways. Aircraft operations at multiple airports that are in proximity to each other must be able to smoothly interact; this requires extensive planning and coordination between the ATC facilities that operate within an area.

ATC relies on pre-determined, coordinated arrival and departure procedures and routes to direct aircraft through the NAS.

Coordinated routes allow for the safe and orderly flow of aircraft and allow ATC to function as a team. Because routes are predetermined and coordinated with an aircraft's flight plan, a controller responsible for one sector can anticipate the actions of a controller in an adjacent sector. Aircraft rarely fly directly from one airport to another, as ATC has to weave departing and arriving aircraft flows through limited areas of airspace (i.e., sectors) due to the proximity of multiple, busy airports. This is especially true in the NY/NJ/PHL Metropolitan Area. Changes to a single route can affect many other routes. It is important to recognize the NAS as a mechanized, interdependent system.

The ATC procedures and requirements used to manage airspace are highly technical and complex. This complexity is due to the intermingling and crossing of routes, the number of flights traveling on those routes, and the varying performance characteristics inherent to different aircraft types. In addition, controller workload will vary depending on the volume of airspace for which he is responsible, the number of flights managed within a given time period, and the number of radio communications needed to manage the sector. All of these factors combine to create what is termed "airspace complexity" for the purpose of this document.

While aircraft generally follow the routes assigned in their flight plans, ATC can also use vectors to direct aircraft. A vector is a heading issued to an aircraft to provide navigational guidance by radar. Vectors are used regularly to route aircraft around weather, provide sequencing to separate aircraft, and direct aircraft onto an IAP. Vectors can also be used to separate aircraft with dissimilar operating characteristics. Vectors add flexibility to the system by allowing controllers to mitigate inefficiencies and improve overall traffic flow.

1.2.3.1 Departure Phase

Prior to departure, IFR flights must file a flight plan with ATC. The flight plan lists the aircraft type, airline and flight number, intended departure time, navigation equipment on board the aircraft, and the proposed route. ATC uses this information to finalize the planned route for the aircraft, given ATC procedures, en route weather, and the preferred route that is used between two specific airports. For air carrier aircraft operating under 14 CFR Part 121 (which includes nearly all passenger and cargo airlines operating in the United States), the airline's dispatch center coordinates with ATC on the flight plan. Like ATC, the dispatch center also maintains contact with the pilots throughout the flight.

Once the flight plan is finalized, ATC issues a clearance for a specific flight. The clearance is essentially a slot in the NAS for an aircraft to "proceed under specified traffic conditions within controlled airspace" to its destination.[9] The clearance includes the routes and initial altitudes that are to be used on the flight. ATCT will transmit the clearance to the pilot and will also direct the aircraft to taxi to the runway for takeoff. The decision to clear an aircraft for takeoff is made by the TRACON and/or Center and relayed to the aircraft by the ATCT. The TRACON and/or ARTCC may delay an aircraft from taking off due to airspace traffic congestion; this is known as a "ground hold."

At many airports, fanned departure headings, also known as divergent headings,

[9] Pilot/Controller Glossary. <http://www.faa.gov/ATpubs/PCG/>.

are used to maximize runway capacity. A departing aircraft is directed to follow a specific heading on takeoff. The next departure from the same runway, or another departure on a parallel runway, will be assigned to a heading that is at least 15-degrees to the left or right of the heading used by the preceding aircraft. Because the aircraft are using fanned headings, the distance (i.e., separation) between the departing aircraft is constantly increasing, thereby reducing the time between successive departures. This increases the throughput of the runway and can lead to decreased delays.

A published departure procedure (DP) may be included in the clearance for a flight. A DP is a standardized ATC departure routing containing a group of routes that would otherwise be transmitted piece by piece. DPs are used at many airports to simplify clearance delivery procedures. As discussed earlier, many busy airports have a systematic and coordinated arrival and departure airspace structure. As a result, many aircraft may receive the same clearance to depart from the airport and transit to the en route portion of their flight. DPs permit the controller to relay this clearance simply and quickly without having to repeat the information for every flight. DPs can be combined with fanned departure headings.

Shortly after takeoff, management of the aircraft is handed off (i.e., ATC management of the aircraft is transferred from one facility to another) from the ATCT to the TRACON. The ATCT and TRACON pre-coordinate and agree to the handoff, and the pilot is then instructed to change radio frequencies from the ATCT to the TRACON. As part of the handoff, the TRACON acquires the aircraft on radar. While ATC radar detects the radio signals reflected off the aircraft, the radar is primarily intended to seek the aircraft's transponder. The transponder is a radio that sends a coded reply and altitude information to the radar system. The code is linked to the aircraft's flight plan.

The TRACON controller manages the aircraft as it proceeds on its assigned route and will give it instructions to climb to specific altitudes. The controller may vector the aircraft to follow a specific course around weather or to avoid other air traffic. Just before the aircraft leaves the terminal environment, the TRACON will handoff management of the aircraft to the Center at a specific, predetermined transfer point, known as a departure gate. Departure gates are used by ATC as doorways to transfer control of aircraft from one facility to another. Aircraft are routed to transition through a gate at a specific location, direction, and altitude. Departure gates have specific location and boundaries and differ from specific fixes in that they cover a larger area in the airspace and are usually associated with multiple fixes. Jet aircraft usually reach the departure gate when at high altitudes, but before the cruise portion of the flight.

1.2.3.2 En Route Phase

By definition, the en route system of ATC is devoted to controlling IFR aircraft between the terminal area of origination and the terminal area of destination. After accepting the handoff of an aircraft from the TRACON, the Center will direct the flight to ascend to its cruise altitude. The flight will proceed along its assigned route, which will be made up of a combination of waypoints, fixes, airways, and the occasional radar vector. The aircraft will be handed off to different sectors and Centers as it traverses along the route towards its destination.

Depending upon congestion in the system, an FAA Traffic Management Initiative (TMI) may be in use. The Command Center monitors the future flow of aircraft into an airport, from 6 to 15 hours in advance, based upon flight schedules. In instances where demand is estimated to exceed an airport's capacity, a TMI may be implemented to meter the flow of aircraft so that demand is in line with capacity. In the en route environment, this often means that a flight may be directed to reduce airspeed to delay its arrival to an airport.

Congestion may also require holding in the airspace. During holding, aircraft are instructed to fly a racetrack holding pattern at specific altitudes. Flights typically enter a hold at a higher altitude and drop in altitude with every circumvention of the pattern. Other flights may be stacked above or below in the holding pattern. Holding may be part of a TMI or it may be caused by specific, unforeseen factors such as weather events. Holding may occur in either the en route or terminal airspace. Aircraft holding under en route ATC separation rules must hold for a multiple of four complete minutes (one complete lap around the holding pattern), even if only one minute is needed to appropriately sequence the aircraft into a gap for arrival sequencing purposes. In addition, the aircraft must be taken out of the holding pattern in the order in which it entered, for example, the aircraft must be at the bottom of the holding pattern and at the lowest altitude being used. In the terminal airspace, by contrast, the system is more flexible and aircraft may be taken out of the holding pattern at any time and in any order.

1.2.3.3 Arrival Phase

When a flight comes within a couple hundred miles of its destination, the Center will direct it to begin a descent to a specified lower altitude. As the aircraft approaches the terminal area, the Center will handoff management of the aircraft to a TRACON at a specific, predetermined transfer point/gate called an arrival post. Arrival posts are designated by a fix. Aircraft are routed to transition through an arrival post at a specific location, direction, and altitude.

TRACONs funnel flights from multiple routes into a single route that is used for arrivals to a specific airport's runway. Sequencing is designed to achieve a specified distance between two aircraft. In order to sequence two aircraft that are converging onto the same course, ATC may direct one aircraft to slow while directing the other to accelerate in order to create the needed gap between the flights on the route. Alternatively, a flight may be vectored off course and then vectored back onto course, in order to create the necessary spacing. Sequencing programs are also used for departures and in the en route environment, in order to provide adequate separation.

The aircraft's clearance may include use of a standard terminal arrival route (STAR). A STAR is similar to a DP; it contains a group of routes and fixes to be used by the aircraft as it approaches the airport. Like a DP, a STAR is intended to simplify clearance delivery procedures.

As the aircraft reaches the end of its STAR, the TRACON will give clearance for a flight to use a specific IAP. Most arriving air carrier aircraft are routed to an ILS IAP for landing at the destination airport.

The TRACON will often route aircraft to the airport using a local traffic pattern. The pattern is used by aircraft operating to and from an airport, to ensure that all aircraft use similar procedures and follow similar routes to and from the runways. If at all possible, aircraft should land and takeoff into the prevailing wind. This reduces takeoff and landing distance, and also helps to create an orderly traffic flow. The terminology used to describe the different segments of the traffic pattern is based upon the segment position relative to the direction of the prevailing wind and the runway. An aircraft taking off is flying into the wind, and hence the segment is known as the "upwind" segment. An aircraft that is flying perpendicular to the wind, near the departure end of the runway, is on the "crosswind" segment of the pattern. An aircraft flying parallel and towards the arrival end of the runway is on the "downwind" segment. The "base" segment is also perpendicular to the prevailing wind, and is intended as a "base" as the aircraft begins it approach for landing on the runway. The last segment, when the aircraft is aligned with the runway for landing, is known as "final." For jet airline traffic, the traffic pattern is usually fairly 'wide,' meaning it is flown several miles away from the airport. During IMC conditions, the pattern flown may be very wide for sequencing purposes. The pattern segments are used to describe the aircraft's position relative to the airport and intended runway.

The TRACON hands the aircraft off to the airport's ATCT when it is within approximately 5 to 10 NM of the airport, or when the ATCT has visual contact with the aircraft. The ATCT gives the aircraft final clearance to land. After using the various components of the NAS, the aircraft then safely completes it flight.

1.2.4 Air Traffic Control Facilities in the Study Area

Three Centers, two TRACONs, and multiple ATCTs have jurisdiction over the airspace above the NY/NJ/PHL Metropolitan area, as described in the following sections.

1.2.4.1 New York Center

New York Center, located in Ronkonkoma, NY, controls aircraft entering, exiting, and overflying the NY region. Figure 1.6 shows the lateral confines of New York Center airspace in relation to the other Centers in the United States. It is designated by its three-letter code of ZNY. New York Center controllers are responsible for approximately 72,000 square miles of domestic airspace over portions of Pennsylvania, New York, New Jersey, Delaware, and Maryland. New York Center is also responsible for 3.25 million square miles of oceanic airspace.[10]

New York Center is among the world's busiest air traffic centers, and was ranked by the FAA as the third busiest Center in the *Administrator's Fact Book*[11] based on 2005 operations. New York Center experienced an operations count of over three million aircraft in 2005, representing an increase in traffic levels of over 47 percent over the past decade. The volume of the operations within the New York Center airspace continues to increase.

1.2.4.2 Boston Center

Boston Center, located in Nashua, New Hampshire controls aircraft entering, exiting, and overflying the New England area. Figure 1.6 shows the lateral confines of Boston Center airspace in relation to the other Centers in the United States. It is designated by its three-letter code of ZBW. Boston Center controllers are responsible for approximately 165,000 square miles of airspace, over portions of Maine, New Hampshire, Vermont, New York,

[10] FAA Facts for Immediate Release, New York En Route Air Traffic Control Center (New York Center) <http://aea.faa.gov/aea5/pr1.htm>.
[11] FAA Administrator's Fact Book, April 2007, p. 9.

Massachusetts, Connecticut, and Rhode Island.

Boston Center was ranked by the FAA as the 15th busiest Center in the *Administrator's Fact Book*,[12] based on 2005 operations. Boston Center had an operations count of over 1.87 million aircraft in 2005, representing an increase in traffic levels of approximately eight percent over the past decade.

1.2.4.3 Washington Center

Washington Center, located in Leesburg, Virginia, controls aircraft entering, exiting, and overflying the Mid-Atlantic region. Figure 1.6 shows the lateral confines of Washington Center airspace in relation to the other Centers in the United States. It is designated by its three-letter code of ZDC. Washington Center controllers are responsible for 119,679 square miles of airspace located over portions of Delaware, Maryland, North Carolina, Pennsylvania, South Carolina, Virginia, and West Virginia, and the District of Columbia.

Washington Center was ranked second among the Centers in the FAA's *Administrator's Fact Book*,[13] based on their 2005 operations. Washington Center had an operations count of over 3.08 million aircraft in 2005, representing an increase in traffic levels of over 32 percent over the past decade.

1.2.4.4 New York TRACON

The New York TRACON, located in Westbury, New York, provides radar air traffic control service to aircraft operating in the New York Metropolitan Area. The New York TRACON has control responsibility for all aircraft within an area of airspace 150 by 125 nautical miles up to an altitude of 17,000 feet MSL. **Figure 1.7** shows the lateral confines of the New York TRACON airspace. As shown in **Table 1.1**, the New York TRACON handled over two million instrument operations in 2006, an increase of approximately 10 percent over the past 10 years.

Table 1.1
TRACON Instrument Operations

TRACON	1996 Instrument Operations	2006 Instrument Operations	Percent Increase
New York	1,895,416	2,090,977	10.3
Philadelphia	565,925	713,274	26.0

Source: FAA OPSNET, July 2007.

Controllers at the New York TRACON interact with numerous ATCTs, adjacent TRACONs, New York Center, Washington Center, and Boston Center.[14] The four major airports located within the New York TRACON airspace are JFK, LGA, EWR, and TEB. Long Island MacArthur (ISP), White Plains/Westchester County (HPN), Morristown Municipal (MMU), and nearly 43 smaller satellite airports[15] are also within the confines of New York TRACON airspace. The New York TRACON is unique in the number of facilities with which it interacts: four major airports, numerous satellite airports, and three Centers. In addition, the proximity of many busy airports in a limited geographic area contributes to the high level of complexity of air traffic operations in the NY Metropolitan Area.

[12] Ibid.
[13] Ibid.

[14] New York TRACON Briefing Guide New York. TRACON Airspace and Procedures Office.
[15] Federal Aviation Administration ATO Locator Tool. <http://www.ato.faa.gov/locator>.

1.2.4.5 Philadelphia TRACON

The Philadelphia TRACON is co-located with the PHL ATCT at the PHL Airport. The Philadelphia TRACON is responsible for providing services to PHL and 29 satellite airports and airport traffic control towers in the Greater Philadelphia Metropolitan Area. Figure 1.7 shows the lateral confines of the Philadelphia TRACON airspace. As shown in Table 1.1, the Philadelphia TRACON handled over 713,000 instrument operations in 2006, representing an increase of approximately 26 percent over the past decade.

1.2.4.6 Airport Traffic Control Towers

There are 129 ATCTs in the NY/NJ/PHL Metropolitan Area.[16] The airspace assigned to these ATCTs typically consists of a five NM radius around each airport, creating a cylindrical boundary that extends upward from ground level to about 2,000 feet AGL. JFK, LGA, EWR, and PHL ATCTs are among the 25 busiest ATCTs in the NAS.[17]

1.2.5 Airports in the Study Area

Because there are many public and private airports in the Study Area, the air traffic flows to and from these airports are highly interrelated. The NY/NJ/PHL Metropolitan Area Airspace Redesign focuses on five major airports and 16 satellite airports in the Study Area. The five major airports are as follows:

- John F. Kennedy International (JFK)
- LaGuardia (LGA)
- Newark Liberty International (EWR)
- Teterboro (TEB)
- Philadelphia International (PHL)

The 16 satellite airports are as follows:

- Allentown/Lehigh Valley International (ABE)
- Atlantic City International (ACY)
- Bridgeport/Igor I. Sikorsky Memorial (BDR)
- Caldwell/Essex County (CDW)
- Westhampton Beach/ The Francis S. Gabreski (FOK)
- Islip Long Island MacArthur (ISP)
- Linden (LDJ)
- Morristown Municipal (MMU)
- Newburgh/Stewart International (SWF)
- New Haven/Tweed-New Haven (HVN)
- Northeast Philadelphia (PNE)
- Republic (FRG)
- Trenton/Mercer County (TTN)
- White Plains/Westchester County (HPN)
- Wilmington/New Castle County (ILG)
- McGuire Air Force Base (WRI)

The five major airports and 16 satellite airports in the Study Area are depicted in **Figure 1.8**.

While there are many satellite airports physically located within the Study Area, they were not included in the operational or

[16] Federal Aviation Administration ATO Locator Tool. <http://www.ato.faa.gov/locator>.
[17] FAA Administrator's Fact Book, April 2007, p. 10.

noise modeling. The decision to include or exclude airports was based on the fact that the Airspace Redesign applies to IFR operations.[18] Airports without a significant amount of IFR traffic were not modeled because there will be little or no change to their operations as a result of the Proposed Action. This is because aircraft from these airports are managed by ATC on an as needed basis. For the purposes of this study, 20 IFR operations per day were used as an initial threshold to logically screen the large number of airports in the Study Area. The resulting list of airports (See **Appendix B**) to be modeled was reviewed and found to be consistent with the airports that may be impacted based on the Proposed Action. Therefore, airports with less than 20 daily IFR operations were not modeled in this study.

1.2.6 Airspace History

The Airspace Redesign is an outgrowth of continuing efforts to serve air traffic demand efficiently. The following sections highlight efforts made by the FAA since the late 1960s to reduce delay and improve the efficiency of the airspace system over the NY/NJ/PHL Metropolitan Area.

1.2.6.1 Consolidation of Approach Control Facilities

Consolidation of smaller facilities and their associated airspace into larger facilities and more efficient blocks of airspace began in 1968, with the creation of the Common IFR Room (CIFRR) at JFK. CIFRR combined EWR, LGA, and JFK approach control airspace into one facility and thus, originated the concept of combining smaller, separate facilities into more efficient and cohesive operations. New York's current TRACON evolved from the CIFRR. This included incorporating the terminal airspace around HPN, ISP, and SWF after 1982.

1.2.6.2 Re-allocation of New York Center Airspace

New York Center originally encompassed all the airspace above and around the NY/NJ/PHL area airports. Using a common automation platform,[19] the New York Center computer system "hosted" the computer systems of the numerous terminal facilities under its jurisdiction. The common automation platform and the layout of the airspace and facilities provided an uninterrupted flow of flight data to and from surrounding en route facilities through New York Center to the NY/NJ/PHL area airports. New York Center provided in trail spacing for all arrivals and departures to the NY and PHL airports. Thus, New York Center had the ability to shift routings in proximity to the airports to more efficiently balance the traffic demands.

In the 1980's, portions of New York Center's airspace were transferred to other facilities. The southern arrival and departure sectors were relocated to the Washington Center in stages between 1982 and 1985. The northern arrival and the northeast departure sectors were relocated to the Boston Center in 1987. The resulting configuration of multiple Centers above and adjacent to the NY and PHL TRACONs, with different automation systems exchanging flight data, severely limited operational flexibility and the ability to achieve maximum efficiency in the airspace.

[18] Only IFR flights were included in the modeling. See Section 3.5.4.1 of the FEIS for a discussion of why VFR flights could not be modeled.

[19] Automation platform refers to a single radar data processing system and the information it provides to controllers.

1.2.6.3 Expanded East Coast Plan

In the mid-1980s, a plan to improve airspace efficiency in and around the NY Metropolitan Area was implemented. The plan, which was initially called the East Coast Plan, focused on developing common departure routes out of the NY Metropolitan Area. During development and design of the plan, however, it became obvious that any change to routes and flows in the NY Metropolitan Area would require coordination with all adjacent ATC facilities. Because of the larger geographical area covered by the design, it was re-named the Expanded East Coast Plan (EECP).

The key elements of the EECP were the: (1) use of flow control to monitor and maintain the arrival rate at airports, (2) relocation of the holding patterns into the en route airspace to allow more room for departure transitions, and (3) the development of multiple departure routes to the west and north to allow for staging of departures from key NY/NJ metropolitan airports over integrated departure tracks. This created a new area within the New York TRACON called the Liberty Area which performed departure sequencing and spacing. This function was previously accomplished in the en route environment, but was converted to the terminal airspace which allowed reduced separation standards to be used.

The EECP was implemented in phases in 1987 and 1988, during a time of substantial growth in aircraft operations at EWR.

1.2.6.4 Other Initiatives

Two other initiatives were undertaken by the FAA in the early 21st century to reduce delay and improve the efficiency of the airspace system in the Study Area. These initiatives include the Robbinsville-Yardley Flip-Flop Procedure and the Dual Modena Procedure. These two procedures are described in the following sections.

Robbinsville-Yardley Flip-Flop Procedure

With the implementation of EECP, airplanes flying from points south passed over Robbinsville, NJ (RBV) for arrival at EWR and over Yardley, PA (ARD) for landing at LGA. Once past these fixes, the aircraft would crisscross to get to their destination airports. This crossing, done relatively close to landing, created complex and inefficient arrival streams into the NY/NJ Metropolitan Area. In December 2001, these routes were “flip-flopped.” Aircraft now fly straighter and more efficient routes. The new procedure permitted the creation of a dedicated controller position in the New York TRACON that is responsible for sequencing arrivals to Runway 4 at EWR. By reducing the complexity and allowing ATC to concentrate solely on the sequencing of airplanes to the runway (rather than on the crisscrossing of airplanes), a major inefficiency in the procedures used to manage airplanes arriving at EWR and LGA has been eliminated. The results of the environmental analysis of the Flip-Flop Procedure indicated that no significant environmental impacts would result from this action and this procedure was categorically excluded from further NEPA analysis. **Figure 1.9** depicts the arrival tracks of aircraft approaching EWR and LGA before and after implementation of the Flip-Flop Procedure.

Dual Modena Procedure

The Dual Modena Procedure was implemented on October 30, 2003, to help reduce departure delays at PHL. Due to PHL’s location along the east coast between NY/NJ to the north and the Washington D.C. Metropolitan Area to the south, departures from PHL are often routed to the west. In the past, about 40 percent of all jet departures from PHL were routed west over a single Modena (MXE) fix before continuing on course to their destinations. Aircraft destined for cities along the west coast of the nation, Florida, and all destinations in between were routed via this fix. After passing over MXE, the departures would be split onto four separate jet airways and then sequenced with other aircraft already on these routes. This configuration created a "bottleneck" over MXE, much like a single lane on-ramp to a busy highway. The Dual Modena Procedure added a fix to the south of the existing one. Westbound departures can now gain more efficient access to jet routes, thereby alleviating some ground delays at PHL. The results of the environmental analysis of the Dual Modena procedure indicated that no significant environmental impacts would result from this action and this procedure was categorically excluded from further NEPA analysis. **Figure 1.10** shows the new fix as well as the MXE fix and jet airways.

1.2.7 System Perspective

Major metropolitan areas have experienced increased air traffic demand resulting from influences such as population growth, the emergence of low-cost carriers, and increased use of regional jets. As a result, the NAS is currently experiencing deficiencies that are evident to both the users of the system and to the FAA. Some of the ways these deficiencies materialize are flight delays, inefficient routings, and airspace saturation. Today's aircraft technology far exceeds the capabilities of the land-based navigation system used by the NAS, as discussed in Section 1.2.2. Additionally, the existing system was not designed to accommodate the use of advanced navigation systems, such as Flight Management Systems and GPS, which permit increased flexibility and efficiency as compared to the ground-based systems.

Nationwide, airspace management has become increasingly complex and more challenging as aircraft technology advances and air traffic activity grows. To maintain safety and efficiency, the FAA, airlines, and airport operators have worked to keep pace with these challenges through advances in ATC technology, airline efficiencies, and airport improvements. Nonetheless, inefficiencies continue to occur and will increase as traffic levels increase unless further improvements are made. As the air traffic levels continue to grow over time, and additional demands are placed upon the NAS, the system will be further strained.

In 2001, the FAA implemented a system-wide strategy for the advancement of the NAS called the Operational Evolution Plan (OEP).[20] It is noted that the FAA administrator re-named the OEP as the Operational Evolution Partnership in spring of 2007. The OEP is a living, 10-year plan which is updated by the FAA as needed. An element of the OEP is the National Airspace Redesign (NAR) program. The goals of the NAR program are:

- Improve the air traffic flows into and out of all of the nation's major airports;
- Increase system flexibility, predictability, and access;
- Maintain and improve system safety;
- Improve efficiency and reduce delays; and

[20] Federal Aviation Administration National Airspace System Operational Evolution Plan, January 2004, Version 6.0.

- Support an airspace system that takes advantage of emerging technologies.

In 2003, the FAA initiated a study, the Future Airport Capacity Task (FACT), to determine whether the improvements included in the OEP were sufficient to meet future demand. FACT[21] was an assessment of the future capacity of the nation's airports and metropolitan areas. The goal of FACT was to determine which airports and metropolitan areas would need additional capacity in the future and why. In 2004, the results of the study were published in the *Capacity Needs in the National Airspace System, an Analysis of Airport and Metropolitan Area Demand and Operational Capacity in the Future* (FACT 1). In response to comments received on FACT 1, the FAA published an update, FACT 2, in May 2007.

For 2013, FACT 1 showed that 15 airports and seven metropolitan areas would need additional capacity. The FACT 1 analysis is based on the assumption that the improvements in OEP Version 5.0 are completed. Therefore, despite the improvements included in the OEP, additional capacity would be required in 2013 for the identified locations. Of the 15 airports and seven metropolitan areas identified in FACT 1, four airports (JFK, LGA, EWR, and PHL) and the NY Metropolitan Area are within the Study Area.

According to the FACT 2, six airports and four metropolitan areas would need additional capacity in 2015 even if the improvements in OEP Version 8 are completed. Of the six airports and four metropolitan areas identified in FACT 2, three airports (LGA, EWR, and PHL) and two metropolitan areas (New York and Philadelphia) are within the Study Area.

If future capacity enhancements are made at airports in the Study Area, the existing airspace structure is likely to impact the efficiency of future traffic demands. Additionally, procedures, technologies, and policy options must be improved to address existing airspace inefficiencies. Thus, FACT provides further support for the need for Airspace Redesign. The NY/NJ/PHL Airspace Redesign is the cornerstone of the FAA's initiative to redesign airspace all across the United States. This initiative fulfills the FAA's primary statutory mission to assure safe and efficient use of the navigable airspace under 49 USC 40103.

In addition to the NY/NJ/PHL Metropolitan Area project, numerous proposals for airspace redesign have begun in the NAS. Airspace Redesign studies have already been completed for the Chicago and Baltimore-Washington areas. A Record of Decision (ROD) for the Chicago Terminal Airspace Project (CTAP) was published in November 2001 and a ROD for the Potomac Consolidated TRACON (PCT) Airspace Redesign was issued in May 2003.

The airspace controlled by the NY/NJ/PHL facilities is one of the busiest air traffic areas in the world. Located in the Northeastern Corridor of the United States, the area is a hub for domestic and international air traffic. Inefficiencies in this airspace create a ripple effect that routinely impact major portions of the NAS. Additionally, the proximity of JFK, LGA, EWR, TEB, and

[21] US Department of Transportation, Federal Aviation Administration, and The MITRE Corporation Center for Advanced Aviation System Development. "Capacity Needs in the National Airspace System: An Analysis of Airport and Metropolitan Area Demand and Operational Capacity in the Future". June 2004 <http://www.faa.gov/arp/publications/reports/capneedsnas.pdf>.

PHL creates a unique and challenging interaction of air traffic flows. These interactions often produce a significant reduction in the operational efficiency at each airport. **Figure 1.11** shows the intermingling of traffic flows in the Study Area.

From a historical perspective, the airspace and the air traffic procedures in the NY/NJ/PHL Metropolitan Area were adequate after the last airspace change which was implemented in the late 1980s. However, over time, increases in airport utilization, and aircraft type and mix have outpaced the airspace's ability to meet demand. The FAA's High Density Rule, commonly known as the slot program, restricted aircraft access at JFK and LGA. Exemptions from the slot program to promote airline competition and service to smaller communities resulted in a rapid increase in air traffic at LGA in 2001, which consequently prompted a temporary reallocation of slots by the FAA in order to reduce massive delays. On August 29, 2006, the FAA issued a proposed rule (71 Fed. Reg. 51260-80, Aug. 29, 2006) to address the potential for increased congestion and delay at LGA in anticipation of the January 1, 2007 expiration of LGA's High Density Rule. The rule, if adopted, would establish an operational limit on the number of aircraft landing and taking off at the airport. The FAA is reviewing public comments on the proposed rule and assessing an appropriate final rule. As indicated above, the FAA currently limits operations at LGA under an interim administrative order (71 Fed. Reg. 77854, Dec. 27, 2006). Slots are no longer in effect at JFK and LGA as of January 1, 2007.[22] The elimination of the slot program has further highlighted the shortcomings of the airspace system in this region.

1.3 AVIATION DEMAND FORECASTS

Many aspects of airspace planning and environmental analysis are based on forecasts of future aviation activity. Thus, the level of IFR aviation activity expected throughout the planning period is an important consideration in the EIS process.

The FAA's office of Aviation Policy and Plans (APO) develops and regularly updates the Terminal Area Forecasts (TAF) for about 3,400 airports throughout the country. These forecasts are prepared by the agency to assist in meeting planning, budgeting, and staffing requirements. While some state aviation authorities and other aviation planners may use the TAF as a basis for planning future airport improvements, the volume of airports included in the TAF often precludes annual updates of the forecast for a given airport. As a result, the TAF forecast for even a major airport may not undergo a rigorous forecast update for several years. Furthermore, the TAF generally does not provide sufficient detail (e.g., aircraft type, destination, time of day, etc.) for environmental modeling.

Accordingly, specific forecasts were developed for IFR operations at each of the 21 airports evaluated in this study, as well as IFR overflights below an altitude of 14,000 feet MSL within the Study Area, in order to provide the necessary data for the operational and environmental impacts analyses. The study forecasts were developed differently than the TAF and

[22] 49 U.S.C. 41715(a)(2).

[23] FAA Memorandum, Revision to Guiodance on Review and Approval Avuiation Forecasts from the

include detailed assumptions specific to the NY/NJ/PHL Metropolitan Area and the 21 airports of interest. The study provided forecasts specific to aircraft type, schedule, and origin/destination.

Considerable analytical attention was applied to forecast development for the general aviation sector. The corporate aviation market, which is generally identified as business executive transportation via small jets and turboprop aircraft, is expected to grow at a more robust rate than scheduled airline service. This is primarily due to the success and growth of fractional ownership programs where businesses or individuals purchase a portion of an aircraft and share its use with other owners.

Among the most pronounced changes in commercial passenger fleets in the late 1990s has been the replacement of turboprop aircraft with regional jets. This trend toward the use of regional jets has continued in recent years with many major airlines replacing narrow body jet aircraft with regional jets in search of more profitable operations.

A number of other general assumptions and factors affecting demand were also considered in development of the forecast. These assumptions, a detailed methodology describing the process by which the forecasts were constructed, and actual forecasts may be found in **Appendix B. Table 1.2** shows the total operations for the 21 study airports and the overflights for the base year (2000), the Airspace Redesign implementation year (2006), and a future year (2011).

After developing forecasts for each of the 21 study airports, individual forecasts were compared to the FAA's TAF. The comparison of these forecasts served as a method to verify the reasonableness of the Airspace Redesign forecast. The FAA uses a 15 percent threshold within 10 years as a rule-of-thumb for accepting non-TAF forecasts as the basis for FAA decision making associated with airport development projects.[23] For the 21 study airports, the new passenger forecasts were within 15 percent of the TAF levels. The weighted average variance for total operations and the aggregate TAF passenger forecasts for 2006 is less than one percent. The weighted average variance in 2011 from the TAF is less than two percent. For SWF, the forecast included the introduction of new low-fare service that was not anticipated in the TAF. Also, the TAF for year 2000 for TTN overstated enplanement levels due to the mid-year withdrawal of service by Westwind Airlines.

When considering the forecasts developed for this analysis, it should be noted that they have been developed specifically for this Airspace Redesign Study. Thus, their make-up and content may differ from other forecasts developed specifically for a given airport. For example, these operational forecasts focus solely on the IFR traffic activity at each of the 21 airports being evaluated. Conversely, a forecast developed for infrastructure planning at a specific airport may include VFR, IFR, and training traffic at that airport. Also, because aviation trends are used to develop forecasts, the period of time when a forecast is developed can affect the results. Forecasts developed for a specific airport before or after the analysis conducted here may indeed present different results.

Table 1.2

Total Annual IFR Operations for Noise Modeling

Airport	Identifier	2000	2006	2011
LaGuardia	LGA	387,995	416,465	416,465
John F. Kennedy International	JFK	347,115	413,910	451,505
Newark Liberty International	EWR	451,505	506,985	524,140
Teterboro	TEB	144,175	162,790	184,325
Philadelphia International	PHL	407,340	550,420	598,600
Morristown Municipal	MMU	36,500	40,880	45,990
Islip Long Island MacArthur	ISP	51,100	64,240	74,095
White Plains/Westchester County	HPN	96,360	116,435	125,195
Allentown/Lehigh Valley International	ABE	44,530	47,815	52,195
Atlantic City International	ACY	25,550	27,375	30,295
Bridgeport/Igor I. Sikorsky Memorial	BDR	8,030	8,760	9,490
Caldwell/Essex County	CDW	5,110	5,475	5,475
Westhampton Beach/The Francis S. Gabreski	FOK	1,095	1,460	1,460
Linden	LDJ	365	365	365
McGuire AFB	WRI	10,585	10,585	10,585
Newburgh/Stewart International	SWF	32,120	40,515	54,385
New Haven/Tweed-New Haven	HVN	8,030	8,760	9,490
Northeast Philadelphia	PNE	13,505	14,965	16,425
Republic	FRG	18,250	20,075	21,535
Trenton/Mercer County	TTN	22,630	20,805	24,090
Wilmington/New Castle County	ILG	22,995	26,280	30,660
Overflights	OVF	162,790	231,775	248,930
Total		2,297,675	2,737,135	2,935,695

Source: Landrum & Brown, 2005.

The bulk of the forecast effort was conducted before the events of September 11, 2001. The tragic events of that day led to increased security and short-term reductions in activity at the NY/NJ/PHL Metropolitan Area airports, as well as airports nationwide. In addition, both the Iraq War and the increasing oil prices have impacted the aviation industry. The airline industry struggles to maintain profitability in this environment as unanticipated changes in airline operations occur.

The ongoing restructuring in the US airline industry led to changes in schedule and fleet mix used on many routes. In some cases, airline schedules have changed to allow for a more constant flow of traffic throughout the day rather than a clustering of flights during certain times of the day. The need to reduce operating costs has resulted in the retirement of older, less efficient aircraft. Domestic customer demand for increased frequency of service combined with the retirement of older aircraft, has led to the replacement of many large narrowbody and widebody jets with smaller regional jets (RJs).

Since these airline industry changes occurred after the development of the forecast used for the purposes of the EIS, an investigation of the implications of these changes on the forecast traffic was conducted. The review of the EIS forecast included a comparative analysis of the forecast traffic (based on 2000 traffic data) with more recent traffic: current traffic for EWR, LGA, JFK, PHL, TEB, HPN, ISP and MMU; and the forecast traffic developed for another study at PHL.

Based on the analysis, the forecasts used in the NJ/NY/PHL Metropolitan Area Airspace Redesign were determined to be accurate in that any differences found with the more recent traffic data would not change the conclusions of the operational or environmental analysis. For details regarding this analysis see "A Comparative Analysis of the NY/NJ/PHL Forecast and 2005 Actual Traffic" included in Appendix B.

Given the relatively long forecast horizon (2001-2011), any short-term suppression of aviation demand due to the terrorist attacks is expected to recover by the first benchmark year of 2006. According to the FAA, "This year [2004] we foresee that the demand for aviation products and services will continue to increase from the low levels of the past few years, with most measures of aviation activity predicted to return to pre-September 11th levels in 2005."[24] Delays at airports in the NY/NJ/PHL Metropolitan Area are growing again and in the case of PHL are exceeding pre-September 11, 2001 conditions.[25] Also, observations are included in Appendix B that support the expectation that aviation growth will continue to rebound over the forecast horizon. Therefore, the events of September 11, 2001 and other near-term impacts are considered short-term and are not expected to affect long-term demand at the Study Area airports.

[24] FAA Aerospace Forecasts Fiscal Years 2005-2016 U.S. Department of Transportation, Federal Aviation Administration, Office of Aviation Policy & Plans, March 2005.

[25] OPSNET: Delays Report from January 2000 through March 2005. <http://www.apo.data.faa.gov/opsnet/delays>.

1.4 PURPOSE AND NEED

The identification of a proposed action's purpose and need is the primary foundation for the identification of reasonable alternatives to the proposed action and the evaluation of the impacts of the alternatives in an EIS.

The FAA's first consideration and highest priority in defining the Purpose and Need for any proposed action is to serve the public interest by exercising its authority to assign, maintain, and enhance safety and security of the national airspace (per 49 USC 40101(d)).

1.4.1 Need

In the case of the existing NY/NJ/PHL Metropolitan Area airspace, the basic air traffic environment was designed and implemented in the 1960s. Since that time, the volume of air traffic and the type of aircraft that use the ATC system have changed significantly. However, the basic structure of the NY/NJ/PHL airspace has essentially remained the same and has not been adequately modified to address changes in the aviation industry, which includes increased air traffic levels, the use of new aircraft types, and emerging technologies to control air traffic.

1.4.1.1 Increased Aircraft Traffic Levels

Aircraft operations in the Study Area are growing despite the operational delays experienced by aircraft operators. As illustrated in **Table 1.3**, the instrument operations at most of the major airports in the Study Area have increased. Dramatic increases have occurred at EWR, PHL, and TEB and these increases are forecast to continue. Inefficiencies due to the inherent limitations of the existing airspace design, including route structure and ATC

Table 1.3
Instrument Operations at Major Airports

Airport	1980	2005	2020
John F. Kennedy International Airport	332,908	399,939	662,615
LaGuardia International Airport	405,918	461,112	501,869
Newark International Airport	235,423	492,314	684,645
Philadelphia International Airport	490,805	739,945	1,048,919
Teterboro Airport	65,280	173,808	216,790

Source: FAA TAF, Issued December 2006.

procedures, will be exacerbated by growth in air traffic operations. As traffic increases, the system will become increasingly inefficient and unreliable in order to ensure safe operations. The following inefficiencies must be addressed in order to accommodate growth:

- Access to en route airways is restricted by downstream congestion.
- EWR and LGA final approach courses are restricted and do not allow for optimal aircraft sequencing to the runways.
- Airspace sectors are currently associated with specific airports which cause an unbalanced use of the airspace, thus requiring excessive communications between controllers.
- Westbound departures from JFK create delays for westbound departures from EWR and LGA due to in-trail sequences.
- NY Metropolitan Area departures to north departure gate fixes are restricted due to inefficient airspace allocation.
- Arrivals to PHL are directed to lower altitudes to maintain separation from arrivals to the NY Metropolitan Area.

The airspace must accommodate growth in air traffic. To accommodate growth, the enhanced airspace system must maintain the current high level of safety and mitigate delays.

Safety

The FAA has the responsibility to control the use of navigable airspace in the interest of safety and efficiency. The following safety-related inefficiencies currently exist in the NY/NJ/PHL Metropolitan Area airspace:

- Arrivals to HPN from the south cross several traffic flows and create unnecessary complexity.
- Arrivals for airports to the north of the Study Area must be assigned high altitudes to avoid conflicts with the NY Metropolitan Area traffic. This creates the need to cross several traffic flows in a short distance while descending.
- Traffic to PHL, ISP, and their associated satellite airports[26] is restricted to intersecting courses in narrow corridors of airspace.
- Airspace restrictions require incremental changes in altitude for arrivals and

[26] PHL satellite airports include Chester County, Brandywine, New Garden, Wings Field, Northeast Philadelphia, Doylestown, Pottstown Limerick, and Capital City Airports. ISP Satellite airports include Brookhaven, Spadaro, Francis S. Gabreski, Republic, and Montauk Airports. Source: NPIAS 2005-2009.

departures causing radio frequency congestion associated with additional control instructions.

- Departures from EWR to the Caribbean and South America must climb through PHL and ACY traffic resulting in traffic conflicts.

- High-performance general aviation aircraft operating out of satellite airports are restricted to less efficient altitudes below major airport flows. This creates increased controller workload to resolve traffic conflicts.

- Departures from ISP and ISP satellite airports to the south/southwest conflict with arrivals to the NY Metropolitan Area and northeast-bound departures from PHL.

Addressing the safety-related inefficiencies will contribute to enhanced safety in light of the growing traffic.

Delays

Delays affect aircraft operators with increased fuel use and operating costs, which are passed on to consumers in the form of higher ticket prices. Delays also impact the public by causing inconveniences with late arrivals, missed connections, and cancelled flights. The public expects a stable and reliable aviation system that supports on-time flights. People have dramatically increased their use of aviation as a mode of travel and increasing delays continue to receive much public attention. Delays are expected to increase in the future as traffic levels continue to grow. These issues prompted the airline industry and the Federal government to search for ways to reduce delays.

The current basic airspace structure was designed and implemented in the 1960s, based on the interaction of independent TRACONs and several overlying Centers. Today, it cannot efficiently handle the current and projected level of traffic within the NY/NJ/PHL Metropolitan Area. In 1988, when the last large scale airspace changes were made, the New York TRACON alone managed approximately 1,710,000 operations annually. In 2006, the New York TRACON handled 2,090,977 operations. By the year 2011, the traffic level is projected to increase to 2,400,143[27] annual operations. The increasing traffic levels result in excessive user delays and inefficient routes. Between 2000 and 2006, total aircraft delays at TRACONs and Centers in the Study Area have increased dramatically (see **Table 1.4**). In addition, airports in the NY/NJ/PHL Metropolitan Area are routinely among the top 10 most delayed airports in the nation, due in part to the inefficiencies of the current airspace structure (see **Table 1.5**).

The following are among the causes for delay in the existing NY/NJ/PHL Metropolitan Area airspace:

- Aircraft departing from the NY Metropolitan Area to the Washington Metropolitan Area are sequenced onto the same routes as long-haul destinations (e.g., Los Angeles).

- Entering and exiting holding patterns in en route airspace are inefficient because more restrictive en route separation rules are used and require extensive coordination.

[27] FAA APO Terminal Area Forecast Issued December 2006.

Table 1.4
Center and TRACON Delays

Facility	2000 Total Aircraft Delays	2000 Average Time (mins)	2006 Total Aircraft Delays	2006 Average Time (mins)
New York Center	438	33.6	36,667	42.6
Boston Center	121	29.4	2,101	41.7
Washington Center	596	32.1	13,075	46.7
New York TRACON	396	34.2	8,002	38.6
Philadelphia TRACON(1)	21,521	47.5	28,641	46.9

Note: Only includes aircraft delayed greater than 15 minutes. [28]
(1)Since the Philadelphia TRACON is collocated with PHL, Philadelphia TRACON statistics include delays for the Airport as well.

Source: FAA OPSNET, accessed July 2007.

Table 1.5
Ten Most Delayed Airports in 2000 and 2006

2000 Delay Rank	Airport	Total Aircraft Delayed	Average Delay (min)	2006 Delay Rank	Airport	Total Aircraft Delayed	Average Delay (min)
1	LaGuardia	61,120	47.54	1	Chicago O'Hare International	65,657	59.58
2	Chicago O'Hare International	57,545	57.71	2	Newark Liberty International	53,619	53.39
3	Newark Liberty International	37,132	56.23	3	Hartsfield-Jackson Atlanta Internal	50,088	41.72
4	Hartsfield-Jackson Atlanta International	28,229	37.39	4	LaGuardia	36,667	42.55
5	San Francisco International	24,478	51.85	5	Philadelphia International	28,641	46.89
6	Logan International	24,120	48.19	6	John F. Kennedy International	23,952	37.64
7	Philadelphia International	21,521	47.52	7	George Bush Intercontinental /Houston	14,889	38.69
8	Dallas-Fort Worth International	20,638	44.45	8	McCarran International	14,805	29.07
9	Los Angeles International	17,141	43.65	9	Logan International	11,983	56.16
10	Phoenix Sky Harbor International	14,024	31.98	10	San Francisco International	10,279	53.41

Note: Only includes aircraft delayed greater than 15 minutes.[28]

Source: FAA OPSNET for ATC delays, accessed July 2007.

[28] A "delay" to Instrument Flight Rules (IFR) traffic is reported when an individual flight is detained 15 minutes or more by the ATC system at the gate, short of the runway, on the runway, on a taxiway, and/or in a holding configuration anywhere enroute. Source: U.S. Department of Transportation. Federal Aviation Administration. Operational Data Reporting Requirements, June 11, 1999.

- Chicago O'Hare International Airport (ORD) is one of the busiest airports in the nation and experiences significant delays. Because of the inflexibility of the current airspace structure, the in-trail restrictions placed on the ORD departures end up affecting all of the westbound departures from the New York/New Jersey/Philadelphia metropolitan areas routed over the same departure fix regardless of the destination airport.

- Aircraft departing from LGA and HPN have poor access to departure routes during severe weather conditions.

- Severe weather that occurs during periods of heavy traffic reduces flexibility for aircraft rerouting resulting in delays.

- During peak demand periods individual arrival fixes can become saturated while other arrival fixes are under used.

The Airspace Redesign is needed to address the system inefficiencies that cause delay.

1.4.1.2 Changes in Type of Aircraft

The overall fleet mix of aircraft types used by domestic air carrier and general aviation operators has evolved rapidly over the past decade. Regional airlines have replaced propeller-driven aircraft with regional jets in response to consumer preferences and to begin service to new markets. Mainline air carriers have transitioned service on some routes from larger narrowbody aircraft to smaller regional jets, due to the lower operating costs of regional jets. The net effect of these changes is that the same numbers of passengers are now being transported with a higher number of operations by smaller aircraft. Also, fractional ownership programs have resulted in the increasing use of business jets. These factors have placed new strains on the NAS by increasing the number of high performance jets vying for the same routes and altitudes. Previously, there were substantial numbers of propeller-driven aircraft operating at lower altitudes on separate routes. The increasing number of jets has resulted in the saturation of jet routes.

1.4.2 Purpose

The purpose of the Airspace Redesign is to increase the efficiency and reliability of the airspace structure and ATC system, thereby accommodating growth while enhancing safety and reducing delays in air travel.

By taking advantage of new technologies and responding to new trends, the Airspace Redesign will increase efficiency and the reliability of the air traffic system.

1.4.3 Other Considerations

Noise reduction is not a component of the Purpose and Need for the Proposed Action. In the case of the NAR, reduction of noise is not appropriately identified as a Purpose because it is not FAA policy to reroute aircraft to reduce noise levels in one community at the expense of another.

Although reduction of noise is not included in the Purpose and Need, the FAA recognizes the concerns associated with aircraft noise. At the scoping meetings held in 1999 and 2001, the FAA committed to using the following techniques, where possible, to reduce aircraft noise and other potential environmental impacts:

- Increase altitudes,

- Disperse or concentrate tracks where appropriate,

- Reduce flying time, and
- Route aircraft over less noise-sensitive areas where feasible.

However, in both the scoping meeting and newsletters, the FAA has been careful to inform the public that airspace redesign is not a cure-all for noise problems for the 29 million people living in the Study Area.

1.5 PROPOSED ACTION

The Proposed Action for this EIS is to redesign the airspace in the NY/NJ/PHL Metropolitan Area. This involves developing new routes and procedures to take advantage of improved aircraft performance and emerging ATC technologies.

To develop the Proposed Action, technical specialists with in-depth knowledge of regional ATC issues evaluated the existing airspace structure, ATC procedures and routes, and the interaction of local air traffic with the NAS as a whole. In designing the alternatives for the Proposed Action, the airspace designers considered the highest reasonable altitudes and the most direct routing when possible. Use of higher altitudes provides more flexibility for maintaining safety and provides greater economic benefits to aircraft operators than the use of lower altitudes.

The Proposed Action does not include any physical changes or development of facilities, nor does it require local or state actions. Therefore, no physical alteration to any environmental resource would occur in the Study Area. Additionally, the NY/NJ/PHL Metropolitan Area Airspace Redesign would not require changes to any Airport Layout Plan, and infrastructure funding is not expected to be necessary.

Since the Proposed Action involves modifications to airspace structure and air traffic management procedures, the project requires direct FAA action in order to be implemented. This consists of the design, development, implementation, and use of new or modified ATC procedures and reconfigured airspace.

1.6 IMPLEMENTATION

The various components of the Proposed Action are expected to be implemented in phases beginning in 2007. Upon issuing a Record of Decision implementation of some of the operational enhancements could begin immediately. For example, using dispersal headings and transferring airspace from other air traffic facilities could begin after training controllers. Implementation of these operational enhancements would require revisions to Letters of Agreement and Facility Orders for all ATCTs, TRACONs, and Centers impacted by the Airspace Redesign. Letters of Agreement are formulated when operational and procedural needs require the cooperation and concurrence of more than one ATC facility. Letters of Agreement typically delegate airspace and responsibilities, specify ATC procedures, and standardize operating methods. Individual ATC facilities may also set forth policies and procedures through a local Facility Order.

Additional procedures such as changes to routes and flows would involve development of new Standard Terminal Arrival Routes (STAR) and further RNAV development. These procedures would need to be charted and published, and thus could require lead time of one year or longer.

Development of a single automation platform to service the expanded terminal airspace, if chosen, would not occur for several years.

1.7 OTHER ACTIONS

According to CEQ Regulations, connected actions must be considered when determining the scope of an EIS. If actions are connected, their impacts should be included in the same EIS. "Actions are connected if they:

- Automatically trigger other actions which may require environmental impact statements.
- Cannot or will not proceed unless other actions are taken previously or simultaneously.
- Are interdependent parts of a larger action and depend on the larger action of their justification."[29]

Actions that are independent or have independent utility can proceed separately and do not need to be analyzed in the same EIS. Independent actions are those that have benefit in and of themselves and do not require or trigger another action.

Ongoing airspace redesign activities (e.g., the Midwest Airspace Enhancement (MASE) and PCT Airspace Redesign), in areas abutting the NY/NJ/PHL Metropolitan Area airspace will be coordinated; however, these activities are not considered connected actions as they can be accomplished independently of each other and are independently justified.

Other aviation projects were considered to determine whether or not they were independent or connected actions with respect to the Airspace Redesign, including the proposed New York Integrated Control Complex (NYICC), runway extensions and relocations at PHL, the Part 150[30] Study at Bradley International Airport and the proposed purchase of the operating lease for Newburgh/Stewart International Airport (SWF) by the Port Authority of New York and New Jersey (PANYNJ).

NYICC is an operational concept that would merge the current New York TRACON and New York Center into a single facility. The NYICC concept would expand the airspace in which terminal separation rules could be used. Where en route airspace separation rules of five nautical miles are typically used today, the NYICC would instead use three nautical mile terminal airspace separation rules. This would permit less restrictive separations to be used over a larger geographical area and at higher altitudes. The NYICC facility would be evaluated in a separate environmental study. However, the NY/NJ/PHL Metropolitan Area Airspace Redesign will consider the implications of the NYICC in its alternatives. Chapter Two provides additional discussion on how the Airspace Redesign would work with or without the NYICC.

The NYICC concept was developed as a means to solve operational and facility issues in the NY Metropolitan Area. The NYICC idea goes beyond the historical FAA consolidation model by seeking to integrate the best aspects of terminal and en route air traffic control into one facility. The integration can remove many of the artificial boundaries that now divide the en route and terminal environment and can provide seamless transitions through all phases of flight in the area. Other benefits to traffic management include the establishment of arrival and departure areas to maximize efficiency, terminal holding to efficiently manage arrival capacity, more effective use

[29] CEQ 1508.25.

[30] 14 CFR Part 150.

of separation rules to safely accommodate growth, and the flexibility to dynamically adapt flows to address volume or weather. NYICC would avoid the expense of rehabilitating the New York Center and replacing the New York TRACON. Additional benefits of the NYICC include a reduction in overall operations and maintenance costs from the use of one facility instead of two, reduced interface delays through the use of a single automation platform, and reduced telecommunications equipment, infrastructure, and line costs. Analysis of redesign alternatives associated with the Airspace Redesign has demonstrated the independent utility of the NYICC concept itself. Even without Airspace Redesign, the NYICC would permit efficiency gains in air traffic management, allow for the use of new technologies, reduce overall operations and maintenance costs, and allow for compliance with current Department of Justice security regulations.

Two projects are underway at PHL: extension to Runway 17/35 and the Capacity Enhancement Program (CEP), which considers major airfield development. In April 2005, the FAA issued a ROD approving the runway extension project, which is currently being constructed. The EIS for the CEP is currently underway. Neither project is a connected action to this project because each can proceed independently of the Airspace Redesign and each has its own justification: to reduce airfield delays at PHL.

Bradley International Airport (BDL) has developed a Part 150 Study including a noise compatibility program involving airport-specific noise abatement measures. A two-day meeting held February 24-25, 2004, between the controllers from BDL Tower and the NY/NJ/PHL Airspace Redesign team concluded that changes associated with the Proposed NY/NJ/PHL Metropolitan Area Airspace Redesign Project would not change any activity at BDL, nor would the proposed procedure changes contained in BDL's Part 150 Study impact any changes contained within the Airspace Redesign. Additionally, BDL is located outside of the Study Area for this EIS. See the end of Section L.4.3 of Appendix L for more information regarding the independence of the BDL Part 150 Study.

On January 25th 2007, the PANYNJ announced that the Port Authority Board of Commissioners authorized the purchase of the operating lease at SWF. The PANYNJ press release quoted New York Governor, Eliot Spitzer as saying, "… Stewart Airport will provide much-needed relief for our three major airports, greatly reduce delays, and help us prepare for the inevitable population and passenger growth." As of July 2007, the PANYNJ was still pursuing the acquisition of the lease and negotiating with both National Express and the State of New York. Even if the purchase is successful, it is unclear whether the airlines will be willing to operate at SWF especially in light of American Airlines recent announcement that they are pulling out of SWF. Regardless, this proposal is not a connected action to Proposed Action because it can proceed independently of the Airspace Redesign.

While there are no connected actions to be evaluated in this EIS, the implications of the NYICC as it relates to the alternatives for the Airspace Redesign will be discussed in this EIS. Additionally, even though these actions are considered independent of the Airspace Redesign, the cumulative impacts of these actions combined with the Airspace Redesign must be considered. The potential for cumulative impacts is discussed in

Section 4.18, *Cumulative Impacts*, of the FEIS.

1.8 SUMMARY

The Purpose and Need for the Proposed Action are:

- The purpose is to increase the efficiency and reliability of the airspace structure and the ATC system.
- This project is needed to accommodate growth while maintaining safety, mitigating delays, and accommodate changes in the types of aircraft using the system.

Chapter Two
ALTERNATIVES

2.1 INTRODUCTION

The Purpose and Need for the Proposed Action has been established in Chapter One. The next step in the environmental process is to identify and screen alternatives.

Federal guidelines concerning the environmental review process require that all prudent, feasible, reasonable, and practical alternatives which might accomplish the objectives of a proposed project be identified and evaluated. The examination of alternatives is of critical importance to the environmental review process. This evaluation establishes whether an alternative addresses the project Purpose and Need. Those alternatives that meet the Purpose and Need will be included for detailed analysis while those alternatives that do not meet the Purpose and Need will be dismissed from further consideration.

This chapter documents the alternatives considered and the screening process. Alternatives were screened based on their ability to meet the Purpose and Need. All alternatives not meeting the Purpose and Need were removed from further consideration. The remaining alternatives were retained for environmental impact analysis.

This chapter includes the following sections:

- Section 2.2 – Identification of Potential Alternatives
- Section 2.3 – Alternatives Considered
- Section 2.4 – Airspace Redesign Alternatives
- Section 2.5 – Evaluation of Detailed Airspace Redesign Alternatives
- Section 2.6 – Comparisons of Airspace Redesign Alternatives

2.2 IDENTIFICATION OF POTENTIAL ALTERNATIVES

The range of alternatives considered in the initial screening for this EIS include those within the following categories:

- **Alternative Modes of Transportation and Telecommunication** – Use alternative modes of transportation and communication including travel by automobile, bus, and rail, as well as use telecommunication methods such as video conferencing.
- **Changes in Airport Use** – Move operations to satellite airports or improve infrastructure of existing airports.
- **Congestion Management Programs** – Regulate air travel demand by limiting flight operations.
- **Improved Air Traffic Control Technology** – Use newly developed air traffic control technologies.
- **Airspace Redesign Alternatives** – Use restructured airspace routes, altitudes, and sectors.

Alternatives that are not within the jurisdiction of the FAA are included in this EIS, in accordance with 40 CFR 1502.1(c).

The following section identifies whether the alternative categories meet the Purpose and Need for the Proposed Action and why they were eliminated or carried forward for detailed environmental analysis.

2.3 ALTERNATIVES CONSIDERED

Each category of alternatives was examined as to whether it would meet the Purpose and Need for the Proposed Action. As stated in Chapter One, the Purpose and Need for the Proposed Action is as follows:

- The purpose of the airspace redesign is to increase the efficiency and reliability of the airspace structure and ATC system.
- The need is to accommodate growth in aircraft operations while maintaining safety, mitigating delays, and accommodating changes in the types of aircraft using the System.

The following subsections explain why categories of alternatives are eliminated or retained for further analysis.

2.3.1 Alternative Modes of Transportation and Telecommunication

The Alternative Modes of Transportation and Telecommunication Category includes alternatives which expand the use of rail, bus, or auto travel or increase the use of telecommunications to avoid travel. Examples of alternatives within this category include: expanding the high-speed rail system in the Northeast Corridor linking New York, Boston, and Washington, D.C. Metropolitan Areas, developing dedicated highway lanes for Bus Rapid Transit systems, and increasing the use of video conferencing.

Although this category of alternatives may have the potential to decrease air travel, it does not meet the Purpose and Need for the Proposed Action. The Proposed Action is needed to improve a specific mode of transportation (i.e., air travel) as the current airspace structure was developed many years ago and better procedures and technology are now available to improve operational efficiency.

Use of other modes of transportation or telecommunications would not address present day inefficiencies of the NY/NJ/PHL Metropolitan Area airspace. Therefore, this category of alternatives is not considered to be a reasonable alternative for meeting the Purpose and Need for the Airspace Redesign and will not be carried forward for additional consideration.

2.3.2 Changes in Airport Use

This category of potential alternatives includes moving operations to satellite airports and building additional airport infrastructure. The potential for this category of alternatives to meet the Purpose and Need is discussed in the following two subsections.

2.3.2.1 Use of Satellite Airports

This subcategory includes alternatives which shift operations from congested airports to nearby satellite airports. An example would be an alternative designed to shift operations at LaGuardia (LGA) to Islip Long Island MacArthur (ISP), Republic (FRG), and Westhampton Beach/The Francis S. Gabreski (FOK).

One problem with this type of alternative is that the NY/NJ Metropolitan Area airports are all located within a relatively small geographic area. Regardless of the airport, flights traveling to or from the New York, Philadelphia, Boston, or Washington, D.C. Metropolitan Areas will still be using the same flight routes to traverse the existing en route and terminal airspace structure. ATC would still need to manage aircraft through the inefficient airspace and route structure. As a result, shifting aircraft activity from highly used airports to lesser used airports may still cause flights to incur airspace delays and, thus, would have a negligible benefit to airspace efficiency.

Another problem with this type of alternative is that use of an airport is determined by aircraft operators and not the FAA. Aircraft operators choose to serve an airport in response to consumer demand for air service. No regulatory mechanism exists for the FAA to redistribute air traffic to satellite airports in the Study Area. Federal legislation would be needed in order to give the FAA the necessary authority to redistribute air traffic, which would represent a fundamental change to the nation's policy of a deregulated aviation system. In consideration of this deregulatory trend, legislation is not likely to be enacted.

Based upon this assessment, use of satellite airports would not address inefficiencies of the present day NY/NJ/PHL Metropolitan Area airspace, since this traffic would still be required to operate into and out of the current terminal and en route airspace structure. Therefore, use of satellite airports is not considered to be a reasonable alternative for meeting the Purpose and Need for the NY/NJ/PHL Airspace Redesign, and will not be carried forward for further consideration.

2.3.2.2 Improvements to Airport Infrastructure

Major improvements to the air carrier and general aviation airports in the Study Area are part of each airport's master planning process. Airfield improvements, such as new runways and improvements to taxiways, have the capability to improve the number of aircraft operations that an airport can efficiently support. That is, airfield improvements address airfield capacity constraints. Airfield improvements would do nothing to address the efficiency and reliability of the airspace structure, nor would they accommodate growth or mitigate delays in the air. Moreover, airfield improvements would do nothing to permit the FAA to take advantage of emerging technologies for controlling air traffic.

Use of improvements to airport infrastructure would not address inefficiencies of the present day arrival or departure procedures for the NY/NJ/PHL Metropolitan Area airspace due to the limitations and inefficiencies of the airspace. Therefore, the use of airport improvement program initiatives alone is not considered to be a reasonable alternative for meeting the Purpose and Need for the Airspace Redesign, and will not be carried forward for further consideration.

2.3.3 Congestion Management Programs

The FAA, airport proprietors, and air carriers use congestion management strategies to align the demand for airfield capacity with the limited supply at an airport. The primary objective of congestion management programs is to increase the efficient use of airports. Such programs may include regulatory and/or economic measures designed to manage the number of flight operations during peak use periods, potentially limiting the number of operations during peak-periods or shifting them to other less congested times of the day. In the context of airport congestion, Congress has articulated a policy that artificial restrictions on airport capacity are not in the public interest and should be imposed to alleviate air traffic delays only after other reasonably available and less burdensome alternatives have been tried. 49 U.S.C. 47101(a)(9)(A)(B). Artificial restraints on operations constrain the ability of air traffic to grow in accordance with market forces and have the potential to impede the use of emerging technologies or other capacity enhancement measures. Three major congestion management techniques are discussed in the sections that follow.

Administrative Approaches

Administrative approaches to congestion management include both the use of operational controls, such as landing and takeoff slots, or the convening of schedule reduction meetings with air carriers to reduce congestion-related delays under statutory authority enacted in 2003 and now codified at 49 U.S.C. 41722. Under the FAA's High Density Rule (HDR)[1] the number of IFR operations at a specified airport may be limited by requiring aircraft to have a reservation, commonly known as a slot, for takeoff or landing. The HDR currently limits operations at Reagan Washington National Airport.[2]

The FAA currently limits operations at LaGuardia Airport under an administrative order (71 Fed. Reg. 77854, Dec. 27, 2006). The FAA also limits operations at Chicago O'Hare International Airport by placing an administrative cap on hourly arrivals under 14 C.V.R. Part 93, Subpart K (71 Fed. Reg. 51382, Aug. 29, 2006). The rule, made effective a series of schedule adjustments that air carriers individually agreed to during scheduling reduction meetings held under 49 U.S.C. 41722. Scheduling reduction meetings offer a non-regulatory means of reducing overscheduling and flight delays at severely congested airports during hours of peak operation if the Administrator determines it is necessary and the Secretary determines that the meeting is necessary to meet a serious transportation need to achieve an important public benefit. In accordance with 49 U.S.C. 41722, schedule reduction meetings may only be called regarding congestion at a severely congested airport. There is currently no statutory authority for the Secretary and Administrator to call a schedule reduction meeting to address congestion in a generalized area, such as the Study Area for the proposed Airspace Redesign.

Voluntary De-Peaking

Voluntary de-peaking is a congestion management approach initiated by an individual air carrier as a response to the free market. In some cases at airports where a single air carrier operates a network hub, the dominant carrier has on its own refined its schedule in a way that smoothes out the operational spikes and thereby reduced delays.

Market-based Approaches

Market-based approaches, which include congestion-based landing fees and the auctioning of landing and take-off rights,

[1] 14 C.F.R. Part 93, Subpart K

[2] The HDR terminated at LaGuardia and Kennedy Airports after January 1, 2007. 49 U.S.C. 41715.

use market forces to encourage system users to schedule their operations efficiently, given the available capacity, and may be instituted either by the FAA or by an airport proprietor to manage airport congestion. One approach that may be implemented by an airport proprietor could include a properly structured peak-period pricing program where the objective is to align the number of aircraft operations with airport capacity during severely congested periods of peak airfield usage. Other approaches that may necessitate appropriate legislative authority in order to be implemented either by the FAA or by the airport proprietor could include congestion-based landing or take-off fees or auctioned landing authority.

The Office of the Secretary and the FAA are presently considering market-based approaches to relieve congestion and delay at airports such as LaGuardia Airport, in connection with the expiration of the HDR at LaGuardia. In connection with the FAA's reauthorization proposal for FY 2008,[5] the FAA has sought input from the flying public and first line stakeholders concerning future financing options to ensure that the FAA's revenues are adequate to fund the future needs of the aviation system. One of the questions posed regarding possible revisions to the current tax system is "What are your thoughts on using congestion pricing at locations and times of day when demand exceeds capacity, in order to capture the economic costs of congestion?" Questions on Future Funding of the Air Traffic Control System, Other Aviation System Components, and Related Issues (September 7, 2005) (http://www.faa.gov/about/office_org/headquarters_offices/aep/aatf/media/Questions%20or%20Stakeholders.pdf). Legislative authority would be necessary to adopt user fees, whether or not market-based, for air traffic facilities and services.

Alternatives involving increasing the size of aircraft at EWR and LGA are not reasonable prudent and practical.[6] Airport congestion management alternatives would not solve the operational inefficiencies and unreliability of the existing airspace and ATC system. AT best they would only alleviate need in portions of the airspace served by these airports. However, they would not accommodate growth in operations while maintaining safety and mitigating delays or accommodate changes in the types of aircraft using the entire system.

The demand for travel to all three major airports in the New York metropolitan areas, EWR, JFK, and LGA, is high. Assuming traffic is reduced using larger aircraft, more aircraft would quickly be scheduled to use the capacity that becomes available and the benefit of fewer aircraft would disappear.

As a strategy for accommodating growth and changes in the type of aircraft using the ATC system, use of larger aircraft is a partial solution, at best. Use of larger size aircraft only works if the increases in demand are coming from an airport already served. Hub and spoke operations, for

[5] This proposal would take effect when the current Airport and Airway Trust Fund excise taxes expire at the end of fiscal year 2007.

[6] For example, to promote the efficient use of limited LGA Airport capacity and facilities, the Port Authority of New York and New Jersey recently proposed a new leasing policy that would favor air carriers using larger aircraft in terms of seats provided in the Port Authority's allocation of gate reservations to the carriers. We do not find it necessary to reach the issue of whether his policy is consistent with Federal law because we find that airport congestion management is not a viable alternative to the proposed action in this EIS.

which increased aircraft size are practical, are a diminishing part of the demand in the U.S. Airlines fly so many regional jets, not because they cannot sell enough tickets to fill a narrow body, but because smaller jets enable more flights to connecting airports in the U.S. Both EWR and JFK are international destinations served by larger aircraft that are economical on such routes. Yet, congestion exists and is forecast to worsen as international traffic grows in the airspace used by these airports.

Finally, there will be small jet traffic to major airports in the study area that, like EWR have 6,800 feet overflow runways, in any event. Narrow body jets can only use such runways when the wind is right.

2.3.3.1 Airspace Congestion Management Programs

To date, congestion management strategies have been available in the context of managing the imbalance between airport capacity and demand. When an airport experiences increasing delay, the airport operator often considers ways to increase the airport's capacity, such as the addition of new runways or related infrastructure. This approach – of increasing airport capacity through infrastructure enhancements – is consistent with Congress' statutory finding that artificial restrictions on airport capacity are not in the public interest. Such restrictions should only be employed where airport improvements are physically impractical[8] or where improvements have been proposed, but not yet implemented by the airport sponsor, as at Chicago O'Hare International Airport.

While congestion management programs may reduce delays, they would not accommodate growth in operations. Such programs are not reasonable alternatives to the proposed redesign of the airspace in the NY/NJ/PHL Metropolitan Area because they would not meet the project's purpose: to increase the efficiency and reliability of the airspace structure and ATC system, thereby accommodating growth while enhancing safety and reducing delays in air travel. Just as airfield projects are preferred over artificial restraints on airport capacity in accordance with the policies noted in the introduction above (namely, 49 U.S.C. 47101(a)(9)(A)(B)), airspace redesign projects are preferred over artificial restraints on use of the airspace to increase the efficiency and reliability of the airspace structure and the ATC system. Congestion management programs premised upon assumptions of limited ability to enhance the airspace, like artificial restrictions on airport operations premised upon limited ability to enhance airfield capacity, should be considered only as a last resort to reduce delays in the national airspace system.

Based upon this assessment, congestion management is not a reasonable alternative for meeting the Purpose and Need for the Airspace Redesign, and will not be carried forward for detailed environmental analysis.

2.3.4 Improved Air Traffic Control Technology

A number of technological advancements are available, or in development, that have

[8] E.g., Washington, D.C.'s Reagan National Airport, and New York City's LaGuardia Airport (66 Fed. Reg. 37131 (June 12, 2001).

the potential to improve airspace efficiency. Examples of alternatives within this category of technological improvements that are currently in development are discussed in the following paragraphs.

Currently in use, the Traffic Management System (TMS) involves the use of computer systems that allow air traffic management coordinators to see aircraft activity on a national scale, identifying traffic surges, gaps, and volumes. Traffic managers can see the projected flow into specific airports or airspace sectors and take action to ensure that traffic demand does not exceed system capacity. The FAA is developing, testing, and implementing additional technologies to improve TMS. These upgrades are known as the Enhanced Traffic Management System (ETMS) and will expedite communication on traffic flow strategies.

The Center/TRACON Automation System (CTAS) includes software for accurately computing and predicting aircraft trajectories in real time and for scheduling aircraft landing times to achieve the least possible delay. CTAS will assist ATC in sequencing, spacing, and merging departing aircraft into the en route traffic system. The system incorporates radar flight track data and weather data and provides controllers with graphic displays. CTAS benefits controllers by reducing stress and workload, and benefits air travelers by reducing delays and enhancing safety. Components of CTAS are undergoing testing at several ATC facilities nationwide.[10]

The Free Flight Program is intended to create an Instrument Flight Rules (IFR) operating environment where aircraft operators have considerable flexibility in planning and flying their routes to minimize flight times and, ultimately, operational costs. Traditionally, aircraft operating under IFR have been subject to positive control by ATC throughout their flight and, thus, required to fly specific routes in the sky. This system of aircraft separation has been required to ensure operational safety for the many aircraft using the airspace. In recent years, numerous technologies have been developed that provide pilots and ATC with much more accurate and complete information about the operating environment and aircraft positions. These technologies promise to afford much greater flexibility and freedom to aircraft operators while maintaining safety and enhancing efficiency. While free flight is not available in the terminal airspace, it will promote more efficient and coordinated staging of aircraft in the en route airspace for unimpeded transfer into the terminal airspace. The initial phases of the Free Fight Program are being used in the airspace above 29,000 feet mean sea level (MSL). Further development of the Free Flight Program is ongoing.

While the potential exists for these technologies to allow controllers to better manage the airspace, they will not by themselves accommodate growth and enhance the safety and efficiency of the system. Technological improvements offer the potential to complement the Airspace Redesign by providing tools needed by controllers to more efficiently manage the flow of traffic. This should be especially helpful in the Study Area airspace given the high number of aircraft operations and the complex pattern of potential arrival runways at a number of major airports in the area (i.e., EWR, JFK, LGA, and TEB).

That both new technologies and the Airspace Management Program (AMP) are

[10] See: www.ctas.arc.nasa.gov.

included in the FAA's Operational Evolution Plan (OEP[11]) is indicative of the need for revised airspace structures that allow new technologies to be fully used.[12] However, the use of improved ATC technologies would not independently address the inefficiencies of the present day arrival or departure procedures for the Study Area airspace. This is because of the inherent limitations of the existing airspace design, route structure, and ATC procedures, as well as the fact that this airspace is operating near saturation during peak demand periods. Therefore, the alternative is not considered to be a reasonable alternative for meeting the Purpose and Need for the Airspace Redesign, and will not be carried forward for detailed environmental analysis.

2.3.5 Airspace Redesign Alternatives

Airspace in the NY/NJ/PHL Metropolitan Area could be redesigned by changing or enhancing departure gates, arrival posts, routes, and/or the airspace boundaries of the various ATC facilities. An example of this type of airspace redesign is the Potomac Consolidated TRACON (PCT) Airspace Redesign under implementation in the Baltimore/Washington, D.C. Metropolitan Area.

For the Study Area under examination, new departure gates and arrival posts would permit the development of new routes in the airspace structure. Expanding the boundaries of the terminal airspace environment would permit less restrictive separation rules to be used in a larger volume of airspace. These actions have the potential to meet the need to accommodate growth in air traffic levels while maintaining safety and mitigating delays. New routes could add efficiency by reducing delays and providing more direct routings; this has the potential to achieve the purpose of increasing the efficiency and reliability of the airspace structure and ATC system.

Airspace Redesign has the potential to independently address the inefficiencies of the Study Area airspace and to increase efficiency and reliability in the airspace. Therefore, this category of alternatives has the potential to meet the Purpose and Need for the Airspace Redesign and will be carried forward for further analysis.

2.3.6 Summary of Alternative Categories Considered but Eliminated

Of the five categories of potential alternatives considered, the following four have been eliminated because they do not meet the Purpose and Need of the Airspace Redesign:

- Alternative Modes of Transportation and Communication,
- Changes in Airport Use,
- Congestion Management Programs, and
- Improved ATC Technology.

The Airspace Redesign Alternatives category has not been eliminated and is discussed in Section 2.4.

2.4 CONCEPTS FOR AIRSPACE REDESIGN ALTERNATIVES

The evaluation of airspace redesign concepts has been an evolutionary process that began

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[11] In Spring of 2007 the FAA Administrator re-named the OEP the Operational Evolution Partnership, rather than Plan.

[12] See http://www.faa.gov/programs/oep/.

in 1999. The consideration of airspace and ATC changes began with the FAA's analysis of potential airspace redesign alternatives for the NY/NJ/PHL Metropolitan Area airspace. A working group, known as the NY/NJ/PHL Airspace Redesign Team (Airspace Redesign Team), was formed to design and evaluate conceptual airspace alternatives. The Airspace Redesign Team included ATC representatives from the affected facilities (New York TRACON, Philadelphia TRACON, New York Center, Washington Center, and Boston Center). The Airspace Redesign Team also included representatives from ATC facilities outside of the Study Area. This was done to ensure consideration of the airspace management responsibilities of the adjacent Centers and TRACONs.

Extensive coordination was a key component of the Airspace Redesign process. FAA internal coordination included exchange of information between the various ATC facilities. External input from airspace users (e.g. airlines, airport operators) and the public was solicited and considered. In addition, recommendations were received from RTCA. RTCA is a private not-for-profit corporation that functions as a Federal Advisory Committee. It develops industry consensus regarding air traffic management issues.

The Airspace Redesign Team developed specific assumptions and objectives for the Airspace Redesign. The assumptions were the common conditions upon which the alternatives were conceptualized. The objectives reflect the Purpose and Need and public concerns regarding the Airspace Redesign. The following assumptions and objectives guided the development of airspace alternatives:

Assumptions

- Point-to-point navigation used,
- Terminal area separation standards applied over a larger airspace area, and
- Present day restricted and prohibited areas, including post-September 11, 2001, Air Defense Identification Zone (ADIZ) and supporting military operations areas (MOAs) remained in place.

Objectives

- Reduce congestion in airspace sectors,
- Shorten routes,
- Segregate routes for aircraft of dissimilar operating characteristics (i.e., large aircraft from small aircraft),
- Impose fewer climb restrictions on departing aircraft and keep arrivals higher longer,
- Allow aircraft to operate at higher, more fuel-efficient altitudes for longer periods,
- Use area navigation (e.g., RNAV, GPS, etc.),
- Create a flexible airspace structure,
- Accommodate projected growth, and
- Reduce environmental impacts, where possible.

2.4.1 Airspace Redesign Concepts

The Airspace Redesign Team explored four broad concepts in developing detailed airspace redesign alternatives that met the Airspace Redesign objectives. The four concepts considered were: Four Corner-Post, Modifications of Existing Routing, Ocean Routing, and Clean Sheet.

2.4.1.1 Four Corner-Post Concept

The four corner-post concept starts with placing a square over the TRACON airspace as the basic structure. Arriving aircraft enter the TRACON airspace at any of the four corners of the square. Arriving aircraft are allowed to proceed to any of the four corners for entry, avoiding delays further from the TRACON airspace. Once aircraft enter at the corner, they can proceed to another corner, enter the square and go directly to the intended airport, or enter into a large overhead circular pattern to await final permission to proceed to their ultimate destination airport (a procedure known as holding). Aircraft in the circular pattern would be stacked at different altitudes to accommodate large quantities of aircraft in the metropolitan area. Departing flights would exit the box on any of the sides.

The four corner-post operation is typically most effective in single airport operations with arrivals from all corners, and departures routed between these arrival corners. For example, the four corner-post concept is currently used at the Atlanta TRACON.

The four corner-post concept would not work for the NY/NJ/PHL Metropolitan Area airspace because arrival and departure streams are concentrated in the west and southwest quadrants, and the north and east quadrants are limited by the requirements for over-water aircraft operation and warning area restrictions. Balancing traffic over arrival posts and departure gates is made more complex by the proximity of airports in other major metropolitan areas.

Thus, alternatives based on the four corner-post concept would not meet the objectives or the Purpose and Need for the Airspace Redesign. Therefore, alternatives based on the four corner-post concept were eliminated from further consideration.

2.4.1.2 Modifications to Existing Routing Concept

This concept involves modifying the current routes and procedures to improve efficiency in the current airspace system. For instance, routes could be added into and out of the TRACON airspace, thus reducing congestion on current routes.

Alternatives based on this concept would have the ability to meet the objectives of the Proposed Action. Therefore, a detailed airspace redesign alternative was developed using the Modifications to Existing Routing Concept.

2.4.1.3 Ocean Routing Concept

The Ocean Routing Airspace Alternative is a proposal that was originally developed by the NJ Citizens for Environmental Research, Inc. (NJCER) at the request of the NJ Coalition Against Aircraft Noise (NJCAAN). This alternative sends all EWR departing flights over the Raritan Bay to the Atlantic Ocean before turning them back over land to head to their departure gates.

The purpose of the Ocean Routing Airspace Alternative is to reduce noise impacts on the citizens of New Jersey. The purpose of the Proposed Action is to increase the efficiency and reliability of the entire NY/NJ/PHL Metropolitan Airspace. The airspace changes designed to achieve the purpose of reducing noise in one specific area, by there very nature, would not increase the efficiency and reliability of the NY/NJ/PHL Metropolitan Airspace. Because all EWR departures would use the same departure route, this alternative would inherently result in a large increase in airport departure delay. Since this concept does not meet the Purpose and Need for the Proposed Action, it would normally be eliminated from further consideration. However, due to the long standing concerns of the NJCAAN, the FAA elected to retain the Ocean Routing Alternative for detailed analysis.

2.4.1.4 Clean Sheet Concept

A clean sheet or "Area Concept" was initially explored as a concept that would be developed within the boundaries of the current NY Center and NY TRACON airspace. Any changes within this airspace would not require changes in adjacent Center's or TRACON's airspace. The Airspace Redesign Team discovered that the constraints of the NY Center's and NY TRACON's airspace boundaries did not facilitate the use of the clean sheet approach. This alternative, therefore, evolved into an integrated airspace concept that used some of the initial design elements of the Clean Sheet "Area Concept" and then added elements that more efficiently integrated the functions of the NY TRACON (N90) and NY Center (ZNY) to operate more seamlessly in either a standalone or consolidated manner. Therefore, a detailed airspace redesign alternative was developed based on the Integrated Airspace Concept.

2.5 EVALUATION OF DETAILED AIRSPACE REDESIGN ALTERNATIVES

After the Airspace Redesign Concepts were explored, detailed alternatives were developed. Two of the detailed alternatives, 'Modifications to Airspace' and 'Integrated Airspace' were developed by the Airspace Redesign Team. These alternatives were based on the aforementioned Airspace Redesign Concepts that had the potential to meet the Purpose and Need. One alternative was developed by the NJCER and was based on the Ocean Routing Concept. The remaining alternative, Future No Action, was developed to satisfy the requirements of CEQ Regulations.

Each Airspace Redesign Alternative is described and illustrated and evaluated for its ability to meet the Purpose and Need for the Proposed Action.

2.5.1 Alternative Descriptions

The Future No Action Airspace Alternative is discussed first because it is the basis for all discussions and illustrations of the other alternatives. The descriptions and figures for the Modifications to Existing Airspace, Ocean Routing, and Integrated Airspace alternatives describe only those aspects that are different from the Future No Action Airspace Alternative. For example, the figures for each of these alternatives illustrate only those gates, posts, and major traffic flows that have changed from the Future No Action Airspace Alternative, based on the modeling. Changes to major traffic flows are only shown immediately beyond the gates/posts; changes to traffic flows further out are not shown.

The alternative descriptions are focused on the five major airports: JFK, LGA, EWR, TEB, and PHL. These descriptions give the reader a high level understanding of how the FAA moves aircraft into and out of the metropolitan NY/NJ and PHL areas. The departure gates, arrival posts, and major traffic flows to and from the most frequently used runway configurations are described in detail.

The detailed descriptions of the Airspace Redesign Alternatives are developed in order to concisely depict a large, complex airspace system. Therefore, the gates, posts, and flows are described to the degree necessary to understand the major features of an alternative.

The specific gates and posts described in this document are not necessarily the same as those used for the purposes of controlling air traffic. The gates and posts found in this document were developed specifically to describe and illustrate the various airspace alternatives. For example, in the current airspace configuration, flights departing from JFK, LGA, EWR, and TEB, and destined for locations south are directed to the same departure gate. However, the following descriptions and illustrations of the South departure gates for these four airports will not match exactly because the South departure gate was developed specifically to identify airspace changes to flights landing at each individual airport.

For simplicity's sake, flows to and from the airports are discussed and illustrated in a two-dimensional manner, relative to their mapped location only. The aircraft altitude and number of aircraft in a particular flow are not discussed. The altitudes of aircraft are not discussed because the noise exposure levels depend on slant angle or distance from the source of the sound, and thus altitudes at specific points may not provide a meaningful comparison among alternatives. Likewise, the number of aircraft on a particular flight path may not provide a meaningful comparison among alternatives because the same number of flights can result in different noise results depending on time of day. The width of the flows shown in the graphics does not indicate the number of aircraft in that flow, it only represents the dispersion of flights using that flow. The locations of flows are described and illustrated by using references to major landmarks in the area of significant routing changes. The figures also show special use airspace areas (e.g., prohibited, restricted, or warning areas). According to the Aeronautical Information Manual (AIM), "Special use airspace consists of that airspace wherein activities must be confined because of their nature, or wherein limitations are imposed upon aircraft operations that are not a part of those activities, or both."[13] These areas have both horizontal and vertical boundaries and are shown to illustrate where use of the airspace may be limited. Flows that are depicted as entering special use airspace may be flying over or under the boundaries of this airspace, or may be allowed access because it is compatible with current activities in the special use airspace.

The primary changes to airspace structure of each alternative are captured by the discussion of the flows to and from the major airports. Flows associated with the satellite airports are discussed only where the resulting changes in noise levels would meet the FAA thresholds as described in Section 4.1.1, *Noise/Compatible Land Use Impact Criteria*. However, all airspace changes, regardless of whether they are associated with a major or satellite airport, were modeled to complete operational and noise analysis.

2.5.2 Purpose and Need Evaluation

The ability of each detailed alternative to meet the Purpose and Need for the Proposed Action is discussed and evaluated, including the degree to which each alternative achieves the objectives of the Airspace Redesign.

[13] AIM, Section 4. Special Use Airspace, 2/19/04.

The evaluations of the Airspace Redesign Alternatives are based on the following Purpose and Need Evaluation Criteria, which are categorized into two groups, operational viability and operational efficiency, based upon similar measurable goals.

Operational viability refers to whether a particular airspace redesign is workable, and thus, safe. This gauge of system safety reflects the potential to maintain standards that define spacing between multiple aircraft, aircraft and other physical structures, and aircraft and designated airspace. Operational viability criteria include:

- **Reduce airspace complexity** - Airspace complexity is often considered an important issue when airspace performance is assessed and when sectors and routes are evaluated for redesign. Airspace complexity is a function of the degree to which aircraft routes are intermingled. The more route crossings, the more complex the airspace. Complexity is also related to the number of aircraft, types of aircraft, and duration of a flight in a particular volume of airspace.

- **Reduce voice communications** - Congested, complex airspace often requires the controller to increase the number of advisories, clearances, and instructions needed to manage the operations. Improved airspace design and routing can minimize vectoring and/or communications between the flight crews and the controllers.

Operational efficiency refers to how well a particular design works. Operational efficiency criteria include:

- **Reduce delay** - Delay is the primary measure of the operational efficiency of the airspace system. Delays in the airspace system may be caused by congestion and the limitations of a particular airspace structure.

- **Balance controller workload** - Balanced controller workload is achieved when airspace is divided into sectors handling approximately equal demand and, geography-permitting, all airspace resources are evenly used. Overworked sectors must be protected with traffic management initiatives that increase delay.

- **Meet system demands** - Meeting the projected growth of traffic is an important objective. Improving airspace efficiency is needed to accommodate projected growth in traffic levels.

- **Improve user access to the system** - The ability of users to act on or obtain services for additional flights is a measure of user access to the system. This measure reflects the quality and level of service, as well as the availability of system resources.

- **Expedite arrivals and departures** - Expediting arrivals and departures will increase the efficiency of the system. In the New York and Philadelphia TRACONS there are three problems that can impede arrivals and departures: high number of aircraft, longer routing distances, and altitude restrictions.

- **Increase flexibility in routing** - Flexible routing permits aviation users to more easily adapt their operations to changing operational conditions (e.g., a shift in the jet stream or to avoid severe weather). Flexibility indicators include the availability of runways, arrival and departure fixes, and routes, as well as the absence of aircraft equipment restrictions on routes.

- **Maintain airport throughput** - The terminal airspace provides arrival and departure paths to and from the runways. In some instances the capacity of the airspace, as defined by the routes into and out of an airport, limits the throughput of the airport. Ideally, the airspace route structure can support the maximum capacity of the runways, thus maintaining a steady stream of aircraft in and out of the airport.

In summary, various Operational Viability and Operational Efficiency Criteria are used to evaluate whether each Airspace Redesign Alternative meets the Purpose and Need and to compare the alternatives to one another. Following the detailed description of each alternative, the evaluation of that alternative is discussed in terms of the Purpose and Need Operational Viability and Operational Efficiency Criteria.

2.5.3 Future No Action Airspace Alternative

This alternative represents all major traffic flows into and out of the Study Area in the study years 2006 and 2011 if no changes are implemented via the Airspace Redesign. A composite representation of flight tracks for the Future No Action Airspace Alternative was developed using multiple sources including actual radar data. The only major difference between this alternative and present day operations will be the type and quantity of aircraft operations.

The following sections will breakdown the Study Area traffic patterns by major airport to simplify the description of how aircraft flow into and out of the NY/NJ/PHL Metropolitan Area.

Note that under the Future No Action Airspace Alternative, the airspace will operate as it did during existing or baseline conditions (2000), with the exception of two procedural changes (i.e., the Dual Modena and the Flip-Flop) that have been implemented and have independent utility with regards to the Airspace Redesign, see Section 1.2.6. As these changes have been implemented, they are included as part of the Future No Action Airspace Alternative.

Figures 2.1 through 2.10 identify existing major routing and flow patterns associated with the Future No Action Airspace Alternative.

2.5.3.1 Future No Action Airspace Alternative - JFK Traffic Routing

Future No Action Airspace Alternative – JFK Departure Routing

The majority of departure traffic from JFK is conducted on parallel Runways 31L/R or 13L/R. There are four JFK departure gates: the North, East, West, and Ocean gates. Aircraft are routed to these gates based primarily on their destination. The location and use of each gate, along with its associated air traffic, are discussed in the following paragraphs. See **Figure 2.1** for a graphic display of flows out of JFK.

<u>Future No Action Airspace Alternative – JFK North Departure Gate</u>

The North departure gate begins approximately 55 miles to the northwest of the Airport and extends from Sussex County, NJ to Orange County, NY. This gate serves flights destined for the upper Midwest. JFK traffic flows from Runways 31L/R and 13L/R follow the same close-in flight paths[14] as East gate traffic. Between 10 and 20 miles from the Airport, these flows will turn to the northwest. This traffic continues to the North departure gate, diverging into three flows when crossing the Hudson River. Traffic finally passes through the North departure gate at three distinct points.

Future No Action Airspace Alternative – JFK East Departure Gate

This departure gate begins just southwest of Tweed-New Haven Airport and extends to the northwest. Flights destined for Canada and the northeastern U.S. use this gate. The majority of traffic departing Runways 31L/R makes an immediate left turn to avoid LGA traffic flows, circles back to the east, and then turns north. These flights diverge into three distinct flows and then proceed directly toward the East departure gate. Runways 13L/R traffic turn left after departure and then fly direct to the East departure gate.

Future No Action Airspace Alternative – JFK West Departure Gate

The West departure gate is located approximately 40 to 45 miles southwest of JFK in the vicinity of Robbinsville, NJ, to a point east of Lakehurst, NJ. This gate serves flights heading directly to the western United States, and to the Washington, D.C. Metropolitan Area. Departures from Runways 31L/R turn left immediately and proceed toward a point in the vicinity of Sandy Hook, NJ. From there, westbound flights will proceed directly towards Robbinsville, NJ. Aircraft departing from Runways 13L/R will turn right off the runway and proceed to a point in the vicinity of Sandy Hook, NJ and then continue from this point as previously described for Runways 31L/R.

Future No Action Airspace Alternative – JFK Ocean Departure Gate

The Ocean departure gate extends in an arc approximately 30 miles in length starting from a point approximately eight miles south of Bay Shore, NY, extending to a point approximately 20 miles east of Point Pleasant, NJ. Transatlantic flights and aircraft heading south along the eastern seaboard, which include flights to the Caribbean, use the Ocean departure gate. Departures close-in to the Airport follow the same tracks as previously described for the North departure gate. Runways 31L/R departures turn immediately to the left heading over Jamaica Bay, NY and proceed either to the east or to the southeast over the Atlantic Ocean. Within 10 miles of the Airport, traffic is established on specific tracks headed toward the Ocean departure gate. Departures off Runways 13L/R head directly toward the east or southeast and continue to the Ocean departure gate. All of the traffic through this gate stays over the Atlantic Ocean, south of Long Island, NY.

Future No Action Airspace Alternative – JFK Arrival Routing

JFK arrivals are primarily conducted on Runways 13L/R and 31L/R. There are three arrival posts into JFK: the North, East, and South posts. The location and use of each post is discussed in the following paragraphs. See **Figure 2.2** for a graphic display of these flows into JFK.

[14] For the purposes of this EIS, 'close-in' procedures refers to aircraft operations and routes within a few miles of the airport. It does not refer to the noise abatement departure profiles referenced in FAA AC 91-53A.

Future No Action Airspace Alternative – JFK North Arrival Post

The North arrival post is located approximately 25 miles northwest of JFK and approximately six miles northwest of TEB. This post serves all flights arriving to JFK from the north, northwest, and west. All major arrival streams from these directions converge at this post. Aircraft landing Runways 13L/R proceed over the top of TEB and then proceed over the top of LGA. These aircraft then head southeast, passing JFK on the north side and arcing in a right turn circling around the Airport to land on Runways 13L/R. Flights landing on Runways 31L/R will also proceed in the vicinity of TEB, but will turn to the southeast and pass JFK on the south side, and then turn left to circle and land on Runways 31L/R.

Future No Action Airspace Alternative - JFK East Arrival Post

The East arrival post is located approximately 30 miles east-northeast of JFK, just southeast of ISP over the Great South Bay, north of Fire Island, NY. This post serves flights arriving from Europe and the northeastern U.S. Arrivals proceed toward JFK just off the coast of Long Island. Flights landing on Runways 31L/R will turn northwest 10 to 20 miles from the Airport and proceed directly to Runways 31L/R to land. Flights destined for Runways 13L/R will continue to pass south of the Airport. Once past JFK, these flights will turn right and circle to land on Runways 13L/R.

Future No Action Airspace Alternative - JFK South Arrival Post

The South arrival post is located approximately 40 miles south of JFK over the Atlantic Ocean. The western most tip of the post is located in the vicinity of Point Pleasant, NJ and the post extends approximately 20 miles to the east. Flights arriving over the Atlantic Ocean, from South America, the Caribbean, and the southwest, all converge at this arrival post. Flights from the Atlantic arrive over the ocean to the arrival post, while flights from the south arrive up the coast of NJ over Atlantic City.

Aircraft landing on Runways 31L/R will continue heading northeast from the arrival post until the Airport is directly to the northwest, at which point they will turn northwest to land on Runways 31L/R. Aircraft landing Runways 13L/R will turn to the northwest and proceed to a point east of Sandy Hook, NJ. At approximately 10 miles from the Airport, the flights will turn to the northeast and proceed to the vicinity of Canarsie, NY. Once past this point, the flights will make a southeast turn to land Runways 13L/R.

2.5.3.2 Future No Action Airspace Alternative - LGA Traffic Routing

Future No Action Airspace Alternative – LGA Departure Routing

The majority of departure traffic from LGA is conducted on Runways 4 or 13, depending on which runway use configuration (i.e., north or south) the Airport is operating. There are five LGA departure gates: North, East, South, West, and Ocean gates. Aircraft are routed to these gates based primarily on their final destination. The location and use of each gate, along with its associated air traffic, is discussed in the following paragraphs. See **Figure 2.3** for a graphic display of flows out of LGA.

Future No Action Airspace Alternative - LGA North Departure Gate

The North gate begins approximately 40 miles to the northwest of the Airport and extends from Sussex County, NJ, to Orange County, NY. This gate serves flights to the upper Midwest. Before the aircraft reach this gate, they diverge into three distinct air traffic flows with two in the State of NJ and one in the State of NY. Aircraft departing from Runway 4 will initially make a right turn off the runway and then begin a turn to the left proceeding directly to the North departure gate. Aircraft departing Runway 13 will follow the same path as the East departure gate flights close-in before circling back to the west, heading north of LGA and then proceeding direct toward the North departure gate. A small percentage will make a right turn initially and continue circling back to the northwest, remaining south of the airport and finally continuing directly toward the North departure gate.

Future No Action Airspace Alternative – LGA East Departure Gate

This departure gate begins just southwest of Tweed-New Haven Airport and extends to the northwest. This gate serves transatlantic flights and flights heading to Canada and the northeastern U.S. Aircraft departing Runway 13 will make a left turn to avoid JFK traffic, proceed over Long Island Sound, and continue to the East departure gate. Aircraft departing Runway 4 make an initial right turn off the Runway, proceed over The Bronx, NY, and then continue to the East departure gate.

Future No Action Airspace Alternative - LGA South Departure Gate

The South departure gate is located approximately 50 miles south of the Airport in the vicinity of Lakehurst, NJ and serves LGA aircraft traveling to southeastern U.S. destinations. Aircraft departing Runway 13 will either make a right turn off the runway turning to the south, passing over the area of Canarsie, NY, then proceeding to the area in the vicinity of Sandy Hook, NJ, or aircraft will make a left turn circling back around LGA on the north side, proceeding to a point in the vicinity of Sandy Hook, NJ. Both flows will then proceed to the South departure gate. Aircraft departing off Runway 4 will turn left, circle to the south, proceed toward Sandy Hook, NJ, and then on to the South departure gate. The majority of the traffic departing LGA and heading to the South departure gate fly between EWR and JFK.

Future No Action Airspace Alternative - LGA West Departure Gate

The West departure gate is located approximately 60 miles west of the Airport. This gate runs along the NJ-PA state line for 30 miles and serves flights departing to the west and southwestern U.S. Aircraft departing from Runway 13 will initially make a left turn, fly north of the Airport, continue on toward TEB, and then proceed directly to the West departure gate. Some departures off of Runway 13 will initially turn right to the south and then turn back to the west, flying south of the Airport. These flights will continue flying to the west, south of TEB, and proceed directly to the West departure gate. The majority of aircraft departing Runway 4 will initially make a slight turn to the right off the Runway, begin a left turn over The Bronx, NY, proceed towards TEB, and then proceed directly to the West departure gate.

Future No Action Airspace Alternative - LGA Ocean Departure Gate

The Ocean departure gate is located approximately 40 to 50 miles southeast of the Airport over the Atlantic Ocean. The Ocean departure gate extends in an arc approximately 30 miles in length starting from a point approximately eight miles south of Bay Shore, NY, extending to a point approximately 20 miles east of Point Pleasant, NJ. This gate serves both South American and southeastern U.S. flights. Aircraft departing both Runways 4 and 13 turn to the southeast in the vicinity of JFK, cross over Long Island, NY, and proceed over the Atlantic Ocean directly to the Ocean departure gate.

Future No Action Airspace Alternative – LGA Arrival Routing

The majority of arrival traffic to LGA is conducted on Runways 31 (north runway use configuration) and 22 (south runway use configuration). There are three arrival posts into LGA: the North, South, and West posts. The location and use of each post, along with its associated air traffic, are discussed in the following paragraphs. In addition, an arrival flow not associated with a particular post is described. See **Figure 2.4** for a graphic display of flows into LGA.

<u>Future No Action Airspace Alternative – LGA North Arrival Post</u>

The North arrival post is located approximately 50 miles north of LGA. The western most tip of the arrival post begins five miles east of SWF and extends 15 miles to the east just short of the Connecticut state line. This post serves arriving flights from the upper Midwest, eastern Canada, and the northeastern U.S. These three major flows converge at the North arrival post and then proceed to the south in the vicinity of HPN. From this point, aircraft landing Runway 22 continue south to land on the runway. Flights destined for Runway 31 once past the post will fly to the southeast over Long Island Sound. These flights will then turn to the northeast, aligning with the Runway and land.

<u>Future No Action Airspace Alternative - LGA South Arrival Post</u>

The South arrival post is located 45 miles southwest of LGA in the vicinity of Robbinsville, NJ. It primarily serves flights coming from the southwest, the southeast, and the Washington Metropolitan Area. This flow merges with the West gate flow just prior to flying in over Raritan Bay en route to LGA. The close-in patterns to LGA are the same as the West post flows once over Raritan Bay.

<u>Future No Action Airspace Alternative - LGA West Arrival Post</u>

The West arrival post is located approximately 70 miles west of LGA on the NJ state line. The West arrival post runs north and south and serves all flights arriving to LGA from the Midwest. Arriving flights continue to the southeast in the vicinity of Princeton, NJ, before making a gradual turn to the north toward LGA. This flow continues over Raritan Bay heading northeast where it is situated between EWR and JFK. Flights landing onto Runway 22 will pass the Airport on either side, then turn south to land onto Runway 22. Flights landing Runway 31 will fly over the top of LGA, turn to the east, and circle back to the northwest to land on Runway 31.

<u>Future No Action Airspace Alternative - LGA Other Arrival Flows</u>

Transatlantic traffic arrives in the vicinity of Sandy Hook, NJ and is sequenced with both the west and south arrival traffic over Raritan Bay where it then proceeds direct to LGA.

2.5.3.3 Future No Action Airspace Alternative - EWR Traffic Routing

Future No Action Airspace Alternative – EWR Departure Routing

The majority of departure traffic from EWR is conducted on Runways 4L or 22R, depending on which flow (north or south) the Airport is operating. There are four EWR departure gates: North, East, South, and West. Aircraft are routed to these gates based primarily on their final destination. The location and use of each gate, along with its associated air traffic, are discussed in the following paragraphs. See **Figure 2.5** for a graphic display of flows out of EWR.

Future No Action Airspace Alternative - EWR North Departure Gate

The North departure gate is located 40 miles northwest of the Airport and extends from Sussex County, NJ into Orange County, NY. This gate serves flights to the upper Midwest. Flights departing on Runway 4L make an initial turn to the right off the Runway, then turn immediately to the northwest climbing between CDW and MMU. These flights diverge into three distinct flows to the northwest approximately 20 to 30 miles from the Airport. Flights departing on Runway 22R make an initial left turn off the Runway, then turn back to the northwest climbing between CDW and MMU and proceeding as previously described to the gate.

Future No Action Airspace Alternative - EWR East Departure Gate

The East departure gate is located 65 miles northeast of EWR. This departure gate begins just southwest of Tweed-New Haven Airport and extends to the northwest. It serves flights destined for the northeastern U.S., Canada, and Europe. Flights departing Runway 4L make an initial right turn off of the Runway and proceed to the northeast towards TEB (approximately 10 to 15 miles). Once these flights are approximately 30 to 35 miles from EWR, they diverge into three distinct flows at the departure gate. Flights departing EWR on Runway 22R make an initial turn to the left, then head southwest turning prior to Linden, NJ and continue turning back to the northeast, climbing past TEB and proceeding as previously described to the East departure gate.

Future No Action Airspace Alternative - EWR South Departure Gate

The South departure gate is located 25 miles to the south of EWR, near Colts Neck, NJ. This gate serves flights heading to the southeastern U.S., the Washington, D.C. Metropolitan Area, South America, and the Caribbean. Flights departing Runway 4L make an initial right turn off the Runway, turn back to the south, climb west of LDN, and then proceed to the vicinity of Colts Neck, NJ. These flights will continue flying southwest over NJ. Flights departing Runway 22R will make an initial left turn off the Runway, turn back to the southwest, merging with the Runway 4L flow 10 miles from the Airport, and finally proceed as previously described for Runway 4L to the gate.

Future No Action Airspace Alternative - EWR West Departure Gate

The West departure gate is located 40 to 45 miles from EWR and serves flights departing to the western and southwestern U.S. This gate runs along the NJ-PA state line for 30 miles. Flights departing Runway 4L make an initial right turn off the Runway, and then turn to the west heading south of MMU. These flights diverge into four distinct flows prior to reaching the gate.

Flights departing Runway 22R make an initial left turn off the runway, and then diverge into westerly and northwesterly flows in the vicinity of LDN. These distinct flows blend with Runway 4L traffic at 20 miles and then proceed as previously described to the gate.

Future No Action Airspace Alternative - EWR Arrival Routing

The majority of arrival traffic to EWR is conducted on Runways 4R (north configuration) or 22L (south configuration). There are four arrival posts into EWR that deliver flights to these runways: the North, South, West, and Ocean. The location and use of each post, along with its associated air traffic, are discussed in the following paragraphs. See **Figure 2.6** for a graphic display of flows into EWR.

Future No Action Airspace Alternative - EWR North Arrival Post

The North arrival post is located 30 miles northwest of EWR along a line that runs between Highland Lakes, NJ and Sloatsburg, NY. This post serves flights arriving from the northeastern and the northwestern U.S., Canada, Europe, and the Pacific Rim. Four distinct flows from these areas converge at this post. Arrivals to Runway 4R will fly west of MMU heading south past the Airport, then turn back to the northeast at various distances from the Runway to land. For Runway 22L, flights will head southeast, and make a right turn to land when aligned with the runway.

Future No Action Airspace Alternative - EWR South Arrival Post

The South arrival post is located 40 miles to the southwest of EWR, in the vicinity of Yardley, PA and serves flights arriving from the southeastern U.S. and Washington, D.C. Metropolitan Area. For Runway 4R, flights arriving from the southwest proceed directly from the arrival post with a slight left turn to align with the runway and land. For Runway 22L, flights arriving from the southwest make a left turn heading north from the arrival post and proceed primarily north and west of MMU. These flights then turn right, continue to circle to the south, and align with the runway to land.

Future No Action Airspace Alternative - EWR West Arrival Post

The West arrival post is located 45 miles west of EWR one to two miles south of Mount Bethel, PA and serves flights arriving from the western U.S. This flow diverges into two distinct flows at the post, depending on which runway is in use. For Runway 22L, flights will proceed to the east in the vicinity of CDW then make a right turn to the southeast, just west of TEB, to align with the Runway and land. For Runway 4R, flights will proceed to the east in the vicinity of LDJ and make a left turn to the north to land.

Future No Action Airspace Alternative - EWR Ocean Arrival Post

The Ocean arrival post is located in the vicinity of Robbinsville, NJ and serves flights arriving from South America and the Caribbean. Flights arriving from the southeast make a right turn to align with Runway 4R and land. Runway 22L arrivals from the southeast make a right turn, heading north from the post. These aircraft then are routed as previously described for the aircraft coming from the southwest to Runway 22L.

2.5.3.4 Future No Action Airspace Alternative - TEB Traffic Routing

Future No Action Airspace Alternative – TEB Departure Routing

The majority of departure traffic from TEB is conducted on Runways 1 or 24, depending in which flow (north or south) the Airport operates. There are four TEB departure gates: the North, East, South, and West. Aircraft are routed to these gates based primarily on their final destination. The location and use of each gate, along with its associated air traffic, are discussed in the following paragraphs. See **Figure 2.7** for a graphic display of flows out of TEB.

Future No Action Airspace Alternative - TEB North Departure Gate

The North departure gate is located 40 miles to the northwest of the Airport and extends from Sussex County, NJ into Orange County, NY. This gate serves flights destined for the upper Midwest. Flights departing on Runway 1 make an initial right turn off the runway, then turn back to the west and proceed to the vicinity of Pompton Plains, NJ where they turn to the northwest and proceed directly to the North departure gate. At the gate, flights will diverge into three main flows. Flights departing Runway 24 will fly straight off the runway, turn to the west, proceed west of Caldwell, NJ, and then turn to the northeast and proceed directly to the gate.

Future No Action Airspace Alternative - TEB East Departure Gate

The East departure gate is located 50 miles to the northeast of TEB, south of HVN, and extends to the northwest. This gate serves flights heading to the northeastern U.S and Canada. Flights departing Runway 1 make an initial right turn off the runway, turn to the left and proceed in the vicinity of Monsey, NY. These flights then turn to the northeast and diverge into three flows prior to reaching the East departure gate, depending on their final destinations. Flights departing Runway 24 in a south flow proceed straight off of the runway and then make a right turn to the northwest passing to the east of Caldwell, NJ. These aircraft continue out across the NJ/NY state line in the vicinity of Monsey, NY where they merge with Runway 1 departures and continue as previously described to the East departure gate.

Future No Action Airspace Alternative - TEB South Departure Gate

The South departure gate is located 30 to 35 miles to the south of the Airport in the vicinity of Colts Neck, NJ. This gate serves flights heading to the southeastern U.S., the Washington, D.C. Metropolitan Area, and South America. Flights departing Runway 1 make an initial right turn off the Runway and then make a left turn, continuing to circle to the south. These flights remain west of EWR and proceed directly to the gate where they diverge into two main flows. One flow continues south over central NJ, while the other proceeds out over the Atlantic Ocean. Flights departing Runway 24 fly straight after takeoff, then turn to the southwest five miles from the Airport, where they proceed as described above for Runway 1 west of EWR.

Future No Action Airspace Alternative - TEB West Departure Gate

The West departure gate is located approximately 50 miles to the west of the Airport. It extends for 30 miles along the NJ/PA state border. This gate serves flights destined for the west and southwest U.S. Flights departing on Runway 1 make an initial right turn off the Runway, turn back to the west five miles north of the Airport, and proceed in the vicinity of Caldwell, NJ. Departure flights then diverge into four distinct flows to the West departure gate. Flights departing Runway 24 fly straight, then turn to the west and proceed in the vicinity of MMU, where they diverge into four distinct flows before heading directly to the gate.

TEB Future No Action Airspace Alternative - Arrival Routing

The majority of arrival traffic to TEB is conducted on Runways 6 (north configuration) or 19 (south configuration). There are four arrival posts into TEB that deliver flights to these runways: North, two South, and West. The location and use of each post, along with its associated air traffic, are discussed in the following paragraphs. In addition, an arrival flow not associated with a particular post is described. See **Figure 2.8** for a graphic display of flows into TEB.

Future No Action Airspace Alternative - TEB North Arrival Post

The North arrival post is located 40 miles to the northwest near Huguenot, NY. This post services all traffic arriving from the north and northeastern U.S. and Canada. These flights are made up of three distinct flows that converge on the arrival post. Flights landing Runway 6, coming from the east, fly over the Hudson River, then over northwest Bergen County, NJ to the southwest towards MMU. These flights then head southeast towards EWR and turn northeast to land on Runway 6. Flights landing Runway 19, coming from the east, fly over the Hudson River and turn towards the south in the vicinity of the Garden State Parkway, then proceed south to land. Flights landing Runway 6 coming from the north head south passing south and west of MMU, before turning left towards the northeast and aligning with Runway 6 for landing. Flights landing Runway 19 coming from the north diverge into two flows: one heads south, turns east, and flies over Passaic and Bergen Counties, NJ, then turns south in the vicinity of the Garden State Parkway and aligns with Runway 19 to land. The other turns to the southeast and proceeds directly over TEB, then turns to the north and circles to the left to land on Runway 19.

Future No Action Airspace Alternative - TEB South Arrivals Posts

Flights arriving from the south use two arrival posts. The first is located 45 miles to the southwest of TEB, northwest of Yardley, PA. This post serves flights arriving from the southern U.S. The second post is located 45 miles to the south in the vicinity of Robbinsville, NJ and serves flights arriving from the Atlantic Ocean.

Arrivals from the western South arrival post that are landing on Runway 6 typically proceed on course as they are aligned with the runway coming from this direction. Runway 19 arrivals typically fly northeast to the vicinity of MMU and then turning to the south to align with Runway 19 to land.

Flights arriving via the Robbinsville, NJ post and landing Runway 6 will continue flying to the northwest past the post and finally turn to the northeast to align with Runway 6 for landing. Flights destined for Runway 19 will continue flying to the northwest and in the vicinity of MMU will continue as described in the preceding paragraph to land on Runway 19.

Future No Action Airspace Alternative - TEB West Arrival Post

The West arrival post is located approximately 45 miles northwest of the

Airport in the vicinity of Stillwater, NJ. This post serves flights arriving from the western U.S. All flights arriving from the west converge at this post. This flow diverges either to the east, toward CDW, or to the southeast in the vicinity of MMU.

Runway 6 arrivals proceeding in the vicinity of CDW continue to the southeast, turn to the northeast in the vicinity of Rutherford, NJ, and align with Runway 6 to land. The flow that proceeds in the vicinity of MMU continues toward EWR, turning to the northeast once aligned with Runway 6 to land.

Runway 19 arrivals that proceed to CDW continue direct to TEB where they pass over the Airport and make a left turn to the north, and circle to land on Runway 19.

Future No Action Airspace Alternative - TEB Other Arrival Flows

Flights arriving from various airports in New England are given a direct route to TEB, via eastern Westchester County, NY. This flow serves mostly turboprop aircraft that are being controlled by tower facilities. Direct routing to the Airport is possible because this flow is generally below the major traffic patterns in the NY Metropolitan area.

2.5.3.5 Future No Action Airspace Alternative - HPN Traffic Routing

Future No Action Airspace Alternative – HPN Departure Routing

The majority of departure traffic from HPN is conducted on Runways 16 or 34, depending on the flow of current operations at the Airport. There are four HPN departure gates: the North, East, West, and South. Aircraft are routed to these gates based primarily on their final destination. The location and use of each gate, along with its associated air traffic routes, are discussed in the following paragraphs.

Future No Action Airspace Alternative - HPN North Departure Gate

The North departure gate is located 50 miles to the northwest of the Airport and extends from Sussex County, NJ into Orange County, NY. This gate serves flights destined for the upper Midwest. Flights departing on Runway 16 make an initial right turn off the runway, then turn back to the west and proceed to the north of New City, NJ where they continue to the northwest and proceed directly to the North departure gate. At the gate, flights will diverge into three main flows. Flights departing Runway 34 will take a slight turn to the left over Rye Lake Reservoir, turn to the west, continue over Hawthorne, NY, and proceed directly to the gate.

Future No Action Airspace Alternative - HPN East Departure Gate

The East departure gate is located approximately 30 miles to the northeast of HPN, extends from Fairfield County, CT into New Haven and Litchfield Counties of CT. This gate serves flights heading to the northeastern U.S. and Canada. Flights departing Runway 16 make a right turn off the runway and continue to loop around and proceed to the vicinity of Chappaqua, NY. These flights then turn to the northeast and diverge into four flows prior to reaching the East departure gate, depending on their final destinations. Flights departing Runway 34 will take a slight turn to the left over Rye Lake Reservoir and then make a right turn to the northeast passing to the east of Hawthorne, NY. These aircraft continue out across the CT/NY state line in the vicinity of Fairfield County, CT where they continue as previously described to the East departure gate.

Future No Action Airspace Alternative - HPN West Departure Gate

The West departure gate is located approximately 80 miles to the south and west of the Airport. This gate serves flights destined for the west and southwest US. Flights departing on Runway 16 make an initial right turn off the Runway, turn back to the west three to five miles west of the Airport, and proceed to the vicinity of Bergen County, NJ. Departure flights then diverge into four distinct flows to the West departure gate. Flights departing Runway 34 will make a slight turn to the left over Rye Lake Reservoir, then turn to the west and proceed to the vicinity of Tarrytown, NY and eventually over Bergen County, NJ where they diverge into four distinct flows before heading directly to the gate.

Future No Action Airspace Alternative - HPN South Departure Gate

The South departure gate is located 75 miles to the south of the Airport in the vicinity of Lakehurst, NJ. This gate serves flights heading to the southeastern U.S. Flights departing Runway 16 make an initial right turn off the runway and then make a left turn down the Hudson River and continue to the south. These flights remain east of EWR and proceed directly to the gate where they diverge into two main flows. One flow continues south over central NJ, while the other proceeds out over the Atlantic Ocean. Flights departing Runway 34 will make a slight turn to the left over Rye Lake Reservoir, then turn to the southwest six to eight miles from the Airport, where they proceed as described above.

HPN Future No Action Airspace Alternative - Arrival Routing

The majority of arrival traffic to HPN is conducted on Runways 34 (north configuration) or Runway 16 (south configuration). There are three arrival posts into HPN that deliver flights to these runways: the North, South, and West. The location and use of each post, along with its associated air traffic routes, are discussed in the following paragraphs. An additional section describes a flow from the east which serves nearby airports from the northeast region of the US.

Future No Action Airspace Alternative - HPN North Arrival Post

The North arrival post is located 30 miles to the northwest in Putnam County, NY. This post services all traffic arriving from the north and northeastern US, northwest US, and Canada. These flights are made up of three distinct flows that converge on the arrival post. Flights landing on Runway 16, coming from the east, fly over Litchfield County, CT, then over southern Putnam County, NY. These flights then head southeast towards HPN and land on Runway 16. Flights landing on Runway 34, coming from the east, take a similar route until exiting Putnam County, NY. At this point they fly down the east side of the airport toward Stamford CT before turning right, over the Long Island Sound, and then proceed north to land. Flights landing on Runway 16 coming from the north head south passing through Dutchess County, NY before turning slightly to the left and aligning with Runway 16 for landing. Flights landing Runway 34 coming from the north again fly over Dutches County, NY before making the right turn over the Long Island Sound and turning north to land on Runway 34. Flights landing Runway 16 and 34 from the northwest fly over Ulster

County, NY and then blend with the arrivals procedures previously described.

Future No Action Airspace Alternative - HPN South Arrivals Posts

Arrivals from the South arrival post enter the study area by crossing the DE/NJ state line near Salem County, NJ and fly across New Jersey passing over Point Pleasant, NJ before flying over the Atlantic Ocean headed toward Deer Park, NY. If the flights are landing Runway 16, they will typically go north over Fairfield, CT and turn left over Westchester, NY as they align with the runway to land. Aircraft headed to Runway 34 will turn over the Long Island Sound before turning north just east of Port Chester, NY and landing.

There is one additional flow from the south that is used by flights destined for HPN. This route stays over the ocean longer, enters New York near Riverhead, and flies a similar route as previously described to the desired runway.

Future No Action Airspace Alternative - HPN West Arrival Post

The West arrival post is located approximately 70 miles west of the Airport in the vicinity of Stillwater, NJ. This post serves flights arriving from the western U.S. If arrivals are destined for Runway 16, the route continues east over Rockland and Westchester Counties before turning right and aligning with the runway. If landing on Runway 34, the route turns southeast over Spring Valley, NY and then left again over Port Chester, NY before aligning with the runway for landing.

Future No Action Airspace Alternative - HPN East Arrival Flow

Flights arriving from various airports in New England are given a direct route to HPN, via eastern Middlesex County, CT and following the Long Island Sound before turning to land on the desired runway. This flow serves mostly turboprop aircraft that are being controlled by tower facilities. Direct routing to the airport is possible because this flow is generally below the major traffic patterns in the NY Metropolitan area.

2.5.3.6 Future No Action Airspace Alternative - PHL Traffic Routing

Future No Action Airspace Alternative - PHL Departure Routing

The majority of departure traffic from PHL is conducted on Runways 9L/R or 27L/R, depending on the configuration (west or east) in which the Airport is operating. There are four PHL departure gates: the North, East, South, and West. Aircraft are routed to these gates based primarily on their final destination. The location and use of each gate, along with its associated air traffic, are discussed in the following paragraphs. See **Figure 2.9** for a graphic display of flows out of PHL.

Future No Action Airspace Alternative - PHL North Departure Gate

The North departure gate is located in the vicinity of Pottstown, PA about 30 miles northwest of PHL. This gate serves flights with final destinations to the north through PA, to the Midwest, and flights continuing to the northwest. Flights departing Runways 9L/R initially fly straight from the runway then make a left turn to the northwest and proceed to the North departure gate. Flights departing Runways 27L/R initially make a left turn off the runway, and then turn back to the northwest before crossing into Delaware and proceeding to the gate.

Future No Action Airspace Alternative - PHL East Departure Gate

The East departure gate is located approximately 30 miles east of the Airport and serves flights destined for the northeastern U.S., eastern Canada, and Europe. Flights departing Runways 9L/R will make a slight right turn and proceed directly to the gate. Aircraft departing on Runways 27L/R will make an immediate left turn, continuing to the west, and proceed directly to the East departure gate. Once over the gate, the departure flow will diverge into two flows; one flow continues out to the east and then over the Atlantic Ocean, while the other will turn north at the gate and proceed north over central NJ. This divergence in departure flow occurs 20 to 30 miles from the Airport.

Future No Action Airspace Alternative - PHL South Departure Gate

The South departure gate is located approximately 15 miles south of the Airport, in the vicinity of Woodstown, NJ. It serves flights proceeding to the southeastern U.S., Caribbean, and South America. Flights departing Runways 9L/R will make a right turn within 10 miles of the Airport then proceed directly to the gate. Aircraft departing on Runways 27L/R will make a left turn off the Runway and proceed directly to the gate.

Future No Action Airspace Alternative - PHL West Departure Gate

The West departure gate is located approximately 25 miles west of the Airport. One end is located in the vicinity of Modena, PA while the other end is located eight miles to the southwest, just north of Avondale, PA. Flights departing Runways 9L/R normally make a left turn and proceed directly to either the north or south ends of the gate depending on the final city destination. Flights departing Runways 27L/R will initially make a left turn, then turn back to the west and proceed to the West departure gate.

Future No Action Airspace Alternative - PHL Arrival Routing

The majority of arrival traffic to PHL is conducted on Runways 9L/R (east configuration) or 27L/R (west configuration). There are five arrival posts into PHL that deliver flights to these runways: the North, East, South, Southwest, and West posts. These arrival posts are generally located in airspace that is not being used by the departure flows to help minimize mixing of arrival and departure traffic. The location and use of each post, along with its associated air traffic, are discussed in the following paragraphs. See **Figure 2.10** for a graphic display of flows into PHL.

Future No Action Airspace Alternative - PHL North Arrival Post

The North arrival post is located 40 miles northwest of the Airport and 10 miles southwest of Allentown, PA. It serves flights arriving from the north. Arriving flights converge in the vicinity of this post and then fly south to the Airport. When the aircraft get within 20 miles of the Airport, they are positioned to land on either Runway 9L/R or 27L/R depending on the current airport flows. Flights for both runways approach the Airport and turn either to the west or to the east, depending on which runway is being used to land aircraft. For Runways 9L/R, once the aircraft are flying to the west past the Airport, they are turned back to the east to land. For Runways 27L/R, aircraft are turned to the east, once past the Airport, they are turned back to the west to land.

Future No Action Airspace Alternative - PHL East Arrival Post

The East arrival post is located 30 miles southeast of PHL and serves three major traffic arrival routes. Flights arriving from the northeastern U.S. and Europe, flights arriving from the southeastern U.S. and flights arriving from South America and the Caribbean converge at this post. Once flights pass through this post, they are sequenced into appropriate landing patterns depending on which runway is in use. For Runways 27L/R, flights are directed to the north and turned to the west at various distances to land. For Runways 9L/R, flights are turned to the northwest initially and then back to the east at various distances from the Airport prior to landing.

Future No Action Airspace Alternative - PHL South Arrival Post

The South arrival post is located 35 miles to the southwest of PHL. This post serves flights arriving from the southern U.S. These flights will diverge into two flows 30 miles from the Airport, depending on which runway is in use. This flow will be blended with the Southwest post arrivals at this point and will fly the same close-in pattern as the southwest arrivals described in the preceding section.

Future No Action Airspace Alternative - PHL Southwest Arrival Post

The Southwest arrival post is located 40 miles to the southwest of PHL in the vicinity of the upper Chesapeake Bay. This gate serves flights arriving from the Washington, D.C. Metropolitan Area. Arrival flights are split between 30 to 40 miles from the Airport, depending on which runway is in use. For Runways 9L/R, flights continue to fly to the northeast and when aligned with the runway, turn to the east to land. Flights landing on Runways 27L/R will pass to the south of PHL heading east; once past the Airport, this traffic will turn back to the west to land.

Future No Action Airspace Alternative - PHL West Arrival Post

The West arrival post is located approximately 50 miles to the northwest of the Airport and serves flights arriving from the west. Once flights are past the post, they diverge into two flows, depending on their destination runway. Aircraft landing onto Runways 9L/R either turn to the south and, once in line with the Runway 10 to 15 miles from PHL, turn back to the east to land, or fly north of the Airport, turn back to the west, and finally turn back to the east to land. Aircraft arriving to Runways 27L/R fly north of the Airport heading east and make a right turn to land, or continue east then turn back to the west to align with the Runway and land.

2.5.3.7 Future No Action Airspace Alternative – Summary

The Future No Action Airspace Alternative is the “do nothing” alternative. Therefore, the features (gates, posts, and flows) of this alternative represent the existing airspace structure including the Robbinsville-Yardley Flip-Flop and the Dual Modena Procedures. The Future No Action Airspace Alternative serves as the basis for discussion of the other airspace alternatives.

2.5.3.8 Future No Action Airspace Alternative - Purpose and Need Evaluation

Although the Future No Action Alternative does not meet the Purpose and Need, it is carried forward for further analysis as required by CEQ regulations.

2.5.4 Modifications to the Existing Airspace Alternative

This alternative includes minor modifications to today's airspace and routing, improving operations as much as possible within the limitations of current ATC facility boundaries. This alternative builds on the Future No Action Alternative. Note that all Modifications to Existing Airspace Alternative descriptions and graphics describe only those aspects of the alternative that are different, or have varied from the Future No Action Airspace Alternative. Figures 2.11 through 2.14 identify major routing and flow changes associated with the Modifications to Existing Airspace Alternative.

2.5.4.1 Modifications to Existing Airspace Alternative - LGA Traffic Routing

Modifications to Existing Airspace Alternative – LGA Departure Routing

As with the Future No Action Airspace Alternative, LGA departure traffic is conducted on Runway 4 during north configuration and Runway 13 during south configuration. All of the departure gates remain the same as in the Future No Action Airspace Alternative, except the South departure gate. This gate is shifted to the northwest resulting in south flows moving to the west. In addition, flights departing from Runway 4 would operate with new departure headings as compared to the Future No Action Airspace Alternative. Both changes and associated flows will be discussed in detail in the following paragraphs. See **Figure 2.11** for a graphic display of flows out of LGA.

<u>Modifications to Existing Airspace Alternative – LGA North Departure Gate</u>

Flights departing off Runway 4 will turn to the left and proceed in a northerly heading over the Bronx, NY and then turn to the northwest at approximately eight to 10 miles from the Airport to proceed directly to the North departure gate.

<u>Modifications to Existing Airspace Alternative - LGA East Departure Gate</u>

Instead of making a slight turn to the right, flights departing from Runway 4 will fly straight off of the runway and proceed directly to the East departure gate.

<u>Modifications to Existing Airspace Alternative – LGA Shifted South Departure Gate</u>

The shifted South departure gate would be shifted to the northwest from the Future No Action Airspace Alternative LGA South departure gate. This would result in south flows moving to the west from the Future No Action Airspace Alternative flows. All jet flights departing off of Runway 13 will fly the same departure headings as the Future No Action Airspace Alternative with the exception of propeller aircraft. Propeller aircraft will turn to the left departing the runway and turn a much tighter radius back around the Airport. Flights will then continue turning to the south, flying between LGA and TEB en route to the shifted South departure gate. This flow will start to diverge from the Future No Action Airspace Alternative flow as the flights cross over the northern NJ coastline south of Raritan Bay. As the flights continue over the State of NJ, they will be moved to the west of the Future No Action Airspace Alternative flow to an area located eight miles northwest of Lakehurst, NJ. A small percentage of flights departing Runway 13 will make a right turn, continue turning to the south flying between LGA and JFK, en route to the shifted gate. Flights departing Runway 4 will make an immediate turn to the northwest, continue to circle to the southwest, and merge with Runway 13 flows west of LGA.

Modifications to Existing Airspace Alternative – LGA West Departure Gate

All flights departing off of Runway 13 will fly the same procedures as the Future No Action Airspace Alternative, with the exception of propeller aircraft. Propeller aircraft will turn to the left departing the runway and turn a much tighter radius back around the Airport and then to the West gate. This tight loop to the left will only be used by propeller aircraft departing this runway.

LGA Modifications to Existing Airspace Alternative - Arrival Routing

There are no changes to LGA arrival routes in the Modifications to Existing Airspace Alternative, as compared to the Future No Action Airspace Alternative. All arrival posts and routing for LGA arrivals remain the same as in the Future No Action Airspace Alternative.

2.5.4.2 Modifications to Existing Airspace Alternative - EWR Traffic Routing

Modifications to Existing Airspace Alternative - EWR Departure Routing

All of the departure gates remain the same as in the Future No Action Airspace Alternative, except the South departure gate. This gate is shifted to the northwest resulting in south flows also moving to the west as compared to the locations for the Future No Action Airspace Alternative. Flights departing from Runways 22R and 4L will operate with additional departure headings than in the Future No Action Airspace Alternative. Departure procedures off of Runway 4L will depend on TEB using the Runway 6 ILS. When the TEB Runway 6 ILS is in use, all flights will follow the same departure headings as the Future No Action Airspace Alternative. If the ILS is not being used, departing flights will use different procedures close to the Airport. Flights departing Runway 22R will depend on EWR Runway 11 use. The North, East, and West departure gates will all use the same initial departure procedure when Runway 11 is being used. When Runway 11 is not being used, flights departing to the North and East departure gates will use different procedures than the West departure gate. These procedural changes and associated flows will be discussed in detail in the following paragraphs. **Figure 2.12** shows flows out of EWR.

Modifications to Existing Airspace Alternative – EWR North or East Departure Gates

Flights departing Runway 22R to either the North or East gate will make a right turn after takeoff heading west from EWR, then turn to the north approximately five miles from the Airport. Once turned to the north, North departure gate traffic will continue directly to the North departure gate, while East departure gate traffic will continue turning to the east approximately eight miles northwest of the Airport and then proceed directly to the East departure gate. If EWR Runway 11 is in use, departing flights will turn to the right, more toward the southwest then previously described, before turning to the north and continuing as before to each respective gate.

Flights departing Runway 4L will make an initial right turn off the Runway if the TEB ILS to Runway 6 is being used, then make a turn to the left at approximately two to five miles from the Airport and proceed direct to the North Gate or they turn to the right and proceed direct to the East departure gate. If the TEB ILS to Runway 6 is not being used, flights will either turn to the left immediately after takeoff, proceeding to the northwest to the North departure gate, or they will make a right turn off of the runway, proceeding northeast, and then turn to the east to proceed to the East departure gate. This immediate left turn departure flow is dependent on the operations at TEB as previously described and will only be used a small fraction of the time. This is true for all left turns immediately off Runway 4L at EWR for this alternative.

Modifications to Existing Airspace Alternative – EWR Shifted South Departure Gate

Flights departing Runway 22R, will fly straight off of the runway following takeoff, make a left turn to the south and then proceed to the shifted South departure gate located eight miles northwest of Lakehurst, NJ. Flights departing Runway 4L will make an initial right turn off the runway, if TEB Runway 6 ILS is being used then a make a looping left turn to the south, preceding directly to the shifted South departure gate or, when Runway 6 ILS is not being used, they will turn to the left after takeoff, heading southwest until past the Airport on the west side, then directly to the shifted South departure gate.

Modifications to Existing Airspace Alternative - EWR West Departure Gate

Flights departing Runway 22R will turn to the right following takeoff, maintain this direction until just north of Linden Airport, and then turn to the west to proceed to the gate. If TEB Runway 6 ILS is in use, flights departing Runway 4L will make an initial right turn off the Runway, make a turn to the west five miles from the Airport, and then proceed directly to the West departure gate. If TEB Runway 6 ILS is not in use, they will turn to the west immediately after take-off and proceed directly to the gate.

Modifications to Existing Airspace Alternative - EWR Arrival Routing

There are no changes to EWR arrival routes in the Modifications to Existing Airspace Alternative, as compared to the Future No Action Airspace Alternative. All arrival posts and routing for EWR arrivals remain the same as in the Future No Action Airspace Alternative.

2.5.4.3 Modifications to Existing Airspace Alternative - TEB Traffic Routing

Modifications to Existing Airspace Alternative – TEB Departure Routing

All of the departure gates remain the same as in the Future No Action Airspace Alternative, except the South departure gate. This gate is shifted to the northwest, resulting in south flows also moving to the west from the Future No Action Airspace Alternative. The location and use of this gate, along with its associated air traffic, are discussed in the following paragraph.

Modifications to Existing Airspace Alternative - TEB Shifted South Departure Gate

The shifted South departure gate is shifted to the northwest, resulting in south flows also moving to the west from the Future No Action Airspace Alternative. All flights departing to the new South departure gate will fly the same route close-in to the

Airport, but will diverge from the Future No Action Airspace Alternative once in the vicinity of Colt's Neck, NJ. Once past Colt's Neck, NJ, flights will turn to the southwest and proceed to the shifted South departure gate. This flow will be the same as the Future No Action Airspace Alternative flow after the flight is south of the gate. (See **Figure 2.13**)

Modifications to Existing Airspace Alternative - TEB Arrival Routing

There are no changes to TEB arrival routes in the Modifications to Existing Airspace Alternative, as compared to the Future No Action Airspace Alternative. All arrival posts and routing for TEB arrivals remain the same as in the Future No Action Airspace Alternative.

2.5.4.4 Modifications to Existing Airspace Alternative HPN Traffic Routing

Modifications to Existing Airspace Alternative - HPN Departure Routing

The HPN departure tracks for the Modifications to Existing Airspace Alternative remain identical to the Future No Action routes within 44 miles of HPN. All of the departure gates remain the same as in the Future No Action Airspace Alternative, except for the South departure gate. This gate would be shifted to the northwest resulting in south flows moving to the west slightly. This change would result in south flows moving to the west from the Future No Action Airspace Alternative flows at a point approximately 45 miles south-southwest of HPN over Raritan Bay. As the alternative routes continue to the southwest over central New Jersey, they will generally parallel the Future No Action Airspace Alternative routes and will be situated approximately eight miles to the west of the No Action route location.

Modifications to Existing Airspace Alternative – HPN Arrival Routing

There are no changes to HPN arrival routes in the Modifications to Existing Airspace Alternative, as compared to the Future No Action Airspace Alternative. All arrival posts and routing for HPN arrivals remain the same as in the Future No Action Airspace Alternative.

2.5.4.5 Modifications to Existing Airspace Alternative - PHL Traffic Routing

Modifications to Existing Airspace Alternative - PHL Departure Routing

All of the departure gates remain the same as in the Future No Action Alternative, except the East departure gate, which would be shifted to the east affecting flights destined for the northeastern U.S., Canada, and Europe. In addition, flights departing from Runways 9L/R and 27L/R will operate with new departure headings as compared to the Future No Action Airspace Alternative. Both changes and associated flows will be discussed in detail in the following paragraphs. See **Figure 2.14** for a graphic display of flows out of PHL.

<u>Modifications to Existing Airspace Alternative – PHL North Departure Gate</u>

Flights departing Runways 9L/R will make an immediate turn to the northeast off the runway and continue turning back to the northwest, continuing as the Future No Action Airspace Alternative flow would at this point. This flow will then proceed direct to the North departure gate. Flights departing Runways 27L/R will make an immediate right turn to the north off of the runway and fly directly to the North departure gate, following the same path as the Future No Action Airspace Alternative flow would to the gate.

Modifications to Existing Airspace Alternative – PHL Shifted East Departure Gate

The shifted East departure gate is shifted further to the east than the PHL Future No Action Airspace Alternative East departure gate; affecting flights destined for the northeastern U.S., Canada, and Europe. Aircraft departing Runways 9L/R will make an immediate right turn and proceed to a point in the vicinity of Coyle, NJ. From this point, all flights will turn to the northeast and proceed in the vicinity of either EWR or JFK. Flights departing Runways 27L/R will make an immediate turn to the south, then turning back to the east, continuing to the vicinity of Coyle, NJ then proceed to the shifted East departure gate. These departure flows would be shifted further to the east to make room for the shifted South gate departure flows from the NY Metropolitan Area. Remaining airspace changes for this alternative take place close-in to the Airport with departing flights and are described in the following paragraphs.

Modifications to Existing Airspace Alternative – PHL South Departure Gate

Flights departing Runways 9L/R will make an immediate right turn to the south proceed directly to the South departure gate, merging with the Future No Action Airspace Alternative flows in the vicinity of the South departure gate. Flights departing Runways 27L/R will make an immediate turn to the southwest off the Runway and then proceed directly to the South gate, merging with the Future No Action Airspace Alternative flows near the Airport prior to reaching the South departure gate.

Modifications to Existing Airspace Alternative – PHL West Departure Gate

Flights departing Runways 9L/R will make an immediate turn to the northeast off of the runway. This flow will circle back to the west using a tighter radius than the North gate flights. Once the aircraft are heading west, these flights will merge with the Future No Action routing and proceed on the same route to the West gate. Flights departing Runways 27L/R will fly straight off the runway or make a slight turn to the right before proceeding to the West departure gate as in the Future No Action Airspace Alternative routing.

Modifications to Existing Airspace Alternative – PHL Arrival Routing

There are no changes to PHL arrival routes in the Modifications to Existing Airspace Alternative, as compared to the Future No Action Airspace Alternative. All arrival posts and routing for PHL arrivals remain the same as in the Future No Action Airspace Alternative.

2.5.4.6 Modifications to Existing Airspace Alternative - Summary

This alternative takes the current routes and procedures and modifies them to improve efficiency in the current airspace system. The differences between this alternative and the Future No Action Airspace Alternative include additional departure headings and shifting of the NY Metropolitan Area airports' South departure gate, as well as the PHL East departure gate.

New departure headings for LGA, EWR, and PHL would be implemented as part of this alternative. For example, in this alternative, a more direct LGA Ocean departure procedure would be added.

In this alternative, the NY/NJ Metropolitan Area South departure gate is shifted 10 miles to the west. Therefore, departures to the south originating from LGA, TEB, EWR and HPN would be shifted to the new South departure gate. In addition, the PHL East departure gate would be shifted to the east. Therefore, PHL departures to the east would have to continue farther east before tuning to the northeast.

Modifications to Existing Airspace Alternative arrivals would not be changed from the current configuration.

Table 2.1 presents a summary of the Modifications to Existing Airspace Alternative, as compared to the Future No Action Airspace Alternative.

2.5.4.7 Modifications to Existing Airspace Alternative - Purpose and Need Evaluation Criteria

The following paragraphs address how the Modifications to Existing Airspace Alternative meets the Purpose and Need evaluation criteria developed by the airspace design team.

Modifications to Existing Airspace Alternative - Reduce Complexity

This alternative reduces complexity by moving the PHL east departures bound for the northeastern U.S. farther to the east, thus segregating this flow from JFK departures in the vicinity of Robbinsville, NJ.

Modifications to Existing Airspace Alternative - Reduce Voice Communications

This alternative does not contain design features that lead explicitly to a decrease in either controller-pilot or controller-controller communications.

