Lease No. AYD-350

between

THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY

and

JETBLUE AIRWAYS CORPORATION

Volume II of VI

EXEMPTION (4) – DRAWINGS OF NON-PUBLIC AREAS

JetBlue AIRWAYS

JFK International Airport Terminal 5 Redevelopment

Basis of Design – Parking Garage

November 15, 2005

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THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY
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EXHIBIT 2.2

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1. EXECUTIVE SUMMARY

1.1 Overview

As part of JetBlue's expansion program at JFK international Airport it is their intention to design and construct a 1500 space (minimum) parking garage in the Yellow Quadrant on behalf of the Port Authority of New York and New Jersey (PANYNJ). The garage will serve JetBlue's proposed Terminal 5 and connect directly into the existing Airtrain Station. The parking garage and Airtrain station will connect into the terminal via a skywalk connection.

The garage will incorporate three (3) entry lanes and eight (8) exit lanes. Access to five (5) above grade floors will be via a series of straight ramps.

All elements of the parking garage will be designed to perform at a minimum Level of Service C.

The garage will be procured by JetBlue under a Design and Build contract. The garage will be subject to a thorough VE review effort as the design progresses to ensure the budget cost estimate of $96.5m is achieved. This review will not compromise the number of spaces below the stated minimum of 1500 agreed nor will it reduce the Level of Service for any element of the garage below the agreed LoS C.

1.2 General Design Criteria

1. The site is the current Yellow Quadrant Parking Lot No. 4, and limited by existing Airtrain guideway and airport access roads.
2. Garage to accommodate a minimum of 1,500 cars on ground plus 5 elevated floors.
3. Pedestrian access to be provided to terminals via elevated connector at Airtrain station. At grade pedestrian connection to Terminals 5 and 6 as well as the Saarinen Building will be provided.
4. Vehicular access and egress to be accommodated between the airport roadway network and the garage.
5. No provision for future additional parking deck(s).
6. One garage floor plate to approximately align with elevation of Airtrain station rotunda.
7. 18' X 9' parking stalls and 24' wide drive isles. Limousine parking bays shall be 10'x30' and ADA stalls shall be in compliance with published requirements (nominally 13.5'x18')
8. Traffic operations at design peak to be Level of Service C or better.
9. Elevators and shafts to be glass enclosed.
10. Sloped parking decks are not to be included.
11. Dead-end drive isles are not to be included.
12. Number and size of elevators sized for short term parking mix and minimum Level of Service C. Analysis to be provided as design progresses.
13. Illuminated signage for easy identification and reading by customers.
14. 14'6" headroom to accommodate construction vehicles to access ground level of the garage.
15. Underground utilities will be relocated where they conflict with garage foundations and bridging over them with the foundations is not possible.
16. All entrance plazas and crash gates will have horizontal warning bars above each lane. Ramp entrance to upper levels will also have horizontal warning bar.
17. An automated pay-on-foot prepaid parking system is not to be accommodated within the garage.
18. The Parking Structure will operate at a minimum Level of Service C.
19. The elevated parking decks will be level with vehicular movements between grade and the decks accommodated by a series of external ramps located in the western section of the site. Pedestrian vertical circulation will be by elevators and stairs with connections at both grade and at the Airtrain Station rotunda
20. The architectural treatment of the facade shall be consistent with the other parking structures within the CTA.
21. The first floor of the garage will have a minimum clear height, in one direction, of 14'-6" to accommodate both emergency vehicles and maintenance vehicles for repair or replacement of underground utilities located under the garage's first floor.
22. The garage's structural components will be supported on piles but may be of either concrete or steel construction.
23. Elevators will be traction type units with glass-enclosed cabs and shaftway.
24. The ground floor plate, as well as the entrance and exit roadways will be paved with asphalt.
25. Sanitary and potable water systems will be provided to accommodate employee and maintenance needs.
26. Where necessary, elevated garage decks will be drained into a scupper system that will be piped to the underground drainage system. The ground floor will be drained to catch basins that in turn will be conveyed to the underground drainage system.
27. The garage will be equipped with a fire hydrant ring around the perimeter of the site.
28. A dedicated electrical service and sub-station will be provided for the garage that will accommodate the lighting, elevator service, as well as electronic fee transactions.

29. The garage as well as the tollbooths will be designed to accommodate E-Z Pass which will be installed under a separate contract. Canopies will be provided at the Entry/Exit plazas. Toll Booths and canopies shall be designed to JFK standard.
30. Emergency lighting will be provided as well as emergency power to the elevators, life safety systems, and revenue control systems.
31. Public and emergency communication systems will be provided as well as a fire alarm system and closed circuit television cameras at critical areas.
32. The site around the garage will be landscaped and hardscaped as appropriate and consistent with other CTA garage sites.
33. The current connection between the blue and yellow parking lots will be maintained.

2. PLANNED CAPACITY

2.1 Vehicle Count

As described in the Lease Agreement between the PANYNJ and JetBlue, 1500 parking spaces will be provided in the garage (ground level plus five suspended levels), including 26 ADA spaces and 22 limousine spaces. ADA parking spaces shall be located adjacent to the elevator core. Limousine spaces shall be located at the ground level. The supporting analysis below is generated from a series of empirical data and design load factors, which inherently carry interpretive assumptions and estimates.

2.2 Traffic Flow

The garage and access roadways and entry and exit plazas shall be designed to accommodate a peak traffic flow of 550vph

2.3 Planning analysis

An hour-by-hour entry-exit analysis showed that approximately 1,581 parking spaces are needed in the T5 sector to serve the 26-gate schedule. This accounts for the peak occupancy of 1,446 vehicles at 19:10, and a short-term parking inefficiency factor, *f*, of 0.80, which is described further in Section 2.4.2 below.

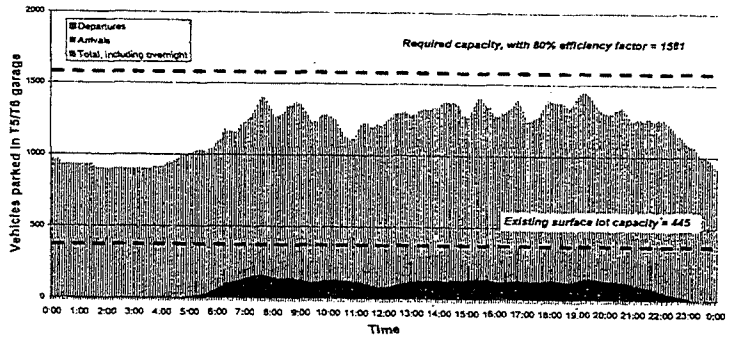

Figure 1. 24-hour parking accumulation pattern, Terminal 5

2.4 Methodology

2.4.1 Hour-by-hour Entry-exit analysis

A parking demand model was constructed to forecast public parking demand in the Terminal 5 sector, using the parameters described in Section 2 of the Terminal 5 Basis of Design report. The model was used to calculate the total number of vehicles that entered the parking garage based on departing and arriving customers at curb. It assumed that vehicles remained in the garage for 110 minutes (the median short-term parking duration observed at Terminal 6), and then exited. A running sum of the entries and exits gave the accumulation of short-term parking vehicles in the garage. The maximum accumulation is 543 short-term vehicles.

Overnight parking in the garage was accounted for by calculating the total daily number of overnight parking entries and multiplying by their length of stay in days. This gave the total number of overnight vehicles in the garage. The total number of vehicles in the garage at the peak was the sum of the variable hourly parking accumulation and the lump sum of overnight parking vehicles. The maximum accumulation is 902 overnight vehicles.

2.4.2 Parking inefficiency

For the purposes of calculating parking capacity requirements, it is assumed that in peak hours 80% of the parking spaces in the garage will be full. This is done by applying an inefficiency factor, *f*, to convert the peak short-term vehicle occupancy (in this case, 543 vehicles), to the peak space requirement to serve these vehicles (in this case, 679 spaces).

The value of *f* is typically set to 0.80 for multistory parking garages like the one proposed for the Terminal 5 landside. It is consistent with the PA's observation of other parking garages in the CTA, including the Blue Garage. Because parking inefficiency stems from short-term parkers entering and leaving spaces in the lot, the factor is applied only to short-term vehicle, not long-term vehicles.

2.5 Area of Garage (Approximate)

Parking Level	Square Foot
Ground	90000
Second	90000
Third	90000
Fourth	90000
Fifth (connector)	90000
Sixth (roof)	90000
Total	540000

3. STRUCTURAL SYSTEM

The garage structure shall span 60ft in one direction across each double loaded drive aisle. The structure may be constructed of steel, concrete or a hybrid.

The columns supporting the main structure and the ramps shall be supported by a piled foundation system. The pile system will transfer the gravity and lateral loads to the deeper denser soil and accommodate the loss of any lateral capacity in any liquefiable soil layer below the surface stratum.

3.1 CODES, AND STANDARDS

- New York City Building Code, 2004
- ACI 318-99 where applicable
- PCI Design Handbook- 5th Edition
- AISC Steel Construction Manual- 9th Edition
- ASCE "Minimum Design Loads for Buildings and Other Structures", for design requirements not covered by the New York City Building Code
- "Guide for the Design of Durable Parking Structures". ACI 363, 1 R-94

3.2 DESIGN LOADS AND CRITERIA

3.2.1 Live Loads

- Typical supported level and ramps (cars) 50 psf
- Stairways 100 psf
- Storage areas 125 psf
- Office 100 psf
- Luggage Handling areas 150 psf
- Mechanical mezzanines 150 psf
- Equipment rooms 150 psf
- Lobbies (including elevator lobbies) 100 psf
- Sidewalks 100 psf
- Snow Load (includes roof of stairways) 30 psf
- Wind load on full facade - per NYC code Min 20 psf or ASCE 7-98, whichever is more stringent where:
  - i. Basic wind speed V= 120mph
  - ii. Importance Factor I = 1.0
  - iii. Exposure Category = C
  - iv. Enclosure Classification = Open
  - v. Design wind loads for the main wind force resisting Systems
  - vi. Design wind load for components and cladding Elements
- Earthquake - per NYC Code: I = 1.0, Z = 0.15, S2 = 1.2 ,Rw = 6 (steel), 4 (concrete)

3.2.2 Dead Loads

Self weight of materials = density per NYC Code, AISC Handbook- Latest edition, PCI Design Handbook- Latest Edition

3.2.3 Temperature loads

Use maximum = 60 degree Fahrenheit for design (range) Per NYC Building Code for expansion and contraction.

3.2.4 Snow Removal

Roof, framing systems and foundation shall be designed to accommodate the stockpiling of snow for an average height of six feet in parking stall areas. Placement of temporary snow melting equipment is to be accommodated in the design of the structure.

3.2.5 Barrier walls

Barrier walls or railing shall be designed for a minimum ultimate load of 10,000 pounds applied at a height of 1'-6" above the floor at any point along the structure.

3.2.6 Precast Concrete

All Precast Concrete calculations including lateral load analysis and drawings shall be stamped by a Professional Engineer registered in the State of New York.

3.3 MATERIALS:

3.3.1 Structural Steel

1. ASTM A 572 Grade 50 - main structural members
2. Anchor Bolts- ASTM A193 B with heavy hex nuts and washers (galvanized)
3. ASTM A325 SC (Slip Critical - galvanized)
4. Welds- AWS E70XX Electrodes

3.3.2 Concrete General

1. Foundations- Pile caps,. grade beams, tie beams fc= 4000 psi
2. Caissons and Caps (Drilled shafts) fc= 5000 psi
3. Superstructure cast-in-place ramps, washes, curbs fc= 5000 psi
4. Precast/ Prestressed Double Tees Min fc= 5000 psi
5. Slabs on Grade fc= 4000 psi

3.3.3 Reinforcing steel

1. Standard - ASTM A615, Grade 60
2. WWF - ASTM 185, Fy = 60 ksi
3. Prestressing Strands - ASTM A416,270K strands
4. Epoxy coating- all cast-in-place and Precast/prestressed floor elements

3.3.4 Concrete Mixes

All concrete mixes will be in accordance with PA standard specifications

3.4 DESIGN PROCEDURES AND ASSUMPTIONS:

3.4.1 Structural Steel

Structural Steel design, fabrication and erection shall conform to the American Institute of Steel Construction Manual of Steel Construction, latest edition, Allowable Stress Design.

All steel details and connections shall be in accordance with the requirements of the AISC Specifications for Structural Steel Buildings, Allowable Stress Design.

Shear connections for beams and girders shall be designed in accordance with allowable stress design for 60% of the total allowable uniform load as computed from the allowable uniform loads on beams.

3.4.2 Structural Concrete

Strength method based on ACI 318-99 requirements and NYC Building Code Seismic Criteria.

Loading patterns causing maximum shear and moment in each member shall be utilized.

3.4.3 Precast Prestressed Concrete

Design all beams and tees for self weight, superimposed dead load of 10 psf, additional superimposed local and snow loads and live loads indicated above.

3.4.4 Design Load Combinations

Load combinations shall be as referenced in the NYCBC 2004 and the PANYNJ Tennant Construction Review Manual and associated referenced applicable codes for the proposed structural system.

3.5 Structural Systems

Based on the grid chosen for the structure, it is feasible that the structural system may be either a concrete or steel frame system.

3.6 Foundations

The foundation design will be based on a piled solution. The capacity, number and arrangement of the piles will be selected by the Design/ Build Contractor. The design of the piles will be selected to offer the best value for the project while meeting code and serviceability criteria.

3.7 Other Structural Design Requirements

The following structural elements will also form part of the parking garage design:

- Antenna mounts and system equipment
- Design of garage support structures including but not limited to electrical substation, communications rooms, electrical rooms, and other support spaces.
- Design of large underground manholes and chambers
- Design of foundations for tollbooths
- Design of sign support structures
- Design of Toll Plaza canopy foundations

4. CIVIL DESIGN CRITERIA

Roadways, parking lots, other open paved vehicle and pedestrian areas, exterior pedestrian sidewalks, storm water drainage, sanitary sewers and water supply shall be in accordance with the current edition of the PANYNJ Civil Engineering Design Guidelines.

4.1 Roadways

Roadways shall meet the geometric design requirements of the current version of A.A.S.H.T.O. 'A Policy on Geometric Design of Highways and Streets'.

Asphalt pavement shall be standard Type I-2 mix for the base course and I-4 for the top course. All curbs, with the exception of curbing at pedestrian ramps and driveways, shall be non-mountable type with an eight-inch maximum height and a six-inch minimum height. Roads shall have a minimum longitudinal slope of 0.5%.and a minimum cross-slope of 2% to facilitate drainage.

4.2 Parking Areas

Roadways shall meet the geometric design requirements of the current version of A.A.S.H.T.O. 'A Policy on Geometric Design of Highways and Streets'.

Pavement shall be two inches of asphalt concrete top course (type I-4) on six-inches of dense graded aggregate base course.

All curbs, with the exception of curbing at pedestrian ramps and driveways, shall be non-mountable type with an eight-inch maximum height and a six-inch minimum height.

Parking lots shall have a minimum grade of 1.0% and an absolute maximum of 3% with a desirable maximum of 2%.

4.3 Pedestrian Sidewalks and Islands

Geometry and other requirements for access for the handicapped shall comply with the American with Disabilities Act (A.D.A.).

Sidewalks and islands shall be four-inches of Portland cement concrete on four-inches of aggregate base course.

Sidewalks shall be sloped towards the roadways and parking lot at a minimum of 2% and a maximum of 5%.

Sidewalks shall be a minimum of 5 feet in width

4.4 Storm Drainage

All paved surfaces shall be positively drained by catch basins, scuppers or trench drains. The minimum level of protection is ten years where the design runoff is assumed to be produced by the corresponding frequency rainfall, (ten year rainfall). The Rational Method will be used to determine the quantity of surface runoff. Runoff coefficients for the Rational Method are 0.95 for paved and roofed surfaces and 0.30 for unpaved surfaces.

Rainfall intensity will be calculated using the Standard Port Authority intensity formula:

$i = 120/(t + 20)$

where i = rainfall intensity (inches per hour) and

t = time of concentration (minutes)

Minimum time of concentration is five minutes.

The maximum desirable catchment area for parking lots is one acre. For roadways, catch basins are spaced to control the spread of water in the traveled lane. The maximum distance between inlets shall not exceed 350 feet. Reinforced concrete pipe (R.C.P.), Class V, shall be used except in areas of shallow cover where Ductile Iron Pipe (D.I.P.) will be used.

4.5 Sanitary Sewer

Pipes shall be designed assuming steady, uniform flow using the Manning equation with a coefficient (n) of 0.013.

Pipes shall be sized to flow half-full, or less at the design peak flow.

The minimum half-full velocity shall be 2.5 ft/sec (desirable) with an absolute minimum of 2.0 ft/sec. The maximum velocity is 10 ft/sec.

Pipe material shall be ductile iron pipe, acrylonitrile-butadiene-styrene composite, or reinforced concrete pipe.

Manholes shall be provided at the ends of the sewer line and at all pipeline intersections, changes in grade or alignment, and whenever the pipe sizes change. In addition, manholes shall be spaced no further than every 300 LF for 0" to 15" diameter pipes and 500 LF for 18" or greater diameter pipes.

Sanitary lines shall be designed to cross under water mains insofar as possible.

4.6 Water Supply

Pipes shall be designed assuming steady, uniform flow using the Hazen-Williams formula. Pipes shall be ductile iron with the exception of service connections, which will be copper.

Hydrants shall be spaced at a maximum of 250-feet apart and a maximum of 300-feet from the building face.

Sectionalizing valves shall be provided.

Minimum depth of cover shall be four feet.

5. MECHANICAL

Provide four (4), 6000 lbs. passenger traction elevators, with glass cab and hoistway, servicing six landings, Each unit will be powered by a 60 HP motor and travel the 65.5 feet height at a speed of 350 fpm

The elevator hoistway, the garage electrical substation, generator rooms and elevator machine room will be ventilated.

The elevator cabs and elevator control room will be air conditioned.

The electrical substation and generator rooms will be heated and vented.

Provide HVAC units for eight (8) tollbooths.

Relocate existing underground hot water and chilled water piping as necessary to avoid foundations.

5.1 Design and Performance Requirements

The design and performance of the mechanical systems shall comply with the applicable provisions of the codes, standards, recommendations of the entities listed below:

1. Underwriters Laboratories Inc. (UL)
2. American Society of Mechanical Engineers (ASM)
3. Anti-Friction Bearing Manufactures Association (AFBMA)
4. Air Movement and Control Association (AMKA)
5. American National Standard Institute (AN)
6. American Society for Testing and Materials (ASTM)
7. American Welding Society (AWS)
8. Steel Structures Painting Council (SSPC)
9. NYC Building Code
10. National Elevator Industry, Inc. (NEMI)
11. National Fire Protection Association (NFPA)
12. Occupational Safety and Health Administration (OSHA)
13. National Electric Code (NEC)
14. American Society of Mechanical Engineers (ASME)
15. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE)
16. Air Conditioning Institute (ARI)
17. CALPINE Design Guidelines for KIAC Underground utility pipes.

5.2 Relocation of Underground Piping

The following assumptions will be used to establish the extent of the underground utility relocation works.

No underground utility lines can remain below the piled foundations. Whenever a new column foundation interferes with existing piping, either the existing piping will be relocated around it or the pipe will be bridged by the foundation.

Existing hot water and chilled water distribution piping may remain below the ground floor of the other areas of the garage as long as adequate access to this piping is provided. This requires that the clear height from the ground floor to the beams of the floor above, in one direction, and the height of the ground floor garage entrances be 14 ft 6 in to permit passage of the vehicles and other machinery required for pipe repair work.

6. PLUMBING

6.1 Codes and Standards

- New York City Building Code
- American Water Works Association (AWWA)
- Cast Iron Soil Pipe Institute (CISPI)
- PANYNJ Tenant Construction Review Manual

6.2 Storm Drain System

The storm drainage system will include roof drains at the top floor low points connected to internal leaders. The leaders will connect to an external collection system and into the existing CTA network.

Floor drains will be located at the low points on all floors and connected into the external system.

6.3 Sanitary and Potable Water System

A sanitary drainage and potable water system will be provided if required to all sanitary fixtures shown on the final architectural design. The sanitary drainage will connect into the existing CTA sanitary network.

The potable water system will connect into an adjacent water main. A meter and backflow preventer will be required in accordance with the NYC building code.

6.4 Materials

6.4.1 Piping

All above ground sanitary and storm water piping shall be galvanized steel pipe with threaded or no-hub fittings.

All potable water piping shall be type L copper with copper solder fittings.

Under ground water piping shall be type K copper with copper solder fittings.

6.4.2 Valves

Valves will be provided in accordance with the New York City Code.

All underground valves shall be (left hand close) resilient seated gate valves.

6.5 Testing

All plumbing system shall be tested per the requirements of the New York City Plumbing Code.