Modifications to Existing Airspace Alternative - Reduce Delay

New departure headings (i.e., divergent headings per FAA Order 7110.65P) allow more aircraft to depart in a given amount of time because the aircraft diverge from one another, thus reducing separation between successive departures and delay.

Modifications to Existing Airspace Alternative - Balance Controller Workload

This alternative improves the balance of controller workload because modifications to departure headings allow aircraft to be more evenly distributed to multiple departure controllers.

Modifications to Existing Airspace Alternative - Meet System Demands

More efficient terminal airspace design has the capability to help controllers more effectively balance peak-hour arrival and departure demand. One way to make the airspace more efficient is to add departure gates and/or arrival posts. This alternative does not appreciably improve the ability to meet system demands because no additional departure gates or arrival posts were added.

Modifications to Existing Airspace Alternative - Improve User Access to System

This alternative does not appreciably improve user access to the System because there would be no additional departure gates, departure routes, arrival posts, or arrival routes.

Table 2.1
Summary of Modifications to Existing Airspace Alternative

Airport	Changes from Future No Action
JFK	No Changes
LGA	South departure gate shifted to the northwest New departure headings for aircraft departing Runway 4 to the North departure gate New propeller aircraft procedures departing Runway 13 to West departure gate New departure headings for propeller aircraft departing Runway 13 to the South departure gate New distant procedures for aircraft departing Runways 4 and 13 to the South departure gate New departure headings for aircraft departing Runway 4 to the East departure gate
EWR	South departure gate shifted to the northwest New procedures for aircraft heading to new South departure gate New departure headings from all runways to all gates New departure headings off Runways 4L dependent on TEB Runway 6 New departure headings off Runways 22R dependent on TEB Runway 11
TEB	South departure gate shifted to the northwest New distant procedures for aircraft heading to shifted South departure gate
HPN	South departure gate shifted to the northwest New distant procedures for aircraft departing to the south gate
PHL	East departure gate shifted further east New procedures for aircraft heading to new East departure gate New departure headings for aircraft heading to the North, East, West, and South departure gates

Modifications to Existing Airspace Alternative - Expedite Arrivals and Departures

Additional departure headings allow air traffic to expedite departures at EWR, LGA, and PHL. In addition, moving PHL East departures destined for the northeastern U.S. to the east allows these flights unrestricted climbs out of the TRACON airspace, thus expediting departures. Benefits to arrival traffic are not expected for this alternative, because arrival procedures have not changed.

Modifications to Existing Airspace Alternative - Increase Flexibility in Routing

During severe weather, additional departure routes can be used to avoid localized weather activity. Thunderstorms may be highly localized, cutting off several routes while leaving adjacent routes open. The increase in departure routes means that controllers have additional flexibility in routing aircraft around severe weather. Since this alternative did not increase the number of departure gates or routes, it does not increase flexibility in routing.

Modifications to Existing Airspace Alternative - Maintain Airport Throughput

For this alternative, additional departure headings yield a minimal increase in maintaining airport throughput since additional departure gates or routes are not available. Benefits to arrival traffic are not expected for this alternative, because arrival procedures have not changed.

Summary

The Modifications to Existing Airspace Alternative enhances safety by reducing complexity. It improves efficiency by increasing flexibility, maintaining airport throughput, and expediting departures.

Therefore, this is a reasonable alternative for meeting the Purpose and Need of the Airspace Redesign and is carried forward for environmental analysis.

2.5.5 Ocean Routing Airspace Alternative

The Ocean Routing Airspace Alternative is a proposal that was developed by the NJ Citizens for Environmental Research, Inc. (NJCER) at the request of the NJ Coalition Against Aircraft Noise (NJCAAN).[15]

This alternative sends all EWR departing flights over the Raritan Bay to the Atlantic Ocean before turning them back over land to head to their departure gates. Note that all Ocean Routing Airspace Alternative descriptions and graphics describe only those aspects of the alternative that are different from the Future No Action Airspace Alternative. There are no changes to arrival or departure routing for PHL and TEB associated with this alternative.

Figures 2.15 through 2.18 identify major routing changes associated with the Ocean Routing Airspace Alternative.

2.5.5.1 Ocean Routing Airspace Alternative - JFK Traffic Routing

Ocean Routing Airspace Alternative – JFK Departure Routing

As with the Future No Action Airspace Alternative, the majority of departure traffic from JFK uses parallel Runways 31L/R or 13L/R. The North and East gates are the same as the Future No Action Airspace Alternative, while the West gate is shifted and the Ocean gate is split. The location and use of these gates, along with their associated air traffic, are discussed in the following paragraphs. See **Figure 2.15** for a graphic display of flows out of JFK.

<u>Ocean Routing Airspace Alternative – JFK Split Ocean Departure Gate</u>

The Future No Action Ocean departure gate is split into the Ocean departure gate and the South departure gate. The flow that passed through the southern tip of the Future No Action Ocean departure gate is moved to the South departure gate. The South departure gate is located approximately 60 miles south of JFK, extending 30 miles to the east from a point in the vicinity of Barnegat Bay into the Atlantic Ocean. This gate serves flights heading to the southeastern U.S. and South America. Flights destined for this gate follow the same procedures as the shifted West departure gate flows until reaching Barnegat Bay, at which point they continue south down the coastline of NJ to the shifted South departure gate.

<u>Ocean Routing Airspace Alternative – JFK Shifted West Departure Gate</u>

The shifted West departure gate is oriented north and south, beginning in the vicinity of Yardley, PA extending south 30 miles into Burlington County, NJ. This gate serves flights heading directly to the western U.S., the Washington, D.C. Metropolitan Area, and points south. This shifted departure gate shifts all JFK departures over central NJ. Aircraft departing Runways 31L/R and 13L/R would head south and east of the Airport over the Atlantic Ocean. This flow will diverge into two flows prior to turning west over the State of NJ. The first flow will turn west in the vicinity of Asbury Park, NJ, towards Robbinsville, NJ, then proceed

[15] Source: Development of Air Traffic Routings for the Mitigation of Aircraft Noise in New Jersey; Submitted to New Jersey Citizens for Environmental Research, Inc.; June 1993; Section 1.0 – Executive Summary, Page 1.

to the north end of the new West departure gate. The second flow continues south along the NJ coastline, turning west in the vicinity of Barnegat Bay, NJ, then west toward Coyle, NJ, and proceeding to the south end of the shifted West departure gate.

Ocean Routing Airspace Alternative - JFK Arrival Routing

There are three arrival posts into JFK: the North, East, and South posts. The North and East arrival posts are the same as the Future No Action Airspace Alternative. The South arrival post is relocated farther to the east for the Ocean Routing Airspace Alternative. The location and use of this post is discussed in the following paragraphs. See **Figure 2.16** for a graphic display of these flows into JFK.

Ocean Routing Airspace Alternative – JFK North Arrival Post

Flights arriving from the North arrival post landing on Runways 31L/R proceed over LGA and fly east where they turn right, and continue to circle to the southwest in the vicinity of Deer Park, NY. These flights would maintain a southwest heading until aligned to land on Runways 31L/R.

Ocean Routing Airspace Alternative - JFK Shifted South Arrival Post

The South arrival post is moved to the east of the Future No Action Airspace Alternative post. Flights arriving over the Atlantic Ocean, the south, and southwest all converge on this arrival post similar to the Future No Action Alternative. Flights from the Atlantic arrive over the ocean to the arrival post, while flights from the south arrive in the vicinity of Sea Isle, NJ, then proceed to the northeast over the Atlantic Ocean, before turning to the north and arriving at the shifted post. All final approach procedures once past the post remain the same as the Future No Action Airspace Alternative.

2.5.5.2 Ocean Routing Airspace Alternative - LGA Traffic Routing

Ocean Routing Airspace Alternative - LGA Departure Routing

As with the Future No Action Airspace Alternative, LGA departure traffic is conducted on Runway 4 during north configuration and Runway 13 during south configuration. All of the departure gates remain the same as in the Future No Action Airspace Alternative. The only substantial change is to the procedure for aircraft heading to the North departure gate. The change in this flow will be discussed in detail in the following paragraph. See **Figure 2.17** for a graphic display of flows out of LGA.

Ocean Routing Airspace Alternative – LGA North Departure Gate

The primary difference between the Future No Action Airspace Alternative and this alternative is related to departures through the North gate. All flights departing Runways 4 or 13 will fly the same departure headings as the Future No Action Airspace Alternative. Once these flows are five miles northwest, they will then turn to the northeast staying east of the Hudson River until between 15 to 20 miles north of the Airport where they would turn to the west and proceed directly to the gate. These flows in the Future No Action Airspace Alternative would cross the Hudson River much closer to the Airport.

Ocean Routing Airspace Alternative - LGA Arrival Routing

There are no changes to LGA arrival routes or arrival posts in the Ocean Routing Airspace Alternative, as compared to the Future No Action Airspace Alternative.

2.5.5.3 Ocean Routing Airspace Alternative - EWR Traffic Routing

Ocean Routing Airspace Alternative - EWR Departure Routing

The primary objective of the Ocean Routing Alternative is to move flights over various water bodies regardless of active runways or final flight destinations. The North and East departure gates are the same as the Future No Action Airspace Alternative, while the South and West departure gates will be moved. Flights departing both Runways 4L and 22R are affected by this design. Specific details of these procedures and associated flows are described in detail in the following sections. **Figure 2.18** shows flows out of EWR.

Ocean Routing Airspace Alternative - EWR North and East Departure Gates

The North departure gate serves flights to the upper Midwest and the East departure gate serves flights heading to the northeastern U.S and Canada. Flights departing Runways 22L/R fly the same initial procedures to the point five miles west of Sandy Hook, NJ. Flights destined for either gate turn northeast flying towards Long Island, passing south of JFK where they cross the southern shore of Long Island in the vicinity of Jones Inlet and head northwest. This flow diverges into three flows north of Jones Inlet. Two flows proceed directly to the East departure gate, while the other proceeds back to the North departure gate northwest of EWR.

Ocean Routing Airspace Alternative – EWR Shifted South Departure Gate

This gate serves flights heading to the southeastern U.S., the Washington, D.C. Metropolitan Area, South America and the Caribbean. Flights departing Runways 22L/R destined for this gate follow the same procedures as the shifted West departure gate flows until reaching Barnegat Bay, at which point they either continue south down the coastline of NJ or they turn to the east and proceed over the Atlantic Ocean.

Flights departing Runways 4L/R will make an initial right turn off the runway, heading to the northeast, and then turn back to the west at four miles and circle to the south staying to the west of EWR. Once past LDJ, these flights will turn back to the east over Raritan Bay and proceed past Sandy Hook, NJ before turning to the southwest and paralleling the NJ coastline. From this point on, South gate flights will proceed as previously described in the Runways 22L/R flows.

Ocean Routing Airspace Alternative – EWR Shifted West Departure Gate

The shifted West departure gate serves flights departing to the western and southwestern U.S. Flights departing Runways 22L/R will make an immediate left turn, heading to the south for two miles before turning back to the right and heading southwest where they fly east of I-95/New Jersey Turnpike near the Arthur Kill Channel. These flights will then turn left heading east in the vicinity of the Outer Bridge Crossing. They will then proceed over Raritan Bay to the vicinity of Sandy Hook, NJ. Aircraft continue on this east heading another four to five miles before turning right towards the southwest and paralleling the shoreline. This flow will then diverge into two flows prior to turning west over NJ. The first flow will turn west over NJ in the vicinity of Asbury Park, NJ, towards Robbinsville, then proceed to the north end of the shifted West departure gate. The other flow continues south along the NJ coastline, turning west in the vicinity of Barnegat Bay, NJ, then west toward Coyle, NJ, and proceeding to the south end of the shifted West departure gate.

Flights departing Runways 4L/R will make an initial right turn off the Runway, heading to the northeast, and then turn back to the west at four miles and circle to the south, staying to the west of EWR. Once past LDJ, these flights will turn back to the east over Raritan Bay and proceed past Sandy Hook, NJ before turning to the southwest and paralleling the NJ coastline. From this point on, West gate flights will proceed as previously described in the Runways 22L/R flows.

Ocean Routing Airspace Alternative - EWR Arrival Routing

There are no changes to EWR arrival routes and arrival posts in the Modifications to Existing Airspace Alternative, as compared to the Future No Action Airspace Alternative.

2.5.5.4 Ocean Routing Airspace Alternative - Summary

The Ocean Routing Airspace Alternative proposes to move EWR departures out over the Atlantic Ocean prior to turning them west to their final destinations. The Ocean Routing Airspace Alternative proposes significant changes to EWR and JFK departures. It also creates a new JFK arrival post which is located approximately 10 miles east of Mantoloking Shores, NJ. In addition, LGA departures flying to the North gate remain east of the Hudson River further than the Future No Action Airspace Alternative prior to turning to the North departure gate.

The Ocean Routing Airspace Alternative reduces the delay on the West departure gate out of the State of NY, as this gate is not available for EWR departures in the high capacity configuration. The downside to this alternative is that delay increases at a point south of NY. The effective result of this trade is a small reduction in overall airspace delay, but with an associated large increase in airport departure delay. Another factor is the proposed routing for EWR and JFK passes just north of the main departure fix out of PHL, where EWR departures are delayed later in the day due to airspace capacity limits and conflict with the PHL evening departure push. The result of this trade-off is increased complexity in the en route airspace to the southwest of NY that is already a bottleneck in the en route airspace structure. **Table 2.2** provides a summary of the changes associated with the Ocean Routing Airspace Alternative compared to the Future No Action Airspace Alternative.

2.5.5.5 Ocean Routing Airspace Alternative - Purpose and Need Evaluation Criteria

The following paragraphs address how the Ocean Routing Airspace Alternative meets the Purpose and Need evaluation criteria developed by the airspace design team.

Ocean Routing Airspace Alternative - Reduce Complexity

The task of merging departures from EWR, LGA, and TEB over the West departure gate would be simplified by separating EWR traffic into a single flow away from LGA and TEB westbound departure traffic. However, moving the EWR departures closer to PHL where they would have to merge with PHL and JFK departures would

Table 2.2
Summary of Ocean Routing Airspace Alternative

Airport	Changes from Future No Action
JFK	Shifted West departure gate New procedures for aircraft heading to the West departure gate Split of the FNA Ocean departure gate into the Ocean and South departure gates New procedures for aircraft heading to the South departure gate South arrival post shifted to the east New procedures for aircraft arriving from the South arrival post New procedures for aircraft arriving from the North arrival post
LGA	New procedures for aircraft heading to the North departure gate
EWR	Shifted West departure gate New procedures for aircraft heading to the West departure gate Shifted South departure gate New procedures for aircraft heading to the South departure gate New procedures for aircraft departing Runways 22L/R to the North departure gate New procedures for aircraft departing Runways 22L/R to the East departure gate
TEB	No Changes
PHL	No Changes

cause an increase in the complexity of en route airspace.

Ocean Routing Airspace Alternative - Reduce Voice Communications

In this alternative, all EWR aircraft would fly the same departure procedure, thus reducing pilot-controller communications because vectoring and air traffic sequencing of aircraft to the Future No Action Airspace Alternative West departure gate would not be required. Both vectoring and sequencing require excessive pilot to controller communications. Conversely, congestion on the single EWR departure route would require increased internal facility communications in order to manage traffic flow before departure.

Ocean Routing Airspace Alternative - Reduce Delay

This alternative would not reduce delay. When EWR flights are departing, all aircraft would have to stay in single file for at least 40 miles. This decreases the throughput of the airport because additional in-trail spacing would be required because of differences in aircraft performance characteristics. This situation would substantially increase delay at EWR which can cause ripple effects throughout the NAS. According to a Government Accountability Office (GAO) Report, "The effect of delays can quickly spread beyond those airports where delays tend to occur most often, such as New York La Guardia, Chicago O'Hare, Newark International, and Atlanta Hartsfield. Delays at these airports can quickly create a "ripple" effect of delays that affects many airports across the country. For example, flights scheduled to take off from these airports may find themselves being held at the departing airport due to weather or limited airspace. Similarly, an aircraft late in leaving the airport where delays are occurring may be late in arriving at its destination, thus delaying the departure time for the aircraft's next flight."[16]

Ocean Routing Airspace Alternative - Balance Controller Workload

This alternative would negatively affect the balance of controller workload. The single controller handling flights arriving from the south to JFK would now have to handle EWR departures as well.

Ocean Routing Airspace Alternative - Meet System Demands

Demand for increased service to the NY Metropolitan Area airports would not be met by this alternative. EWR is a major hub airport in the NAS and included as one of 31 capacity benchmark airports that experience high levels of delay as measured by the FAA OPSNET (Operational Network) system. When EWR flights are departing, all aircraft would have to stay in single file for at least 40 miles, which would increase the necessary separation between departures. This results in departure delays. This, in turn, could affect EWR arrivals because of ground movement congestion and gate availability. In addition, this effect has the potential to ripple through other high-density airports that have aircraft bound for EWR, resulting in take-off delays at these airports.

Ocean Routing Airspace Alternative - Improve User Access to the System

User access would not be improved under this alternative. Some users would have to upgrade their aircraft to models that are capable of operating over water in order to continue flying to and from EWR. In addition, user access would be limited due to the increased EWR delays rippling through the System.

Ocean Routing Airspace Alternative - Expedite Arrivals and Departures

This alternative routing takes westbound EWR departure aircraft farther from their desired more direct routing. This routing penalizes aircraft operators and passengers in terms of longer flight time and longer overall miles flown.

Ocean Routing Airspace Alternative - Increase Flexibility in Routing

This alternative would remove a significant amount of the flexibility of route choice. This is due to the design implications of four EWR routes to the west that would be replaced by a single EWR route out of the terminal airspace.

Ocean Routing Airspace Alternative - Maintain Airport Throughput

Maintaining airport throughput, even at current aircraft traffic levels, would be difficult under this alternative. This is due primarily to the increased departure delays at EWR resulting from this alternative.

Summary

As previously stated, the purpose of the Ocean Routing Airspace Alternative is to reduce noise impacts on the citizens of New Jersey. The purpose of the Proposed Action is to increase the efficiency and reliability of the entire NY/NJ/PHL Metropolitan Area Airspace. The airspace changes designed to achieve the purpose of reducing noise in one specific area, by there very nature would not increase the efficiency and reliability of the NY/NJ/PHL Metropolitan Area Airspace. The evaluation of the Purpose and Need Criteria reiterated this finding. The Ocean

[16] GAO-05-755T, National Airspace System: Initiatives to Reduce Flight Delays and Enhance Capacity, May 26, 2005.

Routing Airspace Alternative would not: reduce delay, balance controller workload, meet system demand, improve user access, expedite arrivals and departures, increase flexibility, nor maintain airport throughput.

Although the evaluation of the Purpose and Need Criteria showed that the Ocean Routing Airspace Alternative would not meet the Purpose and Need, the FAA elected to include this alternative for analysis due to the long standing concerns of the NJCAAN.

2.5.6 Integrated Airspace Alternative

The Integrated Airspace Alternative combines the New York TRACON airspace with portions of surrounding Centers' airspace to permit more seamless operations. The Integrated Airspace Alternative could be accomplished either with standalone (existing facilities) or consolidated facilities because the key component is a common automation platform.[17] Using the existing facilities, airspace would be reallocated among the facilities in order to facilitate a more seamless operation. The consolidated facility is called the NYICC facility as previously discussed in Section 1.7 *Other Actions*. In this study, the Integrated Control Complex (ICC) refers to the existence of the common automation platform in either the standalone existing facilities or in the NYICC facility.

Because the FAA had not yet decided whether to approve the NYICC concept, the Integrated Airspace Alternative was designed with two variations. The initial phase (2006) is the same for both variations because an ICC will not exist in 2006. It involves modifications to a departure gate, as well as additional diverging departure headings, however, airspace facility boundaries would not change.

In the next phase (2011) the following variations appear:

- The first variation is the Integrated Airspace Alternative Variation without ICC; this variation will integrate the airspace to the extent possible without the common automation platform. It includes the same changes to the airspace structure from phase one with expanded use of terminal separation, reallocation of airspace sectors and new technologies.
- The second variation, called the Integrated Airspace Alternative Variation with ICC, involves full airspace integration (i.e., combining the TRACON and Center airspace). There would be modifications to multiple departure gates, additional arrival posts, and additional diverging departure headings.

Note that all Integrated Airspace Alternative descriptions and graphics describe only those aspects of the alternative that are different, or have varied from, the Future No Action Airspace Alternative.

2.5.7 Integrated Airspace Alternative Variation without ICC

The Integrated Airspace Alternative Variation without ICC involves modifications to the West departure gate, as well as additional close-in procedures.

[17] A common automation platform includes shared displays on screens, radar data processing and presentation, and communications.

Figures 2.19 through 2.22 identify major routing and flow changes associated with the Integrated Airspace Alternative Variation without ICC.

2.5.7.1 Integrated Airspace without ICC - LGA Traffic Routing

Integrated Airspace Alternative Variation without ICC – LGA Departure Routing

As with the Future No Action Airspace Alternative, the majority of departure traffic from LGA uses Runways 4 and 13. The North, East, South, and Ocean departure gates remain the same. The West departure gate has been expanded. The use of these gates, along with their associated air traffic, is discussed in the following sections. **Figure 2.19** shows flows out of LGA.

<u>Integrated Airspace Alternative Variation without ICC - LGA North and East Departure Gates</u>

Both the North and East departure gates are the same as the Future No Action Airspace Alternative. All departure headings to the North and East departure gates are the same as the Modifications to Existing Airspace Alternative.

<u>Integrated Airspace Alternative Variation without ICC – LGA Expanded West Departure Gate</u>

The West departure gate is extended in both directions by the incorporation of an additional departure fix, resulting in access to an additional jet airway for departures. The expanded West departure gate is still oriented southeast to northwest and is shifted 10 miles closer to the Airport. This gate serves flights departing to the western and southwestern U.S. This results in changes to the departure flows to the gate. The departure headings are the same as the Modifications to Existing Airspace Alternative. The route aircraft use to transition to the expanded West departure gate will vary due to the movement of the gate. Flights departing Runway 4 will make an immediate turn to the north. These flights will then turn towards the west, north of Manhattan, and proceed to an area in the vicinity of TEB. Once past TEB, the main flow will begin to split up and proceed to either the south, central, or northern areas of the expanded West departure gate. These aircraft will also be merged with the EWR and TEB West gate departure traffic at this point. Flights departing Runway 13 will make an immediate right turn off the runway, then circle back to the northeast staying clear of JFK traffic, and then continue back to the west, north of the Airport. This major flow will begin splitting into individual flows in the vicinity of TEB.

Integrated Airspace Alternative Variation without ICC - LGA Arrival Routing

There are no changes to LGA arrival routes and arrival posts in the Integrated Airspace Alternative Variation without ICC, as compared to the Future No Action Airspace Alternative.

2.5.7.2 Integrated Airspace Alternative Variation without ICC - EWR Traffic Routing

Integrated Airspace Alternative Variation without ICC - EWR Departure Routing

The majority of EWR departures are conducted on Runways 4L and 22R. Changes at EWR involve new departure headings and modification to the West departure gate. These procedures and the expanded West departure gate will be described in the following paragraphs. **Figure 2.20** shows flows out of EWR.

Integrated Airspace Alternative Variation without ICC - EWR South Departure Gate

Flights departing Runways 4L and 22R will fly the same departure headings as in the Modifications to Existing Airspace Alternative. Once flights are southwest of the Airport, they will follow the same path as the Future No Action Airspace Alternative flows.

Integrated Airspace Alternative Variation without ICC – EWR Expanded West Departure Gate

The West departure gate would be extended in both directions by the incorporation of an additional departure fix, resulting in access to an additional jet airway for departures. The expanded West departure gate would also be shifted closer to the Airport. This gate serves flights destined for the western and southwestern U.S.

Flights departing Runway 22R will turn to the southwest following takeoff. This flow will then split into three main flows less than 10 miles from the Airport and then split into five flows prior to reaching the gate.

If TEB is using the ILS to Runway 6, flights departing Runway 4L will make an initial right turn off the runway, and then make a turn to the west within five miles from the Airport. This flow will then merge back with the three previously mentioned flows. If TEB is not using the ILS to Runway 6, flights will make an immediate left turn to the west after takeoff within five miles and then begin to diverge five miles to the west of EWR.

Integrated Airspace Alternative Variation without ICC - EWR North or East Departure Gates

If EWR is not using Runway 11, flights departing Runway 22R will make an initial right turn after taking off heading due west, then turn to the north five miles from the Airport. Once turned to the north, these flights will continue directly to the North departure gate, while the East departure gate flights will continue turning to the east eight miles northwest of the Airport and then proceed direct to the East departure gate. If Runway 11 is being used, the initial turn off the Runway will be to the southwest, then proceeding as described above.

If TEB is not using the ILS to Runway 6, flights departing Runway 4L destined for the North departure gate will make an immediate left turn to the northwest and then proceed direct to the gate. This immediate left turn off Runway 4L is dependent on the operations at TEB as mentioned above and will only be used a small fraction of the time. Flights destined for the East departure gate will fly the same procedures as the Future No Action Airspace Alternative. If TEB is using ILS to Runway 6, flights departing from Runway 4L destined for the North and East departure gates will fly the same procedures as the Future No Action Airspace Alternative.

Integrated Airspace Alternative Variation without ICC - EWR Arrival Routing

There are no changes to EWR arrival routes and arrival posts in the Integrated Airspace without ICC Alternative, as compared to the Future No Action Airspace Alternative.

2.5.7.3 Integrated Airspace Alternative Variation without ICC - TEB Traffic Routing

Integrated Airspace Alternative Variation without ICC - TEB Departure Routing

All departure headings are the same as the Future No Action Airspace Alternative. As with the Future No Action Airspace Alternative, the majority of departures are conducted on Runways 1 and 24. The primary difference between this variation and the Future No Action Airspace Alternative is extension of the West departure gate and modification of its associated flows. See **Figure 2.21**.

Integrated Airspace Alternative Variation without ICC – TEB Expanded West Departure Gate

The West departure gate would be extended in both directions by the incorporation of an additional departure fix, resulting in access to an additional jet airway for departures. The expanded West departure gate would also be shifted closer to the Airport. This gate serves flights destined for the western and southwestern U.S.

Flights departing Runway 1 make a left turn off the runway. Once in the vicinity of CDW, these flights will diverge into five distinct flows heading to different locations of the gate depending on final airport destinations. The aircraft flying to the southern tip of the expanded West departure gate will not turn directly to the gate until clear of the Runway 6 ILS flights arriving from the southwest of the Airport.

Flights departing Runway 24 turn immediately to the west continuing west to the vicinity of MMU. Once past of MMU, this flow diverges into five distinct flows heading to different locations of the gate depending on final airport destinations.

Integrated Airspace Alternative Variation without ICC - TEB Arrival Routing

Turboprop aircraft arriving from the northeast will be moved further to the north of TEB than in the Future No Action Airspace Alternative. This flow will then fly further to the west of the Airport in the vicinity of Sparta, NJ before turning back to the Airport to land. The remainder of the arrival procedures will stay the same as in the Future No Action Airspace Alternative. **Figure 2.22** shows flows into TEB.

2.5.7.4 Integrated Airspace Alternative Variation without ICC - HPN Traffic Routing

Integrated Airspace Alternative Variation without ICC - HPN Departure Routing

The HPN departure tracks for the Integrated Airspace Alternative Variation without ICC remain identical to the Future No Action Airspace Alternative routes within 40 miles of HPN. All of the departure gates remain the same as in the Future No Action Airspace Alternative, except the West departure gate. The West departure gate would be extended in both directions by the incorporation of an additional departure fix, resulting in access to an additional jet airway for departures. The expanded West departure gate would still be oriented southeast to northwest but would be shifted closer to the NY Airports. This gate serves flights departing to the western and southwestern U.S. This modification results in some slight changes to the HPN departure flows to the gate, however, these changes do not occur until the traffic is some 40 miles west-southwest of HPN in the higher altitude structure and near the Morristown Municipal Airport in New Jersey. As the alternative routes continue to the west-southwest over western New Jersey, they will parallel the Future No Action Airspace Alternative routes and will spread to feed the various jet routes now accommodated by the expanded west gate.

Integrated Airspace Alternative Variation without ICC - HPN Arrival Routing

There are no changes to HPN arrival routes in the Integrated Airspace Alternative Variation without ICC as compared to the Future No Action Airspace Alternative within approximately 20 miles of the HPN airport. All routes from all arrival posts except the south arrival post remain exactly the same in their entirety as the Future No Action routes for this alternative.

However, arrivals from the south are generally adjusted in two places. The first is located in eastern central New Jersey near the eastern shoreline and extending to the northeast to the southern shore of Long Island. The adjustment in this area consists of the alternative routes being moved approximately 10 miles to the northwest of the Future No Action Airspace Alternative. This results in a more direct routing from central New Jersey to central Long Island. The adjusted routes meet back up with the Future No Action Airspace Alternative routes over Long Island. The second area of change is located on the northern portion of Long Island near Smithtown and extends to the northeast over the Long Island Sound to just near Westport, CT. The arrivals are shifted about seven miles to the west with the majority of the change occurring over the Long Island Sound. The alternative routes join back to the No Action routing about 20 miles east-northeast of HPN near Westport, CT.

2.5.7.5 Integrated Airspace Alternative Variation without ICC - PHL Traffic Routing

Integrated Airspace Alternative Variation without ICC - PHL Departure Routing

All of the departure gates remain the same as in the Future No Action Airspace Alternative (See Figure 2.9). As with the Future No Action Airspace Alternative, the majority of departure flights would be conducted on Runways 9L/R and 27L/R. All departures from PHL will fly the same departure headings as the Modifications to Existing Airspace Alternative (see Airport Vicinity graphic on Figure 2.14). As the flights proceed away from the Airport, they will proceed as previously described for the Future No Action Airspace Alternative flows and continue on to each respective gate.

Integrated Airspace Alternative Variation without ICC - PHL Arrival Routing

There are no changes to PHL arrival routes and arrival posts in the Integrated Airspace Alternative Variation without ICC, as compared to the Future No Action Airspace Alternative.

2.5.7.6 Integrated Airspace Alternative Variation without ICC - Summary

The major changes associated with this variation versus the Future No Action Airspace Alternative involve departures to the West gate by EWR, TEB, HPN, and LGA flights. The West gate has been extended. This variation also involves changes to departure headings at EWR and LGA. The departure headings are the same as the Modifications to Existing Airspace Alternative, but how the aircraft route to the expanded West departure gate will vary due to the movement of the gate. In addition, a new turboprop arrival route to TEB would be established as part of this variation. Departure headings for PHL would also change. No major changes would be made to JFK arrival or departure routing as a result of this variation. **Table 2.3** provides a summary of the Integrated Airspace Alternative Variation without ICC.

2.5.7.7 Integrated Airspace Alternative Variation without ICC - Purpose and Need Evaluation Criteria

The following paragraphs address how the Integrated Airspace Alternative Variation without ICC meets the Purpose and Need evaluation criteria developed by the airspace design team.

Integrated Airspace Alternative Variation without ICC - Reduce Complexity

When TRACONs are able to hand-off aircraft to the Centers over a larger departure gate, the task of vectoring aircraft to achieve the spacing needed in the en route airspace as they climb to reach their cruise altitudes becomes less complex. Additionally, by adding an arrival route into TEB, some turboprop traffic is separated from jet traffic. This reduces the need to sequence slower prop traffic in with faster jet traffic leading to reduced complexity. Conversely, adding an additional departure route into the already congested West departure gate area would slightly increase complexity.

Table 2.3

Summary of Integrated Airspace Alternative Variation without ICC

Airport	Changes from Future No Action
JFK	No Changes
LGA	West departure gate extended to the north and to the south New procedures for aircraft heading to the West departure gate New departure headings for aircraft departing Runway 4 to the North departure gate New departure headings for aircraft departing Runway 4 to the East departure gate
EWR	New departure headings for all runways and all gates Procedures off Runway 4L dependent on TEB Runway 6 to West departure gates New procedures for aircraft heading to the West departure gate Procedures off Runway 4L dependent on TEB Runway 6 to North and East departure gates Procedures off Runway 22R dependent on EWR Runway 11 use Expanded West departure gate
TEB	West departure gate extended to the north and to the south New procedures for aircraft heading to the West departure gate New procedures for turboprop aircraft arriving from the northeast
HPN	West departure gate extended to the north and to the south
	New procedures for aircraft heading to the West departure gate
	New distant arrival procedures
PHL	New departure headings for aircraft heading to the North, East, West, and South departure gates

Integrated Airspace Alternative Variation without ICC - Reduce Voice Communications

This variation does not contain design features that lead explicitly to a decrease in either controller-pilot or controller-controller communications. Some reduction in controller-pilot communications might be achieved as a consequence of the reduced vectoring needed to separate aircraft, because there is an additional departure route.

Integrated Airspace Alternative Variation without ICC - Reduce Delay

New departure headings (i.e., divergent headings per FAA Order 7110.65P) allow more aircraft to depart in a given amount of time because the aircraft diverge from one another, reducing delay by minimizing separation between successive departures.

The expanded West departure gate and additional arrival route would allow more flights into or out of the airspace system, thus reducing delays.

Integrated Airspace Alternative Variation without ICC - Balance Controller Workload

This variation does improve the balance of controller workload because additional departure headings allow aircraft to be more evenly distributed to multiple departure controllers. Conversely, adding an additional departure route into the West gate departure controller's area would increase his/her workload.

Integrated Airspace Alternative Variation without ICC - Meet System Demands

A more efficient terminal airspace design will help balance hourly arrival and departure demand, making the most out of any existing peak hour airfield capacity limitations.

Having an expanded West departure gate and the associated departure flow will allow more aircraft to depart the area more quickly, therefore, this variation improves the ability to meet system demands.

Integrated Airspace Alternative Variation without ICC - Improve User Access to the System

Access to TEB is improved by having a separate new turboprop arrival route, therefore, this variation improves user access to the System.

Integrated Airspace Alternative Variation without ICC - Expedite Arrivals and Departures

This variation of the Integrated Airspace Alternative will not materially affect arrivals.

When aircraft from several airports have departed and are expected to arrive at the same departure gate at the same time, controllers must vector one or more of these aircraft away from their direct routing to maintain safe separation. This would result in aircraft flying longer routes prior to leaving the metropolitan airspace, however, the expanded West departure gate will decrease the frequency of this non-direct vectoring for departure aircraft and departures will be expedited.

Additional departure headings would allow air traffic to expedite departures at EWR, LGA, and PHL. These departure headings allow more aircraft to depart in a given amount of time, thus, expediting departures.

Integrated Airspace Alternative Variation without ICC - Increase Flexibility in Routing

During severe weather, additional departure routes can be used to avoid localized weather activity. Thunderstorms may be highly localized, cutting off several routes while leaving adjacent routes open. The increase in departure routes means that controllers have additional flexibility in routing aircraft around severe weather. Since this variation added only one departure flow, there would be minimal increase in flexibility of routing.

Integrated Airspace Alternative Variation without ICC - Maintain Airport Throughput

Additional departure headings, as well as expansion of the West departure gate, will show an increase in airport throughput especially at EWR. EWR receives the most benefit, because of its disproportionately high use of the expanded West departure gate.

Summary

The Integrated Airspace Alternative Variation without ICC enhances safety by reducing complexity and voice communications. It improves efficiency by:

- Reducing delay,
- Balancing controller workload,
- Meeting system demands,
- Improving user access to the system,
- Expediting departures,
- Increasing flexibility in the West gate area, and
- Maintaining airport throughput primarily by increasing throughput at EWR.

Therefore, this is a reasonable alternative for meeting the Purpose and Need of the Airspace Redesign and will be carried forward for environmental analysis.

2.5.8 Integrated Airspace Alternative Variation with ICC

As described above, the Integrated Airspace Alternative in the year 2011 has two variations: without an ICC and with an ICC. The second variation of the Integrated Airspace Alternative involves full airspace consolidation, as well as modifications to multiple departure gates, additional arrival posts, and additional departure headings. The second variation is called the Integrated Airspace Alternative Variation with ICC.

This variation represents a full airspace consolidation and is a new approach to the redesign of airspace from NY to Philadelphia. Where current en route airspace separation rules of five nautical miles are typically used, this airspace redesign alternative would use three nautical mile terminal airspace separation rules over a larger geographical area and up to 23,000 feet MSL in some areas.[19] The ICC airspace would be comprised of the majority of current NY TRACON and NY Center airspace, as well as some sectors from Washington Center and Boston Center. Boston Center could take the high-altitude parts of the current NY Center airspace structure, see **Figure 2.23**. Figures 2.24 through 2.33 identify major routing and flow

[19] Many air traffic control altitudes are given in flight levels representing altitude above mean sea level (MSL) in increments of 1,000 feet (i.e., flight level 230 equates to 23,000 feet above MSL).

changes associated with the Integrated Airspace Alternative Variation with ICC.

2.5.8.1 Integrated Airspace Alternative Variation with ICC - JFK Traffic Routing

Integrated Airspace Alternative Variation with ICC – JFK Departure Routing

The majority of departure traffic from JFK is conducted on parallel Runways 31L/R or 13L/R. The following departure gates for the Integrated Airspace Alternative Variation with ICC have been modified from those for the Future No Action Airspace Alternative: the North, West, and Ocean departure gates. The North departure gate would be shifted to the north. The West gate, which JFK flights could not access in the Future No Action Airspace Alternative, would be expanded and accessible. The Future No Action Ocean departure gate is split into an Ocean departure gate and a South departure gate. Additional diverging departure headings would be implemented for flights departing Runways 13L/R to the West Departure Gate. The location and use of these new gates, along with associated air traffic, are discussed in the following paragraphs. See **Figure 2.24** for a graphic display of flows out of JFK.

<u>Integrated Airspace Alternative Variation with ICC – JFK Shifted North Departure Gate</u>

The North departure gate would be shifted to the northeast approximately 15 miles making room for new arrival flows into EWR and LGA. This gate serves flights destined to Canada, the Upper Midwest, and the Pacific Northwest. The close-in flight patterns will remain the same as the Future No Action Airspace Alternative. Once the flights are northwest of the Airport and north of TEB they will begin to diverge into three distinct flows and proceed directly to the shifted North departure gate.

<u>Integrated Airspace Alternative Variation with ICC – JFK Expanded West Departure Gate</u>

One of the primary redesign changes associated with this variation is the expansion of the West departure gate. This gate starts in the vicinity of Princeton, NJ and extends to the north in the vicinity of Hardwick, NJ. The expanded West departure gate would include six departure points and provides greater access to the west for JFK departures. This gate serves flights destined for the western U.S. Flights departing from both primary runways make an initial left turn, circling to the north of the Airport before turning to the west. The flights diverge into six distinct flows over central NJ and proceed to different points over the gate depending on their final destinations. JFK flights destined to the west no longer fly in the vicinity of Robbinsville, NJ.

<u>Integrated Airspace Alternative Variation with ICC - JFK Split Ocean Departure Gate</u>

The Future No Action Airspace Alternative Ocean departure gate is split into the Ocean and South departure gates. One of the primary flight paths over the ocean that was used to define the Ocean departure gate in the Future No Action Airspace Alternative has been moved over eastern NJ and to the South gate. This will cause the Ocean departure gate to be shifted to the northeast and it will no longer serve flights destined for Florida over the Atlantic Ocean. This gate will serve flights destined to South America, the Caribbean, and Europe. Departure headings remain the same as those for Future No Action Airspace Alternative. Flights departing from both primary runways will proceed to the new

Ocean departure gate on a more northerly route than in the Future No Action Airspace Alternative.

The South departure gate begins at the intersection of the Garden State Parkway and Highway 70 and extends 10 miles to the northwest in the vicinity of Cassville, NJ. This gate serves flights heading only to the Washington Metropolitan Area or further south. Flights departing from JFK to the western U.S. will no longer use this gate. Flights departing either primary runway will fly the same close-in patterns in the process of turning toward NJ. When these flights are 10 miles southwest of the Airport, they will be split into two main flows depending on their final destination and proceed directly to the South departure gate. One flow will be concentrated on the northwest tip of the gate and the other on the southeastern tip.

Integrated Airspace Alternative Variation with ICC - JFK Arrival Routing

The primary arrival runways to JFK are 13L and 31L/R. There are three new arrival posts into JFK in the Integrated Airspace Alternative Variation with ICC. These are the North, East, and South posts. The location and use of each post is discussed in the following paragraphs. See **Figure 2.25** for a graphic display of these flows into JFK.

Integrated Airspace Alternative Variation with ICC – JFK Shifted North Arrival Post

The shifted North arrival post is shifted approximately five miles to the southeast in the vicinity of TEB. This arrival post serves flights from the western U.S. Flights that formerly arrived from the north through NY in the Future No Action Airspace Alternative now arrive from the vicinity of Wilkes Barre, PA. The flights then proceed directly to the shifted North arrival post. Once past the arrival post these flights will fly the same close-in arrival procedures as in the Future No Action Airspace Alternative.

Integrated Airspace Alternative Variation with ICC – JFK Shifted East Arrival Post

The shifted East arrival post is shifted slightly to the northwest in the vicinity of ISP. This arrival post serves flights arriving from Europe, the northeastern U.S., and the Pacific Rim via Canada. All flights arrive over the Long Island Sound and then proceed directly to the arrival post. Once past the arrival post flights destined for Runways 13L and 31L/R continue heading southwest back over the Atlantic Ocean. Once aligned with Runways 31L/R, flights landing on Runways 31L/R will turn right and land. Flights landing on Runway 13L will continue to the south of the Airport, then circle to land on Runway 13L.

Integrated Airspace Alternative Variation with ICC – JFK Shifted South Arrival Post

The shifted South arrival post is shifted approximately 30 miles to the northeast. This arrival post serves flights arriving from the Caribbean, South America, and the southern U.S. These flights arrive over the Atlantic Ocean and proceed directly to the new arrival post. Flights landing on Runways 31L/R continue flying to the northwest, then make a right turn to the north and once aligned with the runway turn back to the northwest to land. Flights destined to land on Runway 13L continue to the northwest to the vicinity of Sandyhook, NJ. Once past Sandyhook, these flights will turn to the northeast and proceed to the vicinity of Canarsie, NY. Once aligned with the runway, they will turn to the southeast and land.

2.5.8.2 Integrated Airspace Alternative Variation with ICC - LGA Traffic Routing

Integrated Airspace Alternative Variation with ICC- LGA Departure Routing

The majority of departure traffic from LGA is conducted on Runways 4 or 13. The following departure gates for the Integrated Airspace Alternative Variation with ICC have been modified from those of the Future No Action Airspace Alternative: the North, East, West, and South departure gates. The new East departure gate is shifted to the east. The new North, South, and West, departure gates are the same as described for the JFK Integrated Airspace Alternative Variation with ICC.

The location and use of each redesigned departure gate and its associated air traffic procedures are discussed in the following paragraphs. All departure headings are the same as in the Integrated Airspace Alternative Variation without ICC. See **Figure 2.26** for a graphic display of flows out of LGA.

<u>Integrated Airspace Alternative Variation with ICC – LGA Shifted North Departure Gate</u>

The shifted North departure gate is the same gate that is described in the JFK departure routing (see Section 2.5.8.1). This gate serves flights destined to the Upper Midwest. Flights departing the primary runways at LGA will fly the same departure headings as in the Integrated Airspace without ICC Alternative. The difference will be that the flights will fly further to the north before turning to the west, proceeding to the shifted North departure gate, and diverging into two flows. This movement to the north will allow EWR more arrival airspace.

<u>Integrated Airspace Alternative Variation with ICC – LGA Shifted East Departure Gate</u>

The shifted East departure gate is shifted to the east for this variation, to make room for the north arrivals into LGA. The gate extends from a point in the vicinity of Waterbury, CT to the southeast ending at HVN. This gate serves transatlantic flights and flights heading to Canada and the northeastern U.S. Flights departing the primary runways will follow the same departure headings as the Integrated Airspace Alternative Variation without ICC. Once northeast of the Airport, these flights will proceed directly to the new East departure gate.

<u>Integrated Airspace Alternative Variation with ICC – LGA Expanded South Departure Gate</u>

The expanded South departure gate is the same as the JFK departure gate described in Section 2.5.8.1. This gate serves flights destined to southeastern U.S. Departure headings are the same as those in the Integrated Airspace Alternative Variation without ICC. Once south of the Airport, these flights will diverge into two distinct flows, one heading to the northwestern tip of the gate and the other proceeding to the southeastern tip depending on their final destinations.

<u>Integrated Airspace Alternative Variation with ICC – LGA Expanded West Departure Gate</u>

The expanded West departure gate is also the same gate described in the JFK departure routing section (see Section 2.5.8.1). Departure headings will be the same as the Integrated Airspace without ICC Alternative. Once these flights are past TEB, they will begin to diverge into six distinct flows while proceeding directly to the expanded West departure gate. The predominant difference between this variation and the Future No Action Airspace Alternative is the new departure route heading to the northern end of the gate.

Integrated Airspace Alternative Variation with ICC - LGA Arrival Routing

The differences between this variation arrival routing and the Future No Action Airspace Alternative, concern the shifting of both the North and West arrival posts. These posts are shifted to make room for the redesigned EWR arrival procedures as part of this variation. In addition the arrival flow from the west is split into two separate arrival flows with one proceeding to the new North gate and the other proceeding to the new West gate. See **Figure 2.27.**

Integrated Airspace Alternative Variation with ICC – LGA Shifted North Arrival Post

The entire North post and associated flows are shifted 30 miles to the east of the Future No Action Airspace Alternative location. The midpoint of the post is located eight miles northeast of Danbury, CT. This arrival post serves the same flights as the Future No Action Airspace Alternative. Three major flows still converge on this post, then proceed due south toward the Airport, and follow the same close-in landing procedures as described in the Future No Action Airspace Alternative.

Integrated Airspace Alternative Variation with ICC – LGA Shifted West Arrival Post

The West arrival post has been moved to coincide with the Future No Action Airspace Alternative South arrival post. All flights arriving from the west heading to the southeast will fly a route that is located to the south and parallel to the Future No Action Airspace Alternative route. These flights will proceed directly to the south post, then turn to the north and proceed directly to LGA, following the same close-in flows as described in the Future No Action Airspace Alternative.

2.5.8.3 Integrated Airspace Alternative Variation with ICC - EWR Traffic Routing

Integrated Airspace Alternative Variation with ICC - EWR Departure Routing

The primary departure runways are Runways 4L and 22R. Compared to the Future No Action Airspace Alternative, the East and the North gates are shifted and the West and South gates are expanded and shifted. In addition, this variation incorporates a new Ocean departure gate. The location and use of these gates, along with their associated air traffic, are described in the following sections. See **Figure 2.28** for a graphic display of flows out of EWR.

Integrated Airspace Alternative Variation with ICC – EWR Shifted North Departure Gate

The North departure gate is shifted to a location in the vicinity of Knights Eddy, NY, along the NJ State line, and extending 20 miles to the northeast near Monticello, NY. This gate serves flights to the upper Midwest. Flights departing the Airport follow the same departure headings as the Integrated Airspace Alternative Variation without ICC. These flight paths will converge in the vicinity of MMU then proceed to the northwest. Once past MMU, these flights will turn to the north and diverge into three distinct flows while proceeding directly to the shifted North departure gate.

Integrated Airspace Alternative Variation with ICC – EWR Shifted East Departure Gate

The East departure gate is shifted to the east for this variation, to make room for the north arrivals into LGA. The gate extends from a point west of Waterbury, CT to the southeast ending at HVN. This gate serves flights destined for the northeastern U.S., Canada, and Europe. All flights departing the Airport will follow the same departure headings as in the Integrated Airspace without ICC Alternative. Once the flights are past HPN, they will diverge into three distinct flows and proceed directly to the shifted East departure gate. Once past the gate, two of the flows will follow the same path as the Future No Action Airspace Alternative, while the third flow will turn north at a location east of the Future No Action Airspace Alternative flow.

Integrated Airspace Alternative Variation with ICC – EWR Expanded South Departure Gate

The expanded South departure gate begins at the intersection of the Garden State Parkway and Highway 70 and extends 10 miles to the northwest in the vicinity of Cassville, NJ. This gate serves flights heading to the eastern U.S., the Washington, D.C. Metropolitan Area, the Caribbean, and South America. All flights departing the Airport will follow the same departure headings as the Integrated Airspace Alternative Variation without ICC. Once these flights are south of LDJ, they will continue flying to the southwest and will not turn toward Colts Neck, NJ as was the case in the Future No Action Airspace Alternative. Once these flights are west of Colts Neck, NJ, they will diverge into two distinct flows depending on their final destinations and then proceed to either end of the expanded South departure gate.

Integrated Airspace Alternative Variation with ICC - EWR Expanded West Departure Gate

The expanded West departure gate starts in the vicinity of Princeton, NJ and extends to the north in the vicinity of Hardwick, NJ. The West departure gate now includes six departure points. This gate serves flights destined for the western and southwestern U.S. All flights departing the Airport fly the same departure headings as in the Integrated Airspace Alternative Variation without ICC. Once the flights are past MMU, the flights will diverge into six distinct flows. The predominant difference from the Future No Action Airspace Alternative is that the two most northerly flows fly to the expanded portion of the West departure gate.

Integrated Airspace Alternative Variation with ICC – EWR New Ocean Departure Gate

The new Ocean departure gate is located approximately 10 miles south of Fire Island, NY and extends approximately 16 miles to the south. This gate serves flights destined for Europe, South America, and the Caribbean. These flights will depart to the north of the Airport turning to the south over LGA and then proceed to the southeast over the ocean. This will give EWR more efficient access to ocean routes.

Integrated Airspace Alternative Variation with ICC - EWR Arrival Routing

The primary EWR arrival runways are Runways 4R and 22L. The North arrival post is shifted from its location in the Future No Action Airspace Alternative. Flights arriving from the west are split into two flows. The northerly flow proceeds to the shifted West arrival post. The southerly flow proceeds to the Future No Action Airspace Alternative South arrival post. The location and use of each post, along with its associated air traffic, are discussed in the following paragraphs. See **Figure 2.29** for a graphic display of flows into EWR.

Integrated Airspace Alternative Variation with ICC – EWR Shifted North Arrival Post

The shifted North arrival post is located 50 miles north of EWR and five miles south of SWF. This post serves flights arriving from the northeastern and northwestern U.S. Canada, Europe, and the Pacific Rim. Three main traffic flows converge at the new North arrival post. Flights destined for Runway 22L turn to the southeast heading toward TEB. These flights will turn to the southwest to align with the runway and land. Flights destined for Runway 4R will turn to the southwest and proceed to the vicinity of Sparta, NJ. Once past Sparta, NJ, these flights will turn to the southeast, continue circling, heading to the northeast, and when aligned with the runway, finally land. Flights destined for Runways 4R will fly further to the west of the Airport as compared to the Future No Action Alternative.

Integrated Airspace Alternative Variation with ICC – EWR South Arrival Post

The South arrival post is located in same location as the Future No Action Airspace Alternative South arrival post in the vicinity of Yardley, PA. This post serves flights also arriving from the western U.S. Flights arriving through the South arrival post and destined to land on Runways 22L will turn to the northeast, fly west of EWR, turn to the east, continue to circle to the southwest, and once aligned with the runway, finally land. Flights landing 4R will proceed to fly to the east and once past the post turning to the northeast to align with the runway and land.

Integrated Airspace Alternative Variation with ICC – EWR Shifted West Arrival Post

The West arrival post is shifted to the vicinity of Greenville, NY, just north of the NJ state line. This post serves flights arriving from the western U.S. Flights arriving through this post and destined to land on Runways 22L will continue east past the post, turning to the southeast north of TEB and, finally, aligning with the runway to land. Flights landing Runways 4R will make an immediate turn at the arrival post to the south, passing to the west of MMU, before turning back to the northeast to align with the Runway and land.

2.5.8.4 Integrated Airspace Alternative Variation with ICC - TEB Traffic Routing

Integrated Airspace Alternative Variation with ICC - TEB Departure Routing

All of the departure gates are the same as gates described for EWR with the Integrated Airspace Alternative Variation with ICC. The following sections will describe how flights will access these gates compared to the Future No Action Airspace Alternative. See **Figure 2.30** for a graphic display of these flows out of TEB.

Integrated Airspace Alternative Variation with ICC – TEB Shifted North Departure Gate

The North departure gate would be shifted to the north of the Future No Action Airspace Alternative location as described for EWR Integrated Airspace Alternative Variation with ICC. This gate serves flights destined for the upper Midwest. Flights will fly the same departure headings as the Future No Action Airspace Alternative. Once north of MMU, these flights will diverge into three distinct flows. The predominant difference between this variation and the Future No Action Airspace Alternative is the new departure route heading to the northern end of the gate.

Integrated Airspace Alternative Variation with ICC – TEB Expanded South Departure Gate

The expanded South departure gate is the same as the EWR Integrated Airspace Alternative Variation with ICC South departure gate. This gate serves flights destined for the southeastern U.S., the Washington, D.C. Metropolitan Area, and South America. Flights departing to the south will fly the same departure headings as in the Future No Action Airspace Alternative. These flights will continue flying to the south remaining west of EWR. Once past EWR, they will turn to the southeast and proceed to an area west of Colts Neck, NJ where they will diverge into two distinct flows heading toward the expanded South departure gate.

Integrated Airspace Alternative Variation with ICC – TEB Expanded West Departure Gate

The expanded West departure gate will be the same as the EWR Integrated Airspace Alternative Variation with ICC West departure gate. This gate serves flights destined for western and southwestern U.S. Flights departing to the west will fly the same departure headings as the Future No Action Airspace Alternative. Once these flights are in the vicinity of MMU, they will diverge into six distinct flows depending on their final destination and continue to the expanded West departure gate. The northernmost flow will branch into two separate flows prior to reaching the gate. The predominant difference between this variation and the Future No Action Airspace Alternative is that flights departing Runway 1 head further north to the expanded West departure gate.

Integrated Airspace Alternative Variation with ICC - TEB Arrival Routing

The majority of arrival traffic to TEB is conducted on Runways 6 (north configuration) or 19 (south configuration). There are two primary differences between this variation and the Future No Action Airspace Alternative: the westerly South post is shifted to the southwest and the West post is shifted to the south. The location and use of each post, along with its associated air traffic, are discussed in the following paragraphs. See **Figure 2.31** for a graphic display of flows into TEB.

Integrated Airspace Alternative Variation with ICC – TEB Shifted Westerly South Arrival Post

The shifted Westerly South arrival post is now located west of Philadelphia. Flights arriving to this post will turn to the north and fly to the vicinity of Hackettstown, NJ. From this point on the flights will fly the same path as the flights arriving from the new West arrival post.

Integrated Airspace Alternative Variation with ICC – TEB Shifted West Arrival Post

The West arrival post is shifted approximately 15 miles south to the vicinity of Hackettstown, NJ. This arrival post serves flights arriving from the western U.S. Three flows arriving from the west converge at this post. Flights destined for Runway 6 proceed east in the vicinity of MMU, continue to the east until northwest of EWR, and then turn to the northeast and align with the runway to land. Flights destined to land on Runway 19 will follow one of two paths. Either aircraft will fly to the northeast over CDW continuing to TEB then turn to the northwest and circle to land, or aircraft will fly to the northeast, then turn to the south and align with the runway and land.

2.5.8.5 Integrated Airspace Alternative Variation with ICC - HPN Traffic Routing

Integrated Airspace Alternative Variation with ICC – HPN Departure Routing

The HPN departure tracks for the Integrated Airspace Alternative Variation with ICC change both in the vicinity of the airport and at further distances. The following departure gates for the Integrated Airspace Alternative Variation with ICC have been modified from those of the Future No Action Airspace Alternative: the North, East, West, and South departure gates. The new East departure gate is shifted more to the east. The new North, South, and West departure gates are the same as described for the JFK Integrated Airspace Alternative Variation with ICC. The location and use of each redesigned departure gate and its associated air traffic procedures are discussed in the following paragraphs. All departure headings are the same as in the Future No Action Airspace Alternative.

Integrated Airspace Alternative Variation with ICC – HPN Shifted North Departure Gate

The shifted North departure gate is the same gate that is described in the JFK departure routing (see Section 2.5.8.1). This gate serves flights destined to the Upper Midwest. Flights departing the primary runways at HPN will fly the same close-in departure headings as in the Future No Action Airspace Alternative. The difference will be that they will fly to a point further to the north, just south of Ft. Montgomery, NY before diverging into two flows and turning to the west and proceeding to the shifted North departure gate. This movement to the north puts the diverging and turning point about nine miles further north than in the Future No Action Airspace Alternative alignment and will allow for more EWR arrival airspace.

Integrated Airspace Alternative Variation with ICC – HPN Shifted East Departure Gate

The shifted East departure gate is shifted more to the east for this variation, to make room for the north arrivals into LGA. The gate extends from a point in the vicinity of Waterbury, CT to the southeast ending at HVN. This gate serves transatlantic flights and flights heading to Canada and the northeastern U.S. Flights departing the primary runways will follow the same close-in departure headings as the Future No Action Airspace Alternative. Once departed, the HPN flights will follow the current departure headings and fly to the northwest of the airport where they will turn to the northeast toward the departure gate. This turn will occur about one and a half miles further northwest of the airport than it currently does and the routes will proceed to the gate in the same general location as the Future No Action Airspace Alternative routes.

Integrated Airspace Alternative Variation with ICC – HPN South Departure Gate

The expanded South departure gate is the same as the JFK departure gate described in Section 2.5.8.1. This gate serves flights destined to southeastern U.S. Departure headings are the same as those in the Future No Action Airspace Alternative. However, unlike the no action conditions where the south-bound flights turn west and then southerly and proceed along the Hudson River, the alternative requires that these flights turn to the northeast much like the east gate departures. The southerly departures would continue their turn and pass about three miles east of Armonk, NY. The flights would continue the circling, turn, and pass over the top of HPN. This is necessary so that these flights can climb to sufficient altitude to cross over the top of LGA traffic. Once south of the Airport, these flights will diverge into two distinct flows over Raritan Bay, one heading to the northwestern tip of the gate and the other proceeding to the southeastern tip depending on their final destinations.

Integrated Airspace Alternative Variation with ICC – HPN Expanded West Departure Gate

The expanded West departure gate is also the same gate described in the JFK departure routing section (see Section 2.5.8.1). Departure headings will be the same as the Future No Action Airspace Alternative. The majority of the west-bound flights from HPN will follow the route described for the north gate departures until reaching a point near Ft. Montgomery, NY where they will turn to the southwest and proceed over West Milford, NJ to join the west gate routes near Mount Olive, NJ. Additionally, some of the west gate traffic from HPN will proceed along the route described above for the south gate traffic. In this case, the west-bound traffic will follow the south gate route to a point just south of LGA where it will split off to the west and pass over the top of EWR. Once west of EWR, the route will split into two routes and proceed to the southwest, joining the No Action routes about 40 miles northwest of PHL. This splitting of the west gate traffic between the north gate route and the south gate route was done to ensure that air traffic control sectors west of EWR will not be overloaded with traffic during peak traffic periods.

Integrated Airspace Alternative Variation with ICC - HPN Arrival Routing

The differences between this arrival routing and the Future No Action Airspace Alternative, are specific to the shifting of both the North and South arrival posts. The north post is shifted to make room for the redesigned EWR arrival procedures as part of this variation.

Integrated Airspace Alternative Variation with ICC – HPN Shifted North Arrival Post

The entire North post and associated flows are shifted approximately 10 miles to the east of the Future No Action Airspace Alternative location. The midpoint of the post is located 15 miles northeast of Danbury, CT. This arrival post serves the same flights as the Future No Action Airspace Alternative. Three major flows still converge on this post, then proceed due south toward the Airport. The routes are generally shifted slightly to the east with the downwind route to Runway 34 splitting into two routes. The main route is moved seven miles east and passes between Somers, NY and North Salem, NY. This route gradually joins the Future No Action Airspace Alternative route at Stamford, CT and follows the same close-in landing procedures as described in the Future No Action Airspace Alternative. The second downwind route to Runway 34 serves traffic coming from the northeast and is located about five miles further east from the main route. Similarly, this route converges on the Future No Action Airspace Alternative routings at Stamford, CT and follows them into the runway. The routes to Runway 16 north of HPN also shift about four miles to the east over Putnam County, NY and remain very similar to the Future No Action Airspace Alternative routes.

Integrated Airspace Alternative Variation with ICC – HPN Expanded South Arrival Post

The south arrival routes are adjusted in two places. The first begins in southern New Jersey over Salem County and extends to the northeast to the shoreline near Hamilton, NJ. The adjustment in this area consists of the alternative routes being moved approximately 15 miles to the northeast of the Future No Action Airspace Alternative. This is a more direct routing from central New Jersey and crosses the Future No Action routes over the Ocean about 15 miles south of East Massapequa Long Island. The second area of change is located from this point on to the northern shore of Long Island near Miller Place Long Island. The Integrated Airspace Alternative variation with ICC route here is shifted about eight miles to the east with the route passing over the top of ISP. The Integrated Airspace Alternative variation with ICC routing stays east of the Future No Action routes over the Long Island Sound and begins joining the Future No Action routes near Bridgeport, CT. The Integrated Airspace Alternative variation with ICC route is located north of the Future No Action routes as it passes from Bridgeport to Stamford, CT and then matches the Future No Action routes for the remainder of the distance to HPN.

2.5.8.6 Integrated Airspace Alternative Variation with ICC - PHL Traffic Routing

Integrated Airspace Alternative Variation with ICC - PHL Departure Routing

The primary changes from the Future No Action Airspace Alternative concern both the East and West gates. The West gate is expanded to the northwest and the East departure gate is moved further to the east. The primary departure runways are 9L/R and 27L/R. See **Figure 2.32** for a graphic display of flows out of PHL.

<u>Integrated Airspace Alternative Variation with ICC – PHL Shifted East Departure Gate</u>

The East departure gate is moved approximately 25 miles to the east from the Future No Action Airspace Alternative East departure gate. All flights departing to the northeastern U.S. or eastern Canada via this gate will not be able to turn to the northeast until they are almost over the NJ shoreline. Once over the Atlantic Ocean, these flights will turn toward JFK and diverge into two distinct flows upon reaching JFK.

<u>Integrated Airspace Alternative Variation with ICC – PHL Expanded West Departure Gate</u>

The expanded West departure gate now provides access to three jet routes. This gate serves flights destined for the western and southwestern U.S. Flights departing PHL will follow the same departure headings as the Integrated Airspace without ICC Alternative. Once west of the Airport, the aircraft will diverge into three distinct flows, depending on their final destinations. The predominant difference between this variation and the Future No Action Airspace Alternative, resulting from the expansion of the West departure gate, is the new departure route heading to the northern end of the gate.

Integrated Airspace Alternative Variation with ICC - PHL Arrival Routing

The primary PHL arrival runways are Runways 9R/L and 27L/R. The West arrival post is shifted to the northeast to make room for the expanded PHL West departure gate. In addition, a new arrival route has been added to the North arrival post. The location and use of each post, along with its associated air traffic, is discussed in the following paragraphs. See **Figure 2.33** for a graphic display of flows into PHL.

Integrated Airspace Alternative Variation with ICC - PHL North Arrival Post

The North arrival post is in approximately the same location as the Future No Action Airspace Alternative North arrival post. The post serves the same flights as the Future No Action Airspace Alternative with one addition: a route for flights arriving from the Great Lakes region has been added. Once the flights are south of the post, they will follow the same close-in flows to land as in the Future No Action Airspace Alternative.

Integrated Airspace Alternative Variation with ICC – PHL Shifted West Arrival Post

The West arrival post would be shifted approximately 10 miles to the northeast and is now located in the vicinity of Scarlets Mill, PA. This post would still serve the same flights as the Future No Action Airspace Alternative. Flights arriving from the west will be on a path parallel and north of the Future No Action Airspace Alternative path.

Once past the post, they will fly the same close-in flows to land as in the Future No Action Airspace Alternative.

2.5.8.7 Integrated Airspace Alternative Variation with ICC - Summary

This variation of the Integrated Airspace Alternative is unique in that it includes the expansion of the terminal airspace and associated procedures, thereby allowing for the following:

- Reduction in aircraft spacing from five to three miles due to application of terminal separation rules.
- Use of terminal holding rules in a larger area.
- Incorporation of expanded departure gates, allowing more efficient flows out of the NY/NJ/PHL Metropolitan Area.
- Separation of arrival and departure flows into and out of the design area, providing increased efficiency.

The main specific arrival and departure changes described for the NY Metropolitan Area airports and PHL are summarized in **Table 2.4**.

2.5.8.8 Integrated Airspace Alternative Variation with ICC - Purpose and Need Evaluation Criteria

The following paragraphs address how the Integrated Airspace Alternative Variation with ICC meets the Purpose and Need evaluation criteria.

Integrated Airspace Alternative Variation with ICC - Reduce Complexity

The Integrated Airspace Alternative Variation with ICC has several features which reduce complexity. These include expanded gates, route changes, and full integration of the airspace.

When TRACONs are able to hand-off aircraft to the Centers over a larger departure gate, the task of vectoring aircraft to achieve the spacing needed in the en route airspace as they climb to reach their cruise altitudes becomes less complex. Since this variation includes the expansion of both the West and South departure gates, it reduces airspace complexity.

Table 2.4
Summary of Integrated Airspace Alternative Variation with ICC

Airport	Changes from Future No Action
JFK	North departure gate shifted 15 miles northeast
	New distant procedures for aircraft heading to the North departure gate
	West departure gate extended to the north and to the south
	New procedures for aircraft heading to the West departure gate
	Future No Action Ocean departure gate split into Ocean and South departure gates
	New distant procedures for aircraft heading to the Ocean departure gate
	New procedures for aircraft heading to the South departure gate
	North arrival post shifted five miles southeast
	New distant procedures for aircraft arriving from the North arrival post
	East arrival post shifted northwest
	New procedures for aircraft arriving from the East arrival post
	South arrival post shifted to the northeast
	New procedures for aircraft arriving from the South arrival post
LGA	East departure gate shifted east
	North departure gate shifted 15 miles northeast
	New procedures for aircraft heading to the North departure gate
	West departure gate extended to the north and to the south
	New procedures for aircraft heading to the West departure gate
	South departure gate shifted to the northwest
	New procedures for aircraft heading to the South departure gate
	North arrival post shifted 30 miles east
	New procedures for aircraft arriving from the North arrival post
	West arrival posts shifts to coincide with Future No Action South arrival post
	New procedures for aircraft arriving from the west to coincide with the South arrival post
	West arrival flow split into two arrival flows, one to the north and one to the south
	New departure headings for aircraft departing Runway 4 to the North departure gate
	New departure headings for aircraft departing Runway 4 to the East departure gate
EWR	New departure headings for all runways and all gates
	East departure gate shifted to the east
	New procedures for aircraft heading to the East departure gate
	North departure gate shifted to the northeast
	New procedures for aircraft heading to the North departure gate
	West departure gate expanded to the north and south
	New procedures for aircraft heading to the West departure gate
	South departure gate shifted to the southwest
	New procedures for aircraft heading to the South departure gate
	New Ocean departure gate
	New procedures for aircraft heading to the Ocean departure gate
	North arrival post moved to 50 miles north of EWR
	New procedures for aircraft arriving from the North arrival post
	West arrival post shifted to be near Greenville, NY
	West arrival flow split into two arrival flows, one to the north and one to the south
	New procedures for aircraft arriving from the South arrival post
	Use of both parallel runways for arrivals

Table 2.4 (continued)
Summary of Integrated Airspace Alternative Variation with ICC

Airport	Changes from Future No Action
TEB	Departure gates match those of EWR Integrated Airspace with ICC New distant procedures for aircraft heading to the North departure gate New distant procedures for aircraft heading to the West departure gate New distant procedures for aircraft heading to the South departure gate West arrival post shifted 15 miles south New procedures for aircraft arriving from the West arrival post New procedures for aircraft arriving from the West arrival post from the vicinity of Yardley, PA
HPN	North departure gate shifted 15 miles northeast New distant procedures for aircraft heading to the North departure gate West departure gate extended to the north and to the south New procedures for aircraft heading to the West departure gate South departure gate shifted to the west New departure procedures for aircraft departing to the south gate North arrival post shifted to the east New distant procedures for aircraft arriving from the north gate New distant procedures for aircraft arriving from the south
PHL	West departure gate expanded to the northwest New procedures for aircraft heading to the West departure gate East departure gate is shifted to the east New procedures for aircraft heading to the East departure gate West arrival post shifts to the northeast New distant procedures for aircraft arriving from the West arrival post New departure headings for aircraft heading to the North, East, West, Southwest, and South departure gates Additional route added to North arrival post

Adding a departure route into the already congested West departure gate area would slightly increase complexity. Route changes can reduce or increase complexity depending on their new location. However, the split of EWR arrivals from the west into two flows will reduce complexity by allowing for the sequencing of aircraft farther from the airports.

The full integration of the airspace would allow the complex crossing of traffic flows to be moved from en route airspace to terminal airspace where the procedure is easier and complexity would be reduced. The full integration of the airspace would also allow for the implementation of terminal holding procedures in a larger volume of airspace. This would in turn reduce en route holding and the associated Traffic Management Initiatives.

Integrated Airspace Alternative Variation with ICC - Reduce Voice Communications

Communications between ATC facilities and pilot-to-controller communications would be greatly reduced under the Integrated Airspace Alternative with ICC. Integrated airspace, which puts key controllers on a common automation platform, would reduce coordination among these key ATC entities. For example, this makes approval of reroutes much faster, because key decision makers are able to coordinate in "real time." Furthermore, pilot-to-controller communications may be reduced as well because an aircraft would spend the last 100-200 miles of its flight under the control of the same ATC facility.

Integrated Airspace Alternative Variation with ICC - Reduce Delay

This variation includes changes to departure gates and departure routes which reduce delays. The expanded NY Metropolitan West and South departure gates, as well as the expanded PHL West departure gate, and a segregated ocean departure route for EWR would allow more flights into or out of the airspace system, thus reducing delays. New departure headings (i.e., divergent headings per FAA Order 7110.65P) allow more aircraft to depart in a given amount of time because the aircraft diverge from one another, thus, reducing separation between successive departures and delay.

The full integration of the airspace allows for the use of the less restrictive terminal rules and procedures in a larger volume of airspace. The use of terminal rules and procedures leads to reduction in delays in several ways:

- Terminal ATC facility minimum separation criteria, under which aircraft need to maintain three miles of separation instead of five miles in en route airspace. This reduction in en route separation would allow controllers to put more aircraft into the expanded terminal airspace per given time, thus, reducing delays.

- Because of coordination requirements, aircraft transitioning from terminal to en route require in-trail separation. With an integrated airspace, terminal separation may be used on both sides of the departure gate, reducing the need for in-trail separation between flights at different altitudes. This adds more available airspace for departures, thus, reducing delays. When the airspace can accommodate two separate layers of departures, it also reduces the frequency with which high traffic at one airport causes delays at another.

- Inefficiencies due to the procedures for holding under en route ATC holding procedures would no longer apply, as terminal ATC holding procedures would be used. Holding under terminal ATC procedures provides greater flexibility in the timing of when and from where an aircraft could be pulled from the holding "stack." This capability would allow controllers greater latitude (i.e., more options) for keeping a consistent steady stream of aircraft heading towards active runways, thus, reducing overall delay.

Integrated Airspace Alternative Variation with ICC - Balance Controller Workload

This variation results in a net improvement to the balance of controller workload.

Route changes have the potential to increase or decrease controller workload in a balanced or not so balanced manner.

Changes in departure routes include modifications to departure headings and addition of departures routes to the North, South and Ocean gates. Modifications to departure headings allow aircraft to be more evenly distributed to multiple departure controllers. Conversely, additional departure routes to the North, South, and Ocean gates controllers' departure areas will increase their workloads.

One change to arrivals improves the balance of controller workload. JFK arrivals from the Pacific Rim via Canada would no longer be routed over the top of New York City, instead they would arrive from the east. As a result, the North arrival post would no longer be merging two arrival streams. This means JFK would be able to send traffic more direct to the West gate, as opposed to routing flights to the south in the vicinity of Robbinsville, NJ. This relocation of the arrival stream to the East arrival post would better balance the controller workload for arriving JFK traffic.

Integrated Airspace Alternative Variation with ICC - Meet System Demands

A more efficient terminal airspace design will help balance hourly arrival and departure demand, making the most out of any existing peak hour airfield capacity limitations.

A new ocean departure route for EWR would allow more direct routing for transatlantic flights. JFK departures would be able to send traffic more direct to the West gate, as opposed to routing flights to the south in the vicinity of Robbinsville, NJ.

Expanded gates and added departure routes will allow the airspace to meet increased system demands. The expansion of the West and South gates and an addition of the associated departure flows will allow more aircraft to depart the NY/NJ/PHL Metropolitan Area in a given amount of time.

Integrated Airspace Alternative Variation with ICC - Improve User Access to System

This variation's design improves user access to the airspace system by providing more direct routing and implementing terminal separation rules.

A new ocean departure route for EWR would allow more direct routing for transatlantic flights. JFK departures would be able to send traffic more direct to the West gate, as opposed to routing flights to the south in the vicinity of Robbinsville, NJ.

When two aircraft going to the same route are separated by altitude, the requirements for safe separation have been strictly met according to ATC rules. As a practical matter, some in-trail separation may also be necessary in going from the required three mile to five mile horizontal separation from terminal to en route airspace, or the traffic would eventually overload the first en route sector.

With an integrated airspace, terminal separation may be used on both sides of the departure gate, reducing the need for in-trail separation between flights at different altitudes. This adds more available airspace for departures, thus, reducing delays. When the airspace can accommodate two separate layers of departures, it also reduces the frequency with which high traffic at one airport causes delays at another.

Integrated Airspace Alternative Variation with ICC - Expedite Arrivals and Departures

This variation includes added expanded final controller airspace,[20] departure headings, changed routes, an expanded west gate, and fully integrated airspace, all of which expedite arrivals or departures.

Expanding the final controller's airspace at EWR expedites arrivals because this permits the use of both parallel runways for arrivals at EWR.

Additional departure headings would allow air traffic to expedite departures at EWR, LGA, and PHL. These departure headings

[20] Sector that sequences arrivals on final approach to the runway.

allow more aircraft to depart in a given amount of time thus expediting departures.

This variation includes several changes to routes which expedite arrivals or departures. The splitting of the EWR and LGA west arrival flows allows sequencing to occur earlier, which results in less vectoring close-in to the airport allowing the arrival aircraft to proceed more directly to their arrival runway. A new ocean departure route for EWR would allow more direct routing for transatlantic flights. JFK departures would be able to send traffic more direct to the West gate, as opposed to routing flights to the south in the vicinity of Robbinsville, NJ.

The expanded West departure gate would decrease the frequency of non-direct vectoring for departure aircraft. When aircraft from several airports have departed and are expected to arrive at the same departure gate at the same time, controllers must vector one or more of these aircraft away from their direct routing to maintain safe separation. This would result in aircraft flying longer routes prior to leaving the metropolitan airspace. Expanding the West departure gate allows the controllers to direct air traffic over an additional fix within the gate and, therefore, the need for non-direct routing is decreased.

One of the benefits of the full integration of the airspace is that departures may be stacked at more departure gates (i.e., in trail separation is not required at the departures gates). Stacked departure aircraft over departure gates would effectively reduce the need for vectoring to provide adequate spacing along a departure jet airway. This approach would serve to expedite departures.

The full integration of the airspace also allows for the use of the less restrictive terminal holding rules and procedures in a larger volume of airspace. Aircraft may be taken out of the holding pattern at any time and in any order, thus, capitalizing on any gaps in arrival airspace and expediting arrivals and departures.

Integrated Airspace Alternative Variation with ICC - Increase Flexibility in Routing

Flexibility in routing improves efficiency during abnormal operating conditions such as severe weather. During severe weather, additional departure routes can be used to avoid localized weather activity. Thunderstorms may be highly localized, cutting off several routes while leaving adjacent routes open. The increase in departure routes means that controllers have additional flexibility in routing aircraft around severe weather. Since this variation expanded the West and South departure gates, and added an additional Ocean departure gate for EWR, controllers now have increased flexibility in routing. Likewise, the split of the EWR West arrival routes, increases controller flexibility for arrival routing.

Integrated Airspace Alternative Variation with ICC - Maintain Airport Throughput

This variation includes changes in routes and gates as well as the full integration of the airspace. These design features would allow for an increase in airport throughput. Additional departure headings as well as expansion of the new West departure gate will show an increase in airport throughput especially at EWR. EWR receives the most benefit because of its high use of the expanded West departure gate. Airport arrival throughput is increased by expanding the final controller’s airspace and allowing EWR to use both parallel runways for arrivals.

Since this variation includes the full integration of the airspace, terminal holding procedures may be used in a larger volume of airspace. Aircraft may be taken out of the holding pattern at any time and in any order, thus, capitalizing on any gaps in arrival airspace and maintaining airport throughput.

Summary

The Integrated Airspace Alternative Variation with ICC would enhance safety by reducing overall airspace complexity and voice communications. It improves efficiency by:

- Reducing delay,
- Balancing controller workload,
- Meeting system demands,
- Improving user access to the system,
- Expediting arrivals and departures,
- Increasing flexibility in routing, and
- Maintaining airport throughput.

Therefore, this is a reasonable alternative for meeting the Purpose and Need of the Airspace Redesign and will be carried forward for environmental analysis.

2.5.9 Summary of Evaluation of Detailed Airspace Redesign Alternatives

Table 2.5 provides a summary of major route and gate/post changes associated with each of the Airspace Redesign Alternatives as compared to the Future No Action Airspace Alternative.

2.6 COMPARISONS OF AIRSPACE REDESIGN ALTERNATIVES

The Future No Action Airspace Alternative was carried forward as required by CEQ Regulations to provide a benchmark, enabling decision makers to compare the magnitude of environmental effects of the other alternatives. Two airspace redesign alternatives meet the Purpose and Need for the Airspace Redesign: Modifications to

Existing Airspace and Integrated Airspace. These alternatives were carried forward for detailed environmental analysis. Although the Ocean Routing Airspace Alternative did not meet the Purpose and Need, it was carried forward for environmental analysis to address long standing public concerns.

In this section, each Airspace Redesign Alternative is qualitatively and quantitatively evaluated and compared based on the Purpose and Need Evaluation Criteria. The results of this analysis will be used by the decision makers as a means of comparing the alternatives to assist in selecting a preferred alternative.

The qualitative analysis is based on the expected results of a particular change relative to the existing airspace structure. For example, when a departure gate is added it is expected that the ability of that alternative to meet system demands will improve. The existing airspace structure is equivalent to that of the Future No Action Airspace Alternative, therefore, all qualitative discussions relate changes to an alternatives' airspace design to the Future No Action Airspace.

The quantitative analysis is based on operational metrics obtained through the use of computer modeling of the Alternatives. Flight paths for each alternative are modeled using the Total Airspace and Airport

Table 2.5
Summary of Airspace Alternatives Details

Alternative	Airport	Changes from Future No Action
Modifications to Existing Airspace Alternative		
	JFK	No Changes
	LGA	South departure gate shifted to the northwest New departure headings for aircraft departing Runway 4 to the North departure gate New propeller aircraft procedures departing Runway 13 to West departure gate New departure headings for propeller aircraft departing Runway 13 to the South departure gate New distant procedures for aircraft departing Runways 4 and 13 to the South departure gate New departure headings for aircraft departing Runway 4 to the East departure gate
	EWR	South departure gate shifted to the northwest New procedures for aircraft heading to new South departure gate New departure headings from all runways to all gates New departure headings off Runway 4L dependent on TEB Runway 6 New departure headings off Runway 22R dependent on TEB Runway 11
	TEB	South departure gate shifted to the northwest New distant procedures for aircraft heading to shifted South departure gate
	HPN	South departure gate shifted to the northwest New distant procedures for aircraft departing to the south gate
	PHL	East departure gate shifted further east New procedures for aircraft heading to new East departure gate New departure headings for aircraft heading to the North, East, West, and South departure gates
Ocean Routing Airspace Alternative		
	JFK	Shifted West departure gate New procedures for aircraft heading to the West departure gate Split of the FNA Ocean departure gate into the Ocean and South departure gates New procedures for aircraft heading to the South departure gate South arrival post shifted to the east New procedures for aircraft arriving from the South arrival post New procedures for aircraft arriving from the North arrival post
	LGA	New procedures for aircraft heading to the North departure gate
	EWR	Shifted West departure gate New procedures for aircraft heading to the West departure gate Shifted South departure gate New procedures for aircraft heading to the South departure gate New procedures for aircraft departing Runways 22L/R to the North departure gate New procedures for aircraft departing Runways 22L/R to the East departure gate
	TEB	No Changes
	PHL	No Changes

Table 2.5 (continued)
Summary of Airspace Alternatives Details

Alternative		Airport	Changes from Future No Action
Integrated Airspace Alternative			
	Variation without ICC	JFK	No Changes
		LGA	West departure gate extended to the north and to the south New procedures for aircraft heading to the West departure gate New departure headings for aircraft departing Runway 4 to the North departure gate New departure headings for aircraft departing Runway 4 to the East departure gate
		EWR	New departure headings for all runways and all gates Procedures off Runway 4L dependent on TEB Runway 6 to West departure gates New procedures for aircraft heading to the West departure gate Procedures off Runway 4L dependent on TEB Runway 6 to North and East departure gates Procedures off Runway 22R dependent on EWR Runway 11 use Expanded West departure gate
		TEB	West departure gate extended to the north and to the south New procedures for aircraft heading to the West departure gate New procedures for turboprop aircraft arriving from the northeast
		HPN	West departure gate extended to the north and to the south New procedures for aircraft heading to the West departure gate New distant arrival procedures
		PHL	New departure headings for aircraft heading to the North, East, West, Southwest, and South departure gates
	Variation with ICC	JFK	North departure gate shifted 15 miles northeast New distant procedures for aircraft heading to the North departure gate West departure gate extended to the north and to the south New procedures for aircraft heading to the West departure gate Future No Action Ocean departure gate split into Ocean and South departure gates New distant procedures for aircraft heading to the Ocean departure gate South departure gate shifted to the southeast New procedures for aircraft heading to the South departure gate North arrival post shifted five miles southeast New distant procedures for aircraft arriving from the North arrival post East arrival post shifted northwest New procedures for aircraft arriving from the East arrival post South arrival post shifted to the northeast New procedures for aircraft arriving from the South arrival post
		LGA	East departure gate shifted east North departure gate shifted 15 miles northeast New procedures for aircraft heading to the North departure gate West departure gate extended to the north and to the south New procedures for aircraft heading to the West departure gate South departure gate shifted to the northwest New procedures for aircraft heading to the South departure gate North arrival post shifted 30 miles east New procedures for aircraft arriving from the North arrival post

Table 2.5 (continued)
Summary of Airspace Alternatives Details

Alternative	Airport	Changes from Future No Action
Integrated Airspace Alternative (continued)		
Variation with ICC (continued)	LGA (continued)	West arrival posts shifts to coincide with Future No Action South arrival post New procedures for aircraft arriving from the west to coincide with the South arrival post West arrival flow split into two arrival flows, one to the north and one to the south New departure headings for aircraft departing Runway 4 to the North departure gate New departure headings for aircraft departing Runway 4 to the East departure gate
	EWR	New departure headings for all runways and all gates East departure gate shifted to the east New procedures for aircraft heading to the East departure gate North departure gate shifted to the northeast New procedures for aircraft heading to the North departure gate West departure gate expanded to the north and south New procedures for aircraft heading to the West departure gate South departure gate shifted to the southwest New procedures for aircraft heading to the South departure gate New Ocean departure gate New procedures for aircraft heading to the Ocean departure gate North arrival post moved to 50 miles north of EWR New procedures for aircraft arriving from the North arrival post West arrival post shifted to be near Greenville, NY West arrival flow split into two arrival flows, one to the north and one to the south New procedures for aircraft arriving from the South arrival post Use of both parallel runways for arrivals
	TEB	Departure gates match those of EWR Integrated Airspace with ICC New distant procedures for aircraft heading to the North departure gate New distant procedures for aircraft heading to the West departure gate New distant procedures for aircraft heading to the South departure gate West arrival post shifted 15 miles south New procedures for aircraft arriving from the West arrival post New procedures for aircraft arriving from the West arrival post from the vicinity of Yardley, PA
	HPN	North departure gate shifted 15 miles northeast New distant procedures for aircraft heading to the North departure gate West departure gate extended to the north and to the south New procedures for aircraft heading to the West departure gate South departure gate shifted to the west New departure procedures for aircraft departing to the south gate North arrival post shifted to the east New distant procedures for aircraft arriving from the north gate New distant procedures for aircraft arriving from the south

Table 2.5 (continued)
Summary of Airspace Alternatives Details

Alternative	Airport	Changes from Future No Action
Integrated Airspace Alternative (continued)		
	PHL	West departure gate expanded to the northwest New procedures for aircraft heading to the West departure gate East departure gate is shifted to the east New procedures for aircraft heading to the East departure gate West arrival post shifts to the northeast New distant procedures for aircraft arriving from the West arrival post New departure headings for aircraft heading to the North, East, West, Southwest, and South departure gates Additional route added to North arrival post

Modeler (TAAM) fast-time simulation tool, which is used to calculate metrics. These metrics provide a basis for comparison of the Alternatives.

A written and tabular summary of the evaluation of the Airspace Redesign Alternatives in terms of the Purpose and Need Criteria and potential noise impacts is provided at the end of this chapter.

2.6.1 Reduce Complexity

Airspace complexity is a function of the degree to which aircraft routes are intermingled, with more route crossings resulting in more complex airspace. Complexity is also related to the number of aircraft, types of aircraft, and duration of a flight in a particular volume of airspace.

2.6.1.1 Qualitative Comparison

Complex airspace impacts both the controllers of the airspace and the users of the airspace. For the qualitative assessment the Airspace Alternatives are analyzed to determine features that tend to increase or decrease controller complexity in comparison to the Future No Action Alternative.

The Modifications to Existing Airspace Alternative reduces complexity by segregating PHL departures bound for the northeastern U.S. from both the south bound NY/NJ Metropolitan Area and JFK West Gate departures. This is accomplished by moving the PHL departures further to the east, and the south gate NY departures further to the west.

Similarly, the Ocean Routing Airspace Alternative reduces complexity by separating the EWR departures from the LGA and TEB westbound departures. However, this change results in increased complexity by intermingling EWR departures with the PHL and JFK departures.

The Integrated Airspace Alternative Variation without ICC includes features that reduce complexity: an expanded West departure gate and an additional arrival route into TEB. The expansion of the departure gate reduces complexity because the associated area in which vector aircraft achieve the appropriate separation expands. The addition of the arrival route into TEB allows for the separation of the slower prop-driven aircraft from the faster jet traffic leading to less complexity. Both of these design features help to reduce the complexity of the airspace in limited areas.

The Integrated Airspace Alternative Variation with ICC has several features which reduce complexity: expansion of the departure gates, additional routes, and fully integrated airspace. The expansion of the South and West gates and addition of the associated departure routes allows for separation of flows and more orderly, expeditious routing in the terminal and en route airspace. However, due to the congestion in the West gate area the departure route could slightly increase complexity. In addition to the additional departure routes to serve the expanded gates, routes to the northwest and direct departure routes over the ocean are added. This variation does not include similar changes to the arrival posts, however, it does include a change to an arrival flow. The EWR and LGA arrivals from the west are split into two flows which permit sequencing of aircraft to take place farther from the airports, thereby, reducing complexity. As a result of the changes in departure and arrival routes, this variation un-tangles the departure routes from the arrival routes and results in a reduction in airspace complexity. Lastly, the expanded terminal airspace resulting from the airspace integration allows holding procedures to take place in the terminal environment. This, in turn, reduces en route holding and the use of Traffic Management Initiatives. Therefore, less interaction between FAA terminal and en route control facilities is required and this reduces complexity. Overall, the many features of the Integrated Airspace Alternative Variation with ICC combine to reduce airspace complexity to a larger extent than the features of the other alternatives.

2.6.1.2 Quantitative Comparison

For the quantitative comparison, complexity is identified through its impact on the users of the airspace. To a first approximation, complexity is the result of merging aircraft from several flows into one. When the number of aircraft to be merged exceeds some hypothetical threshold, aircraft are separated by more than the minimum separation, resulting in delays that are measurable. Even when an aircraft is not delayed, it may be directed onto a longer path than optimum conditions might otherwise dictate. For this reason, time and distance are included separately in the calculation of complexity's impact. Therefore, the reduction in complexity is measured using two metrics: (1) *jet route delays plus time below 18,000 feet*, and (2) *arrival distance below 18,000 feet*.

The *jet route delays plus time below 18,000 feet* metric is used to calculate changes in complexity associated with departures. *Jet route delay* is the average delay per operation over a 24 hour period. In this case, the jet delay equals the difference between arrival times at various jet airway fixes of unimpeded aircraft and the modeled Alternatives' aircraft. These delay times are then summed and averaged over all of the operations in the area. The second part of this metric is the *time below 18,000 feet*. This is the average time from take-off until the aircraft reaches 18,000 feet per aircraft over a 24 hour period. This metric reflects the intertwining and dependency of the arrival and departure routes. Ideally, an aircraft is allowed to climb to 18,000 feet as soon as possible. However, as the complexity of the airspace increases aircraft may be held at lower altitudes to avoid other traffic flows.

The jet route delays and time below 18,000 feet are added together for each of the Alternatives. The value calculated for the Future No Action Airspace, Modifications to Existing Airspace, and the Ocean Routing Airspace Alternatives is 12 minutes. In comparison the values calculated for the Integrated Airspace Alternative Variation without ICC and Integrated Airspace Alternative Variation with ICC are 11 minutes and 10 minutes, respectively. These results support the qualitative analysis in that the Integrated Airspace Alternative Variation with ICC provides the most reduction in complexity.

The *arrival distance below 18,000 feet* is the metric used to calculate changes in complexity associated with arrivals. This metric is the average distance flown by the arriving aircraft flying from 18,000 feet to landing. This metric, similar to the *time below 18,000 feet* metric, reflects the intertwining and dependency of the arrival and departure routes. The value calculated for the Future No Action Airspace Alternative and Integrated Airspace Alternative Variation without ICC is 96 nautical miles. The Modifications to Existing Airspace is slightly better, with a value of 95 nautical miles. The Ocean Routing Airspace Alternative has a value of 99 nautical miles. The increased distance for the Ocean Routing Airspace Alternative is the result of this alternative's adverse impacts to JFK arrivals. The Integrated Airspace Alternative Variation with ICC has the largest value, 102 nautical miles. Although this variation reduces complexity overall, it does increase some arrival distances.

2.6.2 Reduce Voice Communications

Voice communications include both controller-to-controller and controller-to pilot communications. Controller-to-controller communications are required to transfer responsibility for a particular aircraft. Controller-to-pilot communications are required to provide instructions to pilots. Improved airspace design can minimize the number of communications required.

2.6.2.1 Qualitative Comparison

The Modifications to Existing Airspace and Integrated Airspace without ICC Alternatives do not include design features that lead explicitly to a reduction in controller-pilot or controller-controller communications. There is a small reduction in controller-pilot communications resulting from the reduced vectoring associated with the expanded West departure gate.

In the Ocean Routing Airspace Alternative, all EWR aircraft fly the same departure procedure, thus, reducing pilot-controller communications because vectoring and sequencing of aircraft to the Future No Action West gate is not required. Conversely, congestion on the single EWR departure route requires increased internal facility communications in order to manage departure traffic flows.

Lastly, the implementation of Integrated Airspace Alternative Variation with ICC greatly reduces the amount of communication required between ATC facilities and between pilots and controllers. Fewer communications are required, because this variation allows controllers to use a common automation platform and there are fewer airspace boundaries for aircraft to cross.

2.6.2.2 Quantitative Comparison

The difference in the number of voice communications between the Airspace Alternatives is the focus of this analysis. In many instances the number of communications does not change between the Alternatives. Basically, only two types of communications are likely impacted as a result of the Airspace Redesign: those required to provide congestion related vector and altitude change instructions and those required to hand off aircraft to another facility. The former types of communications are generally related to delay and, therefore, are not calculated because delay metrics are calculated for other Purpose and Need Criteria. The number of communications required to hand off aircraft is calculated using the *maximum inter-facility handoffs per hour* metric. This metric is defined as the number of controller-to-controller communications in an hour to transfer the responsibility for an aircraft from a controller in one facility to a controller in another facility. The *maximum inter-facility handoffs per hour* for the Future No Action, Modifications to Existing Airspace Ocean Routing Airspace Alternatives, and the Integrated Airspace Alternative Variation without ICC ranges from 521 to 529. At 382 *maximum inter-facility handoffs per hour* the Integrated Airspace Alternative Variation with ICC is the only design that significantly reduces communications. This analysis supports the qualitative analysis because the only design that includes significant design features pertaining to Reduced Voice Communications is the Integrated Airspace Alternative Variation with ICC.

2.6.3 Reduce Delay

Delay is the primary measure of the operational efficiency of the airspace system. Delays in the airspace system are the result of congestion and severe weather. Airspace redesign may mitigate delay by adding and/or changing routes, departure gates, arrival posts, and the structure of the airspace boundaries.

2.6.3.1 Qualitative Comparison

The Ocean Routing Airspace Alternative does not result in a reduction in delay. In fact, delays substantially increase at EWR, because all flights departing EWR remain in single file until they are at least 40 miles from the Airport. This limits the Airport's ability to release aircraft one after the other during peak hours of operation, since aircraft following directly behind one another must be held on the runway until the departing aircraft has traveled a specific distance from the airport.

The Modifications to Existing Airspace, the Integrated Airspace Alternative Variation without ICC, and the Integrated Airspace Alternative Variation with ICC have a common feature which leads to reduced departure delays: additional departure headings. These procedures allow more aircraft to depart in a given amount of time because the aircraft diverge from one another, which permits reduced time between successive departures.

The Integrated Airspace Alternative Variation without ICC includes two additional attributes that further reduce delay: an expanded West departure gate and an additional arrival route.

The Integrated Airspace Alternative Variation with ICC surpasses all the other designs in terms of reduced delay because not only does it include expanded gates and new routes, it also includes changes in the airspace facility boundaries. This change allows for use of terminal separation standards as opposed to the en route separation standard in a much larger volume of airspace. In addition, terminal holding procedures are used in this expanded airspace. Terminal holding procedures allow for aircraft to be taken out of the holding pattern at any time and in any order, thus, capitalizing on any gaps in arrival airspace, and resulting in more efficient terminal holding and reduced arrival delays.

2.6.3.2 Quantitative Comparison

Two metrics are used to compare how well each Alternative reduces delay: *Traffic Weighted Arrival Delay 2011* and *Traffic Weighted Departure Delay 2011*. *Traffic Weighted Arrival Delay 2011* is the weighted[21] average arrival delay per operation in a 24-hour period. The arrival delay is the difference between the arrival time for a specific Alternative's operations and the arrival time for unimpeded operations. Similarly, the departure delay is the difference between the departure time for a specific Alternative's operations and the departure time for unimpeded operations. These delay metrics are best used as a comparison tool and do not in themselves represent an actual delay an air traveler encounters on a given day.

The metrics show that the Ocean Routing Airspace Alternative results in the greatest arrival and departure delay: 23.6 and 29.5 minutes, respectively. The Ocean Routing Airspace Alternative delays are even greater than those for the Future No Action Airspace Alternative which results in arrival delay of 22.9 minutes and departure delay of 23.3 minutes. The Modifications to Existing Airspace and the Integrated Airspace Alternative Variation without ICC result in similar values for arrival delay, 22.6 and 22.8 minutes respectfully and departure delay, 20.9 and 20.8 minutes respectively. Finally, the Integrated Airspace Alternative Variation with ICC results in 19.9 minutes of arrival delay and 19.2 minutes of departure delay. When compared to the Future No Action Airspace Alternative, the Integrated Airspace Alternative Variation with ICC produces the greatest reduction in delay.

2.6.4 Balance Controller Workload

Controller workload impacts the efficiency of the airspace. If traffic loads served by a particular controller exceed safety related limits, restrictions are imposed on the airspace. For example, restrictions could include increasing the separation of aircraft. Thus, safety is maintained while efficiency is reduced. If implementation of an Airspace Alternative results in a more balanced controller workload, efficiency of the airspace would likewise improve.

2.6.4.1 Qualitative Comparison

The qualitative comparison focused on the balance of controller workload between the various gates. The Ocean Routing Airspace Alternative negatively impacts the balance of controller workload, because the single controller who previously handled flights arriving from the south to JFK now also handles EWR departures.

The Modifications to Airspace Alternative, Integrated Airspace Alternative Variation without the ICC, and Integrated Airspace Alternative Variation with ICC all include changes to departure headings which allow operations to be more evenly distributed among the departure controllers.

The Integrated Airspace Alternative Variation with ICC has an additional feature which balances controller workload: the relocation of a JFK arrival stream from the North arrival post to the East arrival post. Conversely, the additional departure routes

[21] A weighted average was used to calculate a single metric for each alternative. The airports operate in many configurations depending on wind direction and runway orientation. The predominant configurations were modeled in TAAM and delays were calculated for each of these configurations. To combine the results, the delay numbers were weighted based on the percent of operations handled in a certain configuration. See Appendix C for more information.

included in the Integrated Airspace Alternative Variation without ICC and the Integrated Airspace Alternative Variation with ICC increase the workload for the controller responsible for the affected departure fix.

2.6.4.2 Quantitative Comparison

The quantitative comparison of the Balance Controller Workload Criterion focuses on balance of workload at each fix. Therefore, the metric that measures the effectiveness of each Alternative in terms of balancing controller workload is *Equity of West Gate Fix Traffic Counts.* The metric, *Equity of West Gate Fix Traffic Counts*, measures the balance of traffic among the departure fixes in a particular departure gate. Departure fix loading is measured because, in the case of this Airspace Redesign, the changes to controller workload result primarily from changes to departures. The metric is calculated per departure gate, because controller workload is not necessarily balanced if the imbalance is simply moved to another gate. The West gate is evaluated because it is the gate most impacted by the various Airspace Alternatives. The numeric value representing *Equity of West Gate Fix Traffic Counts* ranges from zero to one. A value of zero indicates a perfect balance among the traffic using each of the fixes that make up the West gate. A value of one indicates that one fix within the West gate serves all the traffic departing through the gate.

The *Equity of West Gate Fix Traffic Counts* for the Future No Action Airspace, Modifications to Existing Airspace and the Ocean Routing Airspace Alternatives are all 0.37, because these alternatives do not add fixes to the West Gate. The *Equity of West Gate Fix Traffic Counts* for the Integrated Airspace without ICC and the Integrated Airspace with ICC are 0.34 and 0.30 respectively. The additional West Gate fix for both of these alternatives result in a better balance of air traffic at the gate. These results are slightly different than expected from the qualitative analysis, which focused on the balance of workload between the gates; the quantitative analysis considers the balance of workload among the fixes that make up the West Gate.

2.6.5 Meet System Demands and Improve User Access to System

As discussed in Chapter One, the number of air traffic operations in the NY/NJ/PHL Metropolitan Airspace will continue to grow. One of the reasons the NY/NJ/PHL Metropolitan Airspace Redesign project was initiated was to accommodate increasing operations while improving user access.

2.6.5.1 Qualitative Comparison

In general, adding and/or expanding gates or posts and adding arrival and/or departure routes results in an airspace system that better meets system demands and improves user access. Intuitively, it makes sense that adding these features allows for additional operations within a given time period. However, substantial benefits to the airspace in terms of meeting system demand and user access really only occur with the full integration of the airspace system.

Therefore, since the Modifications to Existing Airspace and Ocean Routing Airspace Alternatives do not include any of these features, they do not improve user access or the ability of the airspace to accommodate increased system demand. Furthermore the Ocean Routing Airspace Alternative actually has the potential to reduce both user access and the ability to meet system demands. EWR departures must fly over the ocean and, therefore, aircraft must be upgraded to meet the associated equipment requirements for operations over water. This could result in limiting user access to the airspace system associated with EWR departures if aircraft are not upgraded. Additionally, aircraft departing EWR must remain in a single file line for 40 miles which, in turn, increases the necessary separation between departures causing delays that could ripple through the system and reduce the ability of the airspace to meet the EWR system departure demands. These delays also affect arrival access, because of an increase in ground movement congestion and reduction in gate availability.

The Integrated Airspace Alternative Variation without ICC does not substantially improve user access or the ability to accommodate increased demand because it includes only one expanded gate and one new arrival route.

The Integrated Airspace Alternative Variation ICC is the only design that results in appreciable improvements in user access and the ability to meet increased demand. This variation offers new routes and expanded gates but most importantly it allows for the full integration of the airspace. The full integration of the airspace allows for reduced separation of aircraft in the terminal area and, thus, sets this design apart.

2.6.5.2 Quantitative Comparison

The metric, *End of Day's Last Arrival Push*, is used to compare the extent to which each alternative meets system demand and improved user access. The *End of Day's Last Arrival Push* is the time when the final bank of scheduled flights for all of the modeled airports enters the TRACON system. The later at night this occurs, the more likely that users are discouraged from scheduling additional flights. Thus, this metric indirectly measures the ability of the airspace system to meet system demand and improve user access.

The time, 23:54, of the *End of Day's Last Arrival Push* is the same for the Modifications to Existing Airspace, Ocean Routing Airspace and Integrated Airspace without the ICC Alternatives. Only the Integrated Airspace Alternative with the ICC results in a substantially earlier *End of Day's Last Arrival Push* with a time of 23:00. Overall, the quantitative analysis supports the qualitative analysis in that the only appreciable improvement to user access and the ability to accommodate increased demand is the result of integrating the airspace.

2.6.6 Expedite Arrivals and Departures

Expediting arrivals and departures increases the efficiency of the airspace. In the New York and PHL TRACON environments there are three problems that can impede arrivals and departures: large volume of aircraft, longer routing distances, and altitude restrictions. Large volumes of air traffic can lead to delay, procedural separation of flows result in longer routes, and altitude restrictions force aircraft to fly at lower altitudes where speeds are limited. In the en route airspace longer routes can also impede expeditious arrivals and departures.

2.6.6.1 Qualitative Comparison

The design features of the Ocean Routing Airspace Alternative do not result in expedited arrivals or departures. In fact, the EWR westbound departures fly farther because they must initially proceed over the ocean.

The Modifications to Existing Airspace Alternative, Integrated Airspace Alternative

Variation without ICC, and the Integrated Airspace Alternative Variation with ICC all include additional departure headings for EWR, LGA, and PHL. These additional departure headings expedite departures from EWR, LGA, and PHL. Each of these designs has additional features which expedite arrivals and departures. In the Modifications to Existing Airspace Alternative, PHL east departures destined to northeastern U.S. move farther to the east and, therefore, these departures are allowed to climb out of terminal airspace without altitude restrictions. The Integrated Airspace Alternative Variation without ICC and the Integrated Airspace Alternative Variation with ICC included an expanded West gate. The larger West gate allows for the separation of routes and reduces the need to vector aircraft on non-direct routes. The Integrated Airspace Alternative Variation with ICC includes several other features to expedite arrivals and departures: the ability to stack departure aircraft over departure gates, the use of terminal airspace rules to hold aircraft, the split of the EWR and LGA west arrival flows, and the use of both EWR parallel runways for arrivals. Non-direct vectoring of flights is reduced by stacking departure aircraft over the departure gates and splitting the EWR and LGA west arrival flows. Gaps in arrival airspace are filled because in terminal airspace, unlike en route airspace, aircraft may be taken out of the holding pattern at any time and in any order. Lastly, arrivals are also expedited by using both EWR parallel runways for arrivals.

2.6.6.2 Quantitative Comparison

Three metrics are used to compare the Airspace Alternatives in regard to the Expedite Arrivals and Departures Criteria: *Time Below 18,000 Feet, Change in Route Length per Flight,* and *Change in Block Time.*

Time Below 18,000 Feet is the average time spent descending (arrivals) and climbing (departures) per operation in a 24-hour period. Since aircraft at lower altitudes must fly at lower speeds than those at higher altitudes, *Time Below 18,000 Feet* is one way to measure of how well an alternative expedites arrivals and departures. The model reports a value of 18.2 minutes for the Modifications to Existing Airspace and the Integrated Airspace without ICC Alternatives. This time is less than the value of 18.5 minutes calculated for the Future No Action Airspace Alternative. The reduction in the *Time Below 18,000 Feet* reflected the benefits of the additional departure headings included in both the Modifications to Existing Airspace Alternative and the Integrated Airspace Alternative Variation without ICC. Although the Integrated Airspace Alternative Variation with ICC also includes the additional departure headings, it results in a greater *Time Below 18,000 Feet* of 18.6 minutes. Another feature of the Integrated Airspace Alternative Variation with ICC is the ability to hold aircraft in terminal airspace at a lower altitude. This feature is beneficial in terms of delay, however, it does increase the *Time Below 18,000 Feet.* The Ocean Routing Airspace Alternative had the largest *Time Below 18,000 Feet* of 18.8 minutes because the JFK arrivals and the EWR departures are competing for airspace.

Change in Route Length per Flight is the difference between the distance flown for the Future No Action Airspace Alternative and each of the other Alternatives. *Change in Route Length per Flight* is used to compare the Alternatives' ability to expedite arrivals and departures, because shorter routes expedite arrivals and departures and conversely longer routes slow down arrivals and departures. The "distance flown" is the two-dimensional distance flown over the ground from takeoff to landing per flight in nautical miles. The *Change in Route Length per Flight* calculated for the Modifications to Airspace Alternative is zero nautical miles which indicates that as many routes are shortened as are lengthened, compared to the Future No Action Airspace Alternative. The Integrated Airspace Alternative Variation without ICC results in a slight reduction in route length of 1.2 nautical miles, while the Integrated Airspace Alternative Variation with ICC results in an increase in route length of 3.7 nautical miles. The air traffic in the Integrated Airspace Alternative Variation with ICC is rerouted from the Future No Action Airspace Alternative routes to reduce delays at the major airport. The existing airspace design, which is the design used in the Future No Action Airspace Alternative, appears to have been designed to minimize route length. Therefore, the route changes to reduce delay included in the Integrated Airspace Alternative Variation with ICC result in longer route lengths. The Ocean Routing Airspace Alternative results in the largest increase to route length of 4.5 nautical miles. This reflects the increased distances EWR arrivals and departures must fly.

Change in Block Time is the final metric used to compare the alternatives in terms of their ability to expedite arrivals and departures. “Block time” is the average time a flight takes to fly from gate to gate in a 24 hour period. *The Change in Block Time* is the difference between the block time for the Future No Action Airspace Alternative and each of the other Alternatives. The *Change in Block Time* accounts for both changes in delay and route length. The Modifications of Airspace and Integrated Airspace Alternative Variation without ICC results in similar reductions in block time of 0.9 and 1.0 minutes respectively. The largest reduction in block time, 1.4 minutes, is the result of the Integrated Airspace Alternative Variation with ICC. This reduction in block time shows that in terms of time, the changes made to reduce delay outweigh the increase in route length. The Ocean Routing Airspace Alternative is the only alternative that results in an increase in block time when compared to the Future No Action Airspace Alternative. Longer route lengths and increased delays combine to produce the increase in block time.

2.6.7 Increase Flexibility in Routing

"Flexibility" is generally defined as the ability of the system to respond to changes in user preferences. Flexibility in routing improves efficiency during abnormal operations such as severe weather conditions en route, seasonal variations in route preference, or special-event conditions.

For the qualitative analysis, the flexibility of the alternatives are compared by evaluating the change in the options for aircraft arriving and departing the NY/NJ/PHL Metropolitan Area to and from all directions. The quantitative analysis focuses on how each alternative’s design accommodates one particular weather event. The most common weather related abnormal operation is a westbound route closure due to thunderstorms, which occur approximately 30 times a year. Therefore, the quantitative analysis reflects how flexible the alternatives are in responding to closure of westbound routes.

2.6.7.1 Qualitative Comparison

Normally, adding or expanding gates and/or posts and adding routes increased the flexibility of an airspace alternative. Since the Modifications to Existing Airspace Alternative does not include addition of gates or routes, it does not have an effect on airspace flexibility. The Ocean Routing Airspace Alternative design results in a reduction in airspace flexibility because all routes to the west from EWR are removed. The Integrated Airspace Alternative Variation without ICC provides a slight improvement in flexibility because it includes an expanded West gate. The Integrated Airspace Alternative Variation with ICC provides the largest increase in flexibility because the West and South gates are expanded, an Ocean gate is added for EWR, and a single arrival route for EWR is split into two.

2.6.7.2 Quantitative Comparison

Flexibility in routing is measured by assuming that flights must respond to a route closure in one of two ways: either they must find an alternate route, or they must wait until the route reopens. The amount of delay resulting from the disruption becomes a measurement of flexibility. (Note that this is delay on a day of disrupted operations, which is in addition to the traffic-volume delay in Section 2.1.3.) Weather is by far the most common disruption to the flow of traffic. The metric *Minutes of Delay Saved per Flight per Day* was calculated by dividing the total modeled delay due to a typical weather event, lasting about four hours, by the number of flights in the average annual day. According to the quantitative analysis, flexibility in routing is not improved by the Modifications to Existing Airspace Alternative, Integrated Airspace Alternative Variation without ICC, or Ocean Routing Airspace Alternative. The Integrated Airspace Alternative Variation ICC Alternative provides a benefit of 12.6 minutes per flight. The quantitative results are slightly different than the qualitative results because the quantitative analysis evaluated only the ability for each alternative to accommodate one specific weather scenario.

2.6.8 Maintain Airport Throughput

The terminal airspace provides arrival and departure routes to and from the runways. In some cases the number or locations of these routes limit the number of takeoffs and landings (i.e., throughput) of an airport. It is important that the airspace does not constrain the airport throughput and rather maximizes the use of the airport infrastructure. Therefore, the Airspace Alternatives are compared on how well they maximize airport throughput.

2.6.8.1 Qualitative Comparison

The Ocean Routing Airspace Alternative decreases throughput, due to the separation requirements for the single flow of departures out of EWR. The Modifications to Existing Airspace Alternative, Integrated Airspace Alternative Variation without ICC, and Integrated Airspace Alternative Variation with ICC all include close-in procedures at LGA, EWR and PHL. This feature allows for increased departure throughput particularly at EWR. The Integrated Airspace Alternative Variation without ICC also included the extension of the west gate which allows for additional departures especially at EWR. The largest increase in departure throughput is with the Integrated Airspace Alternative Variation with ICC. This design adds additional routes and expands departure gates, allowing airports to push more aircraft into the airspace system per hour. In addition, JFK is given direct access to the expanded west gate.

The Integrated Airspace Alternative Variation with ICC provides the only enhancements to arrival traffic flows. Splitting the arrivals flows to EWR allows the airport to operate in a more efficient dual approach configuration. In addition, expanding the airspace available for terminal holding procedures allows ATC to more efficiently fill arrival gaps, thereby improving the arrival throughput.

2.6.8.2 Quantitative Comparison

Maximum sustainable airport throughput (i.e., takeoffs or landings per hour) is the metric used to compare the Airspace Alternatives in regard to maintaining airport throughput. Maximum sustainable throughput is perhaps the most important metric regarding airspace efficiency because it translates directly into increased activity for users of the airports and airspace.

The *Maximum Sustainable Throughput* is the sum of the weighted average of the peak traffic count for JFK, LGA, EWR, TEB, and PHL. It is designed to exclude short spikes of throughput that might give an erroneous impression of the efficiency of a design.

The arrival *Maximum Sustainable Throughput* for the Future No Action Airspace, Modifications to Existing Airspace, Ocean Routing Airspace Alternative, and Integrated Airspace without ICC is 223 operations. The only design that shows an increase in the arrival *Maximum Sustainable Throughput* is the Integrated Airspace Alternative Variation with ICC with 238 operations. These results support the qualitative comparison, since the Integrated Airspace Alternative Variation with ICC is the only design that includes enhancements to arrivals.

The Ocean Routing Airspace Alternative has the lowest departure *Maximum Sustainable Throughput* at 221 operations. The Ocean Routing Alternative allows for only one departure stream out of EWR and this appreciably reduces the EWR throughput. The departure *Maximum Sustainable Throughputs* for the Future No Action Airspace Alternative, Modifications to Existing Airspace Alternative, and Integrated Airspace Alternative Variation without ICC have similar values of 238, 239 and 240 operations, respectively. The Modifications to Existing Airspace Alternative and Integrated Airspace Alternative Variation without ICC had only minor improvements when compared to the Future No Action Airspace Alternative. The Integrated Airspace Alternative Variation with ICC had the highest departure *Maximum Sustainable Throughput* of 245 operations. This design has the most beneficial features in regard to improving throughput including expanded gates and use of those gates.

2.6.9 Summary of Comparisons of Airspace Redesign Alternatives

A summary of the quantitative evaluation of the Airspace Redesign Alternatives in terms of the Purpose and Need Criteria is presented in **Table 2.6**. The following paragraphs summarize the qualitative discussions of each of the Proposed Action Alternatives.

The Modifications to Existing Airspace Alternative increases departure efficiency to the west by fanned headings and by splitting the major westbound airway (J80) into two independent airways. This alternative has small benefits.

The Ocean Routing Airspace Alternative will increase route distance and flying time for EWR, LGA, and JFK. Departure efficiency at EWR is greatly reduced. JFK arrivals and departures share one part of the airspace, thereby increasing complexity. The reroute of departures from EWR and JFK increases airspace complexity above PHL which is already a bottleneck in the en route system. These drawbacks are not offset by operational benefits.

Like the Modifications to Existing Airspace Alternative, the Integrated Airspace Alternative Variation without ICC increases departure efficiency to the west by fanned headings and by splitting the major westbound airway (J80) into two independent airways. In addition, this variation reduces congestion on the South departure gate. This variation shows a slight increase in required interfacility voice communications.

The Integrated Airspace Alternative Variation with ICC provides the most significant operational benefit of any of the designs. It is a wholesale restructuring of arrival and departure routes. Efficiency is increased by more use of available runways and departure headings. Airspace delays are virtually eliminated and route flexibility is enhanced. Flying distances are increased for many flights, but the delay reductions are large enough to make this a net benefit to traffic.

Table 2.6
Operational Comparison of Alternatives
(The most advantageous operational metric has been shaded and boldfaced)

Purpose & Need Evaluation Criteria	How Measured	Alternative				
		Future No Action	Modifications to Existing Airspace	Ocean Routing Airspace	Integrated Airspace	
					without ICC	with ICC
Reduce Complexity	Jet route Delays + time below 18,000 feet (minutes)	12	12	12	11	**10**
	Arrival Distance below 18,000 feet (nautical miles)	96	**95**	99	96	102
Reduce Voice Communications	Max Interfacility handoffs per hour	525	525	521	529	**382**
Reduce Delay	Traffic weighted arrival delay 2011 (minutes)	22.9	22.6	23.6	22.8	**19.9**
	Traffic weighted departure delay 2011 (minutes)	23.3	20.9	29.5	20.8	**19.2**
Balance Controller Workload	Equity of West gate fix traffic counts	0.37	0.37	0.37	0.34	**0.30**
Meet System Demands & Improve User Access to System	End of day's last arrival push (time)	23:54	23:54	23:54	23:54	**23:00**
Expedite Arrivals and Departures	Time below 18,000 ft (minutes)	18.5	**18.2**	18.8	18.2	18.6
	Change in route length per flight (nautical miles) (1)	0.0	0.0	4.5	**-1.2**	3.7
	Change in block time (minutes per flight) (1)	0.0	-0.9	3.9	-1.0	**-1.4**
Flexibility in Routing	Delay saved per flight per day (minutes)	0	0	0	0	**12.6**
Maintain Airport Throughput	Arrival Max Sustainable Throughputs	223	223	223	223	**238**
	Departure Max Sustainable Throughputs	238	239	221	240	**245**

Notes: (1) A negative value indicates a net decrease in the category.

Source: Operational Analysis of NY/NJ/PHL Metropolitan Area Airspace Redesign Alternatives, (MITRE Technical Report - MTR 05W0000025, March 2005, Table ES-1. Summary of Operational Impacts, p. ix.).

Chapter Three
AFFECTED ENVIRONMENT

This chapter identifies the character of the environment and the potentially affected environment for the Proposed Airspace Redesign Project. Characteristics of the surrounding area are given to familiarize the reader with the airspace configuration, geography, land use, demography, and general environmental conditions potentially affected by the proposed project.

As discussed in previous chapters, this document focuses on the decision to modify existing ATC procedures in the NY/NJ/PHL Metropolitan Area. The following sections provide baseline conditions for the natural and social environment to be evaluated for potential impacts of the Proposed Airspace Redesign Project alternatives addressed in the previous chapters.

The following factors describe the affected environment:

- Study Area Environment,
- Airport Facilities,
- Land Use,
- Population and Demographics,
- Noise,
- Parks, Forests, and Wildlife Refuges,
- Historic, Archaeological, Architectural, and Cultural Resources,
- Air Quality,
- Energy Supply and Natural Resources,
- Light Emissions and Visual Impacts,
- Coastal Resources,
- Wild and Scenic Rivers,
- Endangered and Threatened Species, and
- Other Resource Categories.

3.1 STUDY AREA ENVIRONMENT

The following sections describe the geographic character of the NY/NJ/PHL Study Area. The sections give an inventory of the project area (including states, counties, cities, and airports that are within the Study Area) considered by the Proposed Airspace Redesign Project.

3.1.1 Study Area Setting and Location

The study area is defined as the geographic area potentially environmentally impacted by the proposed action. The Proposed Airspace Redesign Project Study Area includes a portion of the northeastern region of the United States, illustrated in Figure 1.1. Criterion from FAA Order 1050.1E was used to determine the Study Area for the Proposed Airspace Redesign. According to FAA Order 1050.1E, the altitude ceiling for environmental considerations regarding airspace studies is 10,000 feet above ground level AGL.[1] The highest point in the Study Area is 4,000 feet above MSL at Hunter Mountain, New York, making the overall altitude ceiling of the Study Area 14,000 feet above MSL (resulting in 10,000 feet AGL). Thus, using input from the Airspace Redesign Team, the Study Area was created to encompass the geographic areas where proposed changes to aircraft routes occurred below 14,000 feet above MSL. This Study Area is then the basis for the analysis of the

[1] FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*, June 8, 2004.

alternatives and their potential impacts associated with alternative routings for aircraft flying IFR at altitudes up to 14,000 feet above MSL.

The initial Study Area was later refined based on community concerns and comments received during the scoping process. For example, comments received at a meeting held in Kingston, NY revealed that the community was very concerned about the potential impacts to the Catskill State Park. In response, the Study Area was adjusted to include the Catskill Mountains to ensure that the potential for environmental impacts to this area would be studied.

The Study Area comprises the entire state of New Jersey and portions of four other states —Connecticut, Delaware, New York, and Pennsylvania. This area includes the City of New York and the City of Philadelphia. The Study Area is comprised of approximately 31,180 square miles and encompasses all or portions of 64 counties, 490 independent cities, as well as other municipal areas. **Table 3.1** identifies the counties located in the Study Area.

The Study Area lies between the Atlantic Ocean to the east and portions of the Catskill and Pocono Mountains to the west. The Study Area crosses six physiographic (geographically distinct) regions as shown in **Figure 3.1**. Southeastern New York, northern New Jersey, and Connecticut all lay within the densely populated and urbanized Southern New England physiographic area. Non-urban areas of the region are characterized by fragmented deciduous forests, maritime marshes and dunes, and relict grasslands. Portions of southwestern New York and northern Pennsylvania lie in the Allegheny Plateau Area, which is deeply forested and is characterized by rounded hills and narrow to broad valleys. The Study Area contains portions of the Northern Ridge and Valley physiographic area in southeastern New York, northwestern New Jersey, and southeastern Pennsylvania. This region is distinguished by flowing ridges and ravines. The Delaware and Hudson Rivers are also located in the Northern Ridge and Valley region. Southeastern Pennsylvania and northern New Jersey are located in the Mid-Atlantic Piedmont region, which consists of low rolling hills, mountains, and numerous stream systems. Approximately half of this region is forested, the other half of the region consists of agricultural grasslands and scrub barrens. Rapid urbanization is occurring around the Philadelphia area of the Mid-Atlantic Piedmont Region. Northeastern Connecticut falls in the Northern New England physiographic area, which consists of rolling hills and small mountains, with large areas of farmland. The final physiographic region in the Study Area is the Mid-Atlantic Coastal Plain. This region begins at the southern tip of Long Island, New York, and continues through eastern New Jersey and all of Delaware. This region is characterized by flat plains, marsh land, and forested wetlands.[2]

Portions of two key waterway systems, the Hudson River and the Delaware River, are situated in the middle of the Study Area and are known for their historical value to the area. These rivers serve as important transportation corridors to and from the

[2] Partners In Flight, *Map of PIF Physiographic Areas*. <http://www.blm.gov/wildlife/pifplans.htm>.

Table 3.1
Counties Located in the Study Area

Connecticut	Delaware	New Jersey	New York	Pennsylvania
Fairfield	New Castle*	Atlantic	Albany*	Berks*
Hartford*		Bergen	Bronx (The Bronx)	Bucks
Litchfield*		Burlington	Columbia*	Carbon*
Middlesex		Camden	Delaware*	Chester*
New Haven		Cape May	Dutchess	Delaware
New London*		Cumberland	Greene*	Lackawanna*
Tolland*		Essex	Kings (Brooklyn)	Lancaster*
		Gloucester	Nassau	Lehigh*
		Hudson	New York (Manhattan)	Monroe*
		Hunterdon	Orange	Montgomery
		Mercer	Otsego*	Northampton
		Middlesex	Putnam	Philadelphia
		Monmouth	Queens	Pike
		Morris	Richmond (Staten Island)	Schuylkill*
		Ocean	Rockland	Wayne*
		Passaic	Schoharie*	
		Salem	Suffolk	
		Somerset	Sullivan	
		Sussex	Ulster	
		Union	Westchester	
		Warren		

* Portions of these counties are located outside of the Study Area.

Source: HNTB Corporation, 2004.

Atlantic Ocean for both recreational and commercial purposes. The Delaware River, which flows south through New Jersey and Pennsylvania to the Delaware Bay, provides a vital role in supporting a unique ecosystem and is a source of employment for the fishing industry. In addition, the Long Island Sound which is located between the south shoreline of Connecticut and the north shoreline of Long Island serves as a sanctuary for various marine life and provides recreational and commercial uses. See Section 3.7 *Department of Transportation Act: Section 4(f)*, Section 3.12 *Coastal Resources*, Section 3.13 *Wild and Scenic Rivers*, and Section 3.15 *Other Resource Categories*, for a discussion of additional aquatic resources in the Study Area.

3.2 AIRPORT FACILITIES

There are numerous public and private airports located in the Study Area, however, this chapter of the EIS principally focuses on the eight airports which will likely be most affected by the Proposed Airspace Redesign Project. Thirteen satellite airports are also examined to a lesser degree. Figure 1.7 illustrates the airports in the NY/NJ/PHL Study Area that were examined in this EIS. The eight airports that will likely be most affected are LaGuardia, John F. Kennedy International, Newark Liberty International, Teterboro, Philadelphia International, Morristown Municipal, Islip Long Island MacArthur, and White Plains/Westchester County.

The remaining 13 satellite airports examined are as follows:

- Allentown/Lehigh Valley International Airport,
- Atlantic City International Airport,
- Bridgeport/Igor I. Sikorsky Memorial Airport,
- Caldwell/Essex County Airport,
- Westhampton Beach/The Francis S. Gabreski Airport,
- Linden Airport,
- McGuire Air Force Base,
- Newburgh/Stewart International Airport,
- New Haven/Tweed-New Haven Airport,
- Northeast Philadelphia Airport,
- Republic Airport,
- Trenton/Mercer County Airport, and
- Wilmington/New Castle County Airport.

The five major airports in the Study Area that have the most air traffic are:

- John F. Kennedy International Airport,
- LaGuardia Airport,
- Newark Liberty International Airport,
- Teterboro Airport, and
- Philadelphia International Airport.

These airports are described below and are depicted in figures following each discussion.

3.2.1 John F. Kennedy International Airport

John F. Kennedy International Airport (JFK) is located on 4,930 acres in southeastern Queens County, New York on Jamaica Bay. JFK has nine airline terminals with approximately 175 aircraft gate positions serving the terminals. The Airport has four runways, the longest of which is over 14,500 feet long. Like LaGuardia Airport, JFK has been operated under lease from the City of New York by the PANYNJ since 1947. Sixty-nine scheduled domestic and international airlines serve the Airport, including five all-cargo carriers.[3] In 2004, approximately 318,568 operations were conducted at the Airport.[4] **Figure 3.2** depicts the Airport.

3.2.2 LaGuardia Airport

LaGuardia Airport (LGA) is located in northern Queens County, New York eight miles east of midtown Manhattan. LGA is bordered by Flushing Bay and Bowery Bay. Under lease from New York City, the Airport has been operated by the Port Authority of New York and New Jersey (PANYNJ) since 1947. In 1984, PANYNJ instituted a formal 1,500-mile perimeter rule, which prohibited non-stop arrival and departure flights exceeding 1,500 miles. The purpose of this rule was to help alleviate congestion at LGA.[5] The 680 acre airport has two 7,000-foot runways and 72 aircraft gates. LGA is served by 15 scheduled airlines.[6] In 2004, approximately 398,579 operations were conducted at the Airport.[7] **Figure 3.3** depicts the Airport.

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[3] The Port Authority of New York and New Jersey (PANYNJ). <http://www.panynj.gov/>.

[4] FAA Terminal Area Forecast (TAF), January 2005.

[5] Western Air Lines, Inc. v. Port Authority of New York and New Jersey, 658 F. Supp. 952 (S.D.N.Y. 1986), aff'd 817 F.2d 222 (2d Cir. 1987).

[6] The Port Authority of New York and New Jersey (PANYNJ). <http://www.panynj.gov/>.

[7] FAA Terminal Area Forecast (TAF), January 2005.

3.2.3 Newark Liberty International Airport

Newark Liberty International Airport (EWR) is located on 2,027 acres in Essex and Union Counties, New Jersey. The City of Newark has leased EWR to the PANYNJ since 1948. The Airport has three runways, the longest of which is 11,000 feet. Thirty-five scheduled international and domestic airlines serve the Airport.[8] In 2004, approximately 434,097 operations were conducted at the Airport.[9] **Figure 3.4** depicts the Airport.

3.2.4 Teterboro Airport

Teterboro Airport (TEB) is located in Bergen County, New Jersey. Operating since 1919, TEB is the oldest operating airport in the New York/New Jersey metropolitan area. The Airport consists of 827 acres and has two runways, the longest of which is 7,000 feet. TEB, a reliever airport,[10] does not have scheduled air carrier operations and its utilization is comprised of a broad range of GA activities. TEB is owned and operated by the PANYNJ.[11] In 2004, approximately 220,912 operations were conducted at the Airport.[12] **Figure 3.5** depicts the Airport.

[8] The Port Authority of New York and New Jersey (PANYNJ). <http://www.panynj.gov/>.

[9] FAA Terminal Area Forecast (TAF), January 2005.

[10] *Reliever airports* are airports designated by the FAA to relieve congestion at commercial service airports.

[11] The Port Authority of New York and New Jersey (PANYNJ). <http://www.panynj.gov/>.

[12] FAA Terminal Area Forecast (TAF), January 2005.

3.2.5 Philadelphia International Airport

Philadelphia International Airport (PHL) is located approximately seven miles southwest of downtown Philadelphia in Philadelphia County and Delaware County, Pennsylvania. PHL is owned by the City of Philadelphia and operated by the Department of Commerce's Division of Aviation. PHL is situated on 2,302 acres and includes seven terminals, 120 gates, and four runways.[13] Approximately 26 scheduled carriers and non-scheduled carriers serve the Airport, including six all-cargo airlines.[14] In 2004, approximately 455,561 operations were conducted at the Airport.[15] **Figure 3.6** depicts the Airport.

3.2.6 Remaining Airports in the Study Area

Three other airports, Morristown Municipal, Islip Long Island MacArthur, and White Plains/Westchester County are focused on in this chapter because they are likely to be most affected by the Proposed Airspace Redesign Project. This is due to runway size which would accommodate air carrier operations or business jet aircraft, proximity to metropolitan areas, and the potential to serve as reliever airports. Traffic levels at these other airports were also considered. These airports are described in **Table 3.2**.

[13] An extension to Runway 17/35 at PHL has been approved. The north end is to be extended 640 feet and the south end is to be extended 400 feet for a new runway length of 6,500 feet. Construction of the extension to Runway 17/35 is currently underway and the Airport owner expects the extension to be operational by early 2009.

[14] Philadelphia International Airport. <http://www.phl.org/>.

[15] FAA Terminal Area Forecast (TAF), January 2005.

The remaining thirteen airports in the Study Area are depicted in **Table 3.3**.

3.2.7 Airport Emergency Services

Because of the general concern about aircraft accidents, airport emergency services are described in the following paragraphs. This discussion is focused on the airport emergency services provided at the eight airports which will likely be most affected by the Proposed Airspace Redesign Project. Although not discussed here, it is noted that each local community around these airports also has its own emergency response plan.

Airports certified under 14 CFR Part 139, Certification and Operations: Land Airports Serving Certain Air Carriers (June 2004), must comply with specific Airport Rescue and Fire Fighting (ARFF) operational requirements. Part 139 certification is required of airports that serve scheduled and unscheduled air carrier aircraft with more than 30 seats and airports that serve scheduled air carrier operations in aircraft with between 9 and 31 seats. Part 139 certificates are issued to ensure safety in air transportation. Airports are classified I-IV based on their scheduled and unscheduled operations. The two primary considerations in determining compliance with Part 139 ARFF-related criteria are response time requirements and equipment and agent requirements. These criteria were developed through research conducted by the FAA and the ICAO Rescue and Firefighting Panel. There are five airport classes, A-E, referred to as indexes, with index E having the most stringent ARFF requirements which correspond to ARFF equipment requirements. The applicable airport index is determined by the type of aircraft operated by air carriers with an average of five scheduled departures per day (computed on an annual basis).

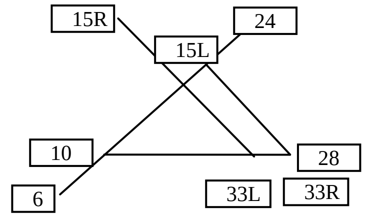
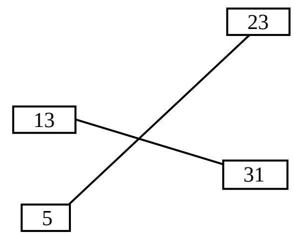
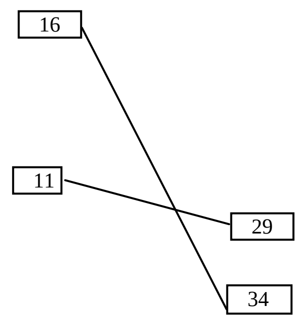
All airports, regardless of their Index classification, are required to have readily available either: (1) 500 pounds of sodium-based dry chemical, halon 1211, or clean agent; or (2) 450 pounds of potassium-based dry chemical in addition to water and commensurate quantity (three to six percent) of aqueous film forming foam agent (AFFF) requirements. AFFF is a liquid concentrate which provides a barrier against air and oxygen and creates an aqueous film on the fuel surface which suppresses fuel vapors.

In addition, all Part 139 certified airports have required response times. The first ARFF response vehicle must reach the mid-point of the furthest runway with all onboard personnel in full protective gear in three minutes. Additionally, the ARFF vehicles must be available 15 minutes prior to and after the arrival of any air carrier aircraft.

There are three Part 139 Class I certified ARFF Index E airports in the Study Area: JFK, EWR, and PHL. These airports are required to have three ARFF vehicles with a combined capacity to carry at least 6,000 gallons of water and AFFF for foam production. LGA, a Class I, Index D airport, is also required to have three ARFF vehicles, but is only required to have a 4,000 gallon carrying capacity for water with a commensurate quantity of AFFF.

Index A airports, including Class IV TEB, are only required to have one ARFF vehicle with the capability to transport the aforementioned amount of their chosen dry chemical extinguishing agent with a total of 100 gallons of water with a commensurate quantity of AFFF. HPN and ISP, which are classified Index B and C airports,

Table 3.2
Other Airports Likely to be Affected by the Proposed Airspace Redesign

Airport (Code)	Description	Runway Diagram
Islip Long Island MacArthur Airport (ISP)	ISP, a commercial service airport, is located in Suffolk County, New York and is approximately 50 miles east of Manhattan. ISP is owned and operated by the Town of Islip. In 2004 there were approximately 177,946 operations with seven scheduled passenger carriers. Runway 6-24 is 7,002', Runway 15R-33L is 5,186', Runway 10-28 is 5,036', and Runway 15L-33R is 3,212.'	
Morristown Municipal Airport (MMU)	MMU, a reliever airport, is located in Morris County, New Jersey and is approximately three miles east of Morristown. MMU does not have and is not certificated for regularly scheduled air carrier or freight service. MMU is used by corporate jets and helicopters as an alternative to EWR and also serves as a valuable site for the medical community. Many hospitals use MMU to transport patients, medical samples, and vital human organs to various locations around the country. In 2004, approximately 211,514 operations were conducted at MMU. Runway 5-23 is 5,999' and Runway 13-31 is 3,998.'	
White Plains/ Westchester County Airport (HPN)	HPN, a primary airport, is located in Westchester County, New York, and is approximately six miles from White Plains on the Connecticut border. The 703-acre facility is owned and operated by Westchester County. The Airport serves eight commercial service operators and over 400 based aircraft including helicopters. Passengers from New York and Connecticut frequent the Airport for its non-stop commercial services to 10 major cities. Eight scheduled passenger carriers serve HPN. In 2004, approximately 192,362 operations were conducted at HPN. Runway 16-34 is 6,548' and Runway 11-29 is 4,451.'	

Note: All annual operations figures are 2004 estimates from the 2005 Terminal Area Forecast.
Based aircraft are active aircraft permanently stationed at an airport.
Commercial Service airports are publicly owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service.[16]
Reliever airports are airports designated by the FAA to relieve congestion at commercial service airports.[17]
General aviation airports serve civilian aircraft operating for purposes other than commercial transport, including personal, business, and instructional flying.
Primary airports are commercial service airports that have more than 10,000 passenger boardings each year.[18]

Sources: Federal Aviation Administration Terminal Area Forecast, issued January 2005 and www.fltplan.com, June 10, 2004.

[16] Airport Improvement Program Handbook, FAA Order 5100.38B, Change 1. January 8, 2004, page 5.

[17] Ibid.

[18] Ibid.

Table 3.3

Thirteen Remaining Airports in the Study Area

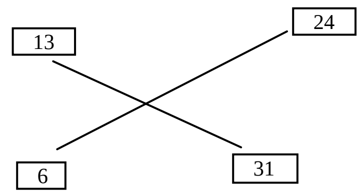
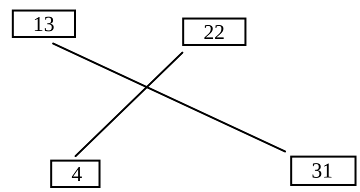
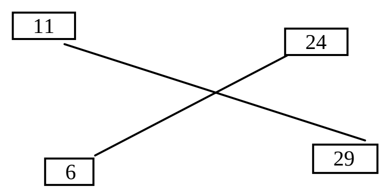
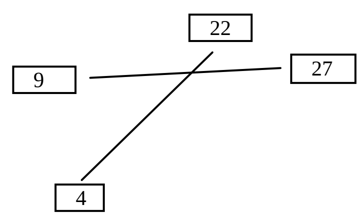
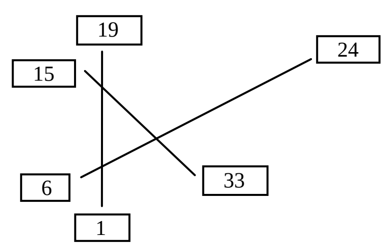
Airport (Code)	Description	Runway Diagram
Allentown/Lehigh Valley International Airport (ABE)	ABE is a primary airport located in Lehigh County, Pennsylvania between Allentown and Bethlehem. ABE is owned and operated by the Lehigh-Northampton Airport Authority. ABE has 126 based aircraft, of which 70 are single engine, 22 are multi-engine, 31 are jets, and three are helicopters. The Airport is served by eight scheduled passenger carriers. In 2004, there were approximately 133,830 operations. Runway 6-24 is 7,600' and Runway 13-31 is 5,797.'	
Atlantic City International Airport (ACY)	ACY is a primary airport located in Atlantic County, New Jersey and is owned and operated by the South Jersey Transportation Authority. ACY has 72 based aircraft, of which 31 are single engine, eight are multi-engine, 11 are jets, seven are helicopters, and 15 are military aircraft. In 2004, there were approximately 118,520 operations. Two scheduled passenger carriers serve ACY. Runway 4-22 is 6,144' and Runway 13-31 is 10,000.'	
Bridgeport/Igor I. Sikorsky Memorial Airport (BDR)	BDR is a GA airport located three miles Southeast of Bridgeport, Connecticut in Fairfield County. BDR has 244 based aircraft, of which 185 are single engine, 25 are multi-engine, 32 are jets, one is a helicopter, and one is an ultralight. In 2004, there were approximately 82,514 GA operations. Runway 6-24 is 4,677' and Runway 11-29 is 4,761.'	
Caldwell/Essex County Airport (CDW)	CDW is a reliever airport located two miles North of Caldwell, New Jersey in Essex County. CDW has 405 based aircraft, of which 314 are single engine, 79 are multi engine, and 12 are helicopters. In 2004, there were approximately 107,078 annual GA operations. Runway 4-22 is 4,553' and Runway 9-27 is 3,721.'	
Westhampton Beach/The Francis S. Gabreski Airport (FOK)	FOK, a GA airport, is located three miles North of Westhampton Beach, New York in Suffolk County. FOK has 119 based aircraft, of which 80 are single engine, 20 are multi-engine, three are jets, two are helicopters, nine are military aircraft, and five are gliders. In 2004, approximately 83,049 operations were conducted at FOK. Runway 1-19 is 5,000', Runway 6-24 is 9,000' and Runway 15-33 is 5,000.'	