7. FIRE PROTECTION

7.1 Codes and Standards

- New York City Building Code
- American Water Works Association (AWWA)
- National Fire Protection Association (NFPA) Standards shall be used in areas not covered by the New York City Code
- PANYNJ Tenant Construction Review Manual

7.2 Standpipe System

As the open parking structure is approximately 67 above grade (roof deck at 81.00 feet minus grade at 14.00 feet), and does not therefore exceed the code maximum of 75 feet, a wet standpipe system will not be required per NYC Building Code section 27-932. A dry standpipe system will be installed

8. ELECTRICAL

8.1 Codes and Standards

- National Electrical Code
- New York City Electrical Code
- New York City Building Code
- New York State Energy Conservation Construction Code
- National Electrical Safety Code (ANSYIEEE C2)
- Requirements of the Americans with Disabilities Act - ADA
- American National Standards Institute - ANSI
- American Society for Testing and Materials - ASTM
- Association of Edison Illuminating Companies - AEIC
- Illuminating Engineering Society - IES
- Institute of Electrical and Electronic Engineers - IEEE
- Insulated Cable Engineers Association - ICEA
- National Fire Protection Association - NFPA
- Authority Specifications, Design Standards and Tenant Construction Review Manual
- National Electrical Manufacturers Association - NEMA
- Underwriters' Laboratories, Inc. - U.L.
- Occupational Safety and Health Act - OSHA
- Electrical Testing Laboratories - ETL
- Certified Ballast manufacturers – CBM

8.2 General

Electrical power shall be picked up by JetBlue at locations to be provided by the PANYNJ immediately adjacent to the garage site. All metering wiring shall be shown on the drawings.

Medium Voltage (over 600 volts) switchgear, transformers, and splicing chambers, that are installed indoors, shall be installed in vaults. Construction over existing duct banks and manholes shall be avoided.

Existing duct banks which fall within the piled foundation footprints shall be relocated prior to commencing construction.

Exploded-view drawings of electrical manholes in which the contractor performs any work shall be submitted.

8.3 Medium Voltage Power

The incoming service shall be designed with a minimum of two (2) 5 KV feeders. The service shall be Secondary Selective.

Primary switchgear switch shall be provided with a grounding switch, arranged to ground the incoming feeder (line side of switch). Switchgear shall be as manufactured by S&C. Interlocks shall be provided to prevent closing the grounding switch if the feeder is energized. The interrupting rating shall be 270MVA.

All incoming feeder cable shall be flat strap cable insulated (133% insulation level), copper conductor, polyethylene-jacketed cable. Cables shall be manufactured by a factory approved by Con Edison.

Transformers shall be dry type, vacuum pressure impregnated. For outdoor locations, transformers shall be cast coil construction (primary and secondary).

One-line diagram shall show all primary connections, switching and interlocks, power source and feeder designations, size and type of feeder and conduit, KVA rating; types and voltages of all transformers, and all load data in justification of the amount of power requested.

8.4 Power Requirements

Power requirements for feeders, panel boards/ switchgear, electric room and closets as spares and spaces shall be based on code requirements and actual load requirements.

A complete electrical installation, including all conduits, wires, auxiliary material, and equipment shall be provided for all equipment described elsewhere in this Basis of Design document, (ie Mechanical, HVAC, Fire Protection, etc.).

8.5 Power Distribution

Shall include the following:

a) Indoor 5KV Substation.

b) Two (2) 5kV circuits.

c) Two (2) 2000A Switchgear @ 480V w/secondary Selective Service.

d) Electrical Closets.

e) Grounding System (All Structures and Electrical Systems).

8.6 Emergency Power

Emergency power shall be provided for the following:

a) Lighting.

b) Life Safety Systems.

c) Elevators.

d) Revenue Control System

8.7 Lighting

Garage Lighting shall be as follows:

a) Fluorescent Lighting for general lighting on each floor

b) Average Foot-candles = 10 FC.

c) Minimum Foot-candles = 5 FC.

d) Uniformity = 2 to 1 or better.

e) Power Consumption = 0.5W/Sq-Ft.

f) Exit and Entrance Roadway Lighting with an average of 2 FC.

8.8 Lighting Control

1) All lighting circuits shall be controlled by means of a Lighting Control Cabinet Equipment with all switching hardware and logic controls.

2) Each level shall have early hour circuitry (2/3 of floor from center out) and nighttime circuitry (1/3 of the floor area at the perimeters).

3) The upper level shall have night light circuitry and normal hour circuitry.

4) All lighting fixture patterns shall be alternately circuited so that the failure of a circuit will not leave an area in darkness.

5) Exit stairs shall be on separate circuits.

9. COMMUNICATIONS

Provisions shall be made for the following:

a) Emergency Phones at each stairwell and in elevator lobby at each floor.

b) Emergency Phones in Elevators.

c) Public Phones in Elevator Lobbies (Only).

d) Communication Closets as appropriate.

e) Backboards and dedicated receptacles in each Communications closet.

f) Separate and independent conduit system for public and emergency telephone systems.

10. FIRE ALARM

Provisions shall be made for the following:

Digital Addressable Fire Alarm System.

Fire Alarm System reports to Police Desk, remote panel to be located in one of the grade level communications closets.

Elevator Recall from Fire Alarm Control Panel (FACP).

Provide Remote Annunciator.

10.1 Closed Circuit Television

Provide cameras at the following locations:

a) Elevators.

b) Elevator lobbies.

c) Connectors.

The CCTV system will be monitored in two locations, at the JFK1A Security and Landside Operations Office in Building 14 and at the OOC in the GAT.

Provide a 24 Hour recording of video in a grade level communications closet.

11. TOLL PLAZA POWER COMMUNICTIONS & LIGHTING

Provide Power and Communication Infrastructure for Revenue Control System including E-Z Pass Plus and License Plate Recognition. A service building will be provided for the toll plaza power and communications services

Provide Canopy Lighting for Exit and Entrance Plazas.

12. DUCTBANKS AND CONDUITS

Remove & Relocate Existing Medium Voltage, Low Voltage and Communication Ductbanks under garage piled foundation structures where it is not possible to bridge and leave insitu.

Install Ductbanks System from the available power Manhole to provide power to the Parking Structure. The main feeder shall originate at the Central Substation.

All wiring shall be in conduits.

All above ground conduits shall be rigid galvanized steel. All underground conduits shall be concrete encased PVC-H. 5kV underground ducts shall be FRE concrete encased.

13. LIGHTNING PROTECTION SYSTEM

Provide Lightning Protection for the Parking Structure.

14. ELECTRICAL OUTLETS AND WIRING

Shall be provided throughout the garage including all communication and electrical closets.

Secure covers shall be provided in public spaces.

All 600V wires, run underground and outdoor shall be type USE,EPR insulation with heavy duty thermosetting chlrosulphanated polyethylene or heavy duty neoprene jacket.

All 600V wires inside the garage shall be type XHHW.

15. ELEVATORS

Four (4) 6,000 lb. Elevators (60HP each @ 480V-3PH).

16. HVAC

Unit Heaters and Fans will be provided for the Substation.

Unit Heaters, Fans and AC Units will be provided for Elevator Equipment and Rooms.

17. ANTENNAS

Antennas for Radio and CCTV. Electrical service will be provided for the antenna system along with the necessary signal cables and equipment rooms.

18. LANDSCAPING

All landscaping, irrigation and maintenance work will be provided within the project specific budget of $0.5m

Provide landscaping consistent with other garages in the CTA while providing a minimum of attractants to birds.

All Landscape contractual work is subject to approval by the FAA/USDA wildlife damage control division

Any installed landscaping measures shall be maintained by the contractor for 2 years following final acceptance.

18.1 Design Parameters

The front and east face of the garage is dominated by the Airtrain elevated station and guideway. The presence of the guideway eliminates any opportunity for planted landscaping beneath and within 5-feet of the guideway and will therefore be paved.

Large irregular islands at the rear of the garage will contain ornamental trees as well as a few specimen canopy trees in order to add a sense of maturity and to match the scale of the elevated roads, parking garage, elevated guideway and roads.

Salt splash shall consist of eight-inch hexagonal asphalt pavers laid out in a random pattern composed of two different color aggregates, CP-Central Park Formula and RBB-Reading Brown with Brown sand. Salt splash shall be three feet wide. Any islands and strips of land not suitable for planting will be paved with the hexagonal asphalt block pavement.

A river-blend gravel mulch will be used under elevated roadways

Security fencing will be a tubular steel construction four feet in height, finished in black.

18.2 Design Criteria

18.2.1 TREES

Trees shall be selected that meet the following criteria:

a) To withstand pollution and tough urban environments,

b) To tolerate excessive road de-icing salts and salt-laced prevailing winds.

c) To be unattractive to birds as a food source and meet FAA approval.

d) To be unattractive to birds as a roosting site and meet FAA approval.

e) To be primarily deciduous, since evergreen trees are an ideal bird habitat.

f) To have interesting flowers, fall color, size, shape or habit.

g) To be obtainable on the commercial market.

Sample List :

Gleditsia triacanthos 'Halka' Moraine Honeylocus

Platanus acerifolia 'Bloodgood'	Bloodgood London Plane Tree
Quercus phellos	Willow Oak
Quercus robur 'Fastigiata'	Fastigiate English Oak
Zelkova serrata	Japanese Zelkova

18.2.2 ORNAMENTALTREES

Ornamental trees shall meet the same criteria as trees.

Sample List

Chionanthus virginicus	Fringe Tree
Cornus x Ruth Ellen	Stellar White Dogwood
Koelreuteria panicdata	Golden Raintree
Malus Spring Snow	Spring Snow Crabapple
Parrotia persica	Persian Parrotia
Syringa reticulata 'Ivory Silk'	Ivory Silk Lilac

18.2.3 SHRUBS AND GROUNDCOVER

Shrubs and groundcovers shall meet the same criteria as trees.

Sample List

Abelia x grandiflora	Glossy Abelia
Euonymus data 'Compacta'	Dwarf Winged Euonymus
Hamamelis 'Arnold Promise'	Arnold Promise Witchhazel
Juniperus chinensis sargenti	Sargent's Chinese Juniper
Rosa x 'Noamel'	Appleblossom Carpet Rose
Spiraea nipponica ' Snowmound'	Snowmound Spirea
Taxus x media wardii	Ward's Yew

18.2.4 SEASONAL DISPLAY

Sample List

Caryopteris x clandonensis	'Blue Mist' Blue Mist Caryopteris
Echinacea purpurea 'Magnus'	Magnus Purple Coneflower
Eupatorium purpurewn 'Big Umbrella'	Big Umbrella Joe Pye Weed
Eupatorium purpureum 'Gateway'	Gateway Joe Pye Weed
Eupatorium rugosum ' Chocolate'	Chocolate Boneset
Eupatorium ageratum 'Cori'	Perennial Ageratum
Hemerocallis 'Happy Returns'	Happy Returns Daylily
Hemerocallis 'Black-eyed Stella'	Black-eyed Stella Daylily
Nepeta faassenii 'Walkers Low'	Catmint
Pennisetum alopcuroides 'Cassian'	Cassian Fountain Grass
Rudebeckia hlgida ' Goldsturm'	Black-eyed Susan
Sedum x 'Autumn Joy'	Autumn Joy Sedum
Stachys byzantina 'Helene von Stein'	Lambs Ear

18.2.5 BULBS

Daffodil x 'Ice Follies'	Ice Follies Daffodil
Daffodil x 'King Alfred'	King Alfred Daffodil

18.2.6 LAWN

Select cultivars that can thrive on low nutrient, low water availability and that are " 90% endophyte enhanced" variety.

18.3 General

A landscape design least likely to attract birds should have the following qualities:

1. Avoid plant material and design features that provide birds with a source of FOOD, WATER, COVER and SPATIAL DOMAIN.
2. Canopy trees should be planted in linear rows, canopies spaced 15-20 feet apart at maturity. (Adjacent canopies should never be touching)
3. Shrubs and small trees should be used moderately and not be planted under or directly adjacent to canopy trees.
4. Shrub beds should be small in size and discontinuous.
5. Flowering ornamental trees should be limited in quantity.
6. Groundcover should be well-manicured, healthy, dense, moderately tall lawn, a hitless low growing groundcover, and gravel or bark mulch.
7. All plants should be planted at the same size and time.

18.4 Irrigation

The irrigation control system will be RainBird Maxicom automated system and will be consistent with the systems provided elsewhere within the CTA.

Seasonal display areas and landscaped areas adjacent to pedestrian nodes should be irrigated with automatic sprinklers.

Trees, shrubs and groundcover shall be irrigated with automatic sprinklers.

Trees not handled by automatic sprinklers shall be irrigated with tree gaters for the first two years after installation and whenever the automatic irrigation system is down due to construction or repair.

Lawn shall be irrigated with permanent irrigation using mist sprinkler heads.

Water supply will be from connections to the existing water mains. The water will be metered and supplied with a backflow preventer.

Where necessary, 8" sleeves will be installed below new roadways to accommodate the irrigation system.

18.5 Asphalt Block Pavers

Salt splash shall consist of eight-inch hexagonal asphalt pavers laid out in a random pattern composed of two different color aggregates, CP-Central Park Formula and RB/B-Reading Brown with Brown sand.

18.6 Fence

Fence shall consist of black powder-coated round tubular steel post and pickets and square tubular rails. Fence posts shall be 6-feet on-center.

18.7 Gravel Mulch

Gravel mulch shall be composed of 1 " to 2" size Delaware River Blend #186.

19. WALKING PATTERNS

Parking bays to be oriented to allow pedestrians to walk along the drive aisles toward the elevator tower.

20. FLOOR HEIGHT

The parking structure floor-to-floor heights are controlled by the need to meet the Airtrain connector at Level 5. Connection to the pedestrian bridge from the LRS station to the terminals is at the 4th level of the garage. The ground floor to 2nd level height shall provide 14'-6" available clear height in one direction to accommodate maintenance equipment and is set at 17'-6" nominal, with the remaining floors set at 12' floor to floor.

21. SIGNS

Overhead signage consistent with PANYNJ CTA signage standards will direct motorists and pedestrians throughout the parking structure.

22. CONSTRUCTION & STAGING

1. The construction of the garage is to be staged/phased so as to accommodate an internal shuttle bus service, provided by the PANYNJ from the Blue Parking Garage to Terminal 6 at all times during construction.
2. The construction of the garage is to be staged/phased so as to accommodate the flow of pedestrians to/from the AirTrain and Terminal 6 at all times during construction.
3. The construction of the garage is to be staged/phased so as to accommodate the flow of pedestrians to/from the AirTrain and the Saarinen Building at all times during construction.
4. The construction of the garage is to be staged/phased so as to allow the flow of pedestrians to/from the Blue Parking Lot and Terminal 6 at all times during construction.

EXEMPTION (4) – DRAWINGS OF NON-PUBLIC AREAS

EXHIBIT 2.4

"Redevelopment of Terminal 5/6 FONSI/ROD"

to Lease No. AYD-350

between

THE PORT AUTHORITY OF NEW YORK AND NEW JERSEY

and

JETBLUE AIRWAYS CORPORATION

For the Port Authority

Initialed:

For the Lessee

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Section 1.0

February 9, 2005 Transmittal Letter

U. S. Department
of Transportation

**Federal Aviation
Administration**

New York Airports District Office
600 Old Country Rd, Suite 446
Garden City, New York 11530
Telephone: 516-227-3800
Fax: 516-227-3813

February 9, 2005

Mr. Ed Knoesel
Aviation Department
The Port Authority of New York and New Jersey
233 Park Ave South, 9th Floor
New York, New York 10003

Re: John F. Kennedy International Airport (JFK)
Terminal 5/6 Redevelopment Project
Environmental Determination

Dear Mr. Knoesel:

The Federal Aviation Administration (FAA) has recently approved the Environmental Assessment (EA) and made a Finding of No Significant Impact/Record of Decision (FONSI/ROD) for the Redevelopment of Terminal 5/6 at John F. Kennedy International Airport, New York. A copy of the signed FONSI/ROD and the EA signature page are enclosed.

This Federal environmental approval is a determination by the Approving Official that the requirements imposed by applicable environmental statutes and regulations have been satisfied by a FONSI/ROD. However, it is not an approval of the Federal action approving the funding of eligible items for this project, nor approval of the air space review, nor approval of the revision to the Airport Layout Plan (ALP) to show these projects.

In compliance with Council on Environmental Quality (CEQ) regulations 1501.4(e)(1) and 1506.6, we require that your office make the final EA with Signature Page and FONSI/ROD available to the affected public, and announce such availability through appropriate media in the area. The announcement shall indicate the availability of the document for examination and note the appropriate location of general public access where the document may be found (i.e., your office, local libraries, public buildings, etc.). We request that a copy of such announcement be sent to the NYADO when it is issued.

Finally, your attention is directed to the mitigating measures that were made a condition of approval of the FONSI/ROD. Please be reminded that these measures must be taken by the airport sponsor in order to meet the terms of the FONSI/ROD.

The process of making these environmental determinations is that of a partnership between yourself, as airport sponsor, and the other contributing parties, both public and private. We thank you for your effort and cooperation.

Please contact our office if you have any questions.

Sincerely,

Philip Brito, Manager
New York Airports District Office

Enclosures (2)

cc: K. Bleach, PANYNJ

Section 2.0

FONSI/ ROD

DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION
FINDING OF NO SIGNIFICANT IMPACT
RECORD OF DECISION

Location

John F. Kennedy International Airport (JFK)
Queens County, New York

Introduction

This Finding of No Significant Impact/Record of Decision (FONSI/ROD) sets out the Federal Aviation Administration's (FAA) consideration of environmental and other factors for the conditional Airport Layout Plan (ALP) approval at John F. Kennedy International Airport (JFK) for the Redevelopment of Terminal 5/6. This FONSI/ROD is based on the Environmental Assessment dated October 2004.

Background

Terminal 5, the original Trans World Airline (TWA) Terminal designed by renowned architect Eero Saarinen, is historically significant and is currently unoccupied by an airline. JetBlue is currently using Terminal 6 and portions of Terminal 7, however, this space is inadequate for JetBlue's needs. To accommodate JetBlue, the Port Authority of NY & NJ (PANYNJ) is proposing to construct a new terminal on the Terminal 5/6 site. Terminal 5 is in need of repairs and restoration, does not meet current aviation industry needs, current safety standards, nor does it comply with the Americans with Disabilities Act of 1990(ADA) (42 USC §§ 12101 et seq). The Terminal 5 building was designed by Eero Saarinen in 1962. It includes the Main Terminal and two Flight Wings with Connector Tubes. The building is considered a masterwork of exceptional importance and is considered to have begun the modern architectural movement. It is eligible for listing on the State and National Register of Historic Places and was designated a landmark in 1994 by the New York City Landmarks Commission. The Main Terminal is considered very significant, the Connector Tubes are moderately significant and the Flight Wings are least significant due to many modifications/additions subsequent to its original design and construction; only Flight Wing #2 is historic.

Project Description

The proposed project consists of the phased construction of a new 1.5 msf multi-airline terminal with 51 aircraft positions (net gain of 14 positions) on the combined site of Terminals 5 and 6. The historic TWA Terminal and the East Tube leading to the present Flight Wing 2 would be retained, rehabilitated and/or restored as part of an adaptive reuse program. Flight Wings 1 and 2

would be demolished. The connector tube leading to the present Flight Wing 1 (the West Tube) may be modified. Both tubes will provide public access between the rehabilitated/restored TWA Terminal and the newly constructed terminal building. The project also includes construction of the following: a new bilevel access roadway system; a new connector from the AirTrain system to the TWA Terminal to enhance public access; and a new parking garage to serve this portion of the Central Terminal Area. Following completion of the new terminal building, roadway, parking garage, and public access to the TWA Terminal, JetBlue's operations would move from the existing Terminal 6 to the new terminal. The construction of the remaining portion of the Revised Concept Master Plan, including the demolition of Terminal 6, is included in this Record of Decision, however, project implementation is pending an additional lease agreement with an airline.

Proposed Agency Actions

The FAA actions involved in the implementation of the proposed project include the following:

a. Conditional approval of the ALP pursuant to 49 U.S.C. § 40103(b) and § 47107(a)(16), and determination of effects upon the safe and efficient utilization of navigable airspace pursuant to 14 CFR Parts 77 and 157 and 49 U.S.C. §44718;

b. Determination under 49 U.S.C. §§ 40101(d)(1) and 47105(b)(3) whether the proposed project meets applicable design and engineering standards set forth in FAA Advisory Circulars;

c. Potential funding through the Federal grant-in-aid program authorized by the Airport and Airway Improvement Act of 1982, as amended (recodified at 49 U.S.C. § 47107) and/or the potential approval of an application to use Passenger Facility Charges (PFCs); and

d. Prior to any funding decision concerning the proposed project, determination under 49 U.S.C. § 44502(b) that the airport development is reasonably necessary for use in air commerce or in the interests of national defense; and

e. Approval of appropriate amendments to the John F. Kennedy International Airport (JFK) Airport Certification Manual (ACM), as required, pursuant to 49 U.S.C. §44706.

Purpose and Need

The purpose of the project is to redevelop the Terminal 5/6 site to include a new airline terminal and to provide improved facilities and services for the safety, comfort, and convenience of air passengers traveling through Terminals 5 and 6. The proposed facilities will more efficiently use the airside of the site and provide the support required for contemporary aviation usage. The proposed project serves the needs for the Port Authority, JetBlue, other airline tenants, airline passengers, and the general public. Those needs include: efficient use of aviation capacity with a flexible design to accommodate a variety of aircraft; a modern terminal that complies with the

ADA; facilities with adequate levels of service within a responsive timeframe; terminal space to meet updated security requirements; sufficient landside access; improved parking facility level of service; and preservation of the historic TWA Terminal.

Alternatives

Initially the following were considered as project alternatives:

1. Taking no action by doing nothing in the way of improving the terminal area and using the existing terminal as currently configured;
2. Constructing terminal facilities at other locations;
3. Constructing alternative terminal redevelopment or new development configurations at the Terminal 5/6 site.

These alternatives were evaluated to determine the technical feasibility and ability to meet the project purpose and need. Next, the alternatives were further refined until an alternative that achieves the project purpose and need was identified. More than twelve alternatives were considered. Most of the alternatives focused on various terminal configurations with special emphasis on the historic nature of the TWA Terminal, the requirements of Section 106 of the National Historic Preservation Act, and Section 4(f) of the Department of Transportation (DOT) Act of 1966. The detailed alternatives analysis can be found in Section 3 of the Environmental Assessment and Appendix A, *DOT Section 4(f) Evaluation of the Terminal 5/6 Development* which are incorporated herein.

Discussion

The attached EA addresses the effects of the proposed action on the quality of the human and natural environment, and is made part of this Finding. The following impact analysis highlights the more thorough analysis presented in the EA.

Historic Preservation and Department of Transportation (DOT) Section 4(f) Evaluation

The proposed project involves development on land protected by Section 4(f) of the DOT Act of 1966 (49 USC 303(c)). The Act provides that the Secretary of Transportation will not approve any program or 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 an 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 such program, and the project includes all possible planning to minimize harm resulting from the use. Publicly and privately owned historic sites of national, state and local significance are protected under this statute and are subject to Section 4(f) evaluation if they are listed or eligible for listing on the National Register of Historic Places. The Terminal 5 site, including the main TWA Terminal building, the Connector Tubes and Flight Wing 2, has been deemed eligible for

listing on the National and State Registers of Historic Places by the New York State Historic Preservation Officer (NYSHPO). As such, these components of the site are considered 'Section 4(f) land.'

The National Historic Preservation Act (NHPA) (16 USC 470) requires federal agencies to consider the impacts and effects of their undertakings on historic sites. Pursuant to 36 CFR 800, implementing Section 106 of the NHPA, the FAA, in conjunction with the PANYNJ, has discussed and coordinated the proposed action with the New York City Landmarks Preservation Commission, the Advisory Council on Historic Preservation (ACHP), the New York State Historic Preservation Officer (NYSHPO), the consulting parties (see below) to the Section 106 process, and the general public. The views of the consulting parties and the public at large were an essential component that assisted the FAA in reaching an informed federal decision. Nine parties requested and were invited by FAA to participate as consulting parties in the 106 process. These entities are:

- The New York Landmarks Conservancy
- The Municipal Art Society of New York
- The National Trust for Historic Preservation
- John Cullinane & Associates
- Documentation and Conservation of Buildings, Sites and Neighborhoods of the Modern Movement (DOCOMOMO)
- The New York City Partnership
- The Consulate General of Finland, New York
- JetBlue Airways
- The New York Buildings Congress

In the absence of a prudent and feasible alternative that avoids all use of Section 4(f) land, there must be a demonstration that the project incorporated all possible planning to minimize harm to the resource. After all efforts to minimize harm are employed, there must also be a demonstrated effort to mitigate any remaining impacts or effects. To accomplish this for the proposed project, many meetings and communications were held to discuss options that could minimize and mitigate the anticipated impacts. The process resulted in a fully executed Memorandum of Agreement (MOA) that stipulates the mitigation measures for the adverse effects under the Section 106 process and for the future involvement of a Redevelopment Advisory Committee (RAC). The RAC will seek input from interested parties, as stipulated in Attachment D of the MOA, on project implementation, including the restoration, rehabilitation, and reuse of the TWA Terminal and efforts to minimize any adverse effects of site redevelopment. The parties to the Section 106 process consulted, commented, and provided input on the terms, conditions, and stipulations of the MOA. Additionally, all parties concurred in the MOA.

All of the parties involved contributed to the effort to arrive at the preferred alternative. The project originally considered complete replacement of the TWA Terminal, including the Connector Tubes and Flight Wings. In response to the interest and need to preserve these structures, a subsequent plan was developed that would fully preserve the main TWA Terminal building and partially preserve the Connector Tubes. After receiving additional input on this proposal, a revised alternative was developed and became the preferred alternative. The

preferred alternative includes full preservation of both the main TWA Terminal building and the East Connector Tube and also includes enhanced public access. The West Tube may be modified in accordance with the MOA to further enhance public access to the TWA Terminal. The evaluations of the alternative schemes described in the EA and its appendices reflect the development of the proposed project as it has evolved throughout the public process.

As a result of the above referenced consultation and coordination, the proposed project alternative best minimizes harm to the historic structure, meets the project sponsor's needs and addresses public concerns. Alternate schemes were proposed that would have retained the TWA Terminal for exclusive airline terminal use and would have appended new construction to the Section 4(f) property, but these alternatives adversely effected the historic features of the terminal structure and were neither feasible nor prudent, and did not meet the project purpose and need.

The MOA provides for mitigation of the adverse effects on the historic resource. In accordance with the MOA, the exterior of the main TWA Terminal building will be restored and numerous building accretions (vestibules, baggage handling facilities, conveyors, etc.) will be removed to return the TWA Terminal closer to its condition when originally constructed. Additionally, a recordation (Historic American Buildings Survey/ Historic American Engineering Record) document will be prepared, maintenance and preservation guidelines for the TWA Terminal will be developed, and public education efforts and preparation of a rehabilitation and reuse plan will be specified. The detailed discussion of the Section 106 process, Section 4(f) analysis, and the signed MOA can be found in the EA and its appendices.

Air Quality

JFK is located in a severe nonattainment area for ozone and a maintenance area for carbon monoxide (CO). The nonattainment status of ozone requires particular attention to the emissions of nitrogen oxides (NOx) and volatile organic compounds (VOC).

Both a General Conformity Analysis and an Air Quality Hot Spot analysis were performed pursuant to the General Conformity Rule of the Clean Air Act (CAA), as amended (42 U.S.C. 7401-7671), and Section 176(c) of the CAA. The analyses conclude that the proposed project will not result in operational or construction related emissions that equal or exceed applicable *de minimis* threshold rates, nor increase the frequency of severity of any existing violations of the national standards. Therefore, a Conformity Determination was not required. Based on these analyses, the proposed project will conform to the New York State Implementation Plan (SIP) and comply with the conformity rules and requirements of the CAA. No adverse impacts to air quality are expected as a result of this project.

Noise

The Environmental Assessment for the *New Entrant Exemption to the High Density Rule and Operations Specifications for JetBlue Airways Corporation,* dated September 1999, analyzed the

potential noise impacts resulting from the addition of JetBlue's flights to the operations at JFK. The analysis was performed using the Integrated Noise Model (INM) and demonstrated that the increase in noise from the additional flights would be 0.6 dB or less. This increase is below the threshold of significance of 1.5 dB.

JetBlue currently operates out of Terminal 6 and these noise conditions exist with or without the proposed Terminal 5/6 redevelopment project. The proposed project is not expected to induce a change in either the type or number of aircraft flight operations beyond those that were previously analyzed by both the DOT and the FAA. Rather, the proposed project will reorganize the available aircraft parking positions. Accordingly, the proposed project is not expected to result in adverse noise impacts.

Water Quality

The Proposed Action will not change the type or quality of surface runoff or pollutant concentrations. The PANYNJ has been issued a State Pollution Discharge Elimination System (SPEDES) permit for the entire airport that includes monthly monitoring requirements for specified water quality constituents. The constituents and their discharge limitations have been chosen to specifically address issues relating to airport operations. Discharges occurring via the stormwater conveyance system would be in accordance with the SPDES permit. Wastewater at JFK is currently discharged to the Jamaica Water Pollution Control Plant (WPCP). The WPCP is currently operating at 76% of its total capacity. Although implementation of the proposed project will result in an increase in wastewater, this increase is not significant and can be accommodated by the Jamaica WPCP.

During construction, storm water runoff would be managed through the implementation of a Storm Water Pollution Prevention Plan which includes best management practices (BMP) to prevent stormwater contamination during construction. BMPs include provisions for the control and/or prevention of soil erosion and containment of construction materials, among others. Based on the above, it is not anticipated that implementation of the Proposed Action will result in significant adverse impacts to water quality.

Construction Impacts

Implementation of the Proposed Action would cause temporary impacts in the areas of noise, water quality, and air quality, all of which are associated with construction equipment. These impacts have been accounted for in the specific resource analyses contained in the EA. Best management practices will be implemented during construction to minimize impacts. All of the construction related impacts are temporary and are not expected to result in any significant adverse impacts.

Cumulative Impacts

The impacts associated with the Proposed Action, when considered with other past, present and reasonably foreseeable projects at JFK are not expected to be significant. The EA includes a list of all the various projects at the airport in final design or construction stages as well as all projects in the feasibility or early planning stages. The analyses presented in the EA conclude that the Proposed Action will not result in any significant negative environmental impacts, nor are any significant cumulative impacts expected as a result of this project.

Other Impact Categories

The impacts of the proposed federal action on light emissions, wetlands, farmlands, coastal resources, wild and scenic rivers, floodplains and floodways, energy supply and natural resources were also evaluated in the EA. Based on the FAA's review of the evaluation, it is the FAA's finding that the Proposed Action will not have any significant effects on any of the above noted categories.

Public Outreach and Agency Coordination

The Port Authority of New York and New Jersey and the FAA have involved the public, coordinated with agencies and the regulatory community, and engaged consulting parties regarding this project and issues addressed in the EA. These efforts were conducted pursuant to NEPA, NHPA Section 106, and DOT 4(f) processes. The public involvement began in September 1999 and continued for approximately five years until the subject EA was completed. As provided for by the MOA, the coordination with the consulting parties will continue throughout the implementation phases of the project.

Public Hearings were held on June 27, 2001 and July 15, 2003 regarding the EA. Many public comments were received primarily focusing on the preservation and adaptive reuse of the TWA Terminal. Because of these comments, the project was substantially revised to arrive at the preferred alternative and a fully executed MOA. The public involvement efforts are detailed in Section 6 of the EA.

Mitigation Measures

1. Measures to minimize harm to the TWA Terminal:
    a. Implementation of a tiered approach to modification of the West Tube to enhance public access.
    b. The rehabilitation and restoration of the TWA Terminal and East Tube.
    c. Sinking of the departures roadway below grade to retain the entire lengths of the East Tube and West Tube.

d. Developing a public plaza between the new terminal and the TWA Terminal to enhance views of the historic structure.
e. Restoring the signature view of the TWA Terminal by removing clutter and post-1960 structures now located in front of the terminal.
f. Prior to demolition of the Flight Wings, recordation of the main TWA Terminal building, the Connector Tubes and Flight Wing 2 to the level 1 standards and guidelines according to HABS/HAER.
g. Nomination of the historic parts of the site to the National and State Registers of Historic Places.
h. Implementation of the stipulations in the signed MOA including formation of a Redevelopment Advisory Committee.

2. Implementation by the Port Authority of NY & NJ of measures to maintain, rehabilitate and adaptively reuse the historic structure.

3. Construction contract provisions shall contain the provisions of AC 150/5370-10A, "Standards for specifying construction of Airports" item P-156, temporary air, water pollution, soil erosion and siltation control and AC 150/5320-5B, "Airport Drainage." All necessary permits for construction of the proposed action shall be obtained prior to construction, including a construction stormwater SPDES permit when applicable.

Decision and Order

The FAA recognizes its responsibilities under the National Environmental Policy Act of 1969 (NEPA) and its implementing Council on Environmental Quality (CEQ) regulations, and its own directives. Recognizing these responsibilities, I have carefully considered the FAA's goals and objectives in relation to the various aeronautical aspects of the *Redevelopment of Terminal 5/6 at John F. Kennedy Airport* as discussed in the Environmental Assessment, and I have used the environmental process to make an informed decision. This review included the purposes and needs to be served by this project, alternative means of achieving them, the environmental impacts of these alternatives, and the mitigation necessary to preserve and enhance the human environment.

After careful and thorough consideration of the facts contained herein, the undersigned finds that the proposed Federal action is consistent with existing national environmental policies and objectives as set forth in Section 101 of NEPA and other applicable environmental requirements. I also find that the proposed Federal action will not significantly affect the quality of the human environment or otherwise include any condition requiring consultation pursuant to section 102(2)(C) of NEPA.

I therefore direct that action be taken to carry out the agency actions noted above. Specifically:

1. Conditional approval of the ALP pursuant to 49 U.S.C. § 40103(b) and § 47107(a)(16), and determination of effects upon the safe and efficient utilization of navigable airspace pursuant to 14 CFR Parts 77 and 157 and 49 U.S.C. §44718;

2. Determination under 49 U.S.C. §§ 40101(d)(1) and 47105(b)(3) as to whether the project meets applicable design and engineering standards set forth in FAA Advisory Circulars;

3. Potential funding through the Federal grant-in-aid program authorized by the Airport and Airway Improvement Act of 1982, as amended (re-codified at 49 U.S.C. § 47107) and/or approval of an application to use Passenger Facility Charges (PFCs);

4. Prior to any funding decision concerning the proposed project, determination under 49 U.S.C. § 44502(b) that the airport development is reasonably necessary for use in air commerce or in the interests of national defense.

5. Approval of appropriate amendments to the John F. Kennedy (JFK) International Airport Certification Manual (ACM), as required, pursuant to 49 U.S.C. §44706.

Approved: _____ 2/7/05
William Flanagan, Manager — Date
Airports Division
Eastern Region

This decision, including any potential subsequent actions approving a grant of Federal funds to the Port Authority of New York and New Jersey, is taken pursuant to the 49 U.S.C. § 40101 et seq. (Part A) and 49 U.S.C. § 47101 et seq. (Part B), and constitutes a final order of the Administrator which is subject to review by the courts of appeals of the United States in accordance with the provision of 49 U.S.C. § 46110.

Environmental Assessment & DOT Section 4(f) Evaluation

Terminal 5/6 Redevelopment Project: John F. Kennedy International Airport

Submitted to

U.S. Department of Transportation
Federal Aviation Administration

THE PORT AUTHORITY OF NY & NJ

October 2004

This Environmental Assessment becomes a federal document when evaluated and signed by the responsible FAA official

Responsible FAA Official

Date: 2/7/05

CH2MHILL

Section 3.0

Environmental Assessment

Section 3.1

Volume 1 of 2

Environmental Assessment &
DOT Section 4(f) Evaluation

Terminal 5/6 Redevelopment Project:
John F. Kennedy International Airport

Prepared for

U.S. Department of Transportation
Federal Aviation Administration

THE PORT AUTHORITY OF NY & NJ

October 2004

Volume 1 of 2

Prepared in partnership with
Ricondo & Associates, Inc.
San Francisco, California

CH2MHILL

Environmental Assessment & DOT Section 4(f) Evaluation

Terminal 5/6 Redevelopment Project: John F. Kennedy International Airport

Submitted to

U.S. Department of Transportation
Federal Aviation Administration

THE PORT AUTHORITY OF NY & NJ

October 2004

This Environmental Assessment becomes a federal document when evaluated and signed by the responsible FAA official

Responsible FAA Official

Date:

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Executive Summary

Introduction

This Environmental Assessment (*EA*) analyzes the potential environmental effects of the redevelopment of the Terminal 5/6 site at John F. Kennedy International Airport (JFK), a project sponsored by the Port Authority of New York and New Jersey (Port Authority). A new terminal will be constructed and the historic Trans World Airline (TWA) Terminal and the connector tube leading to the present Flight Wing 2 (the East Tube) will be restored/rehabilitated and adaptively reused as these projects are reflected herein and described in the *Revised Concept Master Plan* (Appendix B to the *EA*). The *Revised Concept Master Plan* consists of the *JFK International Airport—Site 5 & 6 Redevelopment Plan—TWA Terminal Concept Master Plan, Amended February 2001* (Port Authority 2001), *JFK Sites 5/6 Redevelopment Including the TWA Landmark* PowerPoint presentation by Robert I. Davidson, FAIA (Port Authority 2003), and the October 10th, 2003 report of consultation with the consulting parties to the Section 106 process (Section 106 of the National Historic Preservation Act). The consulting parties for this Proposed Project are listed on page 2 of this Executive Summary. The Port Authority is proposing the project to ensure that existing and future operations by JetBlue and/or other airline tenants can provide an adequate level of service to their customers. The new facilities will more efficiently use the airside of the site while providing the terminal support required for contemporary aviation usage.

The Proposed Project is the result of a series of alternative analyses conducted by the Port Authority and the consulting parties. The result of the extensive consultation and alternative analyses conducted by the Port Authority and interested consulting parties is the *Revised Concept Master Plan* (Port Authority 2004) (Appendix B). The Proposed Project consists of the phased construction of a new, multi-airline terminal on the combined site of Terminals 5 and 6. The original historic TWA Terminal and the East Tube leading to the present Flight Wing 2 would be retained, rehabilitated and/or restored as part of an adaptive reuse program. Flight Wings 1 and 2 would be demolished. The connector tube leading to the present Flight Wing 1 (the West Tube) may be modified. For this connector tube, a hierarchy of options would be investigated as part of the design for the new terminal. The first option would seek to adapt the existing configuration in a minimally intrusive manner to improve public access. If analysis finds this option to be infeasible, then a design for reconstructing the connecting walkway to incorporate a moving walkway system in a manner consistent with the original design will be undertaken. Should such an effort prove to be inconsistent with the objective, a contemporary and appropriate design will be constructed. Both tubes will provide public access between the rehabilitated/restored TWA Terminal and the newly constructed terminal building. Also, a new connector from the JFK light rail (or AirTrain) system to the TWA Terminal will be constructed to enhance public access, and a new parking garage will be constructed to serve this portion of the Central Terminal Area (CTA).

A new bilevel access roadway system, a new parking structure, connections to the AirTrain system, and new site improvements, both airside and landside, are also planned (Figure 1).

Pending approval, construction of the JetBlue terminal and the associated new roadway system, the parking garage, and public access connections to the TWA Terminal would start in the first quarter of 2005 and be completed in the first quarter of 2008. Once Jet Blue's new terminal is competed, their operations would move from the existing Terminal 6 to the new terminal. Terminal 6 would ultimately be demolished (expected within the timeframe of 2008 - 2012). Pending an additional terminal lease agreement with an airline, the construction of the remaining portion of the Revised Concept Master Plan would begin.

Renowned architect Eero Saarinen designed the TWA Terminal, connector tubes, and Flight Wings 1 and 2. In 1994, the New York City Landmarks Preservation Commission designated the main TWA Terminal building, (referred to as the TWA Terminal or Terminal 5), the two connector tubes and Flight Wing 2 a New York City Landmark. In addition, the Terminal 5 site, including the main TWA Terminal building, the connector tubes, and Flight Wing 2, has been deemed eligible for listing on the National and State Registers of Historic Places by the New York State Historic Preservation Office (SHPO). This action qualifies these facilities to be considered a "historic site" under Section 4(f) of the Department of Transportation Act (49 USC 303). A complete description of the criteria that qualify the site as eligible for listing on the National Register of Historic Places is provided in Section 5.8 of this *EA*.

Per the requirements of the National Historic Preservation Act (NHPA), federal agencies are required to consider the impacts and effects of their undertakings on historic sites. Pursuant to 36 CFR 800, implementing Section 106 of the NHPA (16 USC 470f), the Port Authority in conjunction with the FAA has discussed the project with both the New York City Landmarks Preservation Commission and the SHPO. As part of the Section 106 process, the FAA determined that the undertaking would have an adverse effect on the TWA Terminal. After being notified by the FAA of its determination, the Advisory Council on Historic Preservation (Council) notified the FAA that the criteria for its involvement in review of individual Section 106 cases applied, and accordingly, the Council would enter the consultation on the project.

Pursuant to 36 CFR Part 800.2(a)(4), the FAA has also granted the requests of other interested parties to become consulting parties in the Section 106 process for the TWA Terminal. The views of consulting parties and the public at large are essential to informed federal decision-making in the Section 106 process. The nine consulting parties to the Section 106 process for this Terminal 5/6 Redevelopment Project are:

- The New York Landmarks Conservancy
- The Municipal Art Society of New York
- The National Trust for Historic Preservation
- John Cullinane Associates
- Documentation and Conservation of Buildings, Sites, and Neighborhoods of the Modern Movement (DOCOMOMO)
- The New York City Partnership
- The Consulate General of Finland, New York
- JetBlue Airways
- The New York Building Congress

EXEMPTION (4) – DRAWINGS OF NON-PUBLIC AREAS

The parties to the Section 106 process developed a Memorandum of Agreement (MOA) in conformance with the regulations implementing the Section 106 process. The MOA lists agreed-to stipulations to be taken to mitigate the adverse effect to the historic site. The stipulations were developed with comment and input from the signatories (the FAA, SHPO, Port Authority, and Council) and the consulting parties listed above. A copy of the executed MOA is provided in Attachment 1 of this Executive Summary, and in Appendix D of this *EA*.

The Port Authority is committed to maintaining, preserving, rehabilitating and restoring the TWA Terminal. As part of the Proposed Project, the Port Authority has agreed to restore the TWA Terminal and the East Tube and to record the East and West Tubes and Flight Wing 2 to the Level 1 standards and guidelines of the Historical Architectural Building Survey/Historic American Engineering Record (HABS/HAER) of the National Park Service (NPS). The Port Authority is seeking input to develop optimal plans for implementing an adaptive reuse program that will require rehabilitation and restoration consistent with the original Saarinen design. In December 2001 and February 2002, the Port Authority issued a Solicitation of Interest that appeared in approximately 20 publications, including newspapers, periodicals, and trade magazines. It will issue a Request for Proposals to interested parties for redeveloping and adaptively reusing the historic structures. A condition of the redevelopment of the terminal will be the restoration of the main TWA Terminal building and the East Tube, potential modification of the West Tube for enhanced public access, and continuation of public use of the main TWA Terminal building through installation of electronic ticketing kiosks for passengers with carry-on luggage who will be using the new terminal to be constructed behind the TWA Terminal.

The Port Authority is proposing the project to ensure that existing and future operations by JetBlue and/or other airline tenants can provide an adequate level of service to their customers. The new facilities will more efficiently use the airside of the site while providing the terminal support required for contemporary aviation usage.