Table 3.3 (continued)
Thirteen Remaining Airports in the Study Area

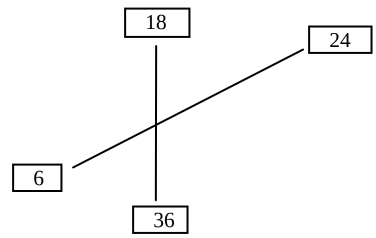
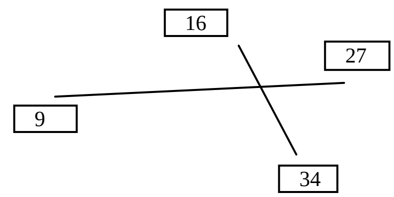
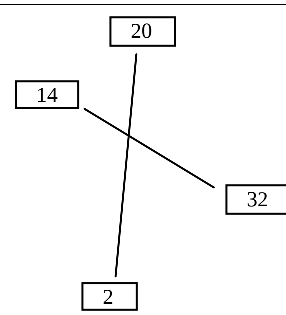
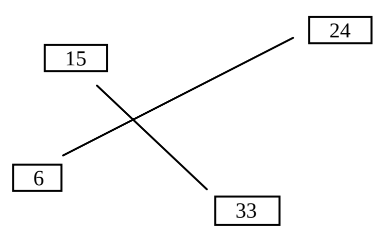
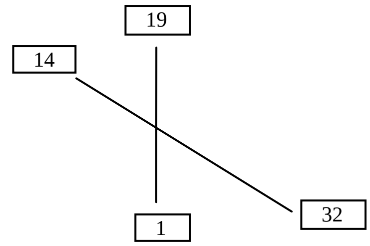
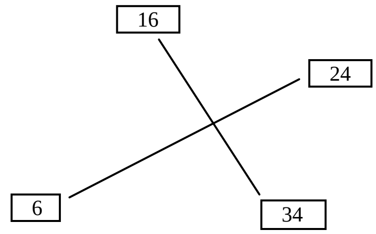
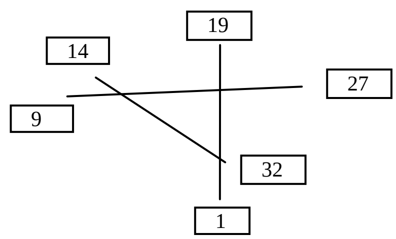
Airport	Description	Runway Diagram
Linden Airport (LDJ)	LDJ, a reliever airport, is located one mile Southeast of Linden, New Jersey in Union County. LDJ has 128 based aircraft, of which 116 are single engine, nine are multi-engine, and three are helicopters. In 2004, there were approximately 69,499 GA operations. Runway 9-27 is 4,137.’	
McGuire Air Force Base (WRI)	Located two miles Southeast of Wrightstown, New Jersey in Burlington County. WRI is a facility owned by the United States Air Force. Runway 6-24 is 10,001’ and Runway 18-36 is 7,124.’	
Newburgh/Stewart International Airport (SWF)	SWF is a primary airport, located three miles Northwest of Newburgh, New York in Orange County. SWF has 81 based aircraft, of which seven are single engine, nine are multi-engine, 27 are jets, seven are helicopters, and 32 are military aircraft. In 2004, there were approximately 103,481 annual operations. Four scheduled passenger carriers provide service to and from SWF. Runway 9-27 is 11,818’ and Runway 16-34 is 6,006.’	
New Haven/Tweed-New Haven Airport (HVN)	HVN, a primary airport is located three miles Southeast of New Haven, Connecticut in New Haven County. HVN has 77 based aircraft, of which 63 are single engine, 11 are multi-engine, and three are jets. HVN is served by two scheduled passenger carriers. In 2004, there were approximately 65,585 operations. Runway 2-20 is 5,600’ and Runway 14-32 is 3,630.’	
Northeast Philadelphia Airport (PNE)	PNE, a reliever airport, is located 10 miles Northeast of Philadelphia, Pennsylvania in Philadelphia County. PNE has 220 based aircraft, of which 141 are single engine, 57 are multi-engine, 12 are jets, and 10 are helicopters. In 2004, there were approximately 111,434 operations. Runway 6-24 is 7,000’ and Runway 15-33 is 5,000.’	

Table 3.3 (continued)
Thirteen Remaining Airports in the Study Area

Airport	Description	Runway Diagram
Republic Airport (FRG)	FRG, a reliever airport, is located one mile East of Farmingdale, New York in Suffolk County. FRG has 510 based aircraft, of which 377 are single engine, 83 are multi-engine, 29 are jets, and 21 are helicopters. In 2004, there were approximately 199,530 operations. Runway 1-19 is 5,516' and Runway 14-32 is 6,827.'	
Trenton/Mercer County Airport (TTN)	TTN is a primary airport located four miles Northwest of Trenton, New Jersey in Mercer County. One scheduled passenger carrier serves the Airport. TTN has 162 based aircraft, of which 80 are single engine, 18 are multi-engine, 20 are jets, 14 are helicopters, and 30 are military aircraft. In 2004, there were approximately 115,850 operations. Runway 6-24 is 6,006' and Runway 16-34 is 4,800.'	
Wilmington/New Castle County Airport (ILG)	ILG is a GA airport located four miles South of Wilmington, Delaware in New Castle County. ILG has 308 based aircraft, of which 171 are single engine, 24 are multi-engine, 63 are jets, 21 are helicopters, and 29 are military aircraft. In 2004, there were approximately 118,216 operations. Runway 1-19 is 7,012', Runway 9-27 is 7,181' and Runway 14-32 is 4,603.'	

Note: All annual operations figures are 2004 estimates from the 2005 Terminal Area Forecast.
Based aircraft are active aircraft permanently stationed at an airport.
Commercial Service airports are publicly owned airports that have at least 2,500 passenger boardings each calendar year and receive scheduled passenger service.[19]
Reliever airports are airports designated by the FAA to relieve congestion at commercial service airports.[20]
General aviation airports serve civilian aircraft operating for purposes other than commercial transport, including personal, business, and instructional flying.
Primary airports are commercial service airports that have more than 10,000 passenger boardings each year.[21]

Source: Federal Aviation Administration Terminal Area Forecast, issued January 2005 and www.fltplan.com, June 10, 2004.

[19] Ibid.

[20] Ibid.

[21] Ibid.

respectively, are both Part 139 Class I certified. Index B airports may have either one or two vehicles as long as at least 1,500 gallons of water and the commensurate amount of AFFF are carried. Index C airports must have either (1) three vehicles, with one carrying the specified amount of extinguishing agents and two carrying water and the commensurate quantity of AFFF to total at least 3,000 gallons of water for foam production, or (2) two vehicles with a capacity equal to that of the three vehicles with one vehicle carrying the extinguishing agents and one carrying the AFFF and water. Though not certified under Part 139, Morristown has obtained agents and equipment to meet Index B ARFF requirements on its own accord.

PANYNJ provides emergency services to four of the major airports in the Study Area: LGA, EWR, JFK, and TEB. The Port Authority Police Force is responsible for providing police, fire fighting, and crash emergency services, as well as responding to all other aircraft emergency incidents. PANYNJ operates its own Police Academy, Aircraft Rescue, and Firefighting Fuel Spill Trainer Facility. Its Criminal Investigations Bureau works with the FBI Joint Terrorist Task Force to prevent terrorist activities. PANYNJ also has a highly specialized K-9 Unit for detections of narcotics and explosives, as well as an Emergency Services Unit which specializes in responding to emergency and rescue situations and aviation accidents.[22]

Philadelphia's Aircraft Rescue Firefighting Unit provides emergency services to PHL. In medical emergencies, this unit is aided by the Airport's Medic Unit. It has the capability to respond to situations ranging from day to day on-site medical treatment and transportation to mass casualty incidents. Construction was recently completed on the Airport's state-of-the-art Aircraft Fire Fighting Training facility, which has been operational since the fall of 2002.[23]

The three smaller airports likely to be affected by the airspace redesign, MMU, ISP, and HPN, rely on local firefighting and rescue providers for services at their airports. In response to public concerns, HPN has developed an emergency response plan because of the proximity of the Airport to Indian Point Energy Center, a nuclear power facility.[24] At MMU, a 24-hour Aircraft Rescue Station provides immediate emergency services in response to aircraft emergencies. The Airport meets the FAA's requirements for response equipment and fire extinguishing agents of an Index B airport.[25]

3.3 LAND USE

This section describes the methodology for ascertaining the land use within the Study Area. This discussion is followed by a broad description of the existing land use for the entire study area and a more detailed description of the land use surrounding each of the five major airports: JFK, LGA, EWR, TEB, and PHL. Finally, future land use is discussed.

[22] The Port Authority of New York and New Jersey (PANYNJ). http://www.panynj.gov/.

[23] Philadelphia Fire Department. June 27, 2003. http://www.mfrconsultants.com/pfd/index.shtml.

[24] Indian Point Emergency Planning. http://www.westchestergov.com/discemergplan/.

[25] Morristown Municipal Airport. 2000. http://www.mmuair.com/aircraftrescuesvs.htm.

3.3.1 Methodology

Digital land use data was obtained from the US Geological Survey's (USGS) National Land Cover Dataset (NLCD). The NLCD, released in 2000, used satellite imagery collected in the mid-1990s. For this study, the NLCD imagery was merged with local data to come up with 22 land use classifications. The local land use data was added to improve the quality of the data in the areas most likely to be impacted by the airspace changes. Local land use information was obtained for the following areas: New York City (NYC Dept. of City Planning Land Use Data – 8/2004), Westchester County (Westchester County Generalized Land Use – 1996), City of Philadelphia (Delaware Valley Regional Planning Commission GIS Land Use – 2000), and New Jersey (New Jersey Dept. of Environmental Protection Land Use – 1995/97).

3.3.2 Generalized Land Use

Figure 3.7 illustrates generalized land use located within the Study Area. The majority of the concentrated urbanized areas are located in central Connecticut, northern New Jersey, and the New York City and Philadelphia metropolitan areas.

Non-urban areas are located primarily in the following portions of the Study Area: southern portions and coastal areas of New Jersey, northern and western portions of New York State, northeast portions of Pennsylvania, and northwest and southeast portions of Connecticut. These areas are primarily forested with sporadic low density residential areas.

3.3.3 Detailed Land Use

The following sections include a more detailed description of the land use surrounding the five major airports in the Study Area. These areas were selected because they are subject to the most air traffic operations.

3.3.3.1 John F. Kennedy International Airport

JFK is located in New York City, New York on Jamaica Bay. Neighborhoods adjacent to the Airport include Rosedale, Springfield Gardens South, South Ozone Park, Old Howard Beach, and Broad Channel. The majority of land use to the north of the Airport is single family residential. Industrial and recreational land use can be found adjacent to the Airport to the northeast, including Idlewild Park. Gateway National Recreation Area is located in Jamaica Bay just southwest of JFK. **Figure 3.8** illustrates the existing land use.

3.3.3.2 LaGuardia Airport

LGA is located in New York City, New York and is bordered by Bowery Bay to the west and Flushing Bay to the east. Riker's Island lies just north of the Airport. Neighborhoods adjacent to the Airport include East Elmhurst, Jackson Heights, and Ditmars-Steinway. Land use to the south of LGA is predominantly single family residential. Flushing Meadows Park is located southeast of the Airport between the Grand Central Parkway and Route 678. Kissena Park is located south and east of LGA, adjacent to Flushing Meadows Park. **Figure 3.9** illustrates the existing land use.

3.3.3.3 Newark Liberty International Airport

EWR is located just west of Newark Bay between the Cities of Newark and Elizabeth. Port Newark and Port Elizabeth border EWR to the east. Land use adjacent to the Airport is predominantly industrial. Beyond these industrial areas, multi-family residential land use predominates. Weequahic Park is located approximately one mile west of the Airport. **Figure 3.10** illustrates the existing land use.

3.3.3.4 Teterboro Airport

TEB is located in Teterboro, New Jersey between Hasbrouck Heights, NJ and Little Ferry, NJ. Wetlands are located adjacent to TEB to the west, south, and east. Land to the south of TEB is predominantly industrial and wetlands. The Meadowlands Sports Complex is located approximately two miles south of the Airport. To the east, single family residential and commercial lands are the predominant land use. To the west, beyond the industrial facilities located adjacent to the Airport, land use is multi-family residential. Areas north of TEB are industrial. **Figure 3.11** illustrates the existing land use.

3.3.3.5 Philadelphia International Airport

PHL is located in Philadelphia, just east of Essington, Pennsylvania. PHL is bordered by Penn Central Railroad and the Delaware River to the south, Darby Creek to the north and west and Schuylkill River and Mingo Creek to the east. Land use in the immediate vicinity of PHL is primarily industrial. An area of industrial activity extends to the north and east of the Airport, following the Schuylkill River, and to south of the Airport into Gloucester County, New Jersey. Fort Mifflin and a U.S. Naval Shipyard and business center are located directly east of the Airport. John Heinz National Wildlife Refuge at Tinicum is located north of the Airport. Governor Printz State Park is located directly west of PHL. North and west of the Airport, low-density residential land use prevails. Some high-density residential communities are located to the northwest, closer to the Airport. To the south across the Delaware River in Gloucester County, New Jersey, land use is heavily industrial, primarily related to oil production, and surrounded by agricultural and wooded land, as well as some low-density residential areas. **Figure 3.12** illustrates the existing land use.

3.3.4 Future Land Use

At this time, there are no known significant planned changes in land use around the five major airports in the Study Area. No indicators of potential changes in future land use around EWR, TEB, or PHL are known. The following paragraphs summarize recent zoning changes around JFK and LGA.

Eight neighborhoods were recently rezoned (between September 2004 and September 2005) in Queens County, NY under a new lower-density rezoning initiative. In practice, this rezoning allows neighborhoods to maintain their existing character by ensuring that new development fits the scale and prevailing character of the existing developed areas. The Richmond Hill and Kew Gardens neighborhoods were also recently rezoned (March 2005) to protect the existing character of interior residential blocks and to encourage mixed use development along Jamaica Avenue and housing production on wide streets near mass transit.[26] Zoning designates permitted uses of land and guides development and redevelopment of areas. Therefore, zoning can indicate potential changes in land use, however, as previously described, rezoning in Queens County has primarily focused on maintaining the existing character of the neighborhoods around JFK and LGA. Thus,

[26] New York City Department of City Planning, Queens Project, Studies and Proposals, November 2005. <http://www.nyc.gov/ html/dcp/html/ subcats/queens.shtml>.

there are no known significant planned changes in land use around these airports.

3.4 POPULATION AND DEMOGRAPHICS

This section describes the population and demographics within the Study Area based on the data obtained from the U.S. Census Bureau, Census 2000. Statistics are provided for population, income, employment, aviation employment, as well as minority and poverty populations with focus on the areas most likely to be affected by the Proposed Airspace Redesign Project. The areas most likely to be affected are those surrounding eight airports: JFK, LGA, EWR, TEB, PHL, MMU, ISP, and HPN. Therefore, the population and demographic information is provided on a county level for all counties in which the eight airports are located. The eight airports are located in eight counties within New York, New Jersey, and Pennsylvania. JFK and LGA reside in Queens County, NY; EWR is located in Essex and Union Counties, NJ; TEB is located in Bergen County, NJ; PHL is located in Philadelphia and Delaware Counties, PA; MMU is in Morris County, NJ; ISP is in Suffolk County, NY; and HPN is located in Westchester County, NY.

The future population is discussed in detail at the end of this section. In order to support noise impact analysis in the EIS, future year population projections are required for the entire Study Area.

3.4.1 Population

Population data obtained from the U.S. Census Bureau, Census 2000, for the subject counties is listed in **Table 3.4**. **Figure 3.13** shows the population density in the Study Area.

3.4.2 Income

Income data obtained from Census 2000 is presented in **Table 3.5** for each of the counties in which the eight affected airports are located. The reported per capita income for each county, as well as the median household and family income is also provided. A household is defined by the Census Bureau as, “all people who occupy a housing unit regardless of relationship. A household may consist of a person living alone or multiple unrelated individuals or families living together.” A family is defined by the Census Bureau as, “two or more people, one of whom is the householder, related by birth, marriage, or adoption and residing in the same housing unit.”

3.4.3 Employment

Census 2000 data provides information on the population in the county that is eligible for employment and those that are employed in the civilian labor force. **Table 3.6** presents the employment statistics.

3.4.4 Aviation Employment

Employment opportunities created by the airport are provided both on and off-airport and by indirectly related business. The service and retail industries are major generators of business-related aviation activity. **Table 3.7** provides aviation employment statistics.

Table 3.4
Population Statistics

Airport	County (State)	2000 Population by County
JFK LGA	Queens (New York)	2,229,379
EWR	Essex (New Jersey) Union (New Jersey)	793,633 522,541
TEB	Bergen (New Jersey)	884,118
PHL	Philadelphia (Pennsylvania)	1,517,550
	Delaware (Pennsylvania)	550,864
MMU	Morris (New Jersey)	470,212
ISP	Suffolk (New York)	1,419,369
HPN	Westchester (New York)	923,459

Source: U.S. Bureau of the Census, Census 2000.

Table 3.5
Income Statistics

Airport	County (State)	Per Capita Income (dollars)	Median Household Income (dollars)	Median Family Income (dollars)
JFK LGA	Queens (New York)	19,222	42,439	48,608
EWR	Essex (New Jersey) Union (New Jersey)	24,943 26,992	44,944 55,339	54,818 65,234
TEB	Bergen (New Jersey)	33,638	65,241	78,079
PHL	Philadelphia (Pennsylvania)	16,509	30,746	37,036
	Delaware (Pennsylvania)	25,040	50,092	61,590
MMU	Morris (New Jersey)	36,964	77,340	89,773
ISP	Suffolk (New York)	26,577	65,288	72,112
HPN	Westchester (New York)	36,726	63,582	79,881

Source: U.S. Bureau of the Census, Census 2000.

Table 3.6
Employment Statistics

Airport	County (State)	Population eligible for employment	Employment in civilian labor force	Employment in Armed Forces	Unemployment in civilian labor force	Population not in labor force
JFK LGA	Queens (New York)	1,775,449	956,784	343	80,111	738,211
EWR	Essex (New Jersey) Union (New Jersey)	608,592 405,859	336,390 244,197	129 75	34,420 14,369	237,653 147,218
TEB	Bergen (New Jersey)	702,617	435,277	95	18,402	248,843
PHL	Philadelphia (Pennsylvania)	1,174,798	584,957	396	71,582	517,863
	Delaware (Pennsylvania)	429,983	258,782	176	13,310	157,715
MMU	Morris (New Jersey)	365,030	243,783	189	8,920	112,138
ISP	Suffolk (New York)	1,086,848	683,062	599	27,964	375,223
HPN	Westchester (New York)	716,252	432,600	100	19,817	263,735

Source: U.S. Bureau of the Census, Census 2000.

Table 3.7
Aviation Employment Statistics

Airport	County (State)	Employment at Airport	Economic Impact on Region	Retail Industry Employment[3]	Service Industry Employment[3]
JFK	Queens (New York)	35,000[1]	$22 billion[1]	10.1%	46.2%
LGA	Queens (New York)	9,000[1]	$6.1 billion[1]		
EWR	Essex (New Jersey)	24,000[1]	$11.3 billion[1]	9.7%	45.0%
	Union (New Jersey)			10.2%	39.7%
TEB	Bergen (New Jersey)	1,000[1]	--	11.8%	42.6%
PHL	Philadelphia (Pennsylvania)	21,000[2]	$7.2 billion[2]	10.4%	49.8%
	Delaware (Pennsylvania)			11.2%	48.3%
MMU	Morris (New Jersey)	--	--	10.2%	41.9%
ISP	Suffolk (New York)	--	--	12.1%	42.8%
HPN	Westchester (New York)	1,500[2]	$0.6 billion[2]	9.2%	50.1%

Sources: (1) 2002 Airport Traffic Report, The Port Authority of NY & NJ.
(2) Individual Airport Statistics.
(3) U.S. Bureau of the Census, Census 2000.

3.4.5 Minority and Low-Income Population

The Department of Transportation Order on Environmental Justice defines minority as:

- Black (a person having origins in any of the black racial groups of Africa),
- Hispanic (a person of Mexican, Puerto Rican, Cuban, Central 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, the Indian subcontinent, or the Pacific Islands), or
- American Indian and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).[27]

The Department of Transportation Order on Environmental Justice defines poverty as:

> A person's household income is at or below the poverty level.[28]

The definition of poverty as defined by the Census Bureau is as follows:

> Following the Office of Management and Budget's Directive 14, the Census Bureau uses a set of money income thresholds that vary by family size and composition to detect who is considered poor. If the total income for a family or unrelated individual falls below the relevant poverty threshold, then the family or unrelated individual is classified as being "below the poverty level." Poverty level income was based on the 2005 HHS Poverty Guideline median annual income (family of four) of $19,350.[29]

Table 3.8 provides statistics on minority populations within the Study Area and includes a comparison to statewide and nationwide statistics.

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[27] DOT Order 5610.2, Environmental Justice in Minority and Low-Income Populations, April 15, 1997, see Appendix, pg 18,380.

[28] Ibid.

[29] The 2005 HHS Poverty Guidelines, United Sates Department of Health & Human Services, http://aspe.hhs.gov/poverty/05poverty. shtml.

Table 3.9 provides statistics on poverty populations within the Study Area and includes a comparison to statewide and nationwide statistics.

Minority and low-income population data is required to evaluate the potential for disproportionate impacts on these communities. There are minority and low-income communities located throughout the large Study Area. It would be unproductive to discuss every one of these communities in this chapter because the entire Study Area is not likely impacted by the Proposed Action. Therefore, a more refined study area is established once the potential environmental impacts are evaluated. Minority and low-income population statistics for these refined study areas are discussed in Section 4.2, *Environmental Justice*.

3.4.6 Future Population

In accordance with FAA Order 1050.1E, the noise analysis for the Proposed Action will focus on the change in noise levels as compared to population throughout the Study Area. The number of people exposed to various changes in noise levels is estimated based on the number of people residing in the census block corresponding to the centroid (center of the census block) where noise is being evaluated. The Census

Table 3.8
Minority Population Statistics

Airport	County (State)	Minority Population	% of Total County Population	Comparison to State(1)	Comparison to Nation
JFK LGA	Queens (New York)	1,246,654	55.9	+23.9%	+31.1%
EWR	Essex (New Jersey)	440,774	55.5	+28.1%	+30.7%
	Union (New Jersey)	180,239	34.5	+7.0%	+9.6%
TEB	Bergen (New Jersey)	190,882	21.6	-5.9%	-3.3%
PHL	Philadelphia (Pennsylvania)	834,283	55.0	+40.3%	+30.1%
	Delaware (Pennsylvania)	101,859	18.7	+4.0%	-6.2%
MMU	Morris (New Jersey)	60,170	12.8	-14.7%	-12.1%
ISP	Suffolk (New York)	218,614	15.4	-16.7%	-9.5%
HPN	Westchester (New York)	264,601	28.7	-3.4%	+3.8%

(1) A plus sign indicates that the noted County has a higher minority population compared to the state or the nation, whereas a minus sign indicated a lower minority population.

Source: U.S. Bureau of the Census, Census 2000.

Table 3.9
Poverty Population Statistics

Airport	County (State)	Poverty Population	% of Total County Population	Comparison to State(1)	Comparison to Nation
JFK LGA	Queens (New York)	321,102	14.4	+0.2%	+2.4%
EWR	Essex (New Jersey)	120,006	15.1	+6.8%	+3.1%
	Union (New Jersey)	43,319	8.3	0.0%	-3.8%
TEB	Bergen (New Jersey)	43,417	4.9	-3.4%	-7.1%
PHL	Philadelphia (Pennsylvania)	336,177	22.2	+11.5%	+10.1%
	Delaware (Pennsylvania)	42,411	8.0	-2.7%	+4.1%
MMU	Morris (New Jersey)	17,872	3.8	-4.5%	-8.2%
ISP	Suffolk (New York)	83,171	5.9	-8.3%	-6.2%
HPN	Westchester (New York)	78,967	8.6	-5.6%	-3.5%

(1) A plus sign indicates that the noted County has a higher population at or below the poverty level as compared to the state or the nation, whereas a minus sign indicated a lower population at or below the state or national poverty level.

Source: U.S. Bureau of the Census, Census 2000.

Bureau defines a census block as, "An area bounded on all sides by visible and/or nonvisible features shown on a map prepared by the Census Bureau. A block is the smallest geographic entity for which the Census Bureau tabulates decennial census[30] data."[31] The noise analysis includes determination of change in aircraft noise exposure in the years 2006 and 2011, therefore, the population must be projected for those same years. Population projections are available at the block group (BG) level. The Census Bureau defines a block group as, "A statistical subdivision of a census tract,"[32] and, "BGs generally contain between 300 and 3,000 people, with an optimum size of 1,500 people."[33] Therefore, analysis is required to distribute future population from the BG level to the census block level. The previously discussed land use information was the basis for the dispersion of the BG population. **Appendix H** details the population forecast analysis and results. Subsequently, population information obtained at the BG level was dispersed down to the census blocks located within each BG. This analysis provided census block forecasted population information for all census blocks (approximated 324,000 populated census blocks) in the study area for years 2006 and 2011. The population data will be used in the evaluation of potential noise impacts in Chapter 4.

3.5 NOISE

Aircraft noise is often the most noticeable environmental effect associated with any aviation project. This section evaluates the Baseline 2000 noise conditions for the Study Area.

The year 2000 is used as a baseline for this analysis for several reasons:

- At the onset of this study, 2000 was the most recently complete calendar year for which air traffic statistics were available.
- A study of this scope and magnitude takes a number of years to fully develop. The noise modeling of future conditions and final alternatives is based on the input data developed from the baseline conditions (2000). Continual revisions of the baseline year would make it impossible to finalize the noise modeling for the study.
- Finally, 2000 was the last full robust year of air traffic activity prior to the aviation slowdown resulting from terrorist activities and economic down turns. Traffic levels in 2000 are, therefore, representative of those in 2005.

Consequently, 2000 was and is appropriately used as the base line year.

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[30] The census of population and housing, taken by the Census Bureau in each year ending in zero.

[31] Census 2000 Basics, U.S. Census Bureau, <http://www.census.gov/mso/www/c2000basics/chapter4.htm>.

[32] A small, relatively permanent statistical subdivision of a county or statistically equivalent entity. Census tracts generally contain between 1,000 and 8,000 people. Census tract boundaries are delineated with the intention of being stable over many decades, so they generally follow relatively permanent visible features. However, they may follow governmental unit boundaries and other invisible features in some instances; the boundary of a state or county is always a census tract boundary. Census 2000 Basics, U.S. Census Bureau, <http://www.census.gov/mso/www/ c2000basics/chapter4.htm>.

[33] Census 2000 Basics, U.S. Census Bureau, <http://www.census.gov/mso/www/c2000basics/chapter4.htm>.

Noise modeling analysis and results for the future conditions and alternatives are presented in Chapter 4, *Environmental Consequences*, **Appendix D**, *Noise Measurement*, and **Appendix E**, *Noise Modeling Technical Report*.

The following sub-sections discuss the guidance and regulations set by FAA for noise analyses, background noise measurements, and baseline (2000) aircraft noise analysis and results.

3.5.1 Noise Basics

Sound is a complex vibration transmitted through the air which, upon reaching our ears, may be perceived as undesirable or unwanted. It is this unwanted sound which people normally refer to as noise. Aircraft noise is unwanted sound caused by aircraft take-offs, landings, overflights and/or aircraft engines running on the ground. Noise and sound are thus, physically the same, the difference being in the subjective opinion of the receiver.

Sound can be defined in terms of three components:

- Loudness (amplitude),
- Pitch (frequency), and
- Duration (time pattern).

While the pitch and duration of a sound are readily understood, the loudness and its measure are often found to be confusing. The most common measuring unit of sound pressure is the decibel (dB). The human ear has an extremely wide range of response to sound amplitude and because the waves of sound typically heard by the human ear may vary through a wide range from 1 to 100 trillion units (bels), a logarithmic scale (decibels) is used to compress the scale to make the number more manageable. Thus, the decibel scale allows people to describe loudness using numbers ranging from zero to about 140. Most everyday sounds range from zero to 120 dB.

The use of the logarithmic decibel scale requires different arithmetic than is used with linear scales. The sound pressures of two separate sounds are not directly arithmetically additive. For example, if a sound of 80 dB is added to another sound of 74 dB, the total is a one decibel increase to 81 dB, not an addition to 154. If two equally loud noise events occur simultaneously, the sound pressure level from the combined events is only three dB higher than the level produced by either event alone. The key result of logarithmic addition is the greater weight it gives to higher noise levels compared to quieter levels. Similarly, when averaging sound levels, the loudest sound levels are the dominant influence in the averaging process. For example, two sound levels of equal duration are averaged; one is 100 dB, the other is 50 dB. Using linear arithmetic, the result would be 75 dB. The logarithmic result is 97 dB because 100 dB contains 100,000 times the sound energy of 50 dB.

In terms of human perception, a 10 dB increase in sound energy over a given frequency is perceived as a doubling of loudness. Similarly, a 10 dB decrease seems only half as loud. A three dB increase in loudness, which is equivalent to a doubling of sound energy, is detected by the ear as a barely perceptible increase in loudness in an outdoor environment.

3.5.2 Guidance and Regulations for Noise Analysis

The FAA has developed specific guidance and requirements for the assessment of aircraft noise in order to comply with NEPA requirements. This guidance, specified in FAA Order 1050.1E, *Environmental*

Impacts: Policies and Procedures, requires that aircraft noise be analyzed in terms of the yearly Day-Night Average Sound Level (DNL) metric. In practice, this requirement means that DNL noise levels are computed for the Average Annual Day (AAD) of operations for the year of interest.

The DNL metric is a single value of sound level for a 24-hour period. This value includes all of the time-varying sound energy within the period. To represent the greater annoyance caused by a noise event at night, the DNL metric includes an added 10 dB weighting for noise events occurring between 10:00 P.M. and 7:00 A.M. (nighttime). This extra nighttime event weighting helps to account for the annoyance caused by noise during time periods when people are trying to sleep and ambient noise levels are lower. The weighting, in essence, equates one night flight to 10 day flights. In this document, for ease of reference, the format 45 DNL is used to represent a noise exposure level of DNL 45 dB. Additional detail relating to the physics of sound, the effect of noise on people, and the emergence of DNL as the metric of choice by FAA is available in Appendix E.

In addition to requiring the use of the DNL metric, the FAA also requires that aircraft noise be evaluated using one of several authorized computer noise models. Specifically, for air traffic actions such as the Proposed Airspace Redesign Project, the Noise Integrated Routing System (NIRS) model is to be used.

The NIRS model was initially developed in 1995 by the FAA's Office of Environment and Energy in cooperation with FAA Air Traffic for assessing the noise impacts of regional airspace design projects covering large geographic areas. NIRS has the following major capabilities:

- Provides automated quantitative comparison of noise impacts across alternative airspace designs.
- Imports and displays track and operation data from airspace models, and population and community data from other sources.
- Enables user to specify air traffic control altitudes, and automatically calculates required aircraft thrusts and speeds necessary for noise using the same up-to-date database used for the FAA's Integrated Noise Model (INM).
- Calculates estimated noise levels and impacts at all population centroids (or other specially defined points) in large Study Areas.
- Provides automated means of annualizing noise impact based on different operational configurations and/or runway usage statistics.
- Identifies and maps all areas of change in noise impact.
- Identifies air traffic elements that are the principal causes of change in noise impact in each area of change.
- Provides data for quantification of mitigation goals and identification of mitigation opportunities.
- Assembles tables and exhibits for noise-impact data analysis and report generation.
- Applies multiple layers of data checking and quality control.

NIRS was validated by the FAA Office of Environment and Energy against INM in 1997. This process involved providing both the NIRS model and FAA's long-standing INM with identical inputs and performing a detailed comparison of the resulting outputs for representative jet, turboprop, and piston-prop aircraft for both arrival and departure operations. The models were found to give the same results in terms of both final noise values and intermediate aircraft state parameters (e.g., position, altitude, thrust, and speed). An on-going program ensures compatibility of the two models.

3.5.3 Background Noise Measurements

A sampling of field noise measurements was included in this EIS effort. Although the FAA guidelines require that the evaluation of aircraft noise be conducted based on approved computer noise model calculations, it can be helpful to consider the noise modeling results in the context of the local ambient noise environment. FAA's Order 1050.1E specifically addresses the use of noise measurement data as follows:

> "Noise monitoring data may be included in an EA or EIS at the discretion of the responsible FAA official. Noise monitoring is not required and should not be used to calibrate the noise model."

While it is clearly not appropriate to use noise measurement data for computer model calibration, field noise measurements provide important data. Background and cumulative noise levels are measured to provide a context with which to consider the modeled noise exposure change resulting from an airspace alteration. The measurement samples also afford a supplemental method to noise modeling that considers all aircraft traffic (including both VFR and IFR traffic). Thus, stake holders, FAA decision makers, and the general public have a context to consider the relevant contributions of project-related noise exposure in relation to noise produced without project-related changes.

The primary focus of the measurement program was to collect and calculate a sample of day/night average noise levels (DNL) at each specific site. The noise measurements contain all noise recorded at a site including aircraft and non-aircraft events.

In addition to the total DNL at each monitoring site, several other metrics were also computed from the measured data as supplemental information. These include the following:

- L_{50} – Sound level at which 50 percent of the measured one-second samples are above and 50 percent are below. This is generally considered to be an estimation of background noise levels by the FAA.
- Aircraft DNL – The DNL value of only the noise events that were correlated with aircraft overflights based on the radar flight track data.
- Non-Aircraft DNL – The DNL value of noise resulting from the subtraction of the Aircraft DNL value from the Total DNL measured at each site.
- Aircraft Lmax – Range of maximum sound level associated with correlated aircraft events.

While there is no end to the number of potential noise measurement sites, issues such as accessibility, cost, and time often create a practical limit to the scope of any noise measurement program. Accordingly, this noise measurement program focused on collecting a sample of data within strategic areas that were directly related to both the range of alternatives evaluated and the local land uses within the Study Area. Key components used in evaluating site locations included:

- Areas that could potentially be over-flown by new procedures proposed by any alternative airspace configuration,
- Areas that have existing overflights, but where the traffic volume may change based on operation mode or utilization,
- Noise-sensitive and/or 4(f)/historic sites that may be identified within the two previous areas indicated,
- Representative traffic patterns flown by uncontrolled-VFR aircraft to/from local airports (typically low-traffic facilities) within the Study Area,
- Areas located throughout the Study Area to provide a more comprehensive analysis of the Study Area, and
- Other public/FAA input.

The field noise measurements were conducted in two phases, each consisting of the same (or nearly the same) 16 sites throughout the Study Area. The phases were selected to provide some notion of seasonality for the measurement samples. The initial phase of the program provided a winter season sample and began on December 3, 2001 and continued for three weeks through December 21, 2001. Noise was measured at 16 sites for continuous periods of approximately three to four days at each site. The second phase provided a summertime sample of measurements and was conducted from August 12, 2002 through August 30, 2002. Where possible, the exact same sites were used from the first phase of winter measurements. However, there were two sites that were not possible to visit during the summer measurement period. In those cases, similar sites were chosen in the same general vicinity as the original wintertime site.

For each of the measurement sites, personnel were also in the field for portions of each day recording a log of observations. These observations involved noting both aircraft and non-aircraft events that were audible. The observer logged the time in hours, minutes, and seconds, as well as when each event started and ended. If aircraft events were detected, the observer attempted to visually site the aircraft and provided any characteristics of the aircraft event (i.e., aircraft type, operation mode, direction of flight, etc.). The time stamps were taken from either the monitor clock or a personal watch that was calibrated to the U.S. Naval Observatory Master Clock. In addition to the observer logs, radar flight tracks in the vicinity of each site were also collected from the nearest FAA radar site during the measurement program. These flight tracks were then computer-correlated to noise events recorded at each site based on the proximity of the aircraft to the measurement site and the time values recorded in the noise measurement data and the radar data.

Table 3.10 offers a brief description of the 18 measurement locations chosen for this program along with their general land use type. **Figure 3.14** illustrates the locations of all the sites on a map of the area. Appendix D includes a detailed description of each of the sites. These individual descriptions include more information regarding location, Study Area position, and land use type. A number of the measurement results statistics are also provided.

Table 3.11 provides a summary of the noise levels recorded during the measurement period for each site. The data for each site is presented in terms of the average DNL values for each phase of the measurement program, as well as the cumulative DNL value for the entire measurement duration at the site. Similarly, the L50 values for each site are also presented.

Table 3.10
Noise Measurement Site Locations

Site	Name	Location	Latitude	Longitude	Land Use	Dates Measured Phase I	Dates Measured Phase II
Site 1a	Saugerties Residence	Saugerties, NY	42.0766	-74.0617	Residential	12/3/01 - 12/7/01	N/A
Site 1b	Stone Ridge Residence	Stone Ridge, NY	41.8554	-74.1552	Residential	N/A	8/19/02 - 8/23/02
Site 2	Oliverea Residence	Oliverea, NY	42.0130	-74.4154	Park	12/3/01 - 12/7/01	8/20/02 - 8/23/02
Site 3	Beaver Dam Sanctuary	Katonah, NY	41.2469	-73.6661	Park	12/3/01 - 12/7/01	8/19/02 - 8/23/02
Site 4	Stamford Residence	Stamford, CT	41.0533	-73.5047	Residential	12/3/01 - 12/7/01	N/A
Site 5	Robert Moses State Park	Fire Island, NY	40.6292	-73.2283	Park	12/18/01 - 12/21/01	8/12/02 - 8/15/02
Site 6	Harbor Island Park	Mamaroneck, NY	40.9446	-73.7324	Park	12/3/01 - 12/7/01	8/19/02 - 8/23/02
Site 7a	Staten Island Residence(a)	Staten Island, NY	40.6385	-74.1662	Residential	12/17/01 - 12/21/01	N/A
Site 7b	Staten Island Residence(b)	Staten Island, NY	40.6394	-74.1686	Residential	N/A	8/12/02 - 8/16/02
Site 8	Carteret Residence	Carteret, NJ	40.5873	-74.2299	Residential	N/A	8/12/02 - 8/16/02
Site 9	Tourne Park	Boonton, NJ	40.9084	-74.4353	Park	12/10/01 - 12/14/01	8/26/02 - 8/30/02
Site 10	Morristown Nat. Hist. Park	Morristown, NJ	40.7618	-74.5436	Park	12/10/01 - 12/14/01	8/26/02 - 8/30/02
Site 11	BWZ VOR	Schooley's Mtn, NJ	40.7985	-74.8233	Open Space	12/11/01 - 12/14/01	8/26/02 - 8/30/02
Site 12	Twin Lights Historic Site	Highlands, NJ	40.3968	-73.9854	Park	12/10/01 - 12/14/01	8/26/02 - 8/30/02
Site 13	Brandywine Battlefield Park	Chadds Ford, PA	39.8750	-75.5713	Park	12/18/01 - 12/21/01	8/14/02 - 8/16/02
Site 14	Colts Neck Residence	Colts Neck, NJ	40.3113	-74.1990	Residential	12/10/01 - 12/14/01	8/26/02 - 8/30/02
Site 15	Ardencroft Residence	Ardencroft, DE	39.8043	-75.4840	Residential	12/17/01 - 12/21/01	8/13/02 - 8/16/02
Site 16	Garden City Residence	Garden City, NY	40.7182	-73.6750	Residential	12/17/01 - 12/21/01	8/12/02 - 8/16/02

Table 3.11
Noise Measurement Summary

	Measured DNL			Measured L_{50}		
Site	**Phase I**	**Phase II**	**Average**	**Phase I**	**Phase II**	**Average**
1a	40.5	N/A	40.5	31.0	N/A	31.0
1b	N/A	62.7	62.7	N/A	47.0	47.0
2	44.1	48.2	46.6	34.0	35.0	34.5
3	60.5	58.8	59.7	53.0	49.0	51.0
4	54.2	N/A	54.2	46.0	N/A	46.0
5	68.9	64.8	67.3	63.0	55.0	59.0
6	56.9	57.7	57.3	49.5	45.0	47.3
7a	67.6	N/A	67.6	52.0	N/A	52.0
7b	N/A	64.1	64.1	N/A	51.0	51.0
8	N/A	66.1	66.1	N/A	52.0	52.0
9	50.5	63.9	61.0	40.0	47.5	43.8
10	50.7	60.4	57.8	41.0	46.0	43.5
11	50.7	63.5	60.7	41.5	53.0	47.3
12	57.4	64.5	62.2	51.0	54.0	52.5
13	57.1	67.0	64.4	51.0	60.0	55.5
14	47.1	62.0	59.2	39.0	47.0	43.0
15	55.4	63.3	60.9	47.5	55.0	51.3
16	56.1	60.7	59.0	45.0	53.0	49.0

Source: Landrum & Brown Analysis, 2002-05.

Table 3.12 presents a summary of the noise levels associated with the correlated aircraft radar track events for each measurement site. The number of days correlated, the average number of aircraft events correlated, and the range of the maximum aircraft noise levels are presented along with the DNL noise values. The time and duration of each correlated aircraft event was used to separate out the aircraft noise from other noise recorded during each observation period. This allowed for the calculation of the DNL noise levels associated with only the aircraft events for comparison against the DNL levels from other sources during the observation periods.

The measurement data provides a general insight into the ambient noise levels for various land use types in the Study Area. While this measurement data is available only for these specific noise measurement locations, when combined with the modeled noise values for each alternative, it does provide some understanding of each alternative's contribution to the total noise in the area. Accordingly, aircraft noise from modeled aircraft operations, as well as VFR and other operations, can be considered. This analysis is detailed in Appendix E.

3.5.4 Baseline (2000) Aircraft Noise Analysis

This subsection presents a brief overview of the noise modeling conducted for the Baseline 2000 conditions. This Baseline modeling is the foundation upon which the noise modeling for the future conditions and alternatives are built.

Noise exposure contours typically used in aircraft noise analysis near a specific airport are not calculated for this study. The FAA's

Table 3.12
Aircraft Event Noise Correlation

Site	Days Correlated	Average Aircraft Correlated per Day	Aircraft LAMAX Range (dBA)	Aircraft DNL	Non Aircraft DNL	Total Site DNL
1a	4	15	37.6-67.1	25.5	40.3	40.5
1b	2	5	54.3-64.8	26.9	62.7	62.7
2	6	3	44.3-65.4	23.2	46.6	46.6
3	7	39	50.6 - 72.0	46.2	59.5	59.7
4	3	22	53.7 - 72.8	44.1	53.7	54.2
5	5	12	53.3 - 73.4	45.1	67.3	67.3
6	7	71	48.1 - 81.4	47.8	56.8	57.3
7a	2	308	57.3 - 88.0	66.3	61.5	67.6
7b	3	244	59.9 - 86.6	62.7	58.7	64.1
8	2	149	55.1 - 83.1	57.5	65.4	66.1
9	6	124	39.2 - 79.1	48.5	60.8	61.0
10	5	126	44.8 - 76.0	47.4	57.4	57.8
11	5	54	46.8 - 75.6	42.3	60.7	60.7
12	7	126	49.8 - 93.3	52.7	61.7	62.2
13	5	31	50.9 - 75.6	53.2	64.1	64.4
14	7	79	41.0 - 75.0	43.0	59.1	59.2
15	6	57	50.5 - 86.1	49.4	60.6	60.9
16	6	61	43.0 - 82.6	52.6	57.8	59.0

Source: Landrum & Brown Analysis, 2002-05.

Integrated Noise Model (INM), which was not used for this study, produces noise exposure contours to describe noise impacts of arrivals and departures operating within the immediate vicinity (three to five miles) of the study airport. NIRS is an analysis tool used to evaluate the effects of airspace changes from the ground level to 10,000 feet AGL on noise sensitive areas within a large study area containing multiple airports, and is the required model for this type of airspace analysis.[34]

For this EIS, a detailed analysis of future noise from aircraft operating between the surface and 14,000 feet above MSL was conducted in the Study Area. The analysis evaluates noise conditions for specific locations on the ground based on population centroids (centers of census blocks) and grid points using the DNL metric. The spatial size of census blocks varies widely depending on the density of the population. The number of people exposed to noise is estimated as the number residing in the census block corresponding to the centroid (based on 2000 Census Data). NIRS produces change of exposure tables and maps at population centroids. For this analysis, the population centroid counts represent the maximum potential population within the census block that could be exposed to modeled DNL levels. The actual number of people impacted can be less than the total population represented by a single centroid because noise levels actually will vary throughout the census block. A total number of 325,682 centroids were analyzed. **Figure 3.15** illustrates the centroid locations with a population greater than zero as well as the population density for 2000.

The following section provides a brief summary of the noise model input and the resulting Baseline noise levels for the year

[34] FAA Order 1050.1E, 14.5e.

2000. Appendix E provides detailed information related to the methodology used in preparing the noise analysis, statistical information used in the development of the predicted noise levels, and information related to the impact of noise on people located within the Study Area. Appendix E also provides background information on noise metrics, aircraft noise analysis, and aircraft noise effects on human beings.

A total of 21 airports within the Study Area were evaluated in this analysis. In addition, IFR overflight traffic transiting the Study Area below 14,000 feet MSL was also included in the modeling.

3.5.4.1 Input Data

The NIRS model requires a variety of user-supplied input including local environment data (e.g., temperature, humidity, and runway layout), aircraft operations, runway use, and flight tracks. The following paragraphs define each type of input and describe how the input was developed.

Local Environment

In order to calculate noise levels specific to the conditions in the Study Area, the NIRS model utilizes several local environmental variables. These include runway layout and elevation, temperature, atmospheric pressure, humidity, airport average headwind, airport elevation, and terrain.

Airport layouts within the Study Area are used as the source for runway descriptions. **Table 3.13** presents a listing of the 21 airports modeled in the NIRS noise analysis along with the runways modeled for each airport.

The annual average temperature calculated for this study was based on the long-term historic weather reports made at EWR between 1979 and 1999. The average annual temperature for the 20-year period was 55.5 degrees Fahrenheit (13.1 degrees Celsius) and the relative humidity was set at 64.6 percent. The standard atmospheric pressure (29.92 inches Hg or 1013.25 millibars) and the NIRS default airport average headwind (8 knots) were used throughout the Study Area.

NIRS uses terrain data from the U.S. Geological Survey (USGS) to account for the effects that variations in terrain will have on noise. The terrain data produced by USGS portrays the elevation of the land in the Study Area. Each point of interest is placed not only at the correct two-dimensional location, but also the height above MSL.

Aircraft Operations

Aircraft operations data including day/night distribution, mix of different aircraft types (fleet mix), and airspace segment and stage length (trip length) are based on the design-day flight schedules. Design-day flight schedules contain information about the following: the type of flight (i.e., scheduled and nonscheduled commercial passenger, air cargo, GA, or military); type of aircraft; arrival and departure times; the origin and destination of the flight (i.e., domestic or international); and the operator of the flight.

The Baseline 2000 operational levels were determined for the Study Area overflights and each of the 21 airports as part of the operational forecasting effort. The 2000 annual IFR operations levels were divided by 365 to identify the Average Annual Day (AAD) operations for each airport. Although the noise environment around major airports comes almost entirely from

Table 3.13
Modeled Airports and Runways

Identifier	Airport	Modeled Runways
LGA	LaGuardia	04, 13, 22, 31
JFK	John F. Kennedy International	04L/R, 13L/R, 22L/R, 31L/R
EWR	Newark Liberty International	04L/R, 11, 22L/R, 29
TEB	Teterboro	01, 06, 19, 24
PHL	Philadelphia International	08, 09L/R, 17, 26, 27L/R, 35
MMU	Morristown Municipal	05, 12, 23, 30
ISP	Islip Long Island MacArthur	06, 15R, 24, 33L
HPN	White Plains/Westchester County	11, 16, 29, 34
ABE	Allentown/Lehigh Valley International	06, 13, 24, 31
ACY	Atlantic City International	04, 13, 22, 31
BDR	Bridgeport/Igor I. Sikorsky Memorial	06, 11, 24, 29
CDW	Caldwell/Essex County	04, 09, 22, 27
FOK	Westhampton Beach/The Francis S. Gabreski	06, 15, 24, 33
LDJ	Linden	09, 27
WRI	McGuire Air Force Base	06, 18, 24, 36
SWF	Newburgh/Stewart International	09, 16, 27, 34
HVN	New Haven/Tweed-New Haven	02, 14, 20, 32
PNE	Northeast Philadelphia	06, 15, 24, 33
FRG	Republic	01, 14, 19, 32
TTN	Trenton/Mercer County	06, 16, 24, 34
ILG	Wilmington/New Castle County	01, 09, 14, 19, 27, 32

Source: Landrum & Brown Analysis, 2001.

operations of jet aircraft, the DNL calculations reflect the noise from many types of jet and propeller aircraft operations on IFR flight plans. Most aircraft around major airports operate IFR to obtain ATC separation services in these busy areas. Aircraft (including helicopters) operating VFR are not part of the airspace redesign because they are unaffected by the proposed alternatives. Further, VFR aircraft operating outside controlled airspace are not required to be in contact with ATC. Since these aircraft operate at the discretion of the pilot on the "see and be seen" principal and are not required to file flight plans, FAA has very limited information for these operations. See Appendix A for a discussion on flight rules and airspace classifications.

Council on Environmental Quality regulations at 1502.22 (b) (40 C.F.R. 1502.22 (b)) provide guidance for use in situations where complete information is not available and there are reasonably foreseeable significant impacts associated with an action. FAA recognizes that it does not have complete information on VFR aircraft operations throughout the study area. However, there is no known source for comprehensive route, altitude, aircraft type and frequency information for VFR operations for the entire study area. VFR aircraft generally fly in two ways – either in a "pattern" around an airport or to some destination of the pilot's choosing. They do not normally fly set routes to the same destination each flight. These operations fly at the pilot's discretion in terms of destination, route of flight, altitude and frequency. As previously stated VFR flights do not require flight plans and pilots are not required to be in contact with ATC.

FAA further notes that, even if complete information were available for VFR operations, the airspace redesign alternatives evaluated in the EIS would not require a change to the route or altitude of these operations. Therefore, if they could be modeled, they would be shown on the same route of flight and altitude under the No Action and each of the action alternatives. Addition of VFR operations would not lead to significant impact being generated by any of the EIS alternatives. Finally, since VFR operations are predominately conducted by non-jet aircraft, their noise levels are relatively low.

Design-day flight schedules for 2000 were then developed based largely on radar track information. A three-month sample of radar tracks from February, April, and July of 2000 was acquired from multiple sources in order to cover the entire Study Area. See Appendices B and E for details regarding the development of design-day aircraft operations.

One key component of the design-day is the day and night distribution of operations. Correctly identifying the number of nighttime operations is important because the DNL noise metric weights nighttime noise levels by 10 dB. In essence, one nighttime flight equates to 10 daytime flights. The day and night distribution of operations at each airport was developed from the sample of radar data. The day/night distribution of the sample data was applied to the AAD operational levels at each of the 21 airports. **Table 3.14** presents the Baseline AAD IFR operations that were noise modeled for each airport along with the time-of-day percentages. It should be noted that for noise modeling purposes, operations are broken down by a number of factors (i.e., arrivals, departures, aircraft type, time-of-day, etc). Thus, fractional AAD operations resulting from data distribution are often modeled. The noise model readily accepts this type of input and computes the noise energy from fractional events and whole events alike.

Another key characteristic of the operational levels at an airport is the mixture of different aircraft types that make up the airport's total operations. This characteristic is often referred to as "Fleet Mix" and literally means the distribution of specific aircraft types (and sometimes specific aircraft/engine combinations) across the operations at an airport. This is an important element in the noise modeling process because even subtle variations in aircraft types can result in significant changes in noise levels.

The mix of specific types of aircraft flown were developed for the 2000 AAD flight schedule based on actual radar data supplemented by Official Airline Guide (OAG) and other forms of data (See Appendix B). Each aircraft in the AAD fleet mix was specified in terms of an airframe/engine combination consistent with the databases maintained within NIRS. During input development, aircraft were categorized as follows:

- H – Heavy Jet (turbo-jet aircraft weighing 255,000 pounds or more),
- M – Medium Jet (turbo-jet aircraft weighing between 75,000 and 255,000 pounds),
- R – Regional Jet (turbo-jet aircraft weighing under 75,000 pounds used for regional air service),
- L – Stage 3 Light Jet (noise certified Stage 3 jets weighing under 75,000 pounds),

Table 3.14
2000 Average Daily Operations and Time-of-Day for Noise Modeling

Identifier	Airport	AAD Operations	Day-%	Night-%
LGA	LaGuardia	1,063	90.3%	9.7%
JFK	John F. Kennedy International	951	82.7%	17.3%
EWR	Newark Liberty International	1,237	85.4%	14.6%
TEB	Teterboro	395	79.5%	20.5%
PHL	Philadelphia International	1,116	84.0%	16.0%
MMU	Morristown Municipal	100	91.6%	8.4%
ISP	Islip Long Island MacArthur	140	89.7%	10.3%
HPN	White Plains/Westchester County	264	90.5%	9.5%
ABE	Allentown/Lehigh Valley International	122	77.1%	22.9%
ACY	Atlantic City International	70	90.8%	9.2%
BDR	Bridgeport/Igor I. Sikorsky Memorial	22	93.0%	7.0%
CDW	Caldwell/Essex County	14	94.6%	5.4%
FOK	Westhampton Beach/The Francis S. Gabreski	3	93.3%	6.7%
LDJ	Linden	1	94.9%	5.1%
WRI	McGuire AFB	29	91.4%	8.6%
SWF	Newburgh/Stewart International	88	78.4%	21.6%
HVN	New Haven/Tweed-New Haven	22	94.0%	6.0%
PNE	Northeast Philadelphia	37	93.7%	6.3%
FRG	Republic	50	81.6%	18.4%
TTN	Trenton/Mercer County	62	94.8%	5.2%
ILG	Wilmington/New Castle County	63	94.2%	5.8%
OVF	Overflights	446	87.7%	12.3%
	Total	**6,295**	**85.9%**	**14.1%**

Sources: 2/00, 4/00, 7/00 Radar data & Landrum and Brown analysis, 2001.

- K – Stage 2 Light Jet (noise certified Stage 2 jets weighing under 75,000 pounds),[35]
- T – Turbo Propeller, and
- P – Piston Propeller.

These categories were used to assist in identifying traffic flows that may be used primarily by unique aircraft type. Attachment A of Appendix E presents the detailed fleet mix by individual aircraft type that was modeled for each airport in each study year. **Table 3.15** presents a generalized summary of the detailed Baseline 2000 fleet mix by overall category that was modeled for each of the 21 airports. Note that the Jet category in the summary table includes the H, M, R, L, and K categories listed above.

Runway Use

The runway use percentages define which runways are to be used for arrivals and departures on an average annual basis. Generally, the primary factor determining runway use at an airport is the weather, aircraft type, and prevailing wind conditions at the time of a flight. Additionally, several other key factors also have a strong influence on runway selection. These factors include: whether taxiing aircraft must cross active runways, the current make up of the traffic (many arrivals or many departures), and even the flight's origin or destination. The interdependence of air traffic between geographically close airports in the Study Area is also a factor in runway use.

[35] All medium and heavy jet aircraft currently in operation meet the Stage 3 noise requirements. 14 C.F.R. Part 91, subpart I.

Table 3.15
General Fleet Mix - Baseline 2000

Identifier	Airport	Jets	Turboprops	Props
LGA	LaGuardia	80.9%	19.1%	0.0%
JFK	John F. Kennedy International	67.9%	32.1%	0.0%
EWR	Newark Liberty International	85.3%	14.6%	0.0%
TEB	Teterboro	82.0%	7.8%	10.1%
PHL	Philadelphia International	72.7%	26.4%	1.0%
MMU	Morristown Municipal	68.2%	12.2%	19.6%
ISP	Islip Long Island MacArthur	64.8%	34.6%	0.6%
HPN	White Plains/Westchester County	46.9%	52.9%	0.2%
ABE	Allentown/Lehigh Valley International	52.8%	45.2%	2.0%
ACY	Atlantic City International	50.8%	38.2%	11.0%
BDR	Bridgeport/Igor I. Sikorsky Memorial	46.0%	18.1%	35.8%
CDW	Caldwell/Essex County	2.9%	12.1%	85.0%
FOK	Westhampton Beach/The Francis S. Gabreski	70.4%	14.8%	14.8%
LDJ	Linden	0.0%	12.5%	87.5%
WRI	McGuire AFB	94.0%	5.3%	0.7%
SWF	Newburgh/Stewart International	71.6%	25.8%	2.6%
HVN	New Haven/Tweed-New Haven	20.4%	65.7%	13.9%
PNE	Northeast Philadelphia	41.0%	19.3%	39.7%
FRG	Republic	39.8%	19.2%	41.0%
TTN	Trenton/Mercer County	40.0%	45.2%	14.7%
ILG	Wilmington/New Castle County	62.5%	20.7%	16.8%

Sources: 2/00, 4/00, 7/00 Radar data & Landrum & Brown analysis, 2001.

The average annual runway use proportions for the 2000 Baseline conditions were developed from the radar data sample of radar flight tracks (See Flight Track Definitions) for each airport. A detailed discussion of the runway use percentage development can be found in Appendix E.

Flight Track

To determine projected noise levels on the ground, it is necessary to determine not only how many aircraft are present, but also the altitude and flight paths. Therefore, flight route information is a key element of NIRS input data. Flight routes to and from an airport are generally a function of the geometry of the airport's runways and the surrounding airspace structure in the vicinity of the airfield. For this project, an extensive effort was undertaken to ensure an accurate portrayal of flight routes both near the airport (terminal) and further out in the Study Area (en route).

Terminal and en route tracks for the baseline condition were developed from a sample of detailed radar data. A three-month sample of radar tracks from February, April, and July of 2000 was acquired from multiple sources in order to cover the entire Study Area. The sample provided over 425,000 radar flight tracks for analysis. **Figure 3.16** illustrates a single day of radar flight tracks from the three-month sample used for the flight track development analysis. Both arrival and departure traffic is shown for the 21 airports, as well as the day’s overflights of the area.

The Airspace Design Tool (ADT)[36] was used for the detailed analysis of the radar data for each of the 21 airports in the study. ADT separated arrival and departure data for each airport. The design tool isolated groups of tracks with similar altitude and climb or descent profiles to create backbone tracks. Backbone tracks are primary flight tracks. The system also accounts for flight track dispersion through subtracks along the primary flight corridor based on the distribution of radar tracks. Statistical distribution of radar tracks along the backbone tracks determines the spacing between the subtracks. Dispersion along the primary flight tracks typically results from, among other things, wind, weather, and pilot technique. Appendix E provides further detail.

The radar data analysis resulted in the development of over 7,000 individual backbone flight tracks with approximately 15,000 associated sub-tracks. Thus, over 22,000 unique NIRS tracks were developed for model input. **Figure 3.17** presents an example of the NIRS departure tracks for LGA in contrast to the radar data that was used to create the model tracks. The dark red lines represent the backbone tracks with the yellow tracks indicating the subtracks.

The radar sample was analyzed in detail for the overflights and each of the 21 airports in the study. All event data from the radar data was maintained for use of calculating runway use and flight track/route utilization percentages. The information was used to assign flight schedule information to the appropriate runways and traffic flows based on the actual proportions that occurred in 2000 as evidenced in the three-month sample of radar data. This detailed information also allowed for the development of an extensive database of fleet mix and time-of-day for the Baseline 2000 condition noise modeling effort.

For further information see Appendix E which includes a detailed description of the following:

- Noise Modeling Assumptions,
- Methodology,
- Input Data,
- Locational Impact Analysis (Population Centroids and Grid Points), and
- DNL Levels.

It should be noted that as a result of comments received on the DEIS, some minor changes in the noise analysis methodology were incorporated into the analysis presented in the FEIS document. These changes reflect a modest refinement in the methodology.

The first refinement in the noise methodology affects the way noise impacts are tallied. Specifically, the DEIS used the internal NIRS software calculation methodology to identify impact based on FAA's noise impact thresholds. The original computations in the DEIS are based on using the computed noise values out to six decimal places. Thus, a centroid whose noise value was 64.999998 DNL would not be considered in the 65 DNL range. However, spreadsheets provided to the public via the project website included noise values rounded to one decimal place. Consequently, the centroid that was 64.999998 DNL in NIRS became 65.0 DNL in the spreadsheets. This led to confusion

[36] Developed by Metron, Inc.

for those who used the spreadsheets to compute the number of centroids/persons exposed to change at FAA's threshold levels. Often the spreadsheet computation did not match what was in the DEIS as computed by the NIRS software. The FAA received numerous comments to this effect and decided to present the results of the analysis in the Final EIS document based on rounding to one decimal place.

This change in methodology results in slightly more impacts. The rounding to one decimal place generally makes no difference at most points, but some that were very close to the thresholds are tipped into the category of a FAA threshold based impact. These refinements in the modeling are reflected in the Existing Condition noise results in this Chapter, as well as in the Airspace Redesign Alternatives results presented in Chapters Four and Five.

The second refinement was related to the noise modeling itself. Specifically, the issue relates to how the Noise Integrated Routing System (NIRS) model handles multiple airports with differing airfield and runway elevations in a large study area. NIRS relates all aircraft flight profiles (arrival and departure) to the NIRS Study Center elevation, which was set at 22 feet above MSL at LGA for this project. At the same time, the model uses the US Geological Survey terrain data to correctly place the noise receptors (census block centroids or grid points) at the correct ground elevation throughout the Study Area. Some airports in the study, such as HPN and SWF, have airfield elevations that are substantially higher (400 feet above MSL) than the 22 feet above MSL elevation near LGA, JFK, EWR, and PHL. Thus, as the NIRS model departs and lands aircraft at the Study Center elevation of 22 feet above MSL, some centroids near these airport may be exposed to aircraft passing at unusually small slant-range (line-of-sight) distances. For centroids located near the "higher" airports this could mean that the noise exposure levels calculated by NIRS for both the Future No Action Airspace and Proposed Action Airspace Alternatives would be greater than would be expected. Refinements to the NIRS model were made to incorporate various airport elevations to more closely model these differences at the higher elevation airports.

The results of these two refinements were reflected in Appendix P, Noise Mitigation Report. After publication of the Noise Mitigation Report it was discovered that the NIRS model ignored the adjustment made to account for the higher airports (i.e. the model disregarded the airport elevation settings because the terrain feature was activated). The result was that the refined NIRS completed for the Noise Mitigation Report as well as the FEIS, still reflected the Study Center Elevation of 22 feet above MSL as was the case in the DEIS. Therefore, a sensitivity analysis was conducted to confirm the reasonableness of the analysis as well as to document the limited effect of the airport elevation issue. It was expected that adjustments to an airport elevation would generally result in a slight reduction in computed noise levels for all scenarios near these higher elevation airports. The sensitivity analysis presented in Section E.3 of Appendix E confirms this expectation and indicates that the results presented in this FEIS document are not materially affected by this issue.

3.5.4.2 Baseline 2000 Results

The results for Year 2000 Existing Conditions are presented for the population centroid locations in the Study Area. The purpose of baseline data is to provide a reader the opportunity to relate current personal experience to the noise metrics recorded, as well as the degree of exposure. Information provided refers to exposure levels only within the Study Area.

Figure 3.18 provides a graphical representation of the Year 2000 Existing Conditions noise exposure levels for the entire Study Area. Each population centroid is thematically colored based on the following DNL ranges:

- 45 to less than 50 DNL – dark blue,
- 50 to less than 55 DNL – light blue,
- 55 to less than 60 DNL – green,
- 60 to less than 65 DNL – yellow,
- 65 to less than 70 DNL – orange, and
- Greater than or equal to 70 DNL – red.

In general, the vast majority of the Study Area is exposed to aircraft noise levels less than 45 DNL. As would be expected, the areas closer to the primary airports are exposed to the highest aircraft noise exposure levels. **Figure 3.19** provides a closer view showing areas such as JFK, LGA, EWR, TEB, and PHL where most population centroids near the airports are exposed to 45 DNL levels or more. As the figure indicates, the areas exposed to aircraft noise levels 60 DNL or more are located relatively close to each of the major airports. These areas are generally aligned with the primary runways and flight patterns and typically extend from three to five miles away from the runway ends.

Around JFK, the 60 DNL or more noise pattern mostly stays south of the Southern Parkway and is largely over Jamaica Bay. To the northeast, the noise pattern extends beyond the Southern Parkway into the residential area in the Valley Stream vicinity. To the southeast, the noise pattern extends east and south over the largely residential areas of North Woodmere, Woodmere, and western Hewlett Bay. It also extends south over Far Rockaway and west to the Belle Harbor area.

In the vicinity of LGA, the 60 DNL noise area extends northwest of the airport over the Hunts Point industrial area and into the residential areas just northeast of the Bruckner Expressway. To the northeast, the 60 DNL noise pattern extends over residential area located west of the Whitstone Expressway (I-678) just north of Clason Point. To the southeast, the 60 DNL noise pattern extends over residential and commercial areas just east of the Van Wyck Expressway to a point just southeast of Kissena Park.

The 60 DNL noise pattern around EWR generally runs north and south along the orientation of the main runways. To the north the noise pattern extends over largely commercial, industrial, and multi-family residential areas to near the Lyndhurst area. To the south the 60 DNL noise pattern extend over commercial and residential areas of Elizabeth, NJ and portions of Staten Island to an area just north of Carteret.

In the area around TEB, the 60 DNL noise pattern is also oriented in a north-south configuration. To the north the pattern extends over commercial, industrial, and some residential area to a point just south of Route 4 and the New Bridge area. South of the Airport, the pattern extends over mostly industrial and wetland area to near the Meadowlands Sports Complex. A portion of the 60 DNL noise pattern also extends to the southwest along State Route 17 to just southwest of Riggin Memorial Field in Rutherford.

In the area around PHL, the 60 DNL noise pattern generally extends in an east-west orientation aligned with the main runways at PHL. To the east, the noise pattern extends over mostly commercial and industrial area located along the Delaware River to a point over residential areas along the eastern bank of the river near Gloucester City, NJ. To the west, the noise pattern also extends along the river over residential areas in Tinicum Township and Essington.

As evidenced by **Table 3.16**, the majority (51 percent) of people residing within the Study Area were exposed to less than 45 DNL. Approximately 202,212 people, or 68 percent of the Study Area population, experience 65 DNL or more within the Study Area under current conditions. Table 3.16 presents the population count for each DNL range.

Table 3.16
Baseline 2000 Maximum Population Exposed to Aircraft Noise

DNL Range (dB)	Population	Percentage of Total
Less than 45	15,140,168	51.15%
45 to less than 50	7,336,023	24.78%
50 to less than 55	4,295,229	14.51%
55 to less than 60	2,102,580	7.10%
60 to less than 65	526,221	1.78%
65 to less than 70	163,870	0.55%
70 to less than 75	38,026	0.13%
Greater than or equal to 75	316	0.00%
Total	29,602,433	100.00%

Source: Landrum & Brown/Metron Inc. analysis, 2002.

3.6 WEATHER AND CLIMATE

Weather and climate are important factors in aviation operations. Wind, temperature, precipitation, and storms affect how aircraft operate and how air traffic is managed. In addition, weather and climate affect the dissipation of noise and air pollutants. The Study Area is located in the middle latitudes, where the general atmospheric flow is from west to east. This area favors a continental climate with four well-defined seasons. This section describes typical weather patterns for the Study Area.

The Study Area's western boundary is located just west of the Catskill and Pocono Mountains. Both the Catskill and Pocono Mountain ranges rise to about 4,000 feet above MSL. Portions of the Delaware Bay and the entire Long Island Sound are located within the Study Area. Easterly winds from the Atlantic Ocean can cause an upsloping effect within the Study Area. This effect forces air to ascend to higher terrain, cooling as it rises. When the air cools to its dew point as it rises, it can condense and form clouds and precipitation even when there is not a substantial amount of moisture in the air.

Aircraft generally takeoff and land into the wind (known as a headwind) whenever possible. Headwinds reduce an aircraft's takeoff and landing distance, as well as increase climb rate. Aircraft can operate with considerable crosswinds (i.e., a wind blowing at the side of the aircraft), up to about 20 knots for a typical air carrier aircraft. Aircraft can operate with limited tailwinds (i.e., a wind blowing on the rear of the aircraft), up to 10 knots for a typical air carrier aircraft. Tailwinds require longer takeoff and landing distances. Winds in excess of crosswind and tailwind limits force aircraft to use a different runway. Accordingly, wind speed and direction dictate the orientation of runways at an airport and the use of specific runway configurations. The annual mean surface wind speed in the Study Area ranges from 8.6 to 12.9 miles per hour, or 7.5 to 11.2 knots. Prevailing winds are from the south during most of the year. During the winter months they are typically from the northwest. The windiest period is late winter and early spring. Winds are generally weakest during the night and early morning hours, increasing to a high in the afternoon. Winds may reach 50 to 60 miles per hour or even higher during severe summer thunderstorms, hurricanes, and winter storms. Tornadoes, which infrequently occur, have resulted in significant damage. Severe hailstorms have occurred in the spring months.

Temperature is an important factor in aircraft performance. High temperatures decrease the density of air, which increases aircraft takeoff distance and reduces climb performance. This generally results in increased noise exposure during hot temperatures, as compared to colder temperatures. Generally pleasant weather with mild temperatures often occurs in the spring and fall seasons. Average summertime (i.e., June, July, August, and September) temperatures (Fahrenheit) in this area range from the upper 80s to the low 90s; average temperatures for the winter months (December, January, and February) usually average in the low to mid-20s.[37]

In general, precipitation is associated with storm events and reduced visibility. These factors can result in increased airport delays. Precipitation is rather evenly distributed throughout the year in the Study Area. Summers are warm and generally humid and winters are generally mild with moderate snowfalls. Snowfalls usually average around 25 inches annually,[38] but can vary greatly from year to year. Annual precipitation has ranged from approximately 35 inches to more than 50 inches. Rainfalls of over 10 inches in a 24-hour period have been recorded during the passage of tropical storms.[39] Tropical storms can bring heavy rain, high winds, and flooding, but extensive damage from wind and tidal flooding is rare. Thunderstorms can occur at any time, but are most frequent during the late spring and summer months. The storms are most often accompanied by downpours and gusty winds, but are not usually severe.

Major flooding of both the Delaware and the Lower Hudson Rivers can occasionally result from heavy rains over the basin augmented by snowmelt and above-normal tides associated with hurricanes or severe storms along the coast.[40] Flooding may also occur after a cold winter when both the Delaware and the Lower Hudson may be blocked by ice.

Severe weather, such as thunderstorms, can result in increased aircraft delay. Severe weather is most common in the summer months. During the summers of 1999 and 2000, air passengers saw unprecedented levels of delay partially due to severe weather. In order to mitigate disruption to air traffic, the FAA has developed Severe Weather Avoidance Plans (SWAPs). According to FAA Order 7210.3 *Facility Operation and Administration*, "SWAPs are formalized programs that are of considerable value in areas that are particularly

[37] NOAA National Climatic Data Center. Comparative Climatic Data of the United States.

[38] Ibid.

[39] Ibid.

[40] National Weather Service, Northeast and Mid-Atlantic River Forecast Centers, 2002.

susceptible to severe weather. Plans that are properly developed, coordinated, and implemented can reduce coordination and traffic management associated with rerouting aircraft around areas of severe weather; therefore, resulting in better utilization of available airspace." The National Playbook[41] is a collection of commonly used SWAP routes. The appropriate Air Route Traffic Control Centers (ARTCC) will use these routes to mitigate the potential impacts to the air space system in the event of severe weather.

3.7 DEPARTMENT OF TRANSPORTATION ACT SECTION 4(f), AND LAND AND WATER CONSERVATION FUND ACT SECTION 6(f)

Section 303(c), Title 49 USC, commonly referred to as Section 4(f) of the DOT Act,[42] states that "…Secretary of Transportation will not approve a project that requires the use of any publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from a historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land…and [unless] the project includes all possible planning to minimize harm resulting from the use."[43] The term "use" encompasses both physical use of the property as well as constructive uses. Indirect adverse impacts, such as noise, that prevent the use of Section 4(f) properties for their intended purpose are considered as constituting a "constructive use."

FAA Order 1050.1E includes guidance on how to determine whether increases in noise constitute a constructive use, The Order states, "The land use compatibility guidelines in 14 CFR Part 150 (Part 150) may be relied upon to determine whether there is a constructive use under Section 4 (f) where the land uses specified in the Part 150 guidelines are relevant to the value, significance, enjoyment of the 4(f) land in question."[44] Careful evaluation of the applicability of the Part 150 guidelines is necessary when the Section 4(f) property is located in a quiet setting and the setting is a generally recognized attribute of the site's significance.[45]

Many lands are also subject to the Land and Water Conservation Fund (LWCF) Act Section 6(f). Section 6(f) states that no public outdoor recreation areas acquired or developed with any 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 the converted areas will be replaced with other recreation lands of reasonably equivalent usefulness and location.

The Study Area includes numerous city, county, state, and national parks, wildlife refuges, and historic sites. The following sections provide information regarding

[41] FAA Order 7210.3, Facility Operation and Administration. Section 21: National Playbook. Effective February 19, 2004, last updated February 17, 2005. Available online at <http://www.faa.gov/atpubs/FAC/Ch17/s1721.html>.

[42] Department of Transportation Act of 1966, § 4(f) [recodified at 49 USC 303 (c)].

[43] FAA Order 1050.1E, Appendix A, page A-19.

[44] FAA Order 1050.1E, Appendix A, page A-20.

[45] FAA Order 1050.1E, Appendix A, page A-21.

National Parks, the National Forest System, National Wildlife Refuge System, and State Parks/Forests within the Study Area. More information on historic sites may be found in Section 3.8.

3.7.1 National Parks and Service Lands

National parks are intended to, "conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations."[46] The first national park was Yellowstone National Park created in 1872. Today, the national park system includes more than 388 units including seashores, monuments, and preserves among others.[47] Over 30 national park service lands are found in the Study Area. **Table 3.17** provides a list and **Figure 3.20** illustrates the national park service lands identified in the Study Area.

3.7.2 National Forest System

The United States Department of Agriculture (USDA) Forest Service is responsible for managing the lands and resources of the National Forest System, which includes 192 million acres of land in 42 states, the Virgin Islands, and Puerto Rico. The system is composed of 155 national forests, 20 national grasslands, and various other lands under the jurisdiction of the Secretary of Agriculture. Section 4(f) applies to only those areas in a National Forest that are historic sites or designated by statute or management plans as a park, recreation area, or wildlife and waterfowl refuge.[48] There are no National Forests within the Study Area.

3.7.3 National Wildlife Refuge System

The United States Department of the Interior Fish & Wildlife Service is responsible for the administration of the National Wildlife Refuge System which now comprises more than 632 units and encompasses over 96 million acres of valuable wildlife habitat.[49] Wildlife refuge areas are a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

Table 3.18 provides a list and Figure 3.20 illustrates the National Wildlife Refuge Areas identified in the Study Area.

3.7.4 State Parks, Forests, and Other Areas of Significance

Within the Study Area there exist approximately 203 public parks and open space areas, including forest preserves. **Table 3.19** provides a list and Figure 3.20 illustrates the state parks, forests, and other areas of state significance identified in the Study Area.

There are over 2,300 national parks and service lands, national forests, national wildlife refuges, and state parks and forests in the Study Area.

[46] 16 USC Section 1.

[47] Draft 2006 NPS Management Policies, National Park Service, October 2005, p. 4 <http://parkplanning.nps.gov/document.cfm?projectId=13746&documentID=12825>.

[48] Section 4(f) Policy Paper, FHWA, Office of Planning, Environment and Realty Project Development and Environmental Review, March 2005, <http://environment.fhwa.dot.gov/projdev/4fpolicy.htm#6>.

[49] National Wildlife Refuge System Fact Sheet – 2004, U.S. Fish & Wildlife Service.

Table 3.17
National Parks and Service Lands

Name	County/Location	Acreage
Connecticut		
Weir Farm National Historic Site	Ridgefield & Wilton	74
Appalachian National Scenic Trail	Litchfield	51.6 miles
New Jersey		
Appalachian National Scenic Trail	Warren & Sussex	72.4 miles
Delaware Water Gap National Recreation Area	Middle Delaware Rivery	70,000
Edison National Historic Site	West Orange	21
Ellis Island National Monument	New York Harbor	27.5
Gateway National Recreation Area	Monmouth	26,607
Morristown National Historical Park	Morristown	1,707
New Jersey Pinelands National Reserve	Cape May, Cumberland, Atlantic, Gloucester, Camden, Burlington and Ocean	1,000,000
New York		
African Burial Ground National Monument	Manhattan	7
Appalachian National Scenic Trail	Orange, Rockland, Westchester, Putnam and Dutchess	88.5 miles
Castle Clinton National Monument	New York	Not Available
Eleanor Roosevelt National Historic Site	Hyde Park	181
Ellis Island National Monument	New York Harbor	27.5
Federal Hall National Memorial	New York	Not Available
Fire Island National Seashore	Patchogue	19,579
Gateway National Recreation Area	Brooklyn, Queens & Staten Island	26,607
General Grant National Memorial	New York	Not Available
Governors Island National Monument	New York	172
Hamilton Grange National Memorial	New York	32
Home of Franklin D. Roosevelt National Historic Site	Hyde Park	800
Lower East Side Tenement Museum NHS	Manhattan	Not Available
Sagamore Hill National Historic Site	Oyster Bay	83
Saint Paul's Church National Historic Site	Mount Vernon	6
Statue Of Liberty National Monument	New York	58
Theodore Roosevelt Birthplace National Historic Site	New York	Not Available
Vanderbilt Mansion National Historic Site	Hyde Park	212
Pennsylvania		
Appalachian National Scenic Trail	Carbon, Northampton and Monroe Counties	145.2 miles
Benjamin Franklin National Memorial	Philadelphia	Not Available
Delaware Water Gap National Recreation Area	Pike and Wayne	70,000
Delaware and Lehigh National Heritage Corridor	Bucks, Lehigh, Northampton, Monroe and Carbon Counties	150 miles
Edgar Allan Poe National Historic Site	Philadelphia	Not Available
Gloria Dei Church National Historic Site	Philadelphia	Not Available
Hopewell Furnace National Historic Site	Elverson	848
Independence National Historical Park, including Liberty Bell, Independence Hall, and Congress Hall	Philadelphia	45
Thaddeus Kosciuszko National Memorial	Philadelphia	Not Available
Upper Delaware Scenic & Recreational River	Pike and Wayne (PA) and Delaware, Orange and Sullivan (NY) counties along the Delaware River, NY, PA, NJ	75,000
Valley Forge National Historical Park	Valley Forge	3,466

Sources: US Department of the Interior and National Park Service.

Table 3.18
National Wildlife Refuges

Name	County	Acreage
Connecticut		
Stewart B. McKinney National Wildlife Refuge	Fairfield, New Haven and Middlesex	800
New Jersey		
Cape May National Wildlife Refuge	Cape May	11,000
Edwin B. Forsythe National Wildlife Refuge	Atlantic, Burlington, Ocean	46,000
Great Swamp National Wildlife Refuge	Morris	7,600
Supawna Meadows National Wildlife Refuge	Salem	2,800
Walkill River National Wildlife Refuge	Sussex	4,800
New York		
Amagansett National Wildlife Refuge	Suffolk	36
Conscience Point National Wildlife Refuge	Suffolk	60
Elizabeth A. Morton National Wildlife Refuge	Suffolk	187
Lido Beach Wildlife Management Area	Nassau	22
Oyster Bay National Wildlife Refuge	Nassau	3,117
Seatuck National Wildlife Refuge	Suffolk	196
Shawangunk Grasslands National Wildlife Refuge	Ulster	565
Target Rock National Wildlife Refuge	Nassau	80
Wertheim National Wildlife Refuge	Suffolk	2,400
Pennsylvania		
John Heinz National Wildlife Refuge at Tinicum	Philadelphia, Delaware	1,200

Sources: US Department of the Interior, U.S. Fish & Wildlife Service.

Table 3.19
State Parks and Forests

Name	County	Acreage
Connecticut		
American Legion State Forest	Litchfield	782
Black Rock State Park	Litchfield	443
Bluff Point State Park	New London	806
Burr Pond State Park	Litchfield	436
Chatfield Hollow State Park	Middlesex	355
Cockaponset State Forest	Middlesex	15,652
Collis Huntington State Park	Fairfield	883
Connecticut Valley Railroad	Middlesex	300
Day Pond State Park	New London	180
Dennis Hill State Park	Litchfield	240
Devil's Hopyard State Park	Middlesex	860
Dinosaur State Park	Hartford	60
Fort Griswold Battlefield State Park	New London	16
Fort Trumbull State Park	New London	Not Available
Gillette Castle State Park	Middlesex	184
Haddam Meadows State Park	Middlesex	175
Haley Farm State Park	New London	198
Hammonasset Beach and State Park	New Haven	919
Harkness Memorial State Park	New London	230
Haystack Mountain State Park	Litchfield	224

Table 3.19 (continued)
State Parks and Forests

Name	County	Acreage
Housatonic Meadows State Park	Litchfield	451
Hurd State Park	Middlesex	884
Indian Well State Park	Fairfield	153
James L. Goodwin State Forest	Middlesex	2,171
John A. Minetto State Park	Litchfield	678
Kent Falls State Park	Litchfield	295
Kettletown State Park	New Haven	605
Lake Waramaug State Park	Litchfield	95
Macedonia Brook State Park	Litchfield	2,300
Miller Pond State Park	Middlesex	Not Available
Mohawk State Forest	Litchfield	3,351
Mount Tom State Park	Litchfield	232
Nehantic State Forest	New London	Not Available
Osborne Homestead Museum	New Haven	3
Osborndale State Park	New Haven	350
Penwood State Park	Hartford	787
Peoples State Forest	Litchfield	2,954
Putnam Memorial State Park	Fairfield	183
Rocky Neck State Park	New London	708
Salmon River State Forest	Hartford	6,115
Selden Neck State Park	New London	528
Seth Low Pierrepont State Park	Fairfield	305
Sherwood Island State Park	Fairfield	234
Silver Sands State Park	New Haven	Not Available
Sleeping Giant State Park	New Haven	234
Southford Falls State Park	New Haven	120
Squantz Pond State Park	Fairfield	172
Stratton Brook State Park	Hartford	148
Talcott Mountain State Park	Hartford	557
Topsmead State Forest	Litchfield	514
Wadsworth Falls State Park	Middlesex	285
West Rock Ridge State Park	New Haven	1,688
Wharton Brook State Park	New Haven	96
Delaware		
Augustine Wildlife Area	New Castle	Not Available
Bellevue State Park	New Castle	328
Brandywine Creek State Park	New Castle	933
Brandywine Zoo	New Castle	12
Chesapeake & Delaware Canal Wildlife Area	New Castle	Not Available
Fort Delaware State Park	New Castle	Not Available
Fort Dupont and the Port Penn Interpretive Center	New Castle	322
Fox Point State Park	New Castle	Not Available
Lums Pond State Park	New Castle	1,790
Ommelanden Hunter Education Training Center	New Castle	Not Available
White Clay Creek State Park	New Castle	3,384
Wilmington State Parks	New Castle	Not Available
New Jersey		
Abram S. Hewitt State Forest	Passaic	2,001
Allaire State Park	Monmouth	3,086
Allamuchy Mountain State Park	Warren	7,770
Barnegat Lighthouse State Park	Ocean	32
Bass River State Forest	Burlington & Ocean	26,764
Belleplain State Forest	Cape May & Cumberland	20,749

Table 3.19 (continued)
State Parks and Forests

Name	County	Acreage
Bull's Island Recreation Area	Hunterdon	80
Cape May Point State Park	Cape May	235
Cheesequake State Park	Monmouth & Middlesex	1,292
Corson's Inlet State Park	Cape May	Not Available
Delaware and Raritan Canal State Park	Burlington, Hunterdon, Mercer, Middlesex and Somerset	4,470
Double Trouble State Park	Ocean	7,337
Farny State Park	Morris	3,951
Forked River State Marina	Ocean	Not Available
Fortescue State marina	Cumberland	Not Available
Fort Mott State Park	Salem	104
Hacklebarney State Park	Morris	977
High Point State Park	Sussex	15,328
Hopatcong State Park	Morris	107
Island Beach State Park	Ocean	3,002
Liberty State Park	Hudson	1,212
Jenny Jump State Forest	Warren	4,239
Kittatinny Valley State Park	Sussex	3,407
Brendan T. Byrne State Forest	Burlington & Ocean	34,725
Leonardo State Marina	Monmouth	Not Available
Liberty Landing Marina	Hudson	Not Available
Long Pond Ironworks State Park	Passaic	2,591
Monmouth Battlefield State Park	Monmouth	2,366
Norvin Green State Forest	Passaic	4,365
Parvin State Park	Salem	1309
Penn State Forest	Burlington	3,366
Princeton Battlefield State Park	Mercer	681
Ramapo Mountain State Forest	Bergen	4,200
Rancocas State Park	Burlington	1,252
Ringwood State Park	Bergen & Passaic	4,034
Round Valley Recreation Area	Burlington	3,639
Senator Frank Farley State Marina	Atlantic	Not Available
Spruce Run Recreation Area	Hunterdon	2,012
Stokes State Forest	Sussex	15,947
Stephens State Park	Warren	805
Swartswood State Park	Sussex	2,266
Voorhees State Park	Hunterdon	632
Washington Crossing State Park	Mercer	1,773
Washington Rock State Park	Union	52
Wawayanda State Park	Sussex	17,541
Wharton State Forest	Atlantic, Burlington & Camden	114,557
Worthington State Forest Park	Warren	6,233
New York		
Armlin Hill State Forest	Schoharie	515
Arnold Lake State Forest	Otsego	1,265
Artic China State Forest	Delaware	2,959
Ashland Pinnacle State Forest	Greene	945
Balsam Mountain Wild Forest	Ulster	Not Available
Barbour Brook State Forest	Delaware	768
Barcelona Neck State Natural Resource Management Area	Suffolk	Not Available
Bashakill State Wildlife Management Area	Sullivan	Not Available
Basswood Pond State Forest	Otsego	711

Table 3.19 (continued)
State Parks and Forests

Name	County	Acreage
Bayard Cutting Arboretum State Park	Suffolk	Not Available
Bayswater Point State Park	Queens	12
Beals Pond State Forest	Delaware	Not Available
Bear Mountain State Park	Orange	Not Available
Bear Spring Mountain State Wildlife Management Area	Delaware	Not Available
Bear Swamp State Forest	Otsego	1,759
Bearpen Mountain State Forest	Delaware & Greene	Not Available
Belmont Lake State Park	Suffolk	459
Bethpage State Park	Nassau	Not Available
Big Buck Mountain State Forest	Putman	Not Available
Big Indian Wilderness	Ulster	Not Available
Blackhead Range Wild Forest	Greene	Not Available
Blauvelt State Park	Rockland	Not Available
Blenheim Hill State Forest	Schoharie	783
Bluestone Wild Forest	Ulster	Not Available
Bog Brook State Unique Area	Putman	Not Available
Bristol Beach State Park	Ulster	Not Available
Brookhaven State Park	Suffolk	2,377
Burnt-Rossman Hills State Forest	Schoharie	9,944
Caleb Smith State Park	Suffolk	543
Calhoun Creek State Forest	Otsego	730
California Hill State Forest	Putnam	Not Available
Captree State Park	Suffolk	298
Castle Rock State Unique Area	Putnam	Not Available
Castleton Island State Park	Columbia	Not Available
Catskill Forest Preserve	Ulster	600,000
Caumsett State Historic Park	Suffolk	1,750
Cherry Island State Wildlife Management Area	Orange	Not Available
Cheery Ridge Wild Forest	Delaware	Not Available
Cherry Valley State Forest	Otsego	1,566
Clapper Hollow State Forest	Schoharie	820
Clarence Fahnestock State Park	Putnam	Not Available
Clausland Mountain State Park	Rockland	50
Clay Pit Ponds State Park Preserve	Richmond	260
Clermont State Park	Dutchess	Not Available
Cole Hill State Forest	Albany	874
Colgate Lake Wild Forest	Greene	Not Available
Columbia Lake State Forest	Delaware	700
Connetquot State Park	Suffolk	3,400
Cotton Hill State Forest	Schoharie	503
Cranberry Mountain State Wildlife Management Area	Putman	Not Available
Croton Gorge State Unique Area	Westchester	Not Available
Crumhorn Mountain State Wildlife Management Area	Otsego	Not Available
Currans Road Pond State Wildlife Management Area	Suffolk	Not Available
David A. Sarnoff Pine State Barrens Preserve	Suffolk	Not Available
Decatur State Forest	Otsego	582
Depot Hill State Forest	Dutchess	Not Available
Dry Brook Ridge Wild Forest	Ulster	Not Available
Dry Brook Wild Forest	Delaware	Not Available
Dutch Settlement State Forest	Schoharie	1,051
Dutton Ridge State Forest	Schoharie	1,249
Empire-Fulton Ferry State Park	Kings	9
Exeter State Forest	Otsego	1,957

Table 3.19 (continued)
State Parks and Forests

Name	County	Acreage
Franklin D. Roosevelt State Park	Westchester	Not Available
Franklinton Vlaie State Wildlife Management Area	Schoharie	Not Available
Franklinton Vly State Forest	Schoharie	Not Available
Gilbert Lake State Park	Otsego	Not Available
Glimmerglass State Park	Otsego	Not Available
Gilgo State Park	Suffolk	Not Available
Goosepond State Park	Orange	Not Available
Great Vly Wildlife Management Area	Ulster	Not Available
Halcott Mountain Wild Forest	Greene	Not Available
Harbor Hurons State Wildlife Management Area	Richmond	Not Available
Harriman State Park	Orange	Not Available
Hartwick State Forest	Otsego	Not Available
Harvey Mountain State Forest	Columbia	1,583
Haverstraw Beach State Park	Rockland	Not Available
Heckscher State Park	Suffolk	1,657
Hemlock Ridge State Forest	Ulster	Not Available
Hempstead Lake State Park	Nassau	Not Available
Hickok Brook State Forest	Sullivan	Not Available
High Knob State Forest	Schoharie	1,344
High State Three State Forest	Schoharie	Not Available
High Tor State Park	Rockland	Not Available
Highland Lakes State Park	Orange	3,000
Hither Hills State Park	Suffolk	Not Available
Honey Hill State Forest	Otsego and Schoharie	1,017
Hook Mountain State Park	Rockland	Not Available
Hooker Hill State Forest	Otsego	Not Available
Hooker Mountain State Wildlife Management Area	Otsego	Not Available
Hudson Highlands State Park	Putnam	Not Available
Huddon River Islands State Park	Columbia	Not Available
Hunter Mountain Wild Forest	Greene	Not Available
Huntersfield State Forest	Greene	1,325
Indian Head Wilderness	Greene & Ulster	Not Available
James Baird State Park	Dutchess	Not Available
John Lennox State Demonstration Forest	Delaware	Not Available
Jones Beach State Park	Nassau	Not Available
Kaaterskill Wild Forest	Greene	Not Available
Kerryville State Forest	Delaware	696
Keyserville State Forest	Schoharie	1,163
Kings Park State Natural Resource Management Area	Suffolk	Not Available
Kowawese State Unique Area	Orange	Not Available
Lafayetteville State Forest	Dutchess	Not Available
Lake Superior State Park	Sullivan	Not Available
Lake Taghkanic State Park	Columbia	Not Available
Leonard Hill State Forest	Schoharie	1,617
Long Island Environmental Interpretive Center	Suffolk	Not Available
Long Island State Pine Barrens Preserve	Suffolk	Not Available
Lutheranville State Forest	Schoharie	1,819
Mallet Pond State Forest	Schoharie	2,526
Manorkill State Forest	Schoharie	Not Available
Manorville State Pine Barrens Preserve	Suffolk	Not Available
Maple Valley State Forest	Otsego	801
Margaret Lewis Norrie State Park	Dutchess	Not Available
Max V. Shaul State Park	Schoharie	Not Available

Table 3.19 (continued)
State Parks and Forests

Name	County	Acreage
Michigan Hill State Forest	Delaware	619
Middle Island State Environmental Education Center	Suffolk	Not Available
Middle Mountain Wild Forest	Delaware and Sullivan	Not Available
Milford State Forest	Otsego	512
Mine Kill State Park	Schoharie	Not Available
Minnewska State Park Preserve	Ulster	Not Available
Mongaup Valley State Wildlife Management Area	Sullivan	Not Available
Montauk Downs State Park	Suffolk	Not Available
Montauk Point State Park	Suffolk	Not Available
Mount Loretto Unique Area	Richmond	Not Available
Mount Pisgah State Forest	Greene	544
Murphy Hill State Forest	Delaware	642
Napeague State Park	Suffolk	1,200
Neversink River State Unique Area	Sullivan	Not Available
New Forge State Forest	Columbia	612
Nimham Mountain State Forest	Putman	Not Available
Nissequogue River State Park	Suffolk	187
Nutton Hook State Unique Area	Columbia	Not Available
Nyack Beach State Park	Rockland	61
Oak Brush Plains State Preserve	Suffolk	Not Available
Oak Ridge State Forest	Ulster	Not Available
Odgen and Ruth Mills Memorial State Park	Dutchess	Not Available
Oil City State Forest	Otsego and Schoharie	180
Orient Beach State Park	Suffolk	Not Available
Otis Pike State Wildlife Preserve	Suffolk	Not Available
Overlook Mountain Wild Forest	Ulster	Not Available
Painter Hill State Forest	Sullivan	Not Available
Palisades State Park	Rockland	Not Available
Patria State Forest	Schoharie	2,161
Petersburg Pass State Forest	Schoharie	1,094
Phoenicia Wild Forest	Greene and Ulster	Not Available
Plainfield State Forest	Otsego	1,403
Planting Fields Arboretum State Park	Nassau	Not Available
Plattekill State Forest	Delaware	1,757
Pudding Street State Forest	Putman	Not Available
Quoque State Wildlife Refuge	Suffolk	Not Available
R. Milton Hick Memorial State Forest	Otsego	1,293
Relay State Forest	Delaware	Not Available
Rensselaerville State Forest	Albany and Schoharie	2,818
Riverbank State Park	New York	28
Robert Moses State Park	Suffolk	Not Available
Roberto Clemente State Park	Bronx	25
Rockefeller State Park Preserve	Westchester	Not Available
Rockland Lake State Park	Rockland	Not Available
Rockwood Hall State Park	Rockland	Not Available
Rocky Point State Natural Resource Management Area	Suffolk	Not Available
Roeliff Jansen Kill State Forest	Dutchess	Not Available
Rogers Island State Wildlife Management Area	Columbia	281
Roseboom State Forest	Otsego	630
Sag Harbor State Park	Suffolk	Not Available
Sanctuary State Park	Holbrook Island	Not Available
Scott Patent State Forest	Albany and Schoharie	1,463
Shandaken Wild Forest	Greene and Ulster	Not Available

Table 3.19 (continued)
State Parks and Forests

Name	County	Acreage
Shawangunk Ridge State Forest	Ulster	Not Available
Shawangunk State Forest	Ulster	Not Available
Slide Mountain Wilderness	Ulster	Not Available
South Hill State Forest	Delaware and Otsego	Not Available
State Pine Barrens Preserve	Suffolk	Not Available
Steam Mill State Forest	Delaware	5,618
Sterling Forest State Park	Orange	Not Available
Stewart State Forest	Orange	Not Available
Stissing Mountain State Forest	Dutchess	Not Available
Stony Kill State Environmental Education Center	Dutchess	576
Storm King State Park	Orange	Not Available
Sundown Wild Forest	Sullivan and Ulster	Not Available
Sunken Meadow State Park	Suffolk	Not Available
Susquehanna State Forest	Otsego	422
Taconic State Park	Columbia and Dutchess	Not Available
Tallman Mountain State Park	Rockland	Not Available
Texas School House State Forest	Otsego	1,245
Tivoli Bay State Unique Area	Dutchess	1,722
Tomannex State Forest	Delaware	Not Available
Turkey Point State Forest	Ulster	Not Available
Valley Stream State Park	Nassau	Not Available
Vinegar Hill State Wildlife Management Area	Greene	394
Wagner Farm State Forest	Otsego	458
Wassaic State Forest	Dutchess	Not Available
West Kill Mountain Wilderness	Greene and Ulster	Not Available
West Mountain State Forest	Dutchess	Not Available
While Pond State Forest	Putnam	Not Available
Wildwood State Park	Suffolk	600
Willowemoc Wild Forest	Sullivan and Ulster	Not Available
Windham High Peak Wild Forest	Greene	Not Available
Wolf Brook State Forest	Sullivan	Not Available
Wolf Hollow State Wildlife Management Area	Delaware	Not Available
Wurtsboro Ridge State Forest	Sullivan	Not Available
Pennsylvania		
Beltzville Lake State Park	Carbon	2,972
Benjamin Rush State Park	Philadelphia	Not Available
Big Pocono State Park	Monroe	1,306
Delaware Canal State Park	Bucks	Not Available
Delaware State Forest	Pike	80,056
Evansburg State Park	Montgomery	3,349
Fort Washington State Park	Montgomery	493
French Creek State Park	Berks and Chester	Not Available
Gouldsboro State Park	Monroe and Wayne	2,800
Hickory Run State Park	Carbon	15,500
Jacobsburg Environmental Education Center	Northampton	1,168
Lackawanna State Forest	Lackawanna	6,711
Marsh Creek Lake State Park	Chester	1,705
Neshaminy State Park	Bucks	330
Nockamixon State Park	Bucks	5,283
Nolde Forest Environmental Education Center.	Berks	665
Norristown Farm Park	Montgomery	Not Available
Promised Land State Park	Pike	3,000
Prompton State Park	Wayne	Not Available

Table 3.19 (continued)
State Parks and Forests

Name	County	Acreage
Ralph Stover State Park	Bucks	45
Ridley Creek State Park	Delaware	2,606
Tobyhanna State Park	Monroe and Wayne	5,440
Tyler State Park	Bucks	1,711
Varden Conservation Area	Wayne	343
Valley Forge State Forest	Berks, Bucks, Chester, Lehigh, Delaware, Lancaster, Montgomery, and Philadelphia	912
White Clay Creek Preserve	Chester	1,255

Sources: Connecticut Department of Environmental Protection.
Delaware Department of Natural Resources and Environmental Control.
New Jersey Division of Parks and Forestry.
New York State Office of Parks, Recreation, and Historic Preservation.
Pennsylvania Department of Conservation and Natural Resources.

3.8 HISTORICAL, ARCHAEOLOGICAL, ARCHITECTURAL, AND CULTURAL RESOURCES

A number of federal laws and regulations address protection of the country's cultural resources. The statute specifically devoted to cultural resource issues is the National Historic Preservation Act of 1966,[50] as amended, which contains two provisions that are pertinent to changes in aircraft routing. Section 106 of the statute requires federal agencies to consider the effect of federally funded or licensed projects on properties and districts listed, or eligible for listing, in the National Register of Historic Places (NRHP).[51] National Historic Landmarks, a designation bestowed on a very limited number of particularly significant cultural resources, are afforded special protection under Section 110 of the National Historic Preservation Act.[52] NRHP has established standards by which individual resources (both archaeological and architectural) are evaluated to determine their eligibility for listing. Resources may include buildings, sites, objects, and structures which are placed on the NRHP in reference to their: (1) association with events that have made a significant contribution to the broad patterns of American History; (2) association with the lives of person significant in our past; (3) architectural or archaeological significance; and/or (4) ability to yield information important in prehistory or history.[53]

Although implementation of the Proposed Action would not result in a direct impact (i.e., destruction or alteration) to any cultural resource, the Proposed Action may result in an indirect impact to cultural resources. Potentially adverse impacts, such as noise, may be considered an indirect impact. Therefore, cultural resources in the Study Area have been identified and will be examined for potential impacts in the next chapter. **Figure 3.21** shows the locations of those cultural resources within the Study Area where locational data was

[50] 16 U.S.C. 470.

[51] Regulations related to the Section 106 process are outlined in 36 CFR Part 800, "Protection of Historic Properties."

[52] 16 USC 470, promulgated under 36 CFR Part 800.10.

[53] National Register of Historic Places, 36 CFR Part 60.

electronically available in the form of latitudes and longitudes. A comprehensive list of historic resource sites is included in **Appendix F**.

Potential impacts to Tribal lands must also be assessed when evaluating impacts to cultural resources. Therefore, the Native American Lands located within the Study Area are discussed in the following paragraphs.

The Study Area encompasses over 1,195 acres of Native American Lands, including five Indian Reservations and two State Designated American Indian Statistical Areas (SDAISA). SDAISAs are assigned by designated state officials to state recognized Native American Tribes without land bases. These areas generally encompass a compact and contiguous area that contains a concentration of individuals who identify with a state recognized American Indian tribe and within which there is structured or organized tribal activity.[54] These lands can be found throughout the Study Area in Connecticut, New York, and New Jersey. Figure 3.20 illustrates the Native American Lands within the Study Area. There are no Native American lands in the portions of Pennsylvania and Delaware that are in the Study Area. The Native American lands within each state are described in the following sections.

3.8.1 Connecticut Native American Lands

There are two state recognized reservations in the Study Area in Connecticut. The Schaghticoke Reservation is located in Litchfield County in western Connecticut. A total of 10 people reside on the 278 acre Reservation. The second reservation, Golden Hill of the Paugeesukq Nation, is comprised of 107.26 acres. It is divided into two parcels, the largest of which is located in Colchester, in central Connecticut. The other parcel, the original Golden Hill Reservation, is located at Trumbull, in southwestern Connecticut. Fewer than six people were residing on either tract in the early 1990's. However, approximately 60 percent of the tribe's 120 members live in the area. The Paugeesukq Nation is developing a bingo hall and fishing pond, and is currently involved in wood cutting and selling at the Colchester parcel. The Colchester parcel also provides an area where tribe members can relax, pray, and congregate.[55]

3.8.2 New York Native American Lands

Two reservations in Suffolk County, New York fall within the Study Area boundary: the federally recognized Poospatuck Reservation and the state recognized Shinnecock Reservation. The Poospatuck Reservation of the Unkechaug Nation is comprised of 52 acres and is home to approximately 250 members.[56] The 400 acre Shinnecock Reservation is located east of the Poospatuck, in the town of Southampton. It has a population of 164 people and its economy is based on the income it receives from charging admission

[54] US Census, American Fact Finder Glossary, *S.* <www.factfinder.census.gov>.

[55] *American Indian Reservations and Indian Trust Areas*, US Department of Commerce Economic Development Administration. 1996, pages 317-320. <http://www.eda.gov/>.

[56] Encyclopedia of North American Indians, "Poospatuck (Unkechaug Nation)". Houghton Mifflin. <http://college.hmco.com/history/readerscomp/naind/html/na_030300_poosepatuck.htm>.

to the Shinnecock Labor Day Weekend Pow Wow. [57]

3.8.3 New Jersey Native American Lands

The Powhatan-Renape Nation, the Ramapough Mountain Indians, and the Nanticoke Lenni-Lenape Indians of New Jersey are all state recognized tribes in the Study Area in New Jersey. The Powhatan-Renape Nation is located at Rankokus Indian Reservation in Burlington County in southern New Jersey. It consists of 350 acres and is home to a museum, art gallery, and nature trails. The reservation is also recognized as a non-profit entity. The Ramapough Mountain Indian lands are located in northern New Jersey, along the border with New York. The Ramapough Mountain Indian SDAISA has a population of 892. The Nanticoke Lenni-Lenape Indians of New Jersey can be found in Cumberland County in far southern New Jersey. The Nanticoke Lenni-Lenape SDAISA has a population of 12,316.[58]

3.9 AIR QUALITY

This section describes the existing air quality conditions within the Study Area, and relevant provisions of the State Implementation Plans (SIP) of Connecticut, Delaware, New Jersey, New York, and Pennsylvania.

The U.S. Environmental Protection Agency (EPA) has established National Ambient Air Quality Standards (NAAQS) for ambient (outdoor) concentrations of the following criteria pollutants: Carbon Monoxide (CO), Nitrogen Dioxide (NO_2), Ozone (ground-level O_3), Sulfur Dioxide (SO_2), Lead (Pb), and particulate matter with a diameter of 10 microns or less (PM_{10} and $PM_{2.5}$).[59] Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

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). Non-attainment areas for O_3 and PM_{10} are further classified based on the severity of non-attainment (i.e., submarginal, marginal, moderate, serious, severe 17, severe 15, and extreme for O_3 non-attainment areas, or moderate and serious for PM_{10} for non-attainment areas, and lastly attainment or non-attainment for $PM_{2.5}$). 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, or if the severity of non-attainment changes.

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 maintenance plan in a

[57] *American Indian Reservations and Indian Trust Areas*, US Department of Commerce Economic Development Administration. 1996, pages 473-481. <http://www.eda.gov/>.

[58] Ibid, page 433.

[59] Clean Air Act, US EPA, 40 CFR Parts 50-99.

revision to the SIP to ensure attainment of the air quality standards is maintained.

In summary:

- An attainment area is any area that meets the national primary or secondary ambient air quality standard for a given pollutant,
- A non-attainment area is any area that does not meet the national primary or secondary ambient air quality standard for a given pollutant, and
- A maintenance area is any geographic area previously designated non-attainment and subsequently re-designated as attainment.

3.9.1 Carbon Monoxide (CO)

Carbon Monoxide is a colorless, odorless, and poisonous gas produced by incompletely burned carbon in fuels. The majority of CO emissions are from transportation sources, with the largest from highway motor vehicles. Molecules of CO survive in the atmosphere for a period of approximately one month, but eventually react with oxygen to form carbon dioxide. Levels of CO found in ambient air may reduce the oxygen carrying capacity of the blood. Health threats from CO are most serious for those with angina or peripheral vascular disease. Exposure to elevated CO levels can cause impairment of visual perception, manual dexterity, learning ability, and performance of complex tasks. There are no areas within the Study Area designated non-attainment for CO, however, there are several areas designated as maintenance areas for CO. Areas designated as maintenance areas for CO are listed in **Table 3.20** and are depicted in **Figure 3.22**.

3.9.2 Nitrogen Dioxide (NO_2)

Nitrogen Dioxide is a brownish, highly reactive gas that is present in all urban atmospheres. This pollutant can irritate the lungs, cause bronchitis and pneumonia, and lower resistance to respiratory infections. Nitrogen oxides are an important precursor to both to O_3 and acid rain and may affect both terrestrial and aquatic ecosystems. The major mechanism for the formation of NO_2 in the atmosphere is the oxidation of the primary air pollutant nitric oxide (NO). Nitrogen oxides, including NO_2, play a major role, together with volatile organic compounds (VOCs), in the atmospheric reactions that produce O_3. Nitrogen oxides form when fuel is burned at high temperatures. The two major emissions sources are transportation and stationary fuel combustion sources, such as electric utility and industrial boilers. There are no areas within the Study Area designated non-attainment for NO_2.

3.9.3 Ozone (O_3)

Ozone is a colorless gas composed of three atoms of oxygen, one more than the oxygen molecule that we need to breathe. The additional oxygen atom makes ozone extremely reactive and irritating to tissue in the respiratory system. Ozone exists naturally in the stratosphere, the Earth’s upper atmosphere, where it shields the Earth from the sun’s ultraviolet rays. However, ozone found close to the Earth’s surface, called ground-level O_3, is considered an air pollutant.

Table 3.20
CO Maintenance Areas in the Study Area

State	County/Cities
Connecticut	Fairfield County Hartford County Litchfield County Middlesex County New Haven County Tolland County
New Jersey	Atlantic County (The city of Atlantic City) Bergen County Burlington County (The city of Burlington) Camden County Essex County Hudson County Mercer County (City of Trenton) Middlesex County (City of Perth Amboy) Monmouth County (Borough of Freehold) Morris County (City of Morristown) Ocean County (City of Toms River) Passaic County Salem County Somerset County (Borough of Somerville) Union County
New York	Bronx County Kings County Nassau County New York County Queens County Richmond County Westchester County
Pennsylvania	Philadelphia County

Source: US EPA Office of Air Quality Planning & Standards. Pollutant status as of April 11, 2005.

Ozone is formed by a complex series of chemical reactions between VOCs and oxides of nitrogen in the presence of sunlight during hot, stagnant summer days.

The primary manmade sources of VOCs and nitrogen oxides (NO_x) are industrial and automobile emissions. Other sources of VOCs include aircraft, airport ground support equipment, lawn and garden equipment, and consumer products such as paints, insecticides, and cleaners. Ozone concentrations can reach unhealthy levels when the weather is hot and sunny with little or no wind. High ozone levels usually occur between 1 p.m. and 7 p.m. from May through September. High concentrations of ozone may cause inflammation and irritation of the respiratory tract, particularly during heavy physical activity. Not only are there negative health effects for humans, but there is clear evidence that ground-level O_3 harms vegetation and forests.

In April 2004, the EPA issued the final designations for areas across the country for the eight-hour ozone standard and 8-hour ozone. Designations and classifications took effect on June 15, 2004. Basic non-attainment areas (i.e., Subpart 1) are areas in attainment for one-hour ozone at the time of designation but in non-attainment for 8-hour ozone. Areas categorized as basic non-attainment will have to comply with the more general non-attainment requirements of the CAA (i.e., attainment deadlines five to 10 years after designation). Subpart 2 non-attainment areas are areas in non-attainment for one-hour ozone. Depending on the severity of their eight-hour ozone concentrations, Subpart 2 areas have attainment dates between 2007 and 2021. Marginal non-attainment areas must achieve attainment status within three years of designation. Moderate non-attainment areas must achieve attainment status within six years. The EPA issued the first phase of the final implementation rule which addresses two key implementation issues: 1) classifications for the eight-hour standard and 2) transitioning from the one-hour to the eight-hour standard. This action outlines the first steps areas will have to take to maintain or improve their air quality. The EPA issued the second phase of the final eight-hour ozone implementation rule in November 2005. This phase addressed the planning and control obligations that will apply for purposes of implementing the 8-Hour ozone NAAQS. On December 22, 2006, the U.S. Court of Appeals for the District of Columbia Circuit upheld certain aspects and rejected certain aspects of EPA's framework for implementing the 8-Hour ozone National Ambient Air Quality Standard (NAAQS). The Phase 1 Ozone Implementation Rule was vacated and remanded to EPA for further proceedings. In March 22, 2007, EPA filed a petition for rehearing. The EPA is however encouraging states to continue developing state implementation plans for 8-hour ozone requirements because the Court felt that EPA was not meeting the requirements of the CAA EPA proposed in June 2007 to strengthen the air quality standards for ground-level ozone. The Agency currently expects designations based on 2007-2009 air quality data to take effect in 2010.

There are still 14 areas listed in 40 CFR Part 81 Subpart C as participating in an Early Action Compact and designated non-attainment with a deferred effective date.

The one-hour standard will be revoked for these areas one year after the effective date of their designation as attainment or non-attainment for the 8-hour ozone standard. By April 2008, these areas will be designated attainment if they meet all their EAC requirements and have clean 8-hour ozone data by December 31, 2007. They will be designated non-attainment if they do not meet all their EAC requirements, including attainment of the 8-hour ozone standard by December 31, 2007.[60] The Study Area does not include any of the 14 areas designated non-attainment for 1-hour ozone.

There are several areas located within the Study Area that have been classified by the EPA as being in non-attainment for the eight-hour ozone standards. **Table 3.21** identifies the eight-hour ozone non-attainment areas. **Figure 3.23** depicts the locations within the Study Area that are in non-attainment for eight-hour ozone.

3.9.4 Sulfur Dioxide (SO_2)

Sulfur dioxide results largely from stationary sources such as coal and oil combustion, steel mills, refineries, and pulp and paper mills. When a sulfur bearing fuel is combusted, the sulfur is oxidized to form SO_2. Natural sources of SO_2 include releases from volcanoes, oceans, biological decay, and forest fires. The most important man-made sources of SO_2 are fossil fuel combustion, smelting, and manufacturing of

[60] USEPA Green Book, <http://www.epa.gov/oar/oaqps/greenbk/>.

sulfuric acid, conversion of wood pulp to paper, incineration of refuse, and production of elemental sulfur. High concentrations of SO_2 affect breathing and may aggravate existing respiratory and cardiovascular disease. Sulfur dioxide is also a primary contributor to acid rain, which causes acidification of lakes and streams. In addition, sulfur compounds in the air contribute to visibility impairment in large parts of the country. Warren County, New Jersey is the only county located within the Study Area that has been classified by the EPA as being in non-attainment for both the primary and secondary SO_2 standards. Figure 3.22 shows this SO_2 non-attainment area.

Table 3.21
Ozone Non-Attainment Areas in the Study Area

State/District	County/Cities	Classification Standard
Connecticut	Fairfield County	Moderate
	Hartford County	Moderate
	Litchfield County	Moderate
	Middlesex County	Moderate
	New Haven County	Moderate
	New London County	Moderate
	Tolland County	Moderate
Delaware	New Castle County	Moderate
New Jersey	Atlantic County	Moderate
	Bergen County	Moderate
	Burlington County	Moderate
	Camden County	Moderate
	Cape May County	Moderate
	Cumberland County	Moderate
	Essex County	Moderate
	Gloucester County	Moderate
	Hudson County	Moderate
	Hunterdon County	Moderate
	Mercer County	Moderate
	Middlesex County	Moderate
	Monmouth County	Moderate
	Morris County	Moderate
	Ocean County	Moderate
	Passaic County	Moderate
	Salem County	Moderate
	Somerset County	Moderate
	Sussex County	Moderate
	Union County	Moderate
	Warren County	Moderate
New York	Albany County	Basic
	Bronx County	Moderate
	Dutchess County	Moderate
	Greene County	Basic
	Kings County	Moderate
	Nassau County	Moderate
	New York County	Moderate
	Orange County	Moderate
	Putnam County	Moderate
	Queens County	Moderate
	Richmond County	Moderate

Table 3.21
Ozone Non-Attainment Areas in the Study Area

State/District	County/Cities	Classification Standard
	Rockland County	Moderate
	Schoharie County	Basic
	Suffolk County	Moderate
	Westchester County	Moderate
Pennsylvania	Berks County	Basic
	Bucks County	Moderate
	Carbon County	Basic
	Chester County	Moderate
	Delaware County	Moderate
	Lackawanna County	Basic
	Lancaster County	Marginal
	Lehigh County	Basic
	Monroe County	Basic
	Montgomery County	Moderate
	Northampton County	Basic
	Philadelphia County	Moderate

Source: US EPA Office of Air Quality Planning & Standards. Pollutant status as of April 11, 2005.

3.9.5 Lead

The majority of atmospheric lead comes from lead gasoline additives, non-ferrous smelters, and battery plants. Exposure to lead can cause seizures and contribute to mental retardation and behavioral disorders. Due to several EPA pollution control programs, lead levels in humans have dramatically declined in recent decades. Beginning in the 1970s, the EPA lowered the amount of lead allowed in gasoline and facilitated the switch to unleaded gasoline as the primary fuel for highway vehicles. This switch virtually eliminated lead violations in urban areas with no point sources.[61] Consequently, no counties in the Study Area are in non-attainment or maintenance areas for lead.

[61] EPA Air Quality Planning & Standards, Lead – How Lead Affects the Way We Live & Breathe, November 2000, available at <www.epa.gov/air/urbanair/lead/index.html>.

3.9.6 Particulate Matter (PM)

Air pollutants considered as PM include dust, dirt, soot, smoke, and liquid droplets directly emitted into the air by sources such as factories, power plants, cars, construction activities, fires, and natural windblown dust. Particles formed in the atmosphere by condensation or the transformation of emitted gases such as SO_2 and VOCs are also considered particulate matter. Based on studies of human populations exposed to high concentrations of particles and laboratory studies of animals and humans, there are major effects of concern for human health. These include effects on breathing and respiratory symptoms, alterations in the body's defense systems against foreign materials, damage to lung tissue, carcinogens, and premature death. Particulate matter also damages materials and is a major cause of visibility impairment.

Since July 1, 1987, the EPA has used the indicator PM_{10}, which includes only those particles with aerodynamic diameter smaller than 10 micrometers. These smaller particles are likely responsible for most of the adverse health effects of particulate matter because of their ability to reach the thoracic or lower regions of the respiratory tract.

The PM spectrum includes both coarse and fine particles. While the main distinction between coarse and fine particles is the process by which they are produced, EPA and epidemiologists who study the health effects of particulate pollution identify coarse and fine particles through rough approximations of those particles' diameters. Coarse particles, which become airborne usually from the crushing and grinding of solids, generally have diameters between two and a half and 10 micrometers and can, thus, be identified by the indicator $PM_{10-2.5}$. Fine particles, indicated by $PM_{2.5}$, come mainly from combustion of gases and generally have diameters of two and a half micrometers or less.

The EPA has developed $PM_{2.5}$ air quality standards. On July 17, 2006, EPA published de minimis levels of 100 tons per year for all PM2.5 maintenance or non-attainment areas.

Under the current PM_{10} standards, New Haven County, Connecticut and New York County, New York are the only two counties designated non-attainment. $PM_{2.5}$ non-attainment areas were identified in December 2004 and modified in April 2005. **Table 3.22** identifies the PM_{10} and $PM_{2.5}$ non-attainment areas within the Study Area. **Figure 3.24** depicts the locations within the Study Area that are designated non-attainment for PM_{10} and $PM_{2.5}$.

3.10 ENERGY SUPPLY AND NATURAL RESOURCES

According to FAA Order 1050.1E, an EIS should ensure that energy use, its conservation, and energy efficient alternatives are considered along with other pertinent factors in planning, detailed design, and in the decision making process leading to an action. In addition, the potential to change demands on stationary facilities, local energy supplies, and natural resources, other than fuel, is also considered.

The proposed changes in air traffic procedures are intended to improve air traffic flow, mitigate delays, and enhance the safe operation of aircraft within the airspace structure. As stated previously in Chapter One *Purpose and Need*, aircraft operational activity is expected to experience normal growth with or without the proposed air traffic procedural changes. Furthermore, none of the alternatives considered would result in the construction of facilities that would potentially impact known sources of minerals or energy.

The potential impacts to energy supply and natural resources as a result of the Proposed Action are discussed in Chapter Four, *Environmental Consequences*.

3.11 LIGHT EMISSIONS AND VISUAL IMPACTS

According to FAA Order 1050.1E, a description of potential impacts due to light emissions and visual impacts associated with a Federal action may be required.

3.11.1 Light Emissions

As stated in FAA Order 5050.4A, “Only in unusual circumstances, as, for example, when high intensity strobe lights would shine directly into individual’s homes, would the impact of light emissions be considered sufficient to warrant a special study or a more detailed examination of alternatives in an EIS.”

Table 3.22
PM_{10} and $PM_{2.5}$ Non-Attainment Areas

Pollutant	State/District	County/Cities	Classification Standard
PM_{10}	Connecticut	New Haven County	Moderate
	New York	New York County	Moderate
$PM_{2.5}$	Connecticut	Fairfield County	Non-Attainment
		New Haven County	Non-Attainment
	Delaware	New Castle County	Non-Attainment
	New Jersey	Bergen County	Non-Attainment
		Essex County	Non-Attainment
		Hudson County	Non-Attainment
		Mercer County	Non-Attainment
		Middlesex County	Non-Attainment
		Monmouth County	Non-Attainment
		Morris County	Non-Attainment
		Passaic County	Non-Attainment
		Somerset County	Non-Attainment
		Union County	Non-Attainment
		Burlington County	Non-Attainment
		Camden County	Non-Attainment
		Gloucester County	Non-Attainment
	New York	Bronx County	Non-Attainment
		Kings County	Non-Attainment
		Nassau County	Non-Attainment
		New York County	Non-Attainment
		Orange County	Non-Attainment
		Queens County	Non-Attainment
		Richmond County	Non-Attainment
		Rockland County	Non-Attainment
		Suffolk County	Non-Attainment
		Westchester County	Non-Attainment
	Pennsylvania	Lancaster County	Non-Attainment
		Bucks County	Non-Attainment
		Chester County	Non-Attainment
		Delaware County	Non-Attainment
		Montgomery County	Non-Attainment
		Philadelphia County	Non-Attainment
		Berks County	Non-Attainment

Source: US EPA Office of Air Quality Planning & Standards. Pollutant status as of April 11, 2005.

In the case of the Proposed Action, no new airport lighting will be installed. The proposed airspace changes do not require construction of any infrastructure. Changes in light emissions will only be associated with changes in aircraft routes. Analysis of the potential changes in light emissions resulting from the Proposed Action is discussed in Chapter Four, *Environmental Consequences*.

3.11.2 Visual Impacts

Visual, or aesthetic, impacts are more difficult to identify than lighting impacts because of the subjectivity involved. Aesthetic impacts deal more broadly with the extent that the development contrasts with the existing environment and whether the governing agency considers this contrast objectionable.

Visual impacts are normally related to the disturbance of the aesthetic integrity of an area caused by development, construction, or demolition. The Proposed Action includes only airspace changes and does not require any construction or demolition. Potential visual impacts in the case of the airspace redesign relate only to changes in aircraft routes, which result in changes in the visibility of aircraft. Therefore, the potential for the changes in aircraft routes to result in intrusive visual impacts will be addressed in Chapter Four.

3.12 COASTAL RESOURCES

The Coastal Zone Management Act (CZMA) of 1972[62] insures effective management, beneficial use, protection and development of the coastal zone. Coastal Zone Management Programs, prepared by states according to guidelines issued by the National Oceanic and Atmospheric Administration (NOAA), are designed to address issues affecting coastal areas.

The Coastal Barriers Resources Act of 1982[63] prohibits federal financing for development within the Coastal Barrier Resources System, which consists of undeveloped coastal barriers along the Atlantic and Gulf coasts. The legislation was amended by the Coastal Barrier Improvement Act in 1990 to include undeveloped coastal barriers along the shores of the Great Lakes, including Lake Superior in St. Louis County.

The Connecticut Coastal Management Program received federal approval in September 1980 to protect, manage, and restore coastal resources, and ensure their availability and accessibility to the public, to foster water-dependent uses of the shorefront and to oversee the State's public trust responsibilities for tidelands. The Office of Long Island Sound Programs administers and coordinates programs within the Department of Environmental Protection which have an impact on Long Island Sound and related coastal lands and waters. The Office undertakes long-range planning for Long Island Sound and is directly responsible for the implementation, oversight, and enforcement of the state's coastal management and coastal permit authorities, as well as providing technical and financial assistance to state and local government agencies. Counties included within Connecticut's Coastal Area are Fairfield, New Haven, Middlesex, and New London.[64]

[62] 15 CFR Part 930, subparts C and D, and 15 CFR Part 923.

[63] 57 FR 52730, November 5, 1992.

[64] Connecticut Department of Environmental Protection, Office of Long Island Sound Programs.

The Delaware Coastal Management Program (DCMP), established in 1979, works to protect, develop, and, where possible, enhance the coastal resources of the State. It does this through the review of federal and state projects to ensure that they are consistent with State coastal policies, special area management planning, assistance to state and local governments for local land use planning, and other special on-the-ground projects related to Delaware's coastal resources. The Delaware Coastal Programs are housed within the Delaware Department of Natural Resources and Environmental Control's Division of Soil and Water Conservation (DNREC/DSWC). Since the entire state of Delaware is located in the coastal zone, the Delaware Coastal Zone Management Plan is a key component of the State's environmental process.[65]

In response to the 1972 passage of the Federal Coastal Zone Management Act, New Jersey developed and gained federal approval of the New Jersey Coastal Management Program, which addresses the complex coastal ecosystem as a whole, integrating goals and standards for protection and enhancement of natural resources, for appropriate land use and development and for public access to and use of coastal resources. The program was first approved in 1978. The Coastal Management Program is comprised of a network of offices within the New Jersey Department of Environmental Protection that serve distinct functions, yet share responsibilities that influence New Jersey's coast. Through the Coastal Management Program, the Department manages the state's diverse coastal area that includes portions of eight counties and 126 municipalities. These counties are Atlantic, Burlington, Cape May, Cumberland, Middlesex, Monmouth, Salem, and Ocean. A central component of New Jersey's Coastal Management Program is the Coastal Management Office, which is part of the Commissioner's Office of Policy, Planning, and Science. The Coastal Management Office administers the planning and enhancement aspects of New Jersey's federally-approved Coastal Management Program.[66]

Consistency with waterfront policies is a key requirement of the Coastal Management Program established in New York State's Waterfront Revitalization and Coastal Resource Act of 1981. The state program contains 44 coastal policies and provides for local implementation when a municipality adopts a local waterfront revitalization program. The New York State Department of State Division of Coastal Resources, administers the state's coastal management program and is responsible for determining whether federal actions are consistent with the coastal policies. Counties within the Study Area that contain areas within the New York State Coastal Areas are Bronx, Columbia, Dutchess, Greene, Kings, Nassau, New York, Orange, Putnam, Queens, Richmond, Rockland, Suffolk, Ulster, and Westchester.[67]

Pennsylvania Coastal Zone Management, a program of the Department of

Feb. 24, 2005, <http://dep.state.ct.us/olisp/index.htm>.

[65] Delaware Department of Natural Resources Division of Soil & Water Conservation. 2002, <http://www.dnrec.state.de.us/DNREC2000/Divisions/Soil/Soil.htm>.

[66] New Jersey Department of Environmental Protection, Coastal Management Program. June 23, 2005, <http://www.state.nj.us/dep/cmp/>.

[67] New York State Department of State, Division of Coastal Resources. 2004, <http://www.state.nj.us/dep/cmp/>.

Environmental Protection's Office for River Basin Cooperation, seeks to protect and enhance these fragile natural resources, while reducing conflict between competing land and water uses. The U.S. Department of Commerce approved Pennsylvania's Coastal Zone Management Plan in September 1980. The Commonwealth has two widely separated coastal areas. The 57-mile stretch of coastline along the Delaware Estuary lies within three counties in the Study Area: Bucks, Philadelphia, and Delaware. This coastal zone varies from one-eighth-mile wide in urban areas like Philadelphia to over three and one-half miles in Bucks County and extends to the boundary with New Jersey in the middle of Delaware. The second coastal area is located on the opposite side of the State and outside the Study Area.[68]

3.13 WILD AND SCENIC RIVERS

The Wild and Scenic River Act defines river areas eligible for protection under the legislation as those that are free flowing and have "outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, and similar values."[69] River segments that qualify for inclusion in the National Wild and Scenic River System are listed on the National Inventory, compiled by the U.S. Department of the Interior.[70] Rivers and river segments included in this discussion are limited to those classified as Wild and Scenic.

The State of Connecticut has one river designated as a National Wild and Scenic River as listed by the National Park Service. The Farmington Wild and Scenic River segment runs from the base of the Goodwin Dam in Hartland to the downstream border of Canton and New Hartford in Litchfield and Hartford counties. The 14-mile segment was designated on August 26, 1994 and classified as recreational.

Located in New Castle County, Delaware and Chester County, Pennsylvania, White Clay Creek and its tributaries were designated as a National Wild and Scenic River on October 24, 2000. The White Clay Creek watershed is one of only a few relatively intact, unspoiled, and ecologically functioning river systems remaining in the highly congested and developed corridor linking Philadelphia, Pennsylvania, with Newark, Delaware. The segment has 24 miles classified as scenic and 166 miles classified as recreational.

The State of New Jersey has two rivers designated as National Wild and Scenic Rivers located solely within the State. The first river is the Great Egg Harbor River, which was designated October 27, 1992. It starts as a trickle near Berlin, NJ and gradually widens as it picks up the waters of 17 tributaries on its way to Great Egg Harbor and the Atlantic Ocean. Nearly all of this 129-mile river system, of which 30.6 miles are designated as scenic and the remaining 98.4 miles are designated as recreational, rests within the Pinelands National Reserve and spans four counties (Atlantic, Gloucester, Camden, and Cape May). The second river is the segment of the Maurice River from the Route 670 Bridge at Mauricetown to the south side of the Millville sewage treatment plant in Cumberland County, New Jersey and two of its tributaries. The tributaries designated include: Menantico Creek from its

[68] Pennsylvania Department of Environmental Protection, Pennsylvania's Coastal Zone Management Program. <http://www.dep.state.pa.us/river/czmp.htm>.

[69] 16 U.S.C. 1271-1287, as amended.

[70] National Wild & Scenic Rivers System. Jan. 7, 2005, <http://www.nps.gov/rivers>.

confluence with the Maurice River to the base of the Impoundment at Menantico Lake; and the Manumuskin River from its confluence with the Maurice to the Pennsylvania Reading Seashore Line Railroad Bridge. Designated as a National Wild and Scenic River on December 1, 1993, 28.9 miles of this segment are classified as scenic and six and one-half miles are classified as recreational. The Maurice River corridor is an unusually pristine Atlantic Coastal river with national and internationally important resources and is also a critical link between the Pinelands National Reserve and the Delaware Estuary.

The Delaware River begins as two separate branches, the East Branch and the West Branch, which both begin in New York State and meet in Hancock, New York. From this point, the Delaware, flowing southeast, continues on the New York-Pennsylvania boundary as far as Port Jervis, New York. There it becomes the boundary between Pennsylvania and New Jersey, following a generally southern course to its outlet in Delaware Bay. The lower Delaware River forms the boundary between New Jersey and Delaware for a few miles. Three sections of the Delaware River have been designated as a National Wild and Scenic River. Designated on November 10, 1978, the Upper Delaware Scenic and Recreational River stretches 73.4 miles along the New York-Pennsylvania border. The Upper Delaware River segment begins at the confluence of the East and West Branches and continues downstream to Milrift, Pennsylvania. This section contains 23.1 miles classified as scenic and 50.3 miles classified as recreational. Also, designated on November 10, 1978, the Middle Delaware National Scenic River stretches 35 miles from the point where the river crosses the northern boundary of the Delaware Water Gap National Recreation Area to the point where the river crosses the southern boundary. All 35 miles of this segment are classified as scenic. On November 1, 2000, a section of the Lower Delaware River was added to the National Wild and Scenic Rivers System. This 67.3-miles stretch has 25.4 miles classified as scenic and 41.9 miles classified as recreational. The segment begins at the southern boundary of the Delaware Water Gap National Recreation Area and continues to Washington Crossing, PA, just upstream of Trenton, NJ.

In summary, there are five rivers in the Study Area with segments that are classified Wild and Scenic. These segments are eligible for protection under the Wild and Scenic River Act. These sections may also be subject to the requirements of Sections 4(f) and 6(f). If a Wild and Scenic River corridor includes historic sites or is designated as a park, recreation area, or wildlife and waterfowl refuge, then Section 4(f) criteria apply. Similarly, if the Wild and Scenic River corridor was acquired or developed with assistance from the LWCF, then Section 6(f) criteria apply.

3.14 WILDLIFE

This section describes the affected environment related to threatened and endangered species and migratory birds in the Study Area. The focus is on avian species because they are the most likely species to be impacted by changes in aircraft routing.

3.14.1 Threatened and Endangered Species

Section 7 of the Endangered Species Act of 1973 provides protection to any plants or animals designated as threatened or endangered species. In compliance with this law, as amended, federal agencies are required to ensure developments and improvements will not jeopardize the continued existence of threatened or endangered species, or result in the destruction or adverse modification of the critical habitat of such species. Endangered species are defined as those in danger of extinction throughout all or a significant portion of its range. Threatened species are 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.

A comprehensive list of state and federally recognized Threatened and Endangered species in the Study Area may be found in **Appendix G**.

3.14.2 Migratory Birds

Migratory birds are protected by the Migratory Bird Treaty Act (MBTA). The MBTA prohibits all takes, including unintentional, of migratory birds, their eggs, or nests except as authorized by the US Department of Interior (DOI). There is currently no mechanism by which the DOI can authorize an unintentional take that is incidental to an otherwise lawful activity. Instead, the DOI works cooperatively with other agencies and private industries to evaluate and minimize major causes of incidental takings. For example, in 2003 the US Fish and Wildlife Service entered into a multi-agency Memorandum of Agreement (MOA). The (MOA) between the FAA, US Air Force, US Army, US EPA, US Fish and Wildlife Service (USFWS), and the US Department of Agriculture was developed to address aircraft-wildlife strikes. Through the MOA a procedure was established to coordinate these agencies' missions with the goal of minimizing wildlife risks to aviation safety while protecting valuable environmental resources.

Executive Order 13186, *Responsibilities of Federal Agencies to Protect Migratory Birds*, was issued in 2001 to further the implementation of the MBTA. The Executive Order directs each federal agency taking actions that negatively affect migratory birds to develop a Memorandum of Understanding (MOU) with the USFWS to promote the conservation of migratory bird populations. Agencies are encouraged to begin immediately implementing listed categories of conservation measures as appropriate and practicable. Although no such MOUs have been completed to date, the FAA has entered into the 2003 multi-agency MOA previously discussed.

To comply with the MBTA, impacts to migratory birds as a result of the Proposed Action Alternatives are considered. In order to understand the potential for impacts, it is first necessary to describe the affected environment for migratory birds. The remainder of this section is focused on discussion of the affected environment for migratory birds. The potential for impacts to migratory birds is discussed in Chapter Four *Environmental Consequences*.

Since changes in where aircraft fly may occur in areas that are traditionally used as migration routes, the description of the affected environment begins with a discussion of migratory routes in the Study Area. This is followed by a discussion of the specific areas, stopovers, which provide nesting, feeding, and resting habitat for all types of migratory fowl. Finally, based on consultation with the USFWS, the Bird Conservation Regions (BCRs) within the Study Area are described. BCRs are ecologically distinct regions with similar bird communities, habitats, and resource management issues. The USFWS often use BCRs when considering conservation efforts and issues.

3.14.2.1 Migration Routes

The Airspace Redesign Study Area, located at a latitude about mid-way between the equator to the south and northern forests and the Arctic to the north, lies at a geographic crossroads of bird migration. The area's geography and habitats are other reasons for the noteworthy abundance and diversity of birds that pass through the region during migration.[71]

Migration routes may be defined as the various lanes birds travel from their breeding ground to their winter quarters. The actual routes followed by a given migratory bird species differ by variables such as distance traveled, time of starting, flight speed, geographic position and latitude of the breeding, and wintering grounds. The most frequently traveled migration routes conform very closely to major topographical features that lie in the general north-south movement of migratory bird flyways. Therefore, the lanes of heavier concentration in the Study Area follow the Atlantic coasts, mountain ranges and principal river valleys. **Figure 3.25** illustrates some of the major mitigation routes in the eastern portion of North America.