The *EA* considers project alternatives prepared by the Port Authority in response to input received from agencies, interested parties, and the public. It also considers alternatives submitted to the Port Authority and the FAA by the Municipal Art Society of New York in response to earlier drafts of the *EA* and the *Concept Master Plan*. The preferred alternative incorporates input from stakeholders, resulting in noteworthy design modifications that allow retention and future use of the main TWA Terminal building and the full length of the connector tubes, as rehabilitated or modified in accordance with the MOA. This *EA* and Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment* describe the alternatives and evaluates their ability to achieve the project's purpose and need, which includes protection of historical resources.

This *EA* evaluates the project scope set forth in the *Revised Concept Master Plan* (Appendix B) for full redevelopment of the site. The airlines that may ultimately use the new terminal building may differ from those discussed in the *Revised Concept Master Plan* or in this *EA*. The focus of this document is the aviation demand expected in the future and the need for a modern facility that can accommodate it.

The *EA* is prepared in accordance with FAA Order 5050.4A, *Airport Environmental Handbook;* DOT Order 5610.C, *Procedures for Considering Environmental Impacts;* FAA Order 1050.1D, *Policies and Procedures for Considering Environmental Impacts;* the recently published Change 4

to FAA Order 1050.1D; and other guidance and instructions promulgated in applicable regulatory and advisory information. Compliance with these orders and guidance ensures that the project will meet the procedural and substantive environmental requirements set forth by the Council on Environmental Quality (CEQ) in its regulations implementing the National Environmental Policy Act of 1969 (NEPA), as amended (40 CFR 1500-1508).

This project is proposed with consideration of other airport actions, which have included the startup of JetBlue operations at JFK, redevelopment of other sectors of the CTA at JFK, and the development of the JFK light rail system (or AirTrain). These actions have been evaluated (CH2M HILL 1999a and Port Authority 1997).

The *EA* describes the purpose of and need for the project, the alternatives considered, the affected environment, environmental consequences, and public involvement and outreach. Supporting documentation is contained in the appendices of this *EA*. The findings contained in the *EA* are summarized below.

Purpose and Need

The purpose of the Proposed Project is to redevelop the site to provide a new airline terminal and to provide improved facilities and services for the safety, comfort, and convenience of air passengers traveling through Terminals 5 and 6. The new facilities will more efficiently use the airside of the site while providing the terminal support required for contemporary aviation usage. The Proposed Project would serve the needs of the Port Authority, JetBlue, other airline tenants, airline passengers, and the general public. Those needs are to make efficient use of aviation capacity with a flexible design to accommodate a variety of aircraft, the need for a modern terminal that promotes airline competition and complies with the Americans with Disabilities Act (ADA), the need for facilities with adequate level of service within a reasonable timeframe, the need for terminal space to meet updated security requirements, the need for sufficient landside access, the need to improve the parking facility level of service, and the need to preserve the TWA Terminal. Consideration has been given to the events of September 11, 2001 on the need for and timing of improvements. The project needs have not changed. Terminals 5 and 6 were designed and constructed more than 40 years ago. The Proposed Project entails construction of a new modern efficient terminal leading to the elimination of deficiencies in passenger facilities and services, noncompliance with the ADA, and other terminal area restrictions and shortcomings. These existing operational inefficiencies reduce passenger levels of service, which is contrary to the Port Authority's goal to assure the highest level of service for its customers. Within JFK's Central Terminal Area, Terminals 1, 4, 7, 8, and 9 either have been or are now being redeveloped and improved. Terminals 2 and 3 have been proposed for redevelopment. In an industry where passenger safety, security, convenience, and airline image are of critical importance to attracting customers, Terminals 5 and 6 also must undergo improvements so that existing and future tenants can serve their customer base and meet travelers' expectations. Detailed analysis of this project's purpose and need can be found in Section 2, Purpose and Need of this document.

Proposed Project

The Proposed Project is the redevelopment of the Terminal 5 and Terminal 6 sites at JFK. This entails demolition of Terminal 6 and of Flight Wings 1 and 2 of the TWA Terminal (Terminal 5); construction of a new terminal; and the restoration, rehabilitation and adaptive reuse of the existing TWA Terminal (Figure 1). The proposed replacement terminal would combine the sites of existing Terminal 5 and Terminal 6 and construct a two-level terminal with fingerlike concourses for 51 aircraft positions sized for present and future fleets of aircraft.

The proposed terminal will have approximately 1,540,000 square feet on two levels and will be designed to meet or surpass all required safety codes and airline passenger and aircraft handling standards. The existing terminals fall far short of meeting these needs. The proposed building would replace the existing Terminal 6 and wrap behind the existing Saarinen-designed Terminal 5 building, requiring the removal of both flight wings. The new Terminal 5/6 complex has been designed to complement the TWA Terminal and its connecting tubes. Both connecting tubes would link the historic TWA Terminal to the new Terminal 5/6 complex. New vertical circulation at the airside ends of the connector tubes would allow passage from the new Terminal 5/6 complex to the existing TWA Terminal. The new complex would have centralized passenger processing facilities with up to four concourses, constructed as the need arises, located airside of the existing TWA Terminal. The new Terminal 5/6 complex would be accessed by a bi-level arrival/departure roadway system, via AirTrain, and through the existing TWA Terminal. A 1,500-space multistory parking garage would be constructed across the access roads and on the opposite side of the AirTrain station from the proposed terminal. Pedestrian access would be provided on pedestrian connectors constructed between the parking garage, the TWA Terminal and the new terminal building. Additional access to the Terminal 5/6 complex would be provided from the new parking garage and the new AirTrain station.

This *EA* includes the evaluation of 12 onsite alternatives, in addition to the Proposed Project. The TWA Terminal has remained vacant since American Airlines ceased operations at the site in January 2002. The adaptive reuse of the TWA Terminal would provide the opportunity to restore and rehabilitate the main terminal structure and the connector tubes. To mitigate the adverse effect of the proposed improvements on the historical features of the building, the Port Authority is pursuing the adaptive reuse of the building and has made restoration a condition of any reuse plan. The restoration would include the removal of all nonhistorical additions since the original construction, in order to restore the facility's original historical and aesthetic characteristics. The MOA developed by the parties to the Section 106 process lists stipulations of the mitigation (Attachment 1).

Summary of Potential Impacts

The potential environmental consequences of implementing the Proposed Project are evaluated in Section 5, *Environmental Consequences,* for each impact category specified in FAA Order 5050.4A, *Airport Environmental Handbook,* Paragraph 47e, for an EA. The *EA* also addresses "Environmental Consequences—Other Considerations" (following Order 5050.4A

Paragraph 47f), and Cumulative Impacts (using guidance in Order 5050.4A Paragraph 26). The categories without adverse impact and requiring no mitigation are:

- Noise
- Wetlands
- Compatible land use
- Floodplains
- Social impacts
- Coastal zone management program
- Induced socioeconomic impacts
- Coastal barriers
- Air quality
- Solid waste
- Wild and scenic rivers
- Water and wastewater quality
- Farmland
- Biotic communities
- Light emissions
- Endangered and threatened species of flora and fauna
- Environmental justice
- Energy supply and natural resources

A detailed examination of each category is found in Section 5, *Environmental Consequences*. Highlighted below are categories that would be affected by the Proposed Project.

Historic, Architectural, Archaeological, and Cultural Resources. The Terminal 5 site, including the main TWA Terminal building, the connector tubes, and Flight Wing 2, has been deemed eligible for listing on the National and State Registers of Historic Places by SHPO. In 1994, the New York City Landmarks Preservation Commission designated the main TWA Terminal building, the two connector tubes, and Flight Wing 2 a New York City Landmark. The FAA has made a finding that the undertaking would adversely affect the historic property and by letter dated June 25, 2001, in accordance with 36 CFR Part 800.6 regulations implementing Section 106 of the National Historic Preservation Act, informed the Council of its finding. By letter dated July 11, 2001, the Council notified the FAA that it had concluded that the criteria in the regulations for Council involvement in review of individual Section 106 cases applied and therefore, the Council would participate in the consultation on this undertaking.

The Port Authority will record the TWA Terminal, the connector tubes, and Flight Wing 2 to the Level 1 standards and guidelines of HABS/HAER of the NPS and prepare a nomination to list the site on the State and National Historic Registers. The Port Authority is pursuing the adaptive reuse of the building and will make restoration a condition of any reuse plan. The restoration would include the removal of all nonhistorical additions since the original construction, in order to restore the facility's original historical and aesthetic characteristics. Nine entities have entered the 106 process as consulting parties. An adverse impact on the historic resource would occur, but the resource would benefit from the recordation, nomination for listing, rehabilitation, restoration, and adaptive reuse of the main TWA terminal building and the East Tube, and modification of the West Tube for enhanced public access.

United States Department of Transportation Act, Section 4(f). Section 4(f) of the United States Department of Transportation (USDOT) Act of 1996 (49 USC 303) provides that the Secretary may approve a project requiring the use of certain land, including significant historic sites, only if there is no prudent and feasible alternative to using that land. If such use cannot be avoided, all possible planning must be undertaken to minimize harm to the land resulting from the use. The Section 4(f) resource affected by the Proposed Project

would be the TWA Terminal, the connecting tubes, and Flight Wing 2. All alternatives to the Proposed Project identified in the *Concept Master Plan* and offered by others would also affect this Section 4(f) land.

Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment,* of this *EA* documents these findings. The analysis shows that alternatives which maintain the sole original function of the TWA Terminal are not prudent and feasible. It also shows that the preferred alternative, which retains the TWA Terminal and the connector tubes for adaptive reuse, is a prudent and feasible alternative that minimizes harm to the Section 4(f) resource. The analysis also shows that proposed alternatives that use the TWA Terminal solely as an airline terminal, and retain the flight wings, would not meet the purpose and need of the Proposed Project because of their inability to provide sufficient space for security and other functions (such as departure terminal space, width of the East Tube, taxi-lane separation, and concourse size), appropriate passenger walking distances and circulation, adequate curb frontage, and other factors (such as lack of efficient use of the site aviation capacity, nonconformance with the American with Disabilities Act and low level of service to the elderly, and costly baggage system). This redevelopment project has undergone several design drafts with the intent to satisfy the need to include all possible planning to respond to public input, and to minimize harm to the historic TWA Terminal resulting from the use (terminal redevelopment). Two public hearings (each consisting of afternoon and evening sessions), three meetings of the consulting parties to the Section 106 process, and numerous other outreach meetings were held, and correspondence exchanged with the consulting parties and others, to obtain public input on the Proposed Project and the stipulations contained in the MOA.

The Proposed Project is intended to restore and preserve the aesthetic value of the TWA Terminal. Specifically, future reuse of the TWA building would include rehabilitation and restoration of the main TWA Terminal building and the East Tube consistent with the original Saarinen design. It would include continuing the aviation use of the main TWA Terminal building through installation of electronic ticketing kiosks for passengers with carry-on luggage, and through rehabilitation or modification of the West Tube for enhanced public access. In addition, the building façade and elevated roadways of the new Terminal 5/6 complex have been designed to complement the TWA Terminal.

Construction Impacts. The Proposed Project is not expected to have any significant construction-related impacts. This is due to the planned implementation of the construction and the mitigation procedures set forth in FAA Advisory Circular 150/5370-10A, *Standards for Specifying Construction of Airports* and the Port Authority's *Good Environmental Practices Manual for JFK* (December 1997). The Proposed Project alone is not expected to have any significant construction impacts on air quality, surface traffic congestion, or noise. Construction would have no significant negative impacts on aircraft operations or safety.

Summary of Cumulative Impacts. The cumulative impacts of the Proposed Project, when added to those of other actions past, present, and in the reasonably foreseeable future, would not be significant. There would be no significant adverse cumulative impact in the categories of air quality, biotic communities, coastal barriers, coastal zone management, endangered and threatened species of flora and fauna, energy supply and natural resources, environmental justice, historic resources, compatible land use, noise, social impacts, solid waste, surface transportation, water and wastewater quality, wetlands, wild and scenic

rivers, floodplains, farmland, and light emission. Some beneficial induced socioeconomic cumulative impacts would occur. The economic and employment-related beneficial impacts extend beyond southeastern Queens. Construction could affect air quality, surface traffic congestion, and noise, when considered cumulatively with other projects, but the impacts would be short-term and not significant.

The adverse individual (not cumulative) impact on the historic TWA building and connecting tubes due to the demolition of Flight Wing 2 and modification of the West Tube would be mitigated resulting in a beneficial effect, through the rehabilitation, restoration, and adaptive reuse of the main TWA terminal building and the East Tube, and modification of the West Tube for future use. This impact to a historic resource is not cumulative because no similar impact would occur as a result of other projects.

Development in the airport area has focused on regional transit, and the Proposed Project along with other improvements at JFK would maintain that focus. Other projects considered as part of the cumulative impacts will provide similar long-term benefits—enhanced operating efficiency, more efficient energy consumption, and improved functionality and customer service—to the Proposed Project. The cumulative impact of these actions is generally expected to be positive.

Federal Action

The federal action required to implement the redevelopment of the Terminal 5/6 site and associated facilities is the approval by FAA of a revised JFK Airport Layout Plan (ALP). While it is unknown at this time, it is possible that federal funding may be applied to portions of this project. Receipt of such funding is also considered a federal action and therefore this document is being prepared to address the clear need for a revised ALP and the possible need for approval of airport funding. The ALP will be prepared by the Port Authority and will include the Proposed Project described in Section 1.2 and Section 3.2 (Parking Garage Alternative 3 and Terminal Redevelopment Alternative 7A). Before the FAA can approve the ALP, NEPA requires FAA to evaluate the potential environmental consequences of its action and determine whether or not the project would cause a significant environmental impact. This *EA* has been prepared to enable the FAA to make that determination. If, on the basis of this *EA*, the FAA determines that the Proposed Project would not cause significant impacts, it may issue a Finding of No Significant Impact (FONSI). FAA also will review the airspace implications of the Proposed Project to ensure that the proposed changes meet airspace requirements at the airport. These approvals must be obtained before the Port Authority may proceed with the Proposed Project.

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E FONSI and ROD for Jet Blue Operations at JFK International Airport, Jamaica, New York...et al

F Air Quality Analysis

G State Agency Correspondence

H Public and Consulting Party Involvement
1. Distribution of the *Final Draft Environmental Assessment (EA):* January 18, 2001 and Notice of Availability of the *Final Draft EA:* March 20, 2001, and Notice of Public Hearing: June 14, 2001
2. First Public Hearing: June 27, 2001
3. Comment Letters Received on the June 2001 *Final Draft EA*
4. First Consulting Parties Meeting Attendance Record: October 29, 2001
5. SOI Announcement: November 30, 2001
6. Documentation of FAA, Port Authority, and Municipal Art Society Meeting Attendance: December 18, 2001
7. Distribution of the June 2002 *Final Draft EA & DOT Section 4(f) Evaluation*
8. Second Consulting Parties Meeting Attendance Record: July 31, 2002
9. Distribution of June 2003 *Draft EA & DOT Section 4(f) Evaluation*: June 17, 2003, and Notice of Availability: June 18, 2003 and Public Hearing: July 15, 2003
10. Second Public Hearing: July 15, 2003
11. Third Consulting Parties Meeting Attendance Record: September 18, 2003
12. Comment Letters and Specific Responses to the June 2003 *Draft EA & DOT Section 4(f) Evaluation*
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I Municipal Art Society Alternative 12

Acronyms and Abbreviations

ACHP	Advisory Council on Historic Preservation
BMP	Best Management Practices
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CTA	Central Terminal Area
DNL	Day-Night Average Sound Level
EA	Environmental Assessment
EDMS	Emissions and Dispersion Modeling System
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
FAA	Federal Aviation Administration
FAR	Floor Area Ratio
GSE	Ground Support Equipment
HVAC	heating, ventilating, and air conditioning
Hz	Hertz
JFK	John F. Kennedy International Airport
LOS	Level of Service
LIRR	Long Island Railroad
$\mu g/m^3$	micrograms per cubic meter
mg/m^3	milligrams per cubic meter
mgd	million gallons per day
MOA	Memorandum of Agreement
MW	Megawatts
MTA	Metropolitan Transit Authority
NAAQS	national ambient air quality standards
NEPA	National Environmental Policy Act of 1969, as amended
NO_x	nitrogen oxides
NRHP	National Register of Historic Places
NYSDEC	New York State Department of Environmental Conservation
NYSDOT	New York State Department of Transportation
NYSNHP	New York State Natural Heritage Program
PM_{10}	inhalable particulate matter less than 10 microns in diameter
ppm	parts per million
SHPO	Station Historic Preservation Officer
SIP	State Implementation Plan
SO_x	sulfur oxide
TSP	total suspended particulate
TWA	Trans World Airlines
U.S.C.	U.S. Code
USDOT	United States Department of Transportation
USFWS	U.S. Fish and Wildlife Service
VOC	volatile organic compound
WPCF	water pollution control facility

1. Introduction and Background

1.1 Document Purpose and Organization

The Environmental Assessment (*EA*) for the redevelopment of Terminals 5 and 6 analyzes the potential environmental effects of a project sponsored by the Port Authority of New York and New Jersey involving certain changes to the Airport Layout Plan (ALP) at John F. Kennedy International Airport (JFK). The Proposed Project would permit the Port Authority of New York and New Jersey to construct a new airline terminal and to undertake other proposed improvements, such as a new parking facility and roadway relocation, needed for operations by JetBlue Airways Corporation and potentially other future airline tenants at Terminals 5 and 6. This *EA* describes the purpose of and need for the project (Section 2), the alternatives considered (Section 3), description of the natural and cultural environment (Section 4), environmental consequences including historic, architectural, archaeological, and cultural resources (Section 5), and public involvement and outreach associated with the Proposed Project (Section 6). References are provided in Section 7. A full evaluation of the effects of the Proposed Project on resources protected by Section 4(f) of the Department of Transportation Act is included within Appendix A *Section 4(f) Evaluation of TWA Terminal 5/6 Redevelopment at JFK*. Various appendices contain additional supporting and related information.

This *EA* is developed in accordance with Federal Aviation Administration (FAA) Order 5050.4A, *Airport Environmental Handbook* (FAA 1985); USDOT Order 5610.C, *Procedures for Considering Environmental Impacts*; FAA Order 1050.1D, *Policies and Procedures for Considering Environmental Impacts* (FAA 1999); the recently published Change 4 to FAA Order 1050.1D; and other guidance and instructions promulgated in applicable regulatory and advisory information. Compliance with these orders and guidance ensures that the project will meet the procedural and substantive environmental requirements set forth by the Council on Environmental Quality (CEQ) in its regulations implementing the National Environmental Policy Act of 1969 (NEPA), as amended (40 CFR 1500-1508).

1.2 Description of Proposed Project

The Proposed Project is described in Appendix B *Revised Concept Master Plan*. The Proposed Project consists of constructing a new, multiairline terminal on the combined site of Terminals 5 and 6. Renowned architect Eero Saarinen designed the main TWA Terminal building, connector tubes, and Flight Wing 2. The site of these structures has been determined to be eligible for listing on both the National Register of Historic Places (NRHP) and the State Register of Historic Places. The New York City Landmarks Preservation Commission also has designated the terminal, connector tubes, and Flight Wing 2 a New York City Landmark. The Port Authority has also presented the Proposed Project to the New York City Landmarks Preservation Commission.

The original historic main Trans World Airlines (TWA) Terminal building and the East Connector Tube are to be retained and restored as part of an adaptive reuse program. The West Tube may be modified to enhance public access. Flight Wings 1 and 2, Terminal 6, and

three airport support structures (Buildings 296, 295, and 164) would be demolished (Figure 1.2-1). The TWA Ground Support Building (Building 296) provided ground service equipment support, commissary stores, aircraft and ground support equipment (GSE) parts storage, a triturator, and deicing product dispensing to Terminal 5. These functions will be incorporated into the new terminal. Switch House #1 (Building 295) will be relocated to the island area surrounded by the restricted service road, Taxiways Alpha and Kilo. This is near the intersections of Runways 4L/22R and 13R/33L. In addition, a small ramp equipment storage building (Building 164) will be demolished and its function will be subsumed into the new terminal.

A new bilevel access roadway system, a new parking structure, connection to the AirTrain system, and new site improvements, both airside and landside, are also part of the Proposed Project. Pending approval, construction of the JetBlue terminal and the associated new roadway system, the parking garage, and public access connections to the TWA Terminal would start in the first quarter of 2005 and be completed in the first quarter of 2008. Once Jet Blue's new terminal is competed, their operations would ove from the existing Terminal 6 to the new terminal. Terminal 6 would ultimately be demolished (expected within the timeframe of 2008 - 2012). Pending an additional terminal lease agreement with an airline, the construction of the remaining portion of the Revised Concept Master Plan would begin.

The Port Authority is proposing the project to ensure that existing and future operations by JetBlue Airways Corporation and other airline tenants can provide an adequate level of service to their customers. The new facilities will more efficiently use the landside and airside of the site while providing the terminal support required for contemporary aviation usage.

The *EA* considers various project alternatives identified by the Port Authority in response to input received from agencies, interested parties, and the public. It also considers alternatives submitted to the Port Authority and the FAA in response to earlier drafts of the *EA* and the *Concept Master Plan* (Port Authority July 2000 amended February 2001). This *EA* describes these alternatives with focus on the achievement of the purpose and need, including protection of historical resources.

The FAA, in accordance with 36 CFR Part 800.6 regulations implementing Section 106 of the National Historic Preservation Act (16 U.S.C. 470f), by letter dated June 25, 2001, notified the Advisory Council for Historic Preservation (Council) of the adverse effect finding as a result of this project on the TWA Terminal (Appendix C *Advisory Council on Historic Preservation Correspondence*). The Council, in accordance with Section 800.6(a)(1) of the regulations by letter dated July 11, 2001, notified the FAA of the Council's conclusion that the criteria for Council involvement in reviewing individual Section 106 cases applied and therefore, the Council would participate in the consultation related to this undertaking (Appendix C *Advisory Council on Historic Preservation Correspondence*).

Under the Section 106 process, members of the public and interested parties may request to formally participate as consulting parties in the Section 106 review process. For this Project, the FAA has granted the requests of the following parties to participate as consulting parties in the Section 106 process: the National Trust for Historic Preservation, the Municipal Art Society of New York, New York City Partnership, Documentation and Conservation of Buildings, Sites and Neighborhoods of the Modern Movement (DOCOMOMO), the Consulate General of Finland, New York, New York Landmarks Conservancy, John Cullinane & Associates, JetBlue Airways Corporation, and the New York Building Congress.

EXEMPTION (4) – DRAWINGS OF NON-PUBLIC AREAS

The focus of this document is the aviation demand expected in the future by the FAA and the Port Authority and the need for a modern facility that can accommodate it while enabling the restoration/rehabilitation and adaptive reuse of the TWA Terminal. This *EA* evaluates the environmental impacts of full redevelopment of the Terminal 5/6 site.

1.3 Background

JFK is leased to the Port Authority by the City of New York for a term extending to December 31, 2015. Negotiations for lease renewal are underway between the City of New York and the Port Authority. The airport is located in the southeastern section of Queens County on Jamaica Bay, 15 miles by highway from midtown Manhattan. It encompasses 4,956 acres, including 880 acres in the Central Terminal Area (CTA). The CTA consists of nine unit passenger terminals with frontage located adjacent to an interior area accommodating the roadway, parking, and transit systems (see Figure 1.3-1). The locations of the terminals are defined and limited by the ground access system and parking areas on one side and the airfield layout and aircraft maneuvering areas on the other side.

The original design concept for the airport called for individual unit terminals, because the resident airlines wanted their own identities. Changes in technology and in the airline industry enabled the airlines to use larger jets, causing the airport layout to evolve to its current configuration, with the future configuration set forth in the *Revised Concept Master Plan* (Appendix B *Revised Concept Master Plan*). Those changes have rendered the terminals built in the early 1960s, including Terminals 5 and 6, inadequate and obsolete.

Redevelopment of JFK is occurring in response to increasing demand for aviation services and the actions by the Port Authority and airport tenants to address that demand. The Port Authority has addressed changes to the landside part of the airport by developing a new roadway system designed to reduce vehicular congestion and by construction of the AirTrain project, a new light rail mass transit access system for the airport. Airport tenants have implemented modernization projects for most of the terminal buildings. Terminals 1 and 4 have been completely modernized, whereas Terminals 7, 8, and 9 are in various phases of reconstruction and redevelopment. Delta Airlines plans to upgrade and renovate Terminals 2 and 3 in the near future.

The TWA Terminal was designed by Eero Saarinen in the late 1950s and constructed in the early 1960s. TWA operated from Terminal 5, commonly referred to as the TWA Terminal, from 1962 until October 2001, when it ceased to exist as an airline. American Airlines conducted operations in the terminal between October 2001 and January 2002. Terminal 5 became dormant in January 2002 when American Airlines ceased operation of TWA, integrating into American Airlines operations and facilities in Terminals 8 and 9. The Port Authority assumed maintenance functions at Terminal 5 in January 2002, to ensure that the unused building does not fall into disrepair. JetBlue operates out of Terminal 6.

The TWA Terminal is considered a significant example of 20th Century modern architecture and engineering because of its revolutionary and influential design. In 1994, the New York City Landmarks Preservation Commission designated the main TWA Terminal building, (referred to as the TWA Terminal or Terminal 5), the two connector tubes and Flight Wing 2 a New York City Landmark. In addition, the Terminal 5 site, including the main TWA

Terminal building, the connector tubes, and Flight Wing 2, has been deemed eligible for listing on the National and State Registers of Historic Places by the New York State Historic Preservation Office (SHPO).

The Port Authority has agreed to record the TWA Terminal, the connector tubes, and Flight Wing 2 to Level 1 standards and guidelines of the Historical Architectural Building Survey/Historic American Engineering Record of the National Park Service and agreed to nominate the site for listing on the National and State Historic Registers. It is maintaining the vacant terminal and is committed to do so in the future until a new adaptive reuse tenant is chosen through a Request for Proposals process. No demolition of any part of the TWA terminal would take place prior to agreements being finalized for the new terminal. The exterior and certain historically significant interior spaces of the building would be restored. The signature landside view of the terminal would be restored within a reconfigured roadway and landscape environment. The Port Authority and the selected adaptive reuse redeveloper would adhere to these and all other terms and conditions set forth in a signed Memorandum of Agreement (Appendix D *Memorandum of Agreement*).

The vacant TWA Terminal, which has 14 aircraft contact gates and five hardstand positions, is located at one of the prime sites in the CTA at JFK. It currently uses only a small portion of the site's aviation capacity efficiently, as described in Section 2, *Purpose and Need*. The TWA Terminal no longer meets the minimum modern standards for passenger service, passenger handling, or building operations required by today's airlines and the travelling public. The shortcomings of the building are exacerbated by the new demands for increased security in all areas of airline terminals.

JetBlue, which operates out of Terminal 6, has selected JFK as its hub to provide its low-cost airline service to cities nationwide. Additional details on the existing and planned JetBlue operations at JFK, as well as the environmental impacts associated with the operations, are presented in the *Environmental Assessment of New Entrant Exemption to the High Density Rule and Operations Specifications for JetBlue Airways Corporation* (CH2M HILL 1999a) (see Appendix E *Finding of No Significant Impact and Record of Decision, New Entrant Exemption to the High Density Rule and Operations Specifications for JetBlue Airways Corporation).*

JetBlue has a need to improve its facilities and expand beyond Terminal 6. The FAA and Port Authority projections for passenger enplanements and airport operations, both before and after September 11, 2001, still indicate consistent increases at JFK. Additional tenant airlines may choose to enter into an agreement with the Port Authority in the future to occupy some of the facilities included in the Proposed Project. These airlines have the same needs as JetBlue with respect to consolidating operations in a manner that improves customer service and airline operations and satisfies security requirements. There is a need to complete the environmental review of this Proposed Project in order for the anticipated future demand to be met in a timely manner.

1.4 Federal Action

The federal action required to implement redevelopment of the Terminal 5/6 site and associated facilities is the approval by FAA of a revised JFK Airport Layout Plan (ALP). While it is unknown at this time, it is possible that federal funding may be applied to

portions of this project. Receipt of such funding is also considered a federal action and therefore this document has been prepared to address the clear need for a revised ALP and the possible need for approval of airport funding. The ALP will be prepared by the Port Authority and will include the Proposed Project described in Section 1.2 and Section 3.2 (Parking Garage Alternative 3 and Terminal Redevelopment Alternative 7A). Before the FAA can approve the changes to the ALP, NEPA requires the FAA to evaluate the potential environmental consequences of its action and determine whether the project would cause a significant environmental impact. This *EA* has been prepared to enable the FAA to make that determination. If, on the basis of this *EA*, the FAA determines that the Proposed Project would not cause a significant impact, it may issue a Finding of No Significant Impact (FONSI). The FAA also will review the airspace implications of the Proposed Project to ensure that the proposed changes meet airspace requirements at the airport. These approvals must be obtained before the Port Authority may proceed with the Proposed Project.

2. Purpose and Need

2.1 Purpose

The purpose of the Proposed Project is to redevelop the Terminal 5/6 site to include a new airline terminal and to provide improved facilities and services, including parking, for the safety, comfort, and convenience of passengers travelling through Terminals 5 and 6 at JFK.

2.2 Need

The Proposed Project would serve the following needs of the Port Authority, airline tenants, airline passengers, and the general public:

- Need to make efficient use of aviation capacity with a flexible terminal design to accommodate a variety of aircraft
- Need for a modern terminal that promotes airline competition and complies with the Americans with Disabilities Act (ADA)
- Need for facilities with adequate level of service within a responsive timeframe
- Need for terminal space to meet updated security requirements
- Need for sufficient landside access
- Need to improve parking facility level of service
- Need to restore and rehabilitate the TWA Terminal

Each of these needs is discussed in detail below. A discussion of how the Proposed Project meets these needs is also provided. Consideration has been given to the effects of the events of September 11, 2001, on the need for and timing of improvements. The project needs have not changed and are responsive to needs of tenant airlines, and the expected rebound of airline business in the future. Interim events may delay the implementation of aviation facility improvements but will not diminish their need.

2.2.1 Need to Make Efficient Use of Aviation Capacity With a Flexible Terminal Design to Accommodate a Variety of Aircraft

The need to make efficient use of the site is important, since JFK is one of the 25 busiest airports in the world in terms of passengers, among the top 50 in terms of aircraft movements, and 12th in the world in terms of international flights. An airport with this level of activity must maintain a central terminal area (CTA) that decreases passenger connection times and increases passenger convenience. The Terminal 5/6 site is the last parcel within the CTA to be considered for redevelopment (the airport, with nine existing terminals, does not have space to expand elsewhere within the established CTA). Although the Terminal 5/6 site is one of the prime sites at JFK, it does not efficiently utilize its aviation capacity in its present configuration. Terminals 5 and 6 together occupy 653,000 square feet, but the Proposed Project concept shows there is ample room to support a 1.5-million-square-foot terminal with full redevelopment of Terminal 5 and Terminal 6. The terminal area must be redeveloped to achieve the proper balance between airside ramp and terminal sizing. The proposed terminal should be configured to ensure ease of aircraft maneuvering while

making the most efficient use of the real estate, pursuant to FAA Advisory Circular 150/5300-13, *Airport Design* (September 1989), for the redevelopment of the terminal, apron, and taxi-lane areas. A flexible design is needed for the site to accommodate a range of aircraft, depending on market needs, while maintaining a high level of service that responds to changing demands over time. Each concourse needs to accommodate Group III, IV, and V aircraft of various lengths and wingspans, with flexibility to vary the locations for each as the tenant airliners' fleet mix changes.

2.2.2 Need for Modern Terminal to Promote Airline Competition and Comply with ADA

Airlines must provide appropriate facilities for all passengers. One of the benefits of modern airport terminals is that accommodations for individuals with disabilities can be included within the base design. To attract and keep customers, airlines need modern building systems and designs that provide convenience and comfort and protect passengers from inclement weather. The ability to compete is hampered when an airline must operate from obsolete facilities when compared to other airlines having more efficient and customer-friendly accommodations. Terminals 5 and 6 do not meet the ADA requirements, so special arrangements must be made to accommodate passengers with disabilities. Weather protection is provided by add-on canopies, not canopies integrated into the building design. Because they do not use heating and ventilating systems with modern, efficient equipment, they also waste energy and add to utility costs. These conditions at Terminals 5 and 6 can be remedied only by redevelopment, a process already completed, under way, or planned at the other airport terminals at JFK. Within the CTA, Terminal 1 has already undergone reconstruction and was reopened in May 1998. Delta Airlines has proposed redevelopment of Terminals 2 and 3. Redevelopment of Terminal 4 began in May 1997, was completed at a cost of $1.2 billion and was dedicated in May 2001. British Airways completed construction of its major expansion of Terminal 7 in 2002. American Airlines has embarked on a new terminal development project that will replace Terminals 8 and 9 at a cost of nearly $1 billion. In light of these redeveloped facilities, Terminals 5 and 6 are the least improved passenger facilities in the CTA in terms of ADA compliance.

In an industry where the competitive environment includes passenger convenience and airline corporate image, the tenants of Terminals 5 and 6 must undertake improvements to remain competitive, maintain their customer base, meet travelers' expectations, and comply with the ADA.

2.2.3 Need for Facilities with Adequate Level of Service within a Responsive Timeframe

Terminals 5 and 6 were state-of-the-art facilities when they were designed and constructed more than 40 years ago. However, since that time, the aviation industry and the sizes and types of aircraft used for travel have changed tremendously. The dramatic changes in the industry and technology, coupled with the advanced age of the facilities, have reduced their desirability by the airlines as terminal buildings. These two terminals originally were planned as separate domestic and international terminals. However, the terminals do not meet modern aviation planning criteria for those uses. Operational inefficiencies have resulted in reduced passenger level of service, which is contrary to the goal of the Port Authority and the airlines: to assure the highest level of convenience and efficiency for their customers. The planning, development, and construction of modern air terminals is a time

consuming process. As demand for aviation services is projected to increase over the next ten years, work must begin now for the planning, design and construction of a new reconfigured Terminal 5/6 site.

Service efficiency can be defined as the quality or conditions of service that passengers experience at a facility. This is normally a measure of either (1) passenger inconvenience (e.g., waiting times or missed flights) or (2) the space, size, or number of facilities available for processing passengers; e.g., the size of the terminal building related to the number of passengers and number of gates, the distance a passenger must travel to reach the gate, the length of ticket counter in linear feet per passenger, the size of the baggage claim area and belt length, and the size of Federal Inspection Services facilities, holdrooms, concessions, and other functional areas. Passengers per aircraft boarding gate and terminal space per gate are other ways of comparing terminal service levels.

Airport facilities generally are sized for a particular useful service life. Therefore, when an airport or new terminal first opens, the level of service provided is desirably better than any adopted criterion, but by the end of the facility's service life, the service provided is often worse than the criterion. Levels of service change as passenger traffic increases, and eventually additional facilities are needed to restore service to a satisfactory level and to ensure it is not soon degraded by future passenger growth. Thus, there is a need for a terminal design that enables construction to be conducted quickly and efficiently in order to maintain adequate service in response to changing market demands.

The Terminal 5/6 Redevelopment Project would improve passenger service by consolidating Terminals 5 and 6 into a single, properly sized terminal. Redevelopment would provide both domestic and international capability and, at a minimum, meet the modern airside requirements established in FAA Advisory Circular 150/5300-13, *Airport Design* (September 1989), and the modern terminal planning criteria established in FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities* (April 2, 1988).

There is often a perception that providing additional facilities at an airport will itself induce additional demand for air travel. Experience at JFK and other airports indicates that such demand does not occur, since the airline's market is the primary driver. Increases in demand can almost always be traced to causes other than terminal facility improvements. For example, in the absence of associated terminal modifications, the number of enplaned passengers increased at an annual rate of 6.5 percent between 1993 and 1995 at JFK, and at less than 2 percent over the subsequent 2 years, primarily because of economic factors and airline scheduling. Conversely, major facility improvements rarely are the cause of an increase in demand. Also, the redevelopment of Terminal 1 has not caused air travel there to increase beyond forecast levels, and the number of operations increased noticeably when JetBlue began operating out of an existing terminal without any increase in terminal size. However, the absence of adequate facilities can restrict an airlines operations or can cause an airline to relocate elsewhere .

Table 2.2-1 provides measurements of the differences in terminal servicing facilities based on actual and future passenger demands at Terminal 6 by JetBlue. In this analysis, Terminal 5 is assumed to remain closed for aircraft operations and is not included in the comparison because it does not account for the deficiencies described above—namely a design based on 40-year-old planning standards that is incompatible with current aircraft requirements and guidelines per FAA Advisory Circular 150/5300-13, *Airport Design* (September 1989), and FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities* (April 2, 1988), and a building that devotes unnecessary square footage to duplicate

support functions. The forecast demand of 7.1 million passengers in 2010 is derived from a flight schedule that assumes 150 narrow-body aircraft departures a day leaving from either the existing or redeveloped Terminal 6. Existing gate utilization would have to increase 375 percent to meet the 2010 forecast passenger demand if JetBlue is constrained to operate in the existing Terminal 6. This increase in gate utilization likely would not be feasible, or would involve an inefficient use of apron hardstands that require bussing of passengers, loading of passengers in an unsheltered environment, and results in a very low level of service.

TABLE 2.2-1
Comparison of Existing and Forecast Terminal 6 Activity

	Existing Terminal 6	
	Actual 2000	Forecast 2010
Annual Enplaned Passengers	1,494,589	7,117,500
Average Daily Enplaned Passengers	4,095	19,500
Number of Aircraft Boarding Gates	14	14
Average Daily Enplaned Passengers per Boarding Gate	293	1,393
Percent Increase in Gate Utilization Compared to 2000	0%	375%

Source: Port Authority of New York & New Jersey. July 15, 2002. *John F. Kennedy International Airport Terminal 5JB Concept Design Study.*

Another way of characterizing the data is to recognize that the level of passenger service congestion will increase three to four times in the future over that which existed in 2000 without any redevelopment in the terminal area. Future enplanement levels are based on the best-forecast information available at the current time. The results indicate a substantial increase in passengers that is well beyond the ability of the existing Terminal 6 facility to process and manage.

A review of recent airline activity statistics also indicates the congestion experienced by passengers. Table 2.2-2 shows the airline's passenger levels at Terminal 6 for four representative months during 2002. It also shows that the number of passengers at Terminal 6 is increasing at the rate of 400 additional passengers each day per gate.

TABLE 2.2-2
JetBlue Passenger Activity at Terminal 6 for Representative Months, Year 2002

Month	Total Passengers in Current and Preceding 11 Months	Passenger Increase from Previous Month	Average Daily Increase in Passengers per Aircraft Boarding Gate
July	4,169,004	NA	NA
August	4,340,234	171,230	395
September	4,532,685	192,451	458
October	4,708,782	176,097	406

Source: Port Authority of New York & New Jersey. July 15, 2002. *John F. Kennedy International Airport Terminal 5JB Concept Design Study.*

Comparisons of the number of passengers per aircraft boarding gate in 2000 and 2002 show that activity levels in Terminal 6 are increasing. Fewer than 300 passengers were enplaned per boarding gate in Terminal 6 in 2000 (Table 2.2-1), but that was before the startup of JetBlue and the events of September 11, 2001. During the past year, which is more representative of current activity, average daily passenger enplanement activity has increased to 921 per boarding gate, an increase of more than 200 percent over the 2000 boarding levels. JetBlue is quickly approaching maximum utilization of gates and cannot sustain continued growth in the existing Terminal 6.

As JetBlue continues to increase its activity levels, it will become a larger player in the overall activity at the airport, thereby emphasizing the need to improve facilities and increase aviation capacity at JFK. The Port Authority's forecasts of passengers and 2010 activity levels in Terminal 6 shown in Table 2.2-1 provides the relationship shown in Table 2.2-3. Table 2.2-3 indicates that JetBlue passenger activity will increase at a rate greater than that experienced by the airport as a whole. That rate of growth will necessitate improved terminal facilities and equipment if the airport is to have an adequate level of service for its passengers at this location.

TABLE 2.2-3
Comparison of JetBlue and Total JFK Passenger Activity

	2000		2010	
	Actual	**%**	**Forecast**	**%**
JFK Airport	32.9 million	100	39.3 million	100
JetBlue Airways	2.9 million	8.9	14.2 million	36.1

Sources:
Port Authority of New York & New Jersey. *Long Range Forecast Summary 2003–2012.*
Port Authority of New York & New Jersey. July 15, 2002. *JFK International Airport Terminal 5JB.Concept Design Study.*

The deficiency in service is also apparent when the amount of space available per aircraft boarding gate is examined. Table 2.2-4 shows that the existing square footage per gate is much less than that of other terminals, clearly establishing a need for improvements. The table also shows that the Proposed Project would provide additional space.

TABLE 2.2-4
Comparison of Current and Proposed Terminal Square Footage per Gate

	Terminal 5/6				
	Current	**Proposed Project**	**Terminal 1**	**Terminal 4**	**Terminal 8/9**
Terminal Building Space (approximate gross total), ft^2	745,000	1,540,000	673,000	2,000,000	1,900,000
Number of Contact Gates	27	47	11	21	57[a]
Terminal ft^2 per Gate	27,593	32,766	61,180	95,240	33,333

Source: Port Authority of New York and New Jersey. January 2003. Aviation Planning Department records.
[a]Source: *American Airlines Environmental Assessment.* 1999.

While the growth of JetBlue provides an example of a current need to improve facilities at JFK, it is important to note, that even without the dramatic growth of JetBlue it is projected that the business of aviation will continue to grow and that the proposed project will be required with or without JetBlue.

Despite economic downturns, global conflict, and heightened security concerns, aviation passenger traffic has grown steadily and reliably throughout the 20th century. The growth in aviation has been driven by a number of factors including; the deregulation of the airline industry, larger more efficient aircraft, increases in population and national wealth, and a steady decrease in airfares.

The recent slowdown in economic growth, coupled with the events of September 11, 2001, the Afghanistan conflict, the Iraq war, and Severe Acute Respiratory Syndrome (SARS) have resulted in a dramatic reduction in aviation demand. These things contributed to the bankruptcy of some major airlines and forced the remaining airlines to initiate programs to dramatically reduce costs. The result of these events has been a significant reduction in aircraft operations and passenger traffic at JFK and other airports nationwide. However, the consensus opinion of aviation experts is that growth in aviation passenger traffic at JFK and other airports worldwide will continue. This opinion is supported by the conclusion that the trends, which have driven aviation demand over the last 50 years, are still in place and will continue to support the steady growth in aviation. Jet Blue's growth has, however, increased at a relatively steady rate.

As outlined in Figure 2.2-1, in the last 20 years of the 20th century, during good economic times and bad, domestic passenger traffic increased at an annual average rate of over 6%. In addition to steady economic growth and increased globalization, this rate of growth has been driven by increasingly lower costs for air travel (see Figure 2.2-2).