A large number of migratory birds are funneled through the New York urban core by the convergence of several river systems (Hudson, Raritan, Passaic, Hackensack, Shrewsbury, Navesink), and the meeting of north-south (New Jersey) and east-west (Long Island) oriented coastlines at the New York Harbor. The north-south oriented migratory corridors of the New York-New Jersey Highlands, Watchung Ridges, and the Hudson River valley also concentrate overland migrating species through or near to the urban core. The Delaware Bay shorelines of New Jersey, Delaware, and Pennsylvania are critical stops on the migration route of several shorebird species. In fall, the geography of the Study Area funnels many bird groups into the Cape May peninsula, where they rest and congregate in preparation for crossing the Delaware Bay.[72]

The Atlantic coast and its river systems constitute a well-known migration route. However, topography influences different bird groups in different ways, with diurnal migrants typically more influenced by landscape features than nocturnal migrants. Radar surveillance indicates that nocturnal migrants (mostly neotropical songbirds) move in a dispersed fashion (broad fronts) with little regard to what lies below. However, fall songbird migration is mostly a coastal phenomenon, as birds get pushed to the shoreline by northwesterly prevailing winds. Birds that migrate by day include shorebirds, raptors, waterfowl, and some songbirds. These groups tend to follow topographical features trending north and south, such as mountain ranges, chains of lakes, river valleys, and peninsulas extending into large bodies of water. Soaring birds like raptors rely on thermals or updrafts for long-distance flights. Accipiter and buteo hawks are typically observed following ridge lines within the study area (Reshetiloff 2004), while other hawks like falcons and harriers tend to migrate along the coastline. Bald eagles and ospreys migrate along the Delaware River, as well as the Atlantic coast. Certain shorebirds and waterfowl follow narrow migration routes along a coastline or river due to narrow stopover habitat requirements.[73]

[71] United States Department of Interior Letter to Mr. Steve Kelley dated June 12, 2006, p 10.

[72] Ibid.

[73] Ibid. p 9.

3.14.2.2 Migratory Stopovers

A critical part of migration are stopovers where migrating birds stop to feed, rest, and gather energy needed to finish the migration. Depending on distance to travel, timing with regard to season and breeding cycles, these stopover areas may support millions of birds for short to extended periods of time. The pattern of the arrival and departure dates throughout the spring/fall migrations is an indicator that is useful in gauging the duration of stopovers by all migratory bird species. **Table 3.23** provides information about the timing of migrations of one important group of migratory birds in the study area, passerines, or altricial songbirds (order Passeriformes), one of the largest orders of birds and comprising more than half of all living birds. Examples of common passerine bird species include the Canada warbler, red-winged blackbird, swamp warbler, hooded warbler, and fox sparrow.

Typical stopover habitats include Estuarine Ecosystems especially within the New York Bight and the Delaware Bay Estuary. In fact, in any given year, these areas of New Jersey play host to one of the highest concentrations of migrating shorebirds (e.g., sandpipers). In Delaware Bay alone, one million birds, including the third largest colonial waterbird (i.e., gulls) population, may use the abundant fresh and/or saltwater marshes as temporary stopovers.

Estuarine Ecosystems are directly involved in the dynamics of migratory birds. Estuaries are an equally important resource in the life cycles of land-based mammals as well as marine mammals and ocean-dwelling fishes. The diversity of organisms using the habitat is contingent on the diversity of physical, as well as chemical, conditions in any location. Water depth can vary from exposed tidal flats and creeks in Delaware Bay to hundreds of feet in eastern Long Island Sound. Water chemistry is determined largely on the influx of fresh water delivered by local waterways and in addition, the effects of tidal movements of the water column itself. These dynamics constantly affect the salinity of these estuarine waters, which in turn, affects the wildlife and also the living habitat (e.g., grasses, submerged vegetation) upon which these organisms depend.

Table 3.23
Migration Timing Characteristics

State	Earliest Arrival Date (Spring)	Latest Departure Date (Fall)	Common Passerine Bird Species
NJ	March	December	Canada Warbler, Louisiana Waterthrush, Snow Bunting, Common Yellowthroat
NY	January	December	American Redstart, Dark-eyed Junco, Hooded Warbler, Fox Sparrow
CT	February	December	Northern Parula, Northern Waterthrush, Swamp Sparrow, Mourning Warbler
PA	February	November	Red-winged Blackbird, Chimney Swift, Lapland Longspur, Magnolia Warbler
DE	March	November	Louisiana Waterthrush, Yellow-breasted Chat, Common Yellowthroat, Hooded Warbler

Source: BirdNature, 2003.

Four types of Estuarine Ecosystems are described in the following paragraphs: islands and inlands, littoral, freshwater tributaries, and open water.

Islands and inlands near water sources support a full range of species, from insects, amphibians, and reptiles to birds and mammals. Stream banks, floodplains, and wetlands, or any transition from water to land, are particularly productive habitats. Forested uplands and forested wetlands are particularly important nesting and resting habitat for both neo-tropical migrant birds and colonial water birds. Surrounded by water and cut off from most large predators, bay islands are a haven for colonial water birds, waterfowl, and raptors.

Littoral (shallow water) areas provide suitable habitat for many life stages of invertebrates, fish, and other aquatic species. Waterfowl, colonial wading birds, and raptors forage for food in these habitats.

Freshwater tributaries of major rivers and the hundreds of thousands of creeks and streams that feed into these tributaries provide nutrients important to the productivity of the bay ecosystem.

The open water areas provide the microscopic plants and animal life (plankton) that are the primary food source for shellfish, invertebrates, and fish that populate the bays. Hundreds of thousands of wintering ducks, particularly sea ducks like scoters, oldsquaw, and mergansers, depend on open water areas for their winter food sources.

There are millions of acres of estuarine habitat within the Study Area including portions of two major ecological regions: the New York Bight and Delaware Bay. These two ecological regions are important population centers and stopovers for migratory birds in the Study Area. Although, there are other important population areas, these two are of the greatest relevance to the Airspace Redesign:

New York Bight

The largest single ecological region in this Study Area with respect to migratory birds is the New York Bight (**Figure 3.26**). A bight is a general term for a bend or curve in the shoreline of an open coast. In the New York region it refers to the great expanse of shallow ocean between Long Island (to the north and east) and the New Jersey Coast (to the south and west). Since Long Island is oriented generally east to west in relation to mainland of New Jersey, it creates a right angle with the Atlantic coastline. This area includes the Hudson River Estuary. The lower Hudson River and valley between New York City and Troy is known as the Hudson River Estuary. The estuary is covered by marshes, wooded swamps, and mud flats. The entire region, as illustrated in Figure 3.26, represents an immense expanse of upland waterways and drainages, which nourish a multitude of wetland habitats crucial to migratory birds including Atlantic brant, black ducks, snow geese, Canada geese, bufflehead, mute swans, mallards, and scaup. The upland waterways and drainages are both freshwater and saline in composition and are found in various types of ecosystems, including freshwater marshes and riparian areas. In addition, saline conditions exist in saltwater marshes, tidal flats, and coastal shores. Outlying this is the Atlantic Ocean, which in this case, would include an area offshore of Long Island, south to lower New Jersey, and further east to the continental shelf lying about 100 miles away. Stopover habitats within the urban core are of particular importance. The large numbers of migratory birds funneled through the New York-New Jersey Harbor are further concentrated in the small amounts of remaining open space. Even isolated habitat pockets along major river corridors provide essential stopover habitats, serving as "urban oases" for energetically-stressed migrants. Protection of remaining open space and restoration of additional areas is a conservation priority in the New York urban core.[74]

The watershed involved in this bight is bordered in part by the Adirondacks, Catskills and New York-New Jersey Highlands. Also influential are the Hudson River Valley and coastal flatlands of New Jersey and southern Long Island. This watershed covers an estimated 20 million acres. Approximately 13.5 million of these acres are considered marine and estuarine waters.

Delaware Bay

Second to the New York Bight in influence is Delaware Bay (Figure 3.26). What this area may lack in size to the New York Bight, it makes up for in sheer numbers of migratory birds throughout the year. In fact, according to surveys, Delaware Bay ranks second in numbers of visiting shorebirds in the entire Western Hemisphere. This bay alone may attract approximately 300,000 to possibly over a million shorebirds during the northern spring migration. The estuarine limits are vast when considering freshwater influences. This ecosystem begins at the falls of the Delaware River in Trenton, New Jersey and extends seaward to the mouth of the Delaware Bay approximately 133 miles later.

As previously stated, the New York Bight and the Delaware Bay are not the only important stopover areas for migratory birds. Several other population centers are present within the study area. For example, the Atlantic coastal bays are a key wintering area for waterfowl such as black duck (*Anas rubripes*) and Atlantic brant (*Branta bernicla*), and the forests of the northwestern part of the study area (including the New York-New Jersey Highlands) are important breeding grounds for many songbirds.

[74] Ibid. p12.

3.14.2.3 Bird Conservation Regions

The USFWS has deemed Bird Conservation Regions (BCR's) as the smallest and ecologically most relevant unit by which to describe the migratory bird affected environment for the Study Area. BCR's have been endorsed by the North American Bird Conservation Initiative (NABCI) as the basic ecological units within which all-bird conservation efforts will be planned and evaluated.[75] NABCI is an endeavor to increase the effectiveness of bird conservation at the continental level and currently includes the United States, Canada, and Mexico. Its goal is to deliver "the full spectrum of bird conservation through regionally based, biologically driven, landscape-oriented partnerships."[76] NABCI has recognized 35 BCR's that cover the contiguous 48 States, Alaska, and Hawaii. These BCR's are numbered 1 to 5, 9 to 37, and 67.[77] Portions of BCR's 13, 14, 28, 29, and 30 are located within the study area. See **Figure 3.27**.

[75] U.S. NABCI Committee, North American Bird Conservation Initiative, *Bringing It All Together* September 2000.

[76] Ibid.

[77] U.S. NABCI Committee, North American Bird Conservation Intiative *Bird Conservation Regions Map*, September 2000.

The bird species potentially found within each BCR within the Study Area and the habitat within which they are most likely to occur, are summarized in **Table 3.24**. This table also indicates which of these species are included on the national and/or regional lists of Birds of Conservation Concern. The 1988 amendment to the Fish and Wildlife Conservation Act mandates the USFWS to "identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act of 1973." *Birds of Conservation Concern 2002* (*BCC 2002*) is the most recent effort to carry out this mandate. The overall goal of this report was to accurately identify the migratory and non-migratory bird species (beyond those already designated as federally threatened or endangered) that represent the highest conservation priorities of the USFWS and draw attention to species in need of conservation action.

The following is a description of the habitat and predominant migratory birds associated with each of the BCRs within the Study Area.

Bird Conservation Region 13
Lower Great Lakes/St. Lawrence Plain

The Lower Great Lakes/St. Lawrence Plain covers the low-lying areas to the south of the Canadian Shield[78] and north of various highland systems in the United States. In addition to important lakeshore habitats and associated wetlands, this region was originally covered with a mixture of oak-hickory, northern hardwood, and mixed-coniferous forests. Very little of the forests remains today due primarily to agricultural conversion. The highest priority bird in remnant forests is the Cerulean Warbler. Because of agriculture, this area is now the largest and most important area of grassland in the Northeast, providing habitat for such species as Henslow's Sparrow and Bobolink. Agricultural abandonment may temporarily favor shrub-nesting species, such as Golden-winged Warbler and American Woodcock, but increasingly, agricultural land is being lost to urbanization. This region also is extremely important to stopover migrants, attracting some of the largest concentrations of migrant passerines, hawks, shorebirds, and waterbirds in eastern North America. Much of these concentrations occur along threatened lakeshore habitats.[79]

Bird Conservation Region 14
Atlantic Northern Forest

The nutrient-poor soils of northernmost New England and the Adirondack Mountains support spruce-fir forests on more northerly and higher sites and northern hardwoods elsewhere. Virtually all of the world's Bicknell's Thrush breed on mountaintops in this region. Other important forest birds include the Canada Warbler and Bay-breasted Warbler. Coastal wetlands are inhabited by Nelson's Sharp-tailed Sparrow;

[78] The Canadian Shield, also known as the Precambrian Shield or Laurentian Plateau, is composed of granite and the earth's greatest area of exposed Precambrian rock. The shield was the first part of the continent to be permanently raised above sea-level. The shield plateau ranges from 1000 to 2000 feet above sea level. There are a number of mountain ranges within the shield: the Adirondack (northeastern New York state), Superior Highlands (northern Minnesota, Wisconsin & Michigan states), Torngat and Laurentian, Canada. <http: //csern.laurentian.ca/Canadian_Shield>.

[79] U.S. NABCI Committee, North American Bird Conservation Initiative, *Bird Conservation Region Descriptions A Supplement to the North American Bird Conservation Initiative Bird Conservation Regions Map*, September 2000.

Table 3.24
Potential Species and Birds of Conservation Concern Including Associated Habitat by BCR

Species	Habitats* by BCR				
	BCR 13	**BCR 14**	**BCR 28**	**BCR 29**	**BCR 30**
Acadian Flycatcher			6		
American Avocet					1,4
American Black Duck	1,4,5	1,4,5			1,4,5
American Golden Plover	1	1			1
American Oystercatcher		1,4,5			1,4,5
American Wigeon					4
American Woodcock	6				
Arctic Tern		2,3			
Atlantic Brant		5			5
Atlantic Puffin		2,3			
Audubon's Shearwater					2
Bachman's Sparrow			6	6	
Bald Eagle		5			
Baltimore Oriole					6
Barrow's Goldeneye	5	5			
Bay-breasted Warbler		6			
Bewick's Wren			6	6	
Bicknell's Thrush		6			
Black Guillemot		2,3			
Black Rail				1,4,5	1,4,5
Black Scoter		2,5			2,5
Black Skimmer					1
Black-bellied Plover	1	1			
Black-billed Cuckoo	6		6		
Black-capped Chickadee			6		
Black-crowned Night Heron	4	4			4
Blackthroated blue Warbler			6		
Blacked-legged Kittiwake		2			
Blackpoll Warbler		6			
Blue-winged Warbler					6
Bobolink	6,7				
Bonaparte's Gull	1,5				
Bridled Tern					2
Brown-headed Nuthatch				6	
Buff-breasted Sandpiper	1		1		1
Bufflehead					4,5
Canada Goose	5	5			5
Canada Warbler	6	6			6
Canvasback					5
Cape May Warbler		6			
Cerulean Warbler	6		6	6	6
Chestnut-sided Warbler		6			
Chuck-will's-widow			6	6	
Clapper Rail					3,4
Common Eider		2,3,5			2,3
Common Goldeneye	5	4,5			5

Table 3.24
Potential Species and Birds of Conservation Concern Including Associated Habitat by BCR

Species	Habitats* by BCR				
	BCR 13	**BCR 14**	**BCR 28**	**BCR 29**	**BCR 30**
Common Loon	2,5	2,5			
Common Merganser		4,5			
Common Tern	1,2,5	1,3,5			1,3,5
Cory's Shearwater					2
Dunlin	1				1
Forster's Tern					4
Gadwall					4
Glossy Ibis					5
Golden-winged Warbler	6		6		6
Great Cormorant		3			
Greater Scaup	5	5			5
Greater Shearwater		2			2
Greater Snow Goose	4				
Greater Yellowlegs	1,4				1,4
Green-winged Teal		4,5			4,5
Gull-billed Tern					1,4
Harlequin Duck		3,5			2,3,5
Henslow's Sparrow	6,7		6,7	6,7	6,7
Herring Gull		3,5			5
High Canvasback	5				
Hooded Merganser					5
Horned Grebe		5			5
Hudsonian Godwit	1,4	1,4			1,4
Ipswich Savannah Sparrow		1			1
Kentucky Warbler			6	6	6
King Rail	4				
Leach's Storm Petrel		1,2,3			
Least Bittern					4
Least Sandpiper	1,4	4			1,4
Least Tern					1
Lesser Scaup	5				5
Lesser Yellowlegs					1
Little Blue Heron					4
Little Gull	1,2				
Long-tailed Duck	2,5	2,5			2,5
Louisiana Waterthrush			6		
Mallard					4
Manx Shearwater					2
Marbled Godwit	1				1
Marsh Wren					4
Nelson's Sharp-tailed Sparrow		1,4,5			1,4,5
Northern Gannet		2,3			2,3
Northern Pintail	5				4,5
Northern Saw-whet Owl			6		
Olive-sided Flycatcher		6	6		
Pectoral Sandpiper	1				
Peregrine Falcon	8	8	8	8	8

Table 3.24
Potential Species and Birds of Conservation Concern Including Associated Habitat by BCR

Species	Habitats* by BCR				
	BCR 13	BCR 14	BCR 28	BCR 29	BCR 30
Piping Plover	1,4,5	1,4,5			1,4,5
Prairie Warbler			6	6	6
Prothonotary Warbler			6	6	
Purple Sandpiper		3			3
Razorbill		2,3			2,3
Redcockaded Woodpecker				6	
Red Crossbill			6		
Red Knot	1	1			1
Red Phalarope		2,5			2,5
Red-breasted Merganser					4,5
Red-headed Woodpecker	6		6		6
Red-necked Grebe		2,5			
Red-necked Phalarope		2,5			2,5
Red-throated Loon		2,5			2,5
Roseate Tern		1,3,5			1,3,5
Royal Tern					1,5
Ruddy Duck					4
Ruddy Turnstone		1,3			1,3
Rusty Blackbird				5	5
Saltmarsh Sharp-tailed Sparrow					4,5
Sanderling	1	1			1
Seaside Sparrow					1,4,5
Sedge Wren	7		7		7
Semipalmated Plover		1			1
Semipalmated Sandpiper	1,3	1,3			1,3
Short-billed Dowitcher	1,4	1,4			1,4
Short-eared Owl		4,6	4,6		4, 6
Snowy Egret					4
Solitary Sandpiper	1,4				
Sora					4
Spotted Sandpiper					4
Surf Scoter		2,5			2,5
Swainson's Warbler			6	6	
Swamp Sparrow					4
Tundra Swan - Eastern					5
Upland Sandpiper	6		6	6	6
Western Sandpiper					1
Whimbrel	1,4	1,4			1,4
Whip-poor-will	6		6	6	6
White-rumped Sandpiper					1
White-winged Scoter	2,5				2,5
Willet		1,4			1,4
Wilson’s Plover					1
Wood Thrush		6	6	6	6
Worm-eating Warbler			6		6
Yellow Rail		5			
Yellow-bellied Sapsucker			6		

Table 3.24
Potential Species and Birds of Conservation Concern Including Associated Habitat by BCR

Species	Habitats* by BCR				
	BCR 13	**BCR 14**	**BCR 28**	**BCR 29**	**BCR 30**
Yellow-crown Night Heron					4

SPECIES FROM THE *BIRDS OF CONSERVATION CONCERN 2002*

*HABITATS
1. Beach, Sand, Mud Flats
2. Marine Open Water
3. Rocky Coast (and Islands)
4. Estuarine Emergent
5. Estuary & Bay
6. Woodlands
7. Grassland
8. Riverine

Sources: U.S. Fish and Wildlife Service. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. (Online version available at <http://migratorybirds.fws.gov/reports/bcc2002.pdf>.
U.S. NABCI Committee, *Bird Conservation Region Descriptions: A Supplement to the North American Bird Conservation Initiative Bird Conservation Regions Map.* September 2000. <http://www.nabcius.org/aboutnabci/bcrdescrip.pdf>.

rocky intertidal areas are important for wintering Purple Sandpipers; and muddy intertidal habitats are critical as Semipalmated Sandpiper staging sites. Common Eiders and Black Guillemots breed in coastal habitats, while Leach's Storm-Petrels, gulls, terns, and the southernmost populations of many breeding alcids nest on offshore islands. Beaver ponds and shores of undisturbed lakes and ponds provide excellent waterfowl breeding habitat, particularly for American Black Duck, Hooded and Common Mergansers, and Common Goldeneye. The Hudson and Connecticut River valleys are important corridors for Brant, Green-winged Teal, and other waterfowl migrating from New England and Quebec. Because inland wetlands freeze, coastal wetlands are used extensively by dabbling ducks, sea ducks, and geese during winter and migration.[80]

Bird Conservation Region 28
Appalachian Mountains

Included in this area are the Blue Ridge, both the Ridge and Valley Region, the Cumberland Plateau, the Ohio Hills, and the Allegheny Plateau. The rugged terrain is generally dominated by oak-hickory and other deciduous forest types at lower elevations and by various combinations of pine, hemlock, spruce, and fir in higher areas. While flatter portions are in agricultural use, the majority of most segments of this region are forested.

[80] Ibid.

Priority[81] forest birds include Cerulean Warbler at low elevations and Blackthroated Blue Warbler at high elevations. Golden-winged Warblers are in early successional areas, and Henslow's Sparrows are in grasslands. While not as important for waterfowl as coastal regions, the Appalachian region contains the headwaters of several major eastern river systems that are used by various waterfowl species during migration. In addition, large wetland complexes, such as Canaan Valley in West Virginia, and isolated beaver-created wetlands provide habitat for Wood Duck breeding.[82]

Bird Conservation Region 29
Piedmont

The Piedmont is transitional between the mountainous Appalachians and the flat coastal plain and is dominated by pine and mixed southern hardwoods. Priority landbirds include Redcockaded Woodpecker, Bachman's Sparrow, and Brown-headed Nuthatch. Interior wetlands, reservoirs, and riverine systems provide migration and wintering habitat for waterfowl and some shorebirds. The fragmented patchwork of pasture, woodlots, and suburban sprawl that now dominates most of this region creates significant bird conservation challenges.[83]

Bird Conservation Region 30
New England/Mid-Atlantic Coast

This area has the densest human population of any region in the country. Much of what was formerly cleared for agriculture is now either in forest or in residential use. The highest priority birds are in coastal wetland and beach habitats, including the Saltmarsh Sharptailed Sparrow and Nelson's Sharp-tailed Sparrow, Seaside Sparrow, Piping Plover, American Oystercatcher, American Black Duck, and Black Rail. The region includes critical migration sites for Red Knot, Ruddy Turnstone, Sanderling, Semipalmated Sandpiper, and Dunlin. Most of the continental population of the endangered Roseate Tern nests on islands off the southern New England states. Other terns and gulls nest in large numbers, and large mixed colonies of herons, egrets, and ibis may form on islands in the Delaware and Chesapeake Bay regions. Estuarine complexes and embayments created behind barrier beaches in this region are extremely important to wintering and migrating waterfowl, including approximately 65 percent of the total wintering American Black Duck population, along with large numbers of Greater Scaup, Tundra Swan, Gadwall, Brant, and Canvasback. Exploitation and pollution of the Chesapeake Bay and other coastal zones, as well as the accompanying loss of submerged aquatic vegetation, have significantly reduced their value to waterfowl.[84]

3.15 OTHER RESOURCE CATEGORIES

The following sections describe the remaining resource categories required to be addressed per FAA Order 1050.1E. This project does not include construction of any

[81] A priority species is one that is included in the *BCC 2002* lists.

[82] U.S. NABCI Committee, North American Bird Conservation Initiative, *Bird Conservation Region Descriptions A Supplement to the North American Bird Conservation Initiative Bird Conservation Regions Map*, September 2000.

[83] Ibid.

[84] Ibid.

infrastructure and, therefore, there are no anticipated impacts to these categories.

3.15.1 Construction

The following presents a summary of the impacts that may be expected to result from typical construction activities:

- Increased noise from construction operations,
- Temporary increase in air pollutant emissions,
- Temporary increases in water turbidity, and
- Disposal and management of solid and hazardous wastes.

The implementation of changes to air traffic procedures does not involve any construction activity. Any ICC facility that may be newly constructed would have independent utility and would be subject to a separate environmental review. Therefore, further analysis of construction impacts within the Study Area is not warranted.

3.15.2 Farmlands

The Farmland Protection Policy Acts (FPPA) of 1980 and 1995 require identification of proposed projects that would affect any soils classified as prime and/or unique. Prime farmland contains soil that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, at the same time as being available for these uses. Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops. The implementation of changes to air traffic procedures does not involve any construction activity/ground disturbance. Any ICC facility that may be newly constructed would have independent utility and would be subject to a separate environmental review.

Therefore, further analysis of prime and/or unique farmland soils within the Study Area is not warranted.

3.15.3 Floodplains

Executive Order No. 11988, *Floodplain Management*, was issued in order to avoid, to the extent possible, the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practical alternative. The order was issued in furtherance of NEPA, the National Flood Insurance Act of 1968, and the Flood Disaster Protection Act of 1973.

The Proposed Action would not result in construction. Therefore, none of the alternatives considered would encroach upon area designated as a 100-year flood event area as described by the Federal Emergency Management Agency (FEMA).

3.15.4 Hazardous Materials and Solid Waste

In accordance with FAA Order 1050.1E, FAA actions to fund, approve, or conduct an activity may require consideration of hazardous materials and solid waste impacts.

Hazardous materials impacts involve the potential to generate or disturb materials identified as a substance that has been determined to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce.[85]

[85] 49 CFR Part 172, Table 172.101.

This includes hazardous substances[86] and hazardous wastes.[87]

Solid waste impacts are those associated with the potential long-term generation of municipal solid waste (MSW).

The Proposed Action would not result in any physical disturbances to the ground. In addition, as stated previously in Chapter One *Project Background and Purpose and Need for the Action*, aircraft operational activity is expected to experience normal growth with or without the proposed air traffic procedural changes. Measures are currently in place at each airport to handle the natural growth of air traffic and its associated hazardous materials and solid waste, regardless of the Airspace Redesign Project. Therefore, further discussion of generation or disruption of hazardous materials, or generation of solid waste within the Study Area is not warranted.

3.15.5 Water Quality

Water quality impacts are determined in accordance with the Federal Water Pollution Control Act, as amended (commonly referred to as the Clean Water Act). The Proposed Action involves air traffic procedural changes, would not require the construction of facilities and, therefore, does not impact water resources.

3.15.6 Wetlands

Executive Order 11990, *Protection of Wetlands*, was enacted to avoid, to the extent possible, adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect new destruction of wetlands.

Section 404 of the Clean Water Act (CWA), as amended, regulates the discharges of dredged or fill material into navigable waters of the United States through the Section 404 Permit program. The United States Army Corps of Engineers (USACE) has primary responsibility for implementing, permitting, and enforcing the provisions of Section 404. Wetlands are defined by the USACE as: "Those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas."[88]

The Proposed Action would not result in the construction of facilities. Therefore, no wetlands impacts are anticipated and further analysis of wetlands within the Study Area is not warranted.

[86] Hazardous Substance – Any element, compound, mixture, solution, or substance defined as a hazardous substance under the Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) and listed in 40 CFR Part 302. If released into the environment, hazardous substances may pose substantial harm to human health or the environment.

[87] Hazardous Waste – Under the Resource Conservation and Recovery Act (RCRA) a waste is considered hazardous if it is listed in, or meets the characteristics described in 40 CFR Part 261, including ignitability, corrosiveness, reactivity, or extraction procedure toxicity.

[88] 33 CFR 328.3(b) (1996).

Chapter Four ENVIRONMENTAL CONSEQUENCES

This chapter describes the potential environmental consequences of each of the alternatives selected for detailed consideration in accordance with FAA Order 1050.1E. A total of 19 impact categories are addressed.

The potential impacts of the Proposed Action Airspace Redesign alternatives (Modifications to Existing Airspace, Ocean Routing Airspace, and Integrated Airspace) are determined by comparing the projected future conditions of the affected environment due to the Proposed Action Airspace Redesign alternatives with the corresponding future conditions of the affected environment due to the No Action Airspace Alternative. The Future No Action Alternative serves as a basis of comparison with the Proposed Action alternatives.

4.1 NOISE/COMPATIBLE LAND USE

The sound generated by aircraft is often the most noticeable environmental effect associated with aviation projects. If the sound is sufficiently loud, or frequent in occurrence, it may interfere with various human activities or be considered objectionable. Detailed descriptions of the physics of sound, noise metrics, and the effects of noise on people are included in Appendix E.1.

Noise increases resulting from the implementation of the Proposed Action may affect the quality of the human environment and are analyzed in this EIS. Noise impacts are analyzed by predicting the community exposure to aircraft noise attributable to each of the Proposed Action Airspace Redesign alternatives. The analysis focuses on the change in aircraft noise associated with each Proposed Action Airspace Redesign alternative as compared to the Future No Action Airspace Alternative conditions in 2006 and 2011. The change in aircraft noise is compared to the noise impact criteria to determine the level of potential noise impacts.

The results of the noise analysis are also used to determine whether the existing and planned land use is compatible with the change in noise exposure. The current and future land use within the Study Area and land use surrounding the affected airports is presented in Chapter Three, *Affected Environment*, Section 3.3, *Land Use*. The potential compatible land use impacts resulting from the alternatives are assessed in accordance with FAA Order 1050.1E.

4.1.1 Noise/Compatible Land Use Impact Criteria

The FAA has established 65 DNL as the threshold above which aircraft noise is considered to be incompatible with residential areas. In addition, the FAA has determined that a significant impact occurs if a proposed action would result in an increase of 1.5 DNL or more on any noise-sensitive area within the 65 DNL exposure level when compared to the No Action alternative for the same time frame.[1]

In 1992, the Federal Interagency Committee on Noise (FICON)[2] recommended that in

[1] FAA Order 1050.1E; FAR 150.21(a)(2)(d).

[2] FICON 1992, Pp. 3-5.

cases where increases in noise of 1.5 DNL occur within the area exposed to 65 DNL, further evaluation should be completed to assess whether or not noise increases of 3 DNL or more occur at noise-sensitive locations within the area exposed to 60-65 DNL. Increases of this magnitude below 65 DNL are not significant impacts, but they should be examined for possible mitigation options. The FAA adopted FICON's recommendation into FAA Order 1050.1E.

For the purpose of this EIS, increases of 1.5 DNL above 65 DNL are considered significant, increases of 3 DNL between 60 and 65 DNL are considered "slight to moderate impacts" as are increases of 5 DNL or greater at levels between 45 DNL to 60 DNL. The increase in noise at these levels is enough to be noticeable and potentially disturbing to some people, but the cumulative noise level is not high enough to constitute a significant impact. The FAA determined that within the Study Area, 45 DNL is the minimum level at which noise needs to be considered because "even distant ambient noise sources and natural sounds such as wind in trees can easily exceed this [45 DNL] value."[3] **Table 4.1** summarizes the criteria used to assess the level of change in noise exposure attributable to the Proposed Action Airspace Redesign alternatives, as compared to the Future No Action Airspace Alternative, evaluated for this EIS.

The criteria used to determine whether there are potential compatible land use impacts with respect to residential areas are the same as those used to determine potential noise impacts. Noise-sensitive land uses other than residential are also considered when evaluating compatible land use impacts. Noise-sensitive land uses within the Study Area include schools, hospitals, places of worship, parks, and historic sites. Potential compatible land use impacts to these noise-sensitive areas were evaluated based on the noise levels designated as compatible in FAA's Part 150 land use compatibility table.[4] For some of the parks within the Study Area, where the noise is very low, the Part 150 guidelines may not adequately address the expectations and purposes of park visitors. Therefore, additional analysis of these parks was conducted..

4.1.2 Noise/Compatible Land Use Analysis

In order to disclose potential noise impacts it is necessary to evaluate the expected noise levels for future conditions. Since future noise levels cannot be directly measured, it is necessary to simulate the expected future condition through noise modeling. Furthermore, noise modeling is the only way that various alternative airspace designs can be compared to one another to identify the relative noise effects for each proposal.

As discussed in the noise section of Chapter Three, the principal noise analysis for this EIS was conducted using NIRS. NIRS is the model specified and required in FAA's Order 1050.1E for major airspace redesign studies. The NIRS model is briefly discussed in Chapter Three *Affected Environment*, Section 3.5, *Noise* and a detailed description of the model is included in **Appendix E**.

The noise modeling effort undertaken for this EIS was unique. Many factors including the large number of modeled airports and the size of the Study Area contributed to the complexity of the modeling effort. The noise modeling was

[3] Expanded East Coast Plan – Changes in Aircraft Flight Patterns Over the State of New Jersey. Federal Aviation Administration. 1995, Pp. 5-9.

[4] 14 CFR Part 150, Appendix A, Table 1.

Table 4.1
Criteria for Determining Impact of Increases in Aircraft Noise

DNL Noise Exposure With Proposed Action	Minimum Increase in DNL With Proposed Action	Level of Impact
65 DNL or higher	1.5 DNL	Significant
60 to 65 DNL	3.0 DNL	Slight to Moderate
45 to 60 DNL	5.0 DNL	Slight to Moderate

Sources: (1) FAA Order 1050.1E, Appendix A, 14.3 Part 150, Sec. 150.21(2) (d) FICON 1992.
(2) FAA Order 1050.1E, Appendix A, 14.4c FICON 1992.
(3) FAA Order 1050.1E, Appendix A, 14.5e.

customized to accommodate and reflect the uniqueness of this airspace redesign. Two examples of this customized approach are:

- Development of tailored computer algorithms to translate radar data into NIRS input, and
- extensive coordination between the noise modelers, airspace modelers, and Airspace Design Team.

In order to develop input for NIRS, the project team started with the Future No Action Alternative. For each Proposed Action alternative, the project team then incorporated the changes to the Future No Action Alternative routing that constitute the alternative. As with the Baseline 2000 noise analysis, aircraft operations between the surface and 14,000 feet above MSL were modeled. Each alternative was then validated through a collaborative effort that included the Airspace Redesign Team and the operational simulation modelers (TAAM modelers). These teams reviewed each alternative on an airport-by-airport, route-by-route, and sometimes even a flight track-by-flight basis.

The actual noise analysis and results focus on the noise conditions for specific locations at the population centroids (centers of census blocks). The number of people exposed to various noise levels is estimated based on the number of people residing in the census block corresponding to the centroid being evaluated. Future population at each centroid was forecasted for 2006 and 2011 from the 2000 census data. **Appendix H** details the population forecast analysis and results. The location and number of persons that are estimated to experience noise level changes based on the FAA's evaluation criterion are identified for each proposed alternative and each future year of analysis.

The change in noise exposure is also the basis for determining the potential for land use compatibility impacts. In terms of residences, the same analysis used for determining the level of noise impacts is appropriate. Therefore, if there is a significant noise impact resulting from the implementation of an alternative, then there is likewise a significant impact to compatible land use. For noise-sensitive sites other than residential areas the analysis is slightly different. Two methods were used to evaluate noise impacts to noise-sensitive sites. The first method was to input location data (latitudes and longitudes) for noise-sensitive sites within the Study Area into the noise model and calculate noise values at the specific locations. Location data was only available for some 4(f) sites and historic sites. The remaining noise-sensitive sites were evaluated using the second method; identifying the noise-sensitive sites located within the significantly impacted census blocks by using the GIS land use data. Each site was assigned the noise exposure level computed for the census block in which it resided. Finally, noise exposure levels for all identified noise-sensitive areas were compared with the noise levels designated as compatible using the FAA's Part 150 land use compatibility table.

The next sub-section describes the noise exposure analysis of the Future No Action Airspace Alternative for the years 2006 and 2011. This analysis is the basis for the evaluation of the potential noise and land use compatibility impacts resulting from each of the Proposed Action Airspace Redesign alternatives. The remaining sub-sections provide the results of the noise and compatible land use analysis for each of the Proposed Action Airspace Redesign alternatives investigated for 2006 and 2011. The sections begin with a brief summary of the major design elements of each alternative and its changes as compared to the Future No Action Alternative. The results of the noise analysis are then presented for both the implementation and future years in graphical and tabular form. The noise exposure changes from the Future No Action Airspace Alternative are presented for each Proposed Action Airspace Redesign alternative by year in total and by area of change (change zone). Brief explanations of the causes associated with each change zone are presented. Lastly, the potential noise and compatible land use impacts are discussed.

For further reference, Appendix E contains a detailed description of the following:

- Noise Modeling Assumptions,
- Methodology,
- Input Data,
- Locational Impact Analysis (Population Centroids/Census Blocks and Grid Points), and
- DNL Levels.

Appendix C also contains a detailed description of the operational modeling analysis, including:

- Airspace design criteria,
- Airspace modeling methodology, and
- TAAM results.

4.1.3 Future Noise Exposure – Future No Action Airspace Alternative

The Future No Action Airspace Alternative represents the expected future conditions if no changes were implemented as a result of this airspace redesign project. This analysis provides the basis for comparison of the effects of each of the Proposed Action Airspace Redesign alternatives. The estimated noise conditions were evaluated for the years 2006 and 2011.

4.1.3.1 Noise Modeling Input

The NIRS modeling for the Future No Action Airspace Alternative conditions is largely based on the Baseline 2000 current condition modeling. Noise modeling was developed for overflights and the expected IFR operations at the 21 airports evaluated in this study. The detailed NIRS modeling data developed for the baseline conditions served as a foundation for building the NIRS model input for the future conditions. The runways and local environmental variables used for the Baseline 2000 modeling were also used in the Future No Action Airspace Alternative modeling.

The Baseline 2000 model was modified to reflect the future operational levels that were forecast for 2006 and 2011. The expected average annual day operational levels for

2006 and 2011 at each airport and for overflights were derived from the operational forecasts presented in **Appendix B**. These forecasts also provided the time-of-day information in the form of operational schedules so that the nighttime operations could be identified. **Table 4.2** presents a summary of the average annual day (AAD) operations and nighttime percentage for each airport and the overflights for the future conditions.

The mix of aircraft types expected to operate at the study airports was also developed in the forecasting effort. **Table 4.3** presents a generalized summary of the future fleet mix modeled for each of the 21 airports and the overflights.

In general, runway use modeled at each airport for the Baseline 2000 conditions was held constant when modeling noise for the Future No Action Airspace Alternative. Some slight variations occurred due to changes in the future fleet mix as some categories of aircraft operate more or less prevalently on specific runways.

Table 4.2

Future Average Daily Operations and Time-of-Day Summary

Identifier	Airport	2006		2011	
		AAD Operations	Nighttime Percentage	AAD Operations	Nighttime Percentage
LGA*	La Guardia	1141	10.1%	1141	10.3%
JFK	John F. Kennedy International	1134	12.5%	1237	12.9%
EWR	Newark Liberty International	1389	17.1%	1436	17.5%
TEB	Teterboro	446	18.2%	505	19.3%
PHL	Philadelphia International	1508	10.5%	1640	10.5%
MMU	Morristown Municipal	112	1.8%	126	1.6%
ISP	Islip Long Island MacArthur	176	9.1%	203	7.9%
HPN	White Plains/Westchester County	319	10.4%	343	10.0%
ABE	Allentown/Lehigh Valley International	131	24.4%	143	25.4%
ACY	Atlantic City International	75	13.3%	83	15.7%
BDR	Bridgeport/Igor I. Sikorsky Memorial	24	25.0%	26	26.9%
CDW*	Caldwell/Essex County	15	26.7%	15	26.7%
FOK*	Westhampton Beach/The Francis S. Gabreski	4	25.0%	4	25.0%
LDJ*	Linden	1	100.0%	1	100.0%
WRI*	McGuire AFB	29	17.2%	29	17.2%
SWF	Newburgh/Stewart International	111	21.6%	149	18.8%
HVN	New Haven/Tweed-New Haven	24	16.7%	26	19.2%
PNE	Northeast Philadelphia	41	19.5%	45	17.8%
FRG	Republic	55	14.3%	59	16.7%
TTN	Trenton/Mercer County	57	1.8%	66	1.5%
ILG	Wilmington/New Castle County	72	8.3%	84	8.3%
OVF	Overflights	635	17.2%	682	17.2%

Note: *Forecast operations are expected to remain constant at some airports in future years. Operations at LGA are currently near maximum levels. Some smaller airports remain flat for IFR traffic because they are primarily VFR general aviation facilities. See Appendix B for further information.

Source: Landrum & Brown, 2001.

Table 4.3
Generalized Fleet Mix Summary – Future Conditions

Identifier	Airport	Percent Fleet Mix					
		2006			2011		
		Jets	Turbo-props	Props	Jets	Turbo-props	Props
LGA	La Guardia	98.5%	1.2%	0.3%	99.4%	0.4%	0.2%
JFK	John F. Kennedy International	89.6%	10.3%	0.2%	99.4%	0.6%	0.0%
EWR	Newark Liberty International	96.0%	3.5%	0.5%	98.7%	0.9%	0.4%
TEB	Teterboro	66.2%	21.6%	12.2%	69.9%	19.1%	11.0%
PHL	Philadelphia International	87.1%	12.1%	0.8%	95.6%	3.7%	0.7%
MMU	Morristown Municipal	67.0%	19.3%	13.8%	64.5%	21.8%	13.7%
ISP	Islip Long Island MacArthur	74.3%	24.0%	1.7%	89.6%	8.9%	1.5%
HPN	White Plains/Westchester County	70.7%	27.8%	1.6%	88.6%	10.0%	1.5%
ABE	Allentown/Lehigh Valley International	73.3%	22.9%	3.8%	85.9%	11.3%	2.8%
ACY	Atlantic City International	62.7%	32.0%	5.3%	62.7%	32.5%	4.8%
BDR	Bridgeport/Igor I. Sikorsky Memorial	50.0%	29.2%	20.8%	50.0%	30.8%	19.2%
CDW	Caldwell/Essex County	6.7%	66.7%	26.7%	6.7%	60.0%	33.3%
FOK	Westhampton Beach/The Francis S. Gabreski	75.0%	25.0%	0.0%	75.0%	25.0%	0.0%
LDJ	Linden	0.0%	100.0%	0.0%	0.0%	100.0%	0.0%
WRI	McGuire AFB	79.3%	20.7%	0.0%	79.3%	20.7%	0.0%
SWF	Newburgh/Stewart International	84.7%	11.7%	3.6%	89.9%	7.4%	2.7%
HVN	New Haven/Tweed-New Haven	50.0%	45.8%	4.2%	80.8%	15.4%	3.8%
PNE	Northeast Philadelphia	36.6%	34.1%	29.3%	40.0%	33.3%	26.7%
FRG	Republic	51.8%	30.4%	17.9%	53.3%	30.0%	16.7%
TTN	Trenton/Mercer County	43.9%	52.6%	3.5%	68.2%	28.8%	3.0%
ILG	Wilmington/New Castle County	62.5%	23.6%	13.9%	61.9%	25.0%	13.1%
OVF	Overflights	91.2%	7.3%	1.5%	91.2%	7.3%	1.5%

Source: Landrum & Brown Analysis 2001.

With only a few exceptions, the modeled flight tracks and dispersion for the Future No Action Airspace Alternative were also held constant from the Baseline 2000 modeling input. The exceptions are those routes or procedures changed after 2000 and subsequently implemented or expected to be implemented by 2006. Thus, the Robbinsville-Yardley "Flip-Flop" Procedure and the Dual Modena Procedure, discussed in Chapter One, *Project Background and Purpose and Need for the Action,* Section 1.2.6.4, *Other Initiatives*, were incorporated into the baseline flight tracks for modeling the future conditions. The only other change considered for inclusion in the Future No Action Alternative was the PHL Runway 17-35 extension. Since the Draft EIS for this project was published in September of 2004 and the Record of Decision was not issued until April of 2005, both well after the No Action noise modeling for this airspace redesign was underway and complete, it was not possible to directly model the PHL Runway 17-35 extension in the Baseline 2000 model. However, a qualitative evaluation of the results presented in the PHL Runway 17-35 Extension Project Final EIS was undertaken. According to the Final EIS, the PHL 17-35 runway extension was not expected to be complete until 2007, thus the 2006 noise modeling for this airspace redesign EIS would not be affected by the runway extension. The 2015 noise analysis for the PHL Runway 17-35 Extension Project Final EIS was reviewed to consider the long-term potential effects of the runway extension on the 2011 noise evaluation for this EIS. This review revealed that the Runway 17-35 extension was expected to result in only a very minimal change in the noise pattern around PHL. Since these minimal noise effects of the PHL Runway 17-35 extension would apply to both the No Action and each airspace alternative evaluated in this EIS, the 2011 noise change analysis results presented in this section would not be affected. Therefore, it was not necessary to modify the Baseline 2000 model. Appendix E provides additional detail regarding the noise model input developed for the Future No Action Airspace Alternative conditions.

Finally, as discussed in Chapter Three, there have been some minor changes in the noise analysis methodology since the publishing of the DEIS. These changes were a direct result of comments received on the DEIS and reflect a modest refinement in the methodology. The changes include the use of various airport elevations to more closely model these differences at the higher elevation airports, as well as the rounding of computed noise values at each population point to one decimal point.

The results of these two refinements were reflected in Appendix P, Noise Mitigation Report. After publication of the Noise Mitigation Report it was discovered that the NIRS model ignored the adjustment made to account for the higher airports (i.e. the model disregarded the airport elevation settings because the terrain feature was activated). The result was that the refined NIRS completed for the Noise Mitigation Report as well as the FEIS, still reflected the Study Center Elevation of 22 feet above MSL as was the case in the DEIS. Therefore, a sensitivity analysis was conducted to confirm the reasonableness of the analysis as well as to document the limited effect of the airport elevation issue. It was expected that adjustments to an airport elevation would generally result in a slight reduction in computed noise levels for all scenarios near these higher elevation airports. The sensitivity analysis presented in Section E.3 of Appendix E confirms this expectation and indicates that the results presented in this FEIS document are not materially affected by this issue.

4.1.3.2 Noise Exposure

The NIRS noise analysis focuses on aircraft noise exposure in areas exposed to noise levels of 45 DNL and greater. NIRS calculates the noise levels at each population census block in the Study Area and computes the potential population exposed to noise based on the criteria presented in Table 4.1. **Figure 4.1** presents the estimated DNL noise exposure pattern for the 2006 Future No Action Airspace Alternative conditions throughout the Study Area. Similarly, **Figures 4.2 through 4.3** present enlarged views of the 2006 Future No Action Airspace Alternative DNL noise exposure at the population centroids.

As the graphics indicate, the areas that are expected to be exposed to aircraft noise above 45 DNL are concentrated in the New York City area, around the Philadelphia International Airport, and close-in to the other airports evaluated in the Study Area. The maps illustrate that higher aircraft noise levels are expected in proximity to each airport. The size of the noise pattern around each airport is generally a function of the operational levels and fleet mix at each airport. The shape of the noise pattern is most influenced by the orientation of the runways and their usage along with the predominant flight routes near the airport. The estimated 2006 aircraft noise exposure pattern is similar in size and shape to the Baseline 2000 noise exposure pattern presented in Chapter Three. In some cases, the size of the 2006 noise pattern is reduced slightly from the 2000 conditions, despite increases in operational levels. This effect is generally the result of fleet mix changes from older noisier aircraft to new quieter aircraft.

Figure 4.4 presents the estimated DNL aircraft noise patterns for the 2011 Future No Action Airspace Alternative for the entire Study Area and **Figures 4.5 through 4.6** present enlarged views. The noise patterns for 2011 are very similar in size and shape to those indicated for 2006. Only slight growth in noise exposure is noted in some cases due to the modest increases in aircraft operations expected between 2006 and 2011. In other areas, some slight reduction in noise is expected due to further retirement of older noisier aircraft in the fleet by 2011.

Table 4.4 presents the maximum potential population exposed to aircraft noise by DNL ranges for the Future No Action Airspace Alternative. As shown in Table 4.4, approximately 0.2 percent of the Study Area population is estimated to be exposed to aircraft noise levels greater than 65 DNL in 2006 and 2011. Approximately 214,000 and 210,000 persons, or about 0.7 percent of the Study Area population, are expected to be exposed to aircraft noise in the 60 to 65 DNL range for 2006 and 2011, respectively. The population within the 45 to 60 DNL range in 2006 and 2011 is expected to be 39 and 38 percent of the Study Area population, or 11,774,446 persons and 11,688,798 persons, respectively.

It is expected that approximately 12.06 million persons within the Study Area would be exposed to noise levels of 45 DNL and greater due to aircraft noise in 2006 if no design changes are made. By the year 2011, it is estimated that the population exposed to noise levels above 45 DNL will decrease slightly to approximately 11.97 million persons. However, the number of persons exposed to noise of 65 DNL and greater is expected to increase 4.6 percent between 2006 and 2011 for the Future No Action Airspace Alternative. These increases are due to both the expected growth in aircraft operations and the forecast population growth in the Study Area through 2011.

Table 4.4

Future No Action Airspace Alternative - Estimated Population within DNL Ranges

	Year	
DNL Range	**2006**	**2011**
45-60 DNL	11,774,446	11,688,798
60-65 DNL	213,692	209,793
65+ DNL	72,141	75,459
Total Population in Study Area	30,401,564	31,156,051

4.1.4 Future Noise Impacts – Modifications to Existing Airspace Alternative

The Modifications to Existing Airspace Alternative includes minor modifications to existing airspace and routing and improving operations as much as possible within the limitations of current ATC facility boundaries. This alternative builds on the Future No Action Airspace Alternative. The following sections present the noise modeling and impacts of the Modifications to Existing Airspace Alternative for the years 2006 and 2011.

4.1.4.1 Noise Modeling Input

The NIRS modeling for the Modifications to Existing Airspace Alternative is directly based on the Future No Action Airspace Alternative noise modeling input. Only the elements of the alternative design that are different from the Future No Action Airspace Alternative procedures or design were modified for the NIRS modeling.

As with the Future No Action Airspace Alternative analysis, noise modeling was developed for IFR overflights and the projected IFR operations at the 21 airports evaluated in this study. The runways, local environmental variables, operations levels, and fleet mix used for modeling the Future No Action Airspace Alternative were also used to model the Modifications to Existing Airspace Alternative. In general, the runway use proportions modeled at each airport for the Future No Action Airspace Alternative were held constant for modeling this alternative.

Similarly, the majority of the modeled flight tracks and dispersion about these tracks for modeling the Future No Action Airspace Alternative were held constant for the Modifications to Existing Airspace Alternative modeling input. Only the flight tracks associated with the design element of the Modifications to Existing Airspace Alternative were adjusted to represent those known changes for the alternative. The noise model changes made to the Future No Action Airspace Alternative input data in order to model this alternative are summarized as follows:

- New departure headings added (LGA, EWR, PHL),
- South departure gate shifted (NY area airports), and
- PHL East departure gate shifted to avoid shifted south departure gate for the NY area.

Each of these items represents a group of flight track adjustments that were required in order to model the Modifications to Existing Airspace Alternative. Flight track adjustments generally involved portions of the route within the Study Area as dictated by the design. Flight tracks dispersion was only modified where route changes would be likely to have an effect on dispersion patterns. Chapter Two, *Alternatives*, provides a detailed discussion of the design changes associated with this alternative. Detailed information regarding the noise model input for this alternative is found in **Appendix E.**

The modeling refinements discussed in Chapter Three and in the Future No Action Noise Model Input section were applied to the analysis for this alternative.

4.1.4.2 Noise Impacts

The following paragraphs describe the noise exposure changes and the potential noise impacts resulting from the implementation of the Modifications to Existing Airspace Alternative.

Exposure

The route and procedural changes associated with the Modifications to Existing Airspace Alternative would result in the population likely to be exposed to 65 DNL and greater, increasing to approximately 78,920 persons in 2006, or 9.4 percent as compared to the Future No Action Airspace Alternative. Conversely, by 2011, the alternative would reduce the expected number of persons within the 65 DNL noise level from 75,459 with the Future No Action Airspace Alternative to 72,439 or by 4% with the Modifications to Existing Airspace Alternative.

The number of persons that would be exposed to 60 to 65 DNL is expected to increase from 213,692 with No Action to 252,657 with the Modifications to Existing Airspace Alternative in 2006. A similar shift is expected in 2011 when the number of persons exposed to 60-65 DNL noise would increase from 209,793 persons with No Action to 249,780 persons with the Modifications to Existing Airspace Alternative.

This alternative would result in a 1.4 percent increase in the number of persons expected to be exposed to noise levels between 45 and 60 DNL in 2006. By 2011, the alternative would increase the estimated persons exposed to aircraft noise between 45 and 60 DNL by about 2.7 percent over the Future No Action Airspace Alternative conditions, to approximately 12 million persons.

Table 4.5 presents a summary of the population likely to be exposed to particular noise levels for the Modifications to Existing Airspace Alternative as compared to the Future No Action Airspace Alternative for both future years.

Change

In order to determine the potential significance of the changes in noise exposure associated with the Modifications to Existing Airspace Alternative, an analysis of the changes relative to the FAA's noise impact criteria was completed. **Figures 4.7 and 4.8** present a map of the Modifications to Existing Airspace Alternative noise changes at the census block centroids for both 2006 and 2011, respectively. Only census blocks that are populated and meet the noise exposure criteria discussed in Section 4.1 are shown. The census blocks centroids are color-coded to identify the criterion that they meet and whether the noise increased or decreased.

Table 4.5

Potential Population Exposure & Change - Modifications to Existing Airspace Alternative

2006					
Scenario	**DNL Range>**	**45-60**	**60-65**	**65 +**	**Total 45+**
No Action		11,774,446	213,692	72,141	12,060,279
Alternative		11,938,721	252,657	78,920	12,270,298
Difference		*164,275*	*38,965*	*6,779*	*210,019*
2011					
No Action		11,688,798	209,793	75,459	11,974,050
Alternative		12,007,618	249,780	72,439	12,329,837
Difference		*318,820*	*39,987*	*-3,020*	*355,787*

Sources: NIRS Analysis, Landrum & Brown/Metron Aviation, Inc. 2007.

As the figures indicate, the changes associated with this alternative are generally clustered around EWR and PHL. There were no other changes meeting the FAA criterion found near any of the other airports modeled in the analysis.

Table 4.6 summarizes the estimated change in population exposed to aircraft noise levels that meet the FAA criteria resulting from the Modifications to Existing Airspace Alternative airspace design. The cells in the table are color-coded similar to the scheme used on the figures so that specific numbers of persons can be related to the maps illustrating the noise change.

Based on the NIRS analysis, it is estimated that 8,755 persons would be exposed to a significant (+1.5 DNL at 65 DNL or higher) change in noise in 2006 resulting from the Modifications to Existing Airspace Alternative. In 2011, approximately 1,010 persons would experience significant noise impacts as compared to the 2011 Future No Action Airspace Alternative. The alternative would, at the same time, provide noise reduction of 1.5 DNL or more in other areas exposed to 65 DNL or greater in the Future No Action Airspace Alternative. In 2006, this level of reduction would be experienced by 5,970 persons and would decrease in 2011 to just over 5,000 persons.

Table 4.6

Modifications to Existing Airspace Alternative - Population Impact Change Analysis Summary

	DNL Noise Exposure With Alternative		
	65 DNL or higher	60 to 65 DNL	45 to 60 DNL
Minimum Change in DNL With Alternative	1.5 DNL	3.0 DNL	5.0 DNL
Level of Impact	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
2006	8,755	37,627	146,056
2011	1,010	34,279	110,720
Noise Decreases			
2006	5,970	1	39,426
2011	5,094	22	8,588

Sources: NIRS Analysis, Landrum & Brown/Metron Aviation Inc. 2007.

Slight to moderate impacts are also evident at lower noise levels due to the Modifications to Existing Airspace Alternative. In the 60 to 65 DNL range, it is expected that 37,627 persons would experience an increase in noise levels of greater than or equal to 3.0 DNL or more in 2006. This number is expected to decrease slightly to 34,279 persons by 2011. There would essentially be no decreases of greater than or equal to 3.0 DNL at noise levels of 60 to 65 DNL expected as a result of this alternative in either 2006 or 2011. At the lowest analyzed noise levels (45 to 60 DNL), where Slight to Moderate (±5.0 DNL) impacts were identified, this alternative is expected to result in potential noise increases for 146,056 persons in 2006. This potential impact is expected to be reduced in 2011 by approximately 23 percent to 110,720 persons. Also, a reduction in noise exposure at these lower noise levels results from the implementation of the Modifications to Existing Airspace Alternative. In 2006, 39,426 persons exposed to between 45 and 60 DNL would experience a noise level reduction of greater than or equal to 5.0 DNL. By 2011, the noise relief at these levels is expected to be experienced by a net total of 8,588 persons.

In order to provide a better understanding of these potential noise impacts, the areas of change within the Study Area were divided into small zones of change. These zones are generally associated with a specific airport and are identified with a unique code name. Figures are provided with enlarged views of the various change zones along with the name of each zone. For these graphics, the entire census block associated with the population centroid where noise change values were computed is color-shaded by noise change level. The following paragraphs discuss the potential change in noise impact along with the cause of the change for each zone. Note that the "PM" used to define change zones in this section is not related to particulate matter (PM) discussed in Chapter Three.

Figures 4.9 and 4.10 present an enlarged view of the noise changes at the census blocks and change zones associated primarily with EWR for 2006 and 2011, respectively. Each change zone shown on the figures is discussed in the following paragraphs.

PM-06EWR-A (Figure 4.9): The estimated increases in noise occurring west of Interstate 95 and over the Elizabeth, NJ area are caused by the new departure headings off of Runways 22L/R to the north and east gates. Headings were moved from 190° to 260° and 240°. As a result of this change, 6,167 persons, represented by 45 census blocks, are expected to experience an increase in noise of greater than or equal to 1.5 DNL above 65 DNL. Similarly, 36,166 persons, represented by 203 census blocks, are expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL and, 29,433 persons, represented by 134 census blocks, are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-06EWR-B (Figure 4.9): The estimated reductions in noise occurring east of Interstate 95 over Elizabethport NJ and Arlington NY are caused by the new departure headings off of Runways 22L/R to the north and east gates. By moving a portion of the traffic from the 190° to 260° or 240° headings, some 5969 persons, represented by 31 census blocks, are expected to experience a decrease in noise of greater than or equal to 1.5 DNL within the 65 DNL. Similarly, one person represented by one census block is expected to experience a decrease in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL and 8,035 persons, represented by 40 census blocks, are expected to experience a decrease in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-11EWR-A (Figure 4.10): The estimated increases in noise occurring west of Interstate 95 and over the Elizabeth, NJ area are caused by the new departure headings off of Runways 22L/R to the north and east gates. Departure headings were changed from 190° to 260° and 240°. As a result of this change, 768 persons, represented by eight census blocks, would receive an increase in noise of greater than or equal to 1.5 DNL above 65 DNL. Similarly, 31,115 persons, represented by 186 census blocks, would receive an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL, and additionally 34,572 persons, represented by 149 census blocks, would receive an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-11EWR-B (Figure 4.10): The estimated reductions in noise occurring east of Interstate 95 over Elizabethport NJ and Arlington NY are caused by the new departure headings off of Runways 22L/R to the north and east gates. By changing a portion of the traffic from the 190° heading to 260° or 240°, 5,094 persons represented by 26 census blocks, would experience a decrease in noise of greater than or equal to 1.5 DNL within the 65 DNL. Similarly, 22 persons represented by two census blocks would receive a decrease in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL and 8,436 persons, represented by 40 census blocks, would receive a decrease in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

Figures 4.11 and 4.12 present an enlarged view of the noise changes at the population census blocks and change zones associated with PHL for 2006 and 2011. Each change zone shown on the figures is discussed in the following paragraphs.

PM-06PHL-A (Figure 4.11): This region is located west and north of the Airport and is approximately 20 square miles in area. The region ranges from the Airport north nearly to Baltimore Avenue, and west nearly to SR-261 (Valleybrook Rd.). Communities within this region include Essington, Crum Lynne, Woodlyn, Wallingford, Rose Valley, Parkside, Brookhaven, and southeastern Chester Heights. These potential increases in noise are caused by the new departure headings off of Runways 27L/R to the north and west gates. Departure headings were changed from the current 240° and 255° headings off of Runways 27R/L to 330° for the north gate and 290° and 270° for the west gate. Nearly 2,590 persons represented by 54 population census blocks are expected to experience an increase in noise of greater than or equal to 1.5 DNL for this alternative. Approximately 1,461 persons represented by 29 census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL and 75,289 persons represented by 1,006 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-06PHL-B (Figure 4.11): This region is located north and slightly east of the Airport and is approximately five square miles in area. The region includes portions of South Philadelphia and central Philadelphia; the eastern edge is near 22nd Street, and the northern edge is near Walnut Street. Also, an area on the west side of the Schuylkill River is included in this region. The area is approximately bounded by Walnut Street to the north and 43rd Street to the west. These potential increases in noise are caused by the new departure headings off of Runways 9L/R to the north and west gates. Departure headings were changed from the current 085° heading to 070° for the north gate and 030° for the west gate. Approximately, 38,754 persons represented by 436 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-06PHL-C (Figure 4.11): This region is located northeast of the airport and is approximately four square miles in area. The main community within the region is Camden, NJ. The area is approximately bounded by Ferry Avenue in the south, Broadway Street in the west, State Street in the north, and Crescent Blvd. in the east. These potential reductions in noise are caused by the new departure headings off of Runways 9L/R to the north and west gates. Departure headings were changed from the current 085° heading to 070° for the north gate and 030° for the west gate. Some 30,884 persons represented by 390 census blocks are expected to experience a reduction in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-06PHL-D (Figure 4.11): This region is located south of the Airport, and is approximately six square miles in area. The region is approximately two miles wide, containing the majority of Gibbstown, NJ north of I-295 and extending about two miles south of I-295. These potential increases in noise are primarily caused by the new departure headings off of Runways 27L/R to the east departure gate. Departure headings were changed from the current 240° and 255° off of Runways 27L/R to 190°. Approximately 2,580 persons represented by 65 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-06PHL-E (Figure 4.11): This region is located southwest of the Airport and is approximately six square miles in area. Bridgeport, NJ is the main community within this region at the interchange of US-130 and US-322. The region extends west approximately three miles to Nortonville, NJ and north nearly two miles to the Delaware River. These potential reductions in noise are caused by the new departure headings off of Runways 27L/R to the south and east gates. Departure headings were changed from the current 240° and 255° headings to 230° and 250° for the south gate and 190° for the east gate. Approximately 507 persons represented by 22 census blocks are expected to experience a reduction in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-11PHL-A (Figure 4.12): This region is located west and north of the Airport, and is approximately 20 square miles in area. The region includes the area from the Airport to slightly north of Baltimore Avenue, and slightly west of SR-452. Communities within this region include Essington, Crum Lynne, Woodlyn, Wallingford, Swarthmore, Rose Valley, and Parkside.

These potential increases in noise are caused by the new departure headings off of Runways 27L/R to the north and west gates. Departure headings were changed from the current 240° and 255° to 330° for the north gate and 290° and 270° for the west gate. Approximately 240 persons represented by six population census blocks are expected to experience an increase in noise of greater than or equal to 1.5 DNL above the 65 DNL. Similarly, approximately 3,160 persons represented by 61 census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL and 68,918 persons represented by 960 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-11PHL-B (Figure 4.12): This region is located north and slightly east of the Airport, and is approximately two square miles in area. The region mainly runs along I-76 bordering the west edge of South Philadelphia. The southern edge of the region is near Pattison Avenue, and the northern edge is near Washington Avenue. These potential increases in noise are caused by the new departure headings off of Runways 9L/R to the north and west gates. Departure headings were changed from the current 085° heading to 070° for the north gate and 030° and 050° for the west gate. Approximately 4,360 persons represented by 50 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-11PHL-C (Figure 4.12): This region is located south of the Airport and is approximately six square miles in area. The region is approximately two miles wide, containing the majority of Gibbstown, NJ north of I-295 and extending about two miles south of I-295. These potential increases in noise are primarily caused by the new departure headings off of runways 27L/R to the east departure gate. Departure headings were changed from the current 240° and 255° headings to 190° for the east departure gate. Approximately 2,870 persons represented by 65 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PM-11PHL-D (Figure 4.12): This region is located southwest of the Airport and is approximately six square miles in area. The region extends west approximately three miles to Nortonville, NJ and north nearly two miles to the Delaware River. Bridgeport, NJ is the main community within this region and is located at the interchange of US-130 and US-322. These potential reductions in noise are caused by the new departure headings off of Runways 27L/R to the south and east gates. Departure headings were changed from the current 240° and 255° headings to 230° and 250° for the south gate and 190° for the east gate. Approximately 152 persons represented by nine census blocks are expected to experience a reduction in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

4.1.4.3 Compatible Land Use Impacts

Based on the NIRS analysis, the Modifications to Existing Airspace

Alternative would potentially result in significant noise impacts to residents located both south of EWR (PM-06-EWR-A and PM-11EWR-A) and west of PHL (PM-06PHL-A and PM-11PHL-A). Residential land use is considered noise-sensitive. Therefore, the significant noise impacts to noise-sensitive areas would also be considered a significant impact in terms of land use compatibility.

Impacts to other noise-sensitive land uses within the Study Area such as schools, hospitals, places of worship, parks, and historic sites were also considered. Noise-sensitive areas were identified by using NIRS results and the ESRI Geographic Names Information System (GNIS) database. All areas subject to significant noise impacts (i.e., census blocks where noise exposure would potentially increase by 1.5 DNL or greater resulting in noise exposure of 65 DNL or greater) were evaluated for the presence of noise-sensitive land uses by using the GNIS database.

NIRS results showed that seven Section 4(f) sites would be in the area subjected to significant noise impacts as a result of the Modifications to Existing Airspace Alternative. These sites include: the Unification Chapel, the John Marshall School, and the Bronx Powder Company and the Jenkins Rubber Company buildings, all located just south of EWR; and the Lazaretto, the Printzhof, and the Westinghouse Industrial Complex all located just to the east of PHL. Based on the analysis presented in Section 4.5, *Department of Transportation Act Section 4(f), and Land and Water Conservation Fund Act 6(f,)* it was determined that this level of noise would be compatible with the Unification Chapel, the Bronx Powder Company, the Jenkins Rubber Company, the Lazaretto, the Printzhof, and the Westinghouse Industrial Complex. However, this level of noise would not be compatible with the residential use of John Marshall School. Therefore, the significant noise impact at this location would be considered a significant impact in terms of land use compatibility.

4.1.5 Future Noise Impacts – Ocean Routing Airspace Alternative

The Ocean Routing Airspace Alternative is a proposal that was originally developed by the NJ Citizens for Environmental Research, Inc. (NJCER) at the request of the NJ Coalition Against Aircraft Noise (NJCAAN). This alternative sends all EWR departing flights over the Raritan Bay to the Atlantic Ocean before turning them back over land to head to their departure gates. This section presents the noise modeling and impacts of the Ocean Routing Airspace Alternative for the years 2006 and 2011. See Chapter Two, Section 2.4.1.3, *Ocean Routing Concept*, for additional details with respect to the Ocean Routing Airspace Alternative.

4.1.5.1 Noise Modeling Input

The NIRS modeling for the future Ocean Routing Airspace Alternative is directly based on the Future No Action Airspace Alternative noise modeling input. Only the elements of the alternative design that are expected to be different from the Future No Action Airspace Alternative procedures or design were modified for the NIRS modeling.

As with the Future No Action Airspace Alternative analysis, noise modeling was developed for IFR overflights and the projected IFR flight plan operations at the 21 airports identified as part of the study. The runways, local environmental variables, operations levels, and fleet mix used for the Future No Action Airspace Alternative modeling were also used in the future Ocean Routing Airspace Alternative modeling. In general, the runway use proportions modeled at each airport for the Future No Action Airspace Alternative conditions were held constant for modeling this alternative.

Similarly, the majority of the modeled flight tracks and dispersion about these tracks for the Future No Action Airspace Alternative was held constant for the Ocean Routing Airspace Alternative modeling input. Only the flight tracks associated with the design element of the Ocean Routing Alternative were adjusted to represent those known changes for the alternative. The noise model changes made to the Future No Action Alternative input data in order to model the Ocean Routing Airspace Alternative are summarized as follows:

- EWR and JFK departures are rerouted over the Atlantic Ocean per NJCER design;
- LGA departures climb to a specified altitude before crossing the Hudson River per NJCER design;
- LGA south arrivals increase altitude over Raritan Bay; and
- JFK south arrivals are shifted to the east, while north and western arrivals stay north of JFK and are routed further east.

Each of these items represents a group of flight track adjustments that were required in order to model the Ocean Routing Alternative. Flight track adjustments generally involved portions of the route within the Study Area as dictated by the design. Flight tracks dispersion was only modified where route changes would likely have an effect on dispersion patterns. Chapter Two provides a detailed discussion of the design changes associated with this alternative. Detailed information regarding the noise model input for this alternative can be found in Appendix E.

The modeling refinements discussed in Chapter Three and in the Future No Action Noise Model Input section were applied to the analysis for this alternative. It should also be noted that through the course of the review of DEIS comments, it was found that the 2006 version of the Ocean Routing Airspace Alternative was modeled with unrestricted climbs for the Runway 4 departures. This was only found to be the case in the 2006 noise modeling input. Since this is contrary to the design of Ocean Routing, where the Runway 4 departures must cross the Raritan bay at 10,000 feet MSL, the noise model input for the FEIS was adjusted to correctly model these flights. The results presented in the subsequent paragraphs reflect the correct modeling for the 2006 conditions.

4.1.5.2 Noise Impacts

The following paragraphs describe the noise exposure changes and the potential noise impacts resulting from implementation of the Ocean Routing Airspace Alternative.

Exposure

The route and procedural changes associated with the Ocean Routing Airspace Alternative would result in the population likely to be exposed to 65 DNL and greater decreasing to approximately 68,660 persons in 2006, or 4.8 percent, as compared to the Future No Action Airspace Alternative. Similarly, by 2011, the alternative would reduce the expected number of persons within the 65 DNL noise level from 75,459 in the Future No Action Airspace Alternative to 72,929 with the Ocean Routing Airspace Alternative.

The number of persons that would be exposed to 60-65 DNL is expected to increase from 213,692 persons with No Action to 213,783 persons with the Ocean Routing Airspace Alternative in 2006. A similar shift is expected in 2011. The number of persons exposed to 60-65 DNL is expected to increase from 209,793 with the Future No Action Airspace Alternative to 214,487 persons with the Ocean Routing Airspace Alternative.

This alternative would result in a 2.4 percent decrease in the number of persons expected to be exposed to noise levels between 45 and 60 DNL in 2006 to approximately 11.5 million persons. Similarly, in 2011 the alternative would decrease the estimated persons exposed to aircraft noise between 45 and 60 DNL by about two percent to approximately 11.4 million persons.

Table 4.7 presents a summary of the population likely to be exposed to noise levels for the Ocean Routing Airspace Alternative as compared to the Future No Action Airspace Alternative for both future years. This table highlights the areas where the alternative caused increases and decreases in population exposure for the specific DNL ranges.

Change

In order to determine the significance of the changes in noise exposure associated with the Ocean Routing Airspace Alternative, an analysis of the changes relative to the FAA's noise impact criteria was completed. **Figures 4.13 and 4.14** present a map of the Ocean Routing Airspace Alternative noise changes at the population census blocks for both 2006 and 2011. Only census blocks that meet the noise exposure criteria discussed in Section 4.1 and that are populated are shown. Both increases and decreases in noise levels meeting the criteria are shown. The census blocks are color-coded to identify the criterion that they meet and whether the noise increased or decreased.

As the figures indicate, the changes associated with this alternative are generally clustered around EWR. There were no other changes meeting the FAA criterion found near any of the other airports modeled in the analysis.

Table 4.7

Potential Population Exposure & Change - Ocean Routing Airspace Alternative

2006					
Scenario	**DNL Range>**	**45-60**	**60-65**	**65 +**	**Total 45+**
No Action		11,774,446	213,692	72,141	12,060,279
Alternative		11,493,555	213,783	68,660	11,775,998
Difference		*-280,891*	*91*	*-3,481*	*-284,281*
2011					
No Action		11,688,798	209,793	75,459	11,974,050
Alternative		11,446,984	214,487	72,929	11,734,400
Difference		*-241,814*	*4,694*	*-2,530*	*-239,650*

Sources: NIRS Analysis, Landrum & Brown/Metron Aviation, Inc. 2007.

The color coding of the census blocks reflect that there are both increases and decreases in noise in both future years resulting from the alternative design. **Table 4.8** presents a summary for the estimated change in population exposed to aircraft noise levels that meet the FAA criteria resulting from the Ocean Routing Airspace Alternative. The cells in the table are color-coded similar to the scheme used on the figures so that specific numbers of persons can be related to the maps illustrating the noise change.

Based on the NIRS analysis, it is estimated that the Ocean Routing Airspace Alternative will not result in an increase of 1.5 DNL or more in areas exposed to 65 DNL or more, nor will it provide a noise decrease of 1.5 DNL or more in areas exposed to 65 DNL and above. While this alternative does provide Slight to Moderate impact relief at lower noise levels, increases are also created. In the 60 to 65 DNL range it is expected that some 675 persons would experience a decrease in noise levels of 3.0 DNL or more in 2006. These benefits are expected to decrease to zero by 2011.

At the lowest noise levels (45 to 60 DNL) where Slight to Moderate (±5.0 DNL) impacts are identified, the Ocean Routing Airspace Alternative is expected to result in noise increases for 26,498 persons in 2006.

This impact is expected to decrease slightly in 2011 to 18,748 persons. There is also a potential reduction in noise exposure at these lower noise levels with this alternative. Approximately 51,000 persons are estimated to experience a 5.0 DNL reduction in noise levels between 45 and 60 DNL in 2006. By 2011, the noise reduction at these levels is expected to be reduced to approximately 17,525 persons.

In order to provide a better understanding of these potential noise impacts, the areas of change within the Study Area were divided into small zones of change. These zones are generally associated with a specific airport and are identified with a unique code name. Figures are provided with enlarged views of the various change zones along with the name of each zone. The following paragraphs discuss the potential change in noise impact along with the cause of the change for each zone.

Table 4.8

Ocean Routing Airspace Alternative Population Impact Change Analysis Summary

	DNL Noise Exposure With Alternative		
	65 DNL or higher	60 to 65 DNL	45 to 60 DNL
Minimum Change in DNL With Alternative	1.5 DNL	3.0 DNL	5.0 DNL
Level of Impact	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
2006	0	0	26,498
2011	0	0	18,748
Noise Decreases			
2006	180	675	51,108
2011	0	0	17,525

Source: NIRS Analysis, Landrum & Brown/Metron Aviation Inc. 2007.

Figures 4.15 and 4.16 present an enlarged view of the noise changes at the population census blocks and change zones associated with EWR for 2006 and 2011, respectively. Each change zone shown on the figures is discussed in the following paragraphs.

PD-06EWR-A (Figure 4.15): The estimated reductions in noise occur over three areas: east of the Garden State Parkway and over the village of Linden, NJ and then further west to Chatham and Summit NJ. These changes are caused primarily by the new departure routes off of Runways 22L/R. These routes have changed from turning directly to the west, north, northeast, or northwest to following the Ocean Routing procedure to the south and east over the ocean. As a result 51,108 persons represented by 684 census blocks are expected to experience a reduction in noise of greater than or equal to 5.0 DNL between 45 to 60 DNL.

PD-06EWR-B (Figure 4.15): The estimated reductions in noise occurring north of EWR and over the village of Harrison, NJ are caused by strict adherence to the departure procedure for Runways 4L/R included in the Ocean Routing Airspace Alternative. This procedure requires aircraft fly four NM before turning toward their departure fix. At that point, the new departure routes off of Runways 4L/R would turn west and then south to the Raritan Bay. As a result 675 persons represented by 5 census blocks are expected to experience a decrease in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL.

PD-06EWR-C (Figure 4.15): The estimated increases in noise occurring northeast of EWR and over Jersey City, NJ are caused by strict adherence to the departure procedure for Runways 4L/R included in the Ocean Routing Airspace Alternative. This procedure requires aircraft to fly four NM before turning to their departure fix. At that point, the new departure routes off of Runways 4L/R would turn west and then south to the Raritan Bay. As a result, 5,399 persons represented by 20 census blocks are expected to experience increases in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PD-06EWR-D (Figure 4.15): The estimated increases in noise occurring south of EWR and over southern tip of Staten Island in the towns of Tottenville, NY and Richmond Valley, NY are caused by the new departure routes off of Runways 22L/R. These routes would change from turning directly west to following the Ocean Routing procedure to the south and east over the ocean. Departures off of these runways will be held down at 6,000 feet to allow LGA arrivals to fly direct to LGA from the south. As a result, 21,099 persons represented by 194 census blocks are expected to receive an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PD-11EWR-A (Figure 4.16): The estimated reductions in noise occurring west of Interstate 95 and over the village of Linden, NJ are caused primarily by the new departure routes off of Runways

22L/R that would change from turning directly to the west, north, northeast, and northwest. These routes would follow the current procedure off the runway, fly south to the Raritan Bay and then east over the ocean. As a result, 17,525 persons represented by 224 census blocks are expected to experience a decrease in noise of greater than or equal to 5.0 DNL between 45 to 60 DNL.

PD-11EWR-B (Figure 4.16): The estimated increases in noise occurring northeast of EWR and between Interstate 95 and Jersey City, NJ are caused by strict adherence to the departure procedure for Runways 4L/R. In the procedure aircraft are required to go four NM before turning toward their departure fix. At that point, the new departure routes off of Runways 4L/R would turn west and then south to the Raritan Bay. As a result, 4,243 persons represented by 17 census blocks are expected to experience increases in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PD-11EWR-C (Figure 4.16): The estimated increases in noise occurring south of EWR and over Staten Island in the towns of Tottenville, NY and Richmond Valley, NY are caused by the new departure routes off of Runways 22L/R. These routes changed from turning directly west to go further south to the Raritan Bay and then east over the ocean. Departures off of these Runways will be held down at 6,000 feet to allow LGA arrivals to fly direct to LGA from the south. As a result, 14,498 persons represented by 129 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PD-11EWR-C-1 (Figure 4.16): The estimated increases in noise occurring south of EWR and over Staten Island near the town of Travis, NY is caused by the new departure routes off of Runways 22L/R. These routes changed from turning directly west to go further south to the Raritan Bay and then east over the ocean. As a result, 7 persons represented by one census block is expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

4.1.5.3 Compatible Land Use Impacts

Based on the NIRS analysis, the Ocean Routing Airspace Alternative would not result in significant noise impacts to residents located in the Study Area. Therefore, there would not be a significant impact to residential areas in terms of land use compatibility.

Impacts to other noise-sensitive land uses within the Study Area such as schools, hospitals, places of worship, parks, and historic sites were also considered. Noise-sensitive areas were identified by using NIRS results and the ESRI GNIS database. All areas subject to significant noise impacts (i.e., census blocks where noise exposure would potentially increase by 1.5 DNL or greater resulting in noise exposure of 65 DNL or greater) were evaluated for the presence of noise-sensitive land uses by using the GNIS database.

NIRS results showed that one Section 4(f) site would be in the area subjected to significant noise impacts as a result of the Ocean Routing Airspace Alternative; the Singer Factory District. Based on the analysis presented in Section 4.5, *Department of Transportation Act Section 4(f), and Land and Water Conservation Fund Act 6(f,)* it was determined that this level of noise would be compatible with the Singer Factory District.

4.1.6 Future Noise Impacts – Integrated Airspace Alternative Variation without ICC

The Integrated Airspace Alternative combines the New York TRACON airspace with portions of surrounding Centers' airspace to permit more seamless operations. The Integrated Airspace Alternative could be accomplished either with standalone (existing facilities) or consolidated facilities (NYICC facility) because the key component is a common automation platform. In this study, the Integrated Control Complex (ICC) refers to the existence of the common automation platform in either the standalone existing facilities or in the NYICC facility. Because the FAA has not yet decided whether to approve the NYICC concept, the Integrated Airspace Alternative was designed with two variations. The initial phase (2006) is the same for both variations because an ICC will not exist in 2006. This phase involves modifications to a departure gate as well as additional diverging departure headings; however, airspace facility boundaries would not change.

In the next phase (2011), the following variations appear:

- The first variation will integrate the airspace to the extent possible without the ICC. It includes the same changes to the airspace structure from phase one with expanded use of terminal separation, reallocation of airspace sectors, and new technologies.
- The second variation involves full airspace integration (i.e., combining the TRACON and Center airspace) and includes the ICC. There would be modifications to multiple departure gates, additional arrival posts, and additional diverging departure headings.

Both the initial phase (2006) and the first variation of the second phase are called the Integrated Airspace Alternative Variation without Integrated Control Complex (ICC) because an ICC i.e. a common automation platform would not exist. The second variation will be called the Integrated Airspace Alternative Variation with ICC. This section presents the noise modeling and impacts of the Integrated Airspace Alternative Variation without ICC in the years 2006 and 2011.

4.1.6.1 Noise Modeling Input

The NIRS modeling for the future Integrated Airspace Alternative Variation without ICC is directly based on the Future No Action Airspace Alternative noise modeling input. Only the elements of the alternative design that are expected to be different from the Future No Action Airspace Alternative procedures or design were modified for the NIRS modeling.

As with the Future No Action Airspace Alternative analysis, noise modeling was developed for IFR overflights and the projected IFR flight plan operations at the 21 airports identified as part of the study. The runways, local environmental variables, operations levels, and fleet mix used for the Future No Action Airspace Alternative modeling were also used in the Integrated Airspace Alternative Variation without ICC modeling. In general, the runway use proportions modeled at each airport for the

Future No Action Airspace Alternative conditions were held constant for this variation's noise modeling.

Similarly, the majority of the modeled flight tracks and dispersion about these tracks for the Future No Action Airspace Alternative modeling were held constant for the Integrated Airspace Alternative Variation without ICC modeling input. Only the flight tracks associated with the design element of the alternative were adjusted to represent those known changes for the alternative. The noise model changes made to the No Action input data in order to model the alternative are summarized as follows:

- West departure gate shifted and Expanded – Added a jet airway (all airports),
- New departure headings added (LGA, EWR, PHL),
- South departure route added (ISP only), and
- HPN Arrivals from the south turn closer to HPN.

Each of these items represents a group of flight track adjustments that were required in order to model the alternative design. Flight track adjustments generally involved portions of the route within the Study Area as dictated by the design. Flight tracks dispersion was only modified where route changes would likely have an effect on dispersion patterns. Chapter Two provides a detailed discussion of the design changes associated with this variation. Detailed information regarding the noise model input for this variation can be found in Appendix E.

The modeling refinements discussed in Chapter Three and in the Future No Action Noise Model Input section were applied to the analysis for this alternative.

4.1.6.2 Noise Impacts

The following paragraphs describe the noise exposure changes and the potential noise impacts resulting from implementation of the Integrated Airspace Alternative Variation without ICC.

Exposure

The route and procedural changes associated with the Integrated Airspace Alternative Variation without ICC would result in the population likely to be exposed to 65 DNL and greater increasing to approximately 78,860 persons in 2006, or 9.3 percent as compared to the Future No Action Airspace Alternative. On the other hand, by 2011 the alternative would reduce the expected number of persons within the 65 DNL noise level from 75,459 with the Future No Action Airspace Alternative to 72,600 with the Integrated Airspace Alternative Variation without ICC.

In the 60 to 65 DNL range the population is expected to increase from 213,692 persons with the Future No Action Airspace Alternative to 252,590 persons with the Integrated Airspace Alternative Variation without ICC in 2006. A similar shift is expected in 2011 with 209,793 persons in the Future No Action Airspace Alternative increasing to 249,537 persons with the Integrated Airspace Alternative Variation without ICC.

This variation would result in a very small percentage decrease in the number of persons expected to be exposed to noise levels between 45 and 60 DNL in 2006 from 11.77 million to approximately 11.76 million persons. Conversely, in 2011 this variation would increase the estimated persons exposed to aircraft noise between 45 and 60 DNL by about 1.5 percent from approximately 11.69 million to 11.86 million persons.

Table 4.9 presents a summary of the potential population exposed to noise levels for the Integrated Airspace Alternative Variation without ICC as compared to the Future No Action Airspace Alternative for both future years. The table highlights the areas where this variation would potentially cause increases and decreases in population exposure for the specific DNL ranges.

Change

In order to determine the significance of the changes in noise exposure associated with the Integrated Airspace Alternative Variation without ICC, an analysis of the changes relative to FAA's noise impact criteria was completed. **Figures 4.17 and 4.18** present a map of the Integrated Airspace Alternative Variation without ICC noise changes at the population census block centroids for both 2006 and 2011. Only populated census blocks that meet the noise exposure criteria in Section 4.1 are discussed. Both increases and decreases in noise levels meeting the criteria are shown. The census block centroids are color-coded to identify the criterion that they meet and whether the noise increased or decreased.

As the figures indicate, the changes associated with this variation are generally clustered around EWR and PHL with a small amount of change evidenced near LGA. There were no other changes meeting the FAA criterion found near the other airports modeled in the analysis.

Table 4.9

Potential Population Exposure & Change - Integrated Airspace Alternative Variation without ICC

Scenario	DNL Range>	45-60	60-65	65 +	Total 45+
2006					
No Action		11,774,446	213,692	72,141	12,060,279
Alternative		11,769,148	252,590	78,866	12,100,604
Difference		*-5,298*	*38,898*	*6,725*	*40,325*
2011					
No Action		11,688,798	209,793	75,459	11,974,050
Alternative		11,863,633	249,537	72,600	12,185,770
Difference		*174,835*	*39,744*	*-2,859*	*211,720*

Sources: NIRS Analysis, Landrum & Brown/Metron Aviation, Inc. 2007.

Table 4.10 summarizes the estimated change in population exposed to aircraft noise levels that meet the FAA criteria resulting from the Integrated Airspace Alternative Variation without ICC airspace design. The cells in the table are color-coded similar to the scheme used on the figures so that specific numbers of persons can be related to the maps of the noise change.

Based on the NIRS analysis, it is estimated that 21,399 persons would be exposed to a significant (+1.5 DNL at 65 DNL or higher) change in noise in 2006 resulting from the implementation of the Integrated Airspace Alternative Variation without ICC. This number would decrease in 2011 to approximately 13,856 persons. This variation would, at the same time, provide a noise reduction of 1.5 DNL or more in some areas exposed to 65 DNL or higher. In 2006 this level of noise reduction would be experienced by 5,970 persons and would decrease in 2011 to just over 5,000 persons.

Slight to moderate impacts would also be evident at lower noise levels due to this variation. In the 60 to 65 DNL range, it is expected that 37,558 persons would experience an increase in noise levels of 3.0 DNL or more in 2006. This number is expected to decrease slightly to 34,140 persons by 2011. There are very slight decreases of 3.0 DNL at noise levels of 60 to 65 DNL expected as a result of this variation in both 2006 and 2011. At the lowest noise levels (45 to 60 DNL) where Slight to Moderate (±5.0 DNL) impacts are identified, this variation is expected to result in noise increases for 142,517 persons in 2006. This impact is expected to be reduced in 2011 by approximately 22 percent to 111,413 persons. There is also a potential reduction in noise exposure at these lower noise levels with this variation. Approximately 39,400 persons are estimated to experience a 5.0 DNL reduction in noise levels between 45 and 60 DNL in 2006. By 2011, the noise reduction at these levels is expected to be experienced by 9,895 persons.

Table 4.10
Integrated Airspace Alternative Variation without ICC Population Impact Change Analysis Summary

	DNL Noise Exposure With Alternative		
	65 DNL or higher	60 to 65 DNL	45 to 60 DNL
Minimum Change in DNL With Alternative	1.5 DNL	3.0 DNL	5.0 DNL
Level of Impact	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
2006	21,399*	37,558	142,517
2011	13,856**	34,140	111,413
Noise Decreases			
2006	5,970	1	39,400
2011	5,094	22	9,895

*Note that 12,834 persons of this total are transient population passing through the jail on Rikers Island.
**Note that 12,846 persons of this total are transient population passing through the jail on Rikers Island.

Source: NIRS Analysis, Landrum & Brown/Metron Aviation Inc. 2007.

In order to provide a better understanding of these potential noise impacts, the areas of change within the Study Area were divided into smaller zones of change. These zones are generally associated with a specific airport and are identified with a unique code name. Figures are provided with enlarged views of the various change zones along with the name of each zone. The following paragraphs discuss the potential change in noise impact along with the cause of the change for each zone.

Figures 4.19 and 4.20 present an enlarged view of the noise changes at the population census blocks and change zones associated with LGA and EWR for 2006 and 2011. Each change zone shown on the figures is discussed in the following paragraphs.

PINB-06LGA-A (Figure 4.19): This region is located north of LGA including Rikers Island and on a small portion of the Hunts Point region in Bronx, NY. The region in Hunts Point extends north about 0.5 miles onto shore ending approximately at Oak Point Ave. These potential increases in noise are primarily caused by the new departure headings off of Runway 31 to the north and west gates. Departure headings were changed from approximately 005° to 020° and 350° to 005°. Approximately 12,800 persons represented by one census block are expected to experience an increase in noise of greater than or equal to 1.5 DNL within the 65 DNL. It should be noted that this single red census block is located on Rikers Island and it represents the estimated jail inmate population. The nature of this facility is such that the population would be considered transient. Additionally, in the area north of LGA, approximately 25 persons represented by two census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL.

PINB-11LGA-A (Figure 4.20): This region is located north of LGA including Rikers Island and on a small portion of the Hunts Point region in Bronx, NY. The region in Hunts Point extends north about 0.5 miles onto shore ending approximately at Oak Point Ave. These potential increases in noise are caused by the new departure headings off of Runway 31 to the north and west gates. Departures were changed from approximately heading 005° to 020° and heading 350° to 005°. Approximately 12,846 persons represented by one census block are expected to experience an increase in noise of 1.5 DNL within the 65 DNL. It should be noted that this single red census block is located on Rikers Island and represents the estimated prison inmate population. One person represented by one census block is expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL.

PINB-06EWR-A (Figure 4.19): The estimated increases in noise occurring west of Interstate 95 and over the Elizabeth, NJ area are caused by the new departure headings off of Runways 22L/R. Departure headings to the north and east gates were changed from 190° to 260° and 240°. As a result of this change, 5,977 persons represented by 42 census blocks are expected to experience an increase in noise of greater than or equal to 1.5 DNL above 65 DNL. Additionally, 36,072 persons represented by 204 census blocks are expected to receive an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL and 29,380 persons represented by 133 census blocks are expected to receive an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PINB-06EWR-B (Figure 4.19): The estimated reductions in noise occurring east of Interstate 95 over Elizabethport, NJ and Arlington, NY are caused by the new departure headings off of Runways 22L/R. The departure headings to the north and east gates were changed by moving a portion of the traffic from the 190° to 260° or 240° headings. Approximately 5,969 persons represented by 31 census blocks are expected to experience a decrease in noise of greater than or equal to 1.5 DNL within 65 DNL. Additionally, one person represented by one census block is expected to experience a decrease in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL and 8,622 persons represented by 43 census blocks are expected to experience a decrease in noise of greater than or equal to 5.0 DNL between 45 DNL and 60 DNL.

PINB-11EWR-A (Figure 4.20): The estimated increases in noise occurring west of Interstate 95 and over the Elizabeth, NJ area are caused by the new departure headings off of Runways 22L/R. Departure headings to the north and east gates were changed from 190° to 260° and 240°. As a result of this change, 768 persons represented by 8 census blocks are expected to experience an increase in noise of greater than or equal to 1.5 DNL above 65 DNL. Additionally, 30,975 persons represented by 186 census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL and 34,521 persons represented by 148 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PINB-11EWR-B (Figure 4.20): The estimated reductions in noise occurring east of Interstate 95 over Elizabethport, NJ and Arlington, NY are caused by the new departure headings off of Runways 22L/R. The departure headings to the north and east gates were changed by moving a portion of the traffic from the 190° to 260° or 240° headings. Approximately 5,094 persons represented by 26 census blocks are expected to experience a decrease in noise of greater than or equal to 1.5 DNL within 65 DNL. Additionally, 22 persons represented by 2 census blocks are expected to experience a decrease in noise of greater than or equal to 3.0 DNL between 60 and 65 and 9,743 persons represented by 43 census blocks are expected to experience a decrease in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

Figures 4.21 and 4.22 present an enlarged view of the noise changes at the census blocks and change zones associated with PHL for 2006 and 2011, respectively. Each change zone shown on the figures is discussed in the following paragraphs.

PINB-06PHL-A (Figure 4.21): This region is located west and north of the Airport and is approximately 20 square miles in area. The region ranges from the Airport north nearly to Baltimore Avenue, and west nearly to SR-261 (Valleybrook Rd.). Communities within this region include: Essington, Crum Lynne, Woodlyn, Wallingford, Rose Valley, Parkside, Brookhaven, and southeastern Chester Heights. These potential increases in noise are caused by the new departure headings off of Runways 27L/R to the north and west gates. Departure headings were changed from the current 240° and 255° to 330° for the north gate and 290° and 310° for the west gate. Approximately 2,600 persons represented by 54 census blocks are expected to experience an increase in noise of greater than or equal to 1.5 DNL within the 65 DNL. Additionally, approximately 1,460 persons represented by 29 census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL. Approximately 75,240 persons represented by 1,005 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PINB-06PHL-B (Figure 4.21): This region is located north and slightly east of the Airport and is approximately five square miles in area. The region includes portions of South Philadelphia and Central Philadelphia, the eastern edge of which is near 22nd Street, and the northern edge is near Walnut Street. Also, an area on the west side of the Schuykill River is included in this region. The area is approximately bounded by Walnut Street to the north and 43rd Street to the west. The potential increases in noise are caused by the new departure headings off of Runways 9L/R to the north and west gates. Departure headings were changed from the current 085° heading to 070° for the north gate and 030 and 050° for the west gate. Approximately 35,400 persons represented by 416 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PINB-06PHL-C (Figure 4.21): This region is located northeast of the Airport and is approximately four square miles in area. The main community within the region is Camden, NJ. The area is approximately bounded by Ferry Ave. in the south, Broadway St. in the west, State St. in the north, and Crescent Blvd. in the east. The potential reductions in noise are caused by the new departure headings off of Runways 9L/R to the north and west gates. Departure headings were changed from the current 085° heading to 070° for the north gate and 030° and 050° for the west gate. Approximately 30,271 persons, represented by 389 census blocks, are expected to experience a reduction in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL for this variation.

PINB-06PHL-D (Figure 4.21): This region is located south of the Airport and is approximately six square miles in area. The region is approximately two miles wide, containing the majority of Gibbstown, NJ north of I-295 and extending about two miles south if I-295. The potential increases in noise are primarily caused by the new departure headings off of Runways 27L/R to the east departure gate. Departure headings were changed from the current 240° and 255° headings to 190°. Approximately 2,400 persons represented by 61 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PINB-06PHL-E (Figure 4.21): This region is located southwest of the Airport and is approximately six square miles in area. Bridgeport, NJ, the main community within this region, is at the interchange of US-130 and US-322. The region extends west approximately three miles to Nortonville, NJ and north nearly two miles to the Delaware River. The potential reductions in noise are caused by the new departure headings off of Runways 27L/R to the south and east gates. Departure headings were changed from the current 240° and 255° headings to 230° and 250° for the south gate and 190° for the east gate. Approximately 500 persons represented by 22 census blocks are expected to experience a reduction in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PINB-11PHL-A (Figure 4.22): This region is located west and north of the Airport and is approximately 20 square miles in area. The region ranges from the Airport to slightly north of Baltimore Ave., and slightly west of SR-452. Communities within this region include: Essington, Crum Lynne, Woodlyn, Wallingford, Swarthmore, Rose Valley, and Parkside. The potential increases in noise are caused by the new departure headings off of Runways 27L/R to the north and west gates. Departure headings were changed from the current 240° and 255° headings to 330° for the north gate and 290° and 310° for the west gate. Approximately 240 persons represented by six census blocks are expected to experience an increase in noise of greater than or equal to 1.5 DNL within 65 DNL. Additionally, approximately 3,100 persons representing 61 census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL. Approximately 68,800 persons represented by 958 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PINB-11PHL-B (Figure 4.22): This region is located north and slightly east of the Airport and is approximately two square miles in area. The region mainly runs along I-76 bordering the west edge of South Philadelphia. The southern edge of the region is near Pattison Avenue, and the northern edge is near Washington Avenue. The potential increases in noise are caused by the new departure headings off of Runways 9L/R to the north and west gates. Departure headings were changed from the current 085° heading to 070° for the north gate and 030° and 050° for the west gate. Approximately 4,650 persons represented by 56 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL at levels between 45 and 60 DNL.

PINB-11PHL-C (Figure 4.22): This region is located south of the Airport and is approximately six square miles in area. The region is approximately two miles wide, containing the majority of Gibbstown, NJ north of I-295 and extending about two miles south of I-295. The potential increases in noise are primarily caused by the new departure headings off of Runways 27L/R to the east departure gate. Departure headings were moved from the current 240° and 255° headings to 190° for the east departure gate. Approximately 3,400 persons represented by 72 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PINB-11PHL-D (Figure 4.22): This region is located southwest of the Airport and is approximately six square miles in area. Bridgeport, NJ is the main community within this region at the interchange of US-130 and US-322. The region extends west approximately three miles to Nortonville, NJ and north nearly two miles to the Delaware River. The potential reductions in noise are caused by the new departure headings off of Runways 27L/R to the south and east gates. Departure headings were moved from the current 240° and 255° headings to 230° and 250° for the south gate and 190° for the east gate. Approximately 150 persons represented by nine census blocks are expected to experience a reduction in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

4.1.6.3 Compatible Land Use Impacts

Based on the NIRS analysis, the Integrated Airspace Alternative Variation without ICC would potentially result in significant noise impacts to residents located north of LGA (PINB-06LGA-A and PINB-11LGA-A), south of EWR (PINB-06-EWR-A and PINB-11EWR-A), and west of PHL (PINB-06PHL-A and PINB-11PHL-A). Residential land use is considered noise-sensitive. Therefore, significant noise impacts to noise-sensitive areas would also be considered a significant impact in terms of land-use compatibility.

Impacts to other noise-sensitive land uses within the Study Area such as schools, hospitals, places of worship, parks, and historic sites were also considered. Noise-sensitive areas were identified by using NIRS results and the ESRI GNIS database. All areas subject to significant noise impacts (i.e., census blocks where noise exposure would potentially increase by 1.5 DNL or greater resulting in noise exposure of 65 DNL or greater) were evaluated for the presence of noise-sensitive land uses by using the GNIS database.

NIRS results showed that five Section 4(f) sites would be in the area subjected to significant noise impacts as a result of the Integrated Airspace Alternative Variation without ICC. These sites include: the Unification Chapel, the John Marshall School, and the Bronx Powder Company and the Jenkins Rubber Company buildings, all located just south of EWR; and the Lazaretto, the Printzhof, and the Westinghouse Industrial Complex all located just to the east of PHL. Based on the analysis presented in Section 4.5, *Department of Transportation Act Section 4(f), and Land and Water Conservation Fund Act 6(f,)* it was determined that this level of noise would be compatible with the Unification Chapel, the Bronx Powder Company, the Jenkins Rubber Company, the Lazaretto, the Printzhof, and the Westinghouse Industrial Complex. However, this level of noise would not be compatible with the residential use of John Marshall School. Therefore, the significant noise impact at this location would be considered a significant impact in terms of land use compatibility.

4.1.7 Future Noise Impacts – Integrated Airspace Alternative Variation with ICC

The second variation of the Integrated Airspace Alternative involves full airspace integration (i.e., combining the TRACON and Center airspace). In addition, there would be modifications to multiple departure gates, additional arrival posts, and additional diverging departure headings.

The Integrated Airspace Alternative Variation with ICC represents a full airspace consolidation and is a new approach to the redesign of airspace from New York to Philadelphia. Where current en route airspace separation rules of five nautical miles are typically used, this airspace redesign alternative would use three nautical mile terminal airspace separation rules over a larger geographical area and up to 23,000 feet MSL in some areas.[5] The ICC airspace would be comprised of the majority of current NY TRACON and NY Center airspace, as well as some sectors from Washington Center and Boston Center. Boston Center could take the high-altitude parts of the current NY Center airspace structure. This section presents the noise modeling and impacts of the Integrated Airspace Alternative Variation with ICC for the forecasted 2011 conditions.

4.1.7.1 Noise Modeling Input

The NIRS modeling for the future Integrated Airspace Alternative Variation with ICC is directly based on the Future No Action Airspace Alternative noise modeling input. Only the elements of the variation's design that are expected to be different from the No Action procedures or design were modified for the NIRS modeling.

As with the Future No Action Airspace Alternative analysis, noise modeling was developed for IFR overflights and the projected IFR flight plan operations at the 21 airports evaluated in this study. The runways, local environmental variables, operations levels, and fleet mix used for the Future No Action Airspace Alternative modeling were also used in the Integrated Airspace Alternative Variation with ICC modeling. In general, the runway use proportions modeled at each airport for the Future No Action Airspace Alternative conditions were held constant for modeling this variation. There were, however, some design elements of this variation that resulted in modified runway use at both EWR and JFK.

The majority of the modeled flight tracks and dispersion about these tracks for the Future No Action Airspace Alternative modeling was held constant for the Integrated Airspace Alternative Variation with ICC modeling input. Only the flight tracks associated with the design elements of the Integrated Airspace Alternative Variation with ICC were adjusted to represent those known changes for this variation. The noise model changes made to the Future No Action Airspace Alternative input data are summarized as follows:

- West departure gates shifted and Expanded – Two jet airways added (all airports),
- New departure headings added (LGA, EWR, PHL),
- EWR and LGA west arrival flow split into two arrival flows, one to the north and one to the south,
- Both EWR parallel runways used for arrivals,
- Access to West departure gate added for JFK and ISP westerly departures,
- South departure gate expanded,
- Ocean departure gate added for EWR,
- West departure gate for PHL expanded, and
- Arrival route added for PHL (for arrivals from the west).

[5] Many air traffic control altitudes are given in flight levels representing altitude above mean sea level (MSL) in increments of 1,000 feet (i.e., flight level 230 equates to 23,000 feet above MSL).

Each of these items represents a group of flight track adjustments that were required in order to model this variation. Flight track adjustments generally involved moving portions of the route within the Study Area as dictated by the design. Flight tracks dispersion was only modified where route changes would likely have an effect on dispersion patterns. Chapter Two provides a detailed discussion of the design changes associated with this variation. Detailed information regarding the noise model input for this variation can be found in Appendix E.

The modeling refinements discussed in Chapter Three and in the Future No Action Noise Model Input section were applied to the analysis for this alternative.

4.1.7.2 Noise Impacts

The following paragraphs describe the noise exposure changes and the potential noise impacts resulting from implementation of the Integrated Airspace Alternative Variation with ICC.

Exposure

The route and procedural changes associated with the Integrated Airspace Alternative Variation with ICC would result in the population likely to be exposed to 65 DNL and greater decreasing to 74,833 persons in 2011.

The number of persons that would be exposed to 60-65 DNL is expected to increase from 209,793 persons with the Future No Action Airspace Alternative to 252,361 persons with the Integrated Airspace Alternative Variation with ICC in 2011.

This variation would result in a 4.6 percent increase in the number of persons expected to be exposed to noise levels between 45 and 60 DNL in 2011 from 11.69 million persons to 12.22 million persons.

Table 4.11 presents a summary of the potential population exposed to noise levels for the Integrated Airspace Alternative Variation with ICC as compared to the Future No Action Airspace Alternative for the forecast 2011 conditions. The table highlights the areas where this variation is expected to cause increases and decreases in population exposure for the specific DNL ranges.

Change

In order to determine the significance of the changes in noise exposure associated with the Integrated Airspace Alternative Variation with ICC, an analysis of the changes relative to FAA's noise impact criteria was completed. **Figure 4.23** is a map of the Integrated Airspace Alternative Variation with ICC noise changes at the census blocks centroids for the 2011 future conditions. Only populated census blocks that meet the noise threshold criteria discussed in Section 4.1 are shown. Both increases and decreases in noise levels meeting the criteria are shown. The census blocks are color-coded to identify the criterion that they meet and whether the noise increased or decreased.

As the figures indicate, the changes associated with this variation are evident both close-in to the airports, as well as farther out in the Study Area. As with previous alternatives, changes are clustered around EWR and PHL with a small amount of change evidenced near LGA. However, several areas of changes associated with EWR traffic are located farther north, west, and south of the Airport. Similarly, a small pocket of change associated with PHL is also located at a distance west of the Airport near the edge of the Study Area. Finally, a small area of change is evident to the northwest of HPN. There were no other changes meeting the FAA criterion found near any of the other airports modeled in the analysis.

Table 4.12 summarizes the estimated change in population exposed to aircraft noise levels that meet the FAA criteria resulting from the Integrated Airspace Alternative Variation with ICC airspace design. The cells in the table are color-coded similar to the scheme used on the figures so that specific numbers of persons can be related to the maps illustrating the noise change.

Based on the NIRS analysis, it is estimated that 15,826 persons would be exposed to a significant (+1.5 DNL at 65 DNL or higher) change in noise in 2011. This variation would, at the same time, provide noise reduction of 1.5 DNL or more in areas exposed to 65 DNL or more. In 2011 this level of reduction would be experienced by 6,984 persons.

Slight to moderate impacts are also evident at lower noise levels due to this variation's airspace design. In the 60 to 65 DNL range, it is expected that 34,824 persons would experience an increase in noise levels of 3.0 DNL or more in 2011. There would be only small decreases of 3.0 DNL at noise levels of 60 to 65 DNL expected due to this design. At the lowest noise levels (45 to 60 DNL) where Slight to Moderate (±5.0 DNL) impacts are identified, the implementation of this variation is expected to result in noise increases for 290,758 persons in 2011. A

Table 4.11

Potential Population Exposure & Change - Integrated Airspace Alternative Variation with ICC

		2011			
Scenario	**DNL Range>**	**45-60**	**60-65**	**65 +**	**Total 45+**
No Action		11,688,798	209,793	75,459	11,974,050
Alternative		12,222,280	252,361	74,833	12,549,474
Difference		*533,482*	*42,568*	*-626*	*575,424*

Source: NIRS Analysis, Landrum & Brown/Metron Aviation, Inc. 2007.

Table 4.12

Integrated Airspace Alternative Variation with ICC - Population Impact Change Analysis Summary

	DNL Noise Exposure With Alternative		
	65 DNL or higher	**60 to 65 DNL**	**45 to 60 DNL**
Minimum Change in DNL With Alternative	1.5 DNL	3.0 DNL	5.0 DNL
Level of Impact	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
2011	15,826*	34,824	290,758
Noise Decreases			
2011	6,984	22	62,537

*Note that 12,846 persons of this total are transient population passing through the jail on Rikers Island.

Source: NIRS Analysis, Landrum & Brown/Metron Aviation Inc., 2007.

reduction in noise exposure at these lower noise levels is also evident from the variation's design. Approximately 62,600 persons are estimated to experience a 5.0 DNL reduction in noise levels between 45 and 60 DNL in 2011.

In order to provide a better understanding of these potential noise impacts, the areas of change within the Study Area were divided into small zones of change. These zones are generally associated with a specific airport and are identified with a unique code name. Figures are provided with enlarged views of the various change zones along with the name of each zone.

Figure 4.24 presents an enlarged view of the noise changes at the census blocks and change zones associated with the NY/NJ Metropolitan Area for the 2011 conditions. Each change zone shown on the figures is discussed in the following paragraphs.

PIWB-11LGA-A (Figure 4.24): This region is located north of LGA (including Rikers Island) and on a small portion of the Hunts Point region in Bronx, NY. The portion in Hunts Point extends north about 0.5 miles onto shore ending approximately at Oak Point Avenue.

The potential increases in noise to the northwest of LGA are caused by the new departure headings off of Runway 31 to the north and west gates. Departure headings were changed from approximately 005° to 020° and 350° to 005°. Approximately 12,800 persons represented by one census block are expected to experience an increase in noise of greater than or equal to 1.5 DNL within the 65 DNL. It should be noted that the single red census block is located on Rikers Island and represents the estimated jail inmate population. The nature of this facility is such that the population would be considered transient. Approximately 26 persons represented by two census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL.

PIWB-11HPN-A (Figure 4.23): This region is located northwest of HPN near Pleasantville, NY. The area is immediately adjacent to the intersection of the Saw Mill Parkway and Bedford Road. The potential increase in noise in this area is caused by the northward shift of the north and west-bound departures out of HPN. This flow was shifted slightly to the north to allow for the dual arrival streams into EWR that are part of this design. Approximately 40 persons represented by one census block are expected to experience an increase in noise of greater than or equal to 5.0 DNL at levels between 45 and 60 DNL. It should be noted that the single yellow census block was generated as a result of the change in methodology to rounding to a single decimal point. Consequently, other census blocks in the vicinity, while changing some amount as a result of the alternative design, did not meet FAA's threshold of change at these lower noise levels.

PIWB-11EWR-A (Figure 4.24): The estimated increases in noise occurring west of Interstate 95 and over the Elizabeth, NJ area are caused by the new departure headings off of Runways 22L/R. Departure headings to the north and east gates were changed from 190°

to 260° and 240°. As a result, 2,729 persons represented by 17 census blocks are expected to experience an increase in noise of greater than or equal to 1.5 DNL above 65 DNL. Similarly, 31,161 persons represented by 187 census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL, and 33,340 persons represented by 143 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PIWB-11EWR-B (Figure 4.24): The estimated reductions in noise occurring east of Interstate 95 over Elizabethport, NJ and Arlington, NY are caused by the new departure headings off of Runways 22L/R. Departure headings to the north and east gates changed by moving a portion of the traffic from the 190° to 260° or 240° headings. Approximately 6,984 persons represented by 33 census blocks are expected to experience a decrease in noise of greater than or equal to 1.5 DNL resulting in noise exposure below 65 DNL. Similarly, 22 persons represented by 2 census blocks are expected to experience a decrease in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL, and 18,761 persons represented by 93 census blocks are expected to experience a decrease in noise of greater than or equal to 5.0 DNL between 45 DNL and 60 DNL.

PIWB-11EWR-B-1 (Figure 4.24): The estimated reductions in noise occurring on the southern end to Staten Island and over the town of Tottenville, NY are caused by the new departure headings off of Runways 22L/R. Departure headings to the north and east gates changed by moving a portion of the traffic from the 190° to 260° or 240° headings. Approximately 137 persons represented by 1 census block are expected to experience a decrease in noise of greater than or equal to 5.0 DNL between 45 DNL and 60 DNL.

PIWB-11EWR-C (Figure 4.23): The estimated reduction in noise occurring west of EWR and over the counties of Carbon PA, Monroe PA, Northampton PA, and Warren NJ, is caused by the removal of the arrival route through PENNS. This traffic would be split between two new arrival fixes. All jet traffic would flow to the north along Interstate 84 (arrival fix IEAW2) and all turbo prop traffic would flow south of Reading PA (arrival fix IASTW). As a result, 20,765 persons represented by 540 census blocks are expected to experience a decrease in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PIWB-11EWR-D (Figure 4.23): The estimated increase in noise occurring west of EWR and over the counties of Morris NJ and Sussex NJ, is primarily caused by two airspace changes: the westward shift of the downwind leg for Runways 4L/R and the increased traffic resulting from the movement of the PENNS arrival route. As a result, 41,743 persons represented by 517 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PIWB-11EWR-E (Figure 4.24): The estimated increases and reductions in noise occurring north of EWR and over the villages of Cedar Grove, NJ (reductions), Montville, NJ (reductions), Monsey, NJ (increases), Hillsdale, NJ (increases), Westwood, NJ (increases), New Millford, NJ (increases) and Oradell, NJ (increases) are caused by the eastward shift and extension of the base leg and final approach to Runways 22L/R. As a result, 16,953 persons represented by 199 census blocks are expected to experience a reduction in noise greater than 5.0 DNL between 45 and 60 DNL, while 100,574 persons represented by 1,607 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PIWB-11EWR-F (Figure 4.23): The estimated increases in noise occurring southwest of EWR and near the village of Spotswood, were caused by the extension of the base leg and final approach to Runways 4L/R. As a result, 1,773 persons represented by 17 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PIWB-11EWR-G (Figure 4.23): The estimated reductions in noise occurring southwest of EWR and over the village of Montgomery, NJ were caused by the extension of the base leg and final approach to Runways 4L/R. As a result, 5,231 persons represented by 49 census blocks are expected to experience a decrease in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

Figure 4.25 presents an enlarged view of the noise changes at the census blocks and change zones associated with PHL for 2011. Each change zone shown on the figures is discussed in the following paragraphs.

PIWB-11PHL-A (Figure 4.25): This region is located to the west and north of the Airport and is approximately 25 square miles in area. The region ranges from the Airport north to US-1 and slightly west of SR-452. Communities within this region include Essington, Crum Lynne, Woodlyn, Wallingford, Swarthmore, Media, Rose Valley, and Parkside. These potential increases in noise are caused by the new departure headings off of Runways 27L/R to the north and west gates. Departure headings were changed from the current 240° and 255° headings to 330° for the north gate and 290° and 310° for the west gate. Approximately 250 persons represented by three census blocks are expected to experience a significant increase in noise of greater than or equal to 1.5 DNL within 65 DNL. Additionally, 3,637 persons represented by 72 census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL between 60 and 65 DNL. Approximately 86,700 persons represented by 1,282 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PIWB-11PHL-B (Figure 4.25): This region is located to the north and slightly east of the Airport and is approximately four square miles in area. The region mainly runs along I-76 bordering the west edge of South Philadelphia. The southern edge of the region is near Pattison Avenue. Also, an area on the west side of the Schuykill River is included in this region. The area is approximately bounded by Chestnut Street to the north and 43rd Street to the west. The potential increases in noise are caused by the new departure headings off of Runways 9L/R to the north and west gates. Departure headings were changed from the current 085 heading to 070° for the north gate and 030° and 050° for the west gate. Approximately 23,200 persons represented by 175 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PIWB-11PHL-C (Figure 4.25): This region is located south of the Airport, and is approximately seven square miles in area. The region is approximately two miles wide, containing the majority of Gibbstown, NJ north of I-295 and extending about two miles south if I-295. There is a slim portion of the region which extends south to the New Jersey Turnpike. These potential increases in noise are primarily caused by the new departure headings off of Runways 27L/R to the east departure gate. Departure headings were changed from the current 240° and 255° headings off of Runway 27R/L to 190° for the east departure gate. Approximately 3,400 persons represented by 72 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL.

PIWB-11PHL-D (Figure 4.25): This region is located southwest of the Airport and is approximately six square miles in area. Bridgeport, NJ is the main community within this region. The region extends west approximately three miles to Nortonville, NJ and north nearly two miles to the Delaware River. The potential reductions in noise are caused by the new departure headings off of Runways 27L/R to the south and east gates. Departure headings were changed from the current 240° and 255° headings to 230° and 250° for the south gate and 190° for the east gate. Approximately 175 persons represented by 11 census blocks are expected to experience a reduction in noise greater than or equal to 5.0 DNL between 45 and 60 DNL.

PIWB-11PHL-E (Figure 4.23): This region is located about 40 miles west-northwest of the Airport and contains an approximately six mile long strip of land. The strip runs near US-322 and includes the communities of Navron, PA and East Earl, PA. These potential reductions in noise are caused by a northward relocation of the primary western PHL arrival route to accommodate the additional west gate departure fix. Approximately 515 persons represented by nine census blocks are expected to experience a reduction in noise greater than or equal to 5.0 DNL between 45 and 60 DNL.

4.1.7.3 Compatible Land Use Impacts

Based on the NIRS analysis, the Integrated Airspace Alternative Variation with ICC would potentially result in significant noise impacts to residents located north of LGA (PIWB-11LGA-A), south of EWR (PIWB-11EWR-A), and west of PHL (PIWB-11PHL-A). Residential land use is considered noise-sensitive. Therefore, the significant noise impacts to noise-sensitive areas would also be considered a significant impact in terms of land use compatibility.

Impacts to other noise-sensitive land uses within the Study Area such as schools, hospitals, places of worship, parks, and historic sites were also considered. Noise-sensitive areas were identified by using NIRS results and the ESRI GNIS database. All areas subject to significant noise impacts (i.e., census blocks where noise exposure would potentially increase by 1.5 DNL or greater resulting in noise exposure of 65 DNL or greater) were evaluated for the presence of noise-sensitive land uses by using the GNIS database.

NIRS results showed that five Section 4(f) sites would be in the area subjected to significant noise impacts as a result of the Integrated Airspace Alternative Variation with ICC. These sites include: Inwood Country Club near JFK; the residences at 34 E. 4th Street and 406 Marshall Street, the John Marshall School, and the Bronx Powder Company and the Jenkins Rubber Company buildings all located just south of EWR; and the Westinghouse Industrial Complex located just to the east of PHL. Based on the analysis presented in Section 4.5, *Department of Transportation Act Section 4(f), and Land and Water Conservation Fund Act 6(f,)* it was determined that this level of noise would be compatible with the Inwood Country Club, the Bronx Powder Company building, the Jenkins Rubber Company buildings, and the Westinghouse Industrial Complex. However, this level of noise would not be compatible with the residences at 34 E. 4th Street and 406 Marshall Street, or the John Marshall School. Therefore, the significant noise impact at these locations would be considered a significant impact in terms of land use compatibility.

4.1.8 Noise/Compatible Land Use Impacts– Summary

A summary of the 2006 population impacts for each alternative in terms of the FAA threshold criteria is presented in **Table 4.13**. The table is color-coded based on the census block mapping scheme presented in the figures that accompany this section.

A similar comparison for the 2011 conditions is presented in **Table 4.14**. The analysis indicates that each of the alternatives creates changes where noise increases or decreases meet one of the FAA criterion thresholds.

In terms of significant noise impact changes (+1.5 DNL in 65 DNL), the noise analysis indicates that with the exception of the Ocean Routing Airspace Alternative, each airspace alternative is expected to generate significant noise impacts in the future. This is largely due to the fact that the Modifications to Existing Airspace and the Integrated Airspace Alternatives include departure heading changes at the major airports while the Ocean Routing Airspace Alternative uses the current headings. The Modifications to Existing Airspace Alternative tends to create the fewest significant impacts and has the best aggregate significant impact totals. The Integrated Airspace Alternative Variations

Table 4.13
Project Alternative Comparison – 2006 Population Impact Change Analysis Summary

	DNL Noise Exposure With Proposed Action		
	65 DNL or higher	**60 to 65 DNL**	**45 to 60 DNL**
Minimum Change in DNL With Alternative	1.5 DNL	3.0 DNL	5.0 DNL
Level of Impact	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
Modifications to Existing Airspace	8,755	37,627	146,056
Ocean Routing Airspace	0	0	26,498
Integrated Airspace Variation without ICC	21,399*	37,558	142,517
Noise Decreases			
Modifications to Existing Airspace	5,970	1	39,426
Ocean Routing Airspace	0	675	51,108
Integrated Airspace Variation without ICC	5,970	1	39,400

*Note that 12,834 persons of this total are transient population passing through the jail on Rikers Island.

Source: NIRS Analysis, Landrum & Brown/Metron Aviation Inc. 2007.

Table 4.14
Project Alternative Comparison – 2011 Population Impact Change Analysis Summary

	DNL Noise Exposure With Proposed Action		
	65 dB or higher	**60 to 65 dB**	**45 to 60 dB**
Minimum Change in DNL With Alternative	1.5 dB	3.0 dB	5.0 dB
Level of Impact	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
Modifications to Existing Airspace	1,010	34,279	110,720
Ocean Routing	0	0	18,748
Integrated without ICC	13,856*	34,140	111,413
Integrated with ICC	15,826*	34,824	290,758
Noise Decreases			
Modifications to Existing Airspace	5,094	22	8,588
Ocean Routing	0	0	17,525
Integrated without ICC	5,094	22	9,895
Integrated with ICC	6,984	22	62,537

*Note that 12,846 persons of this total are transient population passing through the jail on Rikers Island.

Source: NIRS Analysis, Landrum & Brown/Metron Aviation Inc. 2007.

both generate similar levels of significant impacts in the future.

Therefore, it may be concluded that the implementation of the Modifications to Existing Airspace or the Integrated Airspace Alternatives would result in significant noise impacts. These significant noise impacts to noise-sensitive areas would also be considered a significant impact in terms of land use compatibility. Mitigation measures to avoid, minimize, rectify, reduce, eliminate, or compensate for these significant impacts were proposed in the Noise Mitigation Report on April 6, 2007. See Chapter Five, *Preferred Alternative and*

Mitigation, for additional information on the proposed mitigation.

In accordance with FAA Order 1050.1E, noise analysis was also completed for slight to moderate noise impacts. In the slight to moderate noise impact range of ±3.0 DNL between the 60 and 65 DNL levels, the impacts from the Modifications to Existing Airspace Alternative and the Integrated Airspace Alternative Variation without ICC are very similar. The Integrated Airspace Alternative Variation with ICC generates just slightly more impacts in this noise range. Again, due to the absence of modified departure headings, the Ocean Routing Alternative shows the fewest impacts in this range in both future years.

In the slight to moderate noise impact range of ±5.0 DNL between the 45 and 60 DNL levels, a somewhat similar relationship among alternatives is seen with the Modifications to Existing Airspace Alternative and the Integrated Airspace Alternative Variation without ICC having very similar impact levels. However, the Integrated Airspace Alternative Variation with ICC generates nearly double the aggregate impacts in this range as compared to those alternatives. Again, the Ocean Routing Alternative shows the fewest impacts in this range in both future years.

4.2 SOCIOECONOMIC IMPACTS AND ENVIRONMENTAL JUSTICE

All Airspace Redesign alternatives were evaluated to assess the potential for associated socioeconomic and environmental justice (EJ) impacts.

4.2.1 Socioeconomic Impacts

According to FAA Order 1050.1E, the proposed changes in air traffic procedures should be evaluated for their potential to result in the relocation of residences and businesses, alter surface transportation patterns, divide established communities, disrupt orderly, planned development, or to create an appreciable change in employment.

The proposed alternatives would not result in the construction of facilities. Therefore, the alternatives considered would not result in a direct impact causing the relocation of residences or businesses, alteration of surface transportation patterns, division of established communities, disruption of orderly planned development, or creation of an appreciable change in employment.

Although direct socioeconomic impacts would not be expected, there is the potential for indirect impacts, because all of the Proposed Action Airspace Redesign alternatives except the Ocean Routing Airspace Alternative would potentially result in significant noise impacts. All of the significantly impacted census blocks are located in the vicinity of LGA, EWR, and PHL. These areas are already exposed to extensive aviation noise. In addition, because of their urban setting, ambient noise is also high in these areas. For example, the noise levels recorded at noise measurement sites near EWR ranged from 64 to 68 DNL (See Section 3.3.2, *Background Noise Measurement*). Therefore, it would be unlikely that residences or business would relocate, surface transportation patterns would be altered, established communities would be divided, planned development would be disrupted, or employment levels would be changed as a result of any of the Airspace Redesign Alternatives.

4.2.2 Environmental Justice

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations,* and the accompanying Presidential Memorandum and Order DOT 5610.2, *Environmental Justice in Minority and Low-Income Populations,* require the FAA to identify and address disproportionately high and adverse human health or environmental impacts on low-income and minority populations in the communities potentially impacted by the Proposed Action. In order to comply with Order DOT 5610.2, the FAA must conduct meaningful public involvement with minority and low-income populations and analyze the potential for disproportionate impacts to these communities. The following paragraphs describe the public involvement program, and the environmental justice analysis.

4.2.2.1 Public Involvement Program

Public involvement included informal pre-scoping meetings and formal scoping meetings. Pre-Scoping meetings were held from September 1999 to May 2000. Scoping meetings were held between January and June 2001. FAA presentations at these meetings included project information such as the Purpose and Need for the Proposed Action and the potential alternatives to accomplish the Proposed Action. During the pre-scoping and scoping meetings, the public was encouraged to comment on issues regarding the EIS.

All these meetings were designed with sensitivity to low-income and minority populations. To conduct meaningful public involvement, the FAA considered the special needs of the low-income and minority communities. Special needs were accommodated by holding meetings in locations accessible by public transit, providing translators, advertising meetings in specialized local foreign language media, and contacting community and church leaders. Examples of such activities follow:

- FAA provided quarterly briefings to Congress regarding the Project and closely coordinated with Congressional staffers regarding any of their special-needs constituents. Some members of Congress provided guidance on meeting locations that would best suit their constituents. Three representatives in particular strongly recommended meeting locations to accommodate the needs of their minority populations. Representative Menendez recommended that a meeting be held in Carteret, NJ. Representative Serrano and Assemblyman Diaz conferred with community leaders to recommend a meeting location in the Soundview neighborhood in the Bronx. After receiving comments from Representative Nadler's office regarding the inadequacy of one of the meeting locations with respect to proximity to mass transit and train stations, a more accessible site, the Marriott Marquis in Times Square, very close to trains/transit was selected for a second meeting. A second meeting was held to provide an additional opportunity for low-income and minority populations to learn about the project. The scoping meeting was held at the Marriott Marquis for the same reason.
- The Notice of Intent was published in numerous newspapers, including El Diario (large circulation to Spanish-speaking population) and The Village Voice (a popular and well-read local NY paper). Notices of the public workshops were widely advertised, including in local Manhattan papers (Downtown Express, The Westsider, Westside Spirit, and Our Town) and community bulletin boards. Public service announcements were released over local radio (including the Spanish station WPAT 93.1) and cable TV stations.

- Spanish translators were provided at several of the meetings where it was expected that a large minority population may be in attendance (LaGuardia Queens/Elmhurst NY, The Bronx, NY, Newark, NJ, Elizabeth, NJ, and Carteret NJ).

After the publication of the DEIS, the FAA conducted DEIS public information meetings. Thirty public information meetings were held from February 2006 through May 2006. These meetings allowed the public to ask questions of the FAA and submit comments regarding the content of the DEIS. As with the Pre-Scoping and Scoping meeting, the DEIS information meetings were designed with sensitivity to low-income and minority populations. To conduct meaningful public involvement, the FAA considered the special needs of the low-income and minority communities. Special needs were accommodated by holding meetings in locations accessible by public transit, providing translators, advertising meetings in specialized local foreign language media, and contacting community and church leaders. Details regarding the advertisement of these meetings are included in Appendix M.

In summary, the FAA conducted meaningful public involvement by reaching out to minority and low-income communities using the strategies described in the preceding paragraphs.

4.2.2.2 Environmental Justice Analysis

The following paragraphs describe the methodology and results of the environmental justice analysis.

Methodology

The Proposed Action Airspace Alternatives would potentially result in significant noise and land use compatibility impacts. Therefore, the areas significantly impacted by noise were examined for disproportionate high and adverse human health or environmental impacts to low-income and minority communities.

In order to determine whether EJ populations were impacted disproportionately, the FAA relied upon guidance from both DOT and Council on Environmental Quality (CEQ) to define low-income and minority populations.

Order DOT 5610.2 defines the terms low-income population and minority population as follows:

- Low-Income means a person whose median household income is at or below the Department of Health and Human Services poverty guidelines.[6]
- Low-Income Population means any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed DOT program, policy or activity.[7]
- Minority Population means any readily identifiable groups of minority persons who live in geographic proximity, and if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a

[6] Order DOT 5610.2, Environmental Justice in Minority Populations and Low-Income Populations, U.S. Department of Transportation, April 1997, page 1.

[7] Ibid, page 2.

proposed DOT program, policy or activity.[8]

Because the Order DOT 5610.2 definition of a minority population is broad, the Council on Environmental Quality (CEQ)'s definition was also used:

- Minority: Individual(s) who are members of the following population groups: American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic origin; or Hispanic.[9]
- Minority population: Minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis.[10]

The methodology to evaluate environmental justice impacts relied on these definitions of minority and low income populations. This methodology is also based on the assumption that a high and adverse impact would potentially result from a significant noise impact. The first step was to identify the census blocks that are significantly impacted by noise. Census blocks were considered significantly impacted by noise if the noise exposure level increased greater than or equal to 1.5 DNL as a result of one of the Proposed Action Airspace Alternatives, where the noise exposure for the Future No Action Airspace Alternative was already greater than 65 DNL.

The next step was to determine the minority composition and median income of the census blocks. Census bureau data was processed to predict the median income and minority composition of the census blocks in 2006 and 2011. Details on this process are found in Appendix H. The potential for disproportionate impacts to minority or low-income populations was based on projected census data. Census data by census block was used to project the racial composition of census blocks in 2006 and 2011. Because income information is not available at the census block level, census data by census block group was used to project census block median incomes for 2006 and 2011.

By using the data from the first two steps, the income and minority composition of the significantly impacted census blocks was reviewed to determine whether the communities in the significantly impacted census blocks would be considered a low-income or minority population. To determine whether there would be a high and adverse impact to a low-income community, the median income of the significantly noise impacted census blocks was compared to the poverty level income. Based on the definition of a low-income person, a community is considered low-income if the median income is below poverty level. Poverty level income was based on the 2005 HHS Poverty Guideline median annual income (family of four) of $19,350.[11] To determine whether there would be a high and adverse impact on minority communities, the minority composition of the significantly impacted census blocks was considered by using

[8] Order DOT 5610.2, Environmental Justice in Minority Populations and Low-Income Populations, U.S. Department of Transportation, April 1997, page 2.

[9] Environmental Justice, Guidance Under the National Environmental Policy Act, Council on Environmental Quality, December 1997, page 25.

[10] Ibid, pages 25-26.

[11] The 2005 HHS Poverty Guidelines, United Sates Department of Health & Human Services, <http://aspe.hhs.gov/poverty/ 05poverty.shtml>.

CEQ's definition of a minority population. Therefore the population in census block was considered a minority population if the minority population percentage of the census block was 50 percent or meaningfully greater than the minority population percentage of an appropriate unit of geographic analysis. The appropriate units of geographic analysis, was determined to be the county in which the impact took place and/or the nearby census blocks not significantly impacted.

Finally, it was determined whether a low-income or minority community subjected to a high and adverse human health or environmental impact was disproportionately impacted. Disproportionate impacts occur when the high and adverse human health or environmental impact is either predominantly borne by a low-income or minority population or is more severe in magnitude than the impact on the non low-income or non-minority population.

Results

The following paragraphs discuss the results of the environmental justice analysis.

<u>LaGuardia Airport</u>

One census block would be significantly noise impacted by the Integrated Airspace Alternative Variation without the ICC and the Integrated Airspace Alternative Variation with ICC near LGA. See Figures 4.19, 4.20, and 4.24. This block consists of the entirety of Rikers Island, which is New York City's main penal facility.

The minority population of Rikers Island would be approximately 92 percent in both 2006 and 2011. Therefore, the population of Rikers Island would be considered a minority population per the first CEQ criteria.

Since the minority population of Rikers Island would be subject to significant noise impacts, and this impact is borne solely by the minority population, it may be concluded that there would be a disproportionate high and adverse environmental impact to a minority community.

<u>Newark Liberty International Airport</u>

Census blocks near EWR would be significantly impacted as a result of the Modifications to Existing Airspace and Integrated Airspace Alternatives. See Figure 4.26. Significantly impacted blocks would vary depending on the alternative. Racial composition and median income for the significantly noise impacted census blocks near EWR are shown in **Table 4.15**.

With the exception of census block number 27, the minority population of the significantly impacted census blocks near EWR exceeds 50 percent in both 2006 and 2011. Therefore, the population of the significantly impacted census blocks would be considered minority populations per the first CEQ criteria and the significant noise impacts near EWR would constitute a high and adverse environmental impact on a minority population. Since high and adverse impact is borne almost solely by the minority population, it may be concluded that there would be a disproportionate high and adverse environmental impact to a minority community.

It is noted that with one exception, census block number 27, the population in all of the census blocks shown on Figure 4.26 would be considered minority populations. (See Appendix I for minority population and median income statistics for these census

Table 4.15
EWR – Environmental Justice
Minority Population and Median Income for Significantly Noise Impacted Census Blocks

Census Block	% Minority		Median Income		Modifications		Integrated Without ICC		Integrated With ICC
	2006	2011	2006	2011	2006	2011	2006	2011	2011
1	88	88	$25,428	$27,913	X		X		
2	94	95	$24,215	$25,523	X	X	X	X	X
3	84	85	$24,215	$25,523	X	X	X	X	X
4	100	100	$24,215	$25,523	X	X	X	X	X
5	43	56	$24,215	$25,523	X	X	X	X	X
6	98	99	$71,471	$80,917	X	X	X	X	X
7	61	60	$71,471	$80,917	X		X		
8	89	90	$24,215	$25,523	X		X		
9	91	91	$24,215	$25,523	X		X		
10	89	89	$24,215	$25,523	X		X		
11	95	95	$24,215	$25,523	X		X		
12	71	73	$25,428	$27,913	X		X		
13	67	65	$25,428	$27,913	X		X		
14	94	94	$25,428	$27,913	X				
15	50	53	$25,428	$27,913	X		X		
16	76	80	$42,670	$47,929	X		X		
17	75	79	$42,670	$47,929	X		X		
18	62	69	$42,670	$47,929	X		X		
19	80	84	$42,670	$47,929	X		X		
20	82	85	$42,670	$47,929	X		X		
21	83	86	$42,670	$47,929	X		X		
22	84	89	$23,269	$24,460	X		X		
23	84	86	$28,317	$30,748	X		X		
24	100	100	$28,317	$30,748	X		X		
25	93	95	$28,317	$30,748	X		X		
26	81	82	$21,061	$22,853	X		X		
27	36	36	$21,061	$22,853	X		X		
28	75	78	$28,317	$30,748	X		X		
29	79	82	$28,317	$30,748	X		X		
30	83	88	$23,269	$24,460	X		X		
31	65	74	$28,317	$30,748	X		X		
32	56	63	$28,317	$30,748	X		X		
33	98	98	$28,317	$30,748	X		X		
34	92	94	$28,317	$30,748	X		X		
35	85	86	$21,061	$22,853	X		X		X
36	95	95	$21,061	$22,853	X		X		X
37	85	86	$21,061	$22,853	X	X	X	X	X
38	100	100	$21,061	$22,853	X	X	X	X	X
39	95	95	$32,004	$34,584					X
40	89	88	$32,004	$34,584	X		X		X
41	77	78	$32,004	$34,584	X		X		X

Table 4.15
EWR – Environmental Justice
Minority Population and Median Income for Significantly Noise Impacted Census Blocks

Census Block	% Minority		Median Income		Modifications		Integrated		
							Without ICC		With ICC
	2006	2011	2006	2011	2006	2011	2006	2011	2011
42	84	86	$28,317	$30,748	X				
43	97	100	$24,940	$27,500	X		X		X
44	98	100	$24,940	$27,500	X		X		X
45	83	83	$32,004	$34,584	X				X
46	79	79	$34,362	$37,297	X	X	X	X	X

Source: HNTB Analysis 2007.

blocks.) This indicates that there would not be a design element, other than the tracks associated with the Future No Action Airspace Alternative, which would not impact an environmental justice community.

No significantly impacted blocks near EWR have a median income below the poverty level. Therefore, no significant noise impacts near EWR would be considered a disproportionate high and adverse environmental impact to a low-income community.

Philadelphia International Airport

Census blocks near PHL would be subject to significant noise impacts as a result of the Modifications to Existing Airspace and the Integrated Airspace Alternatives. **See Figure 4.27.** The number of significantly impacted blocks would vary depending on the alternative and year. Racial composition and median income for the significantly noise impacted census blocks near PHL are shown in **Table 4.16**. With the exception of census block number 33, impacted blocks would have minority population of less than 50 percent. In addition when compared to the minority population for Delaware County, 18.7 percent, the minority population of census block number 45 could be considered meaningfully greater than the surrounding area. Therefore, the population of census blocks 33 and 45 would be considered minority populations per the CEQ criteria. Since census blocks 33 and 45 are only two of 54 census blocks significantly impacted by the 2006 Modifications to Existing Airspace Alternative and the 2006 Integrated Airspace Alternative Variation without ICC, it is concluded that there would not be a disproportionate high and adverse human health or environmental impact on a minority population.

There are no impacted census blocks near PHL with a median income which is lower than the poverty level. Accordingly, there is not a disproportionate impact to a low-income community due to the significant noise impacts near PHL.