FAA's aviation activity forecasts for JFK are contained in the 2003 terminal area forecasts (FAA 2003). The forecasts, covering fiscal years 2002 to 2013, project substantial increases in future enplanements and aircraft operations. The forecasts indicate confidence in increased aviation at JFK, particularly for future passenger levels. They show robust activity at JFK, which the Port Authority expects will occur as the industry rebounds from the events of September 11, 2001. Review of the Port Authority forecasts indicates similar rates of growth.

These forecasts predict rates of growth that will cause a rapid expansion in aviation demand at JFK. Its important to realize that growth rates of 3 to 4% will cause a 50% increase in aviation demand in as little as 10 to 14 years. Given that the planning horizon for large scale infrastructure projects is approximately 10 years it is clear that the planning and development work for the proposed project needs to begin now in order to meet the expected demand.

The upcoming aviation demands and planned passenger growth need to be met with modern buildings and facilities that provide an adequate level of service. The Proposed Project would meet the Port Authority's desire to improve service to airport customers as aviation demand is projected to increase through 2012. It would accommodate the planned growth of tenant airlines at an acceptable level of service for both domestic and international operations.

FIGURE 2.2-1
Domestic Passengers in the 20th Century

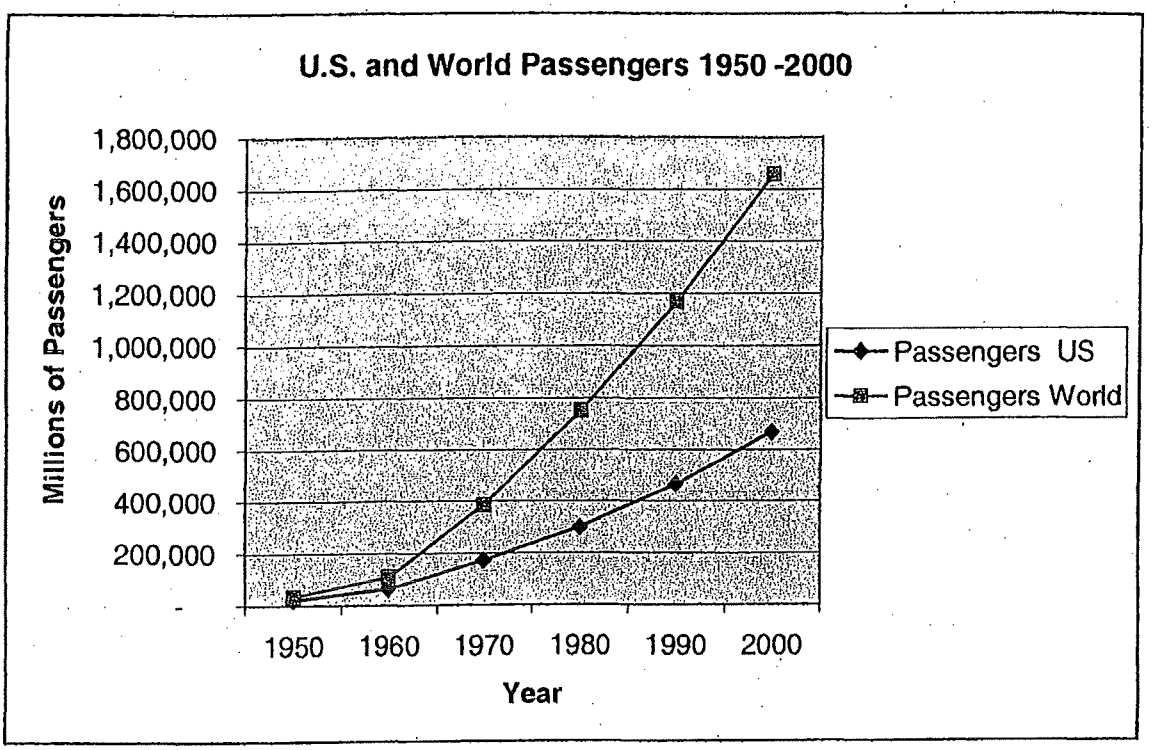

FIGURE 2.2-2
Cost of Passenger Travel

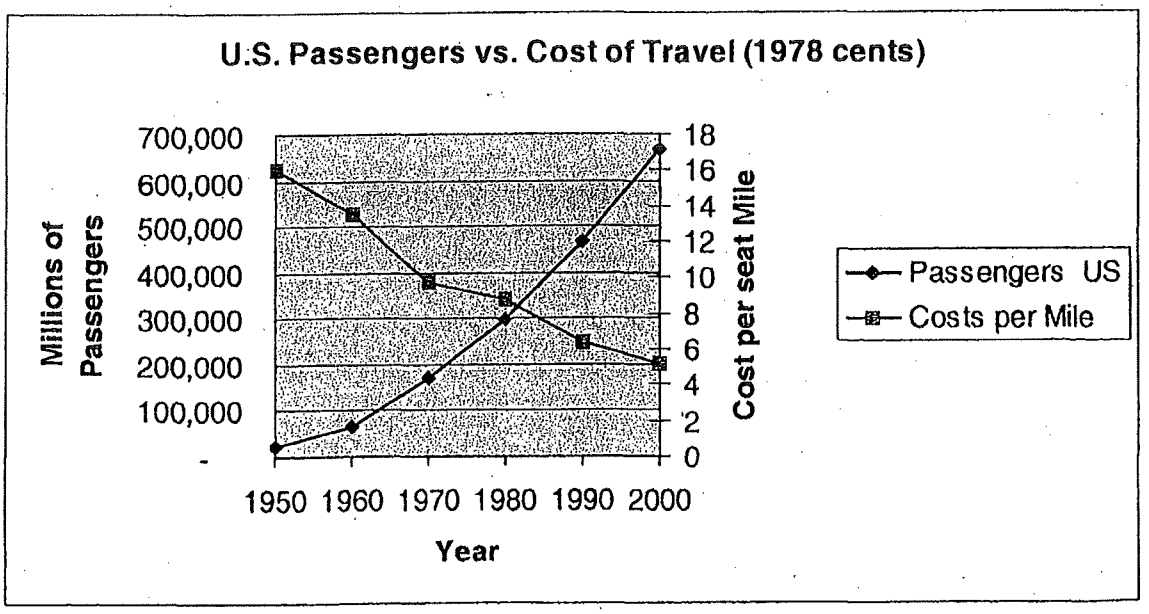

FIGURE 2.2-3
FAA Predictions for Domestic
Large Carrier Enplanements

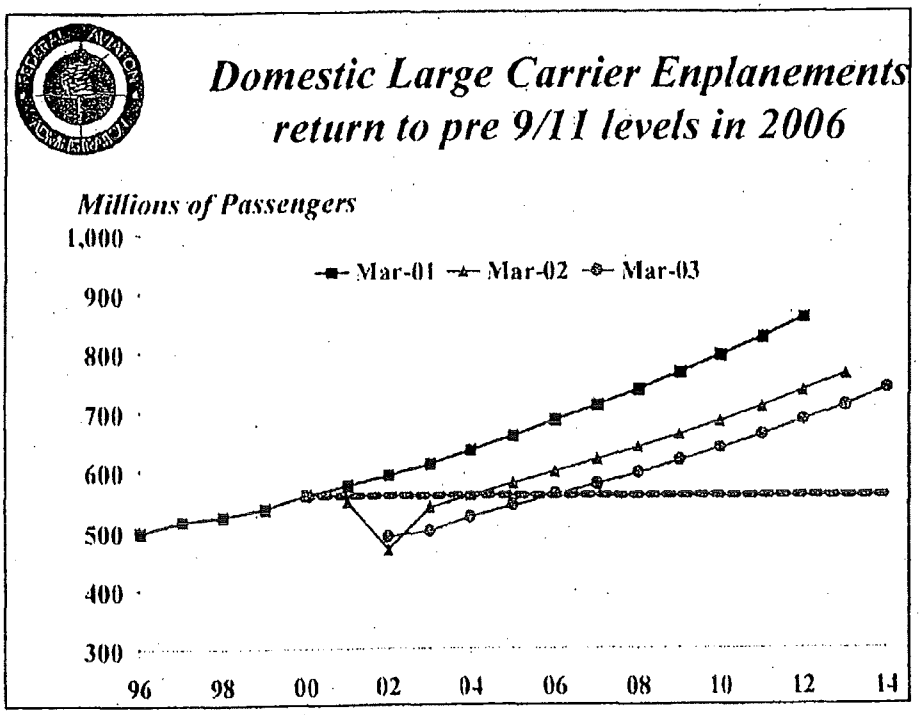

FIGURE 2.2-4
FAA Predictions for
International Passengers

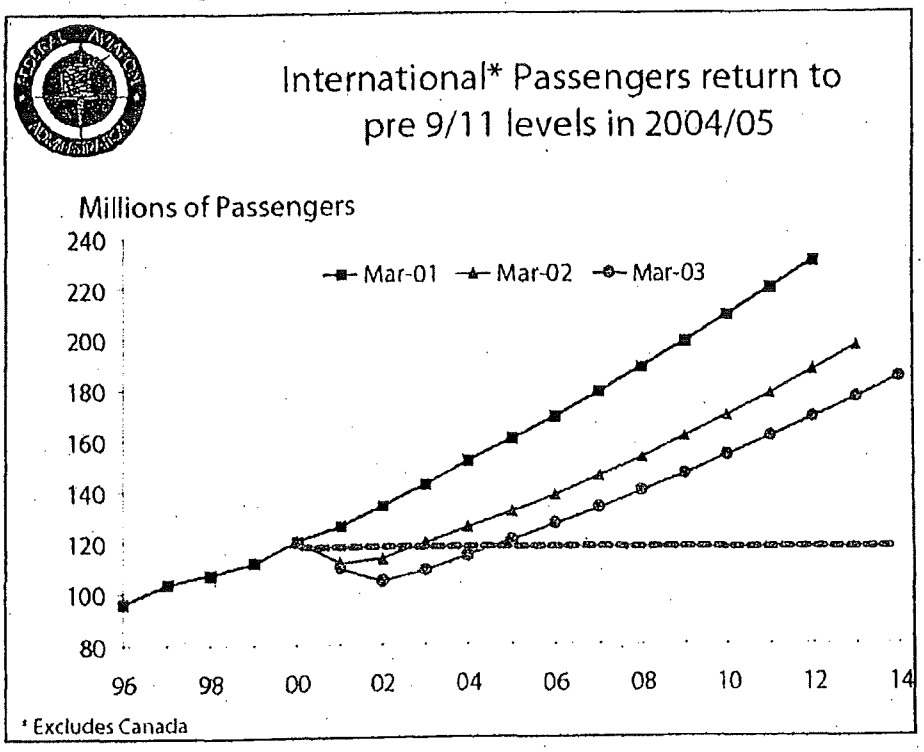

TABLE 2.2-5
FAA Terminal Area Forecasts for Selected Years at JFK International Airport

Year	Total Passengers (in millions)	% Annual Increase from Previous Period	Total Aircraft Operations (in 000s)	% Annual Increase from Previous Period
2002	30	NA	291	NA
2007	38	5.1	343	3.5
2012	45	3.8	375	1.9

Source: FAA. January 22, 2003.Terminal Area Forecast. http://www.api.faa.gov

TABLE 2.2-6
Port Authority Forecast

Year	Total Passengers (in millions)	% Annual Increase from Previous Period	Total Aircraft Operations (in 000s)	% Annual Increase from Previous Period
2002	29	NA	276	NA
2007	36	4.7	340	4.7
2012	42	3.2	380	2.4

Source: Port Authority of New York and New Jersey. *Long-Range Forecast Summary, 2003–2012.*

The Proposed Project would eliminate deficiencies and provide more efficient use of airport terminal passenger facilities and services, assure compliance with ADA regulations, and alleviate other terminal area restrictions and shortcomings that are expected to worsen unless improvements are made as passenger levels continue to grow at this location at JFK.

2.2.4 Need for Terminal Space to Meet Updated Security and Safety Requirements

There is an essential need for all airport facilities to enhance the safety of aircraft operations, improve safety within the terminal area, and improve security. With respect to the current aircraft operating requirements in this general area of the airport, and particularly around Terminal 6, movement is complex because of the number and location of buildings and the limited amount of space available for aircraft maneuvering and parking. A simplified layout for aircraft parking in the terminal area is needed to enhance operational safety and provide for adequately sized gates, basic building configurations, and maximized terminal frontage.

Terminal 5 lacks the safety enhancements needed for safe passenger movement and baggage handling and to meet modern environmental and life safety systems standards. Retrofitting antiquated buildings to satisfy those needs would be expensive and difficult to accomplish in a way that balances needs throughout the structure. Systems that control heating, ventilation, cooling , and fire detection systems would need to be modified. Asbestos removal, glass replacement, and even flooring finishes are safety items that would require attention if the buildings are to meet modern standards. Even after going to the trouble and expense of modernizing the outdated facilities, the result would be facilities that are inflexible and mismatched compared to what could have been accomplished by undertaking complete redevelopment of the terminal.

With the signing of the federal Aviation and Transportation Security Act in November 2001, airports are responsible for meeting the latest security requirements of the Transportation Security Administration (TSA), including baggage screening, vehicle searches, and other measures to eliminate threats to aviation facilities and users. Airport terminals also must be able to accommodate passengers in the event of an emergency incident that requires evacuation of passengers from one area of a terminal to another. These needs may require structural strengthening in buildings to support larger screening devices, the redesign of terminal entrance and airline support facilities, expanding passenger check-in areas, and other measures to ensure terminal integrity and security. Incorporating perimeter area protection, such as eliminating automobile parking within 300 feet of terminal entrances, may be virtually impossible at some terminals, given their building footprints and relationships to surrounding roads and curbsides.

The Proposed Project affords the opportunity to provide for enhanced security for all the terminal area improvements to be undertaken as part of the project. This capability is afforded for airside operations, the terminal building, and landside access. Design of a new terminal, as proposed in the Terminal 5/6 Redevelopment Project, allows all the evolving security requirements to be considered and included in a comprehensive and cost-effective manner that assures the safety of the traveling public.

2.2.5 Need for Sufficient Landside Access

There is a need for sufficient landside access to the Terminal 5/6 site. In particular, the terminal needs to provide an efficient link to the mass transit system, including light rail and the roadway system. Redevelopment of the terminal site is also needed to provide an adequate length of curb frontage to efficiently serve both arriving and departing passengers.

As a separate project, the Port Authority constructed a light rail (AirTrain) system, which became fully operational in 2003. The system interconnects all nine terminals and the rental car facilities located at the Federal Circle Station through a centralized loop. Spur lines connect to Howard Beach and Jamaica, where access to New York's regional mass transit system is available. Access to the system from the Terminal 5/6 site is needed to serve both origination and destination passengers and passengers who may be transferring within the CTA.

The Terminal 5/6 site needs adequate vehicular access. In particular, a new roadway scheme is needed to serve passengers arriving and departing through private vehicle, rental car, taxi/limousine, and public transportation. The new roadway scheme must meet peak-hour vehicle flows and also annual demand.

Modern day planning indicates that terminal frontage should provide adequate sidewalk, preferably covered, that borders the terminal and road system with adjacent paved areas to permit vehicles to offload or load passengers. Terminal access frontage is needed to serve both deplaning and arriving passengers in a manner that ensures that these simultaneous activities do not produce traffic conflicts. To avoid congestion at the terminal, the two areas and functions should be separated vertically in respect to their arrangements and relationships to the terminal building. As reported in the *Combined Terminals 5 and 6 Preliminary Frontage, Intersection Capacity and Parking Analyses* report (Basilio-Avadhani Associates 2000) prepared for this project, an estimated 2,837 linear feet of curb frontage is needed. The arrival curb requires 1,327 feet of frontage and the departure curb 1,510 feet.

The Proposed Project would meet these needs by providing access to the AirTrain, a roadway system that would meet peak hour demand, and a bilevel roadway system that would provide sufficient terminal frontage to meet the needs of arriving and departing passengers.

2.2.6 Need to Improve Parking Facility Level of Service

The Port Authority recently embarked on a major program to improve customer satisfaction with its airports. As part of that effort, it hired JD Power & Associates to survey customer likes and dislikes and to provide guidance and suggestions on improvements that would increase customer satisfaction. One comment that customers repeatedly made in surveys and focus groups is their preference for covered parking facilities adjacent to passenger terminals. The Port Authority recently conducted a series of comprehensive customer surveys associated with parking at its airports. The Port Authority concluded that customer satisfaction with parking facilities at JFK is near the bottom of all airports surveyed. In response to customer feedback and airport surveys, the Port Authority concluded that, where possible, parking garages should be constructed adjacent to passenger terminals to provide airport customers with the highest level of customer service.

The proposed multistory parking structure with 1,500 spaces for the Terminal 5/6 Redevelopment Project, including a passenger connector linking the parking structure to the terminals, will address that need. The project will include modifications to the terminal access roadways and the addition of parking entrances and exit revenue control plazas from the parking structure. The purpose of constructing the parking lot is to enhance customer service and to provide airport patrons with the efficient parking facilities that they expect and desire. Construction of the parking facility is not intended to expand parking capacity airport-wide. As a result of constructing the parking garage, it is expected that nearby terminal covered parking will be the first choice of the segment of the traveling public that arrives by automobile, while remote long-term lots will experience less demand.

2.2.7 Need to Restore and Rehabilitate the TWA Terminal

There is a need to restore and rehabilitate the TWA Terminal. The terminal is unoccupied and has not operated adequately as a terminal for many years. In the time since it was vacated by American Airlines, no airlines have used the terminal, either temporarily or permanently, and it appears to be the least desirable of all terminals at JFK from an operational standpoint. Therefore, unless demand were to saturate other terminals in the CTA or an substantial emergency were to occur at another terminal, requiring that an airline temporarily relocate, the TWA Terminal would not be returned to use as a terminal. A lengthened period of inactivity in or at the TWA Terminal would not be beneficial to the structure. The Port Authority has committed to a maintenance plan that will prevent deterioration, but restoration would not be practical under this alternative in the absence of an identified use for the structure. Incompatible structures added since the original construction continues to adversely affect the historic resource.

The Proposed Project will provide for the restoration and rehabilitation of Terminal 5 through an adaptive reuse program. It is proposed that the appropriate adaptive reuse of the main Terminal 5 building and the connector tubes will be determined through a Request for Proposal document to be issued by the Port Authority. This approach would minimize impacts on the historic setting, minimize the extent of demolition and other impacts on significant historic structures, and maximize the potential for restoration of historic resources and improvement of the site.

2.3 Additional Benefits of the Proposed Project

2.3.1 Economic Importance of a Low-Fare Carrier to the Regional Economy

The New York City metropolitan region has 18 million residents and is the largest travel market in the nation. New York consistently ranks in the top busiest city market pairs in the country. Nevertheless, the cost of airfare to the consumer is substantially greater in many of those markets than for the country as a whole. The Proposed Project would enable JetBlue, a low-fare air carrier, to maintain and grow its presence at JFK in a modern, efficient facility.

The benefits to the regional economy of continuing low-fare service are well documented. In its report on low-cost airline service (USDOT 1996), the U.S. Department of Transportation examined the effects of low-fare service on efficiency, competition, and industry structure. The study notes that passengers all across the country now benefit from the availability of low-cost service, with consumer savings estimated at $6.3 billion annually. However, the study reported that fare premiums are quite high and are increasing at network hub cities where low-cost carriers do not compete. The study points out that "Low fare stimulated demand has very positive implications for the airline industry labor force, and *promotes substantial economic growth to the benefit of consumers, local communities, travel related industries, and the aerospace industry*" (emphasis added). The study also states, "Communities should consider not just the fare consequences for passengers traveling to and from the cities, but the potential economic consequences of low-fare service. We have not attempted here to quantify the potential economic gains for communities, but the multiplier effect of 4 million new passengers a year at Salt Lake City, for example, is clearly enormous. All this suggests that communities that have little or no service by low-cost carriers should actively seek such service."[1] The Proposed Project would help to provide economic benefits needed by communities in the JFK region.

2.3.2 The Airport's Role as a Major Employment Center

The airport plays an important role in the regional economy. The Port Authority's *2000 Airport Traffic Report* provides a 13-year history of airport employment at the three commercial passenger airports (JFK, LaGuardia, Newark International). JFK is the largest employer of the three, having a reported workforce of 37,365 in 2000, or 52 percent of the combined employment at the three airports. This is a reduction from the period of 1984 to 1991, when employment exceeded 40,000 workers and reached as high as 46,000 in one year.

In 2000, workers at JFK received an estimated $2 billion in payroll, and the three airports combined accounted for more than $3.6 billion that year. The importance of aviation employment in the metropolitan region's economy is self-evident. Job creation afforded by the Proposed Project would support aviation's solid performance as a major employment sector, providing an important foundation for the regional economy and its growth.

[1] This quotation refers the success of Morris Air, which operated as a successful low-fare carrier in the Salt Lake City area from 1992 to 1995. Morris Air's president during that time was JetBlue's Chief Executive Officer, David Neeleman.

3 Alternatives

3.1 Overview

This section of the *EA* discusses the wide range of alternatives considered as the means of meeting the needs described in detail in Section 2, and the process conducted in arriving at the preferred alternative for the Proposed Project. The No Action Alternative would not meet the stated needs but must be considered in the *EA* [40 CFR 1502.14(d)]. In addition, other alternatives are described that were considered but rejected from further detailed environmental analysis because they would not be feasible or would not meet the purpose and need for the project.

3.1.1 Approach to Analysis of Alternatives

The approach to the analysis of alternatives was to consider all reasonable possibilities that might be applicable to satisfying the objectives and requirements described in Section 2, *Purpose and Need*. The analysis included:

- Consideration of constructing terminal facilities at other locations;
- Taking no action by doing nothing in the way of improving the terminal area and using the existing terminal as currently configured; and
- Constructing alternative terminal redevelopment or new development configurations at the Terminal 5/6 site.

These alternatives were evaluated to determine whether they would be feasible or prudent from a technical standpoint and also to determine whether they would meet the needs established for this project. The alternatives were refined until an alternative was identified that would satisfy the project purpose and each of the project needs, and would be feasible and prudent. The alternatives considered are described in Section 3.2. The alternative that would best meet the project purpose and needs, would be prudent and feasible, and would minimize harm (refer to Section 5.8, *Historic Architectural, Archeological, and Cultural Resources* and Appendix A *Section 4(f) Evaluation for the Terminal 5/6 Redevelopment at JFK*) was selected as the preferred alternative for the Proposed Project.

3.1.2 Evaluation Criteria

The criteria used to judge the prudence and feasibility of each alternative are based on the project's purpose and need:

1. **Efficient use of aviation capacity with a flexible terminal design to accommodate a variety of aircraft.** The alternative must provide sufficient aircraft gates, consistent with forecast demand, and efficient and safe moving and servicing of aircraft. Proper use of the site ultimately will determine how efficient an airline can operate and, in turn, the level of passenger service it can provide and the profitability of its operation. Having aircraft on the ground and waiting for terminal gates to become available is a great

detriment to service and operational efficiency. Congestion between taxiing aircraft and ground service equipment (such as baggage loaders, fuel trucks, etc) is undesirable. The alternative must provide a balance between airside ramp and terminal sizing and be configured to ensure ease of aircraft maneuvering. It must link with other development within the CTA to decrease passenger connection times and increase passenger convenience. A flexible design is important so the site can accommodate a range of aircraft of various wingspans, particularly Group III through V aircraft, within each concourse, depending on market needs, while maintaining a high level of service that responds to changing demands over time.

2. **Modern terminal that promotes airline competition and complies with ADA.** The alternative must enable airlines to be viable and competitive in the marketplace. To be competitive, airlines must be able to reach out to all passengers, including those covered by the ADA. The alternative should provide modern building systems and designs that provide convenience and comfort and protect passengers from inclement weather.

3. **Facilities with adequate level of service within a responsive timeframe.** The alternative must provide a terminal configuration that maximizes contact aircraft gate positions, minimizes walking distance, and provides the functionally-required building area for passenger processing, baggage claim, Federal Inspection Services facilities, holdrooms, and concessions. Adequate area for support facilities, passenger queuing, and circulation also is necessary to provide quality passenger services. There is a need for a terminal design that enables construction to be conducted quickly and efficiently in order to maintain adequate service in response to changing market demands. The planning, development, and construction of modern air terminals is a time-critical and time-consuming process. As demand for aviation services is projected to increase over the next ten years, work must begin now for the planning, design, and construction of a new reconfigured Terminal 5/6 site.

4. **Space to meet updated security requirements.** The alternative must have sufficient space to enable the terminal to meet the latest security requirements of the Transportation Security Administration, including explosive baggage screening, vehicle searches, and other measures to eliminate threats to aviation facilities and users. The terminal also must accommodate passengers in the event of emergencies that require evacuation from one area of a terminal to another.

5. **Sufficient landside access.** The alternative must provide the proper number of lanes in a well-designed roadway configuration that assures efficient delivery and pickup of passengers. Providing adequate curb frontage for passenger loading and unloading is necessary for the quick delivery of passengers to and from the terminal.

6. **Improved parking level of service.** The alternative must enhance customer service and provide airport patrons with the efficient parking facilities that are required to service the demand for parking adjacent to terminal buildings.

7. **Rehabilitation and restoration of the TWA Terminal.** The alternative must preserve the TWA Terminal, comply with Section 4(f) of the Department of Transportation Act of 1966, minimize impacts to the building, minimize the extent of demolition and other

impacts on significant historic structures, and maximize the potential for rehabilitation and restoration of historic resources and improvement of the site.

3.1.3 Terminal Deficiencies and Improvements Needed

The purpose of the Proposed Project is to redevelop the Terminal 5/6 site to include a new airline terminal and to provide improved facilities and services, including parking, for the safety, comfort, and convenience of passengers traveling through Terminals 5 and 6 at JFK. There are nine airline passenger terminals at JFK. Most have been and are continuing to undergo reconstruction as a result of the Port Authority's efforts to better serve the needs of the traveling public using the airport. Terminal 1 was reconstructed and reopened in 1998. Delta's plans to upgrade and renovate Terminals 2 and 3 have been developed. Redeveloped Terminal 4 was opened in May 2001. Terminal 7 (British Airways) has undergone reconstruction. Terminals 8 and 9 are being demolished and replaced with a single terminal. This redevelopment project is under construction with completion scheduled for 2007. Each of these terminals in the CTA has suffered from age and deterioration, and all have undergone redevelopment or are programmed for improvements except Terminals 5 and 6. Terminals 5 and 6 are more than 40 years old and inadequate by today's standards for passenger facilities and airline efficiency.

The Port Authority has determined that the best way it is going to meet projected aviation growth, its customers service needs, and provide a satisfactory level of comfort and convenience in Terminals 5 and 6 is to undertake a construction program similar to those at other terminals in the CTA. The Terminal 5/6 site must be redeveloped to overcome deficiencies in infrastructure and building systems, aircraft and terminal compatibility requirements, and passenger safety, comfort, and handicap compliance needs.

3.2 Alternatives Considered and Development of a Preferred Alternative

The following subsections describe and evaluate the alternatives that were considered. The Port Authority reviewed and considered more than twelve alternatives for this Proposed Project. The basic types of alternatives considered, based on the need to meet projected growth in aviation demand, are constructing terminal facilities at another location, taking No Action, and constructing alternative terminal configurations. Both the Port Authority and the Municipal Art Society of New York, one of several consulting parties interested in preservation of the site's historical resources as described in Section 1 *Introduction and Background*, generated the alternative terminal configurations that are evaluated in detail. Two other alternatives were received in response to the Port Authority's Solicitation of Interest (SOI) for a Request for Proposals for the restoration, rehabilitation and adaptive reuse of the main TWA Terminal building and the connector tubes (see the Executive Summary, Section 3.2.4, and Section 6.4 for a description of the SOI). One of the two alternatives, submitted by LCOR on January 31, 2002, called for the adaptive reuse of the TWA Terminal as a hotel lobby/meeting center with restaurants. The other LCOR alternative keeps the original function as an airline terminal and is similar to Alternative 12, which is analyzed in this chapter and in the *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK* (Appendix A). An additional alternative was submitted by the

Municipal Art Society of New York as part of their July 29, 2003 comment letter on the June 2003 *Draft EA;* that comment letter refers to it as Alternative 13. That alternative was discussed in the subsequent September 2003 process meetings described below.

The preferred alternative (Alternative 7A) was developed as the result of the meetings and additional consultation held in September 2003 as part of the process to comply with Section 106 of the National Historic Preservation Act, which culminated in the Port Authority report of October 10, 2003 to the FAA (Attachment C of the MOA – see Appendix D *Memorandum of Agreement*). All consulting parties were invited to participate in these meetings. Of the consulting parties, JetBlue Airways, the intended primary tenant of the new terminal, the Port Authority, the Municipal Art Society of New York, the New York State Historic Preservation Officer (SHPO), the New York Landmarks Conservancy and the New York Building Congress attended these meetings and participated heavily in development of the preferred alternative. The preferred alternative (Alternative 7A) was developed with a high level of sensitivity to the concerns and issues raised during the entire public process, taking into account comment received from the public and the consulting parties.

In addition to the redevelopment of the airline terminals, the project also includes a parking facility to service the redeveloped terminal complex. Several parking alternatives were developed and evaluated (see below). The selected parking alternative is a part of each of the 12 terminal alternatives.

Other components of the project would occur under all of the alternatives, except the No Action alternative. These components are the demolition of three airport support structures (Buildings 296, 295, and 164). The TWA Ground Support Building (Building 296) provided ground service equipment support, commissary stores, aircraft and ground support equipment (GSE) parts storage, a triturator (grinding machine for wastewater), and deicing product dispensing to Terminal 5. These functions will be incorporated into the new terminal. Switch House #1 (Building 295) will be relocated to the island area surrounded by the restricted service road as well as Taxiways Alpha and Kilo. This is near the intersections of Runways 4L/22R and 13R/31L. In addition, a small ramp equipment storage building (Building 164) will be demolished and its function will be subsumed into the new terminal.

3.2.1 Alternative Found Not to Be Feasible: Construction of Terminal Facilities at Another Location

An alternative that has been found to be not feasible is to locate the current and future operations of airlines that are now at the Terminal 5/6 site, including JetBlue, in a different terminal in new facilities built in another part of the airport. No facilities or available area of suitable size for the airlines' needs exist in the CTA. As noted, each terminal in the CTA, with the exception of Terminals 5 and 6, has undergone or is now undergoing improvements at costs involving billions of dollars. The airlines housed in those facilities and underwriting the terminal improvement costs have committed to leases and integrated operational considerations tailored to meet their respective long-term financial and operational needs. Sharing those facilities with a competitor airline, and providing terminal and apron sizing required to meet its competitors specific needs, is not efficient and typically not possible or practical. For example, Terminal 4 is designed and constructed with capacity intended to meet the existing and future demands of international activity. Significant investment in the

construction of Federal Inspection Services, including customs, immigration, sterile corridors, oversized baggage carousels etc makes this terminal inappropriate for long term use by a primarily domestic carrier. The role of Terminal 4 is to accommodate the large contingent of International carriers that utilize JFK.

Seeking a stand-alone terminal located in another part of the airport other than the CTA in which to conduct expanded airline operations is impractical, imprudent, and does not meet the project purpose and needs. Limitations in available site sizes rendered the alternative not feasible. JetBlue considered the option of building a new terminal near Hangar 12 outside the CTA. This option was rejected as the location was too far from the CTA and the AirTrain to meet the operational needs of the airline. It also failed on the basis of cost, and the lack of proximity to and association with the other passenger processing areas of the airport.

As with most other areas on the airport, extensive demolition would be required at this location to prepare the site for terminal or other use. A completely new terminal building would be necessary, along with its associated aircraft parking apron, onsite access roads, parking, and additional infrastructure. In addition, access to the airfield at the Hangar 12 site is more restricted than within the CTA, which has direct access to a dual parallel taxiway system. As Runway 13R is an often-used departure runway for which long queues develop, siting a passenger terminal in this area could exacerbate the already significant delay problem at JFK. Attempting to provide service from the other terminals or from an outlying location with a new terminal lacks any distinct advantages for airside operations or customer service that are not already incorporated into the design and location of a redeveloped Terminal 5/6 site. No environmental benefits or reduction in impacts would occur from similar construction farther from the center of the airport. Therefore, it is not reasonable to pursue other alternative locations for detailed analysis.

3.2.2. Parking Garage Alternatives

The Port Authority recently embarked on a major program to improve customer satisfaction with its airports. As part of that effort, it hired JD Power & Associates to survey customer likes and dislikes and to provide guidance and suggestions on improvements that would increase customer satisfaction. One comment that customers repeatedly made in surveys and focus groups is their preference for covered parking facilities adjacent to passenger terminals. The Port Authority recently conducted a series of comprehensive customer surveys associated with parking at its airports. JD Power & Associates concluded that customer satisfaction with parking facilities at JFK is near the bottom of all airports surveyed. In response to customer feedback and airport surveys, the Port Authority concluded that, where possible, parking garages should be constructed adjacent to passenger terminals to provide airport customers with the highest level of customer service.

The No Action Alternative and three individual alternatives were considered to meet the parking garage needs described in Section 2, *Purpose and Need*. These alternatives and their ability to meet the parking garage purpose and needs are described herein.

3.2.2.1 Parking Garage No Action Alternative

The No Action Alternative would retain the existing uncovered ground level parking lot in its existing condition. This alternative is not feasible because it does not meet the Port Authority's need for 1,500 parking spaces. As demand increases, passengers would be subjected to an

increasingly reduced level of service due to the predicted growth in passenger volumes. This alternative does not meet the sponsor's need to improve customer level of service, or the customers' preference for covered parking adjacent to terminals. Extensive traffic congestion and delays would be observed in terms of illegal parking in restricted parking areas, redundant traffic circulation within the lot, and impedances to efficient traffic flow within the aisles. Retention of the existing condition would result in reduced customer service as aviation demand increases.

3.2.2.2 Parking Garage Alternative 1

This alternative would retain the existing ground level lot and add customer amenities such as E-Z Pass (an electronic payment system) and covered parking. This alternative was rejected as the existing lot has only approximately 349 spaces, which is insufficient to meet the needed design capacity, and customers would be forced to cross access roadways at grade to enter the terminal, which causes a less than desirable level of safety.

3.2.2.3 Parking Garage Alternative 2

This alternative would entail constructing a parking garage in the long-term parking area. This alternative does not meet the project purpose because short-term travelers and meeters/greeters seek the convenience of parking close to the terminal. Requiring customers to park a significant distance from the terminal would be an unacceptable inconvenience.

3.2.2.4 Parking Garage Alternative 3 (Preferred Parking Garage Alternative)

This alternative consists of constructing a 1,500 space parking garage adjacent to the AirTrain station (Figure 3.2-1). This alternative meets the need to provide a high level of customer service to patrons of JFK Airport and is feasible to construct within the loop of the AirTrain, on the site of the existing Orange daily parking lot. The proposed garage would contain four levels. The proposed parking structure will contain approximately 1,500 spaces. The parking structure will include a direct structural connection to the adjacent AirTrain station rotunda and to the new terminal.

The garage will replace 349 spaces in the Orange daily parking lot. The Port Authority expects that the overall impact of the garage project on the parking supply at the Airport will be to replace parking spaces lost within the CTA as a result of various roadway, AirTrain, and other construction projects, and a slight reduction in parking levels in long term lots, given the availability of parking directly adjacent to the terminal.

3.2.3 Terminal Redevelopment Alternatives

The redevelopment alternatives are described here and in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*. A conceptual layout is provided for each alternative. The alternatives are evaluated for prudence and feasibility, ability to meet the project purpose and needs, advantages and disadvantages, and adverse or beneficial effect on the historic resource. Each alternative except Alternative 1—No Action includes the parking garage described in Section 3.2.2.4.

3.2.3.1 Alternative 1—No Action

The No Action Alternative (Figure 5 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*) would entail no replacement or redevelopment of Terminals 5 and 6, aircraft parking and maneuvering areas, and associated access roadway and parking needs. It would involve neither demolition nor new construction. At Terminal 5, the TWA Terminal, flight wings, and connector tubes would not be modified. Existing structures that are incompatible with the original design of the TWA Terminal would remain adjacent to the terminal. No changes in roadway access would be made, and no parking structure would be constructed. There would be no additional public access to the TWA Terminal. Restoration and rehabilitation would not be undertaken.

The advantage of this alternative is that any impact to the TWA Terminal, and construction of new facilities adjacent to it, would be avoided. The disadvantages are numerous and severe. If No Action were chosen and TWA Terminal were to be used as an airline terminal, the imbalance between apron and terminal sizing would remain, and aircraft movement in nearby apron areas would become increasingly congested due to the awkward terminal configuration. Passenger levels of service and roadway access needs would not be met because there would be no improvement to the operational deficiencies inherent in the 1950s design of the original terminal: insufficient space for ticketing, baggage, concessions, and other functions, limited frontage with a single level roadway, and a congested roadway access system. The need to meet security requirements and to improve the parking level of service would not be met. The airlines' need for a competitive terminal would not be met since the terminal would not comply with the ADA; nor would it have modern building systems, adequate weather protection, and facilities to enhance passenger comfort and convenience.

The aircraft apron adjacent to Terminals 5 and 6 would remain congested for aircraft movement and become even more so over time as additional flights and possibly larger aircraft require service at the gates. Eventually, passenger air service would be curtailed as a result of the lack of any facility improvements for aircraft maneuvering and parking. The No Action Alternative would fail to provide the level of passenger service expected by the Port Authority and demanded by airlines and their customers. The congestion associated with increased passenger activity would continue to increase until facilities reached their maximum processing and holding capacities, after which they would remain at congested levels and thereby curtail passenger activity.

Existing environmental impacts would continue with the No Action Alternative. Air quality would likely degrade further as a result of road congestion and the lack of adequate parking resulting in increased idling and recirculation of automobiles, and less efficient aircraft taxiing to the gates. As demand increases beyond the existing gate capacity, additional apron hardstands might be considered, which would require bussing of passengers and additional adverse air quality impacts. The lack of improvements to these terminals would result in the reduced ability of their tenants to compete with other airlines in the CTA, which are all operating out of terminals that have been redeveloped or planning redevelopment projects.

EXEMPTION (4) – DRAWINGS OF NON-PUBLIC AREAS

The TWA Terminal has been unoccupied since January 2002 and had not operated adequately as a terminal for many years before then. In the time since it was abandoned by American Airlines (which took over TWA), no airlines have come forth to use the terminal exclusively for its operations, either temporarily or permanently, and is the least desirable of all terminals at JFK from an operational and customer service point of view. The Port Authority has committed to a maintenance plan that will prevent deterioration of the building, but restoration/rehabilitation would not be practical and would not occur in the absence of an identified adaptive reuse for the structure. Incompatible structures added since the original construction would continue to affect the historic resource adversely. Thus, the No Action Alternative would not meet the purpose and needs for which the project was established.

3.2.3.2 Alternative Terminal Configurations

Various terminal configurations and concept plans have been developed and considered for redeveloping Terminals 5 and 6. The Port Authority has developed Alternatives 1 through 7. These alternatives are described in more detail in the *Concept Master Plan* (Port Authority July 2000, amended February 2001). Alternative 7 retains the full length of the connector tubes, in direct response to public input about the historic resource. Alternatives 8 through 12 were submitted by MAS, and retain the use of the main TWA Terminal building solely for airline operations.

Alternative 7A was the result of additional consultations with the consulting parties and is the preferred alternative for the Proposed Project. Alternative 7A retains the full length of both tubes, includes restoration and rehabilitation of the East Tube, and describes for the West Tube a hierarchy of options to be investigated as part of the design for the new terminal. This alternative is the result of input from the consulting parties to the Section 106 process and provides for the adaptive reuse of the TWA Terminal, and for e-ticketing kiosks for passengers without baggage who choose to enter the new terminal through the TWA Terminal and connector tubes. It also will provide enhanced public access to the TWA Terminal from AirTrain, the CTA roadway system, and the new terminal.

The alternatives have been evaluated in this section of the *EA* and in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK.*

Fundamental Concepts for Terminal Design. The type of terminal that would best meet the project needs was chosen based on fundamental terminal design concepts. The fundamental concepts for terminal designs are (1) linear terminals, where gates are provided across the face of the terminal building; (2) satellites, where arrival/departure buildings are separated from the terminal and surrounded by aircraft; (3) the transporter concept, in which passengers are transported by bus from a terminal to remote aircraft; and (4) pier concepts, where aircraft park at concourses extending from a main terminal building. To meet the needs of the project, these alternate schemes would need to preserve the TWA Terminal and satisfy three basic components of terminal design: 1) aircraft parking, maneuvering, and servicing; 2) terminal area sizing and configuration; and 3) roadway capacity and curb frontage. The major features and advantages of the four configuration schemes relative to these factors are summarized below.

The initial screening of alternatives must consider the type and volume of passenger and aircraft activity at the terminals. Most apparent in any terminal configuration is the requirement for consolidated terminal and airside operations that permit transfer of passengers between as many as 10 or more aircraft of various sizes in a short time frame so as to allow for maximum use of gates, aircraft, and airline personnel. The first concept, the linear concept, was removed from further consideration as the preferred alternative because of the extensive amount of building frontage required for each parked aircraft and the walking distances required of passengers when changing airplanes. It also makes less advantageous use of apron areas for aircraft parking and maneuvering. The second concept, the satellite concept, was also removed from further consideration as the preferred alternative because of the expense to provide underground connections between the terminal, the remote satellite terminals, and the amount of disruption caused in trying to construct buildings and underground connections in an operating airport environment. It is also very costly because of greater improvement needs and requirements for construction staging, and because it disrupts operations at an unacceptable level. The third concept is the transporter concept, in which manned or unmanned vehicles (such as an underground train or an above ground mobile lounger) are used to move people between terminals. The transporter concept carries a substantial expense for equipment and labor. It also requires carefully coordinated aircraft scheduling, as the use of transporters involves additional passenger connecting time and more traveler assistance. It was found to not meet the project purpose and need. The fourth concept, the pier concept, provides the highest number of aircraft parking positions for the amount of apron and building space required and allows effective use of aircraft and employees with the least confusion for passengers.

For these reasons, the pier configuration was identified as the most effective use of the space now occupied by Terminals 5 and 6 as evidenced in the Proposed Project (see Alternative 7A below). The geometry required to accommodate the terminal building, several piers, landside access, and the apron associated with aircraft maneuvering space dictates the design proposed for development. While there may be opportunities to provide minor variations in the layout of the terminal areas, the basic spacing is prescribed due to the limited amount of apron area on one side of any terminal footprint and the confines of the access roadways on the other side.

Alternative Configurations Developed by Port Authority. Alternatives 2 through 7 represent the evolution of the pier terminal concepts that have been developed by the Port Authority and refined in response to public input. Alternative 7A is the result of additional consultation and alternative analysis conducted by the Port Authority and the consulting parties as described in the Port Authority's October 10, 2003 report to FAA (Attachment C of the MOA – see Appendix D *Memorandum of Agreement*).