Summary of Environmental Justice Impacts in the Study Area

The Modifications to Existing Airspace Alternative, Integrated Airspace Alternative Variation without ICC, and the Integrated Airspace Alternative Variation with ICC all would result in disproportionate impacts to minority populations and, therefore, would result in significant environmental justice impacts. Mitigation measures to avoid, minimize, rectify, reduce, eliminate, or compensate for these significant impacts

Table 4.16
EWR – Environmental Justice
Minority Population and Median Income for Significantly Noise Impacted Census Blocks

Census Block	% Minority		Median Income		Modifications		Integrated		
							Without ICC		With ICC
	2006	2011	2006	2011	2006	2011	2006	2011	2011
1	0	0	$40,506	$42,925	X		X		
2	17	17	$52,439	$57,715	X	X	X	X	
3	0	0	$52,439	$57,715	X	X	X	X	
4	0	0	$52,439	$57,715	X		X		
5	3	3	$52,439	$57,715	X		X		
6	0	0	$52,439	$57,715	X		X		
7	5	5	$52,439	$57,715	X		X		
8	7	7	$52,439	$57,715	X		X		
9	5	5	$52,439	$57,715	X		X		
10	0	2	$52,439	$57,715	X	X	X	X	
11	0	7	$52,439	$57,715	X	X	X	X	
12	2	4	$52,439	$57,715	X	X	X	X	X
13	3	5	$52,439	$57,715	X	X	X	X	
14	2	2	$52,439	$57,715	X		X		
15	2	2	$52,439	$57,715	X		X		
16	5	6	$52,439	$57,715	X		X		
17	6	6	$52,439	$57,715	X		X		
18	5	5	$52,439	$57,715	X		X		
19	2	2	$52,439	$57,715	X		X		
20	6	6	$52,439	$57,715	X		X		
21	0	4	$52,439	$57,715	X		X		
22	5	5	$52,439	$57,715	X		X		
23	0	0	$52,439	$57,715	X		X		
24	0	0	$52,439	$57,715	X		X		
25	3	3	$52,439	$57,715	X		X		
26	2	2	$52,439	$57,715	X		X		
27	2	2	$52,439	$57,715	X		X		
28	5	9	$52,439	$57,715	X		X		
29	0	3	$52,439	$57,715	X		X		
30	0	5	$52,439	$57,715	X		X		
31	3	3	$52,439	$57,715	X		X		
32	4	6	$52,439	$57,715	X		X		
33	83	83	$54,849	$60,273	X		X		
34	0	2	$52,439	$57,715	X		X		
35	2	2	$52,439	$57,715	X		X		
36	11	14	$52,439	$57,715	X		X		
37	2	2	$52,439	$57,715	X		X		
38	2	2	$52,439	$57,715	X		X		
39	3	3	$52,439	$57,715	X		X		
40	0	0	$54,849	$60,273	X		X		
41	4	4	$54,849	$60,273	X		X		

Table 4.16
EWR – Environmental Justice
Minority Population and Median Income for Significantly Noise Impacted Census Blocks

Census Block	% Minority		Median Income		Modifications		Integrated		
							Without ICC		With ICC
	2006	2011	2006	2011	2006	2011	2006	2011	2011
42	0	0	$54,849	$60,273	X		X		
43	25	25	$54,849	$60,273	X		X		
44	4	7	$54,849	$60,273	X		X		
45	33	33	$54,849	$60,273	X		X		
46	4	6	$54,849	$60,273	X		X		
47	5	5	$54,849	$60,273	X		X		
48	2	3	$44,524	$49,521	X		X		
49	2	2	$44,524	$49,521	X		X		
50	2	3	$44,524	$49,521	X		X		
51	3	3	$44,524	$49,521	X		X		
52	3	4	$44,524	$49,521	X		X		
53	1	3	$44,524	$49,521	X		X		X
54	2	2	$44,524	$49,521	X		X		X

Source: HNTB Analysis 2007.

were proposed in the Noise Mitigation Report, published on April 6, 2007. See Chapter Five, Preferred Alternative and Mitigation, for additional information on the proposed mitigation.

4.3 SECONDARY OR INDUCED IMPACTS

Major development proposals have the potential to produce induced or secondary impacts on surrounding communities. Induced impacts could include shifts in population and growth; increased (or decreased) demand for public services; and changes in business and economic activity within the confines of the Study Area.

Significant induced impacts would normally result from significant impacts to other impact categories especially noise, compatible land use and social impacts. Therefore, potential secondary impacts were considered based on analysis of noise, land use, and social impacts. There is potential for significant noise impacts with all of the proposed alternatives with the exception of the Ocean Routing Alternative, however, it is not expected that any of the Airspace Redesign alternatives would result in shifts in population and growth; increased demand for public services; or changes in business and economic activity. All of the significantly impacted census blocks are located in the vicinity of LGA, EWR, and PHL. These areas are already exposed to extensive aircraft noise. In addition, because of their urban setting ambient noise is also high in these areas. For example, the noise levels recorded at noise measurement sites near EWR ranged from 64 to 68 DNL (See Section 3.3.2, *Background Noise Measurement*). Therefore, it would be unlikely that noise impacts associated with the Proposed Action Airspace Redesign alternatives would result in significant secondary impacts.

4.4 HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Historical, architectural, archaeological, and cultural resources that will be affected by federally funded and licensed undertakings come under the protection of the National Historic Preservation Act of 1966 (16 U.S.C. 470), as amended. This Act, in Section 106, requires Federal agencies to consider the effects of such undertakings on properties listed, or eligible for listing, in the National Register of Historic Places (NRHP). Regulations related to this process are described in 36 CFR Part 800, Protection of Historic Properties.

Primary impacts would include the removal or alteration of historic resources. Secondary, or indirect, impacts would include changes in noise, vehicular traffic, light emissions, or other changes that could interfere substantially with the use or character of the resource.

A variety of historic resources are in the Study Area as discussed in Chapter Three, *Affected Environment*, Section 3.8, *Historical, Archaeological, Architectural, and Cultural Resources*. See Appendix F for a listing of cultural resources located within the Study Area.

There would be no ground disturbance as a result of the Proposed Action. Therefore, there would be no direct impacts on properties on or eligible to be on the National Register of Historic Places.

The potential for indirect impacts to historic resources must also be assessed. Indirect impacts include noise impacts that would diminish the integrity of the property's setting. Since implementation of any of the Airspace Redesign Alternatives would change the noise exposure in the Study Area, the potential for noise impacts on historic resources was studied.

The first step was to identify the appropriate area of potential effect (APE) to account for significant noise impacts on cultural resources. It was proposed that the APE be developed to include all significantly impacted census blocks. The FAA coordinated the proposed methodology for developing the APE with the State Historic Preservation Officers (SHPOs) for Connecticut, Delaware, New Jersey, New York, and Pennsylvania. All of the SHPOs agreed to this methodology with the exception of the Delaware SHPO. The Delaware SHPO requested that all of New Castle County, within the Study Area, be examined for impacts to cultural resources (See **Figure 4.28**.). Potential noise changes in this area of interest were considered while developing the APE.

Once the results of the noise analysis were available, the APE was established. The APE was limited to census blocks where the noise exposure would change greater than 1.5 DNL within the 65 and higher DNL range (significantly impacted). The APE was developed by combining all of the significantly impacted census blocks for all of the Airspace Alternatives. The resulting APE consists of five separate areas: Rikers Island just north of LGA, the Inwood Country Club located immediately to the east of JFK, two areas south of EWR (see **Figure 4.29**), and an area west of PHL (see **Figure 4.30)**. The APE does not include any areas in the states of Connecticut or Delaware because not only were there no significantly impacted census blocks within these states, there were also no moderately or slightly impacted census blocks in either state.

The next step was to identify historic resources listed on or eligible for listing on the NRHP located within the APE. These sites were identified by using data available from the National Register and by conducting windshield surveys when necessary. The results of the windshield surveys are included in Appendix F.

Ten historic and potentially historic sites were identified in the APE: the Inwood Country Club near JFK; the Unification Chapel, the residences at 34 E. 4th Street and 406 Marshall Street, the John Marshall School, the Bronx Powder Company and the Jenkins Rubber Company buildings, and the Singer Factory District all located just south of EWR; and the Lazaretto, the Printzhof, and the Westinghouse Industrial Complex all located just to the east of PHL.

The next step was to determine if the significant noise impacts met the criteria of adverse effect for any of the ten sites. An adverse effect is one that diminishes the integrity of a cultural resource. According to 36 CFR 800.5(a), "An adverse effect is found when and undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location design, setting, materials workmanship, feeling, or association."[12] The ten sites are described and evaluated for adverse effect in the following paragraphs.

The Inwood Country Club is located immediately to the east of JFK Runway 4R across the Head of Bay. It is a private country club featuring a golf course, tennis courts, fitness center and beachfront facilities. Since the country club was founded in 1901 it may be potentially eligible to be listed on the NRHP. As a result of the Integrated Airspace Alternative Variation without ICC the noise exposure level would be 65.9 DNL. Due to this country club's proximity to JFK and the Head of Bay, which is subject to motor boat traffic, it is concluded that a quiet setting would not be a recognized purpose or attribute of the Inwood Country Club. Therefore, the increase in noise would not be considered an adverse effect.

The Unification Chapel is located at 953 E. Grand Street in Elizabeth NJ. The noise analysis showed that the noise exposure at this location would potentially increase from 56.0 DNL to 65.0 DNL in 2006 and from both the Modifications to Existing Airspace Alternative and Integrated Airspace Alternative Variation without ICC. This site was determined eligible to be listed on the NRHP under Criterion C as a remarkably intact and excellent example of a modest ecclesiastical structure dating from the early twentieth century. Eligibility under Criterion C means that a property is important because it illustrates a particular architectural style or construction technique. An increase in noise would not diminish the architectural style of this site. Therefore, the noise impacts would not constitute an adverse effect on the Unification Chapel.

Two residences located at 34 E. 4th Street and 406 Marshall Street in Elizabeth, New Jersey are located in the APE near EWR. The residence at 34 E. 4^{th} Street was previously determined eligible for nomination to the NRHP. The 1985 historic survey report of this circa 1860 residence stated, "This house has local architectural significance as a rare example of a brick duplex with Italianate detailing." The adjacent residence located at 406 Marshall Street is of similar historical architectural integrity. The noise analysis showed that the

[12] 36 CFR Part 800, Protection of Historic Properties, August 2004, Subpart B § 800.5 (1).

noise exposure at these locations would potentially increase from 63.8 DNL to 65.7 DNL in 2006 as a result of Modifications to Existing Airspace and from 63.8 DNL to 65.2 DNL in 2006 as a result of the Integrated Airspace Alternative Variation without ICC. These sites were determined eligible to be listed on the NRHP under Criterion C. Since an increase in noise would not diminish the architectural style of these residences, the noise impacts would not constitute an adverse effect.

The John Marshall School building is located on the northeast side of Magnolia Avenue between E. 5th Street and E. 6th Street in Elizabeth NJ. The school was built in 1929 and the neoclassical brick façade with stone trim is architecturally distinctive and retains high integrity. As a result of the implementation of the Integrated Airspace Alternative Variation with ICC the noise exposure at this site would increase to 67.8 DNL. Since this site may be listed on the NRHP under Criterion C, an increase in noise would not constitute an adverse effect on the John Marshall School building.

The Bronx Powder Company and the Jenkins Rubber Company buildings are located along the railroad line on Magnolia Street at Division Street in Elizabeth NJ. These two separate businesses were built in the late 19th century and may be potentially eligible to be listed on the NRHP because of their architectural integrity and historical significance. The noise analysis showed that the noise exposure at these locations would potentially increase from 58.3 DNL to 66.7 DNL in 2006 as a result of Modifications to Existing Airspace Alternative. Since these sites may be potentially eligible for their architectural integrity and are located in an industrial area along a railroad track, an increase in noise would not constitute an adverse effect on either the Bronx Powder Company and the Jenkins Rubber Company buildings.

The Singer Factory Historic District is located southwest of EWR. The District is significant both because the Singer Manufacturing Company was the first sewing machine complex in the US and because of the high architectural integrity of some of the buildings. As a result of the implementation of the Ocean Routing Airspace Alternative (2011), the noise exposure at this historic site would increase to 67.0 DNL. A quiet setting is not a recognized purpose or attribute of this site. In fact, according to the City of Elizabeth Urban Enterprise Zone Map, the area including the Singer facilities is included in an Urban Enterprise Zone and a proposed light rail train track is to run adjacent to the site. The increase in noise would not alter the historic characteristics which made this site eligible for listing in the National Register,.and therefore would not constitute an adverse affect.

The former Westinghouse Industrial Complex occupies the entire southeastern section of the APE near PHL. All of the Proposed Action Airspace Redesign Alternatives with the exception of the Ocean Routing Airspace Alternative would result in a significant increase in noise in the vicinity of the former Westinghouse Industrial Complex. This industrial area has not been studied in detail for historic resources. Some of the buildings on this site may be potentially eligible for nomination to the NRHP. During the recent windshield survey several structures serving the historical Westinghouse Canal were observed including an apparatus at the north end of the canal that may have pumped the water into the industrial complex. Even if the Westinghouse Industrial Complex were to be determined eligible for the NRHP, increased aircraft noise would not alter the historic characteristics of the industrial complex. Therefore, implementation of any of the Proposed Action Airspace Redesign Alternatives would not result in an adverse affect to the Westinghouse Industrial Complex.

The Lazaretto site is located on the Delaware River in Essington, PA. The noise analysis showed that the noise exposure at this location would potentially increase from 63.7 DNL to 66.5 DNL in 2006 and from 63.0 DNL to 64.6 DNL in 2011 for both the Modifications to Existing Airspace Alternative and Integrated Airspace Alternative Variation without ICC. The Lazaretto is the only known remaining quarantine house from the 19th century that continues to exist. Built in 1799, it was added to the National Register in 1972. After its use as a quarantine site ended, it became a resort and a seaplane base before World War I. The Lazaretto has become a contested site over the past few years, starting when it was purchased by Island Marine Partners, LLC in 2000, with the intent of developing the property. Tinicum Township, the governing municipality, denied the development plans due to the historic nature of the location and eventually bought the property in 2005. The township is planning on using part of the land to develop a firehouse and surveys are being conducted to determine the feasibility of this development. The Township also plans to initiate a feasibility study to determine whether the Lazaretto site could be preserved solely as a public historic site or a combination of a museum and community services facility. Additional information on the Lazaretto site, including the Nomination Form for inclusion in the National Register and photos is provided in **Appendix F**. The increase in noise would not alter the historic characteristics which made this site eligible for listing in the National Register. Therefore, the increase in noise would not be considered an adverse effect.

The Printzhof site is also located in Essington, PA. The noise analysis showed that the noise exposure at this location would increase from 61.9 DNL to 65.7 DNL in 2006 and from 61.2 DNL to 63.5DNL in 2011 for both the Modifications to Existing Airspace Alternative and Integrated Airspace Alternative Variation without ICC. The Printzhof was the residence of Governor Johan Printz from 1643-1653. Johan Printz was the governor of the first permanent European settlement, New Sweden, which became Pennsylvania. This site was added to the National Register in 1966. The significance of preservation is due to the site's relationship to the history of Sweden in America. The only visual remnant of the Printzhof structure is the stone foundation. The Printzhof foundation and a statue of Johan Printz are now part of the Governor Printz Park. The Nomination Form for inclusion of the Printzhof in the National Register is provided in Appendix F. The increase in noise would not alter the historic characteristics which made this site eligible for listing in the National Register. Therefore, the increase in noise would not be considered an adverse effect.

4.5 DEPARTMENT OF TRANSPORTATION ACT SECTION 4(F), AND LAND AND WATER CONSERVATION FUND ACT SECTION 6(F)

Section 303(c), Title 49 USC, commonly referred to as Section 4(f) of the DOT Act,[13] states that the "…Secretary of Transportation will not approve a project that requires the use of any publicly-owned

[13] Department of Transportation Act of 1966, § 4(f) [recodified at 49 USC 303 (c)].

land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from a historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land…and [unless] the project includes all possible planning to minimize harm resulting from the use."[14] Section 4601, Title 16 USC, The Land and Water Conservation Fund (LWCF) Act, commonly referred to as Section 6(f) states that no public outdoor recreation areas acquired with LWCF assistance can be converted to non-recreation uses without the approval of the Secretary of the Interior. The potential impacts to both Section 4(f) and Section 6(f) were analyzed.

4.5.1 Section 4(f)

A list of the 4(f) resources within the Study Area is found in Chapter Three, *Affected Environment*, Section 3.7, *Department of Transportation Act: Section 4(f)*.

In regard to 4(f) properties, the term use encompasses both physical use of the property as well as constructive uses. Indirect adverse impacts, such as noise, that prevent the use of Section 4(f) properties for their intended purpose are considered as constituting a constructive use. In determining whether there is a constructive use, the FAA must determine if the impacts would substantially impair the property. A Section 4(f) property is determined to be substantially impaired when the activities, features, or attributes of the site that contribute to its significance or enjoyment are substantially diminished. According to FAA Order 1050.1E, the Part 150 land use compatibility guidelines may be used to determine if there is a constructive use of a Section 4(f) property, if the guidelines are relevant to the value, significance, and enjoyment of that particular property.

The Airspace Redesign alternatives do not require land acquisition or facility construction. Therefore, the Airspace Redesign alternatives do not result in a physical use of any Section 4(f) property. However, because the Proposed Action Airspace Redesign alternatives would potentially result in significant changes in noise, constructive use of Section 4(f) properties is also addressed.

Two methods were initially used to evaluate noise impacts to the Section 4(f) properties. The first method was to input location data (latitudes and longitudes) for Section 4(f) properties within these census blocks into the noise model and calculate noise values at the specific Section 4(f) locations. The results of this analysis may be found in Appendices F, *Historic Resources*, and J, *Section 4(f) and 6(f) Properties* The second method was to determine which Section 4(f) properties were located within the significantly impacted census blocks by using the ESRI GNIS database.

Based on these analyses it was determined that the noise level would potentially increase significantly at ten historic and potentially historic sites: the Inwood Country Club near JFK; the Unification Chapel, the adjacent residences at 34 E. 4th Street and 406 Marshall Street, the John Marshall School, the Bronx Powder Company and the Jenkins Rubber Company buildings, and the Singer Factory District all located just south of EWR; and the Lazaretto, the Printzhof, and the Westinghouse Industrial Complex all located just to the east of PHL. All of these sites are discussed in Section 4.4, *Historical, Architectural, Archaeological, and Cultural Resources.*

[14] FAA Order 1050.1E, Appendix A, page A-19.

The Inwood Country Club is located immediately to the east of JFK Runway 4R across the Head of Bay. It is a private country club featuring a golf course, tennis courts, fitness center, and beachfront facilities. As a result of the Integrated Airspace Alternative Variation with ICC, the noise exposure level would be 65.9 DNL. Due to this country club's proximity to JFK and the Head of Bay, which is subject to motor boat traffic, it is concluded that a quiet setting would not be a recognized purpose or attribute of the Inwood Country Club. Therefore, Part 150 land use compatibility guidelines may be applied to determine whether there is a constructive use. According to the compatibility guidelines, a golf course is compatible with noise exposure levels of up to 70 DNL. Therefore, the increase in noise exposure resulting from the mitigated Preferred Alternative would not be considered a constructive use of the Inwood Country Club.

The Unification Chapel is located at 953 E. Grand Street in Elizabeth NJ. The noise analysis showed that the noise exposure at this location would potentially increase from 56.0 DNL to 65.0 DNL in 2006 from both the Modifications to Existing Airspace Alternative and Integrated Airspace Alternative Variation without ICC. This site was determined eligible to be listed on the NRHP under Criterion C as a remarkably intact and excellent example of a modest ecclesiastical structure dating from the early twentieth century. Eligibility under Criterion C means that a property is important because it illustrates a particular architectural style or construction technique. An increase in noise would not diminish the architectural style of this site. Therefore, Part 150 land use compatibility guidelines may be applied to determine whether there is a constructive use. According to the compatibility guidelines, a church is generally compatible with noise exposure levels of up to 70 DNL. Therefore, the increase in noise exposure would not be considered a constructive use of Unification Chapel.

Two adjacent residences at 34 E. 4th Street and 406 Marshall Street are located in Elizabeth, New Jersey. The noise analysis showed that the noise exposure at these locations would potentially increase from 63.8 DNL to 65.7 DNL in 2006 as a result of Modifications to Existing Airspace and from 63.8 DNL to 65.2 DNL in 2006 as a result of the Integrated Airspace Alternative Variation without ICC. These sites were noted for their architectural style and integrity. Since an increase in noise would not diminish the architectural style of these residences, the noise impacts would not constitute an adverse effect. Therefore, Part 150 land use compatibility guidelines may be applied to determine whether there is a constructive use. According to the compatibility guidelines, residences are compatible with exposure levels of up to 65 DNL. Therefore, mitigation measures were developed and are discussed in Chapter Five, *Preferred Alternative and Mitigation*.

The John Marshall School building is located on the northeast side of Magnolia Avenue between E. 5th Street and E. 6th Street in Elizabeth NJ. As a result of the implementation of the Integrated Airspace Alternative Variation with ICC the noise exposure at this site would increase to 67.8 DNL. Since this building for its distinctive architecture an increase in noise would not constitute an adverse effect. Therefore, Part 150 land use compatibility guidelines may be applied to determine whether there is a constructive use. According to the compatibility guidelines, schools are compatible with exposure levels of up to 65 DNL. Therefore, mitigation measures were developed and are discussed in Chapter Five, *Preferred Alternative and Mitigation*.

The Bronx Powder Company and the Jenkins Rubber Company buildings are located along the railroad line on Magnolia Street at Division Street in Elizabeth NJ. These two separate businesses were built in the late 19th century and may be potentially eligible to be listed on the NRHP because of their architectural integrity and historical significance. The noise analysis showed that the noise exposure at these locations would potentially increase from 58.3 DNL to 66.7 DNL in 2006 as a result of Modifications to Existing Airspace Alternative. Since these sites may be potentially eligible for their architectural integrity and are located in an industrial along a railroad track, an increase in noise would not constitute an adverse effect on either the Bronx Powder Company and the Jenkins Rubber Company buildings. According to the compatibility guidelines, manufacturing land use is compatible with noise exposure levels of 70 DNL. Therefore, the increase in noise exposure would not be considered a constructive use of the Bronx Powder Company and the Jenkins Rubber Company buildings.

The Singer Factory Historic District is located southwest of EWR. As a result of the implementation of the Ocean Routing Airspace Alternative (2011), the noise exposure at this historic site would increase to 67.0 DNL. The District is significant both because the Singer Manufacturing Company was the first sewing machine complex in the US and because of the high architectural integrity of some of the buildings. A quiet setting is not a recognized purpose or attribute of this site. In fact, according to the City of Elizabeth Urban Enterprise Zone Map, the area including the Singer facilities is included in an Urban Enterprise Zone and a proposed light rail train track is to run adjacent to the site. The increase in noise would not alter the historic characteristics which made this site eligible for listing in the National Register. Therefore, Part 150 land use compatibility guidelines may be applied to determine whether there is a constructive use. According to the compatibility guidelines, manufacturing land use is compatible with noise exposure levels of 70 DNL. Therefore, the increase in noise exposure would not be considered a constructive use of the Singer Factory Historic District.

The former Westinghouse Industrial Complex occupies the entire southeastern section of the APE near PHL. All of the Proposed Action Airspace Redesign Alternatives with the exception of the Ocean Routing Airspace Alternative would result in a significant increase in noise in the vicinity of the former Westinghouse Industrial Complex. This industrial area has not been studied in detail for historic resources. Some of the buildings on this site may be potentially eligible for nomination to the NRHP. During the recent windshield survey several structures serving the historical Westinghouse Canal were observed including an apparatus at the north end of the canal that may have pumped the water into the industrial complex. Even if the Westinghouse Industrial Complex were to be determined eligible for the NRHP, increased aircraft noise would not alter the historic characteristics of the industrial complex. Therefore, Part 150 land use compatibility guidelines may be applied to determine whether there is a constructive use. According to the compatibility guidelines, manufacturing land use is compatible with noise exposure levels of 70 DNL. Therefore, the increase in noise exposure would not be considered a constructive use of the Westinghouse Industrial Complex.

The Lazaretto and Printzhof sites are located in Essington, PA. The Lazaretto site has been purchased by a community to, in part, construct a fire house. The Printzhof, of which only the foundation remains, is located within a recreational park already subjected to aircraft noise. Therefore, Part 150 land use compatibility guidelines may be applied to determine where there is a constructive use. Since neither site is or is expected to be used as a residence these sites are compatible with noise exposure levels of up to 70 DNL. The noise exposure at the Lazaretto and Printzhof sites would potentially increase to 66.5 DNL and 65.7 DNL in 2006, and 64.6 DNL and 63.5 DNL in 2011 for both the Modifications to Existing Airspace Alternative and Integrated Airspace Alternative Variation without ICC. Since the noise exposure remains below 70 DNL, neither the Modifications to Existing Airspace Alternative nor the Integrated Airspace Alternative Variation without ICC would result in a constructive use of either historic site.

When Part 150 land use compatibility guidelines are used to determine if there is a constructive use of a Section 4(f) property, the noise impacts associated with the Airspace Redesign Alternatives do not substantially impair any Section 4(f) sites. However, based on further consultation with the National Park Service and other interested parties, there are 4(f) properties within the Study Area where the noise is very low and where Part 150 guidelines may not adequately address the expectations and purposes of people visiting areas within these parks and wildlife refuges. These 4(f) properties include the national parks and national wildlife refuges in the Study Area, Catskill State Park, Minnewaska State Park, and the Shawangunk Ridge State Forest, all located in NY. Additional analysis of these 4(f) properties in included in Chapter 5, *Preferred Alternative and Mitigation.*

4.5.2 Section 6(f)

NPS has determined that conversion of 6(f) parkland occurs under four conditions: 1) property interests are conveyed for non-public outdoor recreation uses; 2) non-recreation uses are made of the project area, or a portion of it; 3) non-eligible indoor facilities are developed within the project area without approval; and 4) public outdoor recreation use of the property is terminated. Because the Proposed Action would not convey 6(f) property and would not include the construction of indoor facilities, there would be a 6(f) impact only if the new airspace routes would result in the constructive use of a park such that it would cause a permanent and substantial use of the 6(f) property.

To evaluate the potential for impacts to 6(f) properties, a list of 6(f) projects was compiled from the National Park Service's Land & Water Conservation Fund website. Most 6(f) projects identified on the website were associated with a particular county. The list of 6(f) projects was limited to those for counties with significantly impacted census blocks. These lists were sent to the state liaison officers for confirmation of the NPS website data. The New York State Office of Parks, Recreation and Historic Preservation responded that the listings appeared to be accurate. No other responses were received.

All of the 6(f) properties on these lists were then categorized in the following manner.

[18] Cleary, E. C., R. A. Dolbeer, and S. E. Wright. 2006. Wildlife strikes to civil aircraft in the United States, 1990–2005. Federal Aviation Administration, National Wildlife Strike Database, Serial Report No. 12. Report of the Associate Administrator for Airports. Washington D.C., 64 pages.

- AS – project already studied as part of the land use compatibility or 4(f) analysis.
- NI – project not impacted because its location was outside the significantly impacted census blocks.
- NE – projects not expected to be impacted because of the nature of the project such as game land acquisition (location data was not available for these properties).

The resulting lists are provided in *Appendix J*. Only those 6(f) categorized as AS would be potentially impacted by the Proposed Action. This list does not include any of the noise sensitive sites found to be incompatible in the noise and compatible land use analysis. Therefore, based on the land use compatibility guidelines, none of the Proposed Action Airspace Redesign Alternatives would result in a constructive use of a 6(f) property.

4.6 WILD AND SCENIC RIVERS

The Wild and Scenic Rivers Act (PL 90-542, as amended) provides for the protection and preservation of rivers which possess outstandingly remarkable recreational, geologic, fish and wildlife, historic, cultural, and other similar values.

As discussed in Chapter Three, *Affected Environment*, Section 3.13, *Wild and Scenic Rivers*, there are several designated National Wild and Scenic Rivers within the Study Area: the Farmington Wild and Scenic River in Connecticut; the White Clay Creek in Delaware and Pennsylvania; the Great Egg Harbor River and the Maurice River in New Jersey; the Upper Delaware Scenic and Recreational River in Pennsylvania and New York; and the Middle and Lower Delaware Scenic and Recreational River in Pennsylvania and New Jersey. Since the Airspace Redesign Alternatives involve only air traffic procedural changes and no infrastructure development is required for the changes to take place, there would be no direct significant impacts to these resources.

Potential indirect impacts to Wild and Scenic Rivers were also considered. Indirect impacts may result from changes in noise or aesthetics. Implementation of the Airspace Alternatives would potentially result in changes in noise exposure. None of the change zones associated with the significant, moderate or slight noise impacts extend to include the five Wild and Scenic Rivers identified. Therefore, there would be no noise impacts to the five Wild and Scenic Rivers within the Study Area.

The extent of visual impacts, like noise impacts, is related to how far a particular resource is from the primary airports. The more visible airspace changes are those at lower altitudes which are predominantly near the primary airports. All of the Wild and Scenic Rivers segments identified are at least 15 miles from the primary airports. Proposed airspace changes this far from an airport are not normally visually intrusive because of their distance from the ground. Therefore, it may be concluded that there would be no indirect impacts that adversely affect the natural cultural or recreational values of the Wild and Scenic Rivers.

In summary, there would be no indirect or direct impacts that would adversely affect the natural cultural or recreational values of the Wild and Scenic Rivers. Therefore, there would be no significant impact to Wild and Scenic Rivers and no further analysis is required.

Wild and Scenic Rivers may also be subject to the requirements of Sections 4(f) and 6(f). If a Wild and Scenic River corridor includes historic sites or is designated as a park, recreation area, or wildlife and waterfowl refuge, then Section 4(f) criteria apply. Similarly, if the Wild and Scenic River corridor was acquired or developed with assistance from the LWCF, then Section 6(f) criteria apply. See Section 4.4, *Department of Transportation 4(f)* for information regarding the evaluation of 4(f) and 6(f) properties.

4.7 FISH, WILDLIFE, AND PLANTS

This section addresses impacts on fish, wildlife, and plants. Section 4.7.1 includes analysis of species other than avian species. Section 4.7.2 focuses on avian species, primarily migratory birds.

4.7.1 Impacts to Fish, Plants and Wildlife other than Avian Species

Potential impacts to fish, wildlife, and plants were evaluated in accordance with FAA Order 1050.1E. A significant impact would occur if the Proposed Action would jeopardize the continued existence of federally listed threatened or endangered species or result in the destruction or adverse modification of critical habitat for any species. Impacts were also considered in accordance with Executive Order 13112, "Invasive Species." Federal agencies must, to the extent practicable, and within budgetary limitations prevent the introduction, provide for the control, and minimize the economic, ecological, and human health impacts that are caused by invasive species.

The Proposed Action involves only air traffic procedural changes for aircraft in-flight and does not require ground disturbance. It will not destroy or modify critical habitat for any species. Additionally, because the number of flights as well as their origin and destination are the same with the Future No Action Airspace Alternative as with the Proposed Action Airspace Alternatives, the Proposed Action would not increase the opportunity for an invasive species to be introduced into the Study Area. Therefore, there are no significant impacts to fish or plants.

Since the Proposed Action includes changes in aircraft routes, the potential for impacts to wildlife is measured by the potential for the Proposed Action to result in additional wildlife strikes. For the 16-year period (1990–2005), 66,392 wildlife strikes were reported to the FAA. Birds were involved in 97.5 percent of the reported strikes, terrestrial mammals in 2.2 percent, bats in 0.2 percent, and reptiles in 0.1 percent.[18] During that same time period, the states of New York, New Jersey, and Pennsylvania combined reported bats in 13 strikes (.02 percent) and mammals in 256 strikes (.39%).[19] See **Table 4.17**.

Table 4.17
Wildlife Strikes by Species by State
January 1990-December 2005

Species	NJ	NY	PA	Total
Bats	3	4	6	13
Mammals	80	110	70	256

Source: FAA, National Wildlife Strike Database http://wildlife.pr.erau.edu/database/

The strikes involving mammals within the Study Area represented a small percentage of the total. Terrestrial mammal strikes are either on or very close to the ground. The movement of aircraft close to the ground is dictated by the location of the runways. The Proposed Action does not include any changes to physical runways. Therefore, the Airspace Redesign is not expected to result in a change in aircraft strikes involving terrestrial mammals. The strikes involving bats within the Study Area were very small in number and, therefore, would not be expected to change as a result of Airspace Redesign.

4.7.2 Avian Species Impacts

This section discusses potential impacts that the Airspace Redesign alternatives would have on avian species, migratory birds in particular. Potential impacts to avian species resulting from changes to aircraft routes are measured

[19] Ibid.

by the potential for the Proposed Action to result in increases in the number of bird strikes. Absent any wildlife attractant, birds tend to be randomly distributed, and changing aircraft departure routes will not increase the potential for bird strikes. In the case of the Airspace Redesign there are wildlife attractants such as wildlife refuges and breeding colonies beneath the initial departure routes. Therefore, analysis of the potential for the Proposed Action to result in increased bird strike was extensively analyzed

4.7.2.1 Bird Strike Statistics

Several factors have lead to an increase in the probability of bird strikes. First, migratory bird populations have grown due to an extremely successful period of wildlife management in North America. Habitat preservation and aggressive species management have contributed to increases in the populations of many avian species, particularly migratory birds which use available habitat in and adjacent to airports with increasing frequency. Second, civilian and military air traffic have steadily increased over the years. Third, jet aircraft have replaced slower piston-powered aircraft in commercial uses. Lastly, natural habitat attractive to these avian species is typically abundant around airports, which are often located away from extreme urban centers or near shorelines and estuaries along the coast.

The US Air Force reported over 5,000 bird strikes for fiscal year 2006.[20] Over 6,800 bird strikes were reported for U.S. civil aircraft in 2006.[21] Despite this, an estimated 80 percent of bird strikes to U.S. civil aircraft go unreported. Ninety precent of all bird strikes in the U.S. involve species Federally protected under the Migratory Bird Treaty Act of 1918.[22]

Tables 4.18 through 4-20 provide statewide statistics on bird strikes for USFWS birds of conservation concern in USFWS Region 5, key strike-hazard species, and avian groups. USFWS Region 5 encompasses the 13 northeastern states, including those in the Study Area. Factors explaining these strikes include the proximity of their migration routes, the proximity of stopover areas or activities relating to permanent residence. In addition to these statistics, other migratory bird losses occur from inclement weather, predators in the air or on the ground, collisions with radio towers or tall buildings and severe degradation or loss of viable habitat in critical zones of their migration routes.

The FAA reports that 42 percent of bird strikes occur during the approach phase, three percent during "en-route" phase, 39 percent during take-off run and climb, and 16 percent during the landing roll.[23] In an analysis of available bird strike records, the FAA found that during the period 1990-2005, some 42,965 bird strikes were reported. About 73 percent of the bird strikes occurred when the aircraft was at an altitude of less than 500 feet AGL with 92 percent occurring under 3,000 feet AGL (See **Table 4.21**).

[20] USAF Wildlife Strikes by Fiscal Year, September 2006, http://afsafety.af.mil/SEF/Bash/web_year_stat.html.

[21] Wildlife Strikes to Civil aircraft in the United States 1990-2006, FAA, National Wildlife Strike Database Serial Report Number 13, July 2007, p. 15.

[22] Bird Strike Committee USA, 2004.

[23] Wildlife strikes to Civil Aircraft in the United States 1990-2004, U.S. DOT Federal Aviation Administration and U.S. Department of Agriculture, May 2005, Table 8, page 20.

Table 4.18

Bird Strikes Statewide among USFWS Birds of Conservation Concern in Region 5 – 1990 to 2006

Birds of Conservation Concern[1]	**Bird Strike Statistics by State**										**Totals**
	NJ		**NY**		**CT**		**PA**		**DE**		
	CBS	AAS	CBS	AAS	CBS	AAS	CBS	AAS	CBS	ASS	
Roseate Tern	--		**1**		--		--		--		1
Piping Plover	--		--		--		--		--		0
Bald Eagle	**1**		**1**		--		--		--		2
All Rails (Yellow & Black)	--		**4**		--		--		--		4
American Oystercatcher	--		**17**		--		--		--		17
Upland Sandpiper	**5**		**4**		--		**2**		--		11
Whimbrel	**1**		--		--		--		--		1
Hudsonian Godwit	--		--		--		--		--		0
Red Knot	--		**1**		--		--		--		1
Purple Sandpiper	--		--		--		--		--		0
Buff-breasted Sandpiper	--		--		--		--		--		0
Common Tern	--		**6**		--		--		--		6
Least Tern	--		--		--		--		--		0
Black Skimmer	--		**1**		--		--		--		1
Razorbill	--		--		--		--		--		0
Short-eared Owl	**1**		**9**		--		**1**		**1**		12
Whip-poor-will	--		--		--		--		--		0
Red-headed Woodpecker	--		--		--		--		--		0
Olive-sided-flycatcher	--		--		--		--		--		0
Loggerhead Shrike	--		--		--		--		--		0
Bewick's Wren	--		--		--		--		--		0
Sedge Wren	--		--		--		--		--		0
Bicknell's Thrush	--		--		--		--		--		0
Wood Thrush	--		--		--		--		--		0
Golden-winged Warbler	--		--		--		--		--		0
Prairie Warbler	--		--		--		--		--		0
Bay-breasted Warbler	--		--		--		--		--		0
Cerulean Warbler	--		--		--		--		--		0
Worm-eating Warbler	--		--		--		--		--		0
Swainson's Warbler	--		--		--		--		--		0
Kentucky Warbler	--		--		--		--		--		0
Canada Warbler	--		--		--		--		--		0
Henslow's Sparrow	--		--		--		--		--		0
Nelson's Sharp-tailed Sparrow	--		--		--		--		--		0
Saltmarsh s-t Sparrow	--		--		--		--		--		0
Seaside Sparrow	--		--		--		--		--		0

Legend: CBS = Cumulative Bird Strikes; AAS = Average Annual Strikes

Note 1/ U.S. Fish and Wildlife Service. 2002. Birds of conservation concern 2002. Division of Migratory Bird Management, Arlington, Virginia. 99 pp. [Online version available at <http://migratorybirds.fws.gov/reports/bcc2002.pdf>].

Source: *2006 FAA National Wildlife Strike Database, 1990 – July 2006.*

Table 4.19
Bird Strikes Statewide – 1990 to 2006

Species Groups	Bird Strike Statistics by State										Cumulative Strike Total
	NJ		NY		CT		PA		DE		
	CBS	AAS	CBS	AAS	CBS	AAS	CBS	AAS	CBS	ASS	
Ducks, Geese, Swans	154	9.1	187	11.0	82	5.1	126	7.9	9	1.0	415
Swallows	51	3.0	85	5.0	15	0.9	72	4.2	13	0.9	137
Shorebirds	358	5.1	1,164	68.5	191	11.2	324	19.0	58	3.4	1,541
Raptors	333	19.6	384	22.6	54	3.4	130	7.6	35	2.3	936
Blackbirds, Starlings	136	8.5	193	11.4	30	2.1	221	13.0	4	2.0	584
Waterfowl											
Gulls, Terns	306	18.0	1050	61.8	182	10.7	280	16.5	54	3.2	1872
Pigeons and Doves	110	6.5	208	12.2	31	1.8	171	10.1	3	1.5	523

Legend: CBS = Cumulative Bird Strikes; AAS = Average Annual Strikes.

Source: 2006 FAA National Wildlife Strike Database, 1990–July 2006.

Table 4.20
Bird Strikes Statewide by Key Strike-Hazard Species – 1990 to 2006

Key Hazard Species[1]	Bird Strike Statistics by State										Cumulative Strike Total
	NJ		NY		CT		PA		DE		
	CBS	AAS	CBS	AAS	CBS	AAS	CBS	AAS	CBS	ASS	
Ring-billed Gull	25	1.5	61	3.7	2	.1	28	1.7	6	.4	122
Canada Geese	59	3.6	93	5.6	53	3.2	68	4.1	2	.1	275
Red-tailed Hawk	25	1.5	28	1.7	1	.1	34	2.1	3	.2	91
Turkey Vulture	3	.2	2	.1	1	.1	6	.4	0	.0	12
Mallard Duck	58	3.5	32	1.9	8	.5	4	.2	0	.0	102
Rock Pigeon	47	2.8	94	5.7	14	.8	37	2.2	1	.1	193
Mourning Dove	61	3.7	113	6.8	17	1.0	132	8.0	2	.1	325
American Kestrel	109	6.6	65	3.9	9	.5	8	.5	9	.5	200
Kildeer	31	1.9	61	3.7	4	.2	37	2.2	0	.0	133
European Starling	103	6.2	133	8.1	23	1.4	133	1.4	2	.1	394

Legend: CBS = Cumulative Bird Strikes; AAS = Average Annual Strikes
Note 1/ Key Hazard Species as identified in Cleary *et al* (2006) *Wildlife Strikes to Civil Aircraft in the U.S., 1990-2005.*

Source: *2006 FAA National Wildlife Strike Database, 1990 – July 2006.*

Table 4.21
Bird Strikes 1990-2005

Height of aircraft (feet above ground level)	Number of reported strikes (% of total)	Percent (number) of strikes causing substantial damage to aircraft
0-500	31,573 (73)	8 (3,397)
501-3,000	7,999 (19)	4 (1,810)
>3,000	3,393 (8)	2 (692)
Total	42,965 (100)	14 (5,899)

Source: Cleary, E. C., R. A. Dolbeer, and S. E. Wright. 2005. Wildlife strikes to civil aircraft in the United States, 1990–2005. U.S. Department of Transportation, FAA, Serial Report No. 12 DOT/FAA/AS/00-6 (AAS-310). Washington DC, USA. 64 pages.

The study further indicated that the incidence of bird strikes declined consistently by 31 percent every 1,000 feet from 501 to 20,500 feet. In addition, for strikes that resulted in substantial damage to the aircraft, 58 percent occurred at ≤500 feet and 31 percent occurred between 501 and 3,000 feet. Dolbeer, in his analysis of over a decade of bird strike data identified not only the flight elevations most critical to bird mortality but also identified particularly susceptible species groups. **Table 4.22** shows the relationship between species groups mortality and elevations at the time of known collisions. Again the data show that the majority of all bird strikes occur within the first 500 feet.

Dolbeer's analysis confirms that management programs to reduce bird strikes should focus on the airport environment, that is, the first 500 feet of airspace used by aircraft and the adjacent habitat encompassing that 500 feet of airspace. Furthermore, he notes that the months of July-November, especially August, are the months in which management efforts to disperse birds from airports should be the most intense, because these months have the highest strike rates below 500 feet. With the large numbers of recently fledged (young) birds, populations of most North American bird species are at their highest levels in late summer.

4.7.2.2 Bird Strike Impact Assessment

Based on the bird strike statistics and FAA guidance, refined Bird Study Areas were developed. The potential impacts to avian species within these Bird Study Areas were considered.

The footprints of the Bird Study Areas were determined in accordance with FAA AC 150/5200-33A, *Hazardous Wildlife Attractants on or near Airports.* According to this AC the area of concern in regard to wildlife and approach and departure airspace is five statue miles from the airport's air operations area. This criterion was based on the following factors: flight patterns of aircraft, altitude at which most wildlife strikes occur (78 percent occur under 1,000 feet and 90 percent occur under 3,000 AGL[24]), and National Transportation Safety Board (NTSB) recommendations.

The Proposed Action Airspace Alternatives would include redesign of arrivals/departures within the bounds of the Bird Study Areas at the following airports: HPN, ISP, JFK, LGA, EWR and PHL. Bird Study Areas for these airports are shown in **Figures 4.31 through 4.36**. These areas

[24] FAA Advisory Circular 150/5200-33A, Hazardous Wildlife Attractants on or Near Airports, July 27, 2004, page 1.

Table 4.22
Species Groups Reported Struck by Civil Aircraft in USA – June 2003

	Height (feet) AGL			
Species Group	**0-500**	**501-3,500**	**>3,500**	**Total**
Gulls/Terns	3,366	417	40	3,823
Passerines	3,399	322	51	3,772
Waterfowl	994	561	149	1,704
Pigeons/Doves	1,546	59	4	1,609
Raptors	895	131	19	1,043
Other known birds	1,299	272	19	1,590
Unknown birds	11,107	4,316	1,911	17,334
Total	22,606	6,076	2,193	30,875

Source: Richard A. Dolbeer. 2004. Height Distribution of Birds as Recorded by Collisions with Civil Aircraft (Unpublished manuscript). USDA Wildlife Services.

are, for the most part, highly populated urbanized areas.

The Bird Study Area figures show wetlands, watershed boundaries and the BCRs. The locations of the threatened and endangered species (i.e., piping plover, roseate tern and bald eagle)[25] nesting sites were also mapped. These nesting sites are not shown on the Bird Study Area figures because their locations were considered confidential by the US Fish and Wildlife Service. **Table 4.23** shows the resources found within the Bird Study Areas for each of the subject airports.

To consider the potential impacts to avian species within the Bird Study Areas a qualitative analysis was conducted. For each of the subject airports, HPN, ISP, JFK, LGA, EWR, and PHL, the Proposed Action Airspace Alternatives flight tracks were overlayed on the applicable Bird Study Areas. The resulting figures were developed for two purposes: to show the location of the changed tracks relative to the avian resources within the Bird Study Areas and to consider the changed flight tracks in relationship to the Future No Action Airspace tracks. The graphics show only the flight track backbones and not the dispersion of aircraft around each of the flight track backbones (subtracks) because the general relationship of the tracks to one another and to the avian resources would not be discernable if the subtracks were shown. The following paragraphs summarize the results of the qualitative analysis conducted at the subject airports.

HPN

None of the Proposed Action Airspace Alternative aircraft tracks would change within the Bird Study Area as a result of the Modifications to Existing Airspace Alternative, Ocean Routing Airspace Alternative, or the Integrated Airspace Alternative Variation without ICC. The departure and arrival tracks for the Integrated Airspace Alternative Variation with ICC would change. The departure tracks that would change due to the Integrated Airspace Alternative Variation with ICC are shown in **Figure 4.37**. These

[25] The bald eagle was removed from the threatened and endangered species list by the US FWS in June 2007.

Table 4.23
Resources Found within the Airport Bird Study Areas

Resources	Airports					
	HPN	ISP	JFK	LGA	EWR	PHL
Wetlands/Waters of the US	√	√	√	√	√	√
BCR 29 (PBCR)					√	√
BCR 30 (NEMAC)	√	√	√	√	√	√
Piping Plover Nesting Site			√			
Bald Eagle Nesting Site						√

Note: None of the roseate tern nesting sites provided by the US Fish and Wildlife are located in the Bird Study Areas.
Sources: HNTB Analysis and US Fish and Wildlife Service letter dated January 24th 2007.

Changes are primarily due to how aircraft heading to southern and some western destinations depart HPN. Departure headings are the same as those in the Future No Action Alternative. However, unlike the Future No Action conditions where the south-bound flights turn west and then south and proceed along the Hudson River, the Integrated Airspace Alternative Variation with ICC requires that these flights turn to the northeast. The south-bound departures would continue their circling turn and pass over the top of HPN. Some of the west-bound traffic will follow this same departure route until just south of LGA. Therefore, when comparing **Figure 4.38**, showing all Future No Action Airspace Alternative departure backbone tracks, to Figure 4.37 the discernable change is the addition of flight tracks that pass back over HPN. These aircraft would be well above 3,000 feet AGL and therefore above the altitude where most bird strikes occur. **Figure 4.39** shows that arrival tracks would change slightly as a result of the Integrated Airspace Alternative Variation with ICC. **Figure 4.40** shows all of the Future No Action Airspace Alternative arrival backbone tracks. A comparison of Figure 4.39 to 4.40 indicates that, while there are noticeable differences in the flight patterns due to the Integrated Airspace Alternative Variation with ICC, no discernable changes to the relationships of patterns to resources within the bird study areas are evident.

ISP

At ISP the arrival and departure tracks within the Bird Study Area for the Modifications to Existing Airspace Alternative and the Ocean Routing Airspace Alternative would be the same as the tracks for the Future No Action Airspace Alternative. The departure tracks that changed due to the Integrated Airspace Alternative Variation without ICC are shown in **Figure 4.41**. These changes would be primarily due to the relocation of a south departure route. The departure tracks that changed due to the Integrated Airspace Alternative Variation with ICC are shown in **Figure 4.42**. These changes occur primarily because westbound flights from ISP now have access to the West departure gate. While the Integrated Airspace Alternative Variation without ICC arrival tracks do not change, **Figure 4.43** shows that arrival tracks would change slightly as a result of the Integrated Airspace Alternative Variation with ICC. A comparison of Figures 4.41, 4.42 and 4.43 to **Figures 4.44 and 4.45** indicates that, while there are noticeable differences in the flight patterns due to the Integrated Airspace Alternative, no discernable changes to the relationships of patterns to resources within the bird study areas are evident.

JFK

None of the Proposed Action Airspace Alternative aircraft tracks would change within the Bird Study Area as a result of the Modifications to Existing Airspace Alternative or the Integrated Airspace Alternative Variation without ICC. The departure and arrival tracks for both the Ocean Routing the Integrated Airspace Alternative Variation with ICC would change. The departure tracks that would change due to the Ocean Routing Airspace Alternative are shown in **Figure 4.46**. These changes occur primarily because west-bound aircraft initially head east and south of JFK over the Atlantic Ocean instead of immediately proceeding southwest toward Sandy Hook, NJ. The arrival tracks that would change as a result of the Ocean Routing Airspace Alternative are shown in **Figure 4.47**. The arrival tracks change because aircraft arriving from the North arrival post to land on Runways 31 L/R fly north of JFK, instead of south, before turning to line up with the runway. The departure tracks that would change as a result of the Integrated Airspace Alternative Variation with ICC are shown in **Figure 4.48**. These tracks primarily differ from the Future No Action Airspace Alternative tracks because departure headings were added for aircraft departing Runways 13 L/R and departure routes for aircraft departing Runways 31L/R headed to the west changed. Instead of proceeding south toward the vicinity of Sandy Hook before turning west, aircraft make an initial left turn and then circle to the north of JFK before turning west. As shown in **Figure 4.49,** arrival tracks would change only slightly as a result of the Integrated Airspace Alternative Variation with ICC. A comparison of Figures 4.46, 4.47, 4.48 and 4.49 to **Figures 4.50 and 4.51** indicates that, while there are noticeable differences in the flight patterns due to the Ocean Routing Airspace Alternative and the Integrated Airspace Alternative Variation without ICC, no discernable changes to the relationships of patterns to resources within the bird study areas are evident.

Piping plover nesting locations identified by the US Fish and Wildlife service are within the JFK Bird Study Area. Mapping exercises have shown that these locations are subject to aircraft overflight by the Future No Action Airspace Alternative. Therefore, the changes resulting from the Ocean Routing Airspace Alternative and the Integrated Airspace Alternative Variation with ICC would not move routes to fly over piping plover nesting sites not currently exposed to aircraft overflights.

LGA

The arrival and/or departure tracks change within the Bird Study Area for the Modifications to Existing Airspace and the Integrated Airspace Alternatives. The departure tracks that changed due to the Modifications to Existing Airspace Alternative are shown in **Figure 4.52**. These changes would primarily result from three adjustments to the LGA departures: additional departure headings for north and east-bound aircraft departing from Runway 4, revised procedures for south and west-bound propeller aircraft departing off of Runway 13, and revised procedures for south-bound aircraft departing from Runway 4. South and west-bound propeller aircraft departing on Runway 13 would turn left initially and continue to turn back around the Airport on a much tighter radius than that for the Future No Action Airspace Alternative. South-bound flights departing from Runway 4 would turn immediately to the northwest and continue circling to the southwest to merge with the south-bound flights departing from Runway 13. The departure tracks that changed due to the Integrated Airspace Alternative are shown in **Figure 4.53**. These changes result from the addition of new departure headings for north and east-bound aircraft departing from Runway 4 and revision of procedures for west-bound aircraft departing Runways 4 and 13. West-bound aircraft departing on Runway 4 would make an immediate turn to the north and would not turn toward the west until they are north of Manhattan,. West-bound aircraft departing from Runway 13 would make an immediate right turn, then circle back to the northeast, and once north of the Airport continue toward the west. **Figure 4.54** shows that arrival tracks would change as a result of the Integrated Airspace Alternative Variation with ICC. The changes in the arrival tracks are the result of shifting a portion of the LGA arrivals to the east to make room for an expanded area for EWR arrivals. Close-in changes occur for traffic arriving from the north which proceeds along the shifted routes that cross over the LGA area, and then circles back to land on Runway 4. A comparison of Figures 4.52, 4.53, and 4.54 to **Figures 4.55 and 4.56** indicates that, while there are noticeable differences in the flight patterns due to the Modifications to Existing Airspace and the Integrated Airspace Alternatives, no discernable changes to the relationships of patterns to resources within the bird study areas are evident.

EWR

At EWR only departure tracks within the Bird Study Area would change as a result of the Proposed Action Airspace Alternatives; changes to arrival tracks would be outside the Bird Study Area. **Figure 4.57** shows the departure flight tracks that would change due to the Modifications to Existing Airspace and the Integrated Airspace Alternatives. These changes would be the result of the proposed new departure headings for 22L/R and 4L/R. **Figure 4.58** shows the departure flight tracks that would change due to the Ocean Routing Airspace Alternative. These changes would be primarily the result of moving the westbound and southbound departure tracks to be initially over the Atlantic Ocean. **Figure 4.59** shows all the No Action Airspace Alternative departure backbone tracks. A comparison of Figures 4.57 and 4.58 to Figure 4.59 indicates that, while there are noticeable differences in the flight patterns due to the Modifications to Airspace, Ocean Routing Airspace, and Integrated Airspace Alternatives, no discernable changes to the relationships of patterns to resources within the bird study areas are evident.

PHL

None of the Proposed Action Airspace Alternative arrival tracks to PHL would change within the Bird Study Area. The departure tracks for the Proposed Action Airspace Alternatives would change with the exception of the Ocean Routing Airspace Alternative. **Figure 4.60** shows the departure flight tracks that would change due to the Modifications to Existing Airspace and the Integrated Airspace Alternatives. These changes would be the result of the proposed new departure headings for 9L/R and 27L/R. **Figure 4.61** shows all the No Action Airspace Alternative departure backbone tracks. A comparison of Figures 4.60 and 4.61 indicates that, while there are noticeable differences in the flight patterns due to the Modifications to Existing Airspace and Integrated Airspace Alternatives, no discernable changes to the relationships of patterns to resources within the bird study areas are evident.

Bald eagle nesting sites identified by the USFWS are within the PHL Bird Study Area. Mapping exercises have shown that these locations are subject to aircraft arrival and departure overflight by the Future No Action Airspace Alternative. Therefore, the changes resulting from the Modifications to Existing Airspace and the Integrated Airspace Alternative variation with ICC would not move routes to fly over bald eagle nesting sites not currently exposed to aircraft overflights.

All six airports, EWR, HPN, ISP, JFK, LGA, and PHL, have Wildlife Hazard Management Plans in place. The plans promote a comprehensive approach to managing wildlife in the airport environment. Starlings, gulls, pigeons, geese/Brants and passerines are identified as the birds of most concern. However, the plans also address control features for raptors, shorebirds, waders and other waterfowl. Control methods employ a comprehensive approach consisting of both passive control and direct control. Passive control methods consist of habitat management techniques within the airport environment. Such techniques discourage habitat attractants of any kind by minimizing nesting and perching habitat (tree control) and food sources (vegetation control). In addition, control of aquatic water habitat is managed through any means possible to distance such habitat from the airport environment. Direct control methods range from harassment techniques, capture and lethal control, the latter requiring that depredation permits be kept current. Wildlife hazard management plans include provisions to monitor bird populations on and near the airport as well as bird strikes. The plans are reviewed on a yearly basis and would be modified if bird strikes increase.

In conclusion, impacts to various bird categories would be expected to continue but not necessarily increase as a result of the Modifications to Existing, Ocean Routing, or Integrated Airspace Alternatives. Therefore, no significant impacts to bird species would be expected to result from any of the Airspace Redesign Alternatives.

4.8 LIGHT EMISSIONS AND VISUAL IMPACTS

The potential for the Airspace Redesign alternatives to result in light emission or visual impacts is described in the following paragraphs.

4.8.1 Light Emissions

To evaluate the potential for light emissions impact, the FAA considers the extent to which any lighting associated with an action will create an annoyance among people or interfere with their normal activities.

The lights associated with aircraft operating at higher altitudes potentially changed by the Proposed Action Airspace Redesign alternatives routes would not be bright enough to be an annoyance to people, or interfere with normal activities on the ground. Proposed airspace changes at lower altitudes are predominantly near the primary airports. Radar data indicates that under existing conditions all areas near these airports are likely exposed to aircraft lights. Therefore, the Proposed Action would not likely result in significant changes in light emissions to people on the ground. Therefore, no significant impacts relating to light emissions are anticipated for any of the alternatives considered.

4.8.2 Visual Impacts

Visual, or aesthetic, impacts are inherently more difficult to define because of the subjectivity involved. Aesthetic impacts deal more broadly with the extent that the development contrasts with the existing environment and whether the community's jurisdictional agency considers this contrast objectionable.

Visual impacts are normally related to the disturbance of the aesthetic integrity of an area caused by development, construction, or demolition, and thus, do not typically apply to airspace changes.

The Proposed Action Airspace Redesign alternatives would not result in the development, construction, or demolition of facilities. Proposed airspace changes at lower altitudes are predominantly near the primary airports where flights are already extensive and, therefore, these changes would not result in a visual contrast with the existing environment. Proposed airspace changes at higher altitudes are normally not visually intrusive because of their distance from the ground. Therefore, the proposed airspace changes would likely not create a visual impact of significance.

Because of the unique cultural qualities of Tribal Lands, additional analysis of potential visual impacts on Native American Tribes located within the Study Area was completed. A summary of the potential changes in flights over Tribal Lands resulting from the Proposed Action Airspace Redesign alternatives is shown in **Table 4.24**.

The Ocean Routing Airspace Alternative, Integrated Airspace Alternative Variation without ICC, and Integrated Airspace Alternative Variation with ICC would result in moderate changes in aircraft routes in the vicinity of the Ramapough Mountain Indian lands. Since this area is already subject to extensive overflights, no significant visual impacts would be expected.

The Integrated Airspace Alternative Variation with ICC also results in moderate change to aircraft routes over the Schaghticoke Reservation. Changes to routes over the Schaghticoke Reservation are unlikely to result in significant visual impacts because this area is currently exposed to regular overflights.

Therefore, the implementation of any of the Airspace Redesign alternatives would not result in significant visual impacts to Tribal lands within the Study Area.

4.9 AIR QUALITY

Prior to completing the DEIS, the FAA met with the representatives of EPA Regions 1, 2 and 3 to discuss the Proposed Action alternatives and analysis of air quality impacts. (EPA Regions 1, 2, and 3 have jurisdiction over areas with the Study Area.) During these meetings the FAA indicated that no air quality analysis would be undertaken. Several reasons were provided to explain the FAA's assertion that no detailed air quality analysis was required and that no significant air quality impacts would result from the implementation of the Proposed Action. These reasons were:

- The Proposed Action alternatives examined in this EIS are exempt from analysis under the General Conformity Rule. The final rule for Determining Conformity of General Federal Actions to State and Federal Implementation Plans[27] was published in the Federal Register in 1993.[28] In Section 51.853 (c)(1), the Environmental Protection Agency (EPA) lists actions that are *de minimis* and, thus, do not require an applicable analysis under

[27] 40 CFR Parts 6, 51, and 93.

[28] 40 C.F.R. Parts 6, 51, and 93. United States Government Printing Office, World Wide Web Address: www.access.gpo.gov, July 2001.

Table 4.24
Changes in Aircraft Routes over Native American Tribal Lands

Native American Tribal Land	Location	State	Future No Action	Ocean Routing	Modifica-tions to Existing Airspace	Integrated Airspace Variation without ICC	Integrated Airspace Variation with ICC
Rankokas Indian Reservation	Rancocas	NJ	Regular Overflights 3,000 – 8,000+ MSL	No Change	No Change	No Change	No Change
Nanticoke Lenni Lenape Indian Reservation	City of Bridgeton	NJ	Scattered Overflights 10,000-18,000+ MSL	Minor Change-some shifted higher	No Change	No Change	No Change
Ramapough Mountain Indians	Township of Mahwah	NJ	Extensive Overflights 3,000-14,000+ MSL	Moderate change-some shifted higher & some moved north	No Change	Moderate change-some routes moved northwest	Moderate change-some routes moved north or south
Poospatuck Reservation	Mastic	NY	Regular Overflights 3,000-14,000+ MSL	No Change	No Change	Minor Change - some routes moved east	Minor Change - Dep. routes flow W to E rather than N to S. Similar altitudes
Shinnecock Reservation	Shinnecock Indian Reservation	NY	Regular Overflights 2,000-10,000+ MSL	No Change	No Change	No Change	No Change
Golden Hill Paugeesukq	Golden Hill Indian Reservation	CT	Regular Overflights 6,000-14,000+ MSL	No Change	No Change	No Change	Minor Change - some routes moved southeast
Golden Hill Paugeesukq	Trumbull	CT	Extensive Overflights 1,000-14,000+ MSL	Minor Change - some shifted higher	No Change	No Change	No Change
Schaghticoke Reservation	Schaghticoke Indian Reservation	CT	Regular Overflights 6,000-12,000 MSL	Minor Change - some shifted higher	No Change	No Change	Moderate change-some routes moved east or south

Source: Landrum & Brown Analysis, 2005.

this rule. EPA states in the preamble to this regulation that it believes, "air traffic control activities and adopting approach, departure, and en route procedures for air operations" are illustrative of *de minimis* actions.

- The Proposed Action is not a capacity enhancement project. The total number of aircraft operations would not differ between the Future No Action Alternative and the other Airspace Redesign Alternatives.
- The purpose and need for the Proposed Action includes increasing efficiency and reducing delay in the airspace system. Qualitatively, reduction of delay and more efficient flight routings would serve to reduce fuel burn and thereby reduce air pollutant emissions.

In response to these coordination meetings, the EPA indicated that induced changes to vehicular traffic were a concern to the Agency.

Changes in vehicular traffic as the result of the implementation of the Proposed Action alternatives are not anticipated. Aircraft operations and vehicular traffic would grow with or without the proposed air traffic procedural changes. In addition, the implementation of any one of the Proposed Action Airspace Redesign alternatives would not significantly alter the distribution of vehicular traffic among the airports, because these alternatives would not likely change air passenger airport preferences. Air passengers traditionally select an airport based on the ticket cost, airport location, and service to a desired destination.

Therefore, it was concluded in the DEIS that the Proposed Action Airspace Redesign alternatives would be considered *de minimis* actions and would have little effect on vehicle traffic, and thus, no negative air quality impacts would be expected.

Since the issuance of the DEIS the FAA was advised by the EPA that it should not use the Preamble to the final rule for Determining Conformity of General Federal Actions to State and Federal Implementation Plans to determine de minimis actions for "air traffic control activities and adopting approach, departure, and en route procedures for air operations". Instead the FAA chose to include "air traffic control activities and adopting approach, departure and enroute procedures for air operations" in its proposed list of presumed to conform actions. The final list of actions presumed to conform should be published in the Federal Register on or about July 27, 2007. Also, the FAA conducted additional analysis to show that the airspace redesign would result in less fuel consumption. Additional discussion regarding the presumed to conform list and the fuel consumption analysis is provided in Chapter 5, *Preferred Alternative and Mitigation,* Section 5.3.9, *Air Quality.* Lastly, the project will not cause a new violation, worsen an existing violation, or delay meeting the National Ambient Air Quality Standards.

4.10 NATURAL RESOURCES AND ENERGY SUPPLY

According to FAA Order 1050.1E, "for purposes of the EA or EIS, the proposed action will be examined to identify any proposed major changes in stationary facilities or the movement of aircraft and ground vehicles that would have a measurable effect on local supplies of energy or natural resources."

None of the Proposed Action Airspace Redesign alternatives considered would result in the construction of facilities that would potentially impact known sources of minerals or energy.

The proposed changes in air traffic procedures are intended to improve air traffic flow and enhance the safe operation of aircraft within the airspace structure. With the exception of the Ocean Routing Airspace Alternative, the Proposed Action Airspace Redesign alternatives propose changes in air traffic procedures that would result in more direct routing and less delay. Therefore, when compared to the Future No Action Airspace Alternative, these alternatives would result in reduced fuel consumption.

Therefore, it is anticipated that the Proposed Action Airspace Redesign alternatives would not result in the depletion of local supplies of energy and/or natural resources.

4.11 CONSTRUCTION IMPACTS

The implementation of changes to air traffic procedures does not involve any construction activity, therefore, there would be no construction impacts associated with the Proposed Action Airspace Redesign alternatives and no further analysis is required.

4.12 FARMLANDS

The Farmland Protection Policy Acts (FPPA) of 1980 and 1995 require identification of proposed actions that would affect any soils classified as prime and unique. Prime farmland contains soil that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses. Unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops.

The Airspace Redesign alternatives would not result in the development of facilities. Therefore, no prime and/or unique farmland soils would be impacted and no further analysis is required.

4.13 COASTAL RESOURCES

The following sections address two aspects of coastal resources: coastal zone management and coastal barriers.

4.13.1 Coastal Zone Management Program

The increasing pressures of over-development upon the nation's coastal resources prompted the U.S. Congress to promulgate the Coastal Zone Management Act (CZMA) in 1972. The CZMA encourages states to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife using those habitats. A unique feature of the CZMA is that participation by states is voluntary. To encourage states to participate, the act makes federal financial assistance available to any coastal state or territory that is willing to develop and implement a comprehensive coastal management program.

The states of Connecticut, Delaware, New Jersey, New York, and Pennsylvania have initiated coastal zone management programs. However, since the Proposed Action Airspace Redesign alternatives do not impact surface resources, none of the alternatives would impact resources within the CZMP for Connecticut, Delaware, New Jersey, New York, and Pennsylvania.

While only the State of Delaware Department of Natural Resources and

Environmental Control Division of Soil and Water Conservation requested that the FAA review the Proposed Action for Consistency with their Coastal Management Program (CMP), federal consistency determinations were prepared in accordance with each state's CZMP. The state of Delaware concurred with the FAA's consistency determination. No correspondence was received from the states of Connecticut, New Jersey, New York, and Pennsylvania regarding the FAA's consistency determinations. All consistency determinations and related correspondence are included in **Appendix K**.

4.13.2 Coastal Barriers

The Coastal Barrier Resources Act (CBRA) of 1982 and the Coastal Barrier Improvement Act of 1990 were created to minimize the loss of human life, protect coastal resources, and reduce expenditures and subsidies for coastal development.

None of the Proposed Action Airspace Redesign alternatives considered would result in development of facilities that would adversely impact resources protected under the Coastal Barrier Resource System. Therefore, no further analysis is required.

4.14 WATER QUALITY

The Airspace Redesign alternatives involve air traffic procedural changes and would not require the construction of facilities. Therefore, no impacts to water quality would be expected and no further analysis is required. The Proposed Action Airspace Redesign alternatives would not impact water resources.

4.15 WETLANDS

Executive Order 11990, *Protection of Wetlands*, was enacted to avoid, to the extent possible, adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect new construction of wetlands. Wetlands include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds. The Proposed Action Airspace Redesign alternatives would not result in the construction of facilities. Therefore, no wetlands impacts are anticipated and no further analysis is required.

4.16 FLOODPLAINS AND FLOODWAYS

Executive Order No. 11988, *Floodplain Management*, was issued in order to avoid, to the extent possible, the short and long-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practical alternative. The order was issued in furtherance of NEPA, the National Flood Insurance Act of 1968, and the Flood Disaster Protection Act of 1973.

The Proposed Action Airspace Redesign alternatives would not result in the construction of facilities. Therefore, none of the alternatives considered would encroach upon areas designated as a 100-year flood event area as described by the Federal Emergency Management Agency (FEMA). No further analysis is required.

4.17 HAZARDOUS MATERIALS, POLLUTION PREVENTION AND SOLID WASTE

NEPA documentation includes the consideration of hazardous materials and solid waste impacts as well as pollution prevention.[29]

4.17.1 Hazardous Materials

The Proposed Action Airspace Redesign alternatives were reviewed for their potential to generate or disturb materials identified as a substance that has been determined to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce (49 CFR Part 172, Table 172.101). This includes hazardous substances[30] and hazardous wastes.[31]

The Proposed Action Airspace Redesign alternatives would not result in any physical disturbances to the ground. In addition, aircraft operational activity is expected to grow with or without the proposed air traffic procedural changes. Therefore, the potential to generate or disturb materials identified as a substance that has been determined to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce is not anticipated.

4.17.2 Pollution Prevention

With the exception of the Ocean Routing Airspace Alternative, the Proposed Action Airspace Redesign alternatives propose changes in air traffic procedures that would result in more direct routing and less delay. Therefore, when compared to the Future No Action Airspace Alternative, all alternatives (with the exception of the Ocean Routing Airspace Alternative) would result in reduced fuel consumption and less pollution.

4.17.3 Solid Waste

None of the Proposed Action Airspace Redesign alternatives would result in solid waste impacts that are associated with the potential long-term generation of municipal solid waste (MSW). None of the alternatives considered would result in a physical disturbance to the ground or construction debris. In addition, aircraft operational activity is expected to grow with or without the proposed airspace changes, therefore the potential for impacts as it relates to solid waste is not anticipated.

4.18 CUMULATIVE IMPACTS

Consideration of cumulative impacts applies to the impacts resulting from the implementation of the Proposed Action as well as other actions. The concept of cumulative impacts addresses the potential for individually minor, but collectively, significant impacts to occur over time. Council on Environmental Quality Regulations, Section 1508.7, defines "Cumulative Impact" as the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of the agency, Federal or non-Federal, undertaking such actions. Cumulative impacts can result from individually minor, but collectively, significant actions taking place over a period of time.

[29] FAA Order 1050.1E, June 2008,Appendix A, Section 10.

[30] Hazardous Substance – any element, compound, mixture, solution, or substance defined as a hazardous substance under the Comprehensive Environmental Response, Compensation, Liability Act (CERCLA) and listed in 40 CFR Part 302. If released into the environment, hazardous substances may pose substantial harm to human health or the environment.

[31] Hazardous Waste – under the Resource Conservation and Recovery Act (RCRA) a waste is considered hazardous if it is listed in, or meets the characteristics described in 40 CFR Part 261, including ignitability, corrosivity, reactivity, or extraction procedure toxicity.

4.18.1 Potential Cumulative Impacts

Projects within the vicinity of the Study Airports were reviewed to evaluate the potential for cumulative impacts. A list of potential projects proposed on or near the Study Airports was compiled. The majority of the information came from the FAA Airport's Division. Projects with no potential for cumulative impacts such as taxiway rehabilitation were not included.

For each of the primary airports, additional project data was gathered from DOT websites, Comprehensive Land Use Plans, and other area and local plans. Projects within a search radius of each primary airport were added to this list of projects with potential to result in cumulative impacts. The search radius was based on the noise impacts resulting from the Proposed Action Airspace Redesign alternatives. The search radius for each primary airport was determined such that at a minimum all areas where noise levels changed 1.5 DNL or more in an area exposed to 65 DNL or higher were included. Thus, the search radius was one mile for TEB, three miles for JFK, LGA, and PHL, and 3.5 miles for EWR. Project data for projects in the vicinities of JFK and LGA came predominantly from the New York State DOT Five Year Transportation Capital Program Projects List,[32] which is a comprehensive listing of Federal and State projects within each geographical region of New York. Information regarding projects near PHL was gathered from the Pennsylvania Department of Transportation website[33] and the Delaware Valley Regional Planning Commission register of projects slated to begin before or during the year 2030. Construction projects near EWR and TEB were obtained using the North Jersey Transportation Planning Authority's Access & Mobility 2030 Plan.

Table 4.25 shows the resulting list of projects considered in regard to the potential for cumulative impacts. Note that these projects may or may not occur and even when a timeframe is provided there is no certainty that this project will actually be accomplished. Since all impacts resulting from the Proposed Action Airspace Redesign alternatives were noise or noise-related impacts, only other proposed projects with the potential for cumulative noise impacts were considered. Table 4.22 indicates whether there would be potential for cumulative impacts when a project's impacts are combined with the impacts of the Proposed Action Airspace Redesign alternatives. Table 4.22 also shows potential noise mitigation projects. These proposed projects would have the potential to decrease cumulative impacts of noise.

Two projects are underway at PHL: extension to Runway 17/35 and the Capacity Enhancement Program (CEP). Construction of the extension to Runway 17/35 is underway and the Airport Sponsor expects the extension to be operational by early 2009. The north end is to be extended 640 feet and the south end is to be extended 400 feet for a new runway length of 6,500 feet. The results presented in the PHL Runway 17/35 Extension Project Final EIS were reviewed. According to the EIS, the noise analysis for 2015 showed that the Runway 17/35 extension was expected to result in only a very minimal change in the noise pattern around PHL. Additionally the extension of Runway 17/35 will not increase capacity at PHL. Therefore, significant cumulative impacts from the implementation of the NY/NJ/PHL Metropolitan Airspace

[32] 2005-2010 Transportation Program MOU, Appendices A and B: New York State Department of Transportation.

[33] <http://www.dot.state.pa.us/penndot/districts/ district6.nsf/ main? Readform>.

Table 4.25
Potential Cumulative Impacts

Airport	Description	Year(s)	Primary Impact Locations	Potential for Noise Impacts	Potential Noise Mitigation	Potential for Significant Cumulative Noise Impacts
ABE						
Airport Improvements						
	Noise mitigation measures - residences w/in 65-69 DNL	2005-2009	Airport Vicinity	No	Yes	No
	Extend Runway 13/31	2006-2011	Airport Property	Yes	No	No
	Acquire land for development - 104 acres, East Allen Township	2007	Airport Vicinity	No	No	No
	Acquire land for approaches - relocate 28 residences	2007	Airport Vicinity	No	No	No
	Acquire land for noise compatibility w/in 65-69 DNL	2007-2009	Airport Vicinity	No	Yes	No
	Extend Runway 6/24 - Runway 6 Extension	2008-2009	Airport Vicinity	Yes	No	No
	Install Cat II ILS for Runway 24	2008	Airport Vicinity	Yes	No	No
	Modify Access Road	2010	Airport Property	No	No	No
ACY						
Airport Improvements						
	Construct new terminal apron	2005-2007	Airport Property	No	No	No
	Install runway vertical/visual guidance system 13/31	2006	Airport Vicinity	Yes	No	No
	Runway 13 CAT ILS -- Install CAT III Runway 13	2006	Airport Vicinity	Yes	No	No
	Rehabilitate Runway 4/22	2010	Airport Property	No	No	No
BDR						
Airport Improvements						
	Rehabilitate Runway 6/24	2006-2009	Airport Property	No	No	No
CDW						
Airport Improvements						
	Construct 14,000 square foot T-Hangars	2005	Airport Property	No	No	No
	Install Miscellaneous NAVAIDS	2005	Airport Property	No	No	No

Table 4.25 (continued)
Potential Cumulative Impacts

Airport	Description	Year(s)	Primary Impact Locations	Potential for Noise Impacts	Potential Noise Mitigation	Potential for Significant Cumulative Noise Impacts
CDW (continued)						
Airport Improvements (continued)						
	Relocate Airport Beacon	2005	Airport Property	No	No	No
	Rehabilitate/Extend Runway 9/27	2005-2007	Airport Vicinity	Yes	No	No
EWR						
Airport Improvements						
	Noise mitigation measures for public buildings - soundproofing of schools	2005-2007	Airport Vicinity	No	Yes	No
	Improve southern access roads	2007-2009	Airport Property	No	No	No
	Improve central terminal access roads	2007-2009	Airport Property	No	No	No
Other Construction						
	Operational Improvements: Rte. 1&9 Haynes Avenue Bridges		Essex County	Yes	No	No
	Newark Circulation Improvements		Essex County	Yes	No	No
	Pedestrian Improvements: Rte. 1&9		Essex County	No	No	No
FOK						
Airport Improvements						
	Rehabilitate Runway 6/24	2005	Airport Property	No	No	No
	Obstruction removal in proximity of runways	2005	Airport Property	No	No	No
	Acquire land for approaches - Runway 6	2007	Airport Vicinity	No	No	No
FRG						
Airport Improvements						
	Rehabilitate access road - perimeter road	2007	Airport Property	No	No	No
	Rehabilitate Runway 1/19 - relocate Runway 1/19 northward	2008	Airport Vicinity	Yes	No	No

Table 4.25 (continued)
Potential Cumulative Impacts

Airport	Description	Year(s)	Primary Impact Locations	Potential for Noise Impacts	Potential Noise Mitigation	Potential for Significant Cumulative Noise Impacts
HPN						
Airport Improvements						
	Widen existing terminal roadway for security emergency ingress/egress	2008	Airport Property	No	No	No
	Modify access road - relocate a portion of existing perimeter road	2009	Airport Property	No	No	No
HVN						
Airport Improvements						
	Improve terminal building	2005	Airport Property	No	No	No
	Rehabilitate runway	2007	Airport Property	No	No	No
	Expand apron and glycol area	2009	Airport Property	Yes	No	No
ILG						
Airport Improvements						
	Remove obstructions	2006	Airport Vicinity	No	No	No
	Rehabilitate Runway 9/27	2006-2007	Airport Property	No	No	No
	Rehabilitate terminal building	2009	Airport Property	No	No	No
	Construct access road	2010	Airport Property	No	No	No
ISP						
Airport Improvements						
	Construct service road - connects south airside to operational areas	2005	Airport Property	No	No	No
	Construct access road at east end of terminal ramp	2005	Airport Property	No	No	No
	Rehabilitate Runway 10/28	2005	Airport Property	No	No	No
	Install runway vertical/visual guidance system Runway 6/24	2007-2008	Airport Vicinity	Yes	No	No

Table 4.25 (continued)
Potential Cumulative Impacts

Airport	Description	Year(s)	Primary Impact Locations	Potential for Noise Impacts	Potential Noise Mitigation	Potential for Significant Cumulative Noise Impacts
ISP (continued)						
Airport Improvements (continued)						
	Install CAT 2 ILS system for Runway 6/24	2007-2008	Airport Vicinity	Yes	No	No
	Improve west concourse of terminal building	2009-2010	Airport Property	No	No	No
	Acquire Halstead Property for development	2010	Airport Vicinity	No	No	No
JFK						
Airport Improvements						
	Improve airport access road - Van Wyck Expressway	2005	Airport Vicinity	No	No	No
	Rehabilitate access road - 148th Street	2006	Airport Vicinity	No	No	No
	Construct new domestic terminal building	2006-2009	Airport Property	No	No	No
	Noise mitigation measures for public buildings - school soundproofing	2006-2007	Airport Vicinity	No	Yes	No
	Rehabilitate various access roads	2007	Airport Property	No	No	No
	Rehabilitate Runway 13R/31L	2008	Airport Property	No	No	No
Other Construction						
	Belt/Rockaway Parkway		Kings County	Yes	No	No
	Eastern Queens Intelligent Traffic Signalization (ITS) (Clearview Expressway, Cross Island Parkway, Nassau Expressway)		Queens County	Yes	No	No
	Improvements: Van Wyck Expressway		Queens County	Yes	No	No

Table 4.25 (continued)
Potential Cumulative Impacts

Airport	Description	Year(s)	Primary Impact Locations	Potential for Noise Impacts	Potential Noise Mitigation	Potential for Significant Cumulative Noise Impacts
LDJ						
Airport Improvements						
	Acquire land for approaches	2006	Airport Vicinity	No	No	No
LGA						
Airport Improvements						
	Improve access roads/access road bridges	2005-2006	Airport Vicinity	No	No	No
	Improve terminal building	2005	Airport Property	No	No	No
	Rehabilitate Runway 4/22	2005	Airport Property	No	No	No
	Rehabilitate Runway 13/31	2005	Airport Property	No	No	No
	Noise mitigation measures for public buildings - school soundproofing program	2006	Airport Vicinity	No	Yes	No
	Improve access roads west of central terminal building	2008	Airport Property	No	No	No
Other Construction						
	Queens East River N. Shore Greenway Ph. 1		Queens County	Yes	No	No
	Rehabilitation: Brooklyn Queens Expressway/Grand Central Parkway East Leg		Queens County	Yes	No	No
	Improvements: Van Wyck Expressway		Queens County	Yes	No	No
	Bridge Rehabilitation: Roosevelt Avenue over Van Wyck Expressway		Queens County	No	No	No
	Rehabilitation: Brooklyn Queens Expressway/Grand Central Parkway West Leg		Queens County	No	No	No

Table 4.25 (continued)

Potential Cumulative Impacts

Airport	Description	Year(s)	Primary Impact Locations	Potential for Noise Impacts	Potential Noise Mitigation	Potential for Significant Cumulative Noise Impacts
LGA (continued)						
Other Construction (continued)						
	Transmit Expansion (Grand Central Parkway, Van Wyck Expressway, Whitestone Expressway)		Queens County	No	No	No
	Improvements: Van Wyck Expressway		Queens County	Yes	No	No
MMU						
Airport Improvements						
	Install runway vertical/visual guidance Runway 5/23	2005-2006	Airport Vicinity	Yes	No	No
	Rehabilitate Runway 13/31	2006	Airport Property	No	No	No
PHL						
Airport Improvements						
	Noise mitigation measures for residences w/in 65-69 DNL	2005-2008	Airport Vicinity	No	Yes	No
	Extend Runway 17/35	2005-2007	Airport Vicinity	Yes	No	No
	Rehabilitate Runway 9R/27L	2006-2007	Airport Property	No	No	No
	Acquire land for development	2008-2010	Airport Vicinity	No	No	No
Other Construction						
	I-95 Airport Ramps		Philadelphia	Yes	No	No
	Interchange Reconstruction: I-476/I-95		Philadelphia	Yes	No	No
	I-95 Within Philadelphia		Philadelphia	Yes	No	No
	New Station: Regional Rail 1/Route 36		Philadelphia	Yes	No	No
	Rail Line Extension: Broad Street Subway		Philadelphia	Yes	No	No
	Flyover Construction: Regional Rails 1 and 2		Philadelphia	Yes	No	No

Table 4.25 (continued)
Potential Cumulative Impacts

Airport	Description	Year(s)	Primary Impact Locations	Potential for Noise Impacts	Potential Noise Mitigation	Potential for Significant Cumulative Noise Impacts
PNE						
Airport Improvements						
	No activities likely to have cumulative impacts			No	No	No
SWF						
Airport Improvements						
	Improve terminal building	2005-2006	Airport Property	No	No	No
	Construct apron and glycol system - north cargo area	2006-2007	Airport Property	No	No	No
	Extend Runway 16/34	2006-2009	Airport Vicinity	Yes	No	No
	Remove obstructions in proximity of Runway 16 end	2006-2007	Airport Vicinity	No	No	No
	Construct access road	2007-2008	Airport Property	No	No	No
	Expand terminal building	2007-2008	Airport Property	No	No	No
	Remove Tower Hill obstruction	2008-2009	Airport Vicinity	No	No	No
TEB						
Airport Improvements						
	Noise mitigation measures for public buildings - school soundproofing program	2005-2006	Airport Vicinity	No	Yes	No
Other Construction						
	Rte. 17 Essex Street Bridge		Bergen County	Yes	No	No
	Rte. 17 Railroad Avenue		Bergen County	Yes	No	No
	Rte. 120 Paterson Plank road from route 17 to Murray Hill Boulevard		Bergen County	Yes	No	No
	Rte. 46 Main Street, Lodi		Bergen County	Yes	No	No
	Operational and Safety Improvements: Rte. 46 Little Ferry Circle		Bergen County	Yes	No	No

Table 4.25 (continued)
Potential Cumulative Impacts

Airport	Description	Year(s)	Primary Impact Locations	Potential for Noise Impacts	Potential Noise Mitigation	Potential for Significant Cumulative Noise Impacts
TNN						
Airport Improvements						
	Construct terminal building	2006-2007	Airport Property	No	No	No
	Improve terminal access road	2006-2007	Airport Property	No	No	No
	Construct deicing containment facility infrastructure	2007-2008	Airport Property	No	No	No
	Acquire land for approaches in proximity of Runway 6	2010	Airport Vicinity	No	No	No
WRI						
Airport Improvements						
	Receive 13 new C-17s to replace C-141s, and improve infrastructure improvements and facility upgrades to accommodate the new aircraft	2004-2005	Airport Property and Vicinity	No	Yes	No
	Base Realignment and Closure Commission (BRAC) recommended 'Mega-Base' at WRI	2005-2011	Airport Property and Vicinity	Yes	No	No

Source: FAA Airport's Division, New York State DOT Five Year Transportation Capital Program Projects List, Department of Transportation website, Regional Planning Commission register of projects slated to begin before or during the year 2030, North Jersey Transportation Planning Authority's Access & Mobility 2030, McGuire Air Force Base Public Website, http://public.mcguire.amc.af.mil/, http://www.sjcommunityNEWS.com, and HNTB analysis, 2005.

Redesign and the completion of the PHL Runway 17/35 extension would not be expected.

While the PHL Capacity Enhancement Program (CEP) may potentially have cumulative impacts when combined with this project, it has not been included in this analysis. The FAA is preparing an EIS for the proposed airport development included in the CEP, whose purpose is to increase airfield capacity at PHL. The increased airfield capacity is required at PHL, regardless of whether the Airspace Redesign is implemented. Potential improvements under CEP could include the relocation and/or extension of the existing runways.

Because there has been no determination of what the alternatives for this proposed project will look like, there is insufficient information to evaluate cumulative impacts, especially as they related to noise, at this time. It is noted that the CEP EIS analysis will include consideration of the airspace redesign alternative selected for implementation as a result of this EIS.

Bradley International Airport (BDL) has developed a Part 150 Study including a noise compatibility program involving airport-specific noise abatement measures. Since noise abatement measures would decrease noise exposure levels this project would have the potential to decrease cumulative impacts.

On January 25th 2007, the PANYNJ announced that the Port Authority Board of Commissioners authorized the purchase of the operating lease at SWF. The PANYNJ press release quoted New York Governor, Eliot Spitzer as saying, "… Stewart Airport will provide much-needed relief for out three major airports, greatly reduce delays, and help us prepare for the inevitable population and passenger growth." As of July 2007, the Port Authority was still pursuing the acquisition of the lease and negotiating with both National Express and the State of New York. Even if the purchase is successful, it is unclear whether the airlines will be willing to operate at SWF especially in light of American Airlines recent announcement that they are pulling out of SWF. Therefore, this proposal is not reasonably foreseeable and was not considered in the evaluation of cumulative impacts.

Other airspace redesign projects were also considered during the evaluation of potential cumulative impacts. EISs for the Chicago Terminal Airspace Project (CTAP) and the Potomac Consolidated TRACON Airspace Redesign have been completed and the FAA issued Record of Decisions for both projects. Neither of the Study Areas for these projects overlaps the NY/NJ/PHL Metropolitan Area Airspace Redesign Project's Study Area and the projects themselves do not induce growth or increase capacity, therefore, significant cumulative impacts are not anticipated. The FAA is in the process of completing an EA for the Midwest Airspace Enhancement Airspace Redesign in the Cleveland/Detroit Metropolitan Areas. The environmental study area for this project does not overlap the Study Area for the NY/NJ/PHL Metropolitan Airspace Redesign and the project itself does not induce growth or increase capacity, therefore, significant cumulative impacts are not anticipated. Therefore, no cumulative impacts from the implementation of the NY/NJ/PHL Metropolitan Airspace Redesign and other airspace redesign projects are anticipated.

4.18.2 Ambient Noise Comparison

The potential for cumulative noise impacts resulting from any of the Airspace Redesign Alternatives may also be explored by looking at the total noise, ambient noise and aircraft noise. The noise measurement data presented in Appendix D, *Noise Measurement Report*, was analyzed in conjunction with the noise modeling computations for each of the noise measurement sites in the Study Area. This analysis was conducted in order to provide a general understanding of the effects of the proposed project alternatives at each location. By including the measured noise along with the modeled changes for each alternative, an estimation of each alternative's contribution to the total noise picture at each site is possible. Therefore, aircraft noise from modeled aircraft operations, as well as all other aircraft operations can be considered. While this type of analysis can only be done specific to each noise measurement location, it does provide some insights as to the project alternatives contribution to the total noise in the area.

The noise levels measured at each of the 18 noise measurement sites contains contributions from all noise sources, including both aircraft and non-aircraft noise events. See Figure 3.14 for the location of the noise measurement sites. As described in Appendix D, radar data was correlated with the measurement date to identify noise events associated with aircraft overflights at each site. These aircraft noise events were then mathematically subtracted from the total noise recorded at each site and a DNL value was computed. This resulting value represents an estimation of the background noise at each site including various local noise sources which may include other aircraft activity that was not included in the NIRS modeling. This might include VFR flights traversing the area or traffic from airports not modeled in NIRS. For the purposes of this analysis, these computed background noise levels were assumed to be reasonable estimations of the future background noise levels that might be found at each site in 2006 and 2011.

These "background" DNL values were then added to the future NIRS modeled noise levels (representing IFR aircraft only) to create an estimated "Total" noise level for each site. This was done for the No Action as well as each project alternative for each future year. **Table 4.26** presents the results of this computation along with the measured background DNL values at each site.

In order to investigate the changes associated with each project alternative when all noise sources are considered, the No Action total noise levels are subtracted from the total noise levels associated with each alternative in each year. **Table 4.27** presents the estimated differences in total noise at each site for each alternative in each of the future years. As Table 4.24 indicates, only Sites 7a and 7b exhibit any noteworthy changes in total noise with any of the project alternatives. This is expected since these two sites were generally the closest (Staten Island near the EWR south departure route) to any major airport activity. Thus, the total noise picture at these sites would be expected to have a large component from aircraft noise. The slight increases from the Ocean Routing alternative are reasonable as even more departure traffic would be routed close to the sites down Arthur Kill to Raritan Bay where they turn east for the over-ocean routing. Conversely, the changes to the departure headings at EWR would route less traffic over the sites explaining the total noise reductions evident in the table. Much smaller changes are evident from some alternatives at a few sites, however, these sites are not as close to major airports, hence the total noise picture is not as influenced by aircraft noise.

Overall, the resulting changes in total noise for each alternative confirm that the changes in noise associated with each project alternative tend to be very small in the context of the total noise environment for locations that are not situated very near a major airport. This analysis supports the assertion that no significant cumulative impacts are expected as a result of combining the impacts of any of the Airspace Redesign Alternatives with other past, present, or reasonably foreseeable future actions.

4.19 CONSISTENCY WITH STATE AND LOCAL PLANS

The proposed air traffic procedural changes are consistent with applicable state and local plans as they would not have an impact on existing or proposed state and local government land use plans and development patterns.

4.20 SUMMARY OF POTENTIAL FOR SIGNIFICANT ENVIRONMENTAL IMPACTS

Table 4.28 summarizes the potential for significant impacts associated with each alternative. Potential significant impacts

Table 4.26

Comparison of Total DNL Noise Values at Measurement Sites

Measurement Site	Measured Background DNL	No Action	Ocean	Modifications	Integrated without ICC	Integrated with ICC
		2006 Total Noise (background + modeled)				
Site 1a	40.3	41.3	41.3	41.3	41.3	
Site 1b	62.7	62.7	62.7	62.7	62.7	
Site 2	46.6	46.7	46.7	46.7	46.7	
Site 3	59.5	59.5	59.5	59.5	59.5	
Site 4	53.7	53.8	53.8	53.8	53.8	
Site 5	67.3	67.3	67.3	67.3	67.3	
Site 6	56.8	57.0	57.0	57.0	57.0	
Site 7a	61.5	62.3	62.5	61.7	61.7	
Site 7b	58.7	60.7	60.9	59.1	59.1	
Site 8	65.4	66.3	66.6	66.3	66.3	
Site 9	60.8	61.0	60.9	61.0	61.0	
Site 10	57.4	57.7	57.5	57.7	57.6	
Site 11	60.7	60.7	60.7	60.7	60.7	
Site 12	61.7	61.8	61.8	61.8	61.8	
Site 13	64.1	64.2	64.2	64.1	64.1	
Site 14	59.1	59.1	59.1	59.1	59.1	
Site 15	60.6	60.8	60.8	60.8	60.8	
Site 16	57.8	58.4	58.4	58.4	58.4	
		2011 Total Noise (background + modeled)				
Site 1a	40.3	41.2	41.2	41.2	41.2	40.5
Site 1b	62.7	62.7	62.7	62.7	62.7	62.7
Site 2	46.6	46.7	46.7	46.7	46.7	46.8
Site 3	59.5	59.5	59.5	59.5	59.5	59.5
Site 4	53.7	53.8	53.8	53.8	53.8	53.8
Site 5	67.3	67.3	67.3	67.3	67.3	67.3
Site 6	56.8	57.0	57.0	57.0	57.0	57.0
Site 7a	61.5	62.3	62.5	61.7	61.7	61.6
Site 7b	58.7	60.5	61.0	59.1	59.1	59.0
Site 8	65.4	66.3	66.6	66.3	66.3	66.3
Site 9	60.8	60.9	60.9	60.9	60.9	60.8
Site 10	57.4	57.6	57.5	57.7	57.6	57.7
Site 11	60.7	60.7	60.7	60.7	60.7	60.7
Site 12	61.7	61.8	61.8	61.8	61.8	61.8
Site 13	64.1	64.1	64.1	64.1	64.1	64.1
Site 14	59.1	59.1	59.1	59.1	59.1	59.1
Site 15	60.6	60.9	60.9	60.8	60.8	60.8
Site 16	57.8	58.4	58.4	58.4	58.4	58.5

Source: Landrum & Brown analysis, 2003-05.

Table 4.27

Difference in Total Noise for Project Alternatives at Measurement Sites

Measurement Site	2006 Change in Total Noise - DNL			2011 Change in Total Noise - DNL			
	Ocean	Modifications	Integrated without ICC	Ocean	Modifications	Integrated Variation without ICC	Integrated Variation with ICC
Site 1a	0.0	0.0	0.0	0.0	0.0	0.0	-0.7
Site 1b	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 2	0.0	0.0	0.0	0.0	0.0	0.0	0.2
Site 3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 4	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 5	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 6	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 7a	0.1	-0.7	-0.7	0.7	-0.6	-0.6	-0.6
Site 7b	0.3	-1.6	-1.6	0.5	-1.4	-1.4	-1.4
Site 8	0.3	0.0	0.0	0.3	0.0	0.0	0.0
Site 9	0.0	0.0	0.0	0.0	0.0	0.0	-0.1
Site 10	-0.2	0.0	-0.1	-0.1	0.0	0.0	0.0
Site 11	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 12	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 13	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 14	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 15	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Site 16	0.0	0.0	0.0	0.0	0.0	0.0	0.1

Source: Landrum & Brown analysis, 2005.

Table 4.28
Summary of Potential for Significant Environmental Impacts

Environmental Impact Category	Alternative							
	Modifications to Existing Airspace		Ocean Routing Airspace		Integrated Airspace			
					without ICC		with ICC	
	2006	2011	2006	2011	2006	2011	2006	2011
Noise / Compatible Land Use	Yes	Yes	No	No	Yes	Yes	N/A	Yes
Socioeconomic Impacts / Environmental Justice	Yes	Yes	No	No	Yes	Yes	N/A	Yes
Secondary or Induced Impacts	No	No	No	No	No	No	N/A	No
Department of Transportation Act: Sections 4(f) and 6(f)	No	No	No	No	No	No	N/A	No
Historical, Architectural, Archaeological and Cultural Resources	No	No	No	No	No	No	N/A	No
Wild and Scenic Rivers	No	No	No	No	No	No	N/A	No
Fish, Wildlife, and Plants	No	No	No	No	No	No	N/A	No
Light Emissions and Visual Impacts	No	No	No	No	No	No	N/A	No
Air Quality	No	No	No	No	No	No	N/A	No
Natural Resources and Energy Supply	No	No	No	No	No	No	N/A	No
Construction Impacts	No	No	No	No	No	No	N/A	No
Farmlands	No	No	No	No	No	No	N/A	No
Coastal Resources	No	No	No	No	No	No	N/A	No
Water Quality	No	No	No	No	No	No	N/A	No
Wetlands	No	No	No	No	No	No	N/A	No
Floodplains and Floodways	No	No	No	No	No	No	N/A	No
Hazardous Materials and Solid Waste	No	No	No	No	No	No	N/A	No

Source: Source: Landrum & Brown, Metron and HNTB analysis, 2005.

exist for Noise/Compatible Land Use and Socioeconomic Impacts/Environmental Justice. There is no potential for significant impacts associated with the Ocean Routing Airspace Alternative.

Chapter Five
PREFERRED ALTERNATIVE AND MITIGATION

This chapter includes a discussion of the preferred alternative and associated mitigation for the Proposed Action. The FAA did not identify a preferred alternative in the DEIS in order to consider public and agency DEIS comments in the preferred alternative identification process. Upon receipt and consideration of public and agency comments, the FAA identified a preferred alternative and designed mitigation to minimize the associated environmental impacts to the extent possible. Once the mitigation package was designed, the environmental consequences for each of the impact categories including noise was determined. This chapter concludes with a discussion of the environmental impacts of the mitigated preferred alternative.

5.1 PREFERRED ALTERNATIVE

The FAA identified the Integrated Airspace Alternative Variation with ICC as the Preferred Alternative for the NY/NJ/PHL Metropolitan Area Airspace Redesign Project. Among the alternatives studied, the Integrated Airspace Alternative Variation with ICC best meets the purpose and need of the project, which is to improve the efficiency and reliability of the airspace structure and air traffic control system from southern Connecticut to eastern Delaware.

Each of the Airspace Alternatives was analyzed to determine its operational effects. The Future No Action Airspace Alternative would not result in any operational benefits and airspace related aircraft delay would increase. The Modifications to Existing Airspace Alternative and Integrated Airspace Alternative Variation without ICC would result in small operational benefits while the Ocean Routing Airspace Alternative would reduce airspace efficiency and increase airspace complexity. Only the Integrated Airspace Alternative Variation with ICC provides for considerable operational benefit.

The Integrated Airspace Alternative Variation with ICC is a new concept in airspace design. Currently, the airspace is a layered structure, consisting of enroute and terminal airspace. Each layer includes a finite piece of airspace defined by lower and upper altitude limits and defined geographic boundaries. The Integrated Airspace Alternative Variation with ICC would alter the limits of these finite pieces of airspace such that several operational benefits would occur including:

- A reduction in the complexity of the current air traffic system operation in New York / New Jersey / and Philadelphia,
- A reduction in delays and the expeditious arrival and departure of aircraft,
- Improved flexibility in routing aircraft,
- A more balanced controller workload, and
- An increase in the FAA’s ability to meet system demands.

5.2 MITIGATION

Throughout the course of the public meetings and the comment period, the FAA committed to the development of a noise mitigation package to alleviate, to the extent possible, the impacts associated with the Preferred Alternative. Upon identification of the Preferred Alternative, the FAA proceeded with the design of the noise mitigation package.

Mitigation measures are those designed to avoid, minimize, rectify, reduce, eliminate, or compensate for environmental impacts. Since the Preferred Alternative would result in significant noise and noise associated impacts (environmental justice), mitigation measures were developed to reduce the significant noise impacts where possible. It should be noted that the FAA considered measures in all areas, not just those areas that experienced a significant impact or a slight to moderate threshold-based noise change as reported in the DEIS. Consideration was given to measures that would affect areas of noise increase that did not receive a significant or slight to moderate noise increase, as well as long standing issues that may be improved with the airspace redesign.

This section presents an overview of the process and methods by which various noise mitigation procedures were identified and evaluated. A summary of each step in the process is provided along with a discussion of the results of each step. The process begins with the development of a comprehensive list of potential mitigation measures and concludes with a final mitigation package that is both operationally feasible and provides reductions in noise impacts as compared to the unmitigated Preferred Alternative.

After the public comment period closed for the DEIS in July of 2006, all comments received were organized and categorized for response in the Final EIS (FEIS) document. As part of this process, any comment that discussed a potential noise mitigation measure was flagged. There were over 450 such comments considered. At the same time, the FAA identified potential mitigation measures by reviewing not only the threshold-based noise impacts presented in the DEIS, but also the noise changes throughout the Study Area. The proposed public and FAA mitigation measures regarding the Preferred Alternative were combined to develop an initial list of potential mitigation measures. As would be expected, many of the public mitigation comments focused on similar issues and techniques and some of these were similar to the ideas that were generated separately by the FAA. **Table 5.1** presents a summary of the combination of the public and FAA mitigation recommendations.

5.2.1 Operational Screening

Initial screening as to whether each measure was operationally viable or presented a safety concern was conducted. While some mitigation measures were eliminated immediately because of readily apparent operational or safety problems, detailed operational analysis was required for others. The operational screening process was performed in two steps. First, a qualitative review and evaluation of each measure was undertaken by FAA Air Traffic Control and operational simulation professionals. This evaluation identified measures that were not operationally feasible or raised safety concerns based on working knowledge of the airspace. The second step of the evaluation was a quantitative analysis of the remaining measures using the Total Airspace & Airport Modeler (TAAM) to identify the degree of operational efficiency lost with a given measure. A detailed discussion of this effort is documented in the, *Operational Analysis of Mitigation of the New York/New Jersey/Philadelphia Airspace* included in **Appendix O** of the FEIS. The results of both the qualitative and quantitative operational screening are shown in **Table 5.2.**

Table 5.1
Summary of Mitigation Recommendations

Airport	Runway	Mitigation Measure	Applicable Area
EWR	4, 22 Arrival	Raise the altitude of the downwind leg of the approaches to both Runways.	Areas west of EWR
	4, 22 Arrival	Raise the altitude and move the location of the downwind leg of the approaches to both Runways.	Areas west of EWR
	4, 22 Arrival	Implement Continuous Descent Approaches.	Areas west, northwest, and southwest of EWR
	22 Departure	Use the proposed headings (220, 240, 260 degrees) and develop RNAV departure procedures over less noise sensitive areas such as transportation and industrial corridors.	Areas south and southwest of EWR
	22 Departure	Determine the headings and develop RNAV routes by considering where the less noise sensitive areas are located.	Areas south and southwest of EWR
	22 Departure	Reduce the number of departure headings from three to two or one.	Areas south and southwest of EWR
	22 Departure	Use two departure headings; 190 and 240 degrees.	Areas south and southwest of EWR
	22 Departure	Use three departure headings (220, 240, and 260 degrees) from 7 am to 10 pm, and use one departure heading (190 degrees) from 10 pm to 7 am.	Areas south and southwest of EWR
	22 Departure	Change the proposed departure headings from 220, 240, and 260 degrees to 190, 220, and 240 degrees.	Areas south and southwest of EWR
	22 Departure	Use the 190 departure heading until the departure delay reaches 15 minutes. Use the 190 and 240 departure headings when departure delay is between 15 and 30 minutes. Use the 190, 240, and 260 departure headings when the departure delay is greater than 30 minutes.	Areas south and southwest of EWR
	22 Departure	Change the proposed departure headings from 220, 240, and 260 to 190, 220, and 240, and only use the three departure headings when departure delay is greater than 15 minutes.	Areas south and southwest of EWR
	22 Departure	Change the proposed departure headings from 220, 240, and 260 degrees to 195, 200, 215, 240, and 260 degrees with time of day restrictions.	Areas south and southwest of EWR

Table 5.1
Summary of Mitigation Recommendations

Airport	Runway	Mitigation Measure	Applicable Area
EWR (cont'd)	22 Arrival and Departure	Use 22L and 22R for both arrivals and departures.	Areas north and south of EWR
	22 Departure	Change the proposed departure headings to headings less than 190 degrees.	Areas south and southwest of EWR
	22 Departure	Use NJCAAN Ocean Routing for Runway 22 departures.	Areas south and southwest of EWR
	22 Departure	Use Modified Ocean Routing for Runway 22 departures at night from 10 pm to 7 am.	Areas south and southwest of EWR
	22 Departure	Use NJCAAN Ocean Routing for Runway 22 departures at night from 10 pm to 7 am.	Areas south and southwest of EWR
	4 and TEB Arrival	Use RNAV procedures for both TEB arrivals to Runway 6 and EWR departures in conjunction with reductions in required separations to augment the availability of fanned headings.	Areas north and northwest of EWR
	4 Departure	Delay turning aircraft to the left when departing off of Runway 4 in order to keep aircraft flying over the Meadowlands.	Areas north of EWR
	4, 22 Arrival and Departure	Expand the EWR airspace to the east and allow EWR controllers to direct arriving and departing aircraft to fly along the Hudson corridor.	Areas north of EWR
LGA	22 Arrival	Increase the use of the LDA approach.	Areas north of LGA
	31, 22 Arrival	Use Ocean Routing for Runway 22 departures at night from 10 pm to 7 am.	Areas north and south of LGA
	31, 22 Arrival	Implement Continuous Descent Approaches.	Areas north and south of LGA
	31 Departure	Develop RNAV departure procedures that do not route aircraft over Riker's Island.	Riker's Island
	31 Departure	Adjust the time of day when departure routes over Riker's Island are used.	Riker's Island

Table 5.1
Summary of Mitigation Recommendations

Airport	Runway	Mitigation Measure	Applicable Area
HPN	34 Arrival	Implement Flight Management System (FMS) approach to Runway 34.	Areas southeast of HPN
	34 Arrival & Departure	Increase altitude of Runway 34 arrivals and departures.	Areas northwest and southeast of HPN
TEB	19 Arrival, 1 Departure	Develop GPS approach and departure procedures over commercial area north-northeast of TEB.	Hackensack, NJ
MMU	23 Departure	Change departure headings such that aircraft will not overfly an office complex.	Morristown Airport
JFK	13, 31 Arrival	Move routes such that aircraft will fly over water.	Jersey Shore/Sandy Hook
	22R Arrival	Move routes such that aircraft will fly over the Interstate 495 transportation corridor.	Areas east of JFK
ISP	24 Departure	Narrow the corridor for aircraft departing to the south in order to minimize the impact to the wilderness areas of the Fire Island Seashore.	Fire Island Seashore
PHL	9, 27 Arrival	Implement Continuous Descent Approaches.	PHL Area
	9, 27 Arrival	Develop RNAV arrival procedures.	Areas northeast and southwest of the airport
	9 Arrival	Increase use of the visual approach to Runway 9R (the River Approach)	Pennsylvania and Delaware
	9, 27 Departure	Reduce the number of proposed departure headings.	Pennsylvania
TNN	6, 24 Departure	Remove altitude restriction for aircraft departing from Runways 24 and 6.	Trenton Mercer Area
Overflight	Various Arrivals	Move Jetway V213 in order to route aircraft over the Interstate 87 transportation corridor.	Ulster County

Table 5.2
Operational Screening of Initial Mitigation Measures

	Mitigation Measure	**Pass Qualitative Review**	**Pass Quantitative Review**	**Comments**
EWR				
4, 22 Arrival	Raise the altitude of the downwind leg of the approaches to both Runways.	yes	yes	See Chapter 10 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
4, 22 Arrival	Raise the altitude and move the location of the downwind leg of the approaches to both Runways.	yes	no	To do this, departing aircraft would have to be held low until they passed under the downwind leg. Holding departures low decreases efficiency, and worse for a mitigation strategy, increases noise.
4, 22 Arrival	Implement Continuous Descent Approaches.	yes	yes	Continuous Descent Approach only operationally feasible when crossing flows of air traffic are sparse i.e. at night. See Chapter 16 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
22 Departure	Use the proposed headings (220, 240, 260 degrees) and develop RNAV departure procedures over less noise sensitive areas such as transportation and industrial corridors.	yes	yes	Operational analysis showed that the best mitigation measure was a combination of the proposed initial mitigation measures. Three departure headings should be used only when departure demand dictates. When only one heading is necessary, it should be the current 190 heading. When two headings are required they should be approximately 220 degrees (near the New Jersey Turnpike and 240 degrees (near the railroad). See Chapter 7 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
22 Departure	Determine the headings and develop RNAV routes by considering where the less noise sensitive areas are located.	yes		
22 Departure	Reduce the number of departure headings from three to two or one.	yes		
22 Departure	Use two departure headings; 190 and 240 degrees.	yes		
22 Departure	Use three departure headings (220, 240, and 260 degrees) from 7 am to 10 pm, and use one departure heading (190 degrees) from 10 pm to 7 am.	yes		
22 Departure	Change the proposed departure headings from 220, 240, and 260 degrees to 190, 220, and 240 degrees.	yes		

Table 5.2

Operational Screening of Initial Mitigation Measures

	Mitigation Measure	Pass Quali-tative Review	Pass Quanti-tative Review	Comments
22 Departure	Use the 190 departure heading until the departure delay reaches 15 minutes. Use the 190 and 240 departure headings when departure delay is between 15 and 30 minutes. Use the 190, 240, and 260 departure headings when the departure delay is greater than 30 minutes.	yes		
22 Departure	Change the proposed departure headings from 220, 240, and 260 to 190, 220, and 240, and only use the three departure headings when departure delay is greater than 15 minutes.	yes		
22 Departure	Change the proposed departure headings from 220, 240, and 260 degrees to 195, 200, 215, 240, and 260 degrees with time of day restrictions.	yes		
22 Arrival and Departure	Use 22L and 22R for both arrivals and departures.	yes	no	Departing and arriving to both runways is done on a limited case by case basis today and will continue in the Preferred Alternative. However, the complexity of the added runway crossings undercuts the efficiency benefits of adding a second runway. Simulation showed no benefit at peak traffic times.
22 Departure	Change the proposed departure headings to headings less than 190 degrees.	no	N/A	LGA arrivals from the south follow a path that lies approximately 4 nautical miles to the east of EWR airport. Departing flights off of EWR's Runway 22 using a departure heading of less than 190 degrees would be flying directly at the LGA arrival stream. This results in an unsafe operation in the event of a communications, navigation, or engine failure.
22 Departure	Use NJCAAN Ocean Routing for Runway 22 departures.	yes	no	Simulation of the NJCAAN Ocean Routing Alternative showed severe departure delays at EWR. However, nighttime use of a modified version of the NJCAAN Ocean Routing design for Runway 22 departures does not impact delay and has the potential to result in reduction of noise impacts. See Chapter 8 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
22 Departure	Use NJCAAN Ocean Routing for Runway 22 departures at night from 10 pm to 7 am.	yes	no	
22 Departure	Use Modified Ocean Routing for Runway 22 departures at night from 10 pm to 7 am.	yes	yes	

Table 5.2
Operational Screening of Initial Mitigation Measures

	Mitigation Measure	Pass Quali-tative Review	Pass Quanti-tative Review	Comments
4 and TEB Arrival	Use RNAV procedures for both TEB arrivals to Runway 6 and EWR departures in conjunction with reductions in required separations to augment the availability of fanned headings.	no	N/A	As this is already included in the design of the Preferred Alternative, there is no need to evaluate as a separate mitigation measure.
4 Departure	Delay turning aircraft to the left when departing off of Runway 4 in order to keep aircraft flying over the Meadowlands.	no	N/A	This is not operationally feasible. Flights departing EWR on such a route would conflict with LGA departures and thereby result in unsafe operating conditions in the event of a communications, navigation, or engine failure.
4, 22 Arrival and Departure	Expand the EWR airspace to the east and allow EWR controllers to direct arriving and departing aircraft to fly along the Hudson corridor.	yes	no	All LGA departures from Runways 4 and 31, and LGA southbound departures from any runway would need to be rerouted to make this possible, and the resulting extra flying distance negates all the benefit of the proposed procedure. For details regarding the operational analysis see Chapter 11 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
LGA				
22 Arrival	Increase the use of the LDA approach.	yes	yes	See Chapter 4 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
31, 22 Arrival	Use Ocean Routing for Runway 22 departures at night from 10 pm to 7 am.	no	N/A	LGA does not have demand during the hours that nighttime ocean routing would be implemented.
31, 22 Arrival	Implement Continuous Descent Approaches.	no	N/A	CDAs may only be used in periods when the airspace is uncongested. During the operating hours for LGA, the complexity of the airspace will not safely support the application of CDA for LGA arrivals.

Table 5.2

Operational Screening of Initial Mitigation Measures

		Mitigation Measure	Pass Qualitative Review	Pass Quantitative Review	Comments
	31 Departure	Develop RNAV departure procedures that do not route aircraft over Riker's Island.	yes	no	Operational analysis showed that shifting headings to avoid Riker's Island without inducing adverse operational impacts was not possible. However, implementing noise mitigation without losing the benefit of three departure headings was possible by limiting the use of the third heading to periods of low arrival demand and high departure demand. See Chapter 5 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
	31 Departure	Adjust the time of day when departure routes over Riker's Island are used.	yes	yes	
HPN					
	34 Arrival	Implement Flight Management System (FMS) approach to Runway 34.	no	N/A	As this is already part of the Preferred Alternative, there is no need to evaluate as a separate mitigation measure.
	34 Arrival & Departure	Increase altitude of Runway 34 arrivals and departures.	no	N/A	The altitudes of HPN traffic are constrained by LGA traffic. Raising the altitudes of the HPN traffic would create conflicting flows and result in an unsafe operating condition.
TEB					
	19 Arrival, 1 Departure	Develop GPS approach and departure procedures over commercial area north-northeast of TEB.	no	N/A	No noise changes associated with the Preferred Alternative would occur in this area. Therefore, the proposal would not be considered a mitigation measure for impacts resulting from the Proposed Action.
MMU					
	23 Departure	Change departure headings such that aircraft will not overfly an office complex.	no	N/A	The Preferred Alternative does not include changes to the MMU departure headings and thus this proposal would not be considered a mitigation measure for impacts resulting from the Proposed Action.

Table 5.2

Operational Screening of Initial Mitigation Measures

	Mitigation Measure	Pass Quali-tative Review	Pass Quanti-tative Review	Comments
JFK				
13, 31 Arrival	Move routes such that aircraft will fly over water.	no	N/A	New routes are not operationally feasible. The airspace along the coast is tightly constrained on the east by the Warning Areas used by the Department of Defense. Civilian traffic may not use this airspace without coordination to determine whether military missions are using the Warning Areas. Additionally moving the JFK arrivals to Runways 13 and 31 over the water would result in a dependency between the JFK arrivals and the overflight operations. This dependency with the descending northbound overflight traffic and climbing southbound overflight traffic would require ground holds and thus cause longer delays than JFK is currently experiencing. However, more precise aircraft navigation means that aircraft on the current over-water approaches will adhere more tightly to the defined track and deviate over land less often, which may accomplish the same objective.
22R Arrival	Move routes such that aircraft will fly over the Interstate 495 transportation corridor.	yes	no	The part of the Long Island Expressway that would be most useful for noise mitigation is very close to Long Island MacArthur Airport. Once the approach path has been kept safely away from ISP traffic, the result would be a serpentine path to the runway with a lot of low-altitude maneuvering. Compared to a straight-in descent, the noise benefits would be negligible, and might even be negative. See Chapter 3 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
ISP				
24 Departure	Narrow the corridor for aircraft departing to the south in order to minimize the impact to the wilderness areas of the Fire Island Seashore.	yes	no	As this is ready part of the Preferred Alternative, there is no need to evaluate as a separate mitigation measure. See Chapter 6 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.

Table 5.2
Operational Screening of Initial Mitigation Measures

		Mitigation Measure	Pass Qualitative Review	Pass Quantitative Review	Comments
PHL					
	9, 27 Arrival	Implement Continuous Descent Approaches.	yes	yes	See Chapter 16 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
	9, 27 Arrival	Develop RNAV arrival procedures.	yes	yes	Increased use of the visual approach to Runway 9R may be facilitated by the application of a RNAV Approach. See Chapter 14 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
	9 Arrival	Increase use of the visual approach to Runway 9R (the River Approach)	yes		
	9, 27 Departure	Reduce the number of proposed departure headings.	yes	yes	See Chapters 12 and 13 of the *Operational Analysis of Mitigation of the NY/NJ/PHL Airspace Redesign* included in Appendix O of the FEIS.
TTN					
	6, 24 Departure	Remove altitude restriction for aircraft departing from Runways 24 and 6.	no	N/A	Trenton Mercer is located between the two busiest arrival fixes to the New York metropolitan area. The climb restriction may be waived on a case by case basis, but a standard procedure could impede EWR and LGA operations.
Overflights					
	Various Arrivals	Move Jetway V213 in order to route aircraft over the Interstate 87 transportation corridor.	no	yes	As this is already part of the Preferred Alternative, there is no need to evaluate as a separate mitigation measure. Arriving flights are moved closer to the Thruway and cross the area at a higher altitude.

Thus, through the qualitative and quantitative analysis it was determined whether a measure was operationally viable. The quantitative operational analysis also revealed key findings related to developing mitigation measures that would not impact operational efficiency. These findings are summarized as follows:

- EWR - Three departure headings are necessary to maintain operational efficiency.
- EWR – The use of the three headings could be varied throughout the day to minimize noise impact.
- EWR – A modified ocean routing could be used for some late-night departures.
- EWR - Some of the arrival routes could be raised to reduce noise.
- EWR – Continuous Descent Approach (CDA) procedures could be used for some arrival routes during the nighttime hours.
- PHL – A minimum of three departure headings are necessary to maintain operational efficiency.
- PHL – The current single heading departure procedure could be used during the nighttime hours given the forecast traffic levels.
- PHL – The river approach to Runway 9L could be used more to reduce noise.
- PHL – CDA procedures could be used for some arrival routes during the nighttime hours given the forecast traffic levels.
- LGA – The use of the new departure headings could be varied throughout the day to minimize noise impact.
- LGA – The LDA approach procedure to Runway 22 could be used more often.
- HPN – Departures to the northwest could be routed more like the No Action Airspace Alternative to reduce noise impacts.

These factors provided a general framework in which the specific mitigation measures could be developed for noise reduction. **Table 5.3** presents a list of the mitigation measures that withstood the operational screening and were considered to be potentially viable measures.

Some of the measures listed are already refined such that options need not be explored. These measures were incorporated directly into the final mitigation package without further refinement. Other measures, however, had several options and required noise screening to identify the best option in terms of noise reduction for the final mitigation package. Specifically, departure headings at EWR and PHL required additional noise screening for identification of the best headings for mitigation. Section 5.2.2 describes the noise screening completed for EWR and PHL.

Table 5.3

Mitigation Measures to be Included in the Final Mitigation Package

Airport/ Runway/ Procedure	Mitigation Measure	Next Step
EWR 22 Departures	Find the three best headings using the same route weightings as defined in the Preferred Alternative.	Noise Screening
	Using the three best headings found above, move all night events to a modified ocean routing procedure	Noise Screening
	Using the three best headings defined above; change the proportion of use such that weightings reflect usage based on a 15 minute delay threshold.	Noise Screening
EWR 4 and 22 Arrivals	Raise all arrival altitudes as much as possible.	Include in final package
EWR Arrivals	Nighttime Continuous Descent Approach – two arrival fixes on the final approach side of the airport depending on direction of flow.	Include in final package
HPN Departures	Move departure routes to be more like No Action routes NW of the airfield	Include in final package
LGA 31 Departures	Adjust time of day use of headings	Include in final package
LGA 22 Arrivals	Increase arrivals using the LDA.	Include in final package
PHL 9R/27R Arrivals	Develop CDA routes from three primary arrival fixes.	Include in final package
PHL 9R Arrivals	Increase use of the visual approach to Runway 9R (the River Approach) through an RNAV overlay.	Include in final package
PHL 27L/R Departures	Find the four best headings using the same day/night split and weightings as defined in the preferred alternative.	Noise Screening
	Using the four best headings defined above; change the night time use so that single best heading over the river is only used at night.	Noise Screening
	Find the three best headings using the same day/night split and weightings as defined in the preferred alternative.	Noise Screening
	Using the three best headings defined above; change the night time use so that single best heading over the river is only used at night.	Noise Screening
PHL 9L/R Departures	Find the four best headings using the same day/night split and weightings as defined in the preferred alternative.	Noise Screening
	Using the four best headings defined above; change the night time use so that single best heading over the river is only used at night.	Noise Screening
	Find the four best headings using the same day/night split and weightings as defined in the preferred alternative.	Noise Screening
	Using the four best headings defined above; change the night time use so that single best heading over the river is only used at night.	Noise Screening

5.2.2 Noise Screening

Once it was determined that a mitigation measure would be carried forward for noise screening, the measure was fully vetted to determine the optimal routes and the optimal number of aircraft operations assigned to those routes. Two tools were used during the noise screening process. The Route Optimization and Mitigation Analysis (ROMA) tool was used to find the best departure headings/routes and the NIRS Screening Tool (NST) was employed to optimize the use of each heading.

The ROMA tool provided the capability of testing large and complex sets of aircraft routes to identify the best set for reducing noise. To do this ROMA screened potential sets of routes by applying rules defining how single routes could be combined into a set of routes representing a mitigation measure. ROMA then scored each set of routes in order to rank and compare the sets of routes to one another. Ultimately ROMA presented the best set or sets of routes to meet the goal of noise reduction. During the noise screening process ROMA was used to identify the best set of departure headings for both EWR and PHL. These results were then input into the NST or combined with land use data to assist in identifying the final proposed routes.

NST is a screening level application designed to provide guidance in evaluating potential noise impacts as a result of changes in airport arrival and departure routes. In this instance, NST was used to compare the affects of assigning different numbers of aircraft operation levels to each heading identified by ROMA. By using NST, the optimal level of aircraft operations on the ROMA headings was determined.

The noise screening process was used to identify the best departure headings and routes for both PHL and EWR departures. The options for PHL focused on identifying the best initial departure headings and routes for PHL departures. The options for EWR were more complicated, since other traffic constrains the available headings. Since the heading most crucial for efficiency is the worst for noise exposure, not only were the best departure routes sought, but the number of aircraft operations using this heading were varied to minimize its use, consistent with efficiency. Consequently, two levels of screening were conducted. The first level identified the best initial departure headings and routes from EWR and PHL. Since not further variations were part of the PHL measures, this level of screening served to complete the evaluation for PHL. Once the best headings/routes were identified for EWR, a second level of screening was employed to test the variations related to the usage of the headings.

The following is a summary of the options screened for PHL and EWR.

➢ <u>PHL Options Analyzed</u>

- Option 1: Find the optimal four departure headings for reducing noise impacts in each direction of flow.
- Option 2: Find the optimal three departure headings for reducing noise impacts in each direction of flow.
- Both options will include the nighttime use of the current single heading procedure.

➢ <u>EWR Options Analyzed</u>

- Option 1: Find the optimal three departure headings for reducing noise impacts considering two sets of headings:

  - Set 1: Consider an additional constraint that the first heading (220) should stay “close” to runway heading to help reduce air traffic control/pilot communication. In this set, headings between 215 and 225 were considered for the first heading.

  - Set 2: Remove the constraint on the first heading.

- Option 2: Using the three headings identified in Option 1, add Modified Ocean Routing for those operations occurring between 10:30 pm and 6:00 am.

- Option 3: Using Option 2, further reduce the amount of traffic on the three new headings by adding the 190 heading (current procedure) and using it when traffic delay allows. When traffic volume increases during the day, drop the use of the 190 heading in favor of two headings most closely aligned with the runway from Option 1. During periods of maximum traffic demand, add a third westerly heading from Option 1.

The following is a summary of the route optimization process for the PHL departure heading alternatives.

Starting with the Integrated Airspace Alternative Variation with ICC 2011 consider PHL East and West sets of departure headings using two rules: 1) Route variants generated in 1 degree increments for each heading from condensed routes, and 2) Maintain 15 degrees divergence as required by ATC rules.

Using these two rules the following heading combinations were identified:

- PHL East 3 Headings - 132,000 combinations were considered of which 23,300 met the two rules.

- PHL East 4 Headings - 1.6 million combinations were considered of which 82,500 met the two rules.

- PHL West 3 Headings - 132,000 combinations were considered of which 22,200 met the two rules.

- PHL West 4 Headings - 1.5 million combinations were considered of which 64,700 met the two rules.

The resulting combinations were scored and ranked by various criteria. The criteria included noise impact threshold-based change and/or total noise exposure at various DNL levels using 2011 population centroids for impact comparison.

Figure 5.1 highlights the results of the ROMA analysis for the PHL west flow departure three-heading alternative. **Appendix P**, *Noise Mitigation Report*, provides more detailed information on this process.

A similar process was conducted for the EWR south flow departure heading variations. It should be noted that the limited use of the north flow headings did not generate noise impacts, and, thus mitigation was not deemed necessary. The following is a summary of the route optimization process for the EWR departure heading alternatives.

Starting with the Integrated Airspace Alternative Variation with ICC 2011 consider EWR South flow departure headings using the same two rules used for PHL: 1) Route variants generated in 1 degree increments for each heading from condensed routes, and 2) Maintain 15 degrees divergence as required by ATC rules.

Using these two rules the following heading combinations were identified:

- EWR 3 South Flow Headings - 69,000 combinations were considered of which 8,400 passed the rules defined earlier.

The resulting combinations were scored and ranked by various criteria. The criteria included noise impact threshold-based change and/or total noise exposure at various DNL levels using 2011 population centroids for impact comparison.

Since the PHL departure heading alternatives were not as complex as the EWR departure heading alternatives, the ROMA analysis was sufficient to identify the best set of headings for inclusion into the final mitigation package. At EWR however, the ROMA analysis was able to identify the best initial departure headings and routes but further analysis in NST was necessary to identify the best overall alternative that included the usage of each heading.

The results of the noise screening analysis provided for the identification of the best departure options for both EWR and PHL from the list of potentially viable measures listed in Table 5.2. These routes were then reviewed from each runway end to the departure fix to identify any opportunities to further use noise compatible corridors such as highways, waterways, or commercial areas, etc. Where possible, the routes were further adjusted to take advantage of these compatible land uses or adjusted to be more closely aligned with the No Action Airspace Alternative routes if possible.

Table 5.4 presents a summary of the final mitigation package. Note that the table includes both those mitigation measures carried forward as a result of the original operational analysis and those mitigation measures that required additional noise screening to fully describe and optimize the measure (i.e., departures for EWR and PHL).

5.3 ENVIRONMENTAL CONSEQUENCES

NEPA requires that the FAA evaluate and disclose the potential for environmental impacts to result from a proposed action. All of the Proposed Action Airspace Redesign alternatives including the Preferred Alternative were evaluated and discussed in Chapter Four. Since the Preferred Alternative would be modified by the proposed mitigation package, analysis of the potential environmental consequences of the Preferred Alternative with mitigation must be evaluated. Therefore, the Preferred Alternative with mitigation was modeled and analyzed. The following sections include discussions of the potential for impacts to each of the environmental impact categories identified in FAA Order 1050.1E.

5.3.1 Noise/Compatible Land Use

This section focuses on the noise and compatible land use impacts that would result from the implementation of the 2011 version of the Preferred Alternative, the Integrated Airspace Alternative Variation with ICC, with mitigation. The initial phase of implementation for the Preferred Alternative would be the Integrated Airspace Alternative Variation without ICC.

Table 5.4
Mitigation Strategies Retained for Final Noise Modeling

Airport/ Runway/ Operation	Mitigation Measure
EWR 22 Departures	Use 3 departure headings based on demand during daytime hours. - Light Demand use single 190 heading like current conditions - Moderate Demand use 2 departure headings of 215 and 239 - Heavy Demand use 3 departure headings of 215, 239, and 263 At night (10:30 pm – 6:00 am)use 190 heading only and Modified Ocean Routing
PHL 9L/R Departures	Use 4 departure headings of 081, 096, 112, and 127 during daytime hours. At night use 1 departure heading of 085 like current conditions.
PHL 27L/R Departures	Use 3 departure headings of 230, 245, and 268 during daytime hours. At night use 1 departure heading of 255 like current conditions.
EWR 4 and 22 Arrivals	Raise all arrival altitudes as much as possible.
EWR Arrivals	Use CDA procedures at night for arrivals from the Northwest and Southwest
PHL 9R/27R Arrivals	Use CDA procedures for nighttime arrivals from North, Northwest, and Southwest
PHL 9R Arrivals	Increase use of the visual approach to Runway 9R (the River Approach)
LGA 31 Departures	Adjust the usage of the new headings dependant on departure demand during the day.
LGA 22 Arrivals	Increase arrivals using the LDA.
HPN Departures	Move departure routes to be more like No Action routes NW of the airfield

Therefore, mitigation procedures were also developed and analyzed for this variation. However, since these procedures were generally a subset of the procedures for the Integrated Airspace Alternative Variation with ICC, the detailed discussions are focused on the 2011 version of the Preferred Alternative. Where there are slight differences between the variations, the differences are noted in the noise model input sub-section while the results of the analysis presented in the noise impacts sub-section are detailed for both phases of the Preferred Alternative with mitigation.

The following sub-sections provide a discussion of the noise modeling input followed by the results of the noise analysis for the mitigation package for FAA's Preferred Alternative. The sub-sections are organized by airport and operation type. In the noise model input discussions, a brief summary of the mitigation strategy is presented followed by a discussion of the specific methodology used to model the mitigation element. Illustrations are provided to assist the reader in understanding the changes in flight routes and noise model input. Finally, the noise results are presented and discussed by area of effect. The changes in population impacted, according to FAA's thresholds, are presented along with an illustration of the changes in noise in the associated area. The illustrations of the noise results are also provided to orient the reader regarding the areas of noise change and the effects of the mitigation element.

5.3.1.1 Noise Modeling

As discussed earlier, the noise analysis was conducted using FAA's Noise Integrated Routing System (NIRS) computer model. FAA requires the use of the NIRS model to analyze noise impacts associated with major airspace redesign studies. The NIRS model was used to determine noise levels for the year 2006 and 2011 Future No Action and Proposed Action Airspace Alternatives. The rigorous and detailed noise modeling effort was presented in the Chapter Four of the DEIS. The following paragraphs explain the noise modeling for the Preferred Alternative with mitigation.

In order to develop the input to NIRS for the mitigation package, the project team started with the refined Preferred Alternative input. For each mitigation measure, the changes to the preferred alternative routing, profiles, or route weightings were incorporated. Although the NIRS modeling was conducted for all 21 airports with all of the mitigation elements incorporated, the effects of individual mitigation procedures are largely localized and related to specific airports. Consequently, the detailed modeling discussion presented in this sub-section focuses on the specific airports where mitigation procedures were incorporated and the following sub-section focuses on the local results for each procedure. Graphics are included in this subsection to supplement the modeling discussion. It should be noted that for simplicity of presentation, these graphics only show the center model tracks, backbones, without their associated geographic dispersion, subtracks.

HPN Departures

Mitigation for HPN departures was developed because the change in noise exposure level at a census block centroid located about six and a half miles northwest of HPN near Pleasantville met the FAA threshold for a slight to moderate noise impact (+5 DNL at a 45-60 DNL). It is noted that the change in noise levels did not meet the threshold criteria in the initial noise analysis documented in the DEIS.

As discussed in Chapter Three, the noise analysis methodology presented in the DEIS was later refined. This refinement tended to result in the same noise levels at most census block centroids, however, the noise level at some centroids went up slightly due to the rounding. This was the case for the subject census block centroid near Pleasantville. This fact along with the numerous DEIS comments received concerning mitigating the Preferred Alternative changes to HPN departures prompted an investigation into mitigation for HPN departure routes.

At HPN the Preferred Alternative included a shift of the current north-bound departure route to the north. The shift began approximately at the western shore of the Kenisco Reservoir west of the Rye Bridge. The portion of the departure routes between that location and HPN remains the same as the departure routes for the Future No Action Airspace Alternative. The proposed change in routing is required as a result of the expansion of EWR arrival airspace boundaries north of EWR to accommodate dual arrival streams into EWR. Similarly, HPN departures destined to the southwest or south would have to circle around the airport to the north in order to gain altitude before crossing into LGA airspace. **Figure 5.2** provides an illustration showing the Future No Action departure flight tracks for Runways 16 and 34 at HPN in comparison to the Preferred Alternative version of the same tracks. The figure also identifies the single yellow census block centroid where the noise level with the Preferred Alternative meets the FAA's threshold of noise change for a slight to moderate impact.

A detailed review of the preferred alternative design revealed that the departure routes that are shifted to the north could be moved back closer to their original locations while still avoiding the new EWR arrival airspace. This would allow the departure tracks to more closely resemble the Future No Action Airspace Alternative tracks for a greater distance beyond HPN.

The starting point for developing the mitigation routes for the Preferred Alternative at HPN was for the ATC and operational simulation professionals to identify how close the HPN departures tracks could be to the expanded EWR arrival airspace. FAA safety standards were used to establish a buffer that would safely separate the HPN departures from the expanded EWR arrival airspace. HPN departure tracks were then adjusted to follow their Future No Action Airspace Alternative routes as closely as possible while remaining outside of the EWR expanded airspace buffer area. The resulting jet departure routes modeled for the mitigated version of the Preferred Alternative, as well as for the original Preferred Alternative are shown in Figure 5.2. Although only the model tracks for the primary departure runways are shown the actual noise modeling incorporated the mitigation routes for departures from the secondary runways as well.

In the case of HPN, the mitigation strategy only applies to the Preferred Alternative in 2011. The Preferred Alternative in 2006 did not include changes to the departure tracks at HPN, thus there was no need for mitigation.

LGA Departures

At LGA the Preferred Alternative called for the use of three initial departure headings from Runway 31. This improved the operational efficiency of the airspace because there are currently just two departure headings for Runway 31. Since noise analysis showed that a three-heading alternative would potentially cause noise impacts, the possibility of using all three headings only during times of high operational demand was investigated.

Although no significant impacts resulted from the Preferred Alternative, the FAA committed to evaluate the potential for increased use of the LDA, an already existing procedure in use today. An operational analysis was conducted to determine the periods of time during which three-departure headings were operationally required. Through this analysis it was concluded that to maintain operational efficiency use of three headings were required only during the morning departure push from 6 am to 7 am.

Based on the results of the operational analysis a mitigation measure that allowed for the use of three headings during the morning push and two headings during the remainder of the time was developed. Since noise impacts from the Preferred Alternative were caused by a general move of initial headings to the east, the two heading alternative for the mitigation measure was crafted by eliminating the use of the most easterly heading for all but the time period between 6 am and 7 am.

Specifically, departure traffic in the original Preferred Alternative was modeled using balanced proportions on the departure headings 350, 005, and 020. In the mitigated version of the Preferred Alternative the vast majority of the traffic was modeled on the 350 and 005 headings leaving the 020 heading only necessary for the morning departure push.

Once the mitigation measure was designed the noise model was modified. In terms of noise modeling, the morning departure push from 6 am to 7 am represents 70 percent of the nighttime departure operations (between 10 pm and 7 am) and 0 percent of the daytime departure operations (between 7 am and 10 pm). Therefore, the mitigation strategy for departures on Runway 31 at LGA was incorporated into the NIRS model by modeling all modeled daytime traffic and 30 percent of the modeled nighttime traffic using 2-headings similar to current conditions.

Figure 5.3 shows the changes that were made to the model routes to incorporate the mitigation strategy for LGA Runway 31 departures in the Preferred Alternative. Only the routes which were changed as part of mitigation measure are shown. It can be seen in the figure that many of the tracks which would be on initial headings of 005 and 020 in the original Preferred Alternative have been moved west to headings of 350 and 005 respectively in the mitigated Preferred Alternative. These tracks represent the changes for all hours except 6 am to 7 am. Flights between 6 am and 7 am stayed on their original Preferred Alternative routes. It is noted that the noise model input and flight tracks discussed previously apply to the Preferred Alternative for both years of analysis, 2006 and 2011.

LGA Arrivals

Arrivals to Runway 22 at LGA were a major topic of concern for the public who attended the meetings held to discuss the DEIS. Under current conditions, there are two types of approaches to Runway 22; the Instrument Landing System (ILS) and the Localizer Directional Aid (LDA). The ILS procedure is aligned with the runway heading which dictates that aircraft fly over populated areas north of LGA as they approach to land on Runway 22. In contrast, the LDA approach is offset from the runway heading in such a way that aircraft fly over Long Island Sound as they approach the Airport. The model tracks that were developed to represent the two approach types at LGA are shown in **Figure 5.4**. This figure illustrates that north of LGA the ILS approach puts aircraft over land, whereas the LDA approach puts aircraft over water. Obviously, the LDA is the preferred approach from the standpoint of reducing aircraft noise over populated areas. Unfortunately, there are safety considerations and constraints on the airspace which do not allow for the use of the LDA approach for all aircraft landing on Runway 22. However, increased usage of the LDA to mitigate noise levels north of LGA in the Preferred Alternative was explored.

An operational analysis was conducted to determine whether the LDA approach could be used more frequently. Through this evaluation it was determined that when Runway 13 is used for departures, an annual average of 45 percent of arrivals to Runway 22 would be able to use the LDA approach. When Runway 31 is used for departures, an annual average of 34 percent of arrivals to Runway 22 would be able to use the LDA approach. Factoring relative runway configuration usage at LGA, this corresponds to an overall average of 40 percent of arrivals to Runway 22 being able to use the LDA approach. This is higher than the percent of arrivals assigned to the LDA approach in the noise model of the Preferred Alternative which only placed 29 percent of arrivals on the LDA approach. The difference represents about 30 average daily operations at LGA. Thus, a mitigation measure to increase the use of the LDA approach to LGA Runway 22 was included in the mitigation package and modeled in the noise analysis. Again, noise model input and flight tracks discussed previously apply to the Preferred Alternative for both years of analysis, 2006 and 2011.

EWR Departures

At EWR the Preferred Alternative called for use of three initial jet departure headings when the Airport was operating in the southwest flow configuration (departures off of Runways 22L/R). These fanned headings were included in the Preferred Alternative to improve operational efficiency because EWR effectively uses only one jet departure heading under current conditions. The noise analysis of the Preferred Alternative showed that use of the fanned headings would potentially cause noise impacts. Therefore, opportunities to mitigate noise impacts associated with the fanned headings were explored. Alternative headings, different numbers of headings, limited use of headings and routing over water were considered

As described earlier in this Chapter, the ROMA and NST tools were used to determine the optimal departure headings and use of those headings to mitigate noise impacts. In the case of EWR this included considering a modified Ocean Routing for operations occurring between 10:30 pm and 6:00 am.

The optimal headings and use of those headings is described as follows:

- Light Demand - Uses single 190 heading like current conditions.
- Moderate Demand - Uses two departure headings of 215 and 239.
- Heavy Demand - Uses three departure headings of 215, 239, and 263.
- At night (10:30 pm – 5:59 am) the headings use 190 heading only and route traffic over the ocean.

Figure 5.5 illustrates the changes that were made to the noise model departure routes at EWR for mitigation of the Preferred Alternative. The new ocean routing procedure would initially use the Future No Action Airspace Alternative departure heading (190) before turning south to the Raritan Bay and then turning east over the Atlantic Ocean. Once over the ocean, north- and west- bound flights would turn north over JFK before turning to their desired departure fix and south and southwest bound flights routes would turn over the ocean to their desired departure fix. Note that no altitude profile restrictions were enforced for these procedures due to the time period that they are available. All nighttime operations that occurred between 10:30 pm and 6:00 am and used EWR Runways 22L/R in the original Preferred Alternative were moved to these routes.

The tracks shown in Figure 5.5 represent the mitigated flight routes for both the 2006 and 2011 mitigated Preferred Alternative. It should be noted that the loadings on the headings are slightly different between the two years of analysis because different departure fixes are expected to be available in 2011.

EWR Arrivals

In the Preferred Alternative there were two significant traffic pattern changes associated with arrivals that caused increases in noise:

- The downwind tracks to Runways 4L/R and 22L/R were moved further west to accommodate dual arrivals to EWR's parallel runways, and

- The arrivals to Runways 22L/R take a more direct approach when arriving from the north and east.

To reduce the noise impacts resulting from these traffic pattern changes, two mitigation strategies were considered. The first mitigation strategy was to raise the altitude of arriving aircraft until the aircraft were closer to the airport. The second mitigation strategy was to use continuous descent profiles to replace traditional arrival profiles which may have level segments or step downs.

Through operational analysis it was determined that arrival altitudes for aircraft approaching EWR Runways 22 L/R could be raised in two areas. These areas are identified by the orange polygons labeled as "A" and "B" on the left panel of **Figure 5.6.** The right panel of Figure 5.6 presents a profile comparison of the Runway 22 L/R arrival tracks designed and modeled for the Preferred Alternative and the Mitigated Preferred Alternative. The figure illustrates that the mitigation tracks provided for general increases in the altitudes of the arrival tracks.

Similarly, through operational analysis it was concluded that the arrivals to Runways 04L/R could be raised in the area shown on **Figure 5.7.** The profile comparison between the Preferred and the Mitigated Preferred Alternative's arrival tracks to Runways 4L/R shows the general increases in altitudes for the mitigation tracks.

It should be noted that the increases in arrival altitudes described in the previous paragraphs only applies to the mitigation for the Preferred Alternative for the modeled year 2011. The location of the arrival tracks for EWR did not move in the Preferred Alternative in the modeled year 2006. Consequently, there was no need to mitigate the routes for the 2006 analysis.

The second mitigation strategy explored was the potential to use continuous descent profiles for arrivals to EWR. Currently, many aircraft arriving to EWR descend to about 4,000 feet and then maintain that altitude until they begin a constant 3 degree descent to the airport. In order to maintain 4,000 feet, aircraft need to alter their thrust settings which can increase noise. The use of CDAs alleviates the need for leveling at 4,000 feet which reduces the amount of thrust and therefore reduces the noise generated by the aircraft. In order for CDAs to be implemented, the sequencing of aircraft needs to take place much earlier in the arrival process. Because of the complexity of the NY/NJ/PHL Airspace this can only be done safely at lower altitudes and during the nighttime hours when fewer flights are operating.

Based on the results of the operational analysis for Runway 4R, the use of CDAs was limited to the approach from one arrival fix between the hours of 10:00 pm and 6:59 am. **Figure 5.8** illustrates the position of the Runway 4R Preferred Alternative arrival tracks as compared to those for the mitigated or CDA version. Runway 4R arrival track profiles for both the Preferred Alternative and the mitigated Preferred Alternative are also shown on Figure 5.9. As the profiles indicate, the CDA represents a smoother descent as well as a higher altitude path for much of the arrival route. Thus, the noise modeling incorporated the limited use of the CDA for arrivals to Runway 4R as a feature of the mitigated Preferred Alternative.

Similarly, operational analysis showed that CDAs were operationally feasible from one arrival fix to Runway 22L between the hours of 10:00 pm and 6:59 am. In this case the lateral and vertical positions for arrivals do not vary from the predefined noise modeled inputs and it was not necessary to modify the model to reflect the mitigated Preferred Alternative.

The use of CDAs applies to the mitigated Preferred Alternative for both the 2006 and 2011 years of analysis.

PHL Departures

At PHL the Preferred Alternative called for use of six initial jet departure headings in the east flow configuration (Runways 9L/R) and seven jet departure headings in the west flow configuration (Runways 27L/R). These fanned headings were designed in the Preferred Alternative to improve operational efficiency because PHL effectively uses only one jet departure heading under current conditions in each direction of flow. Since noise analysis completed for the Draft EIS showed that use of the fanned headings would potentially cause noise impacts, a strategy for mitigation was developed to investigate reducing the number of headings. Additionally, a mitigation strategy was designed for nighttime departures to use only the current over-river departure heading when traffic levels are low enough such that operational efficiency would not be compromised.

The starting point for determining a set of mitigation headings for the Preferred Alternative at PHL was to find the minimum number of allowable headings in the Preferred Alternative that would still provide an acceptable improvement in operational efficiency from the single-heading Future No Action Airspace Alternative. The operational analysis showed that a minimum of three departure headings was required for both the east flow and west flow configurations.

As described earlier in Section 5.2.2, the ROMA tool was used to determine the optimal departure headings and use of those headings to mitigate noise impacts. Noise screening results from ROMA showed that a four heading scenario worked best for minimizing noise impacts in east flow, while a 3-heading scenario minimized noise impacts in west flow. The optimal headings and use of those headings are described as follows:

- East Flow –
    - Uses 4 departure headings, 081, 096, 112, and 127 during daytime hours, and
    - Uses 1 departure heading of 085, like current conditions during nighttime hours.
- West Flow –
    - Uses 3 departure headings of 230, 245, and 268 during daytime hours.
    - Uses 1 departure heading of 255, like current conditions during nighttime hours.

Figure 5.9 and **Figure 5.10** illustrate the changes that were made to the modeled departure routes at PHL for mitigation of the Preferred Alternative. Although modeled tracks for only the primary departure runways are shown, the actual noise modeling included the application of the mitigation headings to secondary runways as well.

As the figures illustrate, the headings chosen for noise mitigation have a more tightly consolidated splay and tend to be grouped closer to the river corridors than with their original Preferred Alternative counterparts. These headings minimize the number of people exposed to potential noise impacts caused by PHL departures in the Preferred Alternative.

In addition to displaying the initial headings, the figures show that mitigation routes will be in different locations beyond just their initial segments. In essence, choosing new headings requires moderately revised routing between the initial flight segments and the assigned airspace departure fixes. The new track positions are mainly determined by the location where the aircraft are allowed to turn off of their initial segment. In choosing where these turns take place, an attempt was made to select the turn locations in the areas most likely to minimize overall noise impacts.

Beyond reducing the number of headings used under typical to heavy operational demand conditions at PHL, it was determined that one heading would be sufficient operationally during nighttime hours. Operational simulation showed that the use of a single heading could be expected to be possible between 10 pm and 6 am. On average, this time period accommodates 20 percent of all nighttime (between hours 10 pm and 7 am) departures at PHL. Thus, in the noise modeling for mitigation of the Preferred Alternative, 20 percent of the nighttime operations were modeled to fly their original Future No Action Airspace Alternative headings. In terms of noise impact, these headings represent the best possible choice for a single heading scenario as they initially put aircraft over the Delaware River. The remaining 80 percent of nighttime operations were modeled to fly the daytime 3-heading and 4-headings alternatives.

It should be noted that the loadings on the headings are slightly different between the two years of analysis because different departure fixes are expected to be available by the year 2011 as compared to those available in 2006.

PHL Arrivals

Two particular mitigation strategies for PHL arrivals were frequently discussed during the public meetings for the Draft EIS, both CDAs and increased use of the river corridor.

The basic benefit of using CDAs is that arrivals would descend in a way that would minimize the amount of thrust and thus, noise emitted by the aircraft engines. The difficulty in implementing CDAs is that they are not compatible with a complex and/or crowded airspace environment. This is because one technique often used to sequence air traffic for landing at busy airports is to require arrivals to descend to the runway in steps while holding at certain altitudes. With these considerations in mind, a mitigation strategy was developed and modeled where CDAs could be used at PHL during nighttime hours when the airspace is less congested.

The first step in modeling the CDA mitigation strategy was to complete operational analysis to determine which routes could be converted to CDAs, when the CDAs could be used, and how the routing would be affected. Through this analysis it was concluded that CDAs were operationally feasible for arrivals from the north, northwest, and southwest during the entire nighttime (10 pm to 7 am) period.

Revised routing was developed from the arrival airspace fixes to the primary arrival runways for east and west flow at PHL. The CDA routing required moderate modification from the Preferred Alternative routes so that aircraft could fly a predetermined continuous descent path to the runway. **Figure 5.11** shows these moderate routing changes to accommodate the CDAs.

The illustration reveals that there are some subtle differences in routing for the mitigated Preferred Alternative's flight tracks. Take particular note of the generally longer routes designed for the CDA approaches. In changing to a CDA approach, traffic would be constrained to flying fairly precise routes which would not allow them to take more direct routes as were modeled for the Preferred Alternative.

The other necessary component for noise modeling of the CDA flights was ensuring that the designed descent trajectories were incorporated into the routes. To accomplish this, the aircraft were required to fly strict altitude versus distance profiles in the noise model.

Figure 5.11 shows the modifications that were made to the descent profiles of the aircraft flying the CDAs. It can be seen that the CDAs generally approach the airport at a steeper descent angle between 15,000 feet and 4,000 feet in altitude before intercepting a similar glide slope closer in to the airfield.

In addition to CDAs, another arrival mitigation measure was developed and modeled: increased use of the river corridor. Use of the river corridor exists in current conditions, but its use is limited to times of low traffic congestion and clear weather. It was determined that the river corridor could accommodate more east flow traffic if an RNAV procedure were built to mimic the river approach. Thus, a mitigation strategy was developed for the Preferred Alternative whereby certain arrivals during slow traffic periods could take advantage of a river approach.

Once again an operational analysis was required to determine which traffic could use river approaches, when the river approaches could be used, and how the routing would be affected. The results of the analysis showed that additional arrivals from the southwest and southeast would be able to use the river approach for Runway 9R during limited periods of lower than normal operational demand during daytime hours (7 am to 10 pm). This extra usage would be possible through developing an RNAV route to formalize the river approach. The relatively short time periods when the river approach could be used would allow for an average of 15 percent of daytime arrivals to Runway 9R to use the RNAV river approach or 31 average daily operations in 2011. Thus, as part of mitigation for the Preferred Alternative, 31 daily operations coming from fixes southwest and southeast of PHL were moved to use the river approach.

The revised routing of the river approach is shown in **Figure 5.12.** The routes shown for the Preferred Alternative are still used in the mitigated version, just at a lower overall traffic volume. In examining the route changes, it is apparent that the mitigation flight tracks are flying near the north bank of the Delaware River as they approach the runway end. This routing over the north bank does generally move air traffic away from the zones of greater population. It should be noted that restrictions on RNAV procedure turn angles prevent the possibility that the designed river approach could fly directly over the center of the river and still land on the primary arrival runway at PHL.

Identical arrival mitigation elements, as discussed above, were incorporated into both the 2006 and 2011 Preferred Alternative mitigation package for PHL.

5.3.1.2 Noise Impacts

This sub-section provides the results of the noise and compatible land use analysis for the mitigated Preferred Alternative for 2006 and 2011. The noise exposure changes from the Future No Action Airspace Alternative are presented by year in total and by area of change (change zone). Brief explanations of the causes associated with each change zone are presented. Lastly, the potential noise and compatible land use impacts are discussed.

Exposure

The route and procedural changes associated with the mitigated Preferred Alternative would result in the population likely to be exposed to 65 DNL and greater, increasing to approximately 74,460 persons in 2006, or 3.2 percent as compared to the Future No Action Airspace Alternative. Conversely, by 2011, the expected number of persons within the 65 DNL noise level would decrease from 75,459 with the Future No Action Airspace Alternative to 74,681 with the mitigated Preferred Alternative.

The number of persons that would be exposed to 60 to 65 DNL is expected to increase from 213,692 with the Future No Action Airspace Alternative to 236,706 with the mitigated Preferred Alternative in 2006. A similar shift is expected in 2011. The number of persons exposed to 60-65 DNL noise would increase from 209,793 persons with Future No Action Airspace Alternative to 240,387 persons with the mitigated Preferred Alternative.

The mitigated Preferred Alternative would result in a 4.9 percent decrease in the number of persons expected to be exposed to noise levels between 45 and 60 DNL in 2006. By 2011, the mitigated Preferred Alternative would further decrease the estimated persons exposed to aircraft noise between 45 and 60 DNL by about 5.7 percent when compared to the Future No Action Airspace Alternative conditions.

Table 5.5 presents a summary of the population likely to be exposed to particular noise levels for the mitigated Preferred Alternative as compared to the Future No Action Airspace Alternative for both study years.

Table 5.5

Potential Population Exposure & Change – Preferred Alternative - Mitigated

2006				
Scenario DNL Range>	**45-60**	**60-65**	**65 +**	**Total 45+**
Future No Action Airspace Alternative	11,774,446	213,692	72,141	12,060,279
Mitigated Preferred Alternative	11,202,193	236,706	74,460	11,513,359
Difference	*-572,253*	*23,014*	*2,319*	*-546,920*
2011				
Future No Action Airspace Alternative	11,688,798	209,793	75,459	11,974,050
Mitigated Preferred Alternative	11,039,959	240,387	74,681	11,355,027
Difference	*-648,839*	*30,594*	*-778*	*-619,023*

Source: NIRS Analysis, Landrum & Brown/Metron Aviation, Inc. 2007.

Change

In order to determine the potential significance of the changes in noise exposure associated with the mitigated Preferred Alternative, an analysis of the changes relative to the Future No Action Airspace Alternative conditions was developed based on FAA's noise impact criteria. **Figures 5.13 and 5.14** present maps of the mitigated Preferred Alternative noise changes at the census block centroids for 2006 and 2011 respectively. Only census blocks that are populated and meet the noise exposure criteria discussed in Section 4.1 are shown. The census blocks centroids are color-coded to identify the criterion that they meet and whether the noise increased or decreased.

As the figures indicate, the changes associated with this alternative are generally clustered around EWR and PHL. There were no other changes meeting the FAA criterion found near any of the other airports modeled in the analysis.

Table 5.6 summarizes the estimated change in population exposed to aircraft noise levels that meet the FAA criteria resulting from the Mitigated Preferred Alternative airspace design. The cells in the table are color-coded similar to the scheme used on the figures so that specific numbers of persons can be related to the maps illustrating the noise change.

Based on the NIRS analysis it is estimated that only 545 persons would be exposed to a significant (+1.5 DNL at 65 DNL or higher) change in noise in 2006 resulting from the mitigated Preferred Alternative. This number would decrease in 2011 to zero persons. The alternative would, at the same time, provide noise reduction of 1.5 DNL or more in other areas exposed to 65 DNL or greater in the Future No Action Airspace Alternative. In 2006, this level of reduction would be experienced by 310 persons and would increase in 2011 to just over 3,000 persons.

Slight to moderate impacts are also evident at lower noise levels resulting from the mitigated Preferred Alternative. In the 60 to 65 DNL range, it is expected that 21,626 persons would experience an increase in noise levels of greater than or equal to 3.0 DNL or more in 2006. This number is expected to decrease slightly to 16,803 persons by 2011. There would, essentially, be no decreases of greater than or equal to 3.0 DNL at noise levels of 60 to 65 DNL expected as a result of the mitigated Preferred Alternative in either 2006 or 2011. At the lowest analyzed noise levels (45 to 60 DNL), where slight to moderate (±5.0 DNL) impacts were identified, the mitigated Preferred Alternative is expected to result in potential noise increases of greater than or equal to 5.0 DNL for 15,509 persons in 2006. This potential impact is expected to increase in 2011 to some 50,392 persons. Conversely, a reduction in noise exposure at these lower noise levels is also expected from the implementation of the mitigated Preferred Alternative. In 2006, 35,684 persons exposed to between 45 and 60 DNL would experience a noise level reduction of greater than or equal to 5.0 DNL. By 2011, the noise relief at these same levels is expected to be experienced by some 207,629 persons.

In order to provide a better understanding of these potential noise impacts, the areas of change within the Study Area were divided into small zones of change. These zones are generally associated with a specific airport and are identified with a unique code name. Figures are provided with enlarged views of the various change zones along with the name of each zone. For these graphics, the entire census block associated with the

Table 5.6
Estimated Population Impact
Change Analysis Summary – Mitigated Preferred Alternative

	DNL Noise Exposure With Proposed Action		
	65+ DNL	60 to 65 DNL	45 to 60 DNL
Minimum Change in DNL With Alternative>	1.5 DNL	3.0 DNL	5.0 DNL
Level of Impact>	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
2006 – Mitigated Preferred Alternative	545	21,626	15,509
2011 – Mitigated Preferred Alternative	0	16,803	50,392
Noise Decreases			
2006 – Mitigated Preferred Alternative	310	1	35,684
2011 – Mitigated Preferred Alternative	3,201	1	207,629

Source: NIRS Analysis, Landrum & Brown/Metron Aviation, Inc. 2007.

population centroid where noise change values were computed is color-shaded by noise change level. The following paragraphs discuss the potential change in noise impact along with the cause of the change for each zone:

MIT-PIWB-11HPN-A (Figure 5.14): The estimated increases in noise occurring northwest of HPN near Pleasantville, NY in the 2011 Preferred Alternative were caused by the northerly adjustment to the northbound and westbound HPN departure routes as shown in Figure 5.2. As a result of this change, some 40 persons, represented by one census block, were expected to experience an increase in noise of greater than or equal to 5.0 DNL between 45 and 60 DNL. The adjustment to the departure routes at HPN proposed in the mitigation package were successful in reducing the level of noise in this area such that there would be no noise increases that were greater than any of FAA's thresholds of reportability.

Figures 5.15 and 5.16 present an enlarged view of the noise changes at the census blocks and change zones associated primarily with EWR and LGA for 2006 and 2011, respectively. Each change zone shown on the figures is discussed in the following paragraphs.

MIT-PINB-06LGA-A (Figure 5.15): The estimated increases in noise occurring north of LGA on Rikers Island and in the Hunts Point region of the Bronx in the 2006 Preferred Alternative were caused by the northerly adjustment to the departure headings off of Runway 31. As Figure 5.15 indicates, the significant impacts which would potentially exist under the Preferred Alternative have been reduced below a level of significance with the mitigated Preferred Alternative. Consequently, the mitigation adjustments removed some 12,834 persons associated with one census block from the significant impact category of greater than or equal to 1.5 DNL change in the 65+ DNL range. The mitigation also reduced the noise changes expected in the Hunts Point area such that the 25 persons represented by three census blocks are no longer expected to experience a 3 DNL or more increase in the 60-65 DNL noise range.

MIT-PIWB-11LGA-A (Figure 5.16): The estimated increases in noise occurring north of LGA on Rikers Island and in the Hunts Point region of the Bronx in the 2011 Preferred Alternative were caused by the northerly adjustment to the departure headings off of Runway 31. As Figure 5.16 indicates, the impacts which would potentially exist under the Preferred Alternative have disappeared with the mitigated Preferred Alternative. Consequently, the mitigation adjustments removed some 12,846 persons associated with one census block from the significant impact category of greater than or equal to 1.5 DNL change in the 65+ DNL range. The mitigation also reduced the noise changes expected in the Hunts Point area such that the 26 persons represented by three census blocks are no longer expected to experience a 3 DNL or more increase in the 60-65 DNL noise range.

MIT-PINB-06EWR-A (Figure 5.15): The estimated increases in noise occurring west of Interstate 95 and over the Elizabeth, NJ area are caused by the new departure headings off of Runways 22L/R. During the daytime hours EWR has four departures headings which will be used in different combination based on the operational needs of the airport. When operational demand is light, the 190° heading will be used just as it is today. When two headings are required to accommodate the increased traffic volume, the new headings of 215° and 239° will be used. When demand dictates the use of three departure headings, the new heading of 215°, 239°, and 263° will be used. As a result, 20,312 persons represented by 121 census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL resulting in a noise exposure between 60 and 65 DNL, and 15,371 persons represented by 86 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL resulting in a noise exposure between 45 and 60 DNL.

MIT-PINB-06EWR-B (Figure 5.15): The estimated reductions in noise occurring east of Interstate 95, south of Newark Bay and near Elizabethport, NJ are caused by the reduced volume of traffic using the existing 190° departure heading for Runways 22L/R. Approximately 310 persons represented by four census blocks that are exposed to noise levels above 65 DNL with the Future No Action Airspace Alternative are expected to experience a decrease in noise exposure of greater than or equal to 1.5 DNL. Similarly, one person represented by one census block that is exposed to noise levels between 60 and 65 DNL with the Future No Action Airspace Alternative is expected to experience a decrease in noise exposure of greater than or equal to 3.0 DNL.

MIT-PIWB-11EWR-A (Figure 5.16): The estimated increases in noise occurring west of Interstate 95 and over the Elizabeth, NJ area are caused by the new departure headings off of Runways 22L/R. During the daytime hours, EWR has four departures headings which will be used in different combination based on the operational needs of the airport. When operational demand is light, the 190° heading will be used just as it is today. When two headings are required to accommodate the increased traffic volume, the new headings of 215° and 239° will be used. When demand dictates the use of three departure headings, the new heading of 215°, 239°, and 263° will be used. As a result, 16,803 persons represented by 98 census blocks are expected to experience an increase in noise of greater than or equal to 3.0 DNL resulting in a noise exposure between 60 and 65 DNL, and 19,357 persons represented by 99 census blocks are expected to experience an increase in noise of greater than or equal to 5.0 DNL resulting in a noise exposure between 45 and 60 DNL.

MIT-PIWB-11EWR-B (Figure 5.16): The estimated reductions in noise occurring east of Interstate 95, south of Newark Bay and near Elizabethport, NJ are caused by the reduced volume of traffic using the existing 190° departure heading off of Runways 22L/R. Approximately 3,201 persons represented by 15 census blocks that are exposed to noise levels above 65 DNL with the Future No Action Airspace Alternative are expected to experience a decrease in noise exposure of greater than or equal to 1.5 DNL. Similarly, one person represented by one census block that is exposed to noise levels between 60 and 65 DNL with the Future No Action Airspace Alternative is expected to experience a decrease in noise exposure of greater than or equal to 3.0 DNL.

MIT-PIWB-11EWR-C (Figure 5.14): The estimated reduction in noise occurring west of EWR and over the counties of Carbon, PA; Monroe, PA; Northampton, PA; and Warren, NJ is caused by the removal of the EWR arrival route from the west referred to as PENNS arrivals. This traffic would be split between two new arrival fixes. All jet traffic would flow to the north along Interstate 84 (arrival fix IEAW2) and all turbo prop traffic would flow south of Reading PA (arrival fix IASTW). As a result, 20,824 persons represented by 542 census blocks that are exposed to noise levels between 45 and 60 DNL with the Future No Action Airspace Alternative are expected to experience a decrease in noise exposure of greater than or equal to 5.0 DNL.

MIT-PIWB-11EWR-D (Figure 5.14): The estimated increase in noise occurring west of EWR and over the counties of Morris, NJ and Sussex, NJ is primarily caused by two airspace changes: the westward shift of the downwind leg for Runways 4L/R and the increased traffic resulting from the movement of the PENNS arrival route. As a result, 24,115 persons represented by 283 census blocks that are exposed to noise levels between 45 and 60 DNL with the Future No Action Airspace Alternative are expected to experience an increase in noise exposure of greater than or equal to 5.0 DNL.

MIT-PIWB-11EWR-E (Figure 5.14): The estimated reductions in noise occurring north and west of EWR, over the villages of Cedar Grove, NJ and Montiville, NJ are the result of raising the altitude of EWR arrivals from the south and the shifting of EWR arrivals from the north. As a result, 21,552 persons represented by 240 census blocks exposed to noise levels between 45 and 60 DNL with the Future No Action Airspace Alternative are expected to experience a decrease in noise exposure of greater than or equal to 5.0 DNL.

MIT-PIWB-11EWR-F (Figure 5.14): The estimated reductions in noise occurring southwest of EWR and over the villages of Metuchen, NJ; Society Hill, NJ; Somerset, NJ; New Brunswick, NJ; and Bridgepoint, NJ were caused by nighttime use of CDAs to runway 4L/R, raising the altitude of EWR arrivals from the south for runways 4L/R and 22L/R, and the extension of the base leg and final approach to Runways 4L/R. As a result, 161,291 persons represented by 1,411 census blocks exposed to noise exposure between 45 and 60 DNL with the Future No Action Airspace Alternative are expected to experience a decrease in noise exposure of greater than or equal to 5.0 DNL.

Noise change zones associated with PHL are included on Figures 5.13 and 5.14 which show the noise change zones for the entire Study Area. Figures 5.17 and 5.18 present an enlarged view of the noise changes at the census blocks and change zones close to PHL for 2006 and 2011, respectively. Each change zone shown on these figures is discussed in the following paragraphs.

MIT-PINB-06PHL-A (Figure 5.17): This is a region immediately west of the airport. The zone covers two areas of noise change. The first is located about one and a half miles west of PHL and south of Industrial Highway in Tinnicum, PA. The area of change covers approximately one square mile and is bounded to the south by the Delaware River. The potential increases in noise in this close-in area are caused by the new departure headings off of Runways 27L/R to the north and west gates. Departure headings were changed from the current 240° and 255° headings off of Runways 27L/R to the mitigation headings of 230°, 245°, and 268°. Some 545 persons represented by 13 census blocks are expected to experience an increase in noise exposure of greater than or equal to 1.5 DNL within the 65 DNL for the mitigated Preferred Alternative. Similarly, approximately 1,314 persons represented by 31 census blocks are expected to experience an increase in noise exposure of greater than or equal to 3.0 DNL between 60 and 65 DNL.

The second area of change in this zone is located about five miles west of PHL in Garden City, PA just northwest of Harvey Road. This area of change covers less than one square mile and is again caused by the realigned routes to the north associated with the new departure headings from Runways 27L/R. Some 138 persons represented by six census blocks are expected to experience an increase in noise exposure of greater than or equal to 5.0 DNL between 45 and 60 DNL.

MIT-PINB-06PHL-B (Figure 5.17): This is a region located about eight miles northeast of the airport in Camden, NJ. The zone covers two areas of noise change. The first is located in the downtown Camden area near East Camden and covers approximately seven square miles. This is an area of noise reduction caused by the relocation of the nighttime arrivals to Runways 27L/R so that the CDA routing can be used at night. Some 31,457 persons represented by 378 census blocks are expected to experience a decrease in noise exposure of greater than or equal to 5 DNL within the 45 to 60 DNL range for this alternative.

The second area of change in this zone is located about four miles northeast of the first area in Delair near the Betsy Ross Bridge. This area of noise reduction covers less than one square mile and is again caused by the relocation of the nighttime arrivals to Runways 27L/R so that the CDA routing can be used at night. Approximately 2,750 persons represented by 33 census blocks are expected to experience a decrease in noise exposure of greater than or equal to 5 DNL within the 45 to 60 DNL range for this alternative.

MIT-PINB-06PHL-C (Figure 5.17): This region is located approximately nine miles southwest of the airport and is less than one square mile in area. The region is located between Pedricktown and Bridgeport along U.S. Highway 130 at Center Square Road. These potential reductions in noise are caused by the new departure headings off of Runways 27L/R to the south and east gates. Departure headings were changed from the current 240° and 255° headings to the mitigation package headings of 230°, 245° and 268°. Some 101 persons represented by six census blocks are expected to experience a reduction in noise exposure of greater than or equal to 5.0 DNL between 45 and 60 DNL as a result of the mitigated Preferred Alternative.

MIT-PINB-06PHL-D (Figure 5.17): This is a region located about 14 miles southwest of the airport near Carrcroft, DE. The zone covers just over one square mile and is located along the north side of I-95 and west of Marsh Road. This is an area of noise reduction caused by a combination of arrival route changes in the mitigation package. First, the nighttime arrivals to Runways 9L/R were relocated so that the CDA routing could be used at night. Secondly, the increased use of the River Visual Approach to Runway 9R also moves some traffic away from this area. These two mitigation items result in some 1,376 persons represented by 44 census blocks experiencing a decrease in noise exposure of greater than or equal to 5 DNL within the 45 to 60 DNL range.

MIT-PIWB-11PHL-A (Figure 5.18): This is a region located approximately five to six miles west of the airport. The zone is located near Garden City, PA just northwest of Harvey Road and southeast of E. Knowlton Road. This area of change covers just over a two square mile area. The noise changes in this area are caused by the realigned routes to the north associated with the new departure headings from Runways 27L and 27R. Some 6,920 persons represented by 111 census blocks are expected to experience an increase in noise exposure of greater than or equal to 5.0 DNL between 45 and 60 DNL.

MIT-PIWB-11PHL-B (Figure 5.18): This zone is situated approximately 11 miles northeast of PHL in Delair near the Betsy Ross Bridge. This area of noise reduction covers just under one square mile and is caused by the relocation of the nighttime arrivals to Runways 27L/R so that the CDA routing can be used at night. Approximately 1,773 persons represented by 43 census blocks are expected to experience a decrease in noise exposure of greater than or equal to 5 DNL within the 45 to 60 DNL range for this alternative.

MIT-PIWB-11PHL-C (Figure 5.18): This region is located approximately nine miles southwest of the airport and is less than one square mile in area. The region is located between Pedricktown and Bridgeport along US Highway 130 at Center Square Road. These potential reductions in noise exposure are caused by the new departure headings off of Runways 27L/R to the south and east gates. Departure headings were changed from the current 240° and 255° headings to the mitigation headings of 230°, 245° and 268°. As a result, some 67 persons represented by three census blocks are expected to experience a reduction in noise exposure of greater than or equal to 5.0 DNL between 45 and 60 DNL.

MIT-PIWB-11PHL-D (Figure 5.18): This is a region located about 14 miles southwest of the airport near Carrcroft, DE. The zone covers just over one square mile and is located along the north side of I-95 near and west of Marsh Road. This is an area of noise reduction caused by a combination of arrival route changes in the mitigation package. First, nighttime arrivals to Runways 9L/R were relocated so that the CDA routing can be used at night. Secondly, the increased use of the River Visual Approach to Runway 9R also moves some traffic away from this area. These two mitigation items result in some 1,226 persons represented by 33 census blocks experiencing a decrease in noise exposure of greater than or equal to 5 DNL within the 45 to 60 DNL range.

MIT-PIWB-11PHL-E (Figure 5.14): This region is located about 42 miles west-northwest of the airport and contains an approximately six mile long strip of land covering a six square mile area. The strip runs along US-322 and is east of New Holland, PA near Earl, PA. These potential reductions in noise are caused by a northward relocation of the primary western arrival route to PHL to accommodate the additional west gate departure fix included in this alternative. Some 896 persons represented by 13 census blocks are expected to experience a reduction in noise exposure greater than or equal to 5.0 DNL between 45 and 60 DNL for this alternative.

Summary

The preceding sections have provided detailed descriptions of the proposed noise mitigation procedures identified for the Preferred Alternative mitigation package. The results of the noise evaluation have been presented in terms of the 2006 conditions for Preferred Alternative (the Integrated Airspace Alternative Variation without ICC) as well as the 2011 conditions for the Preferred Alternative (the Integrated Airspace Alternative Variation with ICC). The results of the noise analysis have been presented in detail for specific geographical areas and specific airports.

While it is important to understand the localized noise impacts, it is also important to consider the impact to the Study Area as a whole. **Table 5.7** presents the noise exposure associated with the Future No Action Airspace Alternative, the Preferred Alternative, and the Preferred Alternative with mitigation. The exposure is presented in terms of the estimated population expected to be exposed to various ranges of DNL noise levels for each year of analysis. The table also presents comparisons between the Preferred Alternative, the Preferred Alternative with mitigation, and the Future No Action Airspace Alternative. These comparisons highlight the effectiveness of the mitigation package in terms of the number of people impacted.

As the comparisons between the Preferred Alternative and the Preferred Alternative with mitigation indicate, the mitigation package was successful at reducing the estimated population exposed to all noise levels, especially the higher significant noise levels of 65 DNL or more. Additionally, when compared to the Future No Action Airspace Alternative, the Preferred Alternative with mitigation also showed noise reductions at various noise levels. Ultimately, the mitigation package for the Preferred Alternative will reduce the population exposed to aircraft noise levels of 65 DNL or greater when compared the conditions expected if no actions were taken by 2011. The Preferred Alternative with mitigation also effectively reduces the number of persons exposed to aircraft noise of 45 DNL or greater as compared to the Future No Action Airspace Alternative.

Table 5.7

Comparison of Estimated Population within DNL Ranges

2006	**65 +**	**60-65**	**55-60**	**50-55**	**45-50**	**Total 45+**
No Action	72,141	213,692	1,008,370	3,600,506	7,165,570	12,060,279
Preferred Alternative	78,866	252,590	1,136,431	3,680,715	6,952,002	12,100,604
Mitigated - Preferred Alternative	74,460	236,706	1,099,431	3,567,077	6,535,685	11,513,359
Mitigated vs. w/o Mitigation	-4,406	-15,884	-37,000	-113,638	-416,317	-587,245
Mitigated vs. Future No Action	2,319	23,014	91,061	-33,429	-629,885	-546,920
2011	**65 +**	**60-65**	**55-60**	**50-55**	**45-50**	**Total 45+**
No Action	75,459	209,793	919,396	3,612,159	7,157,243	11,974,050
Preferred Alternative	74,833	252,361	1,039,049	3,590,613	7,592,618	12,549,474
Mitigated - Preferred Alternative	74,681	240,387	999,209	3,431,748	6,609,002	11,355,027
Mitigated vs. w/o Mitigation	-152	-11,974	-39,840	-158,865	-983,616	-1,194,447
Mitigated vs. Future No Action	-778	30,594	79,813	-180,411	-548,241	-619,023

Another indication of the effectiveness of the Preferred Alternative and the mitigation package is in terms of the population exposed to changes in noise at the FAA threshold levels. These threshold-based changes are presented in the EIS for all alternatives and represent FAA's primary areas of consideration for noise impacts based on FAA policy outlined on FAA order 1050.1E.

The FAA's policy requires that the change analysis be conducted within a given year of interest and not across different time frames. Consequently, the noise changes considered are referenced to the No Action Airspace Alternative noise levels for the year of interest. As previously discussed, increases of 1.5 DNL above 65 DNL are considered significant. When these significant impacts occur, further analysis is conducted to identify noise sensitive areas between 60 and 65 DNL that have an increase in noise of 3.0 DNL or more. These increases are considered to be "slight to moderate impacts" as are increases of 5 DNL or greater at levels between 45 DNL to 60 DNL.

Table 5.8 presents the estimated population exposed to changes in noise levels at the FAA thresholds for the 2006 conditions for both the Preferred Alternative (Integrated Airspace Alternative Variation without ICC) and the Preferred Alternative with mitigation. When considering the threshold based noise increases for the Preferred Alternative the table reveals that there are sizable populations that would experience both a significant noise change as well as various degrees of slight to moderate changes. In aggregate, the Preferred Alternative would result in exposure of some 200,000+ persons to noise increases that triggered one of the three FAA thresholds. However, when the mitigation package is applied to the Preferred Alternative, this total drops dramatically to some 37,600+ persons for more than an 80 percent reduction. At the significant threshold of +1.5 DNL or above 65 DNL, the mitigation package creates a 97 percent drop in the number of persons that would be expected to experience a significant increase in noise.

Table 5.9 presents the estimated population exposed to changes in noise levels at the FAA thresholds for the 2011 conditions for both the Preferred Alternative (Integrated Airspace Alternative Variation with ICC) and the Preferred Alternative with mitigation. This represents the full implementation of the Preferred Alternative. As the table indicates, in terms of the noise increases there are again sizable populations that would experience either a significant noise change or various degrees of slight to moderate changes with the Preferred Alternative. In aggregate, the Preferred Alternative would expose some 341,000+ persons to noise increases that triggered one of the three FAA thresholds. However, as with the 2006 conditions, when the mitigation package is applied to the Preferred Alternative, this total drops dramatically to some 67,000+ persons. Again, this represents more than an 80 percent reduction in the persons expected to be exposed to noise increases that triggered one of the three FAA thresholds. At the significant threshold of +1.5 DNL at or above 65+ DNL, the mitigation package eliminates all impacts for a 100 percent drop in the number of persons that would be expected to experience a significant increase in noise.

Table 5.8
Preferred Alternative Comparison – Estimated 2006 Population Impacts
Change Analysis Summary

	DNL Noise Exposure With Proposed Action		
	65+ DNL	60 to 65 DNL	45 to 60 DNL
Minimum Change in DNL With Alternative>	1.5 DNL	3.0 DNL	5.0 DNL
Level of Impact>	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
Preferred Alternative	21,399	37,558	142,517
Mitigated Preferred Alternative	545	21,626	15,509
Noise Decreases			
Preferred Alternative	5,970	1	39,400
Mitigated Preferred Alternative	310	1	35,684

Table 5.9
Preferred Alternative Comparison – Estimated 2011 Population Impacts
Change Analysis Summary

	DNL Noise Exposure With Proposed Action		
	65+ DNL	60 to 65 DNL	45 to 60 DNL
Minimum Change in DNL With Alternative>	1.5 DNL	3.0 DNL	5.0 DNL
Level of Impact>	Significant	Slight to Moderate	Slight to Moderate
Noise Increases			
Preferred Alternative	15,826	34,824	290,758
Mitigated Preferred Alternative	0	16,803	50,392
Noise Decreases			
Preferred Alternative	6,984	22	62,537
Mitigated Preferred Alternative	3,201	1	207,629

The comparisons presented in this section clearly illustrate the effectiveness of the mitigation package identified for the Preferred Alternative. Not only is the proposed mitigation effective at reducing overall noise exposure of the Preferred Alternative, but it also reduces noise relative to the Future No Action Airspace Alternative for persons exposed to 65 DNL or greater noise levels in 2011. Similarly, the population exposed to noise changes in terms of the FAA's thresholds is also substantially reduced through the application of the mitigation package.

5.3.1.3 Compatible Land Use Impacts

Based on the NIRS analysis, the 2006 Preferred Alternative with mitigation would potentially result in significant noise impacts to residents located west of PHL (MIT-PINB-06PHL-A). Residential land use is considered noise-sensitive. Therefore, the significant noise impacts to noise-sensitive areas would also be considered a significant impact in terms of land use compatibility. However, the 2011 mitigated Preferred Alternative would not result in significant compatible land use impacts because residential areas would not be exposed to a significant change in noise and the other noise sensitive land uses are compatible with the resulting level of noise exposure.

Impacts to other noise-sensitive land uses within the Study Area such as schools, hospitals, places of worship, parks, and historic sites were also considered. Noise-sensitive areas were identified by using NIRS results and the ESRI GNIS database. All areas subject to significant noise impacts (i.e., census blocks where noise exposure would potentially increase by 1.5 DNL or greater resulting in noise exposure of 65 DNL or greater) were evaluated for the presence of noise-sensitive land uses by using the GNIS database.

NIRS results showed that two Section 4(f) sites would be in the area subjected to significant noise impacts as a result of the mitigated Preferred Alternative. These sites include: the Inwood Country Club, and the Westinghouse Industrial Complex. Based on the analysis presented in Section 5.3.5 *Department of Transportation Act Section 4(f), and Land and Water Conservation Fund Act 6(f)* it was determined that this level of noise exposure would be compatible with the uses of Inwood Country Club, TWA Maintenance Hanger, and the Westinghouse Industrial Complex..

5.3.2 SOCIOECONOMIC IMPACTS AND ENVIRONMENTAL JUSTICE

The Preferred Alternative with mitigation was evaluated to assess the potential for associated socioeconomic and environmental justice (EJ) impacts.

5.3.2.1 Socioeconomic Impacts

According to FAA Order 1050.1E, the Proposed Action should be evaluated for its potential to result in the relocation of residences and businesses, alter surface transportation patterns, divide established communities, disrupt orderly, planned development, or create an appreciable change in employment.

The Preferred Alternative with mitigation is limited to the redesign of the airspace and does not require land acquisition or infrastructure development. Therefore, the Preferred Alternative with mitigation would not result in a direct impact causing the relocation of residences or businesses, alteration of surface transportation patterns, division of established communities, disruption of orderly planned development, or creation of an appreciable change in employment.

5.3.2.2 Environmental Justice

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, and the accompanying Presidential Memorandum and Order DOT 5610.2, Environmental Justice in Minority and Low-Income Populations, require the FAA to identify and address disproportionately high and adverse human health or environmental impacts on low-income and minority populations in the communities potentially impacted by the Proposed Action. In order to comply with Order DOT 5610.2, the FAA must conduct meaningful public involvement with minority and low-income populations and analyze the potential for disproportionate impacts to these communities. The following paragraphs describe the public involvement program, and the environmental justice analysis.

Public involvement, specifically reaching out to low-income and minority populations, was discussed in Chapter Four. The FAA continued to conduct meaningful public involvement by again holding public information meetings. After the publication of the *Noise Mitigation Report*, the FAA conducted seven public information meetings to discuss the Preferred Alternative and the proposed mitigation measures. Prior to the meetings the FAA undertook an extensive "grass roots" public announcement effort. Advertisements were run in major local papers with circulation in the affected areas including El Diario, federal/state/local public officials, including those with predominantly minority and/or low income constituents, were contacted directly via phone and informed of the upcoming public meetings, and Public Service Announcements' were run on several local radio stations. Specific details on this effort are included in *Appendix M*.

These Preferred Alternative and Mitigation Information Meetings allowed the public to ask questions of the FAA and submit comments regarding the proposed mitigation. . In terms of environmental justice, it is important to note that the meeting held in Newark, NJ was near the community subject to significant environmental justice impacts as disclosed in the DEIS. In summary, the FAA continued to conduct meaningful public involvement by reaching out to minority and low-income communities.

In addition to conducting meaningful public involvement with low-income and minority populations, the FAA analyzed the potential for environmental justice impacts. The methodology used to identify and address environmental justice impacts for the Airspace Redesign Alternatives was based on defining "high and adverse human health or environmental impact" as a significant impact.

Based on the NIRS analysis, the 2006 Preferred Alternative with mitigation would potentially result in significant noise impacts to a residential area located west of PHL (MIT-PINB-06PHL-A). Therefore, the potential for the 2006 mitigated Preferred Alternative to result in a disproportionate impact to a minority and low-income communities was evaluated.

Table 5.10 shows the percent minority population and median income of each of the significantly impacted census blocks. For all significantly impacted census blocks the minority population is less than 50 percent of the overall population. In addition when compared to the minority population for Delaware County, 18.7 percent, the minority population of the significantly impacted census blocks is not considered meaningfully greater than the surrounding area. Therefore, the population

Table 5.10
2006 Mitigated Preferred Alternative
Minority Population and Median Income Statistics for Significantly Noise Impacted Census Blocks

Census Block Number	% Minority	Median Income
1	0	40506
2	17	52439
3	0	52439
4	0	52439
5	3	52439
7	5	52439
8	7	52439
9	5	52439
10	0	52439
11	0	52439
12	2	52439
13	3	52439
14	2	52439

Source: HNTB Analysis, 2007

in these census blocks is not considered a minority population in terms of environmental justice and there would not be a disproportionate impact to a minority community as a result of the 2006 mitigated Preferred Alternative.

The median income levels in the significantly impacted census blocks are above the poverty level income. Therefore, the communities in these census blocks would not be considered low income and there would not be a disproportionate impact to a low income community as a result of the 2006 mitigated Preferred Alternative.

The mitigation designed for the 2011 Preferred Alternative reduced the noise levels below the threshold of significance. Therefore, the 2011 Preferred Alternative with mitigation would not result in disproportionately high and adverse human health or environmental impact on low income or minority populations.

5.3.3 SECONDARY OR INDUCED IMPACTS

Major development proposals have the potential to produce induced or secondary impacts on surrounding communities. Induced impacts could include shifts in population and growth, increased (or decreased) demand for public services, and changes in business and economic activity within the confines of the Study Area. Significant secondary or induced impacts normally occur when there is a significant impact in another impact category particularly noise, land use, or direct social impacts.[1]

Since the proposed mitigation measures reduce the level of noise below the threshold of significance, the 2011 Preferred Alternative with mitigation would not be expected to result in significant secondary impacts.

[1] FAA Order 1050.1E, U.S. Department of Transportation FAA, March 2006, p. A-68.

5.3.4 HISTORICAL, ARCHITECTURAL, ARCHAEOLOGICAL, AND CULTURAL RESOURCES

Historical, architectural, archaeological, and cultural resources that will be affected by federally funded and licensed undertakings come under the protection of the National Historic Preservation Act of 1966 (16 U.S.C. 470), as amended. This Act, in Section 106, requires Federal agencies to consider the effects of such undertakings on properties listed, or eligible for listing, in the National Register of Historic Places (NRHP). Regulations related to this process are described in 36 CFR Part 800, Protection of Historic Properties.

Primary impacts would include the removal or alteration of historic resources. Secondary or indirect impacts would include changes in noise, vehicular traffic, light emissions, or other changes that could interfere substantially with the use or character of the resource.

A variety of historic resources are in the Study Area as discussed in Chapter Three, *Affected Environment*, Section 3.8, *Historical*, *Archaeological*, *Architectural*, *and Cultural Resources*. See Appendix F for a listing of cultural resources located within the Study Area.

There would be no ground disturbance as a result of the Proposed Action. Therefore, there would be no direct impacts on properties on or eligible to be on the National Register of Historic Places.

The potential for indirect impacts to historic resources must also be assessed. Indirect impacts include noise impacts that would diminish the integrity of the property's setting. Since implementation of the mitigated Preferred Alternative would change the noise exposure in the Study Area, the potential for noise impacts on historic resources was once again studied.

The first step was to identify the appropriate area of potential effect (APE) to account for significant noise impacts on cultural resources. The method used to establish the APE as well as the resulting APE are discussed in Chapter Four, *Environmental Consequences.*

The next step was to identify historic resources listed on or eligible for listing on the NRHP located within the APE. These sites were identified by using data available from the National Register and by conducting windshield surveys when necessary. The results of the windshield surveys are included in Appendix F.

Ten historic and potentially historic sites were identified in the APE: the Inwood Country Club near JFK; the Unification Chapel, the residences at 34 E. 4th Street and 406 Marshall Street, the John Marshall School, the Bronx Powder Company and the Jenkins Rubber Company buildings, and the Singer Factory District all located just south of EWR; and the Lazaretto, the Printzhof, and the Westinghouse Industrial Complex all located just to the east of PHL.

Only two of these sites were within the area subject to significant noise impacts by the mitigated Preferred Alternative; the Inwood Country Club and the Westinghouse Industrial Complex. As a result of the mitigation, the remainder of the sites are not subject to significant noise impacts.

The next step was to determine if the significant noise impacts met the criteria of adverse effect for any of the three sites. An adverse effect is one that diminishes the integrity of a cultural resource. According to 36 CFR 800.5(a), "An adverse effect is found when and undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location design, setting, materials workmanship, feeling, or association."[2] The nine sites are described and evaluated for adverse effect in the following paragraphs.

The Inwood Country Club is located immediately to the east of JFK Runway 4R across the Head of Bay. It is a private country club featuring a golf course, tennis courts, fitness center and beachfront facilities. Since the country club was founded in 1901 it may be potentially eligible to be listed on the NRHP. As a result of the Integrated Airspace Alternative Variation without ICC the noise exposure level would be 65.9 DNL. Due to this country club's proximity to JFK and the Head of Bay, which is subject to motor boat traffic, it is concluded that a quiet setting would not be a recognized purpose or attribute of the Inwood Country Club. Therefore, the increase in noise would not be considered an adverse effect.

The former Westinghouse Industrial Complex occupies the entire southeastern section of the APE near PHL. The FAA's Preferred Alternative would result in a significant increase in noise in the vicinity of the former Westinghouse Industrial Complex. This industrial area has not been studied in detail for historic resources. Some of the buildings on this site may be potentially eligible for nomination to the NRHP. During the recent windshield survey several structures serving the historical Westinghouse Canal were observed including an apparatus at the north end of the canal that may have pumped the water into the industrial complex. Even if the Westinghouse Industrial Complex were to be determined eligible for the NRHP, increased aircraft noise would not alter the historic characteristics of the industrial complex and therefore, would not result in an adverse affect to the Westinghouse Industrial Complex.

5.3.5 DEPARTMENT OF TRANSPORTATION ACT SECTION 4(f), AND LAND AND WATER CONSERVATION FUND ACT SECTION 6(f)

Section 303(c), Title 49 USC, commonly referred to as Section 4(f) of the DOT Act, states that the "…Secretary of Transportation will not approve a project that requires the use of any publicly-owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance or land from a historic site of national, state, or local significance as determined by the officials having jurisdiction thereof, unless there is no feasible and prudent alternative to the use of such land…and [unless] the project includes all possible planning to minimize harm resulting from the use." Section 4601, Title 16 USC, The Land and Water Conservation Fund (LWCF) Act, commonly referred to as Section 6(f) states that no public outdoor recreation areas acquired with LWCF assistance can be converted to non-recreation uses without the approval of the Secretary of the Interior. The potential impacts to both Section 4(f) and Section 6(f) as a result of the mitigated Preferred Alternative were analyzed.

[2] 36 CFR Part 800, Protection of Historic Properties, August 2004, Subpart B § 800.5 (1).

5.3.5.1 Section 4(f)

In regard to 4(f) properties, the term use encompasses both physical use of the property, as well as constructive uses. Indirect adverse impacts, such as noise, that prevent the use of Section 4(f) properties for their intended purpose are considered as constituting a constructive use. In determining whether there is a constructive use, the FAA must determine if the impacts would substantially impair the property. A Section 4(f) property is determined to be substantially impaired when the activities, features, or attributes of the site that contribute to its significance or enjoyment are substantially diminished. According to FAA Order 1050.1E, the Part 150 land use compatibility guidelines may be used to determine if there is a constructive use of a Section 4(f) property, if the guidelines are relevant to the value, significance, and enjoyment of that particular property.

As with the other Airspace Redesign alternatives, the mitigated Preferred Alternative does not require land acquisition or facility construction. Therefore, the mitigated Preferred Alternative does not result in a physical use of any Section 4(f) property. However, because the mitigated Preferred Alternative would potentially result in changes in noise, constructive use of Section 4(f) properties is also addressed.

Two methods were initially used to evaluate noise impacts to the Section 4(f) properties. The first method was to input location data (latitudes and longitudes) for Section 4(f) properties within these census blocks into the noise model and calculate noise values at the specific Section 4(f) locations. The results of this analysis may be found in Appendix J, *Section 4(f) and 6(f) Properties* The second method was to determine which Section 4(f) properties were located within the significantly impacted census blocks by using the ESRI GNIS database.

Based on these analyses it was determined that the noise level would potentially increase significantly at only two 4(f) sites as a result of the mitigated Preferred Alternative; the Inwood Country Club and the Westinghouse Industrial Complex.

The Inwood Country Club is located immediately to the east of JFK Runway 4R across the Head of Bay. It is a private country club featuring a golf course, tennis courts, fitness center and beachfront facilities. As a result of the mitigated Preferred Alternative the noise exposure level would be 65.9 DNL. Due to this country club's proximity to JFK and the Head of Bay, which is subject to motor boat traffic, it is concluded that a quiet setting would not be a recognized purpose or attribute of the Inwood Country Club. Therefore, Part 150 land use compatibility guidelines may be applied to determine whether there is a constructive use. According to the compatibility guidelines, a golf course is compatible with noise exposure levels of up to 70 DNL. Therefore, the increase in noise exposure resulting from the mitigated Preferred Alternative would not be considered a constructive use of the Inwood Country club.

The former Westinghouse Industrial Complex occupies the entire southeastern section of the APE near PHL. This industrial area has not been studied in detail for historic resources. Some of the buildings on this site may be potentially eligible for nomination to the NRHP. During the recent windshield survey several structures serving the historical Westinghouse Canal were observed including an apparatus at the north end of the canal that may have pumped the water into the industrial complex. Even if the Westinghouse Industrial Complex were to be determined eligible for the NRHP, increased aircraft noise would not alter the historic characteristics of the industrial complex. Therefore, Part 150 land use compatibility guidelines may be applied to determine whether there is a constructive use. According to the compatibility guidelines, manufacturing land use is compatible with noise exposure levels of 70 DNL. Therefore, the increase in noise exposure would not be considered a constructive use of the Westinghouse Industrial Complex.

When Part 150 land use compatibility guidelines are used to determine if there is a constructive use of a Section 4(f) property, the noise impacts associated with the mitigated Preferred Alternative does not substantially impair any Section 4(f) sites. However, based on further consultation with the National Park Service and other interested parties, there are 4(f) properties within the Study Area where the noise is very low and where Part 150 guidelines may not adequately address the expectations and purposes of people visiting areas within these parks and wildlife refuges. These 4(f) properties includes all of the national parks and national wildlife refuges in the Study Area, as well as the Catskill State Park, Minnewaska State Park, and the Shawangunk Ridge State Forest. Additional information regarding the nature of the airspace changes resulting from the mitigated Preferred Alternative relative to these 4(f) properties is presented in the following paragraphs.

The discussion for each of the National Parks, National Wildlife Refuges, and selected State Parks begins with a description of the park highlighting any information relating to level of use and visitor experience. Management plans, when provided by the NPS/FWS, were reviewed and pertinent information was included in the park descriptions.

Following the park description the noise analysis is summarized. The first step in the noise analysis was to calculate noise exposure levels at points within each of the parks. Graphics and tables showing the locations and values of the calculated noise levels in each of the subject parks are included in Appendix J.3. The next step was to screen the subject parks for further analysis by comparing the noise values (DNL) for the 2011 Future No Action Airspace Alternative and the mitigated Preferred Alternative. If the noise level experienced as a result of the mitigated Preferred Alternative would be higher than that of the Future No Action Alternative, by 3.0 DNL or more, the airspace changes to the subject park were analyzed further. This is in accordance with FAA Order 1050.1E which refers to Federal Highway Administration and Urban Mass Transportation Administration's guidance defining *Constructive Use* under 23 CFR 771.135.

For areas where the noise level was greater by 3.0 DNL or more, additional information regarding the nature of the airspace changes is provided. This information includes the number of tracks and operations in a given area as a result of the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

Lastly, the management plans for the parks were reviewed to determine the locations of important and / or outstanding vistas. For the locations where vistas are identified, a summary of the potential airspace changes in the vicinity of the vistas is provided. This information includes number of operations, and the minimum, average and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

Detailed graphics are included in this Chapter for only those parks where additional information is provided regarding the noise or visual impacts. Graphics for all of the subject parks are included in Appendix J.3.

National Parks

African Burial Ground National Monument

From the late 1600s until the mid 1790s, both free and enslaved Africans were buried in a five to six acre burial ground in Lower Manhattan, outside the boundaries of the settlement of New Amsterdam, later known as New York. Lost to history due to landfill and development, the grounds were rediscovered in 1991 as a consequence of the planned construction of a Federal office building. [3]

The General Service Administration and the NPS are hard at work on the African Burial Ground memorial, and anticipate completion in the near future. Although the Visitor Center is open, the outdoor memorial is still under construction and currently not accessible to the public. Ongoing work can be viewed from the Visitor Center. The Visitor Center is open and provides educational programs and interpretation of the commemorative art commissioned for the Burial Ground.[4]

Noise analysis showed that the noise level at the African Burial Ground National Monument would be slightly higher with the mitigated Preferred Alternative; 44.3 DNL as compared to 43.8 DNL with the Future No Action Airspace Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Appalachian National Scenic Trail

The Appalachian National Scenic Trail (AT) is a 2,175-mile long path extending across 14 eastern states from Maine to Georgia. Envisioned in 1921 and first completed in 1937, it crosses the untamed, scenic, wooded, rural, and culturally meaningful lands of the Appalachian Mountains. The hiking trail is enjoyed by millions people each year and is within a day's drive of 2/3rds of the U.S. population.[5] People of all ages and strengths can enjoy short walks, day hikes, and long-distance backpacking excursions. There is a large selection of opportunities for viewing stunning scenery, exploring, exercising, and nature study.

The trail is managed by the National Park Service, the Appalachian Trail Conservancy, volunteers from local Appalachian Trail Clubs, the USDA Forest Service as well as other public land-managing agencies.[6] Thousands of volunteers work each year to keep the Trail open for the public to enjoy.

The following are excerpts from the Appalachian Trail Conservancy describing the portions of the AT running through the Study Area In general, the portion of the AT within the Study Area is less secluded and more heavily traveled than parts of the

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[3] African Burial Ground National Monument, "Park Home,"http://www.nps.gov/afbg/index.htm, June 18, 2007.

[4] African Burial Ground National Monument, "Plan Your Visit: Things To Do," http://www.nps.gov/afbg/index.htm, June 18, 2007.

[5] A.T. Hiking Trail, www.nps.gov/appa, May 22, 2007.

[6] A. T. Logo, www.nps.gov/appa, May 22, 2007.

trail farther to the north and south, and water is often scarce and polluted. That said, the New York-New Jersey Trail Conference, a volunteer, not-for-profit organization that maintains the AT in New York and New Jersey, has taken strides to keep their portion of the trail as secluded as possible. Recent efforts have included relocating a portion of the AT to avoid ATV problems, and repositioning approximately 1500 feet of the trail to avoid being able to see new houses being build in the vicinity of the AT.

New York: "The Appalachian Trail through New York is much less secluded than nearby Trail areas, but is more wooded and removed from civilization than one might expect considering its proximity to the large population centers."[7] "The section through Harriman-Bear Mountain State Park, where in 1923 the very first new section of the Appalachian Trail was completed, gets a lot of visitors. As the Trail passes through the Trailside Museum and Zoo at Bear Mountain, it drops to its lowest elevation point—124 feet."[8] "Elevation changes are generally moderate and vary from relatively flat and gentle to short, steep rocky pitches. Natural water sources are scarce and sometimes polluted." [9]

New Jersey: "The Appalachian Trail along the Kittatinny Range in New Jersey is rugged and more remote than one might expect considering its proximity to large population centers, with abundant wildlife, including an active bear population." [10] "Elevation changes are generally moderate and vary from relatively flat and gentle to short, steep, rocky pitches. Other sections cross bogs and wetlands, including a wildlife sanctuary that features a wide spectrum of bird species. The Trail crosses the Delaware River at the picturesque Delaware Water Gap National Recreation Area."[11] "A highlight of the southern section is glacial Sunfish Pond, but you'll want to hike mid-week or off-season to avoid crowds." [12]

Pennsylvania: "The Appalachian Trail follows ridges of mountains east of the Alleghenies to the Susquehanna River in a long section of Trail notorious for its foot-bruising, boot-destroying rocks. The Trail north of the Susquehanna is characterized by long, flat, rocky ridges broken by fairly strenuous climbs in and out of gaps. About ten miles south of the Susquehanna River, the Trail crosses the Great Valley of the Appalachians to the Blue Ridge. This southern portion of the Trail through Pennsylvania has many sections that are gentle, and grades are easy, making it one of the easiest sections of the Trail."[13]

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[7] The Appalachian Trail Conservancy, "Explore the Trail: New York," http://www.appalachiantrail.org/site/c.jkLXJ8MQKtH/b.773195/k.DF76/New_York.htm

[8] The Appalachian Trail Conservancy, "Explore the Trail: New York," http://www.appalachiantrail.org/site/c.jkLXJ8MQKtH/b.773195/k.DF76/New_York.htm

[9] Ibid.

[10] The Appalachian Trail Conservancy, "Explore the Trail: New Jersey," http://www.appalachiantrail.org/site/c.jkLXJ8MQKtH/b.774739/k.AE4/New_Jersey.htm

[11] The Appalachian Trail Conservancy, "Explore the Trail: New Jersey," http://www.appalachiantrail.org/site/c.jkLXJ8MQKtH/b.774739/k.AE4/New_Jersey.htm

[12] Ibid.

[13] The Appalachian Trail Conservancy, "Explore the Trail: Pennsylvania," http://www.appalachiantrail.org/site/c.jkLXJ8MQKtH/b.774877/k.951D/Pennsylvania.htm

Connecticut: "The Appalachian Trail route through the northwestern corner of Connecticut meanders across the worn-down remnants of a once-lofty mountain range."[14] "The Housatonic River Valley to the east and the Taconic Range to the west are particularly scenic, and one section of the Trail near Falls Village has been designed for wheelchair accessibility."[15] "Many sections run along the banks of rivers. Hiking is mostly moderate, with steep, fairly challenging sections that are short in duration. Views are often pastoral." [16]

Noise Impacts

Noise levels were calculated at multiple points within a 3 mile buffer of the portion of the Appalachian National Scenic Trail within the Study Area (1.5 mile buffer each side of the Trail). Noise values (DNL) for the 2011 Future No Action Airspace Alternative and the mitigated 2011 Integrated Airspace Alternative Variation with ICC were compared. As shown in **Figure 5.19**, the Appalachian Trail was divided into four sections or panels. **Figures 5.20, 5.21, 5.22 and 5.23** show each of the panels in detail. For all the points located within the areas designated as Panel 1 and Panel 4 (see Figures 5.20 and 5.23), the difference in noise levels resulting from the mitigated Preferred Alternative as compared to the Future No Action Airspace would not exceed 3 DNL. Therefore no further noise analysis was completed for this portion of the AT located in Panel 1 and Panel 4. See Appendix J.3 for detailed noise values. For several points located within the areas designated as Panel 2 and Panel 3 (see Figure 5.21 and 5.23) the difference in noise levels resulting from the mitigated Preferred Alternative as compared to the Future No Action Airspace would exceed 3 DNL.: Therefore, additional information regarding the nature of the proposed airspace changes in the regions where these increases take place is provided. Regions were delineated to include those points where noise levels would be higher by 3.0 or more DNL. These regions are shown in dark green on Figures 5.21 and 5.22. **Table 5.11** shows the number of tracks and jet operations that would pass over the regions as a result of the Future No Action Airspace Alternative, Preferred Alternative, and mitigated Preferred Alternative.

Visual Impacts

Several locations along the AT were identified as having important and / or outstanding views. **Table 5.12** includes a list and brief description of these locations. The locations are also illustrated on Figures 5.20, 5.21, 5.22 and 5.23. A summary of the potential airspace changes in the vicinity of these important/outstanding views is provided in **Table 5.13**. This information includes number of operations, and the minimum, average and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

In consultation with the US DOI, the FAA is conducting further evaluation of the potential noise increases and visual changes in applicable areas of the AT to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

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[14] The Appalachian Trail Conservancy, "Explore the Trail: Connecticut," <http://www.appalachiantrail.org/site/c.jkLXJ8MQKtH/b.771635/k.3BBD/Connecticut.htm>.

[15] Ibid.

[16] Ibid.

Table 5.11
Additional Information for National Parks, National Wildlife Refuges and Selected State Parks where the Noise Exposure Level is Higher by 3 DNL or Greater

Location	2011 Future No Action Airspace Alternative		2011 Preferred Alternative		2011 Mitigated Preferred Alternative	
	Total Tracks	Average Daily Jet Operations	Total Tracks	Average Daily Jet Operations	Total Tracks	Average Daily Jet Operations
Appalachian National Scenic Trail - Panel 2 - N2	181	60.9	119	103.3	128	103.2
Appalachian National Scenic Trail - Panel 2 - N1	519	268.1	839	510.2	855	512.4
Appalachian National Scenic Trail Panel 3	1,087	409.0	1,764	772.9	2,046	771.6
Delaware and Lehigh National Heritage Corridor - Panels 2 and 3	1,148	404.7	1,722	642.3	1,813	641.4
Delaware Water Gap National Recreation Area - North	445	208.4	489	305.4	508	304.1
Hopewell Furnace National Historic Site	61	8.8	195	84.1	185	89.2
Upper Delaware Scenic & Recreational River - North Panel	90	33.2	224	150.3	268	152.7
Upper Delaware Scenic & Recreational River - South Panel - N1	132	57.3	387	106.6	493	106.1
Upper Delaware Scenic & Recreational River - N2	62	16.3	148	28.6	199	27.4
Weir Farm National Historic Site	23	5.0	34	9.4	35	10.2
Walkill River National Wildlife Refuge	331	139.1	478	218.2	530	214.2
Big Indian Wilderness Area	234	188.8	211	178.0	215	178.9
Slide Mountain Wilderness Area	355	170.9	345	165.2	351	166.0
Westkill Mountain Wilderness Area	197	110.0	228	65.5	232	65.7

Source: Landrum &Brown/Metron Aviation Inc. Analysis, 2007.

Table 5.12
Appalachian National Scenic Trail Viewpoints

Viewpoint ID	Viewpoint Name	Description
V1	Power line	A power line where there are good farm views off both sides of the ridge.
V2	The Cliffs	The trail balances on the knife-edge blades of quartzite for 200 yd. The large, dark-stained slabs show slick, smooth sides with parallel streaks and areas polished from sliding against one another as they move along a fault. This is an area where extreme care is necessary for a safe traverse.
V3	Bear Rocks	Located 50 yards off the trail to the left. To get to the top of the very large and very irregular stack of quartzite requires a 10-min. scramble with handholds up and over boulders ranging in size from refrigerators to tractor trailers. The many vantage points on top offer a 360-degree panorama of the valleys on both sides of the ridge. The views are spectacular.
V4	Bake Oven Knob	The knob at 1560 ft summit, with views off cliffs to the north and south, is an internationally recognized vantage point for viewing fall hawk migrations. The southern view, reached after scrambling over 50 yd. of boulders to the right of the trail, is the better of the two. Also at the summit hikers can inspect the concrete foundation remains of an old tower that served as an airplane beacon.
V5	Devil's Pulpit	There are good views from the Pulpit of the Lehigh Gap and Lehigh River, and of the mountainside across the river largely denuded by emissions from a century of zinc mining and smelting in Palmerton.
V6	Weathering Knob	There are good views of the Aquashicola Creek valley and Chestnut Ridge to the north and northwest.
V7	Goose Knob	Offers good views of farmland to the south and southwest.
V8	Power line	The AT crosses a power line clearing that offers fine views to the north of Chicola Lake and Aquashicola Creek.
V9	Pipe line	An underground pipeline clearing at 5.3 mi. and beginning the 500-ft., almost-3-mi. decent into Wind Gap.
V10	Lookout Rocks	The rocks afford fine northern views of the Chestnut Ridge and Aquashicola Creek in the foreground and the Pocono Mts. in the distance.
V11	Hahn's Lookout	Includes southern views to Wind Gap village and, in the distance, South Mt.
V12	Power line	The trail turns right on the mountain road, passes under a power line.
V13	Wolf Rocks	There are good views to Fox Gap, the Delaware Water Gap, and all the way into New Jersey. The rocks themselves are tall, broken ledges of very smooth quartzite. Unlike most other rock beds in Pennsylvania's Appalachians, which are angled to the northwest, the Wolf Rocks outcrop dips toward the southeast. At the rocks and along the trail to the north there is evidence of glacial scouring-grit, gravel, and even sand.
V14	Power line	An old telephone cable clearing at 7.9 mi., which is slowly being reclaimed by trees, still offers mostly unobscured views of Stroudsburg to the north.
V15	Lunch Rocks	

Table 5.12
Appalachian National Scenic Trail
Viewpoints

Viewpoint ID	Viewpoint Name	Description
		"Lunch Rocks, the most hospitably named chunk of quartzite on the ridge?" It gives the hikers something to look forward to for at least half the day. Lunch Rocks does not appear on hiking maps of the area, but it is listed as a destination on the information kiosk erected by the Wilmington Trail Club near parking area along PA 191 in Fox Gap.
V16	Mt. Minsi	From the summit of Mt. Minsi the trail begins its more than 1100-ft descent on a series of switchbacks that offer excellent views of the Delaware Water Gap.
V17	Lookout Rock	On a clear day, there are exceptional views to the east and north stretching for 20 mi. or more over Delaware River and multiple ridges into a surprisingly green, forested New Jersey.
V18	Winona Cliff	The view from Winona Cliff is of Mt. Tammany, across the Delaware River
V19	Power line	An open power line offers views on both sides of the ridge.
V20	Unnamed	A high rock ledge looks east over New Jersey farmland.
V21	Catfish Fire Tower	50-ft. tower was built in 1922 and is a lookout for New Jersey Forest Fire Service crewmen, who watch for wisps of smoke in dry times. It is unoccupied most of the year. The tower has a 360-degree view but is closed to the public.
V22	Power line	A power line clearing offers great views east and west. In a short distance, a natural vista looks east over Sand Pond and Boy Scout Camp No-Be-Bo-Sco (Abb. North Bergen Boy Scout Council)
V23	Unnamed	A vista looking west out over a low ridge that hides the Delaware River from view.
V24	Rattlesnake Mt.	This windswept bald has sweeping vistas to the west and north over the Upper Delaware Valley, and limited views east and south back toward Crater Lake. The mountain is an ideal viewing platform for birders watching raptors glide up and down the Atlantic flyway on their annual migrations in April and September.
V25	Bird Mt.	Scrub-oak covered lookout and prime birding spot. The white steeple of Walpack Church is visible far below to the west
V26	Unnamed	A vantage point looks north along the thin spine of the Kittatinny Ridge.
V27	Unnamed	Vista that looks east from a sheer cliff out over Lake Owassa.
V28	Unnamed	A breathtaking vista looks east over Culvers Lake and south along the spine of the Kittatinny Ridge as it twists its wild way to the Delaware Water Gap.
V29	Normanook Fire Tower	A wooden tower stood here until 1934, when CCC workers lugged this 47-ft. steel tower piece by piece up the mountain on their backs. The fire tower survived a near crash by three low-flying Army bombers in 1941, and a 130-acre brush fire in 1994. Though it offers an unobstructed 360-degree view, it is officially closed to the public.

Table 5.12
Appalachian National Scenic Trail
Viewpoints

Viewpoint ID	Viewpoint Name	Description
V30	Sunrise Mt.	At the summit the AT emerges onto an open ledge with views east over the rustic barns and farm fields of the Wallkill River Valley. Just 50 yd. past this ledge the trail arrives at the Sunrise Mt. Pavillion. This rough-hewn stone structure is typical of the rustic "parkitecture" style created by the CCC in its public works construction, a style that can be found up and down the AT. It was built in 1937 and, with its sweeping views east and west over forest and farms, is a good spot for lunch.
V31	Rutherford	Do not make the decent to the lean-to unless you plan to stay or use the privy or really need to obtain water at the spring. The descent is straight down and the area around the shelter can be muddy.
V32	Blue Dot Trail	The trail reaches a last viewpoint west at 13.0 mi., and in a short distance the Blue Dot Trail descends 0.5 mi. to the Sawmill Lake Campground, a High Point State Park campground.
V33	Observation Platform	There is a second view of the pinnacle of stones resembling the Washington Monument, from a raised wooden observation platform on the AT (15.0 mi.)
V34	High Point Monument	A trim pinnacle of stone resembling the Washington Monument. It rises 220 ft. above the state's highest peak of 1803 ft. There are AT states with higher mountain tops, but none graced by such a monument. This veteran's memorial was another donation of the Kuser family.
V35	Wolf Pitt Hill	The summit of Wolf Pitt Hill - 180 degree vista looks west toward the Kittatinny Ridge, which is topped by the stone obelisk of High Point Monument.
V36	Pochuck Mt.	Pochuck Mt. Second Summit includes a very good western overlook (3.3 mi.). The Drowned Lands and the Great Valley of the Appalachians stretch out before you.
V37	Pinwheel's Vista	Pinwheel's Vista- Offers one of the best views in the state, looks north to the Catskills and south toward the Delaware Water Gap.
V38	Unnamed	A view looks down over glacial Surprise Lake, which is encircled by the 1.4 mi.-long Ernest Walter Trail.
V39	Bearfort Mt.	Bearfort Mt. Summit- The view looks down over glacial Surprise Lake, which is encircled by the 1.4-mi.-long Ernest Walter Trail. Further East is the Wanaue Reservoir. Still farther east are the ridges of the Ramapo Mts., and on the far horizon rise New York City's skyscrapers.
V40	Prospect Rock	At 4.1 miles this lookout, with its 360-degree view, is the highest and best of the hike. From here, seams of puddingstone flow as far as the eye can see along Bearfort Ridge.
V41	Bearfort Ridge	The trail offers great views for 1.7 mi. and it also occasionally turns away from the ridge into sheltered hemlock hollows.
V42	Unnamed	A vista that looks over the resort town of Greenwood Lake.

Table 5.12
Appalachian National Scenic Trail
Viewpoints

Viewpoint ID	Viewpoint Name	Description
V43	Eastern Pinnacles	These crags are composed of a boldly colored conglomerate called puddingstone that consists of red and white quartz pebbles mixed with other rock chips. Blue-blazed trails lead around the rock formations and should be used in wet weather or by less agile. Both crags rise above the trees and give views east over Sterling Forest.
V44	Cat Rocks	These crags are composed of a boldly colored conglomerate called puddingstone that consists of red and white quartz pebbles mixed with other rock chips. Blue-blazed trails lead around the rock formations and should be used in wet weather or by less agile. Both crags rise above the trees and give views east over Sterling Forest.
V45	Mombasha High Point	Fifteen thousand years ago the Wisconsin glacier shaved off the tops of this and other Hudson highland ridges, leaving behind the polished, pavement like bedrock surfaces found here. On a clear day, New York City skyscrapers are visible, due magnetic south on your compass, rising above the tree line.
V46	Buchanan Mt. North Summit	A vista looks east past a large pitch pine and down to Little Dam Lake.
V47	Buchanan Mt. South Summit	At elevation 1142 ft., from a rocky outcrop looking west to Sterling Mt. and southwest to Tiger, Cedar, and Hogback mts.
V48	Rock Ledges	Rock Ledges- Includes views west to Mombasha High Point and north to the Catskill Mts.
V49	Agony Grind	The AT descends extremely steeply for 550 vertical ft. to the valley, intersecting NY 17 at 12.0 mi.
V50	Green Pond Mt.	The hills were stripped clean of trees to provide charcoal for the Clove Furnace. The trail ascends steeply on switchbacks and reaches the rocky summit of Green Pond Mt.
V51	Unnamed (limited)	The trail comes out to a small, rocky promontory with a limited view south over Lake Tiorati.
V52	Black Mt.	The AT Ascends steeply, arriving at the first vista atop Black Mt. (5.3 mi.). But the best view is another 0.2 mi. farther up the trail, where it crosses open rocks facing south with views to the Hudson River and, on a clear day, all the way to New York City.
V53	West Mt.	The cliffs of West Mt. have many opportunities to stop and enjoy the view or have lunch. The Hudson highlands stretching westward before you are made of the most ancient bedrock, Precambrian in age. These heights once towered over 10,000 ft., rivaling the American Rockies.
V54	Bear Mt. Summit, Perkins Tower	This landmark offers sweeping 360-degree views of all the Highlands and down to New York City 50 mi. away. The tower was built in 1934 and named after George W. Perkins, first president of the Palisades Interstate Park Commission.
V55	Anthony’s Nose Trail	An old military road that served the signal towers atop Anthony’s Nose in the Revolutionary War.
V56	Unnamed	A small vista, best in autumn and winter, provides views of the U.S. Military Academy at West Point.

Table 5.12
Appalachian National Scenic Trail
Viewpoints

Viewpoint ID	Viewpoint Name	Description
V57	Denning Hill	This vista looks south to Haverstraw bay, and on a clear day offers the northernmost point at which AT hikers can catch a faint glimpse of Manhattan skyscrapers.
V58	Canopus Hill	After crossing Old Albany Post Rd., thick forest quickly closes in, though there is a good, open viewpoint atop Canopus Hill.
V59	Unnamed	The inspiring view looks south along the length of Canopus Lake.
V60	Looking Mt.	At elevation 1282', the view east of green hills is somewhat spoiled by electrical transmission towers. From this point, the trail descends 300 vertical ft. to Long Hill Rd.
V61	Unnamed (first)	This vista looks out from an open ledge to the Hudson Valley, over lush farm fields and towards the town of Fishkill.
V62	Unnamed (second)	Similar to V61.
V63	Unnamed	A small vista provides an impressive view west over the Hudson Valley.
V64	Mt. Egbert	The view from Egbert (8.6 mi.) looks south toward Hosner Mt.
V65	Cat Rocks	A narrow farm valley far below is dotted with barns and trim white farmhouses. Straight ahead, Corbin Hill and Hammersly Ridge can be used to trace the route of the AT north.
V66	Corbin Hill	There are beautiful views north to the little bump of Waldo Hill and the loaf-shaped Sharp Hills as well as West Mt. and Cat Rocks.
V67	Indian Rocks	Road noise mars the view somewhat. This is a popular site for views east into the Housatonic River valley, and on busy weekends you may want to seek an alternative for privacy.
V68	Unnamed	The high point on Schaghticoke Mt.-not a prominent peak; it's more like the humped, bony carapace of a sleeping dinosaur.
V69	Unnamed	Similar to V68.
V70	Caleb's Peak	Caleb's Peak with large rock outcroppings dressed in gorgeous lichens, is a fine destination for a rest or a picnic, offering the broadest panorama yet on this hike.
V71	St. John's Ledges	At 4.3 miles offers a fine viewpoint over the valley.
V72	Mt. Easter	Mt. Easter makes a fine mid-hike lunch spot. The views here compete well with Connecticut favorites, at the Riga Shelter and on Bear Mt., farther north on the AT. (p. 63)
V73	Hang Glider Ramp	A modest climb of 100 ft. over 0.8 mi. to a spectacular viewpoint. Linger here to drink in the multifaceted sights. From the north side of the opening, a clear day reveals the Catskills. From the south side, hikers see the Lime Rock (auto) race track and its circular practice ring, where drivers whirligig on oil and water-slick pavement.
V74	Unnamed	Occasional distant views to the west, and eventually crosses over to the east.
V75	Belter's Bump	A rocky out-cropping providing good views into the Housatonic valley. It is easy to reach from the north and is too heavily used, sometimes abused.

Table 5.12
Appalachian National Scenic Trail
Viewpoints

Viewpoint ID	Viewpoint Name	Description
V76	Lions Head Trail	Lion's Head south lookout - gazing southward one sees the villages of Salisbury and Lakeville and the Wetauwanchu Mt. Range (southeast), over which the AT passes en route to Salisbury. East-northeast may be the best view, however, with Twin Lakes in the middle distance and Canaan and Prospect Mts. beyond..
V77	Unnamed	Bear Mt. is clearly visible below and south of Mt. Everett
V78	Riga	Spreading out before you is almost the entirety of northwestern Connecticut-hills, mountains, valleys, lakes, villages, and sky. No shelter south of here in New England, or north of here until the Godard Shelter near East Arlington, Vermont, offers anything to compare with Riga's famous view.
V79	Unnamed	Great views the east side of the AT

Sources: Exploring the Appalachian Trail, Hikes in Southern New England, David Emblidge, 1998.
Exploring the Appalachian Trail, Hikes in Mid-Atlantic States, Glenn Scherer and Don Hopey, 1998.

Table 5.13
Appalachian National Scenic Trail
Visual Analysis

Point IDs	Total Operations			Average Altitude			Minimum Altitude			Maximum Altitude		
	NA[1]	PA[2]	MPA[3]	NA[1]	PA[2]	MPA[3]	NA[1]	PA[2]	MPA[3]	NA[1]	PA[2]	MPA[3]
V72-V78	141	129	126	21,035	19,327	19,261	4,898	4,898	4,898	33,903	33,923	33,923
V67-V71	101	138	144	14,926	11,894	11,865	2,912	2,912	2,912	35,000	35,000	35,000
V59-V66	224	159	159	11,280	10,807	10,807	4,370	4,370	4,370	36,998	36,998	36,998
V38-V58	618	686	688	14,043	12,587	12,609	2,630	1,922	1,922	38,937	38,937	38,937
V31-V37	317	626	626	12,022	12,788	12,859	2,700	2,700	2,700	39,000	39,000	39,000
V23-V30	212	332	330	19,269	19,210	19,205	3,878	3,602	3,602	35,078	34,658	34,658
V19-V20	252	138	138	15,953	21,444	21,452	3,900	3,836	3,836	27,250	33,821	33,821
V12-V18	255	103	103	8,983	23,623	23,672	3,400	3,400	3,400	22,950	35,320	33,302
V6-V11	112	268	271	11,136	14,095	14,423	2,854	2,854	2,854	27,503	33,750	33,750
V1-V5	304	148	146	15,104	13,379	13,363	2,691	2,691	2,691	38,047	38,047	38,047

Notes:
(1) Future No Action Airspace Alternative
(2) Preferred Alternative
(3) mitigated Preferred Alternative
General Notes: The analysis was developed based on a three mile area around each point evaluated. In cases where the three mile areas for adjacent points overlapped, the areas were joined to form a single larger area. In some cases the areas for numerous points overlapped over a long distance, consequently artificial breaks were inserted based on the groupings that emerged in the pattern of actual points of interest. This was done to ensure that any given grouping did not grow so large (elongated) that the computed statistics would not reasonably apply to the points within the group. Each entry in the table identifies the number of points that were grouped for that area.

Source: Landrum and Brown Analysis 2007.

Benjamin Franklin National Memorial

The Benjamin Franklin National Memorial is located in the rotunda of The Franklin Institute Science Museum in Philadelphia, Pennsylvania. Dedicated by Congress in 1976, Memorial Hall features a 20 foot high marble statue of Benjamin Franklin. Sculpted by James Earle Fraser, the statue weighs 30 tons and sits on a 92-ton pedestal of white Seravezza marble. Originally opened in 1938, Memorial Hall was designed by architect John T. Windrim and modeled after the Pantheon in Rome. The Hall is 82 feet in length, width, and height. The domed ceiling is self-supporting and weighs 1600 tons. The floors, walls, columns, pilasters, and cornices are made of rare marbles from Portugal, Italy, and France. [17]

Memorial Hall also houses many of Franklin's original possessions, including his composing table and several of his original publications. The electrostatic machine that he used to perform his scientific experiments is now on display in Franklin Gallery. A gift that he received while he was in Paris, a mystery clock, has been preserved. Even the odometer that Benjamin Franklin used to measure the postal routes in Philadelphia is displayed in Franklin Gallery. [18]

Activities conducted at the National Memorial include tours, publications, annual convocations, perpetuating the legacy of Benjamin Franklin, and studying the problems facing humanity. [19]

Noise analysis showed that the noise level at the Benjamin Franklin National Memorial would be slightly higher with the mitigated Preferred Alternative; 45.7 DNL as compared to 45.6 DNL with the Future No Action Airspace Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Castle Clinton National Monument

Several forts were constructed to guard the New York Harbor throughout the war in 1812. During this time the Southwest Battery was built on the rocks off the tip of Manhattan Island. The fort never needed to fire against the enemy and in 1817, the fort was renamed Castle Clinton in honor of DeWitt Clinton, Mayor and later Governor of New York. The army departed from the fort in 1821 and the structure was deeded to New York City in 1823. [20]

In the summer of 1824, a new restaurant and entertainment center opened at the site, then called Castle Garden. Castle Garden served as an opera house and theater until 1854.[21] From 1855 to 1890 Castle Garden was used as an immigrant landing depot through which over 8 million immigrants entered. In

[17] The Franklin Institute-Benjamin Franklin National Memorial, <http://www2.fi.edu/exhibits/permanent/franklin_national_memorial.php>, June 18, 2007.

[18] The Franklin Institute-Benjamin Franklin National Memorial, <http://www2.fi.edu/exhibits/permanent/franklin_national_memorial.php>, June 18, 2007.

[19] The Franklin Institute-Benjamin Franklin National Memorial, <http://www2.fi.edu/exhibits/permanent/franklin_national_memorial.php>, June 18, 2007.

[20] Castle Clinton National Monument, "History and Culture," <http://www.nps.gov/cacl/historyculture/index.htm> May 22, 2007.

[21] Ibid.

1896 the building was opened as the New York City Aquarium and served as one of the city's most admired attractions until its close in 1941.

Today the castle has been re-established to look as it originally did and serves as a museum as well as the ticket office for the Statue of Liberty and Ellis Island ferry. There are many activities to take part in while visiting including guided tours of the castle, concerts, ferry to the Statue of Liberty or Ellis Island, and learning about the uniforms, equipment and military life of young soldiers during one of America's forgotten wars.[22]

The Final General Management Plans Environmental Impact Statements – Manhattan Sites New York was reviewed. The following are pertinent excerpts from the general management plan EIS:

"Castle Clinton National Monument is in the Battery, the southern tip of Manhattan overlooking New York Harbor where the East and Hudson Rivers join. Battery Park, surrounding the structure, is bound by the harbor to the west, east, and south and the financial district of New York to the north. Although Battery Park has trees, grass flowers, walkways, benches, and promenades, the environment immediately surrounding the park is a highly complex urban environment." [23]

"Visitors come to Castle Clinton primarily to purchase tickets for the ferry ride to the Statue of Liberty and Ellis Island. There is a direct conflict of visitor access between individuals using the Ellis Island/Circle Line ticketing facility in the structure and those visiting Castle Clinton for its history and interpretation. The crowded space often imposes on visitors who wish to see the exhibits and structure…. Interpretive displays for all the Manhattan Sites are around the inside of the structure. A small museum area contains dioramas and historical views depicting the evolution of Castle Clinton and lower Manhattan from 1801 to 1940. Special events include musical performances and similar cultural activities. Limited restroom facilities are available." [24]

"Three alternatives for the Castle Clinton General Management Plan are reviewed in the EIS." [25] *"The Proposed Action and Preferred Alternative is to construct a performance facility for uses consistent with the Castle Garden era. Under this preferred alternative, Castle Clinton would be redesigned to accommodate cultural and performance uses reminiscent of the Castle Garden era (1832-55). The development of this alternative would reestablish the site as a year-round center for cultural events and performances and would significantly enhance related private and public sector initiatives to revitalize historic Battery Park and all of lower Manhattan. A roofed structure would be constructed substantially within and above the 1811 walls, leaving those walls in place and preserving all of the*

[22] Castle Clinton National Monument, "Outdoor Activities," <http://www.nps.gov/cacl/planyourvisit/outdooractivities.htm>, May 22, 2007.

[23] Final General Management Plans Environmental Impact Statements – Manhattan Sites New York, United States Department of the Interior / National Park Service, 1996, p. 23.

[24] Ibid. p. 45.

[25] Final General Management Plans Environmental Impact Statements – Manhattan Sites New York, United States Department of the Interior / National Park Service, 1996, p. 25.

surviving historic fabric of the fortification. The roof would be a new design, using modern materials and modern construction methods." [26] *"The new structure would contain a multipurpose adaptable stage and auditorium seating, extensive visitor service facilities including new restroom facilities, and adequate space for maintenance and administration of the site."* [27] *"Ticket sales would either remain inside the structure, or as in alternative 2, be relocated nearby."* [28]

Noise values (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Integrated Airspace Alternative Variation with ICC were compared. The noise level would be lower at the Castle Clinton National Monument (Point 6) with the mitigated 2011 Integrated Airspace Alternative Variation with ICC.

Noise analysis showed that the noise level at the Castle Clinton National Monument Memorial would be lower with the mitigated Preferred Alternative than with the Future No Action Airspace Alternative, see Appendix J.3 for detailed noise values. Therefore, there is not constructive use and no further analysis was conducted for this site.

Delaware and Lehigh National Heritage Corridor

The Delaware and Lehigh National Canal Heritage Corridor is a park that is exceptionally rich in history. The canal system began in the 17th century as Pennsylvania was "the most desirable destination in North American."[29] The transportation system that was created here, preserved in this park today, is the most lasting of its kind.[30] Within the part are historic towns, ethnic neighborhoods, and natural landscapes.[31]The park stretches 150 miles, following "the historic routes of the Lehigh & Susquehanna Railroad, the Lehigh Navigation, and the Delaware Canal, from Wilkes-Barre to Bristol, in eastern Pennsylvania."[32] Not only does the park contain beautiful and historical landscapes, but it represents both the first steps in the social development of America, capturing the beginning of the coal mining era, the Industrial Revolution, the development of rail travel, and the evolution of natural conservation.[33] The corridor does more than represent the development of our nation, it also is an "outstanding recreational and scenic resource at the center of one of the most densely populated areas of the United States."[34] There are more than 100,000 acres for outdoor recreation and the trail system includes the Appalachian Trail and will contain five other National Recreation Trail when the Delaware & Lehigh Trail is complete.[35] The Corridor contains "exceptionally scenic settings of the historic

[26] Ibid. p. 29.

[27] Ibid. p. 30.

[28] Ibid.

[29] Delaware & Lehigh Canal National Heritage Corridor and State Park: Management Action Plan: The Delaware &Lehigh Canal National Heritage Corridor Commission, U.S. Department of the Interior, in association with Mary Means & Associates, Inc. January 1993. p. vii.

[30]Ibid.

[31]Ibid.

[32] Ibid. p. viii.

[33] Ibid.

[34] Ibid. p. x.

[35] Ibid.

resources, along wide rivers, in gorges, in mountains, in agricultural valleys and in small towns."[36]

Key excerpts from the General Management Plan read, "In addition to the value of the natural resources and open lands of the Corridor for environmental health and habitat for plant and animal species, these resources have superlative recreational value. … At the center of the most densely populated area of the United States, the Corridor provides expansive open spaces and unique recreational [sic] to millions of people –opportunities that are nationally significant."[37] The plan continues to state that the Corridor provides "rare, high quality water-based recreation, including canoeing and whitewater boating, as well as sport fishing on the rivers [Delaware and Lehigh Rivers] within the park."[38] The value of the sport fishing on only the Delaware River within the park is 3.2 million dollars and the tributaries of Little Lehigh Creek, Monacacy Creek, and Bushkill Creek support populations of wild trout despite being in the middle of the urbanized areas.[39]

In addition to water-recreation, the parks within the Corridor will soon support a 150 mile hiking/biking trail through urban, village, rural, and mountain settings. "Public use and enjoyment of the Corridor are enhanced by the exceptionally scenic settings of the recreations and historic resources, which are found along rivers, in mountainous terrain, in agricultural valleys, and in historic towns. The Corridor's outstanding scenic qualities include long views of wide rivers, gorges and mountains, as well as increasingly rare rural scenery with such traditional elements as farmsteads, covered bridges and small towns."[40]

Noise Analysis

Noise exposure levels were calculated at multiple points within a 3 mile buffer of the Delaware and Lehigh National Heritage Corridor (1.5 mile buffer each side of the Heritage Corridor). Noise values (DNL) for the 2011 Future No Action Airspace Alternative and the mitigated 2011 Preferred Alternative were compared. As shown in **Figure 5.24**, the Delaware and Lehigh National Heritage Corridor was divided into three sections or panels. **Figures 5.25, 5.26 and 5.27** show each of the panels in detail For Panel 1, points 1 thru 20 and point 22 the noise exposure level would be lower by 0.5 to 8.3 DNL with the mitigated 2011 Preferred Alternative. For Panel 1 point 22 and points 25 thru 35 the noise exposure level would be higher by 0.2 to 1.7 DNL with the mitigated 2011 Preferred Alternative. For Panel 2 points 1 thru 10 the noise level would be the same or higher by 0.3 to 3.4 DNL with the mitigated 2011 Preferred Alternative Variation. For Panel 2 points 11 thru 49 the noise level would be lower by 0.7 to 12.1 DNL with the mitigated 2011 Preferred Alternative. For Panel 2 points 50 to 61 the noise level would be higher by 0.6 to 9.5 DNL with the mitigated 2011 Preferred Alternative. For Panel 2 points 62 to 67 the noise level would be lower by 0.7 to 4.1 DNL with the mitigated

[36] Ibid.

[37] Ibid. p. 28.

[38] Ibid.

[39] Ibid.

[40] Delaware & Lehigh Canal National Heritage Corridor and State Park: Management Action Plan: The Delaware &Lehigh Canal National Heritage Corridor Commission, U.S. Department of the Interior, in association wit Mary Means & Associates, Inc. January 1993. pg. 29.

2011 Preferred Alternative. For Panel 3 points 1, 2 and 33 to 40 the noise level would be the same or slightly higher (0.1 to 0.7 DNL) with the mitigated 2011 Preferred Alternative. For Panel 3 points 3 thru 32 the noise level would be higher by 0.1 to 5.9 DNL with the mitigated 2011 Preferred Alternative.

Since the difference in noise exposure levels resulting from the mitigated 2011 Preferred Alternative as compared to the Future No Action Airspace Alternative would exceed 3 DNL in some locations, additional information regarding the nature of the proposed airspace changes in the regions where these increases take place is provided. Regions were delineated to include those points where noise levels would be higher by 3.0 or more DNL. These regions are shown in dark green on Figures 5.26 and 5.27. Table 5.11 shows the number of tracks and jet operations that would pass over the regions as a result of the Future No Action Airspace Alternative, Preferred Alternative, and mitigated Preferred Alternative.

In consultation with the US DOI, the FAA is conducting further evaluation of the potential noise increases in applicable areas of the Delaware and Lehigh National Heritage Corridor to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

Delaware Water Gap National Recreation Area

The Middle Delaware River runs amid low forested mountains for 40 miles. The river then intersects the mountain ridge to form what is known as the "Water Gap". When leaving the park the river runs 200 miles to Delaware Bay and the Atlantic Ocean at Wilmington Delaware. [41] The Water Gap demonstrates the power of water as streams plummet off the Pocono plateau and dash through hemlock groves to the river.

The Delaware Water Gap National Recreation Area website specifies that their objective is to promote "outdoor recreation opportunities while conserving the natural, cultural and scenic resources of the recreation area". The site is one of the most protected natural regions in the metropolitan corridor and spans from Washington D.C. to Boston, Massachusetts. The quality of the water in the river is very high. The website claims that the 125 miles of the river that run through Upper Delaware National Scenic & Recreational River and Delaware Water Gap National Recreation Area are classified as Special Protection Waters which have exceptionally high scenic, recreational, and ecological values. Under the regulations applicable to this category, "no measurable change in existing water quality [is permitted] except towards natural conditions." The park is the tenth most visited area in the National Park System and has about five million visitors a year. Tourism continues to increase and comes from the New York/northern New Jersey and Philadelphia suburban areas.[42]

There are a variety of entertaining and enjoyable activities to take part in while visiting the recreation area. The Delaware watershed provides water for 10 percent of

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[41] Delaware Water Gap National Recreation Area, "Park Home," <http://www.nps.gov/dewa/index.htm>, May 22, 2007

[42] Delaware Water Gap National Recreation Area, "Park Home," <http://www.nps.gov/dewa/parkmgmt/index.htm>, May 22, 2007

the nation's population and the water is clean and safe for swimming, fishing, boating, and rafting. Hikers have the opportunity to climb Mt. Minsi and Mt. Tammany and surface atop the Kittatinny Ridge. The 27 miles of Appalachian Trail is also a frequent path taken among hikers. The valley has been home to people for centuries and many historic structures are scattered along the trails.[43]

According to the General Management Plan for the Delaware Water Gap, the land protection zones include Natural, Historic, Development, and Special Use Zones. The Natural Zone is most applicable when considering impacts that may result from airspace redesign. Two subcategories of Natural Zones are designated: Outstanding Natural Features Subzone and the Resource Management Subzone.[44]

The General Management Plan describes the Outstanding Natural Features Subzone as follows: *"This subzone consists of features with high intrinsic or unique values, and the Delaware River itself is the premier feature of the recreation area. Numerous geologic features in this category include the water gap and its talus slopes, Dingmans Falls, the Kttatinny Ridge, drumlins, and kettle holes. … Many areas in the outstanding natural features subzone area open for visitor use, and they will continue to be focal points for recreational and interpretive activities."*[45]

The General Management Plan describes the Resource Management Subzone as follows: "This subzone is the largest in the recreation area, and it includes natural and man-made features that have contributed to the scenic diversity of the recreation area. The resources include mature forest vegetation and primarily natural areas around lakes and waterfalls, as well as open fields and farmsteads. Developed areas are minor in scale and are compatible with the environment. Facilities include trails for hiking, bicycling, cross-country skiing, horseback riding, and snowmobiling; interpretive signs and waysides; and small parking areas. All the lands and resources in this subzone will be maintained to enhance scenic diversity, wildlife habitat, and natural and man-made systems, as appropriate within certain landscape types."[46]

Scenic resource management is discussed in the General Management Plan. A landscape management plan was to be created to conduct scenic resource management. The landscape management plan was to identify scenic vistas but no details are provided in the Scenic Resource Management section of the General Management Plan. A landscape management plan was not provided by the National Park Service." [47]

Documentation of scenic vistas was included in the Visitor Use Section of the General Management Plan. The following are excerpts from this section: "The water gap

[43]Delaware Water Gap National Recreation Area, "Park Home," <http://www.nps.gov/dewa/index.htm>, May 22, 2007

[44] General Management Plan – Delaware Water Gap National Recreation Area / Pennsylvania – New Jersey, United States Department of the Interior / National Park Service, Approved May 1987, p. 17.

[45]Ibid, p. 18.

[46] Ibid.

[47] Ibid. p. 36-37.

itself is probably the most popular feature with good view from the Arrow Island overlook off PA 611. This overlook shows not only the gap, but also the extensive Kittatinny Ridge. The Point of Gap overlook at the foot of Mount Minsi provides a good view of the tilted rock layers. … Hikers can view the water gap from Lookout Rock along the Appalachain Trail, the vista on the Arrow Island trail, and at various locations on other trails." [48]

Noise Analysis

Noise exposure levels were calculated at multiple points within the Delaware Water Gap National Recreation Area. For the purposes of illustrating and discussing the results of the noise analysis the Recreation Area was divided into two sections; South and North (See **Figures 5.28 and 5.29**). Noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated Preferred Alternative were compared. For all points located in the southern section the noise level would be lower with the mitigated Preferred Alternative than with the 2011 Future No Action Alternative. Therefore, no further analysis was conducted for the southern portion of the Delaware Water Gap National Recreation Area.

Noise exposure levels would be both higher and lower in the northern section; for points 1 to 57 noise exposure levels were higher by as much as 18.4 DNL, for points 66 to 82 noise exposure levels were lower by as much as 2.3 DNL, and for points 82 to 113 noise exposure levels varied by +/- 0.3 DNL. All noise exposure levels with the mitigated 2011 Preferred Alternative would be lower than 40 DNL. Since the difference in noise exposure levels resulting from the mitigated 2011 Preferred Alternative as compared to the Future No Action Airspace Alternative would exceed 3 DNL, additional information regarding the nature of the proposed airspace changes in the regions where these increases take place is provided. Regions were delineated to include those points where noise levels would be higher by 3.0 or more DNL. These regions are shown in dark green on Figure 5.29. Table 5.11 shows the number of tracks and jet operations that would pass over the regions as a result of the Future No Action Airspace Alternative, Preferred Alternative, and mitigated Preferred Alternative.

Visual Impact

Several locations within the Delaware Water Gap National Recreation Area were identified as important and / or outstanding vistas. These include Arrow Island Overlook, Point of Gap Overlook, Kittantinny Point Overlook, Resort Point. Overlook, and Millbrook Village. A summary of the potential airspace changes in the vicinity of these vistas is provided in **Table 5.14**. This information includes number of operations, and the minimum, average and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

The change in daily operations for this view decrease by approximately 42% and the average altitude with mitigation increases by slightly more than 14,500 feet. Both elements of comparison indicate that visual affects on the views for the Delaware Water Gap South Overlooks will be reduced. Therefore, it is concluded that visual changes due to the mitigated Proposed Action are not a constructive use of this site.

[48] Ibid, p. 39

Table 5.14
Various Important/Outstanding Views
Visual Analysis

	Total Operations			Average Altitude			Minimum Altitude			Maximum Altitude		
Park Name	**NA[1]**	**PA[2]**	**MPA[3]**	**NA[1]**	**PA[2]**	**MPA[3]**	**NA[1]**	**PA[2]**	**MPA[3]**	**NA[1]**	**PA[2]**	**MPA[3]**
Delaware Water Gap Recreational Area - South Overlooks (4pts)	239	137	136	8,659	23,164	23,228	3,623	3,680	3,680	30,579	34,558	34,546
Elizabeth A Morton NWR (polygon)*	227	209	207	13,697	14,251	14,123	0[4]	0[4]	0[4]	35,000	35,000	35,000
Delaware Water Gap Recreational Area - Millbrook Village (1pt)	255	125	125	15,941	20,992	20,992	3,951	3,753	3,753	26,876	32,460	32,422
Morristown NHP (2pts)*	1,058	1,074	1,072	7,927	8,542	8,863	0[4]	0[4]	0[4]	38,970	38,970	38,970
Gateway National Recreation Area - Sandy Hook - Mt Mitchell (1pt)	520	407	419	11,310	10,788	10,692	1,485	1,486	1,486	38,398	38,398	38,398
Stewart B. McKinney NWR - Outer Island (1pt)	129	124	124	16,507	16,333	16,378	488	488	488	37,000	37,000	37,000
Statue of Liberty NM Ellis Island NM (2pts)	823	858	860	6,309	6,781	6,842	280	280	280	37,879	37,879	37,879
Target Rock NWR (polygon)	73	55	56	13,657	13,687	13,749	1,965	1,964	1,964	33,901	33,901	33,901
Vanderbilt Mansion NHS Home of FDR NHS (3pts)	109	136	136	13,475	9,734	9,743	1,191	1,191	1,191	37,076	36,420	36,420
The Catskill Park Big Indian Wilderness Area (5 pts)	324	234	235	20,062	18,078	18,088	3,049	3,049	3,049	37,040	37,040	37,040

Table 5.14
Various Important/Outstanding Views
Visual Analysis

Park Name	Total Operations NA[1]	Total Operations PA[2]	Total Operations MPA[3]	Average Altitude NA[1]	Average Altitude PA[2]	Average Altitude MPA[3]	Minimum Altitude NA[1]	Minimum Altitude PA[2]	Minimum Altitude MPA[3]	Maximum Altitude NA[1]	Maximum Altitude PA[2]	Maximum Altitude MPA[3]
The Catskill Park - Slide Mountain Wilderness Area (22pts)	267	203	204	18,170	16,415	16,424	3,049	3,049	3,049	37,063	37,063	37,063
The Catskill Park - Westkill Mountain Wilderness Area (1 pt)	121	109	114	20,048	19,801	19,780	4,487	4,487	4,487	37,000	37,000	37,000

Notes:
(1) Future No Action Airspace Alternative.
(2) Preferred Alternative.
(3) Mitigated Preferred Alternative.
(4) The zero minimum altitudes for these locations indicate that an airport was located within the five mile area around the point(s) of interest. Consequently, the lowest aircraft to pass through that area was the takeoff or landing on the ground at the nearby airport.
General Notes: The analysis was developed based on a five mile area around each point evaluated. In cases where the five mile areas for adjacent points overlapped, the areas were joined to form a single larger area. In some cases the areas for numerous points overlapped, consequently a single larger area defined by the outer boundary of the areas was evaluated. Each entry in the table identifies the number of points that were grouped for that area. In two cases the entire Park boundary was used to create a five mile buffer in the shape of the boundary. These are indicated with the word "polygon."

Source: Landrum & Brown Analysis, 2007.

In consultation with the US DOI, the FAA is conducting further evaluation of the potential noise increases in applicable areas of the Delaware Water Gap National Recreational Area to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

Edgar Allan Poe National Historic Site

The Edgar Allan Poe National Historic Site is a place to envision the famous writer, editor, and poet's life in his only surviving residence in Philadelphia. The site includes a museum with audio-visual programs explaining the history of Poe's life and legacy, exhibits, ranger-guided and self-guided tours of Poe's historic home, as well as many more special programs and events. Visitors can listen to Poe's works which are narrated by famous actors including Vincent Price, Basil Rathbone, and Christopher Walken. [49]

The long range interpretive plan provided by the parks website indicates that the primary themes to focus on are analyzing, hearing, and narrating Poe's themes. There is a desire to make personal connections with these themes as well as make tangible links between Poe and the house. Audiences are encouraged to discover ways that Poe's personal life in the house may have influenced his creative thoughts and how it is referenced in his writing.

According to the Edgar Allen Poe National Historic Site Long Range Interpretive Plan, "Annual visitation averages 16,000 and can be divided into three basic groups (1/3 students/families/individuals). Because of Poe's worldwide popularity, the site has significant foreign visitation. A majority of visitors to this site already have some knowledge of Poe's life and work." [50] The Interpretive Plan goes on to state, "To make the site more appealing to visitors, park officials are working on plans to explore regular and special transit routes to the site, develop and market a thematic tour of sites related to literary Philadelphia, create interpretive media that link the Poe House to literary sites in the historic district, experiment with walking tours, self-guided tours, and virtual tours via internet, and increasing advertising." [51]

Noise analysis showed that the noise level at the Edgar Allan Poe National Historic Site would be slightly higher with the mitigated Preferred Alternative; 46.9 DNL as compared to 46.8 DNL with the Future No Action Airspace Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Edison National Historic Site

The Edison National Historic Site preserves the home and laboratory of the famous inventor Thomas Edison. There are many ways to spend time at the site including exploring the estate of Thomas and Mina Edison called Glenmont. Edison's 29 room Queen Anne style mansion was purchased for his new bride Mina Miller Edison in 1886. It is here that the Edison's raised their

[49] Edgar Allen Poe National Historic Site, "Things to Do," http://www.nps.gov/edal/planyourvisit/things2do.htm, May 22, 2007.

[50] Edgar Allen Poe National Historic Site Long Range Interpretive Plan, "Audiences," December 2003, p. 16.

[51] Ibid., p. 21.

children, entertained friends, family and business associates. Visitors can spend time exploring the newly restored greenhouse, complete with flowers; plants and a new garden shop, or simply walk through the estate grounds and outbuildings.[52]

The following are excerpts from the Edison Historic Site Final Master Plan "Edison National Historic Site shall have the primary goal of identifying and exploring the unique genius of Thomas A. Edison."[53] "Edison National Historic Site consists essentially of two parts – Edison's home and his laboratory area. All management programs are aimed at restoration and interpretation of these two focal point points plus some activities supporting overall objectives."[54]

The Master Plan is focused mostly on the laboratory unit including the construction of a Visitor's Center. Laboratory grounds would include a new enclosed sitting and contemplative area.

Noise analysis showed that the noise level at all points identified in the Edison National Historic Site would be higher by 0.7 or 0.8 DNL with the mitigated 2011 Preferred Alternative as compared to the Future No Action Airspace Alternative. The largest difference would be from 50.4 DNL with the 2011 Future No Action Alternative to 51.1 DNL with the mitigated 2011 Preferred Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Eleanor Roosevelt National Historic Site

The Eleanor Roosevelt National Historic Site, the only National Historic Site dedicated to the first lady, was the place she called home. Originally it was a Roosevelt family retreat with the main building being a furniture factory started by Mrs. Roosevelt to teach young men from the area trade during the depression.[55] After the death of Franklin D. Roosevelt, Eleanor Roosevelt moved to the site permanently and named the modest house Val-Kill, Dutch for valley stream.[56]

It was at Val-Kill that Mrs. Roosevelt followed her political and social interests, wrote her My Day column and worked on the Universal Declaration of Human Rights. Stone Cottage also located on the grounds at Val-Kill, was shared by Eleanor Roosevelt and her two friends, Nancy Cook and Marion Dickerman. Eleanor and Franklin D. Roosevelt entertained many noteworthy guests at Val-Kill, such as the king and queen of England, Winston Churchill, Queen Wilhelmina of the Netherlands, Princess Martha of Norway as well as child star Shirley Temple. [57]

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[52] Edison National Historic Site, "Plan Your Visit," <http://www.nps.gov/edis/planyourvisit/index.htm>, May 22, 2007.

[53] Final Master Plan April 1977 Edison Historic Site/New Jersey, United States Department of the Interior National Park Service, p. 38.

[54] Final Master Plan April 1977 Edison Historic Site/New Jersey, United States Department of the Interior National Park Service, p. 38.

[55] Eleanor Roosevelt National Historic Site, "Things to do," <http://www.nps.gov/elro/planyourvisit/things2do.htm>, May 23, 2007.

[56] Eleanor Roosevelt National Historic Site, "Park Home," <http://www.nps.gov/elro/index.htm>, May 23, 2007.

[57] Eleanor Roosevelt National Historic Site, "Things to do," <http://www.nps.gov/elro/planyourvisit/things2do.htm>, May 23, 2007.

Visitors can tour Mrs. Roosevelt's Val-Kill Cottage and take pleasure in the beautiful gardens and grounds on the site.

According to the Eleanor Roosevelt National Historic Site General Management Plan the goals of the plan are, "To commemorate the life and work of Eleanor Roosevelt, focusing on her personal philosophy and issues that were of concern to her."…"To preserve, rehabilitate, and adaptively use buildings determined to be historically significant and to manage the Val-Kill grounds in a manner that will reflect historic uses (during Eleanor Roosevelt's years) and ensure the perpetuation of the natural environment for visitors to enjoy and study." [58]

Other pertinent excerpts from the General Master Plan include: *"Eleanor Roosevelt National Historic Site encompasses all the important buildings, gardens, orchards, ponds, fields, and woods where Eleanor Roosevelt spent time while at Val-Kill. The entire 180-acre property is listed on the National Register of Historic Places; a 23-acre historical core area is considered most significant to Eleanor's life."* [59] *"The combination of NPS management and interpretation, ERVK programs and seminars, and public use of the entire site for walking, nature study, and personal reflection is intended to stimulate greater understanding of the way Eleanor Roosevelt enjoyed and gained inspiration at Val-Kill."*[60] *"Visitors who want to explore the grounds outside the historical core will be able to follow the entrance road or take one of several trails leading into the more remote areas of the site. The western portion of the site, which will be mowed and maintained largely as open field, will be easily accessible on foot and will provide vantage points for viewing the historical core. The preserved open spaces on the site will offer a wide range of settings for experiencing Val-Kill as Eleanor did."* [61] *"A small picnic area will be established in the apple orchard, and people who carry in gear may be allowed to fish in the pond or along Fall Kill in season in accordance with state laws. Use of the grounds will be restricted only if the numbers of people or types of use are disrupting the solitude and historic ambience of the site."* [62]

Noise was evaluated at one point in the Eleanor Roosevelt National Historic Site. The noise values would be higher with the mitigated 2011 Preferred Alternative. The noise level would be 31.1 DNL with the 2011 Future No Action Alternative, and 32.3 DNL with the mitigated 2011 Preferred Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Ellis Island National Monument

Opening January 1, 1892, Ellis Island was America's premier federal immigration station. Until its closing in November of 1954, the station processed over 12 million immigrant steamship passengers. [63] The

[58] General Management Plan, May 1980, Eleanor Roosevelt National Historic Site/New York, United States Department of the Interior, National Park Service, p.1.

[59] Ibid. p.8.

[60] Ibid, p.19-20.

[61] Ibid. p.27.

[62] Ibid. p. 28.

[63] Ellis Island National Monument, "Park Home," <http://www.nps.gov/elis>, May 23, 2007.

main building was restored after 30 years of abandonment and opened as a museum on September 10, 1990. Today, more than 40 percent of America's population can trace their lineage through Ellis Island.

There is a large selection of things to experience when visiting Ellis Island. There are three floors of the Ellis Island Immigration museum which was designed as a self-guided museum. [64] The Ellis Island brochure provided guides tourist though the many exhibits at their own pace. Visitors can see a movie and learn the island's history and the nation's immigration's past by joining a ranger-guided tour. There are many galleries to enjoy in the main building and guests can also search through the database of immigrant manifests to discover their family history at the American Family Immigration History Center.

The Statue of Liberty National Monument General Management Plan also encompasses the Ellis Island National Monument. According to the General Management Plan, the goals are to: "Preserve the Ellis Island complex and return the buildings to active life by devoting major historic structures to public use and interpretation by making the contributing structures available for adaptive use[65]… and … preserve the interiors of the major historic structures on Ellis Island and, through tours and programs, recall the human drama that occurred within these walls and explore the far – reaching effects it had on our nation" [66]

The following are pertinent excerpts from the Statue of Liberty National Monument General Management Plan. *"Two small islands in New York Harbor form the Statue of Liberty National Monument. Liberty Island bears the Statue of Liberty, one of the world's great monuments, symbolizing freedom to generations of immigrants and visitors. Nearby Ellis Island was the first federal immigration station, through which million of immigrants passed into the mainstream of American life. These islands offer an opportunity to take a thoughtful look at a symbol of our heritage and to gain a better appreciation of the hardships and accomplishments of the American immigrant."* [67] *"Few historical resources in the National Park System are as massive as the old immigration station on Ellis Island. The 27 – acre island holds 33 buildings, which together contain more than 600,00 square feet of interior space. Almost entirely created by landfill, the island is divided by a ferry slip into two rectangles, which are joined together at their western ends by a narrow strip of land. The rectangle north of the ferry slip (unit 1) contains the main building, the largest structure on Ellis Island and the one through which every immigrant passed. Adjoining it are two other major immigration facilities and five support structures. On the rectangle south of the ferry slip is a large hospital complex, comprising five large buildings connected by corridors (unit 2). Behind it are 17 structures that made up the contagious disease wards (unit 3). These two parallel*

[64] Ellis Island National Monument, "Things to Do," <http://www.nps.gov/elis/planyourvisit/things2do.htm>, May 23, 2007.

[65] General Management Plan September 1982, Statue of Liberty National Monument / New York – New Jersey, United States Department of Interior / National Park Service, p.2.

[66] Ibid. p.2.

[67] Ibid. p.1.

rows of buildings are separated by grounds where a large WPA – era recreation hall (unit 4) is sited."[68] *"The proposed visitor use plan, which combines guided and self-guided tours, is designed to expose visitors to Ellis Island's most eloquent spaces – particularly the vast emptiness of the registry room – following a route that roughly corresponds to the route of the immigrants during the first decade of this century."* [69] *"Railroad Ticket Office – "The large windows at the northern end of this room afford dramatic views of New York Harbor and frame a setting that evokes images of immigrants standing on the dock, waiting for the barges that would carry them across the harbor to the New Jersey railroads."* [70] *"The grounds in unit 1 will be cleared of trash, debris, and wild vegetation. New plantings will be consistent with the proposed plan. Tables and benches for outdoor eating will be provided in the corner formed by the north façade of the railroad ticket office and the east façade of the baggage and dormitory building. This corner provides some shelter from the wind and will convenient to the takeout food service area. To accommodate visitors who wish to eat along the water's edge, tables and benches will also be located north of the baggage and dormitory building. The historic walkways around the building will be preserved and may be used by visitors. The grounds west of the baggage and dormitory buildings and north of the kitchen and laundry building will be accessible only to the National Park Service staff, the food service concessioner, and the lessee, all of whom will use the work dock in the northwest corner of the island for loading and unloading."*[71] *"The grounds between the buildings in units 2 and 3 will be cleared of trash, debris, and wild vegetation. Existing walkways, benches, and lampposts will be preserved, and new plantings will be compatible with the landscape remaining after the area has been cleared of wild vegetation. NPS interpreters will conduct guided tours around the grounds and explain to visitors the functioning of the old hospital complexes and their role in the immigration story."* [72]

Noise Analysis

Noise analysis showed that the noise level at the Ellis Island National Monument would be slightly higher with the mitigated Preferred Alternative; 46.0 DNL as compared to 45.9 DNL with the Future No Action Airspace Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property due to noise and no further analysis was conducted for this site.

Visual Impact

One location which has a particularly important view was identified. The view from the Railroad Ticket Office (See **Figure 5.30**) is noted in the General Management Plan as a dramatic view of the New York Harbor. A summary of the potential airspace changes in the vicinity of Ellis Island is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred

[68] Ibid. p.7.

[69] Ibid. p. 12.

[70] Ibid. p.14.

[71] Ibid. p.17.

[72] Ibid. p.18.

Alternative. For the mitigated Preferred Alternative the change in daily operations for this view increase by approximately 5% however the average altitude increases by slightly more than 500 feet which will reduce visual affects on the view of the New York Harbor. Therefore it is concluded that mitigated Proposed Action is not a constructive use of the property due to visual impacts and no further analysis was conducted for this site.

Federal Hall National Memorial

The Federal Hall National Memorial is referred to as the "Birthplace of American Government". This location on Wall Street is where George Washington took the oath of office as our first President. The site was also home to the first Congress, Supreme Court, and Executive Branch offices. The current occupant of the site is a Customs House, which serves as a museum and memorial to our first President and the beginnings of the United States of America.

The *Manhattan Sites* Final General Management Plans Environmental Impact Statements includes the Federal Hall National Memorial. The following are excerpts of interest regarding the setting and function of the Memorial: "Federal Hall National Memorial is in lower Manhattan in the heart of the financial district at the intersection of Wall, Nassau, and Broad Streets; it is completely surrounded by skyscrapers."[73] "Federal Hall measures 177 feet in length and 89 feet in width and occupies an area of just less than 0.5 acre. The building is constructed completely of stone with white marble exterior. Today, the building houses the administrative offices of Manhattan Sites, NPS Northeast Field Offices, cooperators offices and classrooms, and exhibits pertaining to the history of the site." [74]

Noise analysis showed that the noise level at the Federal Hall National Monument would be slightly higher with the mitigated Preferred Alternative; 44.7 DNL as compared to 44.2 DNL with the Future No Action Airspace Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Fire Island National Seashore

Fire Island's naval history begins even before the colonization of Long Island. Native Americans hunted and fished in the area long before Colonial settlements were recognized. The financial system and life patterns of the community have centered around the Great South Bay and Fire Island since the area was first settled. Fire Island has a long heritage of waterfowl hunting and the shell fishing industries on the Great South Bay. Hotels and resorts later followed on Fire Island. Fire Island National Seashore also includes the ancestral home of one of New York's four signers of the *Declaration of Independence*, the William Floyd Estate.[75]

There are a variety of recreational and educational activities to enjoy at Fire Island National Seashore. Tourists can enjoy the

[73] Final General Management Plans Environmental Impact Statements: Manhattan Sites, New York, "Purpose And Need For The Plan: Site Description and Background," p. 59.

[74] Ibid. p. 59.

[75] Fire Island National Seashore, "History and Culture," <http://www.nps.gov/fiis/historyculture/index.htm>, May 22, 2007.

outdoor activities of sightseeing, hiking, and wild-life viewing in nature trails and along the entire seashore and grounds of William Floyd estate. Canoeing, boating, and fishing are some of the water-based activities to enjoy in Great South Bay. At certain times of the year lifeguards are on duty so the public can enjoy ocean beach recreation. Although most of the Fire Island Seashore's resources are more appropriate for the outdoors, in case of bad weather, or if visitors feel like getting out of the sun, they have the opportunity to learn about the park and surrounding ecosystem indoors. The Fire Island lighthouse contains two floors of interactive and two dimensional exhibits about the maritime history of Fire Island.[76] Guided lighthouse tours are also available to the public. Fire Islands National Seashore's visitor centers at Watch Hill, Sailor's Haven, and Wilderness are open seasonally and provide the opportunity to learn about the local natural resources. There is also a tour of the William Floyd estate; the one-hour guided tour throughout the Manor House is well worth a visit.

There are two distinct portions of Fire Island National Seashore: the federally funded portion which runs between Smith Point County Park on the east and the National Park Service's Watch Hill development on the west and the parcel of non-federally owned land, called Bellport Beach that is located, basically, in the middle of the Wilderness area.[77] Traditionally, visitors have used the park for "day hiking, sunbathing, limited camping and backpacking, and regulated hunting."[78] Today the park is valued because of its cultural and natural resources, both in maritime and American history. Not only does the park support a unique barrier island ecosystem, but it also protects biodiversity, the museum of historical objects, and the wilderness surrounding the area. According to the NPS's website for Fire Island the island contains " [r]hythmic waves, high dunes, ancient maritime forests, historic landmarks and glimpses of wildlife—Fire Island has been a special place for diverse plants, animals and people for centuries. Far from the sounds and pressures of nearby big-city life, Fire Island National Seashore's dynamic barrier island beaches offer solitude and camaraderie, and spiritual renewal to civilization-weary people."[79]

Currently, tourists can hike into Fire Island's wilderness and enjoy the dunes at Otis Pike Fire Island High Dune Wilderness, which "contains a variety of barrier island ecosystems in a relatively natural condition."[80] This is "the only federally designated wilderness area in the State of New York. At 1,363 acres, it is also one of the smallest wilderness areas managed by the National Park Service." The privately-owned Bellport Beach splits the wilderness into two zones, but park rangers will issue permits for wilderness camping in the Otis Pike Fire Island High Dune Wilderness Area. According to the NPS website, "In

[76] Fire Island National Seashore, "Indoor Activities," <http://www.nps.gov/fiis/planyourvisit/indooractivities.htm>, May 22, 2007.

[77] Wilderness Management Plan: Fire Island Natational Seashore Leonard Bobinchock, November 1983 pg 4.

[78] "Wilderness Management Plan: Fire Island Natational Seashore Leonard Bobinchock," November 1983 pg 10.

[79] "Fire Island National Seashore" National Park Service. July 3, 2007: <http://www.nps.gov/fiis/>, accessed July 11, 2007.

[80] "Fire Island Wilderness" National Park Service. July 3, 2007: <http://www.nps.gov/fiis/>, accessed July 11, 2007.

the wilderness, you can be free to explore, to discover a natural barrier island ecosystem, to savor the solitude. … This wilderness is so close to millions of urban and suburban populations, yet it provides an opportunity to experience the values of wilderness character. Surrounded and buffered by high dunes and salt marsh, you can actually feel miles away from civilization."[81]

According to the most recent General Management Plan: "Fire Island is a relatively small piece of land compared to many other natural areas of the National Park System, but the diversity of its landscape and the variety of recreational activities that are offered are greater than in areas many time its size."[82] "The extensive tidal marshes of East Fire Island provide some of the seashore's best waterfowl habitats and excellent sites for bird-watching. The outstanding natural area between Watch Hill and Smith Point West provides opportunities for long-distance hikes and exploration by both casual and serious students of natural history."[83]

Noise analysis showed that noise exposure levels in the Wilderness Area would be lower with the mitigated Preferred Alternative than with the Future No Action Airspace Alternative. Noise exposure levels would also be lower for the section of the Fire Island National Seashore located to the northeast of the Wilderness Area. Almost all noise values at points southwest of the Wilderness Area would be higher by 0.2 to 0.9 DNL. None of the noise levels resulting from the mitigated 2011 Preferred Alternative would exceed 42 DNL. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Gateway National Recreation Area

The Gateway National Recreation Area (Gateway) provides abundant recreational and learning opportunities, from swimming, boating and fishing to team sports, bicycling and nature study. The nation's oldest operating lighthouse, forts that defended America, and sites that trace aviation's early days tell significant stories. The living world can be explored in a wildlife refuge, holly forest, ocean dunes and coastal uplands. Gateway is a great place to explore. The parks three units, Jamaica Bay, Staten Island, and Sandy Hook offer a variety of activities to take part in.[84]

The Gateway's Jamaica Bay Unit includes a wealth of history, nature and recreation, from New York City's first major airport and coastal fortifications to a wildlife refuge and pristine beaches. Suggested activities include swimming at Jacob Riis Park and looking for endangered Piping Plovers.[85]

From fishing to sailing, soccer and baseball to model airplane flying, Gateway's Staten Island Unit offers a wide range of recreational opportunities. This is in addition to the rich history of Fort Wadsworth and World War Veterans Park at Miller Field.[86]

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[81] Ibid.

[82] "General Management Plan: Fire Island National Seashore" Department of the Interior: 1977 pg 15.

[83] Ibid. 16.

[84] Gateway National Recreation Area, <http://www.nps.gov/gate/index.htm>, June 8, 2007.

[85] Gateway National Recreation Area, <http://www.nps.gov/gate/index.htm>, June 8, 2007.

[86] Gateway National Recreation Area, <http://www.nps.gov/gate/index.htm>, June 8, 2007.

Sandy Hook Lighthouse is America's oldest operating lighthouse (1764). Fort Hancock and the Sandy Hook Proving Ground helped to defend our freedom. Both of the resources are located at Gateway's Sandy Hook Unit. These sites complement outstanding beaches, a Holly forest, and other natural and recreational resources.[87]

It is noted that all information regarding Gateway is from the NPS website. No general management plan was provided by the NPS.

Noise Analysis

Noise analysis showed that the noise level at the majority of the points identified in the Jamaica Bay Unit would be lower with the mitigated 2011 Preferred Alternative as compared to the Future No Action Airspace Alternative. Noise levels would be slightly higher at the remainder of the points with the greatest difference 1.3 DNL. All noise values for the points located in the Sandy Hook Unit would be lower with the mitigated 2011 Preferred Alternative. Noise levels would also be lower in the Staten Island Unit at all but four points. At these four points the noise level would be higher by 0.3 to 0.6 DNL and the resulting noise level would remain below 45 DNL, see Appendix J.3 for detailed noise values. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property due to noise and no further analysis was conducted for this site.

Visual Impact

Mt. Mitchill Scenic Overlook stands at 266 feet. This overlook in Atlantic Highlands sits on the highest natural elevation from Maine to the Yucatan providing beautiful views of Sandy Hook, Sandy Hook Bay, Raritan Bay and the New York skyline.[88] See **Figure 5.31**. A summary of the potential airspace changes in the vicinity of the Mt. Mitchill Scenic Overlook is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

For the mitigated Preferred Alternative the change in daily operations for this view increase by approximately 20% however the average altitude with mitigation decreases by slightly more than 600 feet. The minimum altitude in this area does not change. With the reduction in daily operations over the Gateway National Recreation area visual impacts are not expected. Therefore it is concluded that mitigated Proposed Action is not a constructive use of the property due to visual impacts and no further analysis was conducted for this site.

General Grant National Memorial

The General Grant National Memorial pays tribute to the triumphant Union Commander of the Civil War. It includes the tomb of General Grant and his Wife Julia Dent Grant. The tomb was designed by architect John Duncan, and the granite and marble masterpiece was completed in 1897 and

[87] Gateway National Recreation Area, <http://www.nps.gov/gate/index.htm>, June 8, 2007.

[88] Monmouth County Park System, "Mt. Mitchell Scenic Overlook," <http://www.monmouthcountyparks.com/parks/mt_mitchel.asp>, June 21, 2007.

remains the largest mausoleum in North America.[89]

For tourists interested in outdoor activities, they can take pleasure in the open air concerts, community activities, and ranger guided walking tours that are offered at the park. [90] Those interested in indoor activities can take part in the site introductory talks which are available on the hour, or the special interpretive programs that are offered daily.[91]

General Grant National Memorial is included in the Manhattan Sites Final General Management Plans Environmental Impact Statements. The following are excerpts of interest regarding the setting and importance of the Memorial as well as the goals of the management plan: *"General Grant National Memorial, commonly known as Grant's Tomb, is on a 130-foot high promontory overlooking the Hudson River on Riverside Drive at West 122nd Street in the West Harlem area of Manhattan. The memorial is a granite structure, 150 feet high and 90 square feet in area, in Riverside Park."* [92] *"General Grant National Memorial, the largest mausoleum in the United States, provides the final resting place of former General and President Ulysses S. Grant and his wife, Julia Dent Grant. The memorial represents gratitude for the Civil War hero who helped preserve the Union. Architecturally, it exemplifies the mixture of classical forms and motifs, on a massive scale, that characterizes turn-of-the-century architecture. Interior paintings, mosaics, and sculpture reflect the desire, on the part of the Grant Monument Association and the National Park Service, to embellish the tomb with artistic pieces commemorating General Grant"* [93] *"Visitors could learn the history of General Grant National Memorial through the interpretation of the themes and the changes and additions to the site that represent the continuing memorialization of Grant."*[94] *"The area around the tomb would continue to be available for recreational activities."*[95] *"Programs such as the Jaazzmobile and Gospelfest would continue in the plaza area."* [96]

Noise analysis showed that the noise level at the General Grant National Memorial would be lower with the mitigated 2011 Preferred Alternative than with the Future No Action Airspace Alternative, see Appendix J.3 for detailed noise values. Therefore, there is no constructive use of the property and no further analysis was conducted for this site.

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[89] General Grant National Memorial, "History and Culture," <http://www.nps.gov/gegr/historyculture/index.htm>, May 29, 2007.

[90] General Grant National Memorial, "Outdoor Activities," <http://www.nps.gov/gegr/planyourvisit/outdooractivities.htm>, May 29, 2007.

[91] General Grant National Memorial, "Indoor Activities," <http://www.nps.gov/gegr/planyourvisit/indooractivities.htm>, May 29, 2007.

[92] Final General Management Plans Environmental Impact Statements: Manhattan Sites, New York, "Purpose And Need For The Plan: Site Description and Background," p. 87.

[93] Ibid. p. 87.

[94] Ibid. p. 89.

[95] Ibid p. 90.

[96] Ibid p. 92.

Gloria Dei Church National Historic Site

The Gloria Dei (Old Swedes') Church, located off South Columbus Boulevard in Philadelphia and Pennsylvania's oldest church, was originally built by the Swedes in the early 1700s.[97] Religious ceremonies are still conducted at the present day Gloria Dei Church. The Church exhibits items from the early log church including a Baptismal Front, the golden sprays on the lectern and pulpit, and the Cherubim below the organ. Patriots and ordinary citizens are buried in the associated cemetery including a number of members of George Washington's army.[98]

The Gloria Dei Church is associated with the Independence National Historic Park. The Independence National Historic Park General Management Plan was reviewed for specifics related to the Church however, none were found.

Noise analysis showed that the noise level at the Gloria Dei Church National Historic Site would be lower with the mitigated 2011 Preferred Alternative than with the Future No Action Airspace Alternative, see Appendix J.3 for detailed noise values. Therefore, there is no constructive use of the property and no further analysis was conducted for this site.

[97] Gloria Dei Church National Historic Site, "Park Home," http://www.nps.gov/glde/index.htm, May 29, 2007.

[98] Gloria Dei Church National Historic Site, "Plan Your Visit- Things To Do," http://www.nps.gov/glde/planyourvisit/things2do.htm, May 29, 2007.

Governors Island National Monument

For over two hundred years, the military on Governors Island were involved in the complex social, political, and economic tapestry known as New York City. Between 1776 and 1996 Governors Island stood as a silent guard in New York Harbor, and provided protection of the ideals represented by the Statue of Liberty across the Bay.[99] Visitors are encouraged to explore the Island's history as it developed from colonial outpost to regional administrative center for the U.S. army and coast guard.

Tourists can take part in an expedition with a National Park Ranger through the 90-acre National Historic Landmark District. On this hike guests can explore the exteriors of early nineteenth century fortifications, the charming scenery surrounding the Officer's quarters and the Island's military and community past from 1776 - 1996.[100]

Documentation concerning Governors Island provided by the NPS was reviewed and the following are excerpts related to the setting and future plans. "*Governors Island is in the inner New York Harbor, a few hundred yards off the southern tip of Manhattan. For more than 200 years, the island was off-limits to the general public, having served as an operational base for the U.S. Army and subsequently, the U.S. Coast Guard. On January 31, 2003, the U.S. Government transferred the 172-acre island:*

[99] Governors Island National Monument, "Park Home," http://www.nps.gov/gois, May 22, 2007

[100] Governors Island National Monument, "Park Home," http://www.nps.gov/gois, May 22, 2007

- *A 22-acre National Monument to the U.S. Department of the Interior, National Park Service (NPS), and*

- *150 acres to the Governors Island Preservation and Education Corporation (GIPEC), a subsidiary of New York's Empire Sate Development Corporation.*

While planning for the long-term redevelopment of the island, for the past four summers (2003 thru 2006), NPS and GIPEC have opened the island to the public and have individually and collaboratively sponsored public tours, programs, and special events. To date, visitation has been restricted to a few weeks a year and restricted by GIPEC's ferry capacity. Visitation has increased from 4,000 (year 1) to 30,000 (year 4) and is expected to significantly increase over the next several years as additional docks are installed or repaired, private ferry service begins, the number and variety of public programs and amenities increase, and as the island's facilities are rehabilitated from military use to serving the general public.

NPS is developing its first General Management Plan (GMP) for Governors Island National Monument. … The National Monument is comprised of two 1812-era fortifications (Fort Jay and Castle Williams), an administrative headquarters building (Bldg. 107), a dock on Buttermilk Channel (Dock 102), approximately 12 acres of open landscape, non-historic buildings that are slated for demolition, and an easement within GIPEC's Building 140, which is adjacent to the main ferry landing on the northern part of the island (Soissons Dock). ... Overall goals are to make the National Monument an integral part of the island's redevelopment, the center of a larger harbor visitor experience and a major NYC attraction. In short, the National Monument would become a Center focused on harbor themes, with a variety of permanent and changing exhibits, public programs, guided and self-guided tours, activities and special events.

GIPEC is developing a master redevelopment plan for the island. While the ultimate mix of attractions is presently unknown, the first phase of redevelopment has begun. It is to develop public park areas on the island: a 40-acre park will be created on the southern portion of the island; the entire perimeter road around the island will be transformed into a public esplanade, accommodating walker, joggers, and bicycles; and historic landscape areas on the northern end will be maintained and linked to the other island public spaces."[101]

Noise analysis showed that the noise level at the Governor's Island National Monument would be slightly higher with the mitigated Preferred Alternative; 44.8 DNL as compared to 44.7 DNL with the Future No Action Airspace Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Hamilton Grange National Memorial

Hamilton Grange National Memorial maintains the home of Alexander Hamilton. Located at 287 Convent Avenue, the Federal style country home is situated on 32 acres in upper Manhattan. Designed by architect John McComb, the home was finished in 1802 and appropriately titled "The Grange" in honor of the Hamilton family's ancestral home in Scotland. On July 11, 1804 Hamilton was killed in a duel with adversary Aaron Burr.

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[101] "Governors Island", Linda Neal, National Park Service, received January 2007.

The *Manhattan Sites* Hamilton Grange Final General Management Plan Environmental Impact Statement includes the Hamilton Grange National Memorial. The following are excerpts from the management plan EIS regarding the setting and NPS plans for the resource: "The house, a three-bay, two-story building that was constructed in the symmetrical Federal style of architecture and had elegant porches on all sides, was completed in February 1803 based on a design by John McComb Jr., a prominent architect of the time." … The general management plan for Hamilton Grange National Memorial would be to relocate and restore the original woodframe first and second floors and attic of the Grange across 141st Street to St. Nicholas Park. Implementation of this plan would accomplish what Congress intended-restoration of the Grange within an appropriate setting while keeping it within the context of its present-day community and on Hamilton's original tract of land." [102]

Noise analysis showed that the noise level at the Hamilton Grange National Memorial would be lower with the mitigated 2011 Preferred Alternative than with the Future No Action Airspace Alternative, see Appendix J.3 for detailed noise values. Therefore, there is no constructive use of the property and no further analysis was conducted for this site.

Home of Franklin D. Roosevelt National Historic Site

Home of Franklin D. Roosevelt National Historic Site is the estate that he loved and the place he considered home. The first US Presidential Library was started by FDR here.

The Historic site offers tours daily. Guests begin their journey at the Henry A. Wallace Visitor and Education Center, where tickets are available for the tour of the home of Franklin D. Roosevelt. Guests are shown the FDR presidential library and museum. Visitors may view a 22 minute film in the auditorium of the Wallace Center titled A Rendezvous with History that explains the Roosevelt experience.[103] Visitors can also relax and enjoy the majestic view from the porch of Top Cottage, where FDR entertained the world's leaders.[104]

The following are excerpts from the Home of *Franklin D. Roosevelt National Historic Site Master Plan* pertaining to the sites features: *"FDR's estate contains a very prominent feature that is not a "resource" at all in the ordinary physical sense: the superb westward view of the Hudson River, the bluffs and mansions across the river in Ulster County, the Shawangunk Mountains beyond, and the Mid-Hudson (Poughkeepsie) Bridge to the south. These vistas, framed by his beloved trees in the foreground so captivated the President that he spoke of them often and they became famous in his lifetime."* [105]

"Topographically, the site contains three distinct elements. Stretching west of the Albany Post Road a plateau contains meadows, the library, a parking area (formerly a vegetable garden), a rose

[102] Final General Management Plan Environmental Impact Statement: Manhattan Sites, Hamilton Grange, New York, pp. 1 and 19.

[103] Home of Franklin D. Roosevelt National Historic Site, <http://www.nps.gov/hofr/>, May 23, 2007.

[104] Ibid.

[105] Master Plan, March 1977, Home of Franklin D. Roosevelt National Historic Site/New York, p. 25.

garden, the mansion lawn, and all the principal buildings, succeeded by a steep bluff. Beyond is rough terrain composed of rocky ridges and deep ravines paralleling the Hudson. This section also contains a large meadow, a vital feature in the sweeping view cited above. However, since President Roosevelt's death there has been considerable encroachment on this vista by second-growth forest." [106]

"Most dramatic feature of the site and the favorite place of the Roosevelt family is the rose garden, surrounded by a 14-foot-high hemlock hedge that predate James Roosevelt's acquisition of the estate in 1867. Here Franklin Roosevelt was buried on April 15, 1945, and his wife Eleanor on November 10, 1962." [107]

"Also contained within this National Historic Site is Top Cottage, FDR's hilltop retreat with expansive views of the Catskill Mountains. Built to reflect his architectural and regional interests and to accommodate his personal needs, the cottage became the site of informal gatherings between FDR and world leaders." [108]

Noise Analysis

Noise was evaluated at multiple points in the Home of Franklin D. Roosevelt National Historic Site. The noise exposure values would be higher with the mitigated 2011 Preferred Alternative when compared to the Future No Action Airspace Alternative. The greatest difference in noise values would be 1.8 DNL. None of the noise levels resulting from the mitigated 2011 Preferred Alternative would exceed 34 DNL. The change in noise would be less than 3.0 DNL therefore there is no constructive use due to noise of the property and no further analysis was conducted for this site.

Visual Impact

The superb views from the estate referenced in the Master Plan were considered. A summary of the potential airspace changes in the vicinity of Franklin D. Roosevelt National Historic Site is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

For the mitigated Preferred Alternative, the change in daily operations for this view increase by approximately 25 percent and the average altitude with mitigation decreases by slightly more than 3,700 feet. The minimum altitude in this area does not change.

In consultation with the US DOI, the FAA is conducting further evaluation of the potential visual changes in applicable areas of the Franklin D. Roosevelt National Historic Site to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

Hopewell Furnace National Historic Site

Hopewell laid the foundations for America's iron and steel industry from 1771 to 1883. The site was a former "iron plantation" and is an example of America's development during the industrial revolution. The site's

[106] Ibid.

[107] Ibid. p. 26.

[108] Hardcopy of Purpose & Significance statement for new GMP in process.

webpage describes Hopewell Furnace from 1771 to 1883 as "Hot, smoky, noisy." [109]

Guests with one to two hours can explore the park visitor center/museum which includes an audio-visual program, exhibits, and bookstore. There is an 11 minute theater program that presents the history of the Hopewell Furnace community as well as a self-guided walking tour of the historic community. During the summer season living history programs and demonstrations are available. Visitors with more time can hike the many miles of trail and historic roadways that travel through Hopewell and neighboring French Creek State Park, or drive to historic Bethesda church or during apple harvest season pick apples from the park's orchard.[110]

The Hopewell Furnace National Historic Site Statement for Management includes the following information describing the site's setting and importance. *"Hopewell Furnace National Historic Site is located in the Schuylkill River Valley about five miles south of Birdsboro on Pennsylvania Route 345, and twelve miles northeast of the Morgantown exit of the Pennsylvania Turnpike. It is on the edge of the growing northwestern Philadelphia suburbs."*[111] *"Hopewell Furnace is located in the midst of a great variety of industrial history. The anthracite coal region is to the northeast where Steamtown National Historic Site and Scranton Iron Works are located; to the southwest in Pennsylvania is the nine-county American Industrial Heritage Project, a region containing significant cultural resource sites contributing to the region's iron and steel, coal and transportation industries."*[112] *"In its heyday, Hopewell Furnace was an island of industry surrounded by agricultural land; today, the National Historic Site is part of a small island of open space endangered by rapidly rising residential and commercial development."*[113] *"The most significant resource of Hopewell Village is the remnant village nucleus: the furnace stack and the buildings loosely clustered in its vicinity. In addition to the buildings the remains closely related to the blast operation [are] the [residences, barn, etc.], minor dependent structures for the Ironmaster's house, and the terraced remains of the Big House garden.*[114] *"French Creek flows through the heart of Hopewell Furnace National Historic Site and reflects the outstanding natural and scenic values of the entire valley."*[115]

The NPS is in the process of developing a General Management Plan for the Hopewell Furnace National Historic Site. The draft statement of purpose is as follows:

The purpose of Hopewell Furnace National Historic Site is to preserve and interpret iron plantation life and operations, and to enhance public understanding of the American evolution of American iron-

[109] Hopewell Furnace National Historic Site, "Park Home," <http://www.nps.gov/hofu>, May 22, 2007.

[110] Hopewell Furnace National Historic Site, "Plan Your Visit," <http://www.nps.gov/hofu/planyourvisit/index.htm>, May 22, 2007.

[111] Statement for Management Hopewell Furnace National Historic Site Pennsylvania, United State Department of the Interior National Park Service Mid-Atlantic Regional Office, October 1993, p.2.

[112] Ibid. p. 3.

[113] Ibid.

[114] Ibid. p. 6.

[115] Ibid. p. 11.

making and its impact on the region and the nation.[116]

Noise was evaluated at multiple points in the Hopewell Furnace National Historic Site. See **Figure 5.33**. The noise exposure levels would be higher with the mitigated 2011 Preferred Alternative when compared to the Future No Action Alternative. The greatest difference in noise values would be 12.3 DNL. None of the noise exposure levels resulting from the mitigated 2011 Preferred Alternative would exceed 40.0 DNL. Since the difference in noise levels resulting from the mitigated 2011 Preferred Alternative as compared to the Future No Action Airspace Alternative would exceed 3 DNL, additional information regarding the nature of the proposed airspace changes in the vicinity of the Hopewell Furnace National Historic Site is provided. Table 5.11 shows the number of tracks and jet operations that would pass over the National Historic Site as a result of the Future No Action Airspace Alternative, Preferred Alternative, and mitigated Preferred Alternative.

In consultation with the US DOI, the FAA is conducting further evaluation of the potential noise increases in applicable areas of the Hopewell Furnace National Historic Site to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

[116] Hopewell Furnace National Historic Site, <http://www.nps.gov/hofu/parkmgmt/gmpdraftpurpose.htm>, May 22, 2007.

Independence National Historic Park including Liberty Bell, Independence Hall, and Congress Hall

Independence National Historic Park spans more than 55 acres across 20 city blocks in the City of Philadelphia. The park was built to preserve and interpret the story of the birth of American Democracy and resources related to the establishment of the United States. [117]

When visiting the park there are many options. The park includes the home of Benjamin Franklin and the First and Second Banks of the United States. The site of meetings of the first and second Continental Congresses, the Declaration of Independence, the Articles of Confederation, and the Constitution of the United States are all available for the public to tour. One of the most important features the park has to offer is the display of one of America's well known symbols of freedom, the Liberty Bell. The park also serves as the steward of four separate parks: Edgar Allen Poe National Historic Site, the Benjamin Franklin National Memorial, the Thaddeus Kosciuszko National Memorial and the Gloria Dei Church National Historic Site. [118]

According to the *Long-Range Interpretive Plan for Independence National Historical Park*, *"Independence National Historical Park is nationally and internationally significant for many reasons. The park includes a World Heritage Site (Independence Hall), and seven national*

[117] Independence National Historical Park, "Park Home," <http://www.nps.gov/inde>, May 29, 2007.

[118] Independence National Historical Park, "Plan Your Visit- Places To Go," <http://www.nps.gov/inde/planyourvisit/placestogo.htm>, May 29, 2007.

historic landmarks (American Philosophical Society Hall, Carpenters' Hall, Christ Church, Deshler-Morris House, First Bank, Merchants' Exchange Building and Second Bank). The park is listed on the National Register of Historic Places and the Underground Railroad Network to Freedom. The park's original structures and artifacts are the tangible remains of some of the most momentous events to shape this country and the world.

Independence National Historical Park is nationally significant because:

• The park was the site of meetings of the first and second Continental Congresses, which gave direction to the American Revolution and the confederation government.

• It was the site where the founding documents of the United States of America were debated and signed.

• It includes the site of the home of Benjamin Franklin, who personified the spirit, ideals, curiosities, and ingenuity of 18th century America.

• It is the site of the tomb of the Unknown Revolutionary War soldier, and the 18th century burial ground for other soldiers, Yellow Fever victims and African-Americans.

• It was where the United States Congress met from 1790 to 1800 adding the Bill of Rights to the Constitution and the first new states to the union (Vermont, Kentucky, and Tennessee.)

• It was the site of the presidency of George Washington (1790-1797) and John Adams (1797-1800) which established precedents and witnessed, with Adams' inauguration, the first peaceful transfer of executive power in the western world.

• It is the site of the First and Second Banks of the United States which set monetary policy and regulated U.S. currency.

• It was the site of efforts to establish treaties with various Indian nations, such as the Mohawk nation led by Chief Joseph Brant.

• It was the site of the first decisions of the United States Supreme Court.

• This is the place where the 1793 Fugitive Slave Act was passed and was signed into law by our first President, George Washington.

• Independence Hall was the scene of trials in Federal District Court related to the Fugitive Slave Act of 1850.

• Independence Square was the scene of activity related to abolition such as Frederick Douglass's famous 1844 speech while a fugitive slave, and other abolition society meetings.

• Independence Square was the site of the first public reading on July 4, 1876, of the"Women's Declaration of Rights…." by Susan B. Anthony urging women's suffrage.

• The park represents the founding ideals of the nation and is a national and international symbol of democracy and liberty.

• The park with its affiliated Churches represents the spirit of religious diversity and tolerance beginning with William Penn and codified in the Bill of Rights.

• Resources in the park are tangible links to the past; they are authentic and have direct

associations with the people and events of the early American republic."[119]

According to the Final General Management plan published in 2006**,** the park views its role "as a responsible steward for the precious treasure it holds."[120] In addition to this role, the park will "continue to serve as an educator and as a place where visitors learn about the people and events that created our nation."[121] Finally, the GMP states that the park will become more active in the community through the plan offered in the document. The NPS plans to alter parking facilities and gathering areas, enhance gateways, and add new educational themes, in addition to updating and relocating their administrative facilities.

Noise was evaluated at multiple points in the Independence National Historic Park. Noise exposure values (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise exposure levels would be lower or the same at the Independence National Historic Park with the mitigated 2011 Preferred Alternative, see Appendix J.3 for detailed noise values. Therefore, there is no constructive use of the property and no further noise analysis was conducted for this site.

119 Long-Range Interpretive Plan for Independence National Historical Park, Independence National Historical Park Interpretation and Visitor Services, October, 2006, pp. 8 and 9.

120 Summary of Actions: Final General Management Plan, Independence National Historical Park: Independence National Historical Park Pennsylvania, 2006, p.1.

121 Ibid.

Lower East Side Tenement Museum

At the heart of the Lower East Side Tenement Museum is the historic tenement, home to an estimated 7,000 people from over 20 nations between 1863 and 1935.[122] The arrival of immigrants to New York City starting in the 1840's changed the real estate market forever. Affordable, multiple family homes were scarce which required newcomers to settle in cramped row homes and single-family houses. Although landlords and growing businessmen profited from providing this type of housing, the tenants failed to have any basic amenities including indoor flushing toilets, light, heat, and running water. The early tenements signified some of the worst housing ever constructed in the United States.

Visitors can tour the tenement's cramped living spaces. Learn about the lives of past residents and the history of the Lower East Side. Throughout the year, visitors may take part in programs such as walking tours, plays, art exhibits, and readings that represent the immigrant experience.[123]

According to the General Management Plan (GMP) the NPS "conduct[s] tours of the tenement for the general public and for visitors with special needs, the Museum carries out numerous innovative interpretive programs that tell the immigrant's story at different levels: the larger phenomenon of mass immigration to New York, explored through the Museum's relationships with Castle Clinton, Ellis Island, and the Statue of Liberty; the unique Lower East Side neighborhood that provides the context for

122 "Lower East Side Tenement Museum" Natational Park Service, Department of the Interior. July 31, 2006. Accessed July 11, 2007.

123 Ibid.

97 Orchard Street; and, at a more intimate scale, the day-to-day life of individuals who lived in the crowded environment of the tenement itself." [124]

According to the GMP and Environmental Assessment, the mission of the Museum is: "To promote tolerance and historical perspective through the presentation and interpretation of the variety of immigrant and migrant experiences on Manhattan's Lower East Side, a gateway to America."[125] It states that "[m]uch work remains to be done to stabilize and preserve the building, including major repairs to the exterior as well as preservation, rehabilitation and restoration of additional apartments. The interior is beginning to show wear and tear from the large number of visitors touring the apartments presently open for interpretation. The level of visitation that the tenement can support without impacting its resources (its carrying capacity) is being determined by a visitor capacity study, which will indicate whether the number of visitors per day per apartment needs to be reduced." [126]

Noise was evaluated at the Lower East Side Tenement Museum. Noise exposure values (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise level would be slightly higher with the mitigated 2011 Preferred Alternative; 43.8 DNL as compared to 42.7 DNL with the 2011 Future No Action Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Morristown National Historical Park

Morristown National Historic Park (NHP) was designated as a National Historical park on March 2, 1933 and was the first NHP in the National Park System. The land and resources at the NHP are associated with the 1777 and 1779-1780 winter encampments of the Continental Army during the War for Independence and General George Washington's headquarters in Morristown. The park is comprised of four separate units, totaling 1,697.55 acres and is located approximately 30 miles from New York City in one of the most densely populated areas in the country. [127]

Scenic vistas from the Fort Nonsense Unit include a view of the town green, where supplies were located, a view of Washington's Headquarters at the Ford Mansion, and a view of the protective nature of the Watchung Ridge and New York City approximately 30 miles away. These views are to the east and southeast of the Fort. A panoramic scenic vista can be seen to the north and east from the Mt. Kemble Loop Trail in the Jockey Hollow Unit. Public use activities include tours of the Wick House and Ford Mansion, traveling over 27 miles of foot and horse trails located in the NHP, and a two-mile automobile tour of the Jockey Hollow Unit.[128]

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[124] Lower East Side Tenement National Historic Site General Management Plan and Environmental Assessment," p. 13.

[125] Ibid. p. 2.

[126] Ibid. p. 12.

[127] Morristown National Historical Park, "Nature and Science-Air Quality," <http://www.nps.gov/morr/naturescience/airquality.htm>, May 29, 2007.

[128] Morristown National Historical Park, "Plan Your Visit," <http://www.nps.gov/morr/planyourvisit/index.htm>, May 29, 2007.

While the Headquarters museum is closed for major renovations, tours are still available in the Ford Mansion. The Jockey Hollow Visitor's Center is open daily, as well as the Wick House, where self-guided tours are enhanced by park employees in period dress. The outdoors areas, including Fort Nonsense, are available for public enjoyment as well.

The following text, pertinent to the NY/NJ/PHL Metropolitan Area Airspace Redesign Project, is an excerpt from the GMP:

> *The urban and suburban setting presents substantial intrusive sounds to park visitors and staff. Yet the prevailing experience at all but the Washington's Headquarters unit is a peaceful one. The two chief sources of elevated sound levels are heavy vehicular traffic, and aircraft. On the grounds of the Washington's Headquarters unit, traffic noise from adjacent Interstate-287 dominates the visitor experience. Noise levels greatly diminish visitor enjoyment of the attractive historic setting, and prevents park staff from giving outdoor interpretive talks. Noise levels have been estimated at between 70 and 75 decibels, a range common in areas along highways. EPA studies indicate that exposure to such conditions over extended periods of time may cause damage to human hearing. These elevated noise levels may also impact wildlife at the unit.*
>
> *At the Jockey Hollow and New Jersey Brigade units, the natural forest soundscape is predominantly quiet, representing an important resource often remarked on by park visitors. This is occasionally broken by sounds of other visitors, automobiles slowly touring the park, and distant traffic. Airplane overflights are becoming more common, with the majority of aircraft approaching Newark International Airport or Morristown Airport, a general aviation airport. Both Newark and Morristown airports are planning to increase their capacities. Baseline data from FAA monitoring studies at the Jockey Hollow visitor center (2001 and 2002) are expected to be available shortly.*
>
> *No baseline data exist for the natural ambient sound levels in any park unit, but the presence of some man-made sounds is not inconsistent with the park's mission. Sounds from activities such as mowing fields, demonstrating the firing of muskets, soldiers drilling, or hut construction are all appropriate to the park's historic character and mission. And since its inauguration, the park has permitted automobiles on the loop road.* [129]

Alternative C of the GMP, the Preferred Alternative, would protect visitor opportunities to enjoy solitude and tranquility by including a land protection plan to avoid the introduction of modern intrusive structures or noise or light sources

[129] Morristown National Historical Park-General Management Plan 2003, p. 128.

from new development on adjacent lands, reducing noise levels associated with traffic on I-287 and airplane overflights, and monitoring carrying capacity, particularly on trails. Baseline levels for noise and light may reflect the 'commemorative era' rather than the 'encampment period' under this alternative.[130]

Noise Analysis

Noise was evaluated at multiple points in the Home of Morristown National Historic Park. The noise exposure levels at 11 of the 13 points evaluated would be lower than those resulting from the Future No Action Airspace Alternative with the mitigated 2011 Preferred Alternative. At the two remaining points the noise level would be slightly higher with the mitigated 2011 Preferred Alternative; 45.1 DNL as compared to 44.8 with the 2011 Future No Action Airspace Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use due to noise for the property and no further analysis was conducted for this site.

Visual Impact

Scenic vistas exist at the Fort Nonsense Unit of the park. Fort Nonsense was the site of an earthwork fortification built by Washington's troops in the spring of 1777. Its purpose was to protect the main roads leading north and south and the military storehouses in Morristown. [131] The current view to the east and southeast include the center of Morristown and allow visitors to see the relationship of the fort to the town green, where supplies were located, Washington's Headquarters at the Ford Mansion, had the protective nature of the Watchung Ridge and New York City approximately 30 miles away. [132]

In the Jockey Hollow Unit of the park, a panoramic view to the north and east can be seen from the Mt. Kemble Loop Trail. The difference in elevation results from the park's location at the junction of the Highland and Piedmont physiographic provinces. [133]

The locations of these vistas are shown in See **Figure 5.34**. A summary of the potential airspace changes in the vicinity of these vistas is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

The change in daily operations for this view increase by approximately 1% however the average altitude with mitigation increases by slightly more than 900 feet which will reduce visual affects on the view of the Morristown National Historic Park. Therefore it is concluded that the mitigated Preferred Alternative there is no constructive use of the property due to visual impacts and no further analysis was conducted for this site.

[130] Morristown National Historical Park-General Management Plan 2003, p. 97.

[131] Morristown National Historical Park, "Nature and Science: Scenic Vistas," <http://www.nps.gov/morr/naturescience/scenicvistas.htm>, June 22, 2007.

[132] Ibid.

[133] Ibid.

New Jersey Pinelands National Reserve

The New Jersey Pinelands National Reserve is America's first National Reserve and a U.S. Biosphere Reserve of the Man and the Biosphere Program. The reserve is 1.1 million acres in size and absorbs 22 percent of New Jersey's land area. It is the major body of open space on the Mid-Atlantic coast between Richmond and Boston and is underlain by aquifers holding 17 trillion gallons of the purest water in the land. In 1979, New Jersey created an organization with the Federal government to protect, maintain, and exemplify the natural and cultural resources of the reserve. The region is protected in a manner that maintains its unique ecology while permitting compatible development.[134]

The Pinelands is a patchwork of pine oak forests, tea-colored streams and rivers, spacious farms, crossroad hamlets, and small towns stretched across southern New Jersey. In the country's early years it had been a place where fortunes were made from lumber, iron, and glass. But the early industries died out and, as the state's major roads bypassed the area, the "Pine Barrens" gradually became known as a remote part of New Jersey abounding in local legends like the "Jersey Devil."[135]

The Pinelands Comprehensive Management Plan Land Capability Map establishes nine land use management areas with goals, objectives, development intensities and permitted uses for each. Zoning is used to implement these goals, but they must conform to the Pinelands' land use standards.[136] The Management Area of particular interest in regard to the potential impact of the Proposed Action is the Preservation Area District.

"Preservation Area District -- 288,300 acres. This is the heart of the Pinelands environment and the most critical ecological region; a large, contiguous wilderness-like area of forest which supports diverse plant and animal communities and is home to many threatened and endangered species. [It has] [n]o residential development, except for one-1 acre lots in designated infill areas (total 2,072 acres) and special "cultural housing" exceptions, on minimum 3.2 acre lots for property owned by families prior to 1979. Limited commercial uses in designated infill areas [is permitted within the preservation area]." [137]

Review of the documents provided by the NPS resulted in identifying the Preservation Area District as a noise sensitive area where Part 150 guidelines may not be sufficient to determine the significance of noise impacts. Noise levels were calculated at multiple points within the Preservation Area District. Noise values (DNL) for the 2011 Future No Action Airspace Alternative and the mitigated 2011 Preferred Alternative were compared. At most points (26 of 48) the noise level would be the same for both alternatives. At 14 points the noise level would be slightly higher (0.1 to 0.2 DNL)

[134] New Jersey Pinelands National Reserve, "Home," <http://www.nj.gov/pinelands/reserve/>, May 29, 2007.

[135] New Jersey Pinelands National Reserve, "Size," <http://www.state.nj.us/pinelands/reserve/size/>, May 29, 2007.

[136] New Jersey Pinelands National Reserve, "The Comprehensive Management Plan-Management Areas," <http://www.nj.gov/pinelands/cmp/ma/>, May 29, 2007.

[137] Ibid.

with the mitigated 2011 Preferred Alternative. At three points the noise level would be slightly higher (0.1 to 0.5 DNL) with the 2011 Future No Action Airspace Alternative. At 5 points (19, 20, 27, 28, and 29) located in the western most section of the Preservation Area District the noise level was higher by up to 2.1 DNL with the mitigated 2011 Preferred Alternative. At these five points, none of the noise levels resulting from the mitigated 2011 Integrated Airspace Alternative Variation with ICC would exceed 41.0 DNL. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Sagamore Hill National Historic Site

Sagamore Hill was the home of Theodore Roosevelt, 26th President of the United States, from 1885 to 1919. From 1902 to 1908 his "Summer White House" in Oyster Bay, New York was the focus of international attention. Today, Sagamore Hill is furnished the same way it was throughout Roosevelt's demanding lifetime.[138] Because Sagamore Hill consists of forest, open fields, beaches and salt marshes, and variety of plant and animal life, the National Park Service performs biological inventories to document the species and habitats that survive at Sagamore Hill. Roosevelt took his own notes regarding these species and the inventories are used to estimate the negative and positive environmental fluctuations that occurred on the site during his lifetime.[139]

Thousand of tourists visit Sagamore Hill each year. It serves as the only presidential suite on Long Island and an excellent model of a well-preserved 19th century house.

Guests can walk with their families and pets around the 83 acres of forest, meadows, salt marsh and beach, as well as observe the small creatures including frogs, insects, and turtles. Many special events and programs are hosted throughout the year for the public to enjoy. [140]

The General Management Plan states, *"The park's mission is 'to preserve in public ownership and interpret the structures, landscape, collections and other cultural resources associated with Theodore Roosevelt's Home in Oyster Bay, New York to ensure that future generations understand and appreciate the life and legacy of Theodore Roosevelt, his family, and the significant events associated with him at Sagamore Hill.'"*

The new draft GMP summarizes the proposed actions and their impact on park management and public use. Alternative 3: Past meets Present, the Preferred Alternative, is described as follows in the GMP: "[u]nder this alternative, visitors to Sagamore Hill would be offered an experience that combines the opportunity to explore the site's contemporary relevance in the same context in which one explores its history. However, under this alternative, greater emphasis is placed on rehabilitation of the cultural landscape and historic structures. [P]eople would begin their tour at a visitor orientation facility located in the historic core – in this case, the New Barn

[138] Sagamore Hill National Historic Site, "Park Home," <http://www.nps.gov/sahi>, May 29, 2007.

[139] Sagamore Hill National Historic Site, "Nature and Science," <http://www.nps.gov/sahi/naturescience/index.htm>, May 29, 2007.

[140] Sagamore Hill National Historic Site, "Plan Your Visit-Things To Do," <http://www.nps.gov/sahi/planyourvisit/things2do.htm>, May 29, 2007.

would be expanded and rehabilitated to provide visitor services. The existing visitor contact station – a mid-20th century structure – would be removed to make way for the rehabilitation of a portion of the historic farm yard. A newly constructed addition to Old Orchard would provide appropriate climate-controlled storage for the park's collections as well as a large education and program space. The Old Orchard garage (current maintenance facility) would be rehabilitated for use as staff housing." [141]

The GMP goes on to say, "proposed landscape rehabilitation would incorporate moderate clearing of existing successional growth in the core historic zone; removal of post- Roosevelt- period specimen trees and plantings; preservation of engineering features, and the replacement of selected agricultural features such as fences and stiles. A greater area of cleared fields would enhance the historic agricultural character of the site. Along with replacement of selected portions of the cutting and vegetable garden, the restoration of selected historic exteriors, and the resurfacing of park pathways, these landscape changes would make the park experience more evocative of the site's history. Apart from the overall rehabilitation of the cultural landscape, the replacement of portions of the cutting and vegetable garden would be an easily noted departure from the existing conditions and would offer the visitor a glimpse into the self- sustaining, agricultural nature of the property. Overall, the proposed rehabilitation of cultural landscape as well as the site's historic farm buildings would result in a major long- term benefit to the visitor experience at the park."[142] "The addition to Old Orchard would include a new education and program space. This space would expand the park's ability to offer educational programs to school groups or to host lectures on- site. The new space would be configured to permit a variety of activities, accommodate both day and evening programming, and allow the park to offer a venue for symposia and other public events. [T]he park would expand its program offerings to include regular tours of the grounds. This would present the opportunity for park visitors to better understand the whole of Sagamore Hill. The location and the natural resources are what drew Theodore Roosevelt to this place and continued to be a source of joy and inspiration to him. To wholly understand Theodore Roosevelt, his values, and his legacy, the visiting public should be offered the opportunity to relate the home to its immediate context."[143]

The NPS hopes that, "[u]nder this alternative, the park could expect to see a moderate increase of 10 to 15 percent in overall park visitation."[144] The NPS believes that "the addition of new program space and the ability to offer a greater range of programming on- site could result in a modest boost in visitation, particularly repeat visitation. Because of the park's enhanced ability to host events, participation in multi- day symposia and other similar events could draw a larger percentage of overnight visitors to the park."[145]

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[141] Sagamore Hill National Historic Site Draft General Management Plan Draft Environmental Impact Statement, Department of the Interior National Park Service Northeast Region, 2006, pp V-VI.

[142] Ibid. 4-40 thru 4-43.

[143] Ibid. pp. 4-40 thru 4-43.

[144] Ibid, pp. 4-40 thru 4-43.

[145] Ibid.

Noise was evaluated at the Sagamore Hill National Historic Site. Noise values (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise level would be lower at the Sagamore Hill National Historic Site with the mitigated 2011 Preferred Alternative, see Appendix J.3 for detailed noise values. Therefore, there is no constructive use of the property and no further noise analysis was conducted for this site.

Saint Paul's Church National Historic Site

Located at 897 South Columbus Avenue in Mount Vernon Saint Paul's Church is one of New York's oldest churches. After the Revolutionary War Battle at Pell's Point in 1776 it was used as a hospital and was the setting of many military developments over the following 6 years. The cemetery adjacent to the church holds burials dating from 1704.[146] The early 20th century included amplified industrialization of the region around St. Paul's Church resulting in the decline of the church. In 1942 the interior of the church was reconstructed to look the way it did in the 18th century, the funds for this development were raised by a committee consisting of Sara Delano Roosevelt, mother of Franklin Delano Roosevelt. Remodeling initially refreshed the parishioners but by the 1970's the church only had a few worshippers.[147]

The site was reassigned from the Episcopal Dioceses of New York to the National Park Service in 1980. The church opened to the community in 1984 and is currently operated under a cooperative agreement with the Society of the National Shrine of the Bill of Rights at Saint Paul's Church, Eastchester.[148] "From 1990 thru 1994 the average number of visitors per year was about 5,000." [149]

School groups can enjoy educational programs when visiting the church. The American Revolution Learning Station Program includes demonstrations and re-enactments that explain the site's past and how it correlates to the American Revolution. The demonstration lasts 1 hour and 45 minutes and is available for groups of 40 to 80 students. The general public is offered interpretive tours to explore the interesting history of the church, centering on the 18th century. The tours take guests through the 225 year old church tower to see a bell cast in 1758 at the same foundry as the Liberty Bell. Sounds of the 1833 pipe organ, one of the oldest working organs in the United States, also play. There is a tour of the historic cemetery, also one of the oldest in the country. [150]

All alternatives in the EIS include the addition of "an informal receiving area with

[146] Saint Paul's Church National Historic Site, "History and Culture," <http://www.nps.gov/sapa/historyculture/index.htm>, May 29, 2007.

[147] Saint Paul's Church National Historic Site, "History and Culture," <http://www.nps.gov/sapa/historyculture/index.htm>, May 29, 2007.

[148] Saint Paul's Church National Historic Site, "History and Culture," <http://www.nps.gov/sapa/historyculture/index.htm>, May 29, 2007.

[149] Final General Management Plans Environmental Impact Statements – Manhattan Sites New York, United States Department of the Interior / National Park Service, 1996, p. 148.

[150] Saint Paul's Church National Historic Site, "Things To Do," <http://www.nps.gov/sapa/planyourvisit/things2do.htm>, May 29, 2007.

picnic tables would be established in the grass area (the village green) in front of the church to provide a gathering and resting area for school groups and other visitors." The site's driveway would be widened to enhance traffic flow and overflow visitor and bus parking space would be provided by negotiating leases or cooperative agreements with owners of adjacent businesses." [151] New waysides would be placed at key interpretive areas around the site, which is helpful because "[w]aysides would offer an abridged yet comprehensive walking tour of the site." [152]

The Preferred Alternative in the EIS/Final General Management Plan proposes that, "New exhibits and tours would reflect the full range of the interpretive themes and provide an educational background for visitors. Special programs, such as performing arts and community events, could be held at the site. School group and other tours would be continued with National Park Service and society staffs and possibly volunteers relating the site's history." [153] The plan includes extensive preservation treatment for the church and cemetery[154] and the carriage house would be altered to contain interpretive exhibits, while still being used for research, administrative, and maintenance activities. The plan also proposes that the entire site be "enclosed with a visually compatible perimeter fence to provide site security."[155]

The plan proposes that "the entire curatorial collection of the site, including the part that is currently at Federal Hall, would be moved to rented or acquired space close to Saint Paul's Church." [156] These actions "would improve the visitor experience. Directional signs would make the site easier to find from the roadways. The picnic area would provide a gathering spot for tour and school groups before they enter the site. Wayside panels would improve the self-guided tours and allow a better understanding of the site's resources. The upgraded interpretive exhibits and the expanded outreach program to schools would provide a more comprehensive understanding of the site's history which would be a positive impact on the visitor's experience."[157]

Noise was evaluated at the Saint Paul's Church National Historic Site. Noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise level would be lower at the Saint Paul's Church National Historic Site with the mitigated 2011 Preferred Alternative, see Appendix J.3 for detailed noise values. Therefore, there is no constructive use of the property and no further noise analysis was conducted for this site.

Statue of Liberty National Monument

The people of France presented the Statue of Liberty to the United States on October 28, 1886 in appreciation of the comradeship

[151] Final General Management Plans Environmental Impact Statements – Manhattan Sites New York, United States Department of the Interior / National Park Service, 1996, p. 134.

[152] Ibid.

[153] Ibid, p. 135.

[154] Ibid.

[155] Ibid, p. 137.

[156] Ibid, p. 137.

[157] Ibid, p. 153.

recognized through the American Revolution. Sculptor Frederic-Auguste Bartholdi was commissioned to design a sculpture and the financing for the pedestal was to be generated by the United States. After a great deal of effort on both the United States and France to produce the funds necessary to create the Statue, it was finally completed in April of 1886. The original date set for Bartholdi to present the gift was 1876 in order to commemorate the Centennial of the American Declaration of Independence. Although a gift ten years late, the Statue of Liberty has strongly represented freedom and democracy as well as the international friendship between France and the US.

In 1979 the park could accommodate fewer than 75,000 visitors per year, but since the implementation of the 1982 General Management Plan visitation has increased dramatically.[158]

There are many activities for the public to take part in when visiting the Statue of Liberty. Ranger-guided tours of the island are provided. In the lobby of the 10th floor Pedestal Observation Level visitors can experience the original torch, the Statue of Liberty Exhibit, and in the promenade area there is an up close view of the statue and a beautiful view of New York Harbor. Guests may walk the 11-point star-shaped Fort Wood and take the elevator to the ten-story pedestal observatory. There are also 45 minute ranger guided tours explaining the conception, construction, and restoration of the monument. Audio tours can be rented in English, Italian, German, Spanish, Japanese, and French at an additional cost. The Statue of Liberty Exhibit on the second floor in the pedestal of the Statue contains museum objects, photographs, prints, video, and oral histories. Opened in 1986, full scale replicas of the Statue's face and foot are also on display. There is also the Torch Exhibit which includes the original 1886 torch and altered flame in the lobby.[159]

The website includes a management link that proposes new ideas and concepts for the park. They are stated as follows: (1) On Liberty Island there could be a new Statue of Liberty museum, improved visitor facilities, and more diverse activities and programs. On Ellis Island the south side would be open to visitors with new programs, exhibits, and a conference center. Immigration exhibits and stories would be expanded beyond the Ellis experience, and new programs would be offered on ferries;[160] (2) Each island could depend on the other. Ellis could be a busy, active place where all visitors go first, and Liberty could have a calm, contemplative setting for reflection on the meaning of the Statue and the ideals of liberty and freedom;[161] (3) On Ellis Island, there could be new exhibits and programs about immigration, a new museum for the Statue of Liberty, and ferry shuttles to the Statue. On Liberty Island, the landscape

[158] Statue of Liberty: General Management Plan, Us. Department of Interior: September 1982.

[159] Statue of Liberty National Monument, "Things to Do," <http://www.nps.gov/stli/planyourvisit/things2do.htm>, May 29, 2007.

[160] Statue of Liberty and Ellis Island NPS, "About the Plan-Learn and Discover," <http://www.libertyellisplan.org/learndiscover.asp>, May 24, 2007.

[161] Statue of Liberty and Ellis Island NPS, "About the Plan-Explore and Reflect," <http://www.libertyellisplan.org/explorereflect.asp>, May 24, 2007.

would enable visitors to find places for quiet reflection;[162]

On September 11, 2001, the National Park Service closed the Statue of Liberty and Ellis Island to assess the park's vulnerability to a terrorist attack and to strengthen the security elements of park operations. Key security measures and life-safety improvements have been put into place and Liberty and Ellis Islands are open to the public. In August 2004, the Statue pedestal was reopened with two new free tours on a time-ticketing system.[163]

Noise Analysis

Noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise level would be only slightly higher with the mitigated 2011 Preferred Alternative, see Appendix J.3 for detailed noise values. The change in noise would be less than 3.0 DNL, therefore, there is no constructive use of the property due to noise and no further analysis was conducted for this site.

Visual Impact

The view of the New York Harbor from the Statue of Liberty site was considered. A summary of the potential airspace changes in the vicinity Statue of Liberty National Monument is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative and the mitigated Preferred Alternative.

As determined for Ellis Island, for the mitigated Preferred Alternative the change in daily operations for this view increase by approximately 5% however the average altitude with mitigation increases by slightly more than 500 feet which will reduce visual affects on the view of the New York Harbor. Therefore it is concluded that there is not a constructive use of the property due to visual impacts and no further analysis was conducted for this site.

Thaddeus Kosciuszko National Memorial

The park commemorating Thaddeus Kosciuszko, a Polish freedom fighter and also a brilliant military engineer who designed successful fortifications during the American Revolution, is a preservation of his home. Located between South Fifth Street and Columbus Boulevard in Philadelphia, the room where he met Chief Little Turtle and Thomas Jefferson is preserved for visitors to enjoy.[164]

When visiting the National memorial guests can explore the life of Kosciuszko by touring through exhibits and information areas. There is a room furnished to act as a replica of one during Thaddeus' time on the second floor. Visitors may also take part in an audio-visual program which explains the house and life of Kosciuszko.[165]

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[162] Statue of Liberty and Ellis Island NPS, "About the Plan-Explore and Reflect," <http://www.libertyellisplan.org/explorereflect.asp>, May 24, 2007.

[163] Statue of Liberty and Ellis Island NPS, "About the Plan-Need For A Plan," <http://www.libertyellisplan.org/need.asp>, May 24, 2007.

[164] Thaddeus Kosciuszko National Memorial, "Park Home," <http://www.nps.gov/thko>, May 29, 2007.

[165] Thaddeus Kosciuszko National Memorial, "Plan Your Visit-Things To Do,"

Based on responses during planning workshops, the park's interpretive program will be most effective when it includes: opportunities for visitors to easily and safely locate key park sites with a minimum of inconvenience due to enhanced security procedures[166], opportunities to interpret the park story from multiple perspectives[167], opportunities for visitors to have more program options to balance constraints due to security, historic preservation, or crowd control[168], and opportunities for all ages (especially younger visitors) to have fun experiencing the park.[169]

One of the main challenges and issues facing Thaddeus Kosciuszko National Memorial is that because of the park's urban setting, visitors often have difficulty locating parking and finding their way to and through the park.[170]

Noise was evaluated at the Thaddeus Kosciuszko National Memorial. Noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise level would be lower at the Thaddeus Kosciuszko National Memorial with the mitigated 2011 Preferred Alternative, see Appendix J.3 for detailed noise values. Therefore, there is no constructive use of the property and no further noise analysis was conducted for this site.

Theodore Roosevelt Birthplace National Historic Site

Theodore Roosevelt Birthplace National Historic Site is situated at 28 East 20th Street, between Broadway and Park Avenue South. Theodore Roosevelt lived at this location from his birth on October 27, 1858 until he was 14 years old. The home includes five period rooms, two museum galleries and a bookstore. Mr. Roosevelt was of unfortunate health and to improve this he started an exercise routine at the home's outdoor gymnasium that started his lifelong passion for the "strenuous life". He graduated from Harvard and pursed his dreams as a rancher, naturalist, explorer, author, and Colonel of the Rough Riders. He reformed the U.S. Civil Service Commission and New York City Police Department, as well as serving terms as governor of New York and Vice President of the United States. After becoming president when William McKinley was assassinated, Roosevelt pushed progressive reforms and negotiated an end to the war between Russia and Japan, for which he won a Nobel Peace Prize. After Roosevelt's death in 1919, his birthplace site was purchased by the Women's Roosevelt Memorial Association, reconstructed and adorned with several of its original furnishings by Roosevelt's sister and wife.[171]

The Park provides visitors with the opportunity to see what it was like to grow

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<http://www.nps.gov/thko/planyourvisit/things2do.htm>, May 29, 2007.

166 Long Range Interpretive Plan for Independence National Historical Park, "The Desired Visitor Experience: General Characteristics of the Desired Audience Experience," p. 15.

167 Ibid.

168 Ibid.

169 Ibid.

170 Ibid, p.17.

171 Theodore Roosevelt Birthplace National Historic Site, "History and Culture," <http://www.nps.gov/thrb/historyculture/index.htm>, May 29, 2007.

up in the "gilded age". Park Ranger guided tours exemplify the way of life of the Roosevelt's in the 19th century. In addition, the Final General Management Plan states, "At Theodore Roosevelt Birthplace, the association uses the site for special programs and cultural events. Some of these programs are an institution to the site, as well as important annual events for the city. The high profile annual Police Awards Ceremony recognizes individuals of the police force that have displayed heroism and persistence to remain in the line of duty despite difficult personal or physical obstacles. Other events, such as the Theodore Roosevelt Association oratory contest, are held for state high schools." [172] Here, visitors can learn about the role of historic preservation as a national monument, as well as the roll of the National Park Service.[173]

The General Management plan states that, "The Theodore Roosevelt Association, a cooperator with the National Park Service, would continue to use the site and its auditorium for special programs and cultural events. The association would also continue to be involved in the preservation and conservation of the structure and its extensive museum collection. The American Landmark Festival would continue its concerts through an informal agreement."[174] The NPS is also planning "[a]dditional exhibits and publications, with multilingual information, [that] would be used to bring Theodore Roosevelt's life into the context of contemporary life." [175]

Noise was evaluated at the Theodore Roosevelt Birthplace National Historic Site. Noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise level would be lower at the Theodore Roosevelt Birthplace National Historic Site with the mitigated 2011 Preferred Alternative, see Appendix J.3 for detailed noise values. Therefore, there is no constructive use of the property and no further noise analysis was conducted for this site.

Upper Delaware Scenic & Recreational River

Upper Delaware Scenic & Recreation River contains the Upper Delaware River, where people have lived for more than 10,000 years, even before European settlement the Lenape Indians and their relations survived on the regions plentiful plant and animal life.[176] Upper Delaware Scenic and Recreational River also includes parts of the Delaware and Hudson Canal, America's first million-dollar private enterprise. The canal was constructed for the purpose of transporting anthracite coal from mines in northeastern Pennsylvania to markets on the Hudson River. It took four years to build and consists of 16 miles of gravity railway and 108 locks over a 108-mile canal.[177] The

[172] Final General Management Plans Environmental Impact Statements: Manhattan Sites, New York, "Alternatives for Development and Preservation of Theodore Roosevelt Birthplace National Historic Site: Theodore Roosevelt Association," p. 178.

[173] Ibid, p.160.

[174] Ibid, p. 161.

[175] Ibid, p. 165.

[176] Upper Delaware Scenic and Recreational River, "History and Culture-People," <http://www.nps.gov/upde/historyculture/people.htm>, May 29, 2007.

[177] Upper Delaware Scenic and Recreational River, "History and Culture-Delaware and Hudson Canal," <http://www.nps.gov/upde/historyculture/dhcanal.htm>, May 29, 2007.

Delaware Aqueduct is the oldest existing wire bridge in the United States. Construction started in 1847 and as one of four suspension aqueducts on the Delaware and Hudson Canal it was planned by and constructed under the management of John A. Roebling.

The Upper Delaware River is the longest free-flowing river in the Northeast. Public river accesses are positioned on both Pennsylvania and New York shorelines. These accesses vary from 3 to 20 miles apart along the river and are controlled by the National Park Service and agencies which own the land.[178] The immaculate water of the Upper Delaware River offers perfect locale for an assortment of fish species and is popular for plentiful fishing opportunities.

Upper Delaware Scenic and Recreational River includes a range of places to visit. The Roebling Bridge Tollhouse is a small facility that offers self-guided exhibits and historic photographs about the D&H Canal and John Roebling's Delaware Aqueduct, which later became Roebling Bride.[179] The Zane Grey Museum is in the building which was home for the creative western author between 1914 and 1918. National Park Service rangers and volunteers offer 20-minute guided tours through the museum and guests can observe the memorabilia, photographs and books. The Narrowsburg Information Center includes an exploration table for children and adults. In 2005, the park had 251,083 visitors.[180]

The Park's Final River Management Plan (MP), dated November 1986, does not specifically mention any noise or over flight problems, nor does it list any explicit naturally quiet or tranquil qualities. As the name implies, however, it is a scenic river. The MP states: "The high quality of the Upper Delaware Valley landscape results from the contrast of farmland and villages on the linear valley floors and the forested hills that surround the valley. This rural landscape is readily accessible to approximately 31,750,000 people who live within 150-mile radius of the river. Indeed, it is these scenic qualities and the avid use of this river by urban recreation-seekers that are among the reasons the river was added by congress to the National Wild and Scenic Rivers System."[181]

Public hunting is permitted on much of the existing public land along the Upper Delaware and hunting and fishing uses of land and water resources have been formally recognized as a public benefit by both the National Wild and Scenic Rivers Act and the Upper Delaware legislation. In addition, private owners' rights to lease hunting and fishing rights is protected. According to the MP, Delaware County, NY, had the second highest deer harvest in the state in 1983 and the highest turkey harvest in the spring of

[178] Upper Delaware Scenic and Recreational River, "Plan Your Visit- Boating," <http://www.nps.gov/upde/planyourvisit/boating.htm>, May 29, 2007.

[179] Upper Delaware Scenic and Recreational River, "Plan Your Visit- Places To Go," <http://www.nps.gov/upde/planyourvisit/placestogo.htm>, May 29, 2007.

[180] Upper Delaware Scenic and Recreational River, "Plan Your Visit- Places To Go," <http://www.nps.gov/upde/planyourvisit/placestogo.htm>, May 29, 2007.

[181] Upper Delaware Scenic and Recreational River, "Final River Management Plan," Prepared by the Conference of Upper Delaware Townships in Cooperation of the National park Service, November 1986, p. 1.

1984.[182] Hunting clubs own large tracks of land which contributes to an abundant wildlife population in the river valley. Hunting and trapping contribute to the economy of the area. According to the MP, NPS hoped to ensure the continued public enjoyment of hunting, fishing, and trapping.[183] Another goal listed in the MP includes protecting and maintaining the unique scenic, cultural, and natural qualities of the Upper Delaware River corridor.[184]

Noise exposure levels were calculated at multiple points within the boundary of the Upper Delaware Scenic and Recreational River. Noise values (DNL) for the 2011 Future No Action Airspace Alternative and the mitigated Preferred Alternative were compared. The Upper Delaware Scenic and Recreational River was divided into two sections; North and South (See **Figures 5.35 and 5.36**). The noise level at only one point (point 1) in the northern section would be higher by more than 3 DNL with the mitigated 2011 Preferred Alternative. The noise level at several points in the northern section would be lower by more than 3 DNL with the mitigated Preferred Alternative. The noise level would be higher (0.1 to 2.2 DNL) at points 1 to 11, 13, 65, 70 to 73, 75 to 85, 92 and points in groups C and D. All noise levels with the mitigated Preferred Alternative would be lower than 31 DNL. In the southern section noise exposure levels would be the same or lower at a small number of points; points 1 thru 4, 7, 8, 13, 14, 15, 20, 28 and 33. At all other points, noise exposure levels would be higher. At points 5, 6, 9, 10, 11, 16 thru 19, 21 thru 46, 60, 63 thru 68, 76 thru 100, 103 thru 117, and points in Group A and Group B noise levels would be higher by 0.1 to 2.8 DNL. At points 47 thru 59, 61, 62, 69, 70, 74, 75, 101, 102, and points in Groups C, D, E, and F noise levels would be higher by 3.0 to 4.9 DNL. In the southern section, all noise exposure levels with the mitigated 2011 Preferred Alternative would be lower than 35 DNL. Since the difference in noise levels resulting from the mitigated 2011 Preferred Alternative as compared to the Future No Action Airspace Alternative would exceed 3 DNL, additional information regarding the nature of the proposed airspace changes in the vicinity of the Upper Delaware Scenic and Recreational River is provided. Table 5.11 shows the number of tracks and jet operations that would pass over the area as a result of the Future No Action Airspace Alternative, Preferred Alternative and mitigated Preferred Alternative.

In consultation with the US DOI, the FAA is conducting further evaluation of the potential noise increases in applicable areas of the Upper Delaware Scenic and Recreational River to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

Valley Forge National Historical Park

Although no combat occurred at Valley Forge, during the war of 1777-1778 roughly 2,000 soldiers passed away at hospitals in the immediate area. Valley Forge tells the story of an army's heroic effort to endure starvation, illness, and forces of nature. Of all the places related with America's War for Independence, Valley Forge is the story of an army's epic struggle to survive against

[182] Ibid, p. 4.

[183] Ibid, p. 13.

[184] Ibid.

terrible odds, against hunger, disease, and the unrelenting forces of nature.[185] According to the Draft General Management Plan (DGMP), "Conditions in and around Valley Forge NHP have changed markedly since 1976, when it was transferred from the commonwealth of Pennsylvania to the national park system. The immediate surroundings have been fully developed, growing into the most traffic-choked area in the state, and causing daily conflicts in and around the park. The build-out of the region has left the park as one of the few large, regional natural areas, heightening its value as both open space for people and also an important refuge for plants and animals. The increasing population – a 23% increase in Chester and Montgomery Counties since 1980 – has resulted in greater recreational pressure on the park."[186]

There are many different kinds of outdoor activities to take part in at the Valley Forge National Historical Park. Twenty-one miles of authorized biking trails are in the park and there is 6.6 miles of paved Joseph Plumb Martin Trail on the south side of the park that connects the key historic and interpretive sites. Two miles of paved regional Schuylkill River Trail run through the park, with connections to sites in Montgomery county and Philadelphia. [187] The park includes 19.5 miles of designated, marked, hiking trails. The Joseph Plumb Martin Trail connects the key historic and interpretive sites.[188] Seventeen miles of designated horse trails are available to riders. There are also exhibits which contain Revolutionary War artifacts and an 18 minute film "Valley Forge: A Winter Encampment."

In addition, a variety of tours are available to the public. A 40-minute ranger-led tour departs from the theater for the Muhlenberg Brigade daily. Guests may rent hybrid bikes and explore the Park on their own, and ranger-led bike tours are offered on weekends. Eighteen miles of trail, including six miles of paved multi-purpose trail, coils through the park, as well as a 10-mile, self-guided automobile tour.

The Draft General Management Plan states that "[m]ost of the park's historic structures are stabilized; some await stabilization and restoration. Nationally significant resources, as well as park visitors, are threatened by traffic congestion that spills into the park from surrounding areas. Invasive exotic plant species infest natural areas, and white-tailed deer are rampant in the region, preventing forest regeneration in the park. Despite the park's educational mission, programs provided to the public reach only 3% of park visitors. Routine maintenance of structures and landscapes is sometimes deferred. Much of the park's museum collection, which features nationally renowned American Revolution military artifacts and documents, is inadequately housed in terms of environmental and

185 Valley Forge National Historic Park, "History and Culture," <http://www.nps.gov/vafo/historyculture/index.htm>, May 29, 2007.

186 Valley Forge National Historic Park, "Purpose of and Need for Action," Draft General Management Plan/Environmental Impact Statement, iii.

187 Valley Forge National Historic Park, "Outdoor Activities-Biking," <http://www.nps.gov/vafo/planyourvisit/outdooractivities.htm>, May 29, 2007.

188 Valley Forge National Historic Park, "Outdoor Activities-Hiking," <http://www.nps.gov/vafo/planyourvisit/outdooractivities.htm>, May 29, 2007.

security controls, and less than 5% can be publicly displayed." [189]

Being placed on the National Trust for Historic Preservation's list of "11 Most Endangered Places" and the National Parks Conservation Association's list of "10 Most Endangered National Parks", highlighted the serious problems facing the park. The most egregious problems facing the park were "inadequate visitor services, deteriorating historic buildings closed to the public, invasive plant and animal species, development threats to privately owned lands within the park boundary, resource impacts from surrounding sprawl, and the potential taking of park land for a national cemetery."[190]

Changes in the deployment of interpretive rangers are providing more contact with both destination and recreational visitors. Most of the encampment-period structures have received stabilization. Eradication of exotic invasive plants is the subject of annual projects. Some of the formerly private lands within the boundary have been acquired and permanently protected. Measures to address traffic congestion have been identified, and some are underway. The national cemetery will be constructed elsewhere. In every case, these gains have been accomplished through partnerships.[191]

Noise exposure levels were calculated at multiple points within the Valley Forge National Historical Park. Noise exposure values (DNL) for the 2011 Future No Action Airspace Alternative and the mitigated 2011 Preferred Alternative were compared. At points on the north and east sides of the Historical Park the noise level would be slightly higher (1 DNL) with the mitigated 2011 Preferred Alternative. At points on the south and east sides of the Historical Park the noise exposure levels would be higher (0.3 – 2.9 DNL) with the 2011 Future No Action Airspace Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Vanderbilt Mansion National Historic Site

According to the Final Master Plan for the Vanderbilt National Historic Site, "The scenic quality of the land strongly attracted Vanderbilt, as it does visitors today, who often linger until sunset to enjoy the panoramic views of the Hudson River, the Shawangunk Mountains to the west, the Catskills to the north, and the ring of hills in the foreground. This view is heightened when seen from the plateau on which the mansion sits. The plateau drops sharply to a meadow, and then a succession of knolls, belts of trees, and open ravines. Near the mansion is a rich composition of lawns and stately specimen trees. In the distance runs Crum Elbow Creed with several dams and waterfalls in near-forest seclusion. The whole effect is that of an English country park. In the meadow are 125 acres – 20 in lawns and 66 in trees. ……Although the grounds were laid out during a period of 140 years – dating back to Dr. Samuel Bard in the 1790"s – the effect today bears Frederick Vanderbilt's stamp. It represents a managed landscape planned and executed with subtlety and skill, and reveals Vanderbilt's

[189] Valley Forge National Historic Park, "Purpose of and Need for Action,"1-2 Description of Valley Forge NHP.

[190] Ibid.

[191] Ibid.

serious interest in horticulture." [192] The site also contains "…formal Italian gardens [which] were an integral part of the elaborate way of life of extremely wealthy men such as Vanderbilt."[193] The views are incredible: "The imposing three story limestone mansion powerfully dominates the bluff where it overlooks the Hudson panorama."[194] "Although not under control of the Park Service, the scenic views of the bluffs and imposing mansions across the river in Ulster County are an important part of the experience for visitors at the site." [195]

"The estate, once nearly 700 acres, included one of the best remaining Hudson River Romantic-era landscapes, with formal gardens and a working farm, and one of the oldest collections of native and exotic specimen trees in North America. Today the landscape retains an impressive continuity covering more than two hundred years."[196]

Visitors are free to tour the house and walk on the 211 acres of park land that holds hundred of years worth of old tree plantings. The beautiful Hudson River and Catskill Mountain views and Italian Gardens are maintained by volunteers of the Frederick William Vanderbilt Garden Association.

[192] Final Master Plan, January 1976, Vanderbilt Mansion National Historic Site / New York, United States Department of the Interior / National Park Service, pp.14-15.

[193] Ibid. p. 15.

[194] Ibid.

[195] Ibid, p. 25

[196] Excerpt from Hardcopy of Purpose & Significance statement for new GMP in process.

The Vanderbilt National Historic Site was created as a memorial to an era and not as an honor to any one person or family. The property portrays the lifestyle in the country house and is unusual today because there are only a few models that survive in the 21st century. The park gives an insight into the perspective of the American country house, the lives of the household staff, and its connection to the neighboring people. The General Management Plan states: "The focal point for all development, restoration, and interpretation should be the period from 1900 to 1917, when the estate was at the height of its grandeur."[197] The Plan continues to state that, "Visitors should be encouraged to stroll freely over the grounds. Lunching should be allowed at a number of places, not just at Bard Rock. The estate was conceived as a managed landscape; accordingly, esthetic aspects should be carefully maintained. These include selective topping and removal of trees to maintain vistas; conscious balancing of open meadows, lawns, specimen trees, and shrubs; removal of dead trees and brush; and cleaning of ponds and waterfalls to preserve the delightful sound and sight of moving water. Enjoyment of the grand panorama of the Hudson River and the Shawangunk and Catskill Mountains is one way the visitors can identify with Frederick Vanderbilt. An understory of pines should be planted along Albany Post Road, to maintain the feeling of privacy created by Vanderbilt and to provide a present-day insulation against traffic." [198]

[197] Final Master Plan, January 1976, Vanderbilt Mansion National Historic Site / New York, United States Department of the Interior / National Park Service, p. 22.

[198] Ibid.

Noise Analysis

Noise was evaluated at multiple points in the Vanderbilt Mansion National Historic Site. The noise exposure values would be higher with the mitigated 2011 Preferred Alternative than with the 2011 Future No Action Airspace Alternative. The greatest difference in noise exposure values would be 1.6 DNL. None of the noise exposure levels resulting from the mitigated 2011 Preferred Alternative would exceed 33 DNL. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property due to noise and no further analysis was conducted for this site.

Visual Impact

There are two important scenic viewpoints in the Vanderbilt Mansion National Historic site. See **Figure 5.32**. They include a breathtaking scenic view from the Vanderbilt Mansion and an overlook north of the mansion. A summary of the potential airspace changes in the vicinity of the Vanderbilt National Historic Site is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

As with the Franklin D. Roosevelt National Historic Site for the mitigated Preferred Alternative, the change in daily operations for this view increase by approximately 25% and the average altitude with mitigation decreases by slightly more than 3,700 feet. The minimum altitude in this area does not change.

In consultation with the US DOI, the FAA is conducting further evaluation of the potential visual changes in applicable areas of the Vanderbilt Manson National Historic Site to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

Weir Farm National Historic Site

The Weir Farm National Historic Site in Wilton, Connecticut has been a source of motivation for artists for over 120 years. American Impressionist Julian Alden Weir, sculptor Mahonri Young and painter Sperry Andrews lived on the farm from 1882 to 2005. The 60-acre National Historic Site includes the homes, studios, and barns of the farm. The rolling hills, pastures, and unique stone walls, enthuse visitors and painters even today.[199]

Visitors can enjoy landscape/audio tours and stonewall tours daily. Rotating art and history exhibitions can be discovered in the Burlingham House Visitor Center throughout usual operating hours during the year.[200]

“Weir Farm National Historic Site, established by Congress on October 31,1990 (P.L. 101-485) (104 stat. 1171), preserves and interprets historically significant properties and landscapes associated with the life and work of J. Alden Weir (1852-1919), one of the founders of the Impressionist tradition in American art. According to the site’s enabling legislation (Appendix A), the National Park Service

[199] Weir Farm National Historic Site, “History and Culture,” <http://www.nps.gov/wefa/historyculture/index.htm>, May 29, 2007.

[200] Weir Farm National Historic Site, “Things to Do,” http://www.nps.gov/wefa/planyourvisit/things2do.htm, May 29, 2007.

(NPS) and its principal partner at Weir Farm, the Weir Farm Heritage Trust, are charged with preserving the site and maintaining "the integrity of a setting that inspired artistic expression." Weir Farm is one of only two sites within the national park system that focus primarily on fine art."[201]

According to the General Management Plan, "Weir Farm, J. Alden Weir's summer home and workplace for 37 years, thus preserves a way of life once shared by many important figures in American arts and letters. What drew him to the farm initially was its landscape and the opportunity it offered to "experience nature" as well as to take artistic inspiration from it. Located within easy reach of his New York City home, for Weir the farm was a retreat from urban life which, by the late-nineteenth century, was increasingly viewed as harmful to the body and spirit."[202]

The General Management Plan continues to read: "Landscape artists from the region and the New York metropolitan area, as well as area schools, have consistently shown interest in using the site to create art and as a setting for art-related programs. Artists who wish to use the site need quiet and an uncrowded space in which to draw and paint, as well as such amenities as parking and rest rooms. Provisions must be made to accommodate these activities." [203]

The General Management Plan notes that, "Despite the lack of visitor facilities and interpretive programs at the time of the survey, visitors reacted strongly to the "peace and quiet of the area" and the opportunity to "enjoy the natural environment."[204] Even though, "[h]unting and trapping will not be allowed on the site, …visitors may fish in the pond." [205]

In attempts to keep the serene views currently had at the park, "[t]he NPS will work cooperatively with park neighbors on the planting of screens of vegetation appropriate to Weir Farm. These screens will minimize the visual intrusion of contemporary development adjacent to the park and enhance the privacy of neighboring property owners." [206] In addition to planting screens, the NPS wants to minimize the number of signs which have the potential to destroy the visual serenity of the park, saying: "Although outbuildings and landscapes are usually interpreted in wayside signs and exhibits, such features may constitute and intrusion upon the historical scene of Weir Farm. Instead, an interpretive brochure, including trail information, will be available to visitors." [207]

"Unlike conventional museums where visitors see only the creative products of artists' lives, Weir Farm provides the opportunity to acquaint them with the domestic, personal, and creative dimensions of the lives of Weir and his successors. Domestic interiors will be furnished and gardens, farm fields, and other landscape

[201] Weir Farm National Historic Site General Management Plan/Environmental Impact Statement, United States Department of the Interior National Park Service, September 1995. p. 1.

[202] Ibid, p.5.

[203] Ibid, p.7.

[204] Ibid, p.12.

[205] Ibid, p.15.

[206] Ibid, p.16.

[207] Ibid, p. 25.

features will be rehabilitated to appear as they did to the farm's historic figures and their guests."[208] "The landscape surrounding the Weir complex will be restored to its appearance in about 1940, to reflect the continuous use of the site while conveying the historic character of the landscape that prevailed through both the Weir and Young periods." [209]

Eventually the NPS intends to acquire more adjacent property for the visitor center, as well as the administration and maintenance facilities.[210]

The NPS would also like to see a full development of an artist-in-residence program. Housing would be provided in the Burlingham house, already designed for domestic use, and studios would be located in the rehabilitated and expanded caretakers's garage/barn.[211]

Noise was evaluated at multiple points in the Weir Farm National Historic Site. See **Figure 5.37**. The noise exposure values would be higher with the mitigated 2011 Preferred Alternative than with the 2011 Future No Action Airspace Alternative. The greatest difference in noise exposure values would be 5.5 DNL. None of the noise levels resulting from the mitigated 2011 Preferred Alternative would exceed 37 DNL. Since the difference in noise levels resulting from the mitigated 2011 Preferred Alternative as compared to the Future No Action Airspace Alternative would exceed 3 DNL, additional information regarding the nature of the proposed airspace changes in the vicinity of the Weir Farm National Historic Site is provided. Table 5.11 shows the number of tracks and jet operations that would pass over the National Historic Site as a result of the Future No Action Airspace Alternative, Preferred Alternative and mitigated Preferred Alternative.

In consultation with the US DOI, the FAA is conducting further evaluation of the potential noise increases in applicable areas of the Weir Farm National Historic Site to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

National Wildlife Refuges

Amagansett National Wildlife Refuge

This 36-acre refuge is located in Suffolk County, NY and is part of the Long Island National Wildlife Refuge Complex. Amagansett NWR was established in 1968 and protects and manages fragile shore habitat and wildlife. According the US Fish and Wildlife Service's profile of the Refuge, a major purpose of the refuge is the protection of the secondary dunes, which have become scarce on Long Island due to development.[212] Management activities at the Refuge include protection of the primary and secondary dunes, beach-nesting bird monitoring and protection, exotic plant control, and minimization of human/wildlife disturbance. Rare orchids can be found on the Refuge, as well as the federally endangered roseate turn (resting and foraging), the federally threatened piping

[208] Ibid, p. 24.

[209] Ibid, p. 25.

[210] Ibid, p. 29.

[211] Ibid, p. 29.

[212] Amagansett National Wildlife Refugee, <http://www.fws.gov/refuges/profiles/index.cfm?id=52562>, June 8, 2007.

plover (foraging and nesting), and the NY state threatened least terns (resting and nesting).[213]

The refuge is specifically managed to protect the beach and dune habitat and its wildlife in a natural state. Principle management issues at the Amagansett NWR include primary and secondary dune protection, beach-nesting bird monitoring and protection, exotic plant control, and human/wildlife disturbance. The refuge's wildlife is monitored using breeding songbird and waterfowl surveys. Natural processes including tides, storm events, and wind shape the refuge and protect its value to wildlife.[214]

Noise was evaluated at Amagansett National Wildlife Refuge. Noise exposure values for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise level would be lower at the Amagansett National Wildlife Refuge with the mitigated 2011 Preferred Alternative, see Appendix J.3 for detailed noise values. Therefore, there is no constructive use of this property and no further noise analysis was conducted for this site.

Cape May National Wildlife Refuge

Located in the Atlantic Flyway, in New Jersey's Cape May Peninsula, the 11,000-acre Cape May National Wildlife Refuge is an important stopover for migratory birds. The Refuge consists of three separate divisions: The Delaware Bay Division, which extends five miles along the Delaware Bay; The Great Cedar Swamp Division, and the Two Mile Beach Unit. The Refuge's proposed acquisition area is 21,200 acres. The acquisition areas are located in the Great Cedar Swamp and Delaware Bay Divisions, which would provide more contiguous habitat and expand those divisions. The Refuge has been designated a Flagship Project of the North American Waterfowl Management Plan, as well as a Wetland of International Importance under the Convention on Wetlands of International Importance.[215]

Permitted activities include foot traffic along the four trails located in Cape May NWR, bird watching and wildlife observation, photography, and environmental education. Seasonal deer and migratory bird hunting are allowed in designated portions of the Delaware Bay Division and the Cedar Swamp Division. Shore fishing is permitted in the Two Mile Beach Unit from October 1 to March 31.[216]

The Service has focused its planning efforts on: conserving and enhancing the quality and diversity of fish and wildlife habitat within the Refuges; providing opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing wild-life observation and photography, environmental education and interpretation; establishing partnerships with other Federal agencies, State agencies, tribes, organizations, industry and the

[213] Ibid.

[214] Amagansett National Wildlife Refugee, <http://www.fws.gov/refuges/profiles/index.cfm?id=52562>, June 12, 2007.

[215] "Cape May National Wildlife Refuge", <http://www.fws.gov/northeast/capemay/GeneralInformation.html>. accessed July 11, 2007.

[216] Cape May National Wildlife Refuge Public Access Information, "Access to Two Mile Beach Unit," <http://www.fws.gov/northeast/capemay/PublicAccess.html>, June 12, 2007.

general public; increasing opportunities for public involvement in the planning of refuge land protection and management activities.[217]

Noise was evaluated at multiple points in the Cape May National Wildlife Refuge. Noise exposure values (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. All noise values for the points located in the Great Cedar Swamp Division would be the same or lower with the mitigated 2011 Preferred Alternative. Noise exposure levels would also be the same or lower in the Delaware Bay Division at all but one point. At this point, the noise exposure level would be slightly higher by 0.1 DNL and the resulting noise exposure level would remain below 34 DNL. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Conscience Point National Wildlife Refuge

This 60-acre refuge, established in 1971, is located in Suffolk County, NY and is part of the Long Island National Wildlife Refuge Complex. It contains woodlands, salt marsh, and grasslands, including one of the few maritime grassland communities on Long Island. Management activities focus on attracting grassland dependent birds.[218]

Conscience Point NWR is open only to select public use activities, such as biological research and environmental education with a Special Use Permit.[219]

According to the Long Island National Wildlife Refuge Complex Comprehensive Conservation Plan, "The following goals, objectives, and strategies are designed to enhance the quality, effectiveness, and sustainability of our management priorities. They will increase our protection and management of endangered, threatened or other species of concern, including migratory wildlife. They will also increase the number and quality of opportunities for compatible, wildlife-dependent, public recreation, and allow the Complex to benefit from its proximity to New York City and urban communities.[220] (1) Improve the biological diversity and integrity of upland cover types to sustain high quality habitat for migratory passerine birds.[221] (2) Restore the biological health of aquatic habitats to high-quality conditions on the Complex salt marshes, bays, tidal.[222] (3) Restore and increase the biological diversity and integrity of native grasslands to foster endangered plant recovery and the communities upon which they depend.[223] (4) Enhance the functionality of coastal strand habitats as they relate to beach nesting Colonial water birds and shorebirds to meet optimal

[217] Cape May National Wildlife Refuge Comprehensive Conservation Plan, Chapter 2: Planning Process, 2004, p.11.

[218] Long Island National Wildlife Refuge Complex, "Conscience Point National Wildlife Refuge," <http://www.fws.gov/northeast/longislandrefuges/consciencepoint.html>, June 12, 2007.

[219] Long Island National Wildlife Refuge Complex, "Conscience Point National Wildlife Refuge," <http://www.fws.gov/northeast/longislandrefuges/consciencepoint.html>, June 12, 2007.

[220] Long Island National Wildlife Refuge Complex Comprehensive Conservation Plan, September 2006, p.8.

[221] Ibid.

[222] Ibid, p.12.

[223] Ibid, p.18.

population levels.[224] (5) Provide priority wildlife-dependent recreational and educational opportunities when compatible with the resource and available funding.[225] (6) Communicate and collaborate with local communities and partners throughout Long Island to promote the National Wildlife Refuge System and the Complex.[226]

Noise analysis showed that the noise exposure level at the Conscience Point NWR would be slightly higher with the mitigated 2011 Preferred Alternative; 32.6 DNL as compared to. 32.4 DNL with the 2011 Future No Action Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Edwin B. Forsythe National Wildlife Refuge

Edwin B. Forsythe National Wildlife Refuge, located in the Atlantic Flyway, consists of over 46,000 acres of southern New Jersey coastal migratory bird habitat. The refuge is over 82% wetland habitat and management activities include damming to create additional fresh- and brackish-water marsh habitat and appropriate water levels. Over 6,000 acres of the refuge are designated as a National Wilderness Area. The NWR is divided into two areas the Brigantine Division and the Barnegat Division.

<u>Brigantine Division</u>: Most public use facilities are located at the Brigantine Division headquarters. Wildlife Drive, an eight-mile, one-way, unpaved road, is located in the Brigantine Division and provides views of migratory water birds. This division also contains numerous trails. The Refuge's headquarters and auditorium are also located in this Division. A boat ramp is located in the Brigantine Division, at the end of Scotts Landing Road.[227]

<u>Barnegat Division</u>: The Edwin B. Forsythe NWR's Barnegat Division includes two trails, an observation platform, and a pristine barrier beach. The barrier beach, the Holgate Unit, is located at the southern tip of Long Beach Island and is only open from early September to late March, being closed for the nesting of piping plovers.[228]

The trails in both divisions offer visitors year-round opportunities to experience the tranquil beauty of refuge woodlands and wildlife.[229]

Public use activities permitted on the refuge include wildlife viewing, photography, and environmental education.[230] Seasonal waterfowl and deer hunting, fishing, and crabbing are permitted in designated areas of both the Brigantine and Barnegat

[224] Ibid, p.19.

[225] Ibid, p.21.

[226] Ibid, p.33.

[227] Edwin B. Forsythe National Wildlife Refuge: Visitor Opportunities, "Wildlife Observation: At The Brigantine Division," <http://www.fws.gov/northeast/forsythe/PublicAccess.html>, June 12, 2007.

[228] Ibid.

[229] Ibid.

[230] Ibid.

Divisions.[231] There are over 200,000 visits to the refuge each year.

The recently completed Edwin B. Forsythe NWR Comprehensive Conservation Plan (2004) includes objectives to acquire the remaining 12,300 acres of privately owned land within the currently approved 56,600 acre Refuge acquisition boundary. Bicycling and ATV use will be prohibited in newly acquired Focus Lands.[232]

Noise exposure levels were calculated at multiple points within the Edwin B. Forsythe National Wildlife Refuge. For the purposes of this discussion, Edwin B. Forsythe National Wildlife Refuge was divided into three sections; Barnegat Division North, Barnegat Division South and Brigantine Division. Noise exposure levels for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. For most points located in the Barnegat Division North and South, the noise level would be the same or lower with the mitigated 2011 Preferred Alternative than with the 2011 Future No Action alternative. At a few points the noise exposure level would be slightly higher (0.1DNL) with the mitigated 2011 Preferred Alternative. Noise exposure levels would be predominantly the same or slightly lower in the Brigantine Division with the mitigated 2011 Preferred Alternative. At some points the noise exposure level is slightly higher (0.1-0.2 DNL) with the mitigated Preferred Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Elizabeth A. Morton National Wildlife Refuge

Morton Refuge, which is part of the Long Island National Wildlife Refuge Complex, is a 187-acre peninsula which consists of upland forest, ponds, salt marshes, a beach, a lagoon, and grasslands.[233] The Refuge is managed to protect migratory bird habitat, so parts of the beach are closed from April 1st-August 31st to protect nesting sites for Federal and state listed threatened and endangered species including the piping plover, least tern, and roseate tern.[234]

Public use activities include nature photography, observation, and interpretation, environmental education, saltwater fishing, and hiking. A nature trail runs through the upland areas and onto the beach. Visitors can then follow along the peninsula for almost two miles to an upland trail or to visit a brackish pond. [235] According to the U.S. FWS "The refuge's picturesque quality and diverse habitats make this an ideal spot for both landscape and wildlife photography."[236]

[231] Ibid.

[232] "US Fish and Wildlife Service: Edwin B. Forsythe National Wildlife Refuge Comprehensive Conservation Plan" U.S. FWS, June 2004.

[233] Elizabeth A. Morton National Wildlife Refuge, <http://www.fws.gov/northeast/longislandrefuges/morton.html>, June 12, 2007.

[234] Elizabeth A. Morton National Wildlife Refuge, "Management," <http://www.fws.gov/northeast/longislandrefuges/morton.html>, June 12, 2007

[235] Elizabeth A. Morton National Wildlife Refuge, "Visiting The Refuge," <http://www.fws.gov/northeast/longislandrefuges/morton.html>, June 12, 2007.

[236] Elizabeth A. Morton National Wildlife Refuge, "Wildlife Observation and Photography,"

The Morton Refuge is managed to protect a unique natural area for migratory birds. Federal and state threatened and endangered species such as piping plover, least tern, and roseate tern use the Refuge for nesting, rearing young, feeding and resting. In order to protect the peninsula's habitat for wildlife, access to that part of the beach is seasonally closed (April 1st - August 31st). Nesting structures (platforms, nest boxes) are erected to help increase bird productivity. Wetland management enhances waterfowl use, and grasslands are maintained for habitat diversity and migratory birds. [237]

Noise Analysis

Noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise exposure level would be slightly higher with the mitigated 2011 Preferred Alternative; 33.6 DNL as compared to. 32.8 DNL with the 2011 Future No Action Airspace Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use due to noise of the property and no further analysis was conducted for this site.

Visual Impact

The refuge's picturesque quality and diverse habitats make this an ideal spot for both landscape and wildlife photography.[238] Therefore, visual impacts in regard to the Elizabeth A. Morton National Wildlife Refuge were considered. The Morton NWR is shown in **Figure 5.38** and a summary of the potential airspace changes in the vicinity of this national wildlife refuge is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

For the mitigated Preferred Alternative the change in daily operations for this view decrease by approximately 9% and the average altitude with mitigation increases by slightly more than 400 feet which will reduce visual affects on the view of the Elizabeth A. Morton National Wildlife Refuge. Therefore it is concluded that with the mitigated Preferred Alternative there is no constructive use of the property due to visual impacts and no further analysis was conducted for this site.

Great Swamp National Wildlife Refuge

The Great Swamp National Wildlife Refuge, established in 1960, is approximately 7,600 acres and located seven miles south of Morristown, NJ. The Great Swamp NWR consists of a management area on the western half and a wilderness area on the eastern half. The Wildlife Service has worked hard to remove any remaining traces of man from the eastern half of the refuge. Over 222 species of birds, as well as mammals, fish, reptiles, and amphibians, and wildflowers can be found at the Refuge. The federally threatened and state endangered bog turtle, state threatened wood

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<http://www.fws.gov/refuges/profiles/observephotog.cfm?ID=52566>, June 12, 2007.

[237] Elizabeth A. Morton National Wildlife Refuge, "Management," <http://www.fws.gov/northeast/longislandrefuges/morton.html>, June 13 2007.

[238] Elizabeth A. Morton National Wildlife Refuge, "Wildlife Observation and Photography," <http://www.fws.gov/refuges/profiles/observephotog.cfm?ID=52566>, June 13, 2007.

turtle, and state endangered blue-spotted salamander, and the formerly federally endangered bald eagle are all species which can be found in this Refuge.[239]

Public use activities at Great Swamp NWR include observing, studying, photographing, and walking in designated public areas.[240] Trails are open to foot traffic only.[241]

The western half of the Refuge is intensively managed to maintain optimum habitat for a variety of wildlife. Water levels are regulated; grasslands and brush are mowed periodically to maintain habitat and species diversity; shrubs are planted; nesting structures for wood ducks, bluebirds, and other birds are provided; other habitat management practices are employed; and research studies are conducted. Public access in this area is limited to the Wildlife Observation Center and Pleasant Plains Road to minimize disturbance to wildlife. [242]

The Wilderness Area serves as an outdoor laboratory and provides a more primitive outdoor experience for the general public. Generally, no permanent structures, motorized vehicles, or equipment are allowed. Hiking on almost eight miles of trails is permitted. By limiting use in this sensitive area to foot travel, the wilderness experience can be preserved. Great Swamp was established as an area to provide migration, nesting and feeding habitat for migratory birds. [243]

Noise analysis showed that the noise exposure levels would be lower at all noise analysis locations within the Great Swamp National Wildlife Refuge with the mitigated 2011 Preferred Alternative as opposed to the 2011 Future No Action Airspace Alternative. Therefore, there is no constructive use of the property and no further noise analysis was conducted for this site.

John Heinz National Wildlife Refuge

John Heinz National Wildlife Refuge (NWR) was established in 1972. This soon to be 1,200 acre refuge, currently 1,000 acres, is located in an urban area approximately one mile north of Philadelphia International Airport, in Philadelphia and Delaware Counties, PA. Interstate 95 runs along the southern edge of the Refuge.[244] Refuge habitats include coastal wetlands, the last 200 acres in the Philadelphia area, open water, grassland, and riparian and upland forest. The Refuge, located in the Atlantic Flyway, is an important stopover for migratory birds. In addition, forty species of fish, eight species of amphibians, and eighteen species of reptiles, including state threatened and

239 "Great Swamp National Wildlfie Refugre: Conserving the Nature of America" <http://www.fws.gov/northeast/greatswamp/>, July 11, 2007.

240 Great Swamp National Wildlife Refuge, "Refuge Information," <http://www.fws.gov/northeast/greatswamp/directions.htm>, June 12, 2007.

241 Great Swamp National Wildlife Refuge, "Refuge Information," <http://www.fws.gov/northeast/greatswamp/directions.htm>, June 12, 2007.

242 Great Swamp National Wildlife Refuge, "Wildlife Management: Refuge Management," <http://www.fws.gov/northeast/greatswamp/wildlife management.htm>, June 13, 2007.

243 Ibid.

244 John Heinz National Wildlife Refuge, "About the Refuge," <http://www.fws.gov/northeast/heinz/welcome.htm>, June 12, 2007.

endangered species – the red-bellied turtle and the coastal plain leopard frog, are found in John Heinz NWR.[245]

Public use activities permitted on the John Heinz NWR include hiking, bicycling on paved and gravel roads, photography, as well as canoeing and fishing in designated areas. While hunting on the Refuge is prohibited, lands near and adjacent to the Refuge allow hunting. [246]

According to the USFWS website, "the mission of the Cusano Environmental Education Center [located on John Heinz NWR] is to demonstrate within an urban setting, the importance of the natural world to the human quality of life and inspire visitors to become responsible stewards of the environment. … The Center features exhibits on Tinicum Marsh, wetlands, watersheds, citizen action, and the U.S. Fish and Wildlife Service, a resource library, classrooms for study, and public meeting space."[247]

Noise exposure levels were calculated at multiple points within John Heinz National Wildlife Refuge. Noise exposure levels (DNL) for the 2011 Future No Action Airspace Alternative and the mitigated 2011 Preferred Alternative were compared. With the exception of three points, the noise exposure levels would be the same or lower with the mitigated 2011 Preferred Alternative. The noise levels at points 3, 11, and 12 would be slightly higher with the mitigated 2011 Preferred Alternative. The greatest difference in noise level would be 1.2 DNL at point 12; 51.1 DNL as compared to. 49.9 DNL with the 2011 Future No Action Alternative, see Figures in Appendix J.3 for point locations. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Lido Beach Wildlife Management Area

Lido Beach Wildlife Management Area is part of the Long Island National Wildlife Refuge Complex. The Lido Beach area is almost entirely tidal wetland, where shorebird and wading bird diversity is high. Wintering waterfowl, such as black ducks and Atlantic brant also make good use of the wetland. Lido Beach supports nesting clapper rails, osprey and numerous songbirds due to its location on a barrier island.[248]

The following goals, objectives, and strategies, listed in the Long Island National Wildlife Refuge Complex Comprehensive Conservation Plan, are designed to enhance the quality, effectiveness, and sustainability of our management priorities. They will increase the protection and management of endangered, threatened or other species of concern, including migratory wildlife. They will also increase the number and quality of opportunities for compatible, wildlife-dependent, public recreation, and allow the Complex to benefit from its proximity to New York City and urban

[245] John Heinz National Wildlife Refuge, "History," <http://www.fws.gov/northeast/heinz/welcome.htm>, June 12, 2007.

[246] John Heinz National Wildlife Refuge, "Permitted," <http://www.fws.gov/northeast/heinz/welcome.htm>, June 12, 2007.

[247] <http://www.fws.gov/northeast/heinz/ceec.htm>, July 11, 2007. "The Cusano Environmental Education Center at John Heinz National Wildlife Refuge."

[248] Long Island National Wildlife Refuge Complex, "Lido Beach National Wildlife Refuge," <http://www.fws.gov/northeast/longislandrefuges/lidobeach.html>, June 13, 2007.

communities. [249] (1) Improve the biological diversity and integrity of upland cover types to sustain high quality habitat for migratory passerine birds.[250] (2) Restore the biological health of aquatic habitats to high-quality conditions on the Complex salt marshes, bays, tidal. [251] (3) Restore and increase the biological diversity and integrity of native grasslands to foster endangered plant recovery and the communities upon which they depend.[252] (4) Enhance the functionality of coastal strand habitats as they relate to beach nesting Colonial water birds and shorebirds to meet optimal population levels.[253] (5) Provide priority wildlife-dependent recreational and educational opportunities when compatible with the resource and available funding.[254] (6) Communicate and collaborate with local communities and partners throughout Long Island to promote the National Wildlife Refuge System and the Complex. [255]

Noise analysis showed that the noise exposure level at Lido Beach National Wildlife Refuge would be slightly higher with the mitigated 2011 Preferred Alternative; 49.9 DNL as compared to. 49.2 DNL with the 2011 Future No Action Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Oyster Bay National Wildlife Refuge

Oyster Bay NWR is part of the Long Island National Wildlife Refuge Complex. Sub-tidal habitats, salt marsh, and a freshwater pond make up this 3,209 acre Refuge which is inhabited by numerous waterfowl and water-dependent wildlife.[256]

Public use activities include fishing, wildlife observation, photography, and environmental education.[257]

Oyster Bay NWR has the same goals, objectives, and strategies as listed for the Long Island National Wildlife Refugee Complex Comprehensive Conservation Plan.

Noise Analysis

Noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. At four points (2, 3, 17, and 18) in the Oyster Bay NWR the noise exposure levels would be slightly higher (0.2 - 0.4 DNL) with the mitigated Preferred Alternative. At the remaining points the noise exposure level would be lower by 0.4 to 2.6 DNL with the mitigated Preferred Alternative. The change in noise would be

[249] Long Island National Wildlife Refuge Complex Comprehensive Conservation Plan, Chapter 4: Management Direction and Implementation, "Refuge Goals, Objectives, and Strategies," September 2006, p. 8.

[250] Ibid.

[251] Ibid. p. 12.

[252] Ibid. p. 18.

[253] Ibid.

[254] Ibid. p. 21.

[255] Ibid. p. 33.

[256] Long Island National Wildlife Refuge Complex, "Oyster Bay National Wildlife Refuge," <http://www.fws.gov/northeast/longislandrefuges/oysterbay.html>, June 12, 2007.

[257] Long Island National Wildlife Refuge Complex, "Oyster Bay National Wildlife Refuge," <http://www.fws.gov/northeast/longislandrefuges/oysterbay.html>, June 12, 2007.

less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Visual Impact Analysis

Summer offers the best chance to see and photograph osprey, egret, and herons as you cruise, canoe or kayak the waters of Oyster Bay NWR. An especially observant visitor can spot diamondback terrapins in shallow waters along the wetlands. [258]

Winter offers the best opportunities for viewing waterfowl. Thousands of ducks winter on the Refuge, particularly black duck, greater scaup, bufflehead, and canvasback. [259]

Oyster Bay's most scenic aspects are the saltmarshes, accessible by canoe or kayak. Local vendors rent gear and provide directions for those who want to kayak and canoe in the area. [260]

Since the opportunities for observing wildlife and accessing scenic area were highlighted for this NWR, visual impacts were considered. The Oyster Bay NWR is shown in **Figure 5.39,** and a summary of the potential airspace changes in the vicinity of this national wildlife refuge is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

The change in daily operations for this view increase by approximately 23% and the average altitude with mitigation increases by about 100 feet which will help to reduce visual affects on the view of the Oyster Bay NWR. Therefore it is concluded that for the mitigated Preferred Alternative there is no constructive use of the property due to visual impacts and no further analysis was conducted for this site.

Seatuck National Wildlife Refuge

Seatuck National Wildlife Refuge is located on the south shore of Long Island and is managed as part of the Long Island National Wildlife Refuge Complex. The refuge consists of 196 acres bordering the Great South Bay and is separated from the Atlantic Ocean only by Fire Island. Situated in a heavily developed urban area, the refuge is an oasis for many species of migratory birds and waterfowl.[261]

Approximately one half of the refuge consists of tidal marsh, which serves a vast number of waterfowl in the winter months. The refuge attracts waterfowl, white-tailed deer, red fox, and migratory songbirds and raptors. The Refuge has been classified as part of the larger Great South Bay, a significant coastal habitat.[262]

The Seatuck NWR is actively managed for migratory birds, particularly waterfowl and raptors, and to maintain and enhance habitat diversity. [263] Both upland and wetland habitats at the Seatuck NWR are actively

[258] Oyster Bay National Wildlife Refuge, "Wildlife Observation and Photography," <http://www.fws.gov/northeast/oysterbay/>, June 22, 2007

[259] Ibid.

[260] Ibid.

[261] Seatuck National Wildlife Refuge, <http://www.fws.gov/refuges/profiles/index.cfm?id=52565>, June 8, 2007

[262] Ibid.

[263] Ibid.

managed. Wetland management activities conducted at the refuge include restoring tidal flow, blocking manmade drainage ditches, open marsh water management, and wood duck nest box maintenance. Upland management activities include erecting osprey nesting platforms, mowing grasslands and upland shrub habitats, prescribed burning, restoring derelict lands to native habitat, white-tailed deer management, songbird nest box program, and an owl monitoring program which is conducted by the South Shore Audubon Society. [264]

Wildlife monitoring conducted at the refuge includes waterfowl surveys, migratory songbird and raptor surveys, white-tailed deer counts, and mosquito sampling. [265]

Noise analysis showed that the noise exposure levels at Seatuck NWR would be slightly higher with the mitigated 2011 Preferred Alternative; 42.5 DNL as compared to 43.0 DNL with the 2011 Future No Action Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Shawangunk Grasslands National Wildlife Refuge

Shawangunk Grasslands NWR is located in Ulster County, NY. The 566 acre refuge is comprised of 400 acres of open fields or grasslands which are also classified as seasonal perched wetland, 136 acres of upland hardwood woodland and some shrub land in transition to woodlands, and 30 acres of asphalt and concrete runway and taxiway. The Refuge's land was transferred to the U.S. Fish and Wildlife Service in 1999 after spending many years as the Galeville Military Airport. Like the Wallkill River NWR, the Shawangunk Grasslands NWR is part of the Hudson River/New York Bight Ecosystem.[266]

Public use activities include wildlife observation, nature photography, environmental education, interpretation, snowshoeing, and cross-country skiing. [267] Fishing will be allowed in the small man-made pond under the Refuge's Comprehensive Conservation Plan (CCP). The CCP also includes archery season for white-tailed deer as a permitted public use.

Management activities include keeping the grassland by controlling the invasion of weeds, woody shrubs, and trees. This is done primarily through a cooperative farming program in which local residents mow the refuge for hay. The Refuge will also consider herbicide application and reseeding. [268]

In the biological program, the priority will continue to be grasslands management to benefit breeding grassland migratory birds and wintering raptors with the goal of creating a diverse mosaic of grassland habitat structure capable of sustaining the

[264] Ibid.

[265] Ibid.

[266] Shawangunk Grasslands National Wildlife Refuge, "History," <http://www.fws.gov/northeast/shawangunk/history.htm>, June 8, 2007.

[267] Shawangunk Grasslands National Wildlife Refuge, "Visitor Opportunities," <http://www.fws.gov/northeast/shawangunk/visitor%20opportunities.htm>, June 8, 2007.

[268] Shawangunk Grasslands National Wildlife Refuge, "History," <http://www.fws.gov/northeast/shawangunk/history.htm>, June 8, 2007.

full complement of grassland-dependent birds during all seasons. Managing the various grassland structural types (short, medium, tall) as a shifting mosaic over time and increasing the available grasslands by up to 30 acres through the restoration of the asphalt and concrete runways and taxiways are goals for the future. There are plans to restore the natural hydrology of the area after evaluating the drainage system while ensuring consistency with the grassland habitat program. In addition, strengthening the biological inventory and monitoring program to allow better evaluation of the programs and make more informed decisions are part of the CCP. [269]

Noise analysis showed that the noise exposure levels at the Shawangunk Grasslands NWR would be slightly higher with the mitigated 2011 Preferred Alternative; 44.8 and 43.7 DNL as compared to 44.7 and 43.5 DNL with the 2011 Future No Action Airspace Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Stewart B. McKinney National Wildlife Refuge

Stewart B. McKinney National Wildlife Refuge (NWR) was established in 1972 and encompasses over 800 acres. The Stewart B. McKinney NWR is located in the Atlantic Flyway and provides migratory bird habitat as well as a nesting site for federally threatened piping plovers and over 124 pairs of federally endangered roseate terns. [270] It is comprised of ten different units that are stretched across Connecticut's shoreline. Each one that is located in the Study Area is described below.[271]

Salt Meadow Unit: This unit is accessible by car and has been designated as an “Important Bird Area” by the National Audubon Society, used by over 280 species of migrating neotropical birds in the spring and fall.[272]

Outer Island Unit: The Outer Islands are only accessible by private vessel or by ferry from Stony Creek, CT. Only open on weekends between July 4th and Labor Day, pink granite dominates the geology and makes for “spectacular photographic opportunities”.[273]

Falkner Island Unit: This unit is closed to the public with the exception of an open house held each year in September. The lighthouse, research facility, and natural beauty of Falkner Island allow for many photographic opportunities. This unit has been designated as an “Important Bird Area” by the National Audubon Society. Falkner Island is home to the roseate tern colony and to protect the colony from black-crowned night-herons, vegetation used as cover by the predators has been removed.

[269] Shawangunk Grasslands National Wildlife Refuge Comprehensive Conservation Plan, Chapter 4: Management Direction and Implementation, “Refuge Goals, Objectives, and Strategies,” May 2006, p. 10.

[270] Stewart B. Mckinney National Wildlife Refuge, “Overview,” <http://www.fws.gov/refuges/profiles/index.cfm?id=53546>, June 12, 2007

[271] Ibid.

[272] Ibid.

[273] Stewart B. Mckinney National Wildlife Refuge, “Wildlife Observation and Photography,” <http://www.fws.gov/refuges/profiles/observephotog.cfm?ID=53546>, June 12, 2007.

Additionally, artificial nesting and hiding structures have been implemented to help protect eggs and newborn chicks.[274]

Milford Point Unit: This unit is accessible by car and piping plovers nest on the beach in this unit. During nesting, a wire enclosure is erected around the nests when eggs are laid to protect the nests from avian and mammalian predators. Wildlife can only be viewed from the observation deck or the very tip of the peninsula.[275]

Great Meadows Unit: This unit is currently closed to the public, but will reopen once an educational trail is complete. The trail will be fully accessible and will include voice recordings for the visually disabled. A waterfowl hunting program began in 2005 on 165 acres of the Great Meadows Unit and is allowed in designated areas with a Refuge permit.[276]

Sheffield Island Unit: A ferry runs between Norwalk, CT and Sheffield Island from May through September. A self guided trail explores the history of the island and the importance of the island habitats, while allowing visitors to view a tidal salt water pond. [277]

Chimon Island Unit: This unit is only accessible via private vessel and is open seasonally to visitors. No trails or other facilities are available, but a 3-acre beach operated by the Town of Norwalk during the summer season may be visited all year. [278]

Goose Island Unit: Goose Island Unit is currently closed to the public.

Peach Island Unit: Peach Island Unit is also currently closed to the public.

Calf Island Unit: A private vessel must be used to reach this unit. [279]

Wildlife observation, nature photography, environmental education, and trail walking opportunities are encouraged and available. A waterfowl hunting program began in 2005 on 165 acres of the Great Meadows Unit and is allowed in designated areas with a Refuge permit. Hunting is not allowed on any other part of the Stewart B. McKinney NWR.[280]

The refuge is involved in many extremely important management activities, both on and off the refuge. These management activities look at the importance of the refuge in the larger structure of its local ecosystem. These activities range from grassland and marsh restoration to the creation of artificial nesting structures for terns, bluebirds, and black ducks.[281]

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[274] Ibid.

[275] Stewart B. McKinney National Wildlife Refuge, "Units of Stewart B. McKinney Refuge: Milford Point," <http://gorp.away.com/gorp/resource/us_nwr/ct_mckin.htm>, June 12, 2007

[276] Stewart B. McKinney National Wildlife Refuge, "Units of Stewart B. McKinney Refuge: Great Meadows Unit," <http://gorp.away.com/gorp/resource/us_nwr/ct_mckin.htm>, June 12, 2007.

[277] Stewart B. McKinney National Wildlife Refuge, "Overview," <http://www.fws.gov/refuges/profiles/index.cfm?id=53546>, June 12, 2007.

[278] Ibid.

[279] Ibid.

[280] Ibid.

[281] Stewart B. McKinney National Wildlife Refuge, "Management Activities,"

Noise Analysis

Noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. For the Great Meadows Marsh and Milford Point Divisions the noise level would be the same or slightly higher with the mitigated 2011 Preferred Alternative. The greatest difference in noise exposure levels would be 0.1 DNL. For the Norwalk Harbor Islands Division, with the exception of two points, the noise exposure levels would be lower with the mitigated 2011 Preferred Alternative. At two points, the noise exposure levels would be slightly higher by 0.6 and 0.5 DNL. For all points in the Salt Meadow Division the noise levels would be lower (0.1 to 2.7 DNL) with the mitigated 2011 Preferred Alternative. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property due to noise and no further analysis was conducted for this site. .

Visual Impact

Since the spectacular photographic opportunities were noted for the Outer Island Unit, visual impacts in the vicinity of this location were considered. The location of the Outer Island is shown **Figure 5.40,** and a summary of the potential airspace changes in this vicinity is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

The change in daily operations for this view decreases by approximately 4% however the average altitude with mitigation decreases by slightly more than 100 feet. Since the operations and altitude for this view remain basically the unchanged compared to the No Action Alternative it is concluded that for the mitigated Preferred Alternative there is no constructive use of the property due to visual impacts and no further analysis was conducted for this site.

Supawna Meadows National Wildlife Refuge

Supawna Meadows National Wildlife Refuge is a 2,800 acre refuge located along the Delaware River in Salem County, New Jersey. It is an important stopover point for numerous migratory bird species and is home to, or is visited by, over 60 Species of Conservation Concern. This includes 58 species of birds and five species of reptiles and amphibians. The entire refuge is considered an active foraging area for bald eagles and there is an active bald eagle nest present on the refuge. In addition, during the nesting season, the refuge marshes provide valuable foraging habitat for colonial wading birds located on Delaware's nearby Pea Patch Island Rookery, which hosts over 6,000 pairs of nine species.[282]

Public use activities permitted on the refuge are the hunting of deer and waterfowl during designated seasons in the majority of the refuge, fishing, wildlife observation and photography, and environmental education and interpretation. There are no boat ramps on the refuge and all other activities, including horseback riding and camping, are prohibited. There are three wildlife observation trails on the refuge with

<http://www.fws.gov/refuges/profiles/index.cfm?id=53546>, June 13, 2007.

[282] Supawna Meadows National Wildlife Refuge, "Overview," <http://www.fws.gov/northeast/nj/spm.htm>, June 13, 2007.

interpretive signs; a small historic gravesite is located along one of the trails.[283]

Management of the refuge centers around protection and enhancement of high quality habitat for migratory birds, particularly waterfowl, wading birds, songbirds, woodcock and shorebirds. The refuge's impoundments are managed to provide habitat for waterfowl, shorebirds, wading birds and resident fish and wildlife. Former cropland has been converted to grasslands for upland nesting species.[284]

Woodlands are being managed to provide early successional habitats for migratory birds including woodcock. Prescribed burns help to control non-native plants and enhance grassland management. These burns help restore natural vegetation including wild rice, cattails, and sedges that provide the nutrition needed by migrating birds and resident wildlife. With the help of volunteers, the refuge maintains over 100 wood duck and 25 song bird nest boxes. [285]

Noise analysis showed that the noise exposure level at the Supawna Meadows NWR would be lower with the mitigated 2011 Preferred Alternative than with the Future No Action Airspace Alternative. Therefore, there is no constructive use of the property and no further noise analysis was conducted for this site.

[283] Supawna Meadows National Wildlife Refuge, "Recreation and Education Opportunities," <http://www.fws.gov/northeast/nj/spm.htm>, June 13, 2007.

[284] Supawna Meadows National Wildlife Refuge, "Management Activities," <http://www.fws.gov/northeast/nj/spm.htm, June 13, 2007.

[285] Ibid.

Target Rock National Wildlife Refuge

Target Rock National Wildlife Refuge (NWR) is located on the north shore of Long Island, and is part of the Long Island NWR Complex. It was a garden estate belonging to the Eberstadt family until it was donated in 1967 under the Migratory Bird Conservation Act.[286] Mature oak-hickory forest, a half-mile rocky beach, a brackish pond, and several vernal ponds make up the 80 acre Refuge. Target Rock is managed to provide habitat for migratory songbirds, shorebirds, waterfowl, and other wildlife.[287] A nature trail runs through hardwood forest, past seasonal ponds, and along the shore of Huntington Bay.

Public use activities include environmental education, nature trails, fishing from the shore into Huntington Bay, interpretation, wildlife observation, and wildlife and scenic photography.[288]

The refuge is managed to provide habitat for migratory songbirds, shorebirds, waterfowl and other wildlife. During the spring breeding season, a segment of the beach is closed to public use to provide undisturbed nesting habitat for the bank swallows using the bluffs, and piping plover foraging and rearing young along the shore. [289]

[286] Target Rock National Wildlife Refuge, "History," <http://www.fws.gov/refuges/profiles/index.cfm?id=52568>, June 13, 2007.

[287] Target Rock National Wildlife Refuge, "Overview," <http://www.fws.gov/refuges/profiles/index.cfm?id=52568>, June 13, 2007.

[288] Target Rock National Wildlife Refuge, "Recreation and Education Opportunities," <http://www.fws.gov/refuges/profiles/recEdMore.cfm?ID=52568>, June 13, 2007.

[289] Target Rock National Wildlife Refuge, "Management Activities,"

Management programs include invasive species management, sensitive species protection and habitat enhancement, and public facility management. [290]

Noise Analysis

The noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise level would be lower with the mitigated 2011 Preferred Alternative. Therefore, there is no constructive use of this property due to noise and no further noise analysis was conducted for this site.

Visual Impact Analysis

Since scenic photography is highlighted, visual impacts in the vicinity of the Target Rock NWR were considered. The location of the Target Rock NWR is shown Figure 5.39**,** and a summary of the potential airspace changes in this vicinity is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

As with Oyster Bay NWR, for the mitigated Preferred Alternative the change in daily operations for this view increase by approximately 23% and the average altitude with mitigation increases by about 100 feet which will help to reduce visual affects on the view of the Target Rock NWR. Therefore it is concluded that for the mitigated Preferred Alternative there is no constructive use of the property due to visual impacts and no further analysis was conducted for this site.

Wallkill River National Wildlife Refuge

The 5,100 acre Wallkill River National Wildlife Refuge, located in Sussex County, New Jersey and Orange County, New York, consists of approximately 1,800 acres of grassland and old field, 800 acres of upland forests, 400 acres of upland shrublands, 1,500 acres of forested wetland, 1,400 acres of emergent marsh, 600 acres of wet meadow wetlands, and 400 acres of scrub-shrub wetland. Like the Shawangunk Grasslands NWR, the Wallkill River NWR is part of the Hudson River/New York Bight Ecosystem. The Wallkill River flows through the Refuge from south to north. Habitat in the Wallkill River NWR is primarily managed for federally listed threatened and endangered species, grassland birds, migratory birds and waterfowl, and forest-dwelling birds.[291]

Public use activities in the Wallkill River NWR include wildlife observation along three nature trails, fishing, canoeing/ kayaking, and hunting. Hunting is permitted on approximately 3,500 acres of the refuge. Portions in the northern part of the Refuge are closed to all hunting activities, and a portion of the southern part of the Refuge is closed to migratory bird hunting but is open for wild turkey and deer hunting. A portion of the northern part of the Refuge is reserved for disabled hunters. Deer season generally runs from September through January; there is a spring wild turkey season which occurs in April and May, and a fall wild turkey

<http://www.fws.gov/refuges/profiles/index.cfm?id=52568>, June 13, 2007.

[290] Ibid.

[291] Wallkill River National Wildlife Refuge, "Habitat and Management Practices," <http://www.fws.gov/northeast/wallkillriver/habitat.htm>, June 13, 2007.

season which runs from late October through early November; migratory bird hunting season runs from mid-August to mid-February, depending on the species. Note that the Service's Preferred Alternative for the Draft CCP/EA, identified in a September 2006 Newsletter, includes a measure to expand hunting opportunities to include all State seasons. [292]

The USFWS is in the process of developing a Draft Comprehensive Conservation Plan and Draft EA for the Wallkill River NWR. The document is expected to be released in the fall of 2007. The preliminary project proposal identified by the Director of the USFWS is to expand the refuge acquisition boundary by 16,000 acres. The planning team has identified the following seven goals, which will lend direction to the management alternatives set forth in the draft CCP. [293] To (1) protect and enhance populations of federal trust species (species protected through federal law or executive order, such as, migratory birds or threatened and endangered species) and other species and habitats of special management concern, (2) manage regionally-significant ecological communities, including grasslands and wetlands (3) promote actions which contribute towards a healthier Wallkill River (4) continue land acquisition and land management partnerships to support accomplishment of species, habitat, and ecosystem goals (5) provide opportunities for high quality, compatible, wildlife-dependent use (6) cultivate an informed and educated public that works to support the purposes of the refuges, and (7) provide refuge staffing, operations, and maintenance support to effectively accomplish refuge goals and objectives.

Noise was evaluated at multiple points in the Walkill River NWR. See **Figure 5.41**. Noise values for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. The noise exposure level would be higher by 4.1 to 7.8 DNL with the mitigated 2011 Preferred Alternative, see Appendix J.3 for detailed noise values. Since the difference in noise exposure levels resulting from the mitigated 2011 Preferred Alternative as compared to the Future No Action Airspace Alternative would exceed 3 DNL, additional information regarding the nature of the proposed airspace changes in the vicinity of the Walkill NWR is provided. Table 5.11 shows the number of tracks and jet operations that would pass over the National Historic Site as a result of the Future No Action Airspace Alternative, Preferred Alternative and mitigated Preferred Alternative.

In consultation with the US DOI, the FAA is conducting further evaluation of the potential noise increases in applicable areas of the Walkill NWR to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

Wertheim National Wildlife Refuge

Wertheim NWR is a 2,550 acre refuge on the south shore of Long Island. New York The State Wild and Scenic Carmans River runs through the Refuge. Primary management activities include protecting the

[292] Wallkill River National Wildlife Refuge, "Visitor Opportunities," <http://www.fws.gov/northeast/wallkillriver/>, June 13, 2007.

[293] Wallkill River National Wildlife Refuge, "Comprehensive Conservation Plan: Refuge Goals," <http://www.fws.gov/northeast/wallkillriver/ccp.htm>, June 13, 2007.

Carmans River estuary for use by migratory waterfowl and other water-birds. Habitats include oak-pine woodlands, grasslands, ponds, river, streams, bay, and fresh, brackish, and saltwater wetlands. There are approximately four miles of hiking trails in the Refuge.[294] According the USFWS there is ample opportunity to enjoy viewing wildlife, as well as photographing nature. In addition fishing, environmental education, nature interpretation, hiking, and cross country skiing are common activities in the park. Bird watching is a year-round activity with spring and fall migrations keeping the variety of species high and the water fowl numbers peaking in the winter. The area is always colorful, either with spring blossoms or autumn foliage.[295]

Public use activities include large game hunting of deer eleven days per year. The Final Environmental Assessment (Amended) for White-Tailed Deer Management Program at Wertheim NWR makes the following statement regarding noise associated with hunting activities:

> "The sound of firearms discharges are expected to be only minimally noticeable to surrounding homeowners given the distance between homes and hunt areas (i.e., more than 500 feet) and the noise attenuation provided by forest vegetation. The sound effects will also be minimized as shotgun hunting will occur only during daylight periods on weekdays when most residents are at work and away from home."

Other public use activities include wildlife viewing, nature photography, fishing, environmental education, nature interpretation, hiking, and cross-country skiing. [296]

Wertheim is managed to protect the Carmans River estuary for use by migratory waterfowl and other water-birds. Refuge staff manage impoundments, wetlands and forests to maintain and enhance habitat, wildlife diversity and productivity. Managers also maintain nesting structures for songbirds, barn owls, osprey and wood ducks.[297]

Noise analysis showed that the noise exposure level at the Wertheim NWR would be lower with the mitigated 2011 Preferred Alternative than the Future No Action Airspace Alternative. Therefore, there is no constructive use of the property and no further noise analysis was conducted for this site.

Selected State Parks

Big Indian Wilderness Area

"The Big Indian-Beaverkill Range Wilderness Area is a management unit in the south-central portion of the Catskill Park. It is made up of Forest Preserve lands in the Towns of Shandaken, Denning and Hardenburgh in Ulster County. …The unit is bordered on the north by the Belleayre

[294] Long Island National Wildlife Refuge Complex, "Wertheim National Wildlife Refuge," <http://www.fws.gov/northeast/longislandrefuges/wertheim.html>, June 13, 2007.

[295] Ibid.

[296] Long Island National Wildlife Refuge Complex, "Wertheim National Wildlife Refuge: Visiting the Refuge," <http://www.fws.gov/northeast/longislandrefuges/wertheim.html>, June 13, 2007.

[297] Long Island National Wildlife Refuge Complex, "Wertheim National Wildlife Refuge: Management," <http://www.fws.gov/northeast/longislandrefuges/wertheim.html>, June 13, 2007.

Mountain Ski center Intensive Use Area, on the east by Ulster County Route 47, on the south by Willowemoc-Long Pond Wild Forest, on the southwest by the Balsam Lake Mountain Wild Forest, and on the northwest by Dry Brook. Both the Belleayre Intensive Use Area and the Willowemoc- Long Pond Wild Forest UMP's (Unit Management Plans) have been approved and are in effect."[298] The New York State Department of Environmental Conservation describes it as, "a wilderness -- a place where we leave behind the comforts of civilization which give us the illusion of master rather than belonging to the environment."[299] The park provides not only this opportunity, but also preserves extensive terrain, many streams and ponds, wetlands, hardwood forests, threatened plant species, and the expected wildlife.[300] The fisheries provide opportunity for recreation, as do the visual resources. While the number of vistas is unusually low for a state park, the streams, waterfalls, diverse vegetation, and wildlife all contribute to the overall visual resources of the area.[301]

The primary goal is to preserve and protect the wilderness character of the unit, especially its natural plant and animal communities, in such a way that man's influence is not apparent. The secondary goal is provide opportunities for a primitive and unconfined type of outdoor recreation, favoring the opportunity for solitude and other experiences unique to and/or dependent of wilderness. [302]

Land Management objectives include: abandoned mining the Black Bear Road (Town of Denning) and the Hardenburgh-Neversink Road (Tow of Hardenburgh) as they transverse forest preserve lands so as to prohibit motor vehicles within this wilderness area, resolve the issue of motor vehicle use of wood roads adjoining the Big Indian Mountain Association development in Burnham Hollow, and to eliminate incompatible uses which detract from the wilderness character of the unit, especially the illegal use of motor vehicles and snowmobiles. [303]

Noise Analysis

Noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. At points 1 thru 5, 8, 9, 16 thru 18, 20 thru 23, and 30 (See **Figure 5.42)** the noise exposure levels would be higher by 3.2 to 7.6 DNL with the mitigated 2011 Preferred Alternative. At points 6, 7, 10 thru 13 thru 15, 19, 24 thru 29, 31 thru 40, 46 thru 50, 55 thru 59, and 62 the noise exposure levels would be higher by 0.1 to 2.3 DNL with the 2011 mitigated Preferred Alternative. At points 41 thru 45, 51 thru 54, 60, and 61 the noise exposure levels would be the same or lower with the mitigated 2011 Preferred Alternative. Since the difference in noise levels resulting from the mitigated 2011 Preferred Alternative as compared to the Future No Action Airspace Alternative would exceed 3 DNL, additional

[298] Bid Indian-Beaverkill Range Wilderness Area Unit Management Plan, New York State Department of Environmental Conservation, June 1993. p. 1.

[299] Ibid, p.ii.

[300] Ibid, p.15-26.

[301] Ibid, p.30.

[302] Bid Indian-Beaverkill Range Wilderness Area Unit Management Plan, New York State Department of Environmental Conservation, June 1993. p. 67.

[303] Bid Indian-Beaverkill Range Wilderness Area Unit Management Plan, New York State Department of Environmental Conservation, June 1993. p. 68.

information regarding the nature of the proposed airspace changes in the vicinity of the Big Indian Wilderness Area is provided. Table 5.11 shows the number of tracks and jet operations that would pass over the wilderness area as a result of the Future No Action Airspace Alternative, Preferred Alternative, and mitigated Preferred Alternative.

In consultation with the New York State Department of Environmental Conservation, the FAA is conducting further evaluation of the potential noise increases in applicable areas of the Big Indian Head-Beaverkill Range Wilderness Area to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

Visual Impact Analysis

As with other forest preserve units, the Big Indian Head-Beaverkill Range Wilderness Area is an important component of the view shed which makes the Catskill Park a unique resource in Southern New York. [304]

Vistas from within the unit are rare. In fact, the most prominent viewpoints associated with this unit (Balsam Summit and Doubletop Summit) are on private land adjacent to the unit. This lack of vistas may explain the relatively low level of public use. However, the visual opportunities are not limited to high elevation vistas. This area has a variety of features such as streams, waterfalls, diverse vegetation and wildlife which all contribute to the visual resources of the unit. [305] Although vistas are rare, visual impacts in the vicinity of the Big Indian-Beaverkill Range Wilderness Area were considered. A summary of the potential airspace changes in this vicinity is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

For the mitigated Preferred Alternative the change in daily operations for this view decrease by approximately 27% however the average altitude with mitigation decreases by about 200 feet. Considering the reduced number of daily operations and minimal altitude change it is not expected that views in the Big Indian Head Beaverkill Range Wilderness Area will be impacted. Therefore it is concluded that for the mitigated Preferred Alternative there is no constructive use of the property due to visual impacts and no further analysis was conducted for this site.

Slide Mountain Wilderness Area

The Slide Mountain Wilderness is the largest and most popular of the four designated wilderness areas in the Catskills. The hiking trail complex is extensive, over lofty peaks and provides access to much of the interior of the unit. Slide Mountain, with its many unique features, is the highest peak in the Catskills.[306] Within the park are unique resources, which include everything

[304] Bid Indian-Beaverkill Range Wilderness Area Unit Management Plan, New York State Department of Environmental Conservation, June 1993. p. 29-30.

[305] Bid Indian-Beaverkill Range Wilderness Area Unit Management Plan, New York State Department of Environmental Conservation, June 1993. p. 30.

[306] Slide Mountain Wilderness Unit Management Plan, New York State Department of Environmental Conservation, October 1998, p. 1.

from distinct vegetation, wetlands, rare orchids, wildlife, extensive fish populations, visual resources, and wilderness.[307] The trail system is the most used in the Catskills. Prudent management coupled with public cooperation will protect the resource and continue to provide the recreational opportunities in the future as in the past.[308] According to the website maintained by the New York Department of Environmental Conservation, "[T]he system…offers an expansive trails area providing visitors with the solitude, challenge and independence commonly associated with wilderness."[309] The opportunities available to visitors include "day hiking, backpacking, camping, hunting and trapping, fishing, cross-country skiing and snowshoeing, observing and photographing nature, and enjoying solitude."[310]

The primary goal for the Slide Mountain Wilderness Unit is to preserve and protect the wilderness character of the area, especially its natural plant and animal communities in such a way that man's influence is not apparent. The secondary goal is to provide opportunities for a primitive and unconfined type of outdoor recreation, favoring the opportunity for solitude and other experiences unique to and/or dependent upon wilderness.[311]

Land management objectives include: to effect abandonment of the Woodland Valley-Winisook Road (Town of Shandaken and the Denning-Winisook (Towns of Shandaken and Denning) as they traverse forest preserve lands so as to prohibit motor vehicles within this wilderness area, maintain boundary lines to clearly identify public ownership and discourage trespassing on private islands, and adequately protect the unit from wildfire.[312]

Wildlife management objectives include: maintaining all native wildlife species at levels compatible with their natural environment, and maintain hunting, trapping, and other wildlife-related to recreational activities.[313]

Public use management objectives include: providing primitive recreation opportunities only to the extent that they do not infringe upon the area's naturalness and its ability to provide a high degree of solitude, monitoring the level and intensity of public use, take appropriate steps to prevent overuse and degradation of the area, and educating visitors to use and enjoy the wilderness without adverse environmental impacts. [314]

Noise Analysis

Noise values (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. At the majority of points in the Slide Mountain Wilderness Area (points 1 thru 16, 19 thru 21, 23, 25 thru 34, 36 thru 40, 43 thru 46, 50 thru 52, 57 thru 62, 66 thru 70, 75 thru 78,

[307] Ibid, p. 5-8.

[308] Ibid, p. 2.

[309] "Slide Mountain Wilderness" New York State Department of Environmental Conservation. Accessed July 11, 2007. <http://www.dec.ny.gov/outdoor/9150.html>.

[310] Ibid.

[311] Slide Mountain Wilderness Unit Management Plan, New York State Department of Environmental Conservation, October 1998, p. 33.

[312] Ibid, p. 34.

[313] Ibid.

[314] Ibid.

81 thru 85, 89 thru 91, 93 and 94) (See **Figure 5.43)**, the noise exposure levels would be higher by 3.1 to 11.5 DNL with the mitigated 2011 Preferred Alternative. At points 17, 18, 22, 24, 35, 41, 47, 48, 53, 54, 62 thru 64, 71 thru 74, 79, 80, 86 thru 88, and 92 the noise exposure levels would be higher by 1.0 to 2.9 DNL with the mitigated 2011 Preferred Alternative. At points 42, 49, 55, and 56 the noise levels would be lower with the mitigated 2011 Preferred Alternative. Since the difference in noise levels resulting from the mitigated 2011 Preferred Alternative as compared to the Future No Action Airspace Alternative would exceed 3 DNL, additional information regarding the nature of the proposed airspace changes in the vicinity of the Slide Mountain Wilderness Area is provided. Table 5.11 shows the number of tracks and jet operations that would pass over the wilderness area as a result of the Future No Action Airspace Alternative, Preferred Alternative, and mitigated Preferred Alternative.

In consultation with the New York State Department of Environmental Conservation, the FAA is conducting further evaluation of the potential noise increases in applicable areas of the Slide Mountain Wilderness Area to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

Visual Impact

The visual attributes of the Slide Mountain Wilderness Unit contribute as much to its popularity as any of its other resources. A climb to the summit of Slide Mountain, the highest point in the Catskills offers spectacular views of surrounding mountains. Numerous scenic opportunities exist throughout the unit of Slide, Cornell, Wittenberg, Table, Peekamoose, Panther, Giant Ledge and Balsam Cap. The fall foliage attracts the largest number of hikers, though the area is popular all year round, including winter. [315]

The visual opportunities are not limited solely to vistas from high elevations. Throughout the unit, streams, water falls, a variety of vegetation and wildlife form a landscape of great natural beauty. [316]

Since the scenic vistas are a highlight of the Slide Mountain Wilderness Area visual impacts in the vicinity were considered. A summary of the potential airspace changes in this vicinity is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

For the mitigated Preferred Alternative the change in daily operations for this view decrease by approximately 24% however the average altitude with mitigation decreases by about 1,700 feet to about 16,400 feet MSL. Considering the reduced number of daily operations and the average altitude of flight it is not expected that views in the Slide Mountain Wilderness Area will be impacted. Therefore it is concluded that for the mitigated Preferred Alternative there is no constructive use of the property due to visual impacts and no further analysis was conducted for this site.

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[315] Ibid, p. 7.

[316] Ibid.

Indian Head and Westkill Mountain Wilderness Area

The Indian Head-Plateau Mountain Wilderness Unit is located at the east edge of the Catskill Mountains in the southeastern part of Greene County and the northeastern part of Ulster County, NY. In an east-west axis, it begins mid-slope up the Catskills escarpment facing the Hudson River Valley and ends near Stony Clove along NY Route 214. In a north-south axis, it begins at the Platte Clove Road (Hunter Town Road 16) and the Elka Park Road (Hunter Town Road 8) and ends in Ulster County, north of Woodstock and Shady.[317]

The Unit consists of 16, 725 acres in parts of two countries and three towns. The Wilderness Unit is characterized by extremely rugged topography. It is entirely forested with a wide diversity of plant species influenced by soils, topography, climate, man's use, natural disturbance and by chance distribution of seeds and spores.[318] This unique park is a high elevation east-west ridge that lies between the Westkill Creek to the north and the Esopus Creek to the south. Westkill Mountain Wilderness is a remote mountainous location of more than 19,250 acres. The terrain is very steep in places with elevations ranging from 1,000 feet to 3,880 feet. [319]

The Indian Head-Plateau Mountain Wilderness Area lies within the Catskill Peaks ecozone.[320] The hardwood forest provides a habitat for beavers, as well as other species which do not require open land and early successional forest stages. The streams leading into Echo Lake provide a healthy aquatic habitat. Black bears, white-tail deer, and over 116 species of bird frequent the forests in this area.

A variety of wilderness recreational opportunities ranging from hiking, snowshoeing, bird-watching, mountain biking, cross-country skiing and primitive camping to horseback riding, hunting, fishing, and trapping can be done at the Unit[321] and in the Westkill Mountain Catskill Preserve foot and horse trails, as well as camping are available.[322]

The broad goals of the unit are to protect the natural setting of the Wilderness as defined by the Catskill Park State Land Master Plan, accommodate and provide for the broadest spectrum of public uses compatible with wilderness land-use criteria and in keeping with recognized legal and environmental constraints, identify and actively protect the special unique and fragile areas within the Unit. These fragile areas include critical or unique plant and animal habitat, highly

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[317] Indian Head Plateau Mountain Wilderness Unit Management Plan, New York State Department of Environmental Conservation, October 1992, p. 5.

[318] Indian Head Plateau Mountain Wilderness Unit Management Plan, New York State Department of Environmental Conservation, October 1992, p. 8.

[319] Westkill Mountain wilderness Area, "Department of Environmental Conservation," <http://www.dec.ny.gov/outdoor/7984.html>, June 17, 2007.

[320] Indian Head Plateau Mountain Wilderness Unit Management Plan, New York State Department of Environmental Conservation, October 1992, p. 7.

[321] Westkill Mountain wilderness Area, "Department of Environmental Conservation," <http://www.dec.ny.gov/outdoor/7984.html>, June 17, 2007.

[322] "Westkill Mountain Wilderness: Catskill Forest Preserve Map and Guide" NYS Department of Environmental Concervation. April 2001.

scenic areas, historic sites, special geological formations, etc.[323]

The Land Management Objectives Include: Continue with the closure procedure on un-maintained public roads, or assumed public roads, within the bounds of the Wilderness Unit. Determine first if already legally abandoned, continue and active boundary line maintenance program to maintain the integrity of public ownership and to discourage trespass, and adequately protect the Unit from Wildfire.[324]

Noise Analysis

Noise exposure levels (DNL) for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. All noise values for the points located in the Indian Head Plateau Mountain Wilderness Unit would be lower with the mitigated 2011 Preferred Alternative. Therefore, there is no constructive use of the Indian Head Plateau Mountain Wilderness Unit and no further noise analysis was conducted for this site.

The noise exposure levels at the Westkill Mountain Wilderness Area would be higher by 3.1 to 13.9 DNL with the mitigated 2011 Preferred Alternative when compared to the 2011 Future No Action Airspace Alternative. Since the difference in noise levels resulting from the mitigated 2011 Preferred Alternative as compared to the 2011 Future No Action Airspace Alternative would exceed 3 DNL, additional information regarding the nature of the proposed airspace changes in the vicinity of the Westkill Mountain Wilderness Area is provided. **Figure 5.44** shows the Westkill Mountain Wilderness Area and Table 5.11 provides the number of tracks and jet operations that would pass over the wilderness area as a result of the Future No Action Airspace Alternative, Preferred Alternative, and mitigated Preferred Alternative.

In consultation with the New York State Department of Environmental Conservation, the FAA is conducting further evaluation of the potential noise increases in applicable areas of the Westkill Mountain Wilderness Area to determine whether they result in a constructive use. The FAA will include the results of this evaluation, and any necessary additional 4(f) analysis and determination, in the Record of Decision.

Visual Impact

Visual impacts to the Indian Head Plateau Mountain Wilderness Unit were not evaluated because the reduction in noise exposure levels indicate that overflights are reduced and higher with the mitigated 2011 Preferred Alternative.

Seven miles of the very popular Devil's Path traverse the northeast portion of the area, rising to the summit of Westkill Mountain. The hike is considered moderate, rising approximately 1,600 feet from Buttermilk Falls, and 2,000 feet from the Devil's Path Trailhead along Spruceton Road. This scenic trail offers hikers breathtaking views of the Central Catskills from the Buck Ridge Lookouts - located just east of the Westkill Summit.[325]

[323] Indian Head Plateau Mountain Wilderness Unit Management Plan, New York State Department of Environmental Conservation, October 1992, p. 34.

[324] Ibid.

[325] Westkill Mountain Wilderness Area, “Department of Environmental Conservation,” <http://www.dec.ny.gov/outdoor/7984.html>, June 17, 2007.

Since the scenic vistas are a highlight of the Westkill Mountain Wilderness Area, visual impacts in the vicinity were considered. A summary of the potential airspace changes in this vicinity is provided in Table 5.14. This information includes the number of operations, and the minimum, average, and maximum altitudes resulting from the Future No Action Airspace Alternative, Preferred Alternative, and the mitigated Preferred Alternative.

For the mitigated Preferred Alternative the change in daily operations for this view decrease by approximately 6% however the average altitude with mitigation decreases by about 300 feet to about 19,800 feet MSL. Considering daily operations are reduced and the average altitude of flight it is not expected that views in the Westkill Mountain Wilderness Area will be impacted. Therefore it is concluded that for the mitigated Preferred Alternative there is no constructive use of the property due to visual impacts and no further analysis was conducted for this site

Minnewaska State Park

"Minnewaska State Park is situated in Ulster County, NY on the dramatic Shawangunk Mountain ridge that rises more than 2,000 feet above sea level. The terrain is rugged and rocky, blanketed by dense hardwood forest encircling two lakes. Clear streams cut into valleys, incising sheer cliffs and ledges and emerging in waterfalls. Hiking, biking, horseback riding and cross-country skiing are very popular activities. Visitors also enjoy swimming, picnicking, boating and the scenery."[326] The Park contains many major habitat types: cool, clear nutrient-poor waters, wetlands, ice caves, cliffs and talus, ravines, virgin forests, and hawk migration routes.[327] Because of such diverse habitat types, the park is home to a multitude of species and is haven to much biodiversity.

According to the Final Master Plan from July of 1993, the park plans to maintain the basic use and development pattern, as well as continue to proceed with the development around the existing entry roads and parking areas at the north end of Lake Minnewaska. This portion of the park will have only one entry. The existing main entry will continue to be available for public vehicles, but the westerly entrance will be closed to improve traffic and security.[328] The parking areas will be expanded to provide 290 spots for cars and 10 for buses, trailers, recreational vehicles in the Awosting lot, while the parking lot at the top of the hill will have 300 spots for passenger vehicles.

According to the Master Plan, the Visitor/Interpretive Center, the maintenance area, and the Conservation Education and Research Center will be located near the Lake Minnewaska parking lot. All new structures will be out of view of users around Lake Minnewaska.

"The swimming area will be retained and a boating/ice-skating area will be situated at the existing boat dock. Small, informal picnic areas will be developed near the Visitor/Interpretive Center around the lake's east side."[329]

[326] New York State Office of Parks, Recreation and Historic Preservation: Minnewaska State Park Preserve, <http://nysparks.state.ny.us/parks/info.asp?parkID=78>, June 15, 2007.

[327] Minnewaska State Park: Final Master Plan and Environmental Impact Statement, July 1993.

[328] Ibid. V.B-1.

[329] Ibid.

The plan describes the expansion of the trail system, including possible relocations for aesthetics and circulation. All changes will be made to improve the user experience. In addition to these changes, a pioneer tent camping area will be provided for approximately 100 people. This area will continue to provide parking and access for hunters and hikers.[330]

The Peterskill Area (formerly known as Ski Minne) will now have a 100 car parking area for use by climber and hikers to access this area after and the Peterskill Brook and upper falls area.[331]

Potential noise impacts to the Minnewaska State Park were considered. Noise exposure levels for the 2011 Future No Action Alternative and the mitigated 2011 Preferred Alternative were compared. For the majority of points identified in the Minnewaska State Park the noise exposure levels would be the same or lower with the mitigated 2011 Preferred Alternative. For the remaining eight points noise levels would be higher with the mitigated 2011 Preferred Alternative. The greatest difference would be 2.1 DNL at point 1. See **Figure 5.45**. The change in noise would be less than 3.0 DNL therefore there is no constructive use of the property and no further analysis was conducted for this site.

Shawangunk Ridge State Forest

The Shawangunk Ridge State Forest is located in Ulster County in New York. Covering 1,989 acre land, Shawangunk State Forest is one of the nine major parks and preserves in the Shawangunk Mountains. The Shawangunk Ridge is one of only two ridgetop dwarf Pine Barrens in the world. Twenty-seven rare plant and animal species are documented[332].

Shawangunk State Forest is one of the recommended places to see in New York State. The forest is designated for recreational activities where hunting, trapping, fishing, hiking, camping, and horseback riding are allowed.

"Shawangunk Ridge State Forest is one of the Open Space Institute's signature projects in the New York State Open Space Plan. Acquisition of this property connects several disparate units of state forest preserve thus public access."[333]

Noise analysis showed that the noise exposure levels for all the points located in the Shawangunk Ridge State Forest would be lower with the mitigated 2011 Preferred Alternative than with the 2011 Future No Action Airspace Alternative. Therefore, there is no constructive use of this property and no further noise analysis was conducted for this site.

5.3.5.2 Section 6(f)

The potential for the Proposed Action Airspace Redesign Alternatives, including the Preferred Alternative to impact Section 6(f) resources are presented in Chapter Four,

[330] Ibid.

[331] Ibid.

[332] Nature Conservancy in New York. <http://www.nature.org/wherewework/northamerica/states/newyork/preserves/art12373.html>. The Shawangunk Ridge Coalition. <http://www.shawangunkridge.org/> Department of Environmental Conservation. <http://www.dec.ny.gov/press/33813.html>.

[333] Open Space Institution. <www.osiny.org/projects.asp?type=NY>.

Environmental Consequences. Since the mitigation reduces the environmental impacts associated with the Preferred Alternative, the Section 6(f) analysis and results presented in Chapter Four apply to the mitigated Preferred Alternative as well. See Section 4.4.2 *Section 6(f)* for additional details.

5.3.6 WILD AND SCENIC RIVERS

The Wild and Scenic Rivers Act (PL 90-542, as amended) provides for the protection and preservation of rivers which possess outstandingly remarkable recreational, geologic, fish and wildlife, historic, cultural, and other similar values.

As discussed in Chapter Three, Affected Environment, Section 3.13, Wild and Scenic Rivers, there are several designated National Wild and Scenic Rivers within the Study Area: the Farmington Wild and Scenic River in Connecticut; the White Clay Creek in Delaware and Pennsylvania; the Great Egg Harbor River and the Maurice River in New Jersey; the Upper Delaware Scenic and Recreational River in New York and Pennsylvania; and the Lower Delaware Scenic and Recreational River in Pennsylvania and New Jersey. Since the Airspace Redesign Alternatives involve only air traffic procedural changes and no infrastructure development is required for the changes to take place, there would be no direct significant impacts to these resources.

Potential indirect impacts to Wild and Scenic Rivers were also considered. Indirect impacts may result from changes in noise or aesthetics. Implementation of the mitigated Preferred Alternative would potentially result in changes in noise exposure. None of the change zones associated with the significant, moderate or slight noise impacts extend to include the five Wild and Scenic Rivers identified. Therefore, there would be no noise impacts to the five Wild and Scenic Rivers within the Study Area.

The extent of visual impacts, like noise impacts, is related to how far a particular resource is from the primary airports. The more visible airspace changes are those at lower altitudes which are predominantly near the primary airports. All of the Wild and Scenic Rivers segments identified are at least 15 miles from the primary airports. Proposed airspace changes this far from an airport are not normally visually intrusive because of their distance from the ground. Therefore, it may be concluded that there would be no indirect impacts that adversely affect the natural cultural or recreational values of the Wild and Scenic Rivers.

In summary, there would be no indirect or direct impacts that would adversely affect the natural cultural or recreational values of the Wild and Scenic Rivers. Therefore, there would be no significant impact to Wild and Scenic Rivers and no further analysis is required.

Wild and Scenic Rivers may also be subject to the requirements of Sections 4(f) and 6(f). If a Wild and Scenic River corridor includes historic sites or is designated as a park, recreation area, or wildlife and waterfowl refuge, then Section 4(f) criteria apply. Similarly, if the Wild and Scenic River corridor was acquired or developed with assistance from the LWCF, then Section 6(f) criteria apply. See Section 5.3.4, *Department of Transportation Act Section (4)f, and Land and Water Conservation Fund Act Section 6(f)*, for information regarding the evaluation of 4(f) and 6(f) properties.

5.3.7 FISH, WILDLIFE, AND PLANTS

This section addresses impacts on fish, wildlife, and plants. Section 5.3.7.1 includes discussion of species other than avian species. Section 5.3.7.2 focuses on avian species primarily on migratory birds.

5.3.7.1 Impacts to Fish, Plants and Wildlife other than Avian Species

Potential impacts to fish, wildlife, and plants were evaluated in accordance with FAA Order 1050.1E. A significant impact would occur if the Preferred Alternative would jeopardize the continued existence of federally listed threatened or endangered species or result in the destruction or adverse modification of critical habitat for any species. Federal agencies must, to the extent practicable, and within budgetary limitations prevent the introduction, provide for the control, and minimize the economic, ecological, and human health impacts that are caused by invasive species.

The Preferred Alternative involves only air traffic procedural changes for aircraft in-flight and does not require ground disturbance. It will not destroy or modify critical habitat for any species. Additionally, because the number of flights as well as their origin and destination are the same with the Future No Action Airspace Alternative as with the Preferred Alternative, the Proposed Action would not increase the opportunity for an invasive species to be introduced into the Study Area. Therefore, there are no significant impacts to fish or plants.

Since the Proposed Action includes changes in aircraft routes, the potential for impacts to wildlife is measured by the potential for the Preferred Alternative to result in additional wildlife strikes. See Section 4.7 for detail on wildlife strikes from 1990-2005.

The Preferred Alternative is not expected to result in a change in aircraft strikes involving terrestrial mammals. The strikes involving bats within the Study Area were very small in number and therefore, would not be expected to change as a result of the Preferred Alternative.

5.3.7.2 Avian Species Impacts

This section discusses potential impacts that the mitigated Preferred Alternative would have on avian species. Potential impacts to avian species resulting from changes to aircraft routes are measured by the potential for the Proposed Action to result in increases in the number of bird strikes. Chapter Four, *Environmental Consequences*, Section 4.7.2.1, *Bird Strike Statistics*, provides background information on bird strikes including statistics for bird strikes in the Study Area.

As described in Section 4.7.2.2, *Bird Strike Impact Assessment*, the potential impacts to avian species within Bird Study Areas were considered. The impacts resulting from the Proposed Action Airspace Alternatives including the Preferred Alternative were evaluated where redesign of arrivals/departures occurred within the bounds of the Bird Study Areas. Based on the locations of potential changes to arrival and departures it was determined that impacts should be analyzed within the Bird Study Areas at HPN, ISP, JFK, LGA, EWR and PHL. Since the mitigated Preferred Alternative is the same as the Preferred Alternative within the Bird Study Areas for ISP, and JFK, additional analysis for the mitigated Preferred Alternative is limited to changes within the HPN, LGA, EWR, and PHL Bird Study Areas.

To consider the potential impacts to avian species within the Bird Study Areas a qualitative analysis was conducted. For each of the subject airports, HPN, LGA, EWR, and PHL, the mitigated Preferred Alternative flight tracks were overlayed on the Bird Study Area. The resulting figures were developed for two purposes: to show the location of the changed tracks relative to the avian resources within the Bird Study Areas and to consider the changed flight tracks in relationship to the Future No Action Airspace tracks. The figures show only the flight track backbones and not the dispersion of aircraft around each of the flight track backbones (subtracks) because the general relationship of the tracks to one another and to the avian resources would not be discernable if the subtracks were shown. The following paragraphs summarize the results of the qualitative analysis conducted at the subject airports.

HPN

The departure tracks for the mitigated Preferred Alternative would change from those for both the Preferred Alternative and the Future No Action Airspace Alternative. The departure tracks that would change due to the mitigated Preferred Alternative are shown in **Figure 5.46**. The mitigation adjusted the Preferred Alternative HPN departure tracks to follow their Future No Action Airspace Alternative routes as closely as possible while remaining outside of the EWR expanded airspace. The differences between the track locations for Preferred Alternative and the mitigated Preferred Alternative within the Study Area are minor.

When comparing Figure 4.38, showing all Future No Action Airspace Alternative departure backbone tracks, to Figure 5.46 the discernable change is the addition of flight tracks that pass back over HPN. These aircraft would be well above 3,000 feet AGL and therefore above the altitude where most bird strikes occur.

The arrival tracks for the mitigated Preferred Alternative are the same as those for the Preferred Alternative. The change in arrival tracks, within the HPN Bird Study Area, as a result of the Preferred Alternative were previously addressed in Section 4.7.2.2, *Bird Strike Impact Assessment*

LGA

The departure tracks that changed within the Study Area due to the mitigated Preferred Alternative are shown in **Figure 5.47**. The difference between the Preferred Alternative and the mitigated Preferred Alternative departure tracks are the result of changing the use of the initial departure headings from Runway 31. In the Preferred Alternative the departure headings 350, 005, and 020 were to be used equally. With the mitigation the vast majority of the traffic would be on the 350 and 005 headings leaving the 020 heading to be used only for the morning departure push from 6 am to 7 am. The differences between the track locations for Preferred Alternative and the mitigated Preferred Alternative within the Study Area are minor.

A comparison of Figures 5.47 and 4.55 indicates that, while there are noticeable differences in the flight patterns due to the mitigated Preferred Alternative no discernable changes to the relationships of patterns to resources within the Bird Study Area are evident.

The arrival tracks for the mitigated Preferred Alternative are the same as those for the Preferred Alternative. The change in arrival tracks, within the LGA Bird Study Area, as a result of the Preferred Alternative were previously addressed in Section 4.7.2.2, *Bird Strike Impact Assessment*

EWR

At EWR only departure tracks within the Bird Study Area would change as a result of the mitigated Preferred Alternative; changes to arrival tracks would be outside the Bird Study Area. **Figure 5.48** shows the departure flight tracks that would change due to the mitigated Preferred Alternative. The difference between the mitigated Preferred Alternative and the Preferred Alternative tracks result from the change in Runway 22L/R departure headings and an addition of a nighttime ocean route. Therefore, differences between the mitigated Preferred Alternative and the Preferred Alternative tracks are visible in the area just south of EWR.

A comparison of Figures 5.48 and 4.59 indicates that, while there are noticeable differences in the flight patterns due to the mitigated Preferred Alternative no discernable changes to the relationships of patterns to resources within the bird study areas are evident.

PHL

Figure 5.49 shows the departure flight tracks that would change due to the mitigated Preferred Alternative. The differences between the mitigated Preferred Alternative and the Preferred Alternative tracks result from the reduction of initial departure heading for Runways 9L/R and 27 L/R. **Figure 5.50** shows the arrival flight tracks that would change due to the mitigated Preferred Alternative. The differences between the mitigated Preferred Alternative and the Future No Action Airspace Alternative tracks are due to introduction of CDAs at night for arrivals to Runways 9L/R and 27L/R as well as the increase in use of the river approach to Runway 9R. A comparison of Figures 5.49 and 5.50 to Figures 4.61 and 5.50 indicates that, while there are noticeable differences in the flight patterns due to the mitigated Preferred Alternative, no discernable changes to the relationships of patterns to resources within the bird study areas are evident.

Bald eagle nesting sites identified by the USFWS are within the PHL Bird Study Area. Mapping exercises have shown that these locations are subject to aircraft arrival and departure overflight by the Future No Action Airspace Alternative. Therefore, the changes resulting from the mitigated Preferred Alternative would not move routes to fly over bald eagle nesting sites not currently exposed to aircraft overflights.

All six airports, EWR, HPN, ISP, JFK, LGA, and PHL, have Wildlife Hazard Management Plans in place. The plans promote a comprehensive approach to managing wildlife in the airport environment. See Section 4.7 for more detail on birds of concern and control methods.

In conclusion, impacts to various bird categories would be expected to continue but not necessarily increase as a result of the mitigated Preferred Alternative. Therefore, no significant impacts to bird species would be expected to result from the mitigated Preferred Alternative.

5.3.8 LIGHT EMISSIONS AND VISUAL IMPACTS

The potential for the Proposed Action Airspace Redesign alternatives, including the Preferred Alternative, to result in light emission or visual impacts is described in Chapter Four, *Environmental Consequences*. In Section 4.7 *Light Emissions and Visual Impacts*, it is concluded that the proposed airspace changes at lower altitudes are predominantly near the primary airports where flights are already extensive and, therefore, these changes would not result in a visual contrast with the existing environment nor would they result in significant changes in light emissions to people on the ground. This conclusion applies to the mitigated Preferred Alternative as well.

Because of the unique cultural qualities of Tribal Lands, additional analysis of potential visual impacts on Native American Tribes located within the Study Area was completed. As with the Preferred Alternative, the mitigated Preferred Alternative would result in moderate changes in aircraft routes in the vicinity of the Ramapough Mountain Indian lands. Since this area is already subject to extensive overflights, no significant visual impacts would be expected.

Both the Preferred Alternative and the mitigated Preferred Alternative would result in moderate change to aircraft routes over the Schaghticoke Reservation. Changes to routes over the Schaghticoke Reservation are unlikely to result in significant visual impacts because this area is currently exposed to regular overflights.

Therefore, the mitigated Preferred Alternative would not result in significant visual impacts to Tribal lands within the Study Area.

5.3.9 AIR QUALITY

Prior to publication of the DEIS, the FAA met with the representatives of EPA Regions 1, 2 and 3 to discuss the Proposed Action alternatives and analysis of air quality impacts. (EPA Regions 1, 2, and 3 have jurisdiction over areas with the Study Area.) During these meetings the FAA indicated that no air quality analysis would be undertaken. Several reasons were provided to explain the FAA's assertion that no detailed air quality analysis was required and that no significant air quality impacts would result from the implementation of the Proposed Action. These reasons were:

- The Proposed Action alternatives examined in this EIS are exempt from analysis under the General Conformity Rule. The final rule for Determining Conformity of General Federal Actions to State and Federal Implementation Plans (40 CFR Parts 6, 51, and 93) was published in the Federal Register in 1993. In Section 51.853 (c)(1), the Environmental Protection Agency (EPA) lists actions that are de minimis and, thus, do not require an applicable analysis under this rule. EPA states in the preamble to this regulation that it believes, "air traffic control activities and adopting approach, departure, and en route procedures for air operations" are illustrative of de minimis actions.

- The Proposed Action is not a capacity enhancement project. The total number of aircraft operations would not differ between the Future No Action Alternative and the other Airspace Redesign Alternatives.

- The purpose and need for the Proposed Action includes increasing efficiency and reducing delay in the airspace system. Qualitatively, reduction of delay and more efficient flight routings would serve to reduce fuel burn and thereby reduce air pollutant emissions.

Since the issuance of the DEIS, the FAA was advised by the EPA that it should not use the Preamble to the final rule for Determining Conformity of General Federal Actions to State and Federal Implementation Plans to determine de minimis actions for "air traffic control activities and adopting approach, departure, and en route procedures for air operations." Instead the FAA chose to include "air traffic control activities and adopting approach, departure and enroute procedures for air operations" in its proposed list of presumed to conform actions. The Conformity Rule allows Federal agencies to develop a list of actions that are presumed to conform and prescribes the procedures to do so in the Conformity Rule. On February 12, 2007 issued a Draft Notice, *Federal Presumed to Conform Actions Under General Conformity*, in the Federal Register.[334] In accordance with the General Conformity Rule the FAA included a summary of documentation and analysis which demonstrates that "air traffic control activities and adopting approach, departure and enroute procedures for air operations" would not exceed the applicable de minimis emission levels for nonattainment and maintenance areas as specified under 40 CFR 93.153(b). In the Notice the FAA stated the following:

"Air traffic control activities are defined as actions that promote the safe, orderly, and expeditious flow of aircraft traffic, including airport, approach, departure, and enroute air traffic control. Airspace and airtraffic actions (e.g. changes in routes, flight patterns, and arrival and departure procedures) are implemented to enhance safety and increase the efficient use of airspace by reducing congestion, balancing controller workload, and improving coordination between controllers handling existing air traffic among other things. Although increased efficiency and delay reduction would allow traffic volume to increase, in FAA's experience such actions do not lead to increased annual aircraft operations or changes to the operational level of airports in the vicinity of the air traffic changes. In today's deregulated environment, market forces determine where airlines fly and how often.

Emissions released into the atmosphere above the inversion base for pollutant containment, commonly referred to as the "mixing height," (generally 3,000 ft. above ground level) do not have an effect on pollution concentrations at ground level, Therefore air traffic control actions above the mixing heath are presumed to conform.

In addition, the results of FAA research on mixing heights indicated that changes in air traffic procedures above 1,500 ft. AGL, and below the mixing height would have little if any effect on emissions and ground concentrations. Such actions in the vicinity of the airport are tightly constrained by runway alignment safety, aircraft performance, weather conditions, terrain, and vertical obstructions. Accordingly, air traffic actions below the mixing height are also presumed to conform when modifications to routes and procedures are designed to increase safety, enhance fuel efficiency, or reduce community noise impacts by means of engine thrust reductions. Other air traffic procedures and system enhancements that are presumed to conform include actions that have no effect on air emissions or result in air quality improvement, such as gate hold procedures which reduce queuing, idling, and flight delays."

The FAA also addresses the issue of regional significance in the Notice. According to the Conformity Rule a Federal action that is presumed to conform may still be subject to a general conformity determination if the action is shown to be regionally significant. A regionally significant action is one that results in

[334]Federal Register/Vol. 72, No. 28 / Monday, February 12, 2007 / Notices 6641 -6656.

emissions of any pollutant that represents 10 percent or more of a maintenance or non attainment region's total emission of that pollutant. In the Notice the FAA states:

"The FAA Air Quality Handbook states that an airport project that is presumed to conform is unlikely to have emission levels that are regionally significant. This is because, based on the highest de minimis threshold level (100 tons per year), in order for an action's net emissions to represent 10 percent or more of a maintenance or non attainment area's total emissions of a particular pollutant, the area's total emissions inventory for any pollutant must be less than 1,000 tons, which is unlikely. Based on this rationale, the presumed to conform activities in this Notice are not considered to be regionally significant."

Also in the context of regional emissions, it should be noted that aviation related emissions have consistently been found to contribute much fewer emissions to the regional emission load than other transportation sources. The 2005 FAA released "Aviation and Emissions, a Primer" indicated that JFK, LGA, and EWR airports contributed only four percent NOx (a precursor to Ozone) to the metropolitan area.[335]

FAA received comments on the Notice for 45 days and is in the process of developing the Final Notice. It is expected that air traffic operations will be included in the Final Notice.

[335] Compilation of data from the SIP inventories for New York and New Jersey provided by Mr. Raymond Forde, Region 2, U. S. Environmental Protection Agency, June 16, 2004. Additional data provided by Mr.Kevin McGarry, New York State Department of Conservation and Ms. Tonalee Key, New Jersey Department of Environmental Protection.

Since the Final Notice has not been issued the FAA provided additional evidence that the Proposed Action would not result in emissions that would exceed the applicable de minimis emission levels for nonattainment and maintenance areas. A fuel consumption analysis was conducted for the Preferred Alternative and mitigated Preferred Alternative. The analysis provided in Appendix R, *Effect of the NY/NJ/PHL Airspace Redesign on Aircraft Fuel Consumption*, indicated that the Preferred Alternative with mitigation would reduce aircraft fuel consumption in the Study Area in 2011 by about 194 metric tons per average day. Reduced fuel consumption is directly related to reducing air pollutant emissions.

Therefore, it is concluded that the fuel burn consumption would be reduced with the mitigated Preferred Alternative and thus air pollutant emissions would be reduced and presumed to be de minimis. Lastly the project will not cause a new violation, worsen an existing violation, or delay meeting the National Ambient Air Quality Standards.

5.3.10 NATURAL RESOURCES AND ENERGY SUPPLY

According to FAA Order 1050.1E, "for purposes of the EA or EIS, the proposed action will be examined to identify any proposed major changes in stationary facilities or the movement of aircraft and ground vehicles that would have a measurable effect on local supplies of energy or natural resources."

The mitigated Preferred Alternative would not result in the construction of facilities that would potentially impact known sources of minerals or energy. Additionally, analysis showed that fuel consumption would be reduced with the mitigated Preferred

Alternative as compared to the Future No Action Airspace Alternative.

Therefore, it is not anticipated that the mitigated Preferred Alternative would result in the depletion of local supplies of energy and/or natural resources.

5.3.11 CONSTRUCTION IMPACTS

The implementation of changes to air traffic procedures does not involve any construction activity; therefore, there would be no construction impacts associated with the mitigated Preferred Alternative and no further analysis is required.

5.3.12 FARMLANDS

The Farmland Protection Policy Acts (FPPA) of 1980 and 1995 require identification of proposed actions that would affect any soils classified as prime and unique. Prime farmland contains soil that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses. Unique farmland is land other than prime farmland that is used for the production of specific high value food and fiber crops.

The mitigated Preferred Alternative would not result in the development of facilities. Therefore, no prime and/or unique farmland soils would be impacted and no further analysis is required.

5.3.13 COASTAL RESOURCES

The following sections address two aspects of coastal resources: coastal zone management and coastal barriers.

5.3.13.1 Coastal Zone Management Program

The increasing pressures of over-development upon the nation's coastal resources prompted the U.S. Congress to promulgate the Coastal Zone Management Act (CZMA) in 1972. The CZMA encourages states to preserve, protect, develop, and, where possible, restore or enhance valuable natural coastal resources such as wetlands, floodplains, estuaries, beaches, dunes, barrier islands, and coral reefs, as well as the fish and wildlife using those habitats. A unique feature of the CZMA is that participation by states is voluntary. To encourage states to participate, the act makes federal financial assistance available to any coastal state or territory that is willing to develop and implement a comprehensive coastal management program.

The states of Connecticut, Delaware, New Jersey, New York, and Pennsylvania have initiated coastal zone management programs. However, since the mitigated Preferred Alternative does not impact surface resources, none of the alternatives would impact resources within the CZMP for Connecticut, Delaware, New Jersey, New York, and Pennsylvania.

While only the State of Delaware Department of Natural Resources and Environmental Control Division of Soil and Water Conservation requested that the FAA review the Proposed Action for Consistency with their CMP, federal consistency determinations were prepared in accordance with each state's CZMP. The state of Delaware concurred with the FAA's consistency determination. No correspondence was received from the states of Connecticut, New Jersey, New York, and Pennsylvania regarding the FAA's consistency determinations. All consistency determinations and related correspondence are included in **Appendix K**.

5.3.13.2 Coastal Barriers

The Coastal Barrier Resources Act (CBRA) of 1982 and the Coastal Barrier Improvement Act of 1990 were created to minimize the loss of human life, protect coastal resources, and reduce expenditures and subsidies for coastal development.

The mitigated Preferred Alternative would not result in development of facilities that would adversely impact resources protected under the Coastal Barrier Resource System. Therefore, no further analysis is required.

5.3.14 WATER QUALITY

The mitigated Preferred Alternative involves air traffic procedural changes and would not require the construction of facilities. Therefore, no impacts to water quality would be expected and no further analysis is required.

5.3.15 WETLANDS

Executive Order 11990, Protection of Wetlands, was enacted to avoid, to the extent possible, adverse impacts associated with the destruction or modification of wetlands, and to avoid direct or indirect new construction of wetlands. Wetlands include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds. The mitigated Preferred Alternative would not result in the construction of facilities. Therefore, no wetlands impacts are anticipated and no further analysis is required.

5.3.16 FLOODPLAINS AND FLOODWAYS

Executive Order No. 11988, Floodplain Management, was issued in order to avoid, to the extent possible, the short and long-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practical alternative. The order was issued in furtherance of NEPA, the National Flood Insurance Act of 1968, and the Flood Disaster Protection Act of 1973.

The mitigated Preferred Alternative would not result in the construction of facilities. Therefore, there would not be encroachment upon areas designated as a 100-year flood event area as described by the Federal Emergency Management Agency (FEMA). No further analysis is required.

5.3.17 HAZARDOUS MATERIALS, POLLUTION PREVENTION AND SOLID WASTE

NEPA documentation includes the consideration of hazardous materials and solid waste impacts as well as pollution prevention.

5.3.17.1 Hazardous Materials

The mitigated Preferred Alternative was reviewed for its potential to generate or disturb materials identified as a substance that has been determined to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce (49 CFR Part 172, Table 172.101). This includes hazardous substances and hazardous wastes.

The mitigated Preferred Alternative would not result in any physical disturbances to the ground. In addition, aircraft operational activity is expected to grow with or without the proposed air traffic procedural changes. Therefore, the potential to generate or disturb materials identified as a substance that has been determined to be capable of posing an unreasonable risk to health, safety, and property when transported in commerce is not anticipated.

5.3.17.2 Pollution Prevention

When compared to the Future No Action Airspace Alternative, the mitigated Preferred Alternative would result in reduced fuel consumption and less pollution.

5.3.17.3 Solid Waste

The mitigated Preferred Alternative would not result in solid waste impacts that are associated with the potential long-term generation of municipal solid waste (MSW) nor would it result in a physical disturbance to the ground or construction debris. In addition, aircraft operational activity is expected to grow with or without the proposed airspace changes, therefore the potential for impacts as it relates to solid waste is not anticipated.

5.3.18 CUMULATIVE IMPACTS

Consideration of cumulative impacts applies to the impacts resulting from the implementation of the Proposed Action as well as other actions. The concept of cumulative impacts addresses the potential for individually minor but collectively significant impacts to occur over time. Council on Environmental Quality Regulations, Section 1508.7, defines "Cumulative Impact" as the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of the agency, Federal or non-Federal, undertaking such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time.

Cumulative impacts in respect to the Proposed Action Airspace Redesign Alternatives, including the Preferred Alternative are presented in Chapter Four, *Environmental Consequences*. Since the mitigation reduces the environmental impacts associated with the Preferred Alternative, the cumulative impact analysis and results presented in Chapter Four apply to the mitigated Preferred Alternative as well. See Section 4.17, *Cumulative Impacts*, of Chapter Four for additional details.

Chapter Six
PUBLIC INVOLVEMENT AND AGENCY COORDINATION

In accordance with NEPA guidelines, the FAA has involved the public and other agencies, with jurisdiction or special knowledge, in the impact assessment process. This chapter summarizes actions that the FAA has taken to inform and involve the public and agencies during the NEPA process.

Public involvement and agency coordination included informal pre-scoping meetings, formal scoping meetings, agency meetings, public information meetings, newsletters, and a website. During the informal pre-scoping and formal scoping period for the EIS, the public and agencies were given the opportunity to assist in determining the scope of issues to be addressed in this EIS. After the scoping meetings, the FAA held a number of agency meetings, distributed newsletters, and created a web site to educate, inform, and receive feedback from concerned citizens and organizations. Upon publication of the DEIS the FAA held 30 public information meetings. The public meetings were specifically developed to enhance public participation in the NEPA process by allowing for one on one discussion between the public and air traffic/environmental staff. Since specific mitigation measures were not included in the DEIS, the FAA published a Noise Mitigation Report and followed up with additional public meetings to discuss the proposed mitigation measures. The sections that follow provide a brief description of the public involvement and agency coordination conducted during the EIS process for the NY/NJ/PHL Metropolitan Airspace Redesign.

6.1 PRE-SCOPING

The FAA recognized that this project had the potential to be viewed as controversial based on potential environmental impacts. Additionally, public reaction to a previous airspace redesign project, the Expanded East Coast Plan, indicated that the NY/NJ/PHL Metropolitan Airspace Redesign had the potential to be controversial. In recognition of the potential for controversy, the FAA held extensive pre-scoping meetings to understand critical public issues and to improve public understanding of the proposed airspace redesign.

The pre-scoping workshops on airspace redesign provided a forum for informal discussions between the public and experienced FAA personnel. The goal of the workshops was to gather critical public comment prior to the formal scoping process. The pre-scoping process was intended to provide the following benefits:

- Increased partnership with the public early in the redesign phase,
- Expanded design options in the beginning of the project,
- Increased understanding of critical public issues that will need to be addressed as the project proceeded,

- Improved public understanding of the project and its goals in order to facilitate meaningful discussions concerning project alternatives, and

- Development of a more comprehensive project.

Several methods were used to announce the community workshops, including sending workshop announcements to interested parties, advertising in major and local newspapers, and conducting press briefings. Thirty-one workshops were held between September 22, 1999 and February 3, 2000. The date and location for each workshop is shown in **Table 6.1**. The workshop format included a short introductory presentation followed by an open forum where participants could discuss the airspace redesign individually with experienced FAA personnel. Displays illustrated key project information, such as the airspace redesign concepts. The same information was presented at each workshop. Materials distributed included: a point of contact brochure containing address, phone, fax, and e-mail of the lead contractor; airport flight operations at the major airports for the years of 1990, 1995, and 1998; aircraft noise brochures published by FAA Eastern Region; FAA Air Traffic Environmental Guide; and an Airspace Redesign Project Newsletter. Displays included: a presentation covering the purpose of the meetings, description of the project and the redesign concepts, maps depicting actual aircraft radar tracks, and the NEPA process.

A total of 1,174 people attended the workshops and 712 comments were received. A summary of the comments received at each workshop is included in Appendix L.

6.2 NOTICE OF INTENT

On January 22, 2001 the FAA Eastern Region published a Notice of Intent (NOI) to prepare an EIS in the Federal Register. The announcement stated that the EIS would assess the potential environmental impacts resulting from the proposed modifications to air traffic routings in the Study Area. The NOI provided information on the scoping process including the following:

- General information regarding public scoping meetings,

- Standard and electronic mail addresses where comments could be submitted, and

- Web site address and a toll free number where additional information such as the scoping meeting locations and schedule could be obtained.

Advertisements summarizing the NOI and mentioning the scoping meeting schedule and locations were published on January 18, 2001 in the following newspapers: *New York Daily News*, *Newsday*, *The Advocate* (CT), *The Journal News* (NY), *Newark Star Ledger*, *Philadelphia Daily News*, *El Diario* (NY/Spanish) and *The Village Voice* (NY). A copy of the NOI is provided in Appendix L.

6.3 FORMAL SCOPING

In accordance with NEPA and regulations set forth by CEQ, a formal scoping process was conducted for the NY/NJ/PHL Metropolitan Area Airspace Redesign EIS. The formal scoping process is intended to encourage and facilitate early public involvement in the environmental process. The objectives of the scoping process and associated public meetings were:

Table 6.1
Pre-Scoping Workshops

Location	Date
Waterbury, CT	September 22, 1999
Danbury, CT	September 23, 1999
Kingston, NY	September 28, 1999
Stamford, CT	September 29, 1999
New York, NY	September 30, 1999
Yonkers, NY	October 5, 1999
Bronx, NY	October 6, 1999
New Rochelle, NY	October 7, 1999
East Elmhurst, NY	October 12, 1999
Uniondale, NY	October 13, 1999
Staten Island, NY	October 14, 1999
Montclair, NJ	November 3, 1999
Hasbrouck Heights, NJ	November 4, 1999
Newark, NJ	November 9, 1999
Elizabeth, NJ	November 10, 1999
Carteret, NJ	November 16, 1999
Edison, NJ	November 17, 1999
Springfield, NJ	November 18, 1999
Bridgewater, NJ	December 1, 1999
Parsippany, NJ	December 2, 1999
Bordentown, NJ	December 7, 1999
Philadelphia, PA	December 8, 1999
Wilmington, DE	December 9, 1999
Hazlet, NJ	December 14, 1999
Toms River, NJ	December 15, 1999
Tinton Falls, NJ	December 16, 1999
New York, NY	January 11, 2000
White Plains, NY	January 12, 2000
Weehawken, NJ	January 13, 2000
Bronx, NY	January 19, 2000
Jamaica, NY	February 3, 2000

- To provide a description of the proposed action to interested parties and participants in the EIS process,
- To provide an early and open process to determine the scope of issues to be addressed in the EIS,
- To identify potentially significant issues or impacts related to the proposed action that should be analyzed in the EIS,
- To identify any coordination efforts associated with the proposed action that are outside Federal requirements, and
- To identify and eliminate from detailed study those issues that are not deemed significant to the study.

The formal scoping period was January 22, 2001 through June 29, 2001. The scoping process consisted of 28 meetings held in various locations throughout the Study Area. The date and location for each meeting is shown in **Table 6.2**. In addition to a presentation and question and answer session, exhibits depicting potential environmental concerns and computer modeling processes were on display. A court recorder was available to record individual comments and an area was provided for the public to write and submit written comments.

A total of 1,031 people attended the scoping meetings and 901 comments were received. A summary of the comments received at each meeting is included in Appendix L.

6.4 AGENCY COORDINATION

In addition to formal scoping meetings, the FAA coordinated with agencies which had jurisdiction or special knowledge relative to the Airspace Redesign project on an as needed basis. Consultation was conducted throughout the EIS process and in a variety of manners including meetings, written correspondence, and telephone conversations.

Table 6.2
Formal Scoping Meetings

Location	Date
Danbury, CT	February 7, 2001
Kingston, NY	February 8, 2001
White Plains, NY	February 12, 2001
Stamford, CT	February 13, 2001
New Rochelle, NY	February 14, 2001
Newark, NJ	March 6, 2001
Carteret, NJ	March 7, 2001
Edison, NJ	March 8, 2001
Clifton, NJ	March 12, 2001
Hasbrouck Heights, NJ	March 13, 2001
Park Slope, Brooklyn, NY	March 14, 2001
Springfield, NJ	March 20, 2001
Somerville, NJ	March 21, 2001
Parsippany, NJ	March 26, 2001
Jersey City, NJ	March 27, 2001
Tottenville, Staten Island, NY	March 28, 2001
Uniondale, NY	April 3, 2001
Lawrence, NY	April 4, 2001
Elmhurst, Queens, NY	April 5, 2001
NW Staten Island, NY	April 24, 2001
Manhattan, NY	April 25, 2001
Bronx, NY	April 26, 2001
Glen Mills, PA	May 14, 2001
Toms River, NJ	May 15, 2001
Tinton Falls, NJ	May 16, 2001
Talleyville, DE	May 22, 2001
Philadelphia, PA	May 23, 2001
Trenton, NJ	May 24, 2001

The agencies were encouraged to share their concerns or comments regarding the Airspace Redesign project. **Table 6.3** provides a sampling of the agencies consulted. More information regarding agency coordination is included in Appendices L and M.

6.5 DEIS PUBLIC INFORMATION MEETINGS

Public information meetings were held from February 2006 through May 2006. On February 16, 2006 emails were sent to over 580 residents listing the specific meeting locations and on February 24, 2006 postcards were sent to over 3,200 residents with specific meeting locations. Each meeting was publicized through multiple local newspapers and radio stations. The public meeting process consisted of 30 meetings held in various locations throughout the Study Area. The date and location for each meeting is shown in **Table 6.4.**

The meetings typically began with a short video presentation. This was followed by an open forum where the public could engage in one on one discussion with air traffic/environmental experts. Exhibits depicting the environmental and computer modeling processes were on display to facilitate these discussions. During the final hour of the meeting, a panel made up of project team members responded to the audience questions in a group setting. The project team would usually extend the meeting beyond the scheduled time if questions were still being addressed. Questions and answers during the panel portion of the meeting were not recorded for the formal record. A court recorder was available to record individual comments and an area was provided for the public to write and submit written comments.

A total of 1,166 people attended the public meetings and a total of 321 written and oral comments were received. Details regarding the advertisement of and attendance at the public information meetings are included in Appendix M.

6.6 PUBLIC AND AGENCY COMMENT ON THE DEIS

The EPA published a Notice of Availability (NOA) for the DEIS in the Federal Register on December 30, 2005. In addition, 2,800 newsletters were sent out to notify residents of the release of the DEIS, as well as provide locations where the DEIS could be found and contact information. Both the NOA and the newsletter stated that FAA would accept comments regarding the DEIS until June 1, 2006. On May 30th 2006, the FAA announced that the comment period would be extended to July 1, 2006 based on numerous requests from public officials and other interested parties. On June 6th, postcards noting the extension of the comment period were mailed out to 3,800 residents and public officials.

The FAA reviewed and responded to all comments received during the comment period. Comments from letters/e-mails/ transcripts from agencies, elected officials, and special interest groups were reviewed and responses were provided. Appendix N includes each of these letters/e-mails/transcripts with the specific comments highlighted and numbered. Each piece of correspondence is followed by a table of responses coded to correspond to the numbered comments in the original correspondence.

Responses were also prepared for the comments from the general public. Since many people had the same or similar comments, these comments were grouped

Table 6.3
Sampling of Agencies and Organizations Consulted

Airline Pilots Association
Brandywine Hundred, Delaware
Connecticut State Department of Transportation
Connecticut State Historic Preservation Officer
Delaware Department of Natural Resources and Environmental Control
Delaware State Historic Preservation Officer
Delaware Valley Regional Planning Commission
Eastern Region Helicopter Council
Environmental Protection Agency Regions 1, 2, and 3
Manhattan Borough President, Manhattan Borough President’s Helicopter Task Force
Metropolitan New York Aircraft Noise Mitigation Committee (Governor’s Group of Nine)
Mid-Atlantic Federal Partners for the Environment
NBAA Users Forum
New England Airspace/Range Council
New Jersey Coalition Against Aircraft Noise
New Jersey Department of Environmental Protection
New Jersey Department of Transportation
New Jersey State Commerce Department
New Jersey State Historic Preservation Officer
New York Department of Transportation
New York State Department of Environmental Conservation
New York State Historic Preservation Officer
Newark International Airport Aircraft Advisory Committee
New Jersey Acting Governor and Director of Aeronautics
Pennsylvania Department of Environmental Protection
Pennsylvania Department of Transportation
Pennsylvania State Historic Preservation Officer
Philadelphia Airport Authority
Port Authority of New York/New Jersey
Queens Borough President’s Aviation Advisory Committee
State Aviation Directors
Town and Village Aviation Safety/Noise Abatement Committee
Transportation Research Board
US Department of Homeland Security
US Department of Interior, National Park Service and Fish and Wildlife Service

Table 6.4
DEIS Public Meeting Schedule

Location	Date
White Plains, NY	February 7, 2006
Stamford, CT	February 8, 2006
Larchmont, NY	February 9, 2006
SW Staten Island, NY	February 15, 2006
NW Staten Island, NY	February 16, 2006
Carteret, NJ	February 22, 2006
Elizabeth, NJ	February 23, 2006
Edison, NJ	February 27, 2006
Princeton, NJ	February 28, 2006
Tinton Falls, NJ	March 1, 2006
Toms River, NJ	March 2, 2006
Lawrence, NY	March 13, 2006
Hempstead, NY	March 14, 2006
Elmhurst, NY	March 15, 2006
Springfield, NJ	March 21, 2006
Jersey City, NJ	March 22, 2006
North Branch, NJ	March 23, 2006
Paulsboro, NJ	March 27, 2006
Wilmington, DE	March 28, 2006
So. Philadelphia, PA	March 29, 2006
Ridley Park, PA	March 30, 2006
Parsippany, NJ	April 4, 2006
Clifton/Totowa, NJ	April 5, 2006
Hasbrouck Heights, NJ	April 6, 2006
Kingston, NY	April 10, 2006
Danbury, CT	April 11, 2006
Park Slope, Brooklyn, NY	April 25, 2006
Bronx, NY	April 26, 2006
Manhattan, NY	April 27, 2006
Howard Beach, NY	May 2, 2006

and summarized. Responses are provided for each of the comment categories.

All comments and responses are included in Appendix N.

6.7 MITIGATION PUBLIC INFORMATION MEETINGS

On April 6, 2007, the FAA published its Noise Mitigation Report, providing detailed information on mitigation measures for its Preferred Alternative. FAA informed the public of its availability through the FAA website and provided copies of the report to 71 libraries within the Study Area. Prior to meeting with the public, the FAA undertook an extensive "grass roots" public announcement effort. Advertisements were run in major local papers with circulation in the affected areas, federal/state/local public officials were contacted directly via phone and informed of the upcoming public meetings and Public Service Announcements were run on several local radio stations. Specific details on this effort are contained in *Appendix M*. Following the formal outreach, the FAA conducted seven public information meetings to discuss the Preferred Alternative and the proposed mitigation measures. The final two mitigation meetings were coordinated directly with US Congressman Garrett and Andrews of NJ in order to ensure that appropriate sites were selected. The date and location of each meeting is shown in **Table 6.5**. The format of the meetings was identical to that used for the DEIS public information meetings. Over 2,200 people attended the mitigation meetings and approximately 1700 written and oral comments were received.

Table 6.5
Mitigation Public Information Meetings

Location	Date
East Elmhurst, NY	April 23, 2007
Stamford, CT	April 24, 2007
Newark, NJ	April 25, 2007
Wilmington, DE	April 30, 2007
Essington, PA	May 1, 2007
Cherry Hill, NJ	June 27, 2007
Woodcliff Lake, NJ	June 28, 2007

6.8 PUBLIC AND AGENCY COMMENT ON THE PREFERRED ALTERNATIVE AND PROPOSED NOISE MITIGATION

The FAA accepted comments on the Noise Mitigation Report via the US Postal Service as well as the project website through May 11, 2007. Comments were also accepted at the Mitigation public information meetings both in writing and verbally through a certified court recorder. All comments submitted on the mitigation strategies during the comment period, and the associated FAA responses are included in Appendix Q.

6.9 OTHER COMMUNITY INVOLVEMENT

The FAA has engaged in several initiatives to educate and involve the public in the Airspace Redesign Project. These activities are summarized in the following sections.

6.9.1 Media Outreach

Since its inception, the agency has sought to bring to the public's attention the details of the airspace redesign project through news outlets in the five state study area. FAA has used press releases, media advisories, and briefings as part of this media outreach effort. Wherever possible, the agency has always accommodated any media requests for individual or group interviews on issues perceived to be of a controversial nature.

The following is a sampling of press briefings that the FAA held for regional press at project milestones:

- September 20, 1999, press briefing at Eastern region building at JFK to announce pre-scoping meetings,
- January 30, 2001, telephone briefing to announce scoping meeting schedule,
- December 17, 2001, briefing to announce Yardley-Robbinsville flip flop procedure,
- November 6, 2006, briefing for Philadelphia Inquirer at Philadelphia International Airport traffic control tower,
- March 23, 2007, telephone briefing on preferred alternative selection, and
- April 6, 2007, telephone briefing on noise mitigation report.

6.9.2 Newsletters, Postcards and Email

A series of newsletters was prepared and distributed to the mailing list over the course of the project. The newsletters are included in *Appendices L and M.*

Postcards and email were also used to disseminate important project information. See Sections 6.6 and 6.7 for specific descriptions of how these materials were used to inform the public.

6.9.3 Web Site

A World Wide Web site was established for the NY/NJ/PHL Metropolitan Airspace Redesign project in 2002. The web site has been providing the following information since its inception:

- All public meeting locations, times and formats, as well as all meeting displays.
- Copies of all relevant project documentation, such as the scoping report, operational analysis, DEIS, Noise Mitigation Report, and the FEIS. In the Future, the site will include the Record of Decision.
- Noise Exposure Tables which includes the calculated noise exposure level (DNL) in every populated census block for each of the proposed Airspace Redesign Alternatives. Website visitors may use these tables to determine what the noise exposure levels would be at their location as a result of any of the proposed Airspace Redesign Alternatives
- Toll free phone number to contact project personnel concerning any aspect of the project.
- Electronic comment input section. The project received over 1000 comments on the mitigation strategy's during the mitigation comment period through the website. These comments are addressed in Appendix Q of the FEIS.

The website is located at http://www.faa.gov/airports_airtraffic/air_traffic/nas_redesign/regional_guidance/eastern_reg/nynjphl_redesign/. The website has had numerous visitors. For example, **Table 6.6** represents the activity on the website during the mitigation phase of the Airspace Redesign Project.

6.9.4 Project Briefings

Periodic briefings were conducted for members of Congress, the New Jersey and Delaware Congressional delegations, and various Governors' offices.

Table 6.6
Website Use During the Mitigation Phase

Month	**Views**[1]	**Visits**[2]
April 2007	13,075	6,472
May 2007	38,629	19,051
June 2007	35,155	16,816

Notes: (1) Views are tallied when a website visitor accesses different pages in the website.
(2) Visits are tallied when the main website is initially accessed by a website visitor.

Source: Sane Solutions, LLC analysis, 2007.

Chapter Seven
LIST OF ACRONYMS, ABBREVIATIONS AND GLOSSARY OF TERMS IN THIS EIS

7.1 LIST OF ACRONYMS AND ABBREVIATIONS

ABE	Allentown/Lehigh Valley International Airport
ACY	Atlantic City International Airport
ADIZ	Air Defense Identification Zone
AFFF	Aqueous Film Forming Foam Agent
AGL	Above Ground Level
AIM	Aeronautical Information Manual
AIP	Airport Improvement Plan
AMP	Airspace Management Program
AIR-21	Aviation Investment and Reform Act for the 21st Century
AOP	Airline Operations Centers
APO	Federal Aviation Administration's Office of Aviation Policy and Plans
APE	Area of Potential Effect
ARD	Yardley, Pennsylvania Fix
ARFF	Airport Rescue and Fire Fighting
ARTCC	Air Route Traffic Control Center
ATC	Air Traffic Control
ATCSCC	Air Traffic Control System Command Center, Command Center
ATCT	Airport Traffic Control Tower
BCR	Bird Conservation Region
BDL	Bradley International Airport

BDR	Bridgeport/Igor I. Sikorsky Memorial Airport
BRAC	Base Realignment and Closure Commission
CAA	Clean Air Act
CBRA	Coastal Barriers Resources Act
CDA	Continuous Descent Approach
CDW	Caldwell/Essex County Airport
Center	Air Route Traffic Control Center
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CIFRR	Common IFR Room
CMP	Coastal Management Program
CO	Carbon Monoxide
CTAP	Chicago Terminal Airspace Project
CTAS	Center/TRACON Automation System
CWA	Clean Water Act
CZMA	Coastal Zone Management Act
CZMP	Coastal Zone Management Program
dB	Decibel
DC	District of Columbia
DCMP	Delaware Coastal Management Program
DME	Distance Measuring Equipment
DNL	Day-Night Average Sound Level
DNREC	Delaware Department of Natural Resources and Environmental Control
DOT	Department of Transportation (United States)
DP	Departure Procedure

DRVSM	Domestic Reduced Vertical Separation Minimum
DSWC	DNREC Division of Soil and Water Conservation
EECP	Expanded East Coast Plan
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency (United States)
ETMS	Enhanced Traffic Management System
EWR	Newark International Airport
FAA	Federal Aviation Administration
FACT	Future Airport Capacity Task
FAR	Federal Aviation Regulations
FEMA	Federal Emergency Management Agency
FICON	Federal Interagency Committee on Noise
FOK	Westhampton Beach/The Francis S. Gabreski Airport
FPPA	Farmland Protection Policy Act
FR	Federal Register
FRG	Republic Airport
FY	Fiscal Year
GAO	Government Accountability Office
GPS	Global Positioning System
HDR	High Density Rules
HPN	White Plains/Westchester County Airport
HVN	New Haven/Tweed-New Haven Airport
IAP	Instrument Approach Procedure
ICAO	International Civil Aviation Organization
ICC	Integrated Control Complex

IFR	Instrument Flight Rules
ILG	Wilmington/New Castle County Airport
ILS	Instrument Landing System
IMC	Instrument Meteorological Conditions
INM	Integrated Noise Model
ISP	Long Island MacArthur Airport
JFK	John F. Kennedy International Airport
LAAS	Local Area Augmentation System
LDA	Localizer Directional Aid
LDJ	Linden Airport
LGA	LaGuardia Airport
LWCF	Land and Water Conservation Fund
MASE	Midwest AirSpace Enhancement
MMU	Morristown Municipal Airport
MOA	Military Operations Areas
MSL	Mean Sea Level
MSW	Municipal Solid Waste
MXE	Modena Airspace Fix
N90	New York TRACON
NAAQS	National Ambient Air Quality Standards
NAR	National Airspace Redesign
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NAVAID	Navigation Aid
NDB	Non-Directional Beacon

NEPA	National Environmental Policy Act
NIRS	Noise Integrated Routing System
NJCAAN	New Jersey Coalition Against Aircraft Noise
NJCER	New Jersey Citizens for Environmental Research, Inc.
NM	Nautical Miles
NO_2	Nitrogen Dioxide
NOAA	National Oceanographic and Atmospheric Administration
NO_x	Nitrogen Oxides
NOI	Notice of Intent
NPS	National Park Service
NRHP	National Register of Historic Places
NST	Noise Screening Tool
NYICC	New York Integrated Control Complex
NY/NJ/PHL	New York/New Jersey/Philadelphia
O_3	Ozone
OEP	Operational Evolution Plan
OPSNET	Operational Network
ORD	Chicago O'Hare International Airport
PANYNJ	Port Authority of New York and New Jersey
Pb	Lead
PCT	Potomac Consolidated TRACON
pFAST	Passive Final Approach Spacing Tool
PHL	Philadelphia International Airport
PM-2.5	Particulate Matter less than 2.5 micrometers in diameter
PM-10	Particulate Matter less than 10 micrometers in diameter

PNE	Northeast Philadelphia Airport
RBV	Robbinsville, New Jersey Fix
RJ	Regional Jet
RNAV	Area Navigation
ROD	Record of Decision
ROMA	Route Optimization and Mitigation Analysis
SDAISA	State Designated American Indian Statistical Areas
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
SWAP	Severe Weather Avoidance Plans
SWF	Newburgh/Stewart International Airport
TAAM	Total Airspace & Airport Modeler
TACAN	Tactical Air Navigation Equipment
TAF	Terminal Area Forecast
TEB	Teterboro Airport
TMI	Traffic Management Initiative
TMS	Traffic Management Systems
Tower	Airport Traffic Control Towers
TRACON	Terminal Radar Approach Control
TTN	Trenton/Mercer County Airport
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
VFR	Visual Flight Rules
VMC	Visual Meteorological Conditions

VOC	Volatile Organic Compound
VOR	VHF Omni-directional Radio Range Station
VORTAC	VHF Omni-directional Range with Tactical Air Navigation
WAAS	Wide Area Augmentation System
WRI	McGuire Air Force Base
ZBW	Boston Air Route Traffic Control Center
ZDC	Washington Air Route Traffic Control Center
ZNY	New York Air Route Traffic Control Center

7.2 GLOSSARY OF TERMS

A-Weighted Sound Level – A quantity, in decibels, read from a standard sound-level meter with A-weighting circuitry. The A-weighting scale discriminates against the lower frequencies below 1000 hertz according to a relationship approximating the auditory sensitivity of the human ear. The A-weighted sound level is approximately related to the relative "noisiness" or "annoyance" of many common sounds.

Acoustics – The science of sound, including the generation, transmission, and effects of sound waves, both audible and inaudible.

Air Carrier – An entity holding a Certificate of Public Convenience and Necessity issued by the Department of Transportation to conduct scheduled air services over specified routes and a limited amount of non-scheduled operations.

Air Pollutant – Any substance in air that could, in high enough concentration, harm man, other animals, vegetation, or material. Pollutants may include almost any natural or artificial composition of airborne matter capable of being airborne. They may be in gases, particulates, or in combinations thereof. Generally, they fall into two main groups: (1) those emitted directly form identifiable sources and (2) those produced in the air by interaction between two or more primary pollutants, or by reaction with normal atmospheric constituents, with or without photoactivation.

Air Route Traffic Control Center (ARTCC, Center) – An FAA facility established to provide air traffic control service to aircraft operating on an IFR flight plan within controlled airspace and principally during the en-route phase of flight. When equipment capabilities and controller workload permit, certain advisory/assistance services may be proved to VFR aircraft.

Air Taxi – An air carrier certificated in accordance with Part 135 and authorized to provide, on demand, public transportation of persons and property by aircraft. Generally operates small aircraft "for hire" for specific trips.

Air Traffic Clearance – An authorization by air traffic control for the purpose of preventing collision between known aircraft, for an aircraft to proceed under specified traffic conditions within controlled airspace.

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

Airport Traffic Control Tower (ATCT, Tower) – A facility that uses air/ground communications, visual signaling, and other devices to provide ATC services to aircraft operating in the vicinity of an airport. Authorizes aircraft to land or take-off at the airport controlled by the tower regardless of flight plan or weather conditions.

Airspace – Navigable area used by aircraft for purposes of flight.

Airspace complexity – A function of the degree to which aircraft routes are intermingled, with more route crossings resulting in more complex airspace. Complexity is also related to the number of aircraft, types of aircraft, and duration of a flight in a particular volume of airspace.

Airway – A control area or portion of established in the form of a corridor, the center line of which is the defined by radio navigational aids. The network of airways serving aircraft operations up to but not including 18,000 feet MSL are referred to as “Victor” airways. The network of airways serving aircraft operations at or above 18,000 feet MSL are referred to as “Jet” airways.

Altitude – Height above a reference point, usually expressed in feet. Reference points are typically sea level, the ground, or airfield elevation in which case MSL, AGL or AFE further describes the altitude, respectively.

Ambient Noise Level – The level of noise that is all-encompassing within a given environment for which a single source cannot be determined. It is usually a composite of sounds from many and varied sources near to and far from the receiver.

Area Navigation (RNAV) – A method of navigation that permits aircraft operation on any desired course within the coverage of station-referenced navigation signals or within the limits of a self-contained system capability.

Arithmetic Averaged Sound Pressure Level – The arithmetic sum of a series of sound pressure levels divided by the number of levels included in the sum.

Arrival distance below 18,000 feet – The metric used to calculate changes in complexity associated with arrivals. This metric is the average distance flown by the arriving aircraft flying from 18,000 feet to landing.

Attainment Area – An area in which the Federal or state standards for ambient air quality are being achieved.

Based Aircraft – Active aircraft which are stationed at an airport on a permanent basis.

Block – Census blocks are small areas bounded on all sides by visible features such as streets, roads, streams, and railroad tracks, and by invisible boundaries such as city, town, township, and county limits; property lines; and short, imaginary extensions of streets and roads. Blocks are numbered uniquely within each census tract or block numbering area (BNA). A three-digit number identifies a block, sometimes with a single alphabetical suffix. The U.S. Bureau of Census designates census blocks.

Block time – The average time a flight takes to fly from gate to gate in a 24 hour period.

Centroid – A point representing the geographic center of a US Bureau of Census census block.

Change in Route Length Per Flight – The difference between the distance flown for the Future No Action Airspace Alternative and each of the other Alternatives.

Clearance – *See Air Traffic Clearance.*

Climb – The act or instance of increasing altitude.

Common Automation Platform - Includes shared displays on screens, radar data processing and presentation, and communications.

Conformity – A determination that a project conforms with a State Implementation Plan (SIP) whose purpose is to eliminate or reduce the severity and number of violations of the National Ambient Air Quality Standards; and does not impede the scheduled attainment of such standards.

Controlled Airspace – Airspace of defined dimensions within which air traffic control service is provided to IFR flights and to VFR flights in accordance with the airspace classification.

Corner Post – An airspace structure wherein arriving aircraft are routed to one of four arrival fixes located at the corners of the TRACON airspace, at approximately 90-degrees from one another. A straight track from the arrival fix to the major airport is used to route arriving aircraft; therefore, there are four primary arrival routes in a corner post system. Departing aircraft are routed via several departure routes that use the airspace between the arrival routes. This effectively segregates arriving and departing aircraft into different sections of airspace.

Criteria Pollutants – The 1970 amendments to the Clean Air Act required EPA to set National Ambient Air Quality Standards for certain pollutants known to be hazardous to human health. EPA has identified and set standards to protect human health and welfare for six pollutants: ozone, carbon monoxide, total suspended particulates, sulfur dioxide, lead, and nitrogen oxide. The term, "criteria pollutants" derives from the requirement that EPA must describe the characteristics and potential health and welfare effects of these pollutants. It is on the basis of these criteria that standards are set or revised.

***de minimis* Levels –** *de minimus* levels are levels and vary according to the type of pollutant and severity of the non-attainment area. These levels are consistent for all conformity determinations (unless the State chooses to set lower *de minimis* levels and apply the conformity requirements to non-federal as well as Federal entities). The calculation of total project emissions is made and the difference before the Proposed Project emissions and the No Action emissions are compared to these *de minimis* cutoffs. If the emissions for a pollutant are above *de minimis*, the project requires a conformity determination. All emissions from the project must be analyzed and found to conform, not only those above the *de minimis* levels.

Departure – The act of an aircraft taking off from an airport.

Departure Procedure – A preplanned IFR ATC departure procedure printed for pilot use in graphic and/or textual form. DP's provide transition from the terminal to the appropriate en route structure.

Descent – The process of decreasing altitude.

Distance Measuring Equipment (DME) – Equipment (airborne and ground) used to measure, in nautical miles, the slant-range distance of an aircraft from the DME navigational aid.

Day-Night Average Sound Level (DNL) – A measure of the annual average noise environment over a 24-hour day. It is the 24-hour, logarithmic- (or energy-) average, A-weighted sound pressure level with a 10-decibel penalty applied to the nighttime event levels that occur between 10 p.m. and 7 a.m.

Decibel (dB) – Commonly used to define the level produced by a sound source. The term used to identify 10 times the common logarithm of two like quantities proportional to power, such as sound power or sound pressure squared.

Delay – The primary measure of the operational efficiency of the airspace system. Delays in the airspace system are the result of congestion and severe weather.

Emissions – Pollution discharged into the atmosphere from stationary sources such as smokestacks, surface areas of commercial or industrial facilities, residential chimneys, and from mobile sources such as motor vehicles, locomotives, or aircraft exhausts.

Energy-Averaged Sound Pressure Level – The logarithmic sum of the sound power of a series of sound pressure levels divided by the number of levels included in the sum.

Enplanement – The total number of revenue passengers boarding aircraft, including originating, stopover, and transfer passengers, in scheduled and non-scheduled services.

En Route Airspace – A general term to describe the airspace controlled by an ARTCC.

End of Day's Last Arrival Push – The time when the final bank of scheduled flights for all of the modeled airports enters the TRACON system.

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

Equivalent Sound Level (L_{eq}, LAEQ, LAEQD or LAEQN) – The level of a constant sound which, in the given situation and time period, has the same average sound energy, as does a time-varying sound. Specifically, equivalent sound level is the energy-averaged sound pressure level of the individual A-weighted sound pressure levels occurring during the time interval. The time interval over which the measurement is taken (or for which the metric is computed) should always be specified. For example, if the time interval is the daytime period (7 a.m. to 10 p.m.) then the acronym LAEQD is used. Similarly, if the time interval is the nighttime period (10 p.m. to 7 a.m.) then the acronym LAEQN is used.

Expanded East Coast Plan (EECP) – A comprehensive revision (prepared in 1986 and implemented in stages) of IFR routes and procedures above 3,000 feet. The plan was designed, to restructure routes to and from the New York metroplex to complement improved terminal ATC procedures, to reduce delays, to adjust arrival and departure corridors and facilitate air traffic management.

Family – According to the U.S. Census Bureau, a family consists of two or more people, one of whom is the householder, related by birth, marriage, or adoption and residing in the same housing unit.

Federal Aviation Administration (FAA) – The Federal Aviation Administration (FAA) is the element of the United States government with primary responsibility for the safety of civil aviation. Among its major functions are the regulation of civil aviation to promote safety and fulfill the requirements of national defense and development and operation of a common system of air traffic control and navigation for both civil and military aircraft.

Federal Airway – *See Airway.*

Fix – A geographical position determined by reference to the surface, by reference to one or more NAVAIDs or area navigation (RNAV) (including GPS).

Flexibility – Generally defined as the ability of the system to respond to changes in user preferences.

Flight Data Information – Specific information used by ATC for an individual flight. This includes information such as aircraft identification, destination, type, route, and altitude.

Flight Data Processing System – The system used to store and track flight data information.

Flight Level – A level of constant atmospheric pressure related to reference datum of 29.92 inches of mercury. Each FL is expressed in three digits representing hundreds of feet. For example FL 250 represents a barometric altitude of 25,000 feet. Aircraft operating at altitudes greater than 18,000 feet MSL in the United States use Flight levels as their altitude reference.

Flight Track – The route used by an aircraft in flight.

Flight Track Utilization – The amount and type of aircraft that use a specific flight track, on either departure or arrival.

Frequency (acoustic) – The number of oscillations per second completed by a vibrating object.

Gates – Gates and posts described in this document are not necessarily the same as those used for the purposes of controlling air traffic. The gates and posts found in this document were developed specifically to describe and illustrate the various airspace alternatives.

General Aviation (GA) – All civil aviation except scheduled passenger and cargo airlines.

Global Positioning System (GPS) – A satellite-based radio positioning and navigation system operated by the Department of Defense. The system provides highly accurate position and velocity information, and precise time, on a continuous global basis to an unlimited number of properly equipped users.

Handoff – An action taken to transfer the radar identification of an aircraft from one controller to another if the aircraft will enter the receiving controller's airspace and radio communications with the aircraft will be transferred.

Heading – A compass bearing indicating the direction of travel.

Hertz (Hz) – The unit used to designate frequency; specifically, the number of cycles per second.

Household – A household includes all the persons who occupy a housing unit. The occupants may be a single family, one person living alone, two or more families living together, or any other group of related or unrelated persons who share living arrangements.

Housing Unit – A housing unit is a house, apartment, a mobile home or trailer, a group of rooms or a single room occupied as separate living quarters or, if vacant, intended for occupancy as separate living quarters.

Hub – Airport that serves as a focus of an air carrier's route structure. Flights from many cities converge at the focal airport permitting passengers to connect to other points in the route structure. See also Hubbing.

Hydrocarbons (HC) – Chemical compounds that consist entirely of carbon and hydrogen.

Instrument Approach Procedure (IAP) – A series of predetermined maneuvers for the orderly transfer of an aircraft under instrument flight conditions from the beginning of the initial approach to a landing or to a point from which a landing may be made visually.

Instrument Flight Rules (IFR) – Rules governing the procedures for conducting instrument flight. Also a term used by pilots and controllers to indicate type of flight plan.

Instrument Meteorological Conditions (IMC) – Weather conditions expressed in terms of visibility, distance from clouds, and cloud ceilings during which all aircraft are required to operate using Instrument Flight Rules (IFR).

Integrated Noise Model (INM) – A computer program developed, updated and maintained by the Federal Aviation Administration to evaluate aircraft noise impacts in the vicinity of airports.

Inter-Facility Boundary – Boundary of two adjacent ATC facilities.

Intra-Facility Boundary – Internal boundary in an ATC facility (i.e., a sector wall).

In-Trail Spacing – The distance between two aircraft on an identical route; one aircraft is following another.

Invasive Species – Invasive species are organisms (usually transported by humans) which successfully establish themselves in, and then overcome, otherwise intact, pre-existing native ecosystems.

Jet route delay – The average delay per operation over a 24 hour period.

Jet Stream – A migrating stream of high speed winds present at high altitudes.

Knots – Speed measured in nautical miles per hour.

Loudness – The attribute of an auditory sensation, in terms of which sounds may be ordered on a scale extending from soft to loud. Loudness depends primarily upon the sound pressure of the source, but it also depends upon the frequency and waveform of the source.

Maximum inter-facility handoffs per hour – This metric is defined as the number of controller-to-controller communications in an hour to transfer the responsibility for an aircraft from a controller in one facility to a controller in another facility.

Maximum Sustainable Throughput – The sum of the weighted average of the peak traffic count for JFK, LGA, EWR, TEB, and PHL.

Mean Sea Level (MSL) – The height of the surface of the sea for all stages of the tide, used as a reference for elevations. Also called sea level datum.

Mean Surface Wind Speed – Average wind velocity calculated at the surface or at ground level elevation.

National Airspace System (NAS) – The NAS is the common network of air navigation facilities, equipment and services, airports or landing areas; aeronautical charts, information and services; rules, regulations and procedures, technical information, and manpower and material.

National Ambient Air Quality Standards (NAAQS) – Standards for criteria pollutants established by United States Environmental Protection Agency that apply to outdoor air.

Natural Areas – Undeveloped areas of land such as parks, wildlife refuges/management areas, and nature preserves.

Nautical Mile (NM) – A measure of distance equal to 1 minute of arc on the earth's surface (approximately 6,076 feet).

Navigation Aids (NAVAIDs) – Any visual or electronic device airborne or on the surface which provides point to point guidance information or position data to aircraft in-flight.

Noise – Any sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying.

Noise Abatement Procedure – Measures taken to reduce the off-airport impacts of aircraft noise. Procedures developed by airport operators in cooperation with the FAA, and local community officials, to mitigate aircraft noise near airports.

Noise Exposure – The cumulative acoustic stimulation reaching the ear of a person over a specified period of time (e.g., a work shift, a day, a working life, or a lifetime).

Noise Integrated Routing System (NIRS) – A computer program developed, updated, and maintained by the Federal Aviation Administration to evaluate aircraft noise impact for air traffic actions involving multiple airports over broad geographic areas.

Non-Attainment Area – Areas with levels that exceed one or more of the National Ambient Air Quality Standards for the criteria pollutants designated in the Clean Air Act.

Non-Directional Beacon (NDB) – A radio beacon transmitting non-directional signals whereby the pilot of an aircraft equipped with direction finding equipment can determine his bearing to or from the radio beacon and "home" on or track to or from the station. When the radio beacon is installed in conjunction with the Instrument Land System (ILS) marker, it is normally called a Compass Locator.

Operation – Landing or take-off of an aircraft.

Operational viability – Refers to whether a particular airspace redesign is workable and thus, safe. This gauge of system safety reflects the potential to maintain standards that define spacing between multiple aircraft, aircraft and other physical structures, and aircraft and designated airspace. Operational viability criteria include reduced airspace complexity and reduced voice communications.

Operational efficiency – Refers to how well a particular design works. Operational efficiency criteria include: reduce delay, balance controller workload, meet system demands, improve user access to the system, expedite arrivals and departures, increase flexibility in routing, and maintain airport throughput.

Overflights – Aircraft whose flights originate or terminate outside the controlling facility's area that transit the airspace without landing.

Piston Driven Aircraft – Propeller driven aircraft powered by an internal combustion engine.

Positive Control – The separation of all air traffic within designated airspace by air traffic control.

Post – Gates and posts described in this document are not necessarily the same as those used for the purposes of controlling air traffic. The gates and posts found in this document were developed specifically to describe and illustrate the various airspace alternatives.

Radar (primary) – A device which, by measuring the time interval between transmission and reception of radio pulses, and correlating the angular orientation of the radiated antenna beam, or beams in azimuth and/or elevation, provides information on range, azimuth, and /or elevation of objects in the path of the transmitted pulses. Also known as Primary Radar.

Radar (secondary) – A radar system in which the object to be detected is fitted with cooperative equipment in the form of a radio receiver/transmitter (transponder). Radar pulses transmitted from the searching transmitter/receiver (interrogator) site are received in the cooperative equipment and used to trigger a distinctive transmission from the transponder. This reply transmission, rather than a reflected signal, is then received back at the interrogator site for processing and display at an ATC facility. Also known as a radar beacon.

Radial – A magnetic bearing extending from a VOR/VORTAC/TACAN navigation facility.

Receiver – The listener or measuring microphone that detects the sound transmitted by the source.

Satellite Navigation – *See Global Positioning System*.

Sector – A defined volume of airspace, including both lateral and vertical limits, in which a single air traffic controller is responsible for the safe movement of air traffic. A TRACON's or ARTCC's airspace is comprised of multiple sectors.

Scoping – The early and open process for determining the scope of issues to be addressed and for identifying the significant issues related to a proposed action. Scoping is also used to eliminate from detailed study the issues that are not significant or have been covered by prior environmental review.

Separation – Spacing between aircraft. This spacing may be vertical, lateral, longitudinal and visual.

Sequencing – Procedure in which air traffic is merged into an orderly flow.

Sound Exposure Level (SEL) – A time-integrated metric (i.e., continuously summed over a time period) which quantifies the total energy in the A-weighted sound level measured during a transient noise event. The time period for this measurement is generally taken to be that between the moments when the A-weighted sound level is 10 dB below the maximum.

Sound Pressure Level – A measure, in decibels, of the magnitude of the sound. Specifically, the sound pressure level of a sound that, in decibels, is 10 times the logarithm to the base 10 of the ratio of the squared pressure of this sound to the squared reference pressure. The reference pressure is usually taken to be 20 micropascals. (See also Energy-Averaged Sound Pressure Level.)

Source (acoustic) – The object that generates the sound.

Statute Mile (SM) – A measure of distance equal to 5,280 feet.

Sulfur Dioxide (SO_2) – Sulfur dioxide typically results from combustion processes, refining of petroleum, and other industrial processes.

Tactical Air Navigation (TACAN) – An ultra high frequency electronic air navigation aid which provides equipped aircraft a continuous indication of bearing and distance to the station.

Terminal Area – A general term used to describe airspace in which approach control services for airport traffic control service is provided.

Terminal Radar Approach Control (TRACON) – An FAA ATC facility which uses radar and two way radio communication to provide separation of air traffic within a specified geographic area in the vicinity of one or more large airports.

Time below 18,000 feet – This is the average time spent descending (arrivals) and climbing (departures) per operation in a 24-hour period.

Traffic Weighted Arrival/Departure Delay 2011 – The weighted average arrival/departure delay per operation in a 24-hour period. The arrival delay is the difference between the arrival time for a specific Alternative's operations and the arrival time for unimpeded operations. Similarly, the departure delay is the difference between the departure time for a specific Alternative's operations and the departure time for unimpeded operations.

Topography – The configuration of a surface including its relief and the position of its natural and man made features.

Tower – *See Airport Traffic Control Tower*.

Turboprop Aircraft – An aircraft whose main propulsive force is provided by a propeller driven by a gas turbine. Additional propulsive force may be provided by gas discharged from the turbine exhaust.

Vector – Heading instructions issued by ATC to provide navigational guidance by radar.

Visual Meteorological Conditions (VMC) – Weather conditions expressed in terms of visibility, distance from cloud, and ceiling equal to or better than specified minima.

Visual Flight Rules (VFR) – Rules that govern the procedures for conducting flight under visual conditions. The term 'VFR' is also used in the United States to indicate weather conditions that are equal to or greater than minimum VFR requirements. In addition, it is used by pilots and controllers to indicate type of flight plan.

Voice communications – Includes both controller to controller, and controller to pilot communications. Controller–to-controller communications are required to transfer responsibility for a particular aircraft. Controller-to-pilot communications are required to provide instructions to pilots.

Volatile Organic Compound (VOC) – Any organic compound that participates in atmospheric photochemical reactions except those designated by EPA as having negligible photochemical reactivity.

VOR (Very High Frequency Omni-directional Radio Range Station) – A ground-based electronic navigation aid transmitting very high frequency navigation signals, 360° in azimuth, oriented from magnetic North. DME may be installed. Used as a basis for navigation in the National Airspace System.

VORTAC (Very High Frequency Omni-directional Range with Tactical Air Navigation) – A navigation aid providing VOR azimuth, TACAN azimuth, and TACAN distance measuring equipment (DME) at one site. The most common form of radio navigation currently in use.

Wake Turbulence – Phenomena resulting from the passage of an aircraft through the atmosphere. The term includes vortices, thrust stream turbulence, jet blast, jet wash, propeller wash, and rotor wash both on the ground and in the air.

Weighting – An additive (or subtractive) factor by which the sound pressure level at certain frequencies in an acoustic measurement is increased (or reduced) in order for that measurement to be more representative of certain simulated conditions.

Chapter Eight
LIST OF PREPARERS

This chapter identifies the individuals responsible for the preparation and independent review of the EIS.

8.1 FAA PREPARERS

The following sub-sections include the roles and/or responsibilities of the FAA personnel who participated in the development of the EIS.

8.1.1 FAA EIS Environmental Team

Steve Kelley – Airspace Manager, Eastern Terminal Service Area

Steve Kelley has been assigned air traffic duties at the NY TRACON since 1982 as an air traffic controller and operations supervisor in both the Newark and Kennedy approach control areas. In addition, he was an airspace specialist for the Newark area during the Expanded East Coast Plan project. Mr. Kelley has served as the project manager for the NY/NJ/PHL Airspace Redesign Project for the last five and a half years.

Moira Keane – Environmental Team Lead, Eastern Terminal Service Area

Moira (Mo) Keane has been the FAA Eastern Terminal Service Area's Environmental Specialist since May 1999. Ms. Keane has been with the FAA since 1984. She worked one year in the Oklahoma City Airports District office, while completing her Masters degree in Environmental Health/Epidemiology. She was in the Southwest Region's Airports Division at Fort Worth, Texas from 1985-1992, where she completed an EIS for two new runways at the Dallas/Fort Worth International Airport. While in the Central Region Airports Division from 1993 to 1999, Ms. Keane worked on a complex EIS for a proposed expansion of the Lambert-St. Louis International Airport. As the Environmental Lead, she participated in the preparation of the Draft EIS for the NY/NJ/PHL Airspace Redesign Project. Ms. Keane also holds a Master of Science in Geosciences from Mississippi State University.

Lee Kyker – Environmental Specialist, Eastern Service Center

Lee Kyker has been in the FAA Eastern Service Center since July 2006 and with the FAA since 1988. She began her FAA career in the Atlanta Airports District office (ATL ADO) working as a program manager before serving as Manager of Airport Programs. During her career, Ms. Kyker has prepared, managed, prepared, and reviewed various planning and environmental documents. Ms. Kyker served as the FAA Environmental Specialist during the development of the Final EIS for the NY/NJ/PHL Airspace Redesign Project.

8.1.2 FAA Airspace Redesign Team

The FAA pulled together air traffic controllers from numerous facilities to engage in development of airspace design alternatives for the proposed project. Their names and the facilities in which they work appear below:

New York TRACON (N90)

- Tim Byrnes
- Robert F. Clarke
- James Coschignano, Jr.
- Richard J. De Vivo
- Frank Fleischer
- Paul F. Greco
- Timon A. Kalpaxis
- Ed Kane
- Barry S. Krasner
- John A. Landi
- Christopher A. Leigh
- Ralph P. Mormile
- Patricia L. Moss
- Peter Porcaro
- Philip G. Rodgers
- William J. Russell
- Michael Santos
- John A. Shanahan
- James D. Shelton
- Louis J. Vengilio
- Chris Villafranca
- Thomas White

Philadelphia TRACON (PHL)

- Kevin J. Devery
- Michael J. Gercke
- Michael McFadyen
- Robert S. Niszczak, Jr.
- Stephen Nogar
- Stephen L. Smith

Eastern Terminal Service Area Management

- Tom Bock
- Carmine Gallo
- Loretta J. Martin
- Leon J. Prusak
- Michael J. Sammartino
- Benedict Sliney
- Carl Zimmerman

Washington Center (ZDC)

- Kevin M. Aurandt
- Arthur W. Breon, Jr.
- William Paul Cook, Jr.
- Mark Drew
- Michael L. Goodson
- Rexford A. Jackson
- Kerry L. Johnson
- Andrew L. Kalnoske
- Charles C. Lentile
- Wayne B. McKenna
- Michael F. McLaughlin
- Dale E. Tutterrow
- Jeffery D. Wellborn

- David F. West
- Guy J. Whitlock
- Walter B. Winston

New York Center (ZNY)

- John B. Azzarone
- Edward V. Barrett, Sr.
- Scott Boucher
- Paul G. Cartier
- Christopher A. Chiorando
- Laurence J. Clayton
- Johnny W. Cornett
- Daniel A. Fraser
- Paul J. Galligan
- Reubin Graf
- John M. Hoppe
- Jackie C. Jackson
- Thomas J. O'Neill
- John J. Robertson
- Victor C. Santore
- Steven M. Strano
- Linda Waters

8.1.3 Additional FAA Reviewers

The following table identifies FAA personnel who assisted in the independent review of the EIS.

Table 8.1
Additional FAA Reviewers

Name	Location
Manny Weiss	Administrator, Regional Office, Jamaica NY
John McCartney	Manager, Eastern Terminal Service Area (Air Traffic), Regional Office, Jamaica, NY
Felicia Miller-Brown	Air Traffic, Regional Office, Jamaica NY
Anthony Tallini	Air Traffic, Regional Office, Jamaica NY
Andrew Brooks	Airports Division, Regional Office, Jamaica, NY
Claire Wang	Technical Operations/Engineering, Regional Office, Jamaica NY
Ernestine Gatewood	Air Traffic, Washington, DC
Jeffrey Clark	Manager, NY TRACON
Michael Wagner	Manager, Philadelphia Air Traffic Control Tower
Michael McCormick	Manager, New York Center
Theresa Flieger Left to work for another employer.	Eastern Terminal Service Area Management
Mark Ward	Manager, Enroute Services, Atlanta, GA
Mary McCarthy	Attorney, Regional Office, Jamaica, NY

8.2 TECHNICAL TEAM

The following individuals provided technical assistance to the FAA in the preparation of the EIS.

Table 8.2
EIS Technical Team

Preparer	Title	EIS Responsibility
Northrop Grumman Information Technology		
Michael Merrill	NY EIS Program Manager	Program Manager for Program, Schedule & Product Deliverables, Alternative/Design Analysis, Purpose and Need Development
Michael T. Johnson	Airspace Specialist	Airspace Design Analysis, Alternative Descriptions, Purpose and Need Development
Adam Mouw	Environmental Analyst	Environmental Analysis Support
Crown Consulting Inc.		
Jayna Goodman Left to work for another employer.	Environmental Specialist	Environmental Technical Analysis, NEPA Preparation and Coordination
Peter Nelson	Consultant	FAA Air Traffic Operations
Patricia A. Reilly	Consultant	FAA Project Management
HNTB Corporation		
Kimberly C. Hughes, P.E.	Manager, Environmental Services/Project Manager	Environmental Technical Analysis, Air Quality Specialist, NEPA Preparation
Barbara Kulvelis	Project Manager, Senior Environmental Planner	Environmental Technical Analysis, NEPA Preparation
Kent Duffy Left to work for another employer.	Environmental Planner	Environmental Technical Analysis, Alternatives and Noise, NEPA Preparation
Ashley Eckles Left to work for another employer.	Jr. Environmental Aviation Planner	Environmental Technical Analysis, NEPA Preparation
Naveed Sami	Senior GIS Analyst	GIS Analysis
Kent Miller	GIS Analyst	GIS Analysis
Bryan Bielinski	GIS Analyst	GIS Analysis
Adam Turbett	Jr. Environmental Aviation Planner	NEPA Preparation
Landrum & Brown		
Scott D. Carpenter	Sr. Project Manager	Project Management, Noise Technical Analysis Management
Stephen C. Smith Left to work for another employer.	Sr. Consultant	Noise Technical Analysis and Coordination
Matthew H. Lee	Vice President	Airspace Simulation Integration, Day-Night Schedule Analysis
Richard M. Kula	Sr. Consultant	Day-Night Schedule Analysis
James G. Walsh	Sr. Project Manager	Operational Forecasting
Qianlin Li	Project Manager	Operational Forecasting, Operational Schedule Development
Sarah J. Potter	Consultant	Noise Technical Analysis, Operational Schedule Development
Ralph E. Redman	Consultant	Noise Technical Analysis

Table 8.2 (continued)
EIS Technical Team

Preparer	Title	EIS Responsibility
Rebecca Cointin Left to work for another employer	Analyst	Noise Technical Analysis
Stanley K. Eshelman	Consultant	Noise Technical Analysis, Operational Schedule Development
Jesse A. Baker	Consultant	Noise Technical Analysis
Maria T. Cordova	Consultant	Noise Technical Analysis
Metron Aviation, Inc.		
Michael L. Graham	Sr. Project Manager	Project Management, Noise Technical Analysis Management
Tyler White	Analyst	Noise Technical Analysis
Aaron Weikle	Analyst	Noise Technical Analysis
Dr. Terrance Thompson	Senior Consultant	Noise Modeling, ADT Analysis
Dejan Neskovic	Analyst	Noise Technical Analysis
MITRE		
Linda M. Boan	Lead Staff, Airspace and Airport Analysis	Alternative Documentation, Design, and Analysis
Heather L. Danner	Project Team Manager, Airspace and Airport Analysis	Alternative Documentation, Design, and Analysis
Dr. Jonathan H. Hoffman	Principal Scientist, Center for Advanced Aviation Systems Development	Alternative Documentation, Design, and Technical Analysis
Elizabeth Anderson Comer/Archaeology (EAC/A)		
Elizabeth A. Comer	Archaeologist	Historic and Cultural Resource Specialist

Chapter Nine
DISTRIBUTION LIST

This Chapter includes the list of DEIS and FEIS recipients.

9.1 DEIS

This section provides a listing of libraries, officials, agencies, organizations, and individuals that were provided copies of the DEIS in one of three formats. These formats included: (1) Executive Summary (with full copy CD), (2) Hard Copy (full document including appendices on CD), and (3) Full Hard Copy (hard copy of entire document and appendices). Both electronic and hard copies were available for review at libraries listed on the following pages. In addition, approximately 4,000 officials, agencies, organizations, and individuals were notified by newsletter that the DEIS had been released and provided information on how to obtain a copy if desired.

Table 9.1
Libraries

Name	Address	City
Connecticut		
Bridgeport Library	925 Broad Street	Bridgeport
Danbury Public Library	170 Main Street	Danbury
Ferguson Public Library	One Library Plaza	Stamford
Hartford Public Library	500 Main Street	Hartford
New Haven Public Library	133 Elm Street	New Haven
New London Public Library	63 Huntington Street	New London
Rathburn Free Memorial	36 Main Street	Haddam
Delaware		
Brandywine Hundred Branch	1300 Foulk Road	Wilmington
Newark Branch Library	750 Library Avenue	Newark
New Jersey		
Atlantic City Public Library	1 North Tennessee Avenue	Atlantic City
Bridgewater Library	1 Vogt Drive	Bridgewater
Camden County Library System - South County Regional Branch	35 Coopers Folly Road	Atco
Charles E. Reid Branch Library	E. 116 Century Road	Paramus
Elizabeth Public Library	11 S. Broad Street	Elizabeth
Franklin Township Public Library	485 DeMott Lane	Somerset
Gloucester County Library System - Greenwich Township Branch	411 Swedesboro Road	Gibbstown
Jersey City Public Library	472 Jersey Avenue	Jersey City
Middlesex Public Library	1300 Mountain Avenue	Middlesex
Middletown Library	55 New Monmouth Road	Middletown
Monmouth County Library Eastern Branch	Rt. 35	Shrewsbury

Table 9.1
Libraries

Name	**Address**	**City**
Monmouth County Library Headquarters	125 Symmes Drive	Manalapan
Montclair Public Library	50 South Fullerton Avenue	Montclair
Morris County Library	30 East Hanover Avenue	Whippany
Newark Public Library - Main Library	5 Washington Street	Newark
Ocean County Library	101 Washington Street	Toms River
Passaic Public Library	195 Gregory Avenue	Passaic
Pinelands Library	39 Allen Avenue	Medford
Salem Public Library	112 West Broadway	Salem
South County Branch	1108-A Old York Road	Ringoes
Sussex County Library - Main	125 Morris Turnpike	Newton
Trenton Public Library	120 Academy Street	Trenton
Union Public Library	1980 Morris Avenue	Union
Vineland Public Library	1058 East Landis Avenue	Vineland
Warren County Library	199 Hardwick Street	Belvidere
New York		
Albany Public Library	161 Washington Avenue	Albany
Brooklyn Public Library - Central Library	Grand Army Plaza	Brooklyn
Chatham Public Library	11 Woodbridge Avenue	Chatham
East Rockaway Public Library	477 Atlantic Avenue	East Rockaway
Franklin Free Library	334 Main Street	Franklin
Greenville Public Library	P.O. Box 8, North Street	Greenville
Grinton I. Will Branch	1500 Central Park Avenue	Yonkers
Huntington Memorial Library	62 Chestnut Street	Oneonta
Hunt's Point Branch	877 Southern Boulevard	Bronx
Inwood Branch Library	4790 Broadway	New York
Kingston Library	55 Franklin Street	Kingston
Larchmont Public Library	121 Larchmont Avenue	Larchmont
Levittown Public Library	1 Bluegrass Lane	Levittown
Liberty Public Library	189 North Main Street	Liberty
Mahopac Public Library	668 Route Six	Mahopac
Middleburgh Library	323 Main Street	Middleburgh
New Amsterdam Branch Library	9 Murray Street	New York
New City Free Library	220 North Main Street	New City
New York Public Library	127 East 58th Street	New York
Newburgh Free Library	124 Grand Street	Newburgh
Port Richmond Branch Library	75 Bennett Street	Staten Island
Poughkeepsie Public Library District	93 Market Street	Poughkeepsie
Queens Borough Public Library	4117 Main Street	Flushing
Queens Borough Public Library	89-11 Merrick Boulevard	Jamaica
Schenectady County Public Library	99 Clinton Street	Schenectady

Table 9.1
Libraries

Name	Address	City
Tottenville Branch Library	7430 Amboy Road	Staten Island
West Islip Public Library	3 Higbie Lane	West Islip
White Plains Public Library	100 Martine Avenue	White Plains
Woodstock Public Library	5 Library Lane	Woodstock
Yonkers Public Library - Riverfront Branch	One Larkin Center	Yonkers
Pennsylvania		
Abington Township Public Library	1030 Old York Road	Abington
Allentown Public Library	1210 Hamilton Street	Allentown
Chester County Library System	450 Exton Square Parkway	Exton
County of Bucks Free Library	150 South Pine Street	Doylestown
Easton Area Public Library	515 Church Street	Easton
Free Library of Philadelphia - Central Branch	1901 Vine Street	Philadelphia
Lancaster County Library	125 North Duke Street	Lancaster
Northampton Area Public Library	1615 Laubach Avenue	Northampton
Pike County Public Library - Milford Branch	201 Broad Street	Milford
Pottsville Free Library	215 West Market Street	Pottsville
Reading Public Library	100 South 5th Street	Reading
Ridley Park Public Library	Wark & Cresswell Street	Ridley Park
Scranton Public Library	500 Vine Street	Scranton
Wayne County Public Library - Honesdale	1406 Main Street	Honesdale
Western Pocono Community Library	2000 Pilgrim Way	Brodheadsville

Table 9.2
Federal Officials

First Name	Last Name	Position	Organization
Connecticut			
Nancy	Johnson	Member	U.S. House of Representatives
Rosa	DeLauro	Member	U.S. House of Representatives
Christopher	Dodd	Member	United States Senate
Joseph	Lieberman	Member	United States Senate
John	Larson	Member	U.S. House of Representatives
Christopher	Shays	Member	U.S. House of Representatives
Delaware			
Michael	Castle	Member	U.S. House of Representatives
Thomas	Carper	Member	United States Senate
Joseph	Biden Jr.	Member	United States Senate
New Jersey			
Frank	Lautenberg	Member	United States Senate
James	Saxton	Member	U.S. House of Representatives
Thomas	Quaadman	Chief of Staff	Congressman Fossella's Office
Donald	Payne	Member	U.S. House of Representatives
Steven	Rothman	Member	U.S. House of Representatives
Robert	Menendez	Member	U.S. House of Representatives
Linda	DiGiovanni		Congressman Franks' Office
Michael	Beson		Congressman Pallone's Office
Adam	Zellner		Congressman Rothman's Office
Rush	Holt	Member	U.S. House of Representatives
Frank	LoBiondo	Member	U.S. House of Representatives
Scott	Garrett	Member	U.S. House of Representatives
Rodney	Frelinghuysen	Member	U.S. House of Representatives
Bill	Pascrell, Jr.	Member	U.S. House of Representatives
Frank	Pallone, Jr.	Member	U.S. House of Representatives
Christopher	Smith	Member	U.S. House of Representatives
Jon	Corzine	Member	United States Senate
Robert	Andrews	Member	U.S. House of Representatives
Paul	Dement		Congressman Pallone's Office
New York			
Sue	Kelly	Member	U.S. House of Representatives
Timothy	Bishop	Member	U.S. House of Representatives
Carolyn	Maloney	Member	U.S. House of Representatives
Gary	Ackerman	Member	U.S. House of Representatives
Nydia	Velazquez	Member	U.S. House of Representatives
John	Svare		Congressman Hinchey’s Office
Lori	DuBord		Congressman Hinchey's Office
Dennis	Velez		Congresswoman Lowey's Office
Jason	Goldstein		Senator Schumer’s Office

Table 9.2
Federal Officials

First Name	Last Name	Position	Organization
Steve	Israel	Member	U.S. House of Representatives
Maurice	Hinchey	Member	U.S. House of Representatives
Anthony	Weiner	Member	U.S. House of Representatives
Liliane	Ferrara		Congressman Crowley's Office
John	Sweeney	Member	U.S. House of Representatives
Michael	McNulty	Member	U.S. House of Representatives
Jerrold	Nadler	Member	U.S. House of Representatives
Peter	King	Member	U.S. House of Representatives
Thomas	Reynolds	Member	U.S. House of Representatives
Carolyn	McCarthy	Member	U.S. House of Representatives
Charles	Rangel	Member	U.S. House of Representatives
Jack	Quinn	Member	U.S. House of Representatives
Nita	Lowey	Member	U.S. House of Representatives
James	Walsh	Member	U.S. House of Representatives
Edolphus	Towns	Member	U.S. House of Representatives
Louise	Slaughter	Member	U.S. House of Representatives
Gregory	Meeks	Member	U.S. House of Representatives
Eliot	Engel	Member	U.S. House of Representatives
Sherwood	Boehlert	Member	U.S. House of Representatives
Major	Owens	Member	U.S. House of Representatives
John	McHugh	Member	U.S. House of Representatives
Jose	Serrano	Member	U.S. House of Representatives
Louis	Torres		Representative Serrano’s Office
Gerald	Nappi		Congresswoman Kelly's Office
Charles	Schumer	Member	United States Senate
Hillary	Clinton	Member	United States Senate
Joseph	Crowley	Member	U.S. House of Representatives
Craig	Donner		Congressman Vito Fossella's Office
Vito	Fossella	Member	U.S. House of Representatives
Linda	Rosenthal		Congressman Nadler's Office
Pennsylvania			
Jim	Gerlach	Member	U.S. House of Representatives
Mellisa	Hart	Member	U.S. House of Representatives
Todd	Platt	Member	U.S. House of Representatives
Bill	Shuster	Member	U.S. House of Representatives
Paul	Kanjorski	Member	U.S. House of Representatives
Donald	Sherwood	Member	U.S. House of Representatives
Tim	Holden	Member	U.S. House of Representatives
Phil	English	Member	U.S. House of Representatives
Chaka	Fattah	Member	U.S. House of Representatives
Curt	Weldon	Member	U.S. House of Representatives
John	Murtha	Member	U.S. House of Representatives

Table 9.2
Federal Officials

First Name	Last Name	Position	Organization
John	Peterson	Member	U.S. House of Representatives
Joseph	Pitts	Member	U.S. House of Representatives
Rick	Santorum	Member	United States Senate
Arlen	Specter	Member	United States Senate
Robert	Brady	Member	U.S. House of Representatives
Gibson	Armstrong	Member	U.S. House of Representatives
Michael	Doyle	Member	U.S. House of Representatives

Table 9.3
State Officials

First Name	Last Name	Position	Organization
Connecticut			
Jodi	Rell	Governor	State of Connecticut
Delaware			
Robert	Gilligan		DE House of Representative
Ruth Ann	Minner	Governor	State of Delaware
Catherine	Cloutier	Senator, 5th District	State of Delaware
Wayne	Smith	Majority Leader	DE House of Representative
New Jersey			
Richard	Codey	Governor	State of New Jersey
Nick	Goldsack		
Nicholas	Scutari	Member	NJ Senate
New York			
George	Pataki	Governor	State of New York
Pennsylvania			
Rendell	Edward	Governor	State of Pennsylvania

Table 9.4
Local Officials

First Name	Last Name	Position	Organization
Connecticut			
Sebastian	Giuliano	Mayor	City of Middletown
Eddie	Perez	Mayor	City of Hartford
New Jersey			
John	Gregorio	Mayor	City of Linden
Joseph	Doria, Jr.	Mayor	City of Bayonne
Karen	McCoy Oliver	Mayor	City of Hillside
Fred	Profeta, Jr.	Mayor	City of Maplewood
Gregg	David	Mayor	City of Kenilworth
Andrew	Skibitsky	Mayor	City of Westfield
Sal	Bonacorsso	Mayor	City of Clark
James	Kennedy	Mayor	City of Rahway
Daniel	Reiman	Mayor	City of Carteret
Christian	Bollwage	Mayor	City of Elizabeth
Glen	Cunningham	Mayor	Jersey City
Anthony	Terrezza	Mayor	City of Union
Garrett	Smith	Mayor	City of Roselle
Edward	Jackus	President	City Council of Elizabeth
Joseph	Jenkins	Administrator	East Orange
New York			
Michael	Bloomberg	Mayor	New York City
Jeremy	Wilber	Supervisor	Town of Woodstock
Vito	Pinto	Legislator	Westchester County
Anthony	Borelli	Member	Manhattan Community Board 4
Arthur	Strickler	Member	Manhattan Community Board 2
Paul	Goldstein	Member	Manhattan Community Board 1
Gary	Parker	Member	Manhattan Community Board 5
Toni	Carlina	Member	Manhattan Community Board 6
C. Virginia	Fields	Borough President	Manhattan Borough
Javier	Llano	Member	Manhattan Community Board 11
Lawrence	McClean	Member	Manhattan Community Board 9
Elizabeth	McKee	Member	Manhattan Community Board 8
Barry	Schneider	Member	Manhattan Community Board 8
Penny	Ryan	Member	Manhattan Community Board 7
Kathy	Dodd	Member	Staten Island Community Board 2
Marie	Bodnar	Member	Staten Island Community Board 3
Nicholas	Dmytryszyn	SIBP Officer	Office of Staten Island Borough President
Joseph	Carroll	Member	Staten Island Community Board 1
James	Molinaro	President	Staten Island Borough
Hugh	Weinberg	QBPAAC	Office of Queens Borough Pres.

Table 9.4
Local Officials

First Name	Last Name	Position	Organization
Helen	Marshall	President	Queens Borough
Betty	Bratton	Chairperson	Queens Community Board 10
Dorothy	Schreiber	Member	Queens Community Board 7
Shirley	Clark	Member	Queens Community Board 3
Millicent	O'Meally	Member	Queens Community Board 7
Giovanna	Reid	Member	Queens Community Board 3
Jimmy	Smith	Member	Queens Community Board 3
Catherine	Poggi	Member	Bronx Community Board 10
Francisco	Gonzales	Member	Bronx Community Board 9
Elizabeth	Ring	Member	Bronx Community Board 9
David	Mojica	Member	Bronx Community Board 4
John	Robert	Member	Bronx Community Board 2
Adolfo	Carrión, Jr.	President	Bronx Borough
John	Fratta	Member	Bronx Community Board 11
Carmen	Angueira	Member	Bronx Community Board 12
James	Vacca	Member	Bronx Community Board 10
Grace	Belkin	Member	Bronx Community Board 8
Rita	Kessler	Member	Bronx Community Board 7
Xavier	Rodriguez	Member	Bronx Community Board 5
John	Dudley	Member	Bronx Community Board 3
Cedric	Loftin	District Manager	Bronx Community Board 1
Marty	Markowitz	President	Brooklyn Borough
Annette	Robinson	Member	Brooklyn Community Board 3
		Member	Brooklyn Community Board 6
		Member	Brooklyn Community Board 15
		Member	Brooklyn Community Board 14
		Member	Brooklyn Community Board 12
		Member	Brooklyn Community Board 10
		Member	Brooklyn Community Board 16
		Member	Brooklyn Community Board 7
		Member	Brooklyn Community Board 13
		Member	Brooklyn Community Board 5
		Member	Brooklyn Community Board 4
		Member	Brooklyn Community Board 2
		Member	Brooklyn Community Board 1
		Member	Brooklyn Community Board 8
		Member	Brooklyn Community Board 11
		Member	Brooklyn Community Board 17
		Member	Brooklyn Community Board 18
		Member	Queens Community Board 9
		Member	Queens Community Board 12
		Member	Queens Community Board 2

Table 9.4
Local Officials

First Name	Last Name	Position	Organization
		Member	Queens Community Board 1
		Member	Queens Community Board 5
		Member	Queens Community Board 11
		Member	Queens Community Board 4
		Member	Queens Community Board 6
		Member	Queens Community Board 8
		Member	Queens Community Board 13
Pennsylvania			
John	Street	Mayor	City of Philadelphia
Hank	Eberle	Mayor	City of Ridley Park
Ralph	Orr	Mayor	City of Eddystone
Robert	McMahon	Mayor	City of Media
Donald	Cook	Mayor	City of Prospect Park
Dennis	Sharkey	Mayor	City of Narberth

Table 9.5
Federal Agencies

First Name	Last Name	Position	Organization
Connecticut			
Kathleen	McGinty	Commissioner, Secretary Environmental Protection	Department of Agriculture
Matthew	Kelley	Supervising Engineer	Department of Transportation
Terry	Villanueva	Manager	Bombay Hook National Wildlife Refuge (NWR)
District of Columbia			
Ken	Mittleholtz	Environmental Protection Specialist	Environmental Protection Agency (EPA)
Ethel	Smith		U.S. Department of Interior
Margo	Oge	Director, Trans. & Air Quality	EPA
Robert	Hargrove		EPA
Norman	Mineta	Secretary	U.S. Department of Transportation
Camille	Mittelholtz	Environmental Policies Team Leader	U.S. Department of Transportation
Don	Klima	Director, Federal Agency Program	ACHP
New Jersey			
Clifford	Day	Supervisor	U.S. Fish & Wildlife Service
Steve	Atzert	Project Leader	U.S. Fish and Wildlife Service
William	Koch	Refuge Manager	U.S. Fish and Wildlife Service
Stan	Gorski	Field Office Supervisor	National Marine Fisheries
Karen	Greene	NEPA, Environmental Resources	NOAA National Marine Fisheries
Charles	Kuperus	Secretary	U.S. Department of Agriculture
Randy	Turner	Superintendent	Morristown National Historical Park
Steve	Atzert	Refuge Manager	Edwin B. Forsythe NWR
Howard	Schlegel	Refuge Manager	Cape May NWR
Ed	Henrey	Refuge Manager	Wallkill River NWR
New York			
Lynngard	Knutson	Environmental Scientist	EPA Region 2 (NY, NJ, PR, and the U.S. Virgin Islands)
Frank	Santomauro	Chief, Planning Div.	U.S. Army Corps of Eng.
David	Stillwell	Field Supervisor	U.S. Fish & Wildlife Service
Kathileen	Callahan	Dep. Regional Administrator	EPA
Alan	Steinberg	Regional Administrator	EPA Region 2
Michael	Reynolds	Superintendent	National Park Service, Fire Island National Seashore

Table 9.5
Federal Agencies

First Name	Last Name	Position	Organization
Raymond	Werner	Chief, Air Programs Branch	U.S. Environmental Protection Agency, Region 2
Deborah	Lofredo	Office Assistant	Elizabeth A. Morton, Target Bay and Oyster Bay NWR
Pennsylvania			
Barbara	Okorne		EPA Region 3
Donald	Welsh	Regional Administrator	EPA Region 3 (DE, DC, MD, PA, VA, WV, US)
Jerry	Pasquale	Chief of Environmental Research	Army Corps of Engineers, Environmental Resources Branch
Samantha	Fairchild	Director	EPA Region 3, Enforcement, Compliance & Environmental Justice
Mary	Bomar	Regional Director	National Park Service
Kate	McManas	Refuge Manager	Johne Heinz NWR at Tinicum
Massachusetts			
Andrew	Raddant	Regional Environmental Officer	U.S. Dept. of the Interior
Marvin	Moriarty	Regional Director	U.S. Fish & Wildlife Service
Betsey	Higgins	Fed. Activities	EPA Region 1 (CT, ME, MA, NH, RI, VT, and 10 Tribal Nations)
Robert	Varney	Regional Administrator	EPA Region 1
Delaware			
Michael	Scuse	Deputy Secretary	Department of Agriculture

Table 9.6
State Agencies

First Name	Last Name	Position	Organization
Connecticut			
David	Poirier	Staff Archeologist	State Historic Preservation Office (SHPO)
Paul	Loether	Division Director And Deputy State Historic Officer	SHPO
Susan	Chandler	Historical Architect	SHPO
Brian	Emerick	Supervising Environmental Analyst	CT Dept. of Envr. Protection
Jane	Stahl	Dep. Com.	CT Dept. of Envr. Protection
Stephen	Korta	Commissioner	CT Dept. of Transportation
David	Head	Supervisor of Planning	CT Dept. of Transportation
Carmine	Trotta	Transportation Assistant Planner	CT Dept. of Transportation
Ned	Hurle	Transportation Planning Director	CT Dept. of Transportation
Diane	Bray	Airport Planning	CT Dept. of Transportation
Steve	Korta	Airport Administrator	CT Dept. of Transportation
Kevin	Lynch	Airport AFV Committee Member	CT Dept. of Transportation
Richard	Jaworski	Bureau Chief	CT Bureau of Aviation & Ports
Anne	Gobin	Bureau Chief	CT Bureau of Air Management
Delaware			
Craig	Lukezic	Archaeologist	DE State Historic Preservation Office (SHPO)
Timothy	Slavin	Director	DE Historical & Cultural Affairs/SHPO
Jim	Hewes	DE Coastal Programs	DE Dept. of Natural Resources and Envr. Control (DNR)
Sarah	Cooksey	Coastal Management Program Administrator	DE DNR
Joe	Cantalupo	Director, Aeronautics Division	DE Dept. of Transportation
Michael	Kirkpatrick	Administrator, Office of Aeronautics	DE Dept. of Transportation
Ralph	Reeb, III	Director, Planning	DE Dept. of Transportation
Harry	Van DenHuevel	Office of Aeronautics	DE Dept. of Transportation
Terry	Fulmer	Wetlands Mitigation, Envr. Services Branch	DE Dept. of Transportation
Kevin	Magerr		DE Dept. of Transportation

Table 9.6
State Agencies

First Name	Last Name	Position	Organization
David	Carter	Environmental Program Manager	DNREC/DSNC/DCP
Ali	Mirzakhalili	Program Administrator	DE - Air Quality Management Section
Steve	Marz	Deputy Director	DE Historical & Cultural Affairs
Charles	Salkin	Director, DE State Parks	Parks & Rec. Div. of DNR
New Jersey			
Meghan	MacWilliams-Baratta	Historic Preservation Specialist	NJ State Historic Preservation Office (SHPO)
Dan	Saunders	Principal Historic Preservation Specialist	NJ SHPO
Dorothy	Guzzo	Deputy	Natural & Historic Resources
Gregory	McDonough	Chief of Operations	NJ Dept. of Transportation
Greg	McDonough	Division of Aeronautics	NJ Dept. of Transportation
Tomas	Thatcher	Director, Aeronautics	NJ Dept. of Transportation
John	Kaiser	Division of Aeronautics	NJ Dept. of Transportation
Ted	Matthews	Executive Director	NJ Dept. of Transportation
James	Fox	Commissioner	NJ Dept. of Transportation
Richard	Gimello	Executive Director	NJ Dept. of Transportation
Jack	Lettiere	Commissioner	NJ Dept. of Transportation
Ken	Koschek	Office of Program Coordination	NJ Dept. of Environmental Protection
Deborah	Pinto	Chief, Off. of Local Env. Management	NJ Dept. of Environmental Protection
Leslie	McGeorge	Assist Comm., Planning, Science & Technology	NJ Dept. of Environmental Protection
Bradley, M.	Campbell	Commissioner	NJ Dept. of Environmental Protection
Linda	Miller	Air Quality Management	NJ Dept. of Environmental Protection
Lisa	Jackson	Asst. Commissioner, LUR Program	NJ Dept. of Environmental Protection
Jose	Fernandez	Director, Parks & Forestry	NJ Dept. of Environmental Protection
Patrick	Brannigan	Deputy Chief, Management operations	NJ Dept. of Environmental Protection
New York			
Betty Ann	Hughes	Chief, Bureau of Envr. Permits	NYS Dept. of Environmental Conservation (NYDEC)
Thomas	Kunkel	Regional Director	NYDEC
Lou	Berchielli	Wildlife Management Unit	NYDEC

Table 9.6
State Agencies

First Name	Last Name	Position	Organization
		Leader	
Bryan	Swift	Nongame and Habitat Unit	NYDEC
James	Ralston	Director Bureau of Air Quality Planning	NYDEC
Robert	Kulikowski	Director	NYC Office of Environmental Coordination
David	Shaw	Director, Air Resources	NYDEC
Stephanie	Henrich		Dept. of Environment and Waterways
Julian	Adams		NY State Historic Preservation Office (SHPO)
Ruth	Pierpont	Director	Historic Preservation Staff
Steve	Campbell	Passenger Transportation Division	NYS DOT, Region 1
Joseph	Testo	Passenger Trans. Div.	NYS DOT, Region 1
Thomas	Madison, Jr.	Acting Commissioner	NYS DOT, Region 1
Subinal	Chakraborti	Regional Director	NYS DOT, Region 10
Robert	Dennison	Regional Director	NYS DOT, Region 8
Douglas	Currey	Regional Director	NYS DOT, Region 11
Lorrin	Bird	Aviation Services	NYS DOT
Seth	Edelman	Director, Aviation Services Bureau	NYS DOT, Region 1
Mary	Ivy	Director, Environmental Analysis Bureau	NYS DOT
Kevin	McGarry	Environmental Engineer	Bureau of Air Quality Planning, NYS DOT
Pennsylvania			
Susan	Zacher	Historic Structures Section Chief	PA Bureau for Historic Preservation
Jean	Cutler	Director	Bureau for Historic Preservation
Jim	Burton	Bureau of Aviation	PENN DOT
Ed	Yewdall	Bureau of Aviation	PENN DOT
Rob	Betz	Bureau of Aviation	PENN DOT
Rick	Harner	Director, Bureau of Aviation	PENN DOT
Sharon	Daboyoin	Deputy Secretary, Aviation & Rail Freight	PENN DOT
David	Lamereaux	Northeast Asst. Regional Director	PA Department of Environmental Protection
Michael	Bedrin	Director	PA Department of Environmental Protection
Jim	Spontak	Southcentral Asst. Regional	PA Department of

Table 9.6
State Agencies

First Name	Last Name	Position	Organization
		Director	Environmental Protection
John	Kennedy	Assistant Director	PA Department of Environmental Protection
Joe	Sieber	Field Operations	PA Department of Environmental Protection
Michael	Zuvich	Chief, Division of Air Quality	PA Dept of Environ. Protection
Kurt	Carr	Division Chief	Division of Archaeology & Protection

Table 9.7
Local Agencies

First Name	Last Name	Position	Organization
Connecticut			
Tigist	Zegeye	Member	Wilmington Area Planning Council
New Jersey			
Rick	Gimello	Executive Director	Intermobile Services
New York			
Iris	Weinshall	Commissioner	NYC DOT
Christopher	Ward	Assistant Commissioner	NYC DEP
Patricia	Ornst	Director of Aviation	NYC Economic Development Corporation
Joseph	Gallucci	Aviation Unit	NY Police Department
Lee	Ellman	Planning Director	Yonkers Planning Bureau
Pennsylvania			
Roger	Moog	Manager, Office of Aviation	Delaware Valley Regional Planning Commission

Table 9.8
Tribes/Nations

First Name	Last Name	Position	Organization
Mary	Sebastian	Chairperson	Eastern Pequot Indians of Connecticut
			Eastern Pequot Reservation
Roy	Sebastian	Chairperson	Paucatuck Eastern Pequot Tribe
Kenneth	Reels	Chairman	Mashantucket Pequot Tribe
Agnes	Cunha	Chairperson	Paucatuck Eastern Pequot Indian Tribal Nation
Ransford	Collins		The Southern Pequot Tribe
Aurelius	Piper		Golden Hill Paugussett Tribe
Moonface	Bear	Leader	Golden Hill Indian Reservation
Ralph	Sturges	Chief	The Mohegan Tribe of Indians of the State of CT
Roland	Harris	Chairman	Mohegan Indian Tribe
Paulette	Crone-Morange	Chairperson	Schaghticoke Indian Tribe
Richard	Velky	Chairperson	Schaghticoke Tribal Council
Jerry	Walden	Chairperson	The Nehantic Tribe and Nation
Jacqueline	Johnson	Executive Director	National Congress of American Indians
D. Bambi	Kraus	President	National Association of Tribal Historic Preservation Office
Mark	Gould	Chairperson	Nanticoke Lenni-Lenape Indians of New Jersey
C.W.	Longbow	Chairperson	Cherokee Nation of New Jersey
		Chairperson	Taino Jatibonucu Tribe of Puerto Rico
Walter	Van Dunk	Chief	Ramapough Mountain Indians
Roy	Crazy Horse	Chairperson	Powhatan Renape Nation
Randy	King	Chairman	Shinnecock Tribe
Tom	Porter	Chief	Mohawk Reservation
Ralph	Bunn	Chairperson	Native American Validation Alliance
			Seneca Nation of Indians (Salamanca)
Harry	Wallace	Chief	Unkechauga Nation (Poospatuck Reservation)
Kathleen	Mitchell	Member	Seneca Nation of Indians
Ray	Halbritter	Representative	Oneida Indian Nation of New York
Glenn	Hoagland	Executive Director	Mohonk Preserve, Inc.
James	Ransom	Chief	St. Regis Mohawk Tribe
Leon	Shenandoah, Sr.	Head Chief	Onondaga Nation Tribal Council
Edward	Smoke	Chief	St. Regis Mohawk Tribe
John	Loran	Head Chief	St. Regis Mohawk Council Chiefs

Table 9.8
Tribes/Nations

First Name	Last Name	Position	Organization
Dennis	Bowen, Sr.	President	Seneca Nation Tribal Council
Irving	Powless, Jr.	Chief	Onondaga Nation Tribal Council
Emerson	Webster	Chief	Tonawanda Band of Seneca
Bernie	Parker	Chief	Tonawanda Band of Seneca Council of Chiefs
Vernon	Isaac	Chief	Cayuga Nation Tribal Council
Arnold	Hewitt	Head Chief	Tuscarora Tribal Business Council
Duane	Ray	President	Seneca Nations
Doris	Pieschel	Secretary	Eastern Lenape Nation of Pennsylvania
Alan	Downer	HPO	Navajo Nation
Jacqueline	Johnson	Executive Director	National Congress of American Indians
D. Bambi	Kraus	President	National Assn. Of Tribal HPO
David	Conrad	Executive Director	National Tribal Environmental Council
		Environmental Manager	United South & Eastern Tribes

Table 9.9
Airport Authorities

First Name	Last Name	Position	Organization
Michael	O'Donnell	Airport Manager	Waterbury-Oxford Airport
Alex	Cole	Airport Operations Manager	New Castle County Airport
Justin	Edwards	Airport Manager	Trenton Mercer Airport
Thomas	Rafter	Director	Atlantic City Int. Airport
Raymond	Zee	Sr. Airport Engineer	Port Authority of NYNJ
Sue	Baer	General Manger	Port Authority of NYNJ
Lanny	Rider	Manager	Port Authority of NYNJ
Tom	Bock	Manager, Airspace Redesign General	Port Authority of NYNJ
Thomas	Bosco	Deputy General Manager	Port Authority of NYNJ
Alfred	Werner	Manager	Long Island MacArthur Airport
Charles	Seliga	President & COO	Stewart International Airport
Alfred	Graser	General Manager	Port Authority of NYNJ
Mike	Geiger	Airport Manager	Republic Airport
William	DeCota	Director of Aviation	Port Authority of NYNJ
Kevin	Bleach	Manger, Aviation Tech. Services	Port Authority of NYNJ
Frank	Woodruff	Manger, Aviation Tech Services	Port Authority of NYNJ
Stephen	Lachetta		Albany County Airport Authority
Robert	Bracchitta	Director of Airport Operations	Westchester County Airport
Alan	Reiss	Deputy Director Aviation	Port Authority of NYNJ
Kurt	Krummenac ker	Manager Aviation Tech. Services	Port Authority of NYNJ
Ed	McCarthy	Manager Aviation Tech Services	Port Authority of NYNJ
Rich	Louis	Manager, Airport Operations	Port Authority of NYNJ
Peter	Scherrer	Manager	Westchester County Airport
John	O'Donnell	CEO	Albany County Airport Authority
Warren	Kroeppel	General Manager, LGA	Port Authority of NYNJ
Calvin	Davenger	Dep. Director of Aviation, Planning & Environmental	City of Philadelphia Division of Aviation
Charles	Isdell	Director of Aviation	Philadelphia International Airport
Terry	Sroka	Airport Manager	Reading Regional Airport
Lawrence	Krauter	Dep. Executive Director	Lehigh North Hampton Airport Authority
John	Bruer	Airport Manager	NE Philadelphia Airport Suptdt.
David	Eberly	Airport Manager	Lancaster Airport

Table 9.10
Airlines

First Name	**Last Name**	**Position**	**Organization**
		Chief Pilot	United Air Lines Inc.
Frank	Eliano		Continental Airlines
Gregory	Blackhall		Federal Express
		Chief Pilot	Air Canada
		Chief Pilot	British Airways PLC
		Chief Pilot	Northwest Airlines Inc.
Michele	Treacy		Continental Airlines
		Chief Pilot	UPS Company
		Chief Pilot	Midway Airlines Corporation
William	Cranor		Continental Airlines
Monica	Slatter Stokes	Senior Manager, State and Civic Affairs	Continental Airlines, Newark Airport
Glenn	Morse		Continental Airlines
		Chief Pilot	Aerosvit Ukranian Airlines
		Chief Pilot	Aerolineas Argentinas
Pete	Russo	Chief Pilot	JetBlue Airlines
Mauri	Lerpala		Finnair-JFK
		Chief Pilot	Air Lingus Shanon Ltd.
		Chief Pilot	Korean Airlines Co. Inc.
		Chief Pilot	Aeroflot
		Chief Pilot	Ceske Aerline
Robert	Laura		El Al Israel Airlines
		Chief Pilot	Allegheny Airlines Inc.
S. Michael	Scheeringa	Vice President Operations Planning	US Airways
		Chief Pilot	America West Airlines Inc
Jeff	Rehaluk	Manager, Flight Dispatch	Spirit
Ken	Pender	Global ATM Manager	Delta
		Chief Pilot	Delta Air Lines Inc.
Ralph	Davis	Air Traffic Systems Manager	American Airlines
Tim	Stull	Manager, ATS	UPS Airlines
Ron	Haggerty	Manager	Air Traffic Services, UA
		Chief Pilot	Federal Express Corporation
Tom	Amato	Director of Flight Dispatch	Jetblue
Renee	Chesnic	Airfield Operations/ATC	US Airways
George	Dodelin	Systems Operations	Jetblue
Steve	Vail	Senior Manager	FedEx Air Traffic Operations
Dennis	Airey	Supervisor of Airport Operations	United Airlines (IAD)
Jay	Salter	VP – Operations Administration	Continental Airlines

Table 9.10
Airlines

First Name	Last Name	Position	Organization
Joseph	Ritorto	Vice President	First Aviation Services
		Chief Pilot	American Airlines Inc.
		Chief Pilot	Continental Airlines Inc.
Mark	Montgomery	Chief Pilot	Southwest Airlines
Charles	Hall	Director ATS	American
Patrick	Dempsey	Manager	ATC Systems, Southwest Airlines
Les	Parson	Managing Director	Continental Airlines-SOCC
Mike	Bleike	Sr. Director	Continental Airlines-SOCC

Table 9.11
Special Interest

First Name	Last Name	Position	Organization
David	Faile	President	Friends of Sikorsky Airport (FOSA)
Jeff	Gilley	Manager	National Aviation Association (NBAA)
Stephen	Alterman	President	Cargo Airline Association
Gregory	Walden	Counsel, NJCER/NJCAAN	Patton Boggs, LLP
Dean	Saucier	NE Regional Representative	NBAA
Robert	Lamond, Jr.	Director	NBAA, ATS
Will	Mack	Managing Director	Teterboro Users Group
Pamela	Barsam-Brown	Exec. Director	NJ Coalition Against Aircraft Noise (NJCAAN)
Jerome	Feder	President	Westfield/ CAAN
Angel & Angela	Garcia		People Against Newark Noise
Wendy and Richard	Rudman		Jockey Hollow Historic Preservation Association
James & Barbara	Frawley	President	Morris County CAAN
Thomas	Carver	President	New Jersey Aviation Association
Dennis	Hardie	Co-Chair	The Original Scotch Plains/Fanwood Citizens Against Noise
Christopher	Mazauskas	Executive Director	PROCEED, Inc.
Jerome	Feder	Chairman	Union County Air Traffic Noise Advisory Board
Frederick	Obrock	President	EWR Runway 22 Coalition, Inc.

Table 9.11
Special Interest

First Name	Last Name	Position	Organization
William	Holzapfel	City Attorney	City of Elizabeth
Stephen	McCabe	President	Warren Twp. Ad Hoc Noise Mitigation Com.
Martha	Sides	Secretary	Scotch Plains/Fanwood Citizens Against Aircraft Noise
Eileen	Werner	Representative	Caldwell Aviation Association
Barbara	Reeder	Representative	Central Jersey R/W 22 Coalition Inc.
Michael	Schatzki	President	NJ Citizens for Environmental Research Inc.
Robert	Belzer	President	NJCAAN
Fran	Coakley		MOAAN
Ron	Gravino	Chairman	NIAAAC
Donald	Bowen		QUEST
Joyce	Gulden	Member	Governors Group of Nine
Barbara	Krause	Representative	Cranford Aircraft Noise Pollution Committee
Kevin	Campbell	Chair	Aircraft Noise Advisory Com.
Rodney & Gloria	Ruth	President	Citizens Air Rights Inc.
Scott	Godfrey	Director	NYALO
Ned	Cloonam	Representative	Sound Shore Community Alliance
Susan	Staples	Representative	Ulsterites Flight Over flight Noise
Gioia	Timpanelli	Representative	Woodstock Overflight Focus Group
Peter	Malkin	Representative	Metropolitan New York Aircraft Noise Mitigation Committee
Carl	Baessler	Committee Member	TVASNAC
Patricia	Horing	Representative	WRAIN (Westchester Residents Acting to Improve Neighborhoods)
Brian	Shapiro	Representative	Woodstock Env. Commission
Joel	Farley	Attorney	NJCAAN
Kendall	Lampkin	Exec. Director (TVASNAC)	Aircraft Safety&Noise Abatement
Arline	Bronzaft	Member	Council of the Environment
Constantine	Kaniklidis	Representative	AirNoise
Joy	Held	Representative	Helicopter Noise Coalition
Mark	Cato	Representative	ALPA
Steve	Brown	Senior Vice President	AOPA
Heidi	Williams	Representative	AOPA
			Natl. Air Transport Association

Table 9.12
Public Interest Groups/Organizations

First Name	Last Name	Position	Organization
Eric	Zwerling	Director	Rutgers University Air & Noise Program
Ithan	Zimmer	Program Director	New Jersey Institute of Technology
Alexander	Balaban	Roselle Park Rep.	Union City Noise Ad. Board
Katherine	Cowperthwaite		Mayor's Committee Against Airplane Noise
Robert	Weisenfeld		
Donald	Bluestone	Executive Director	Mosholu Montefiore Community Center
Patricia	Barone		Wurtsboro Flight Service Inc.
Richard	Halik	Sen. Airport Engineer	Aviation Technical Service Division
Patrick	Mallen		Sea Air NY
Abigal	Trenk		Air Pegasus
Matt	Zuccaro		Easter Region Helicopter Council
Mark	Green	Public Advocate	City of New York
Charles	Brodie	Airport Owner/Man.	Aerodrome Development Corporation
James	Dougherty		
Tracy	Carluccio		Delaware Riverkeeper

9.2 FEIS

This section provides a listing of libraries, officials, agencies, organizations, and individuals that were provided copies of the FEIS in one of three formats. These formats included: (1) Executive Summary (with full copy CD), (2) Hard Copy (full document including appendices on CD), and (3) Full Hard Copy (hard copy of entire document and appendices). In addition, all 6,050 contacts on the mailing list developed throughout the life of the airspace redesign project received a postcard notifying them as to where the FEIS was available for review.

Table 9.13
Libraries

Name	Address	City
Connecticut		
Bridgeport Library	925 Broad Street	Bridgeport
Danbury Public Library	170 Main Street	Danbury
Ferguson Public Library	One Library Plaza	Stamford
Hartford Public Library	500 Main Street	Hartford
Rathburn Free Memorial	36 Main Street	East Haddam
New Haven Public Library	133 Elm Street	New Haven
New London Public Library	63 Huntington Street	New London
Delaware		
Brandywine Hundred Branch	1300 Foulk Road	Wilmington
Newark Branch Library	750 Library Avenue	Newark
New Jersey		
Atlantic City Public Library	1 North Tennessee Avenue	Atlantic City
Charles E. Reid Branch Library	E. 116 Century Rd.	Paramus
Pinelands Library	39 Allen Avenue	Medford
Camden County Library System - South County Regional Branch	35 Coopers Folly Road	Atco
Vineland Public Library	1058 East Landis Avenue	Vineland
Newark Public Library - Main Library	5 Washington St.	Newark
Montclair Public Library	50 South Fullerton Ave.	Montclair
Gloucester County Library System - Greenwich Township Branch	411 Swedesboro Road	Gibbstown
Jersey City Public Library	472 Jersey Ave	Jersey City
South County Branch	1108-A Old York Road	Ringoes
Trenton Public Library	120 Academy St	Trenton
Middlesex Public Library	1300 Mountain Ave	Middlesex
Franklin Township Public Library	485 DeMott Lane	Somerset
Monmouth County Library Headquarters	125 Symmes Drive	Manalapan
Monmouth County Library Eastern Branch	Rt. 35	Shrewsbury
Morris County Library	30 East Hanover Ave	Whippany
Ocean County County Library	101 Washington St.	Toms River

Table 9.13
Libraries

Name	Address	City
Passaic Public Library	195 Gregory Ave	Passaic
Salem Public Library	112 West Broadway	Salem
Bridgewater Library	1 Vogt Dr.	Bridgewater
Sussex County Library - Main	125 Morris Turnpike	Newton
Union Public Library	1980 Morris Ave	Union
Elizabeth Public Library	11 S. Broad St.	Elizabeth
Warren County Library	199 Hardwick St.	Belvidere
New York		
Albany Public Library	161 Washington Ave.	Albany
Schenectady County Public Library	99 Clinton St.	Schenectady
Hunt's Point Branch	877 Southern Blvd.	Bronx
Chatham Public Library	11 Woodbridge Ave.	Chatham
Franklin Free Library	334 Main St.	Franklin
Poughkeepsie Public Library District	93 Market St.	Poughkeepsie
Greenville Public Library	P.O. Box 8, North St.	Greenville
Brooklyn Public Library - Central Library	Grand Army Plaza	Brooklyn
Levittown Public Library	1 Bluegrass Lane	Levittown
New York Public Library	127 East 58th St.	New York
Newburgh Free Library	124 Grand St.	Newburgh
Huntington Memorial Library	62 Chestnut St.	Oneonta
Mahopac Public Library	668 Route Six	Mahopac
Queens Borough Public Library	89-11 Merrick Blvd.	Jamaica
Queens Borough Public Library	4117 Main St.	Flushing
Tottenville Branch Library	7430 Amboy Road	Staten Island
Port Richmond Branch Library	75 Bennett St.	Staten Island
New City Free Library	220 North Main St.	New City
Middleburgh Library	323 Main St.	Middleburgh
West Islip Public Library	3 Higbie Lane	West Islip
Liberty Public Library	189 North Main St.	Liberty
Kingston Library	55 Franklin St.	Kingston
Yonkers Public Library - Riverfront Branch	One Larkin Center	Yonkers
White Plains Public Library	100 Martine Ave.	White Plains
Pennsylvania		
Reading Public Library	100 South 5th St.	Reading
County of Bucks Free Library	150 South Pine St.	Doylestown
Allentown Public Library	1210 Hamilton St.	Allentown
Easton Area Public Library	515 Church St.	Easton
Chester County Library System	450 Exton Square Parkway	Exton
Ridley Park Public Library	Wark & Cresswell St.	Ridley Park
Scranton Public Library	500 Vine St.	Scranton

Table 9.13
Libraries

Name	Address	City
Lancaster County Library	125 North Duke St.	Lancaster
Bethlehem Public Library	11 West Church St.	Bethlehem
Easton Area Public Library	515 Church St.	Easton
Western Pocono Community Library	2000 Pilgrim Way	Brodheadsville
Abington Township Public Library	1030 Old York Road	Abington
Northampton Area Public Library	1615 Laubach Ave.	Northampton
Free Library of Philadelphia - Central Branch	1901 Vine St.	Philadelphia
Pike County Public Library - Milford Branch	201 Broad St.	Milford
Wayne County Public Library - Honesdale	1406 Main St.,	Honesdale

Table 9.14
Federal Officials

First Name	Last Name	Position	Organization
Connecticut			
Nancy	Johnson	Member	U.S. House of Representatives
Christopher	Shays	Member	U.S. House of Representatives
District of Columbia			
Hillary	Clinton	Member	United States Senate
Charles	Schumer	Member	United States Senate
Robert	Menendez	Member	United States Senate
Joseph	Lieberman	Member	United States Senate
Joseph	Biden Jr.	Member	United States Senate
Frank	Lautenberg	Member	United States Senate
Christopher	Dodd	Member	United States Senate
Robert	Casey	Member	United States Senate
Thomas	Carper	Member	United States Senate
New Jersey			
Steven	Rothman	Member	U.S. House of Representatives
Scott	Garrett	Member	U.S. House of Representatives
Donald	Payne	Member	U.S. House of Representatives
Robert	Andrews	Member	U.S. House of Representatives
Rush	Holt	Member	U.S. House of Representatives
James	Saxton	Member	U.S. House of Representatives
Bill	Pascrell, Jr.	Member	U.S. House of Representatives
New York			
Maurice	Hinchey	Member	U.S. House of Representatives
Joseph	Crowley	Member	U.S. House of Representatives
Carolyn	Maloney	Member	U.S. House of Representatives
Jerrold	Nadler	Member	U.S. House of Representatives
Eliot	Engel	Member	U.S. House of Representatives
Sue	Kelly	Member	U.S. House of Representatives
Nita	Lowey	Member	U.S. House of Representatives
Charles	Rangel	Member	U.S. House of Representatives

Table 9.15
State Officials

First Name	Last Name	Position	Organization
Connecticut			
John	Zelinsky	Representative	Town of Stamford
Toni	Boucher	State Representative	CT House of Representatives, 1143rd District
Delaware			
Gregory	Lavelle	State Representative	DE State Assembly, 11th District
Ruth Ann	Minner	Governor	State of Delaware
New Jersey			
Joseph	Coniglio	State Senator	NJ General Assembly, 38th District
Eric	Munoz	Assemblyman	NJ General Assembly, 21st District
Loretta	Weinberg	State Senator	NJ General Assembly, 37th District
Thomas	Kean, Jr.	State Senator	NJ General Assembly, 21st District
Charlotte	Vandervalk	Assemblywoman	NJ General Assembly, 39th District
Joan	Voss	Assemblywoman	NJ General Assembly, 38th District
Jon	Bramnick	Assemblyman	NJ General Assembly, 21st District
Joseph	Cryan	Assemblyman	NJ General Assembly, 20th District
Gordon	Johnson	Assemblyman	NJ General Assembly, 37th District
John	McKeon	Assemblyman	NJ General Assembly, 27th District
Robert	Gordon	Assemblyman	NJ General Assembly, 38th District
Gerald	Cardinale	State Senator	NJ State Senate, 39th District
Valerie	Huttle	Assemblywoman	NJ General Assembly, 37th District
Marcia	Karrow	Assemblywoman	NJ General Assembly, 23rd District
New York			
Sandy	Galef	Assemblywoman	NY State Assembly, 90th District
John	Lavelle	Assemblyman	NY State Assembly, 61st District
Kemp	Hannon	State Senator	New York Senate, 61st District
Pennsylvania			
James	Roebuck	State Representative	PA House of Representatives, 188th District
Bryan	Lentz	State Representative	PA House of Representatives, 161st District
Dominic	Pileggi	State Senator	PA State Senate, 9th District

Table 9.16
Local Officials

First Name	Last Name	Position	Organization
Connecticut			
James	Lash	First Selectman	Town of Greenwich
Michael	Freimuth	Director	Office of Economic Development City of Stamford
Alice	Ayers	First Selectman	Town of Wilton
Kenneth	Flatto	First Selectman	Town of Fairfield
Judy	Neville	First selectwoman	Town of New Canaan
Rudy	Marconi	First Selectman	Town of Ridgefield
New Jersey			
Joanne	Kwasniewski	Municipal Clerk	Borough of Fair Lawn
Jerome	Feder	Chairman	Union County Air Traffic Noise Advisory Board
Joanne	Howley	Chairwoman	Borough of Woodcliff Lake
Elwood	Malick	Mayor	Borough of Spring Lake Heights
Elise	McCann	Municipal Clerk	Borough of Spring Lake Heights
Alexander	Mirabella	Chairman	Union CTY Board of Chosen Freeholders
James	Kimball	Councilman	Borough of Montvale
Jeni	Branum		Jersey City Planning Bd Commissioner
Ruth	Spellman	Mayor	Township of Pequannock
Wanda	Worner	Township Clerk	Township of Rivervale
Rosalie	Hellenbrecht	Municipal Clerk	Township of Cranford
Nancy	Ward	Freeholder	Union County/Air Traffic and Noise Advisory Board of Union County
Andrew	Skibitsky	Mayor	City of Westfield
Mark	Hurwitz	Committeeman	Township of Springfield
Carol	Skiba	Councilwoman	Borough of Hasbrouck Heights
Dennis	Deutsch	Mayor	Borough of Hillsdale
Frank	Cuesta	Councilman	City of Elizabeth
Lori	Sciara	Borough Clerk	Borough of Woodcliff Lake
Eileen	Sarubbi	Borough Clerk	Borough of Westwood
Gerard	Scharfenberger	Mayor	Middletown Township
Barbara	Ripston	Councilwoman	Borough of Upper Saddle River
Diane	Klaif	Council President	City of Summit
Manny	Grova, Jr.	Councilman	Firstward Office
Dennis	McNerney	County Executive	Bergen County
Donald	Bowen	Councilman	Borough of Madison
George	Jorn	Member	Cranford Township Committee
Christian	Bollwage	Mayor	City of Elizabeth
Reina	Murphy	Municipal Clerk	Township of Edison
Clara	Harelik	Mayor	Township of Springfield

Table 9.16
Local Officials

First Name	Last Name	Position	Organization
Joan	Kapitan	Councilmember	Township of Edison
Kenneth	Florek	Mayor	Township of Colts Neck
Michael	Amorosa	Secretary	Somerset County Planning Board
Joseph	Lapaglia	Mayor	Borough of Woodcliff Lake
William	Mennen	Attorney at Law	Pascack Valley Mayors Association
Joanne	Monarque	Township Clerk	Township of Millburn
George	Zeller	Mayor	Borough of Montvale
Denise	Szabo	Municipal Clerk	Township of Bernards
Robert	Sandt	Municipal Clerk	Borough of Hillsdale
George	Shivery, Jr.	Mayor	Township of Greenwich
Norman	Dotti	Consultant	City of Elizabeth - Russell Acoustics
Maureen	Iarossi-Alwan	Municipal Clerk	Borough of Montvale
Joseph	Blundo	Councilman	Township of River Vale
Susan	Nelson	Deputy Clerk	Borough of Harrington Park
Janet	Sobkowicz	Council President	Township of Washington
Mary Ann	Ozment	Township Clerk	Township of Washington
Maureen	Massey	Borough Clerk	Borough of Mendham
Justin	Dipisa	Councilman	Borough of Hasbrouck Heights
Brenda	Restive	Deputy Mayor	Township of Union
Dolores	Sweeney	Township Clerk	Township of Pequannock
Ailish	Hambel	Mayor	Township of Sparta
Jacqueline	Grindrod	District Director	Congressman Bill Pascrell's Office
Richard	Kraft	Mayor	Borough of Mendham
Joanne	Cocchiola	Mayor	Township of Nutley
Daniel	Hennessy	Clerk of the Board	County of Ocean
Mary	Citurso	Township Clerk	Rockaway Township
Hedy	Lipke	Borough Clerk	Borough of Kenilworth
John	Giovannnitti	Councilman	Borough of Paulsboro
Judith	Howard	Municipal Clerk	Borough of Beach Haven
Frederick	LaMonica	Mayor	Borough of Oradell
Ronald	Jones	Mayor	Hasbouch Heights
New York			
Monroe	Mann	Town Attorney	Town of Rye
William	Vescio	Mayor	Village of Briarcliff Manor
Gennaro	Faiella	Administrator	Town of New Castle
Hugh	Weinberg	QBPAAC Counsel	Office of Queens Borough President
Hala	Makowska	Member	Millwood Task Force
John	Chervokas	Supervisor	Town of Ossining
Gerard	Lundquist	Mayor	Village of Garden City
Paul	Shew	City Manager	City of Rye
Eugene	Kelty	Chairperson	Community Board 7, Queens
Margaret	Gelardo	Clerk	Mount Pleasant Supervisor's Office

Table 9.16
Local Officials

First Name	Last Name	Position	Organization
Patti	Dwyver	Municipal Clerk	Village of Pleasantville
Jeremiah	Quinlan	Trustee	Hastings-on-Hudson Township
Helen	Marshall	President	Community Board 9, Queens
Joseph	Addabbo, Jr.	Council Member	NY City Council,, 32nd District
Robert	Meehan	Supervisor	Town of Mt. Pleasant
Sheldon	Fine	Chairperson	Community Board 7, Manhattan
Penny	Ryan	Member	Community Board 7, Manhattan
Elizabeth	Braton	Chairperson	Community Board 10, Queens
Cheryl	Lewy	Chairperson	Westchester County Planning Board
Elizabeth	Braton	Chairperson	Community Board 10, Queens
Ranganatha	Rao	President	Community Board 7, Queens: Aviation Advisory Council
John	Laffey	City Manager	City of Long Beach
Robert	Funicello	Environmental Project Director	Westchester County Department of Transportation
Mario	Posillico	Administrator	Village of Sataire
Daniel	O'Neill	Mayor	Village of Buchanan
Peter	Bee	Mayor	Garden City
Lance	Millman	Deputy Mayor	Village of Montebello
Patrick	Withers	County Legislature	County of Rockland
Susan	DeRobertis	Chair	Millwood Task Force
Leonard	Remo	President	City of Long Beach Council
Michael	Sweeton	Town Supervisor	Town of Warwick
Thomas	Abinanti	Legislator	Westchester County
George	Skinner	Chairman	Westchester County Airport Advisory Board
John	Antoniello	Chairman	Community Board 3, Staten Island
Edward	Berman	Vice Chairman	Westchester County Airport Advisory Board
Jeremy	Wilber	Supervisor	Town of Woodstock
Marilyn	Bitterman	District Manager	Community Board 7, Queens
Damian	Sciano	Chairman	Long Beach, NY Planning Advisory Board
Kathleen	Mihm	Clerk	Ulster County Legislature
James	Molinaro	President	Borough of Staten Island
Russell	Barnett	Director	Dept. of Environment & Waterways
Scott	Vanderhoef	County Executive	County of Rockland
Marty	Markowitz	President	Borough of Brooklyn
Andrew	Spano	County Executive	Westchester County, NY
Marie	Bodnar	District Manager	Community Board 3, Staten Island
Pennsylvania			
Donald	Cook	Mayor	Borough of Prospect Park

Table 9.16
Local Officials

First Name	Last Name	Position	Organization
David	Bashore	Township Manager	Radnor Township
Thomas	Judge, Jr.	Chief Admin. Officer	Upper Darby Township
Ralph	Orr	Mayor	Eddystone Borough
Thomas	Giancristoforo, Jr.	President	Commissioners of Tinicum Township
Robert	Willert	Township Manager	Township of Concord
Marianne	Grace	Executive Director	Delaware County Council
Nick	Roger	Chief Clerk	PA House of Representatives
Scott	Galloway	Chairman	Middletown Township Council
Gary	Cummings	Township Manager	Township of Nether Providence
Michelle	Artmount	President	Millbourne Borough Council
James	Raith	Chairman, Board of Supervisors	Thornbury Township
William	Wassh	President	Commissioners of Tinicum Township
Lin	Floyd	4th Ward Commissioner	Township of Nether Providence
John	Purcell	Council VP	Borough of Ridley Park Council
Thomas	Orio	Council President	Eddystone Borough
Brian	Lauer	Secretary/Treasurer	Eddystone Borough
Thomas	Mahoney	President	Township of Springfield Board of Commissioners
Anne	Howanski	Township Manager	Township of Ridley
Robert	O'Neill	Mayor	Borough of Sharon Hill
Joseph	Botta	Council President	Borough of Sharon Hill
Thomas	Danzi	Council President	Borough of Glenolden
Robert	Poole	Bourogh Manager	Ridley Park Bourogh Council
Deborah Love	D'Elia	Chairman	Chadds Ford Township Board of Supervisors
Issac	Dotson	President	Yeadon Bourogh Council
Andrew	Reilly	Chairman	Delaware County Council
Linda	Cartisano	Chairman	Delaware County Council
Mary Alice	Brennan	Chairman	Delaware County Council
Michael	Puppio, Jr.	Chairman	Delaware County Council
John	Whelan	Chairman	Delaware County Council
Vivian	Ford	Council President	Borough of Yeadon
Robert	Willert	President	Township of Ridley, Board of Commissioners
Charles	Vivial	Mayor	Folcroft Borough
John	McBlain	Solicitor	County of Delaware

Table 9.17
Federal Agencies

First Name	Last Name	Position	Organization
District of Columbia			
		Office of Federal Activities, EIS Filing Section	US Environmental Protection Agency Headquarters
Ken	Mittleholtz	Environmental Specialist	US Environmental Protection Agency
Mary	Peters	Secretary	US Department of Transportation
Kenneth	Havran	Office of Environmental Policy & Compliance	US Department of Interior
Massachusetts			
Peter	Colosi, Jr.	Asst. Regional Administrator	NOAA Habitat Conservation Division
Rick	Perez	Navy Representative	FAA ANE-930
Robert	Varney	Regional Administrator	EPA Region 1 (CT, ME, MA, NH, RI, VT & 10 Tribal Nations)
New York			
John	Filippelli	Chief, Strategic Planning	US Environmental Protection Agency Region 2 (NJ, NY, Puerto Rico, US Virgin Islands, Tribal Nations)
Alan	Steinberg	Regional Administrator	Environmental Protection Agency Region 2 (NJ, NY, Puerto Rico, US Virgin Islands, Tribal Nations)
Pennsylvania			
Donald	Welsh	Regional Administrator	Environmental Protection Agency Region 3 (DE, DC, MD, PA, VA, WV US)

Table 9.18
State Agencies

First Name	Last Name	Position	Organization
Connecticut			
Richard	Jaworski	Bureau Chief	CT Bureau of Aviation & Ports
Rebecca	Muchetti	Chairman	Town Zoning Commission
J. Paul	Loether	Deputy State Historic Preservation Officer	State of CT DEP
Richard	Blumenthal	Attorney General	State of CT
Delaware			
Craig	Lukezic	Archaeologist	DE State Historic Preservation Office
Sarah	Cooksey	Administrator, Coastal Programs	DE Department of Natural Resources and Environmental Control
New Jersey			
Meghan	MacWilliams-Baratta	Specialist	NJ Historic Preservation Office
Aaron	Watson	Director Department of Transportation and Infrastructure	County of Mercer
Ken	Koschek	Supervising Environmental Specialist	NJ State DEP
Joseph	Lepis, Jr.	Chairman	NJ State DEP, Noise Control Council
Dorothy	Guzzo	Deputy State Historic Preservation Officer	NJ State DEP
New York			
Tom	Lyons	Director of Resource Management	NY State Office of Parks, Recreation and Historic Preservation
Ruth	Pierpont	Director	Historic Preservation Staff
Pennsylvania			
Susan	Zacher	Historic Structures Section Chief	PA Bureau for Historic Preservation
Douglas	McLearen	Chief, Division of Archaeology & Protection	PA State Historic Preservation Office

Table 9.19
Airport Authorities

First Name	Last Name	Position	Organization
Charles	Isdell	Director of Aviation	Philadelphia International Airport
William	DeCota	Director of Aviation	Port Authority of NYNJ
Tom	Bock	Manager, Airspace Redesign General	Port Authority of NYNJ
Paul	Estefan	Administrator	Danbury Municipal Airport
Justin	Edwards	Airport Manager	Trenton Mercer Airport
Calvin	Davenger, Jr.	Deputy Director of Aviation, Planning & Environmental	City of Philadelphia Division of Aviation
Charles	Isdell	Director of Aviation	Philadelphia International Airport

Table 9.20
Airlines

First Name	Last Name	Position	Organization
Larry	Taylor	Pilot	US Airways
David	DiBiase	Manager Safety	Avaintair, Inc.
Richard	Buergel	Asst. Chief Pilot	NetJets Aviation, Inc.
Paul	Everstijn	Captain	ExpressJet Airlines
Glenn	Morse	Director - Industry Affairs	Continental Airlines

Table 9.21
Special Interest

First Name	Last Name	Position	Organization
California			
Barbara	Lichman	Attorney at Law	Sound Shore Communities of Westchester County
Connecticut			
William	Wilson	Director	Concerned Connecticut Citizens Group
Erica	Purnell	Member	Northwest Greenwich Association, Inc.
Eric	Lichenstein	Director	Residents for Appropriate Development, Inc.
Barbara	Bishop	President	Residents for Appropriate Development, Inc.
Janet	Lockton	Member	Metropolitan Aircraft Noise Mitigation Committee
Keith	Felcyn	Co-Chairman	The Round Hill Assn., Inc.
Lawrence	Larson	Co-Chairman	The Round Hill Assn., Inc.

Table 9.21
Special Interest

First Name	Last Name	Position	Organization
District of Columbia			
David	Berg	VP, General Counsel	Air Transportation Association
Thomas	Lynch	Senior VP & Director	The Staubach Company
Delaware			
William	McGlinchey	Chair	PHL Airport Action Group
Kentucky			
Timothy	Stull	Manager	Air Traffic Systems UPS
Maryland			
Heidi	Williams	Director	Aircraft Owners and Pilots Association - Air Traffic Services
New Jersey			
Rodney & Gloria	Ruth	President	Citizens Air Rights Inc.
Lawrence	Feinsod	Superintendent of Schools	Cranford Public School District
Gordon	Haas	Executive Director	Greater Elizabeth Chamber of Commerce
Wayne	Greenstone	Member	Cranford Airplane Noise Committee
Rose	Heck	Chair	Hasbrouck Heights Environmental & Transportation Commission
Robert	Hoeffler	Executive Director	Cranford Chamber of Commerce
Robert	Belzer	President	Citizens Against Aircraft Noise
Dennis	Hardie	Chairman	Scotch Plains Aircraft Noise Committee
Joyce	Gulden	Member	Tri-State Noise Mitigation Review Committee
Kevin	Campbell	Chair	Cranford Aircraft Noise Advisory Com.
John	Lewis	Vice President	Hartshorne Woods Association
Bill	Chappel		Historic James Street Neighborhood Assn., Inc.
Martine	Donofrio	Chairman	Millburn Environmental Commission
Jerome	Feder	President	Citizens Against Aircraft Noise
Frederick	Obrock	President	South Plains Citizens Against Aircraft Noise
Barbara	Krause	Member	Cranford Aircraft Noise Pollution Committee
Jeff	Robinson	Member	Air Traffic Advisory Board
James & Barbara	Frawley	President	Morris County Citizens Against Aircraft Noise
Carter	Strickland, Jr.	Lawyer	Citizens Against Aircraft Noise

Table 9.21
Special Interest

First Name	**Last Name**	**Position**	**Organization**
Nelson	Dittmar	Chairman	Cranford Environmental Commission
Richard	McOmber	President	Riverside Drive Association
Terrill	Doyle	Representative	Oak Knoll Neighborhood Association
Robert	Planz	Representative	Rivervale at Holiday Farm - Condo Association
Zenon	Jaszczuht	Representative	Citizens Against Aircraft Noise
Gregg	Talley	President & CEO	Talley Management Group, Inc.
Patrick	Spagnoletti	Superintendent of Schools	Roselle Park Public Schools
Kevin	Heaney	Chairman of Dentistry	Hackensack University Medical Center
New York			
Herbert	Fox	President	Federated Conservationists of Westchester County, Inc.
Donald	Stever	Secretary	Friends of Rockefeller State Park
Peter	Malkin	Chairman	Metropolitan New York Aircraft Noise Mitigation Committee
William	Mulcahy	Chair	Environmental Committee Rockaway Beach Civic Association
Rose Marie	Povermo	President	United Community Civic Association
Christopher	Olney	Director of Conservation	Catskill Center
Vincenza	Messina	Representative	Locust Grove Civic Association
Euphrosyne and Kate	Bloom	Representative	Woodstock Overflights Focus Group
Martin	Keith	Representative	Woodstock Overflights Focus Group
Diana	Schneider		Residents Opposed to Aircraft Racket (ROAR)
Maureen	Radl	Vice President	Friends of the Shawangunks
Kendall	Lampkin	Chairman	TVASNAC
Phillip	Musegaas	Policy Analyst	Riverkeeper, Inc.
Lisa	Rainwater	Policy Analyst	Riverkeeper, Inc.
Joan	McDonald	Sr. VP, Transportation	NY City Economic Development Corporation
William	Mulcahy	Vice President	Friends of Rockaway
Gerard	Stoddard	President	Fire Island Association, Inc.
Brian	Shaughnessy	Communications Director	New York Aviation Management Association
Patterson	Schackne	Chairperson	Marbletown Enviornmental Conservation Commission
Frans	Verhagen	President	Sane Aviation For Everyone (SAFE, Inc.)

Table 9.21
Special Interest

First Name	Last Name	Position	Organization
			Ulsterites Fight Overflight Noise, Inc.
Pennsylvania			
Bill	Giles	Chairman & Honorary President of National League	Philadelphia Phillies Baseball Team
Daniel	Fitzpatrick	President	Bank of America - PA
Nicholas	DeBenedictis	Chairman & President	Aqua America, Inc.
Laurie	Actman	CEO	Council for Growth
Craig	Spencer	President & CEO	The Arden Group, Inc.
Jerry	Sweeney	President & CEO	Brandywine Realty Trust
Tom	Muldoon	President	Philadelphia Convention & Visitors Bureau
Bruce	Crawley	Chairman	African American Chamber of Commerce of PA, NJ & DE
Mark	Schweiker	Chairman	CEO Council for Growth
Jack	Holefelder	President	Delaware County Chamber of Commerce
William	Wilson	Principal-in-Charge	Synterra Ltd.
Douglas	McBrearty	Principal	Gulph Creek Hotels
Amy	Gutmann	President	University of Pennsylvania
Francis	Van Kirk	Vice Chairman	CEO Council for Growth
Stephen	Aichele	Chairman	CEO Council - Saul Ewing, LLP
James	Gallagher	President	Philadelphia University