Alternative 2—Demolition or Relocation. Alternative 2 (Figure 6 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*) would remove both Terminals 5 and 6 in their entirety, and a new terminal would be constructed using the entire Terminal 5/6 area. The terminal could be designed without the site restrictions caused by full or partial retention of the TWA Terminal. The greatest potential use of the airside could be achieved with as many as 58 gate positions, including hardstand (or remote aircraft loading) accommodation.

Alternative 2 would cause adverse impacts to historic resources since the portions of the site eligible for listing on the National Register (the TWA Terminal, connector tubes, and Flight Wing 2) would be demolished or removed. Demolition of the buildings (Alternative 2A) would result in the entire loss of a significant architectural landmark. Although feasible, this alternative would not be prudent since the TWA Terminal can be preserved under other alternatives. The terminal could be relocated to a new site (Alternative 2B), but that that would be infeasible for several reasons. Although structures as large as the TWA Terminal have been relocated, they must be moved in multiple pieces. The thin-shell dome structure may not survive separation without significant damage and possible collapse. Additionally, the terminal is landlocked; there is no feasible airside move route to the waterfront without major disruption of airport operations. A landside move also is not possible because of the AirTrain and access roads blocking any potential route. Both alternatives would meet most of the needs for which the project was established but not the need to preserve the TWA Terminal.

Alternative 3—Internal Loop Roadway. Alternative 3 (Figure 7 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*) proposes a new terminal structure constructed on the airside of the TWA Terminal. Flight Wing 2 and its connector tube (the East Tube) would be retained corresponding to the 1962 terminal plan, but Flight Wing 1 and its connector tube (the West Tube) would be demolished. A link would be provided between one of the existing gate lounges and the new terminal. The plan would provide 31 aircraft gates, 2 of which would be provided in Flight Wing 2 and accessed from the new structure.

Alternative 3 would cause adverse impacts to historic resources because the West Tube connecting to Flight Wing 1 would be demolished. It would be neither prudent nor feasible for several reasons. Since Alternative 3 would provide only 31 of 51 gates potentially available, it would not efficiently use the airside potential of the site. The original Terminal 5 would not adequately serve the gates in Flight Wing 2 in the areas of passenger service, security and ADA requirements. The loop roadway configuration would be nonfunctional since it would be unable to achieve the minimum grades to transition to a bilevel system. The tight turning radius required to retain Flight Wing 2 would not meet industry-wide accepted traffic planning standards. The 1,100 feet per level of curb frontage would be inadequate to support a new terminal of this size (Basilio-Avadhani Associates 2000). For these reasons, Alternative 3 would not be feasible or prudent and would not meet the purpose and needs for which the project was established.

Alternative 4—Perimeter Roadway. Alternative 4 (Figure 8 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*) would retain the main TWA Terminal building, both connectors, and Flight Wing 2. This plan proposes an adaptive reuse for the original TWA Terminal. It would provide 34 gates, including hardstands. A bilevel roadway system would provide 1,500 feet per level of curb frontage.

Alternative 4 would adversely affect historic resources because the new construction would block the airside view from the Saarinen-designed TWA Terminal, and the original use of the land as an airline terminal would be discontinued. It would not meet the project purpose and need because it would provide only 34 of 51 gates potentially available. Therefore, it would not efficiently use the airside potential of the site, the major need for which the project was established. An advantage of Alternative 4 is that it would provide a good

balance between the airside development and the landside (terminal and roadway) capacities, which would enable the other project needs to be met.

Alternative 5—Roadway Over and Under Tubes. Alternative 5 (Figure 9 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*) would locate most of the new terminal on the northern part of the Terminal 5/6 site and provide 29 gates. The main TWA Terminal building, Flight Wing 2, and its connector tube (the East Tube) would remain, for restoration and adaptive reuse.

Alternative 5 would adversely affect the historic resources because views of the airfield from the northern side of the TWA Terminal would be eliminated, all views from the terminal would be degraded by the departures roadway, and the original uses of this land would be discontinued. The alternative would not be prudent for several reasons. Only 29 gates can be furnished, and the ramp area would be greatly underused. The bilevel roadway would have an inadequate 1,000 feet of curb frontage per level (Basilio-Avadhani Associates 2000), and so there would be an unsatisfactory balance between airside activity and landside development. For these reasons, Alternative 5 would not meet the purpose and needs for which the project was established.

Alternative 6—Semicircular Roadway. Alternative 6 (Figure 10 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*), a precursor to Alternative 7, would include restoration and adaptive reuse of the main TWA Terminal structure. Alternative 6 would locate the new terminal in a semicircular form wrapping around the airside of the main TWA Terminal building. A two-level roadway would follow the curve of the new structure and provide 1,500 feet of curbside on each level of the terminal. This alternative would take full advantage of the large airside area to provide 52 gates. The main TWA Terminal building and roughly one-third of each connector tube would be retained. The tubes would be partially removed to allow construction of the bilevel roadway. The tubes would terminate in a new vertical circulation structure, allowing access to grade along the edge of the roadway. Both flight wings would be demolished to construct the new terminal. This alternative was modified on the basis of public input that led to a refinement, Alternative 7.

This alternative would cause adverse impacts to historic resources since views of the airfield from the northern side of the TWA Terminal would be eliminated; the new terminal would visually overwhelm the TWA Terminal; Flight Wing 2 and a major part of both connector tubes would be demolished; and the original uses of the land would be discontinued. Though feasible, it would not be prudent because another alternative exists that would reduce visual and physical impacts to these resources. Advantages of Alternative 6 include the good balance between landside and airside development, optimization of the ramp area, and the numerous gate positions. It also would provide the potential for aesthetic and functional improvements to be made in the small open space area that would be created between the airside of the TWA Terminal and the landside of the new terminal. Disadvantages relate primarily to the negative effect on historic resources. The new structure would be located close to the landmark, with the highest parts of the proposed building closest to the TWA Terminal. This approach would visually overwhelm the TWA Terminal from the perspective of viewers on the landside of the structure and from within the TWA Terminal. The original use of the connector tubes would be eliminated, since the tubes would be partially demolished and would not connect directly

to another building. Thus Alternative 6 would not meet the purpose and needs for which the project was established.

Alternative 7—Bilevel Shifted Roadway. Alternative 7 (Figure 11 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*) is similar to Alternative 6 with two differences. First, the semicircular form of the new terminal would be located farther from the TWA Terminal. This modification would reduce the tendency of the new terminal to visually overwhelm the landmark building and will provide broader public access to the back view of the Saarinen-designed building. The Saarinen-designed building will now be accessible to the public at large, and not limited to the passengers of the Terminal 5/6 airline tenants. The expansive area between the buildings would be developed into a large-scale public plaza. Second, the bilevel departures roadway would be shifted away from the TWA Terminal and into the new terminal. The arrivals roadway would be set 4 feet below grade within waterproof bulkheads to resist the high water table and to fit below the connector tubes. The roadway configuration allows the entire length of the connector tubes to be retained and to connect directly to the new arrivals hall.

This alternative addresses the airport's needs, which are articulated within Section 2, *Purpose and Need* of this document. By fully utilizing the available aeronautical area and by providing adequate taxi-lane separation for all aircraft types, Alternative 7 makes efficient use of the site and provides the flexibility to handle a variety of different aircraft. Alternative 7 would enable the Port Authority to meet or exceed the latest standards for passenger convenience, efficient operation, and disability accommodation. The level of service will be dramatically improved, as the existing terminals are inadequate and the terminal complex in this alternative will be developed and sized to meet the demand expected to develop at JFK over the next 10 years and be consistent with modern airside requirements FAA Advisory Circular 150/5300-13, *Airport Design* (September 1989), and modern terminal planning criteria FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities* (April 2, 1988).

This alternative provides the ability to meet current security requirements (49 CFR Chapter XII, Part 1542), and the provides flexibility for future additional requirements. Airports around the country are facing enormous difficulty in accommodating the latest in security technologies and requirements within terminal buildings that were designed and constructed only a few years ago. As the existing Terminals 5 and 6 were designed and constructed over 40 years ago, during a different era of aviation, the ability to retrofit these buildings for new security requirements, while maintaining some reasonable level of service, is not feasible.

Access is a critical component of any airport development project and landside access to the existing terminals is lacking. Existing Terminal 5 has a frontage of 455 linear feet for departures and 265 linear feet for arrivals. However, this design is inefficient as the departure and arrival frontages are all on one level with arrivals on an inner roadway and departures on an outer roadway with an island separating the two. This arrangement requires departing passengers to walk across the arrival roadway to reach the terminal. Terminal 6 has separate roadways for arrivals and departures with curb frontages directly adjacent to the terminal; total frontage for this terminal is 873 linear feet. This alternative doubles the existing available departures and arrivals frontage to 3000 linear feet, to meet the project need of 2,837 feet (Section 2.11, *Purpose and Need*). In addition, all frontage will have direct access to curbside

and there will be no need to walk across traffic lanes to access the terminal, as currently exists at Terminal 5.

As described earlier, a 1,500-space garage will be constructed as part of any terminal alternative. Figure 11 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK,* shows the parking garage with Alternative 7. The proposed parking garage structure associated with Alternative 7 will be located approximately 10 to 20 feet from the AirTrain Guideway within the footprint of the current open area parking lot. The roof parking level of the proposed garage is roughly the same elevation as the top of the AirTrain Rotunda. An evaluation of the impact of the AirTrain structure on Terminal 5 which was conducted as part of the JFK light rail system project *Final Environmental Impact Statement, JFK International Airport Light Rail System* (Port Authority, May 1997) concluded that the AirTrain structures, as designed, would have no adverse effect on the historic character of Terminal 5. Given that the parking garage is contained within the Guideway, is partially blocked by the AirTrain, is no higher than the AirTrain Rotunda, and is further away from the Terminal 5 than the AirTrain structure, there will be no adverse effect of the parking structure on Terminal 5.

This alternative would be both prudent and feasible. However, it would cause adverse impacts to historic resources since views of the airfield from the TWA Terminal would be eliminated, Flight Wing 2 would be demolished, and the original use of this land would be discontinued. An advantage of this alternative is that locating the departures roadway further to the airside lowers the profile of the terminal facing the Saarinen-designed TWA Terminal, thus reducing the perception of bulk. Another is the full use of the airside potential of the Terminal 5/6 site while retaining the main TWA Terminal building and the connector tubes in their entirety. A total of 51 gates, including hardstands, a good balance of airside/landside development, and adequate curb frontage, would be provided. Like Alternative 6, Alternative 7 would allow restoration and adaptive reuse of the Saarinen-designed TWA building. Its direct connection to the new terminal would reinforce the building's new use. An attractive public plaza could be developed in the space between the terminals and the recessed arrivals roadway that would have less impact on the plaza than an at-grade road. Alternative 7 would meet the purpose and needs for which the project was established.

Alternative 7A (Preferred Alternative for the Proposed Project)—Bilevel Shifted Roadway With Enhanced Access and Electronic Ticketing Kiosks.

This alternative (Figure 3.2-1) is the result of extended consultation and alternative analysis conducted by the Port Authority, interested consulting parties, and the SHPO in September 2003. The extended consultation resulted in the Port Authority's report of October 10, 2003 to the FAA (Attachment C of the MOA – see Appendix D *Memorandum of Agreement*). It is similar to Alternative 7 with the following improvements:

- Enhanced public access to the TWA Terminal through direct connection from the AirTrain to the main TWA Terminal building, through direct access to the main TWA Terminal building frontage via the roadway system, and from the new terminal through the connector tubes.
- Provision of electronic ticketing machines (kiosks) to be placed within the main TWA Terminal building for airline passengers with carry-on luggage only, who

choose to access the new terminal through the TWA Terminal and the connector tubes.

Alternative 7A would retain the full length of the East Tube. The main TWA Terminal building and the East Tube would, as a whole, be treated in accordance with the Secretary of the Interior Standards for the Treatment of Historic Properties – Rehabilitation. Structural modifications may be required to the columns of the East Tube. The existing façade, including the landside entrances and window walls, the airside window walls, the concrete roof shell, the lower and upper main lobby spaces and the Ambassador Club on the north mezzanine in the main TWA Terminal building interior would be restored in accordance with the Secretary of the Interior Standards for the Treatment of Historic Properties – Restoration.

As reflected in the Port Authority's October 10, 2003 report to the FAA (Attachment C of the MOA – see Appendix D *Memorandum of Agreement*) on the consulting process and the MOA, both Flight Wing 1 and Flight Wing 2 would be demolished. Reuse of two of the gate lounge "trumpets", as well as other architecturally significant elements as part of the new terminal concourse and gate holdroom area would be investigated. If feasible, all or part of the "trumpets" and their original interiors would be relocated and included as part of the new terminal concourse.

As also reflected in the Port Authority's October 10, 2003 report to the FAA (Attachment C of the MOA – see Appendix D *Memorandum of Agreement*) on the consulting process and the MOA, the West Tube may be modified in this Alternative. For this connector tube, a hierarchy of options would be investigated as part of the design for the new terminal. The first option would seek to adapt the existing configuration in a minimally intrusive manner to improve public access. If analysis finds this option to be infeasible, then a design for reconstructing the connecting walkway to incorporate a moving walkway system in a manner consistent with the original design will be undertaken. Should such an effort prove to be inconsistent with the objective, a contemporary and appropriate design will be constructed. Both tubes will provide public access between the rehabilitated/ restored main TWA Terminal building and the newly constructed terminal building.

Configurations That Retain the TWA Terminal Exclusively as an Airline Terminal. The following alternatives would retain the TWA Terminal's sole function as an airline terminal.

Alternative 8—Terminal Addition to North Side of TWA Terminal. Alternative 8 (Figure 12 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*) would maintain use of the TWA Terminal as an airline terminal. To do so, it would add a major new terminal structure to the north side of the existing TWA Terminal, extending along the same frontage road. The addition would contain 17 gates. Flight Wing 1 would be demolished, but its connecting tube (the West Tube) would remain with an undefined function. Flight Wing 2 and its connecting tube (the East Tube) would be retained. Extending from Flight Wing 2 would be a new 1,200-foot concourse added to the end of the eastern flight wing gate-lounge. Alternative 8 would provide a total of 46 gates including hardstands. As shown in Figure 12 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, most gates would be for smaller Group III aircraft, which would not serve the purpose and need of the Proposed Project. A new bilevel road system would place departures at-grade with the roadway and arrivals underground within a watertight bulkhead to resist the high

water table at JFK. The alternative would provide roughly 1,200 feet curbside frontage per level.

This alternative would not be prudent and would not meet the project purpose and need. It would cause adverse impacts to historic resources since views of the TWA Terminal would be affected by the large new terminal structure to be located adjacent and connected to its north side, and the original use of the connector tube to Flight 1 (the West Tube) would be discontinued. While an advantage of Alternative 8 is the retention of the historic structures and maintenance of their use, the West Tube would terminate in the ramp area without connecting to another building. Airfield views from the TWA Terminal would be maintained.

Alternative 8 would not be feasible because the original TWA Terminal would not adequately serve the gates in Flight Wing 2 in the areas of passenger service, baggage handling, security and ADA requirements. The 185,000-square-foot TWA Terminal would not be of adequate size to support the necessary number of loading positions. Alternative 8 does not meet the project purpose and need because it does not provide the flexibility for Group III through V aircraft to be located along each concourse. When the TWA Terminal supported a 16-gate complex it experienced capacity problems (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figures 17 and 20). The addition of 50 percent more gates, the new needs for passenger and baggage screening areas, and the need for more space for concessions and baggage handling together would cause severe congestion, would not comply with FAA design guidelines, would not meet or the project purpose and need, and would create a very low level of service for passengers within the terminal. This alternative would continue to be noncompliant with the ADA, offer marginal weather protection, and use outmoded building systems. Its reliance on existing facilities, including retention of the 1970 baggage room as the only connection between the old and new terminals, would generate bottlenecks in passenger flow. Two security areas are required as no direct connection is provided between the north and south gates, so passengers would have to exit one security area and enter another if they wished to make connections within the same complex. Extensive and expensive underground construction would be necessary for the subterranean arrivals roadway, as well as an additional arrivals passageway to alleviate overcrowding in the flight wing. The new long concourse extending from Flight Wing 2 would cause long passenger walking times to most gate positions.

Passenger, baggage, service, and security systems requirements would not be met because of the lack of space and flexibility in the original building to support the planned level of gate activity. The underground roadway, which would be more costly and difficult to maintain than an at-grade structure, would result in a deficiency of 127 linear feet of arrivals curb and 310 linear feet of departures curb (Basilio-Avadhani Associates 2000). Finally, this alternative would adversely affect the TWA Terminal through the addition of a large new structure with a different appearance adjacent and attached to the sculptural Saarinen form. The effect would marginalize the unique historic character of the historic property. Use of the terminal also would not allow full restoration of the exterior and major interior spaces of the main TWA Terminal building and connector tubes because a full complement of modern aviation items (security machines, vestibules, kiosks, etc.) still would need to be accommodated. Thus, Alternative 8 would not meet the purpose and needs for which the project was established.

Alternative 9—Terminal Addition Connected to Flight Wing 1. Alternative 9 (Figure 13 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*) would locate a major terminal structure north of, but separate from, the original TWA Terminal. The new terminal building would be connected by a short concourse to Flight Wing 1. A 1,200-foot-long concourse would be positioned between the two gate lounges of Flight Wing 2. This alternative would retain the original TWA complex and continue the use of the original building as an airline terminal. The access roadway would continue to provide at-grade arrivals at both the new and old terminals; the departures roadway would be located on the upper level of the new terminal only. Forty-four gates, including hardstand positions, would be provided, most of which would be for smaller Group III aircraft. The plan would accommodate 1,800 feet of curbside frontage.

This alternative would be neither prudent nor feasible. It would cause adverse impacts to historic resources, since views of the TWA Terminal would be affected by the large new terminal structure that would be located near its north side, and airside views from the TWA Terminal would be blocked by the new terminal and departures roadway. An advantage of Alternative 9 is the retention of the historic resources, although interventions are proposed for both flight wings: a concourse connecting to the new terminal at Flight Wing 1 and a new concourse at Flight Wing 2. Part of the existing airfield views from the main TWA Terminal building would remain.

Disadvantages would be numerous and severe. First, the complex would support eight fewer gate positions than set forth in the preferred alternative. Second, limiting aviation activities in the TWA Terminal to arrivals only would be a fatal flaw, as it would require moving aircraft from an arrivals gate to a departure gate. Whereas this limitation may improve passenger flow in the undersized TWA Terminal by eliminating the need for extensive passenger and baggage screening equipment, it would create numerous other issues. Of the 36 contact gates, only 14 could be used for departures, resulting in serious underuse of the facilities. Aircraft would have to be tugged between gates when transitioning from arrivals to departures. JetBlue Airways requires that a terminal gate turn an aircraft in 35 minutes. The process of unloading, repositioning, and reloading an aircraft could not be accomplished in that time, especially if more than one aircraft must be repositioned at the same time. With respect to convenience and meeting FAA design guidelines, passenger walking distances and wayfinding within the terminal, especially between connecting fights, would be long, circuitous, and confusing. Departing passengers using the southernmost gate would have to travel, in sequence, through the new terminal building, Flight Wing 1, the TWA Terminal, Flight Wing 2, and then the new concourse before reaching their gate. The space would be used too inefficiently to support concessions, which need space for both passengers waiting to depart and greeters waiting for arriving passengers. The arrivals hall would not generate an adequate amount of waiting traffic to justify a concessions program, and space in the departures hall would be restricted to accommodate security and screening.

This split configuration with two clusters of gates would require two separate security areas, or the redesigning of the upper lobby of the TWA Terminal to be a secure zone. The plan accommodates 1,800 feet of curbside frontage, a deficiency of more than 1,000 feet compared to the need identified (Basilio-Avadhani Associates 2000). Although Alternative 9 would create a better visual relationship between the new and old terminals, with the

connection made beyond the signature view, the mass of the new terminal would be too close to avoid an imposing and adverse visual impact on the historic main TWA Terminal building. Continued use of the TWA Terminal, although modified by restricting the main building to arrivals only, would not address the inherent deficiencies in the building for contemporary aviation use, nor would it allow full restoration of the historic interiors. Alternative 9 would not meet the purpose and needs for which the project was established.

Alternative 10—Terminal Addition North of the TWA Terminal and Terminal 4 Concourse. Alternative 10 (Figure 14 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*) would be a two-part expansion program with a major new terminal structure located north of the TWA Terminal and an additional concourse proposed for the adjacent site at Terminal 4. The new Terminal 5/6 would be appended to the north baggage wing of the TWA Terminal and would face the same frontage road. An extended concourse from the new structure would intersect Flight Wing 1. Aviation use for the TWA Terminal is proposed. Flight Wing 2 and both connector tubes would be preserved. Forty-seven gates would be provided although 20 would be part of Terminal 4, which would be accessed beyond the project site. Similar to Alternative 9, all departures would occur in the new terminal, relieving some of the congestion at the TWA Terminal. The historic terminal would handle only arrivals, whereas both departures and arrivals would occur in the new structure on a new bilevel roadway. Roughly 1,800 feet of total curb frontage would be provided.

Alternative 10 would be neither prudent nor feasible. It would cause adverse impacts to historic resources since views of the TWA Terminal would be affected by the large new terminal structure that would be connected to its north side, and views from the north side of the TWA Terminal would be blocked by the new structure. It does offer the advantage of retaining the historic resources, although Flight Wing 1 would be severely compromised by the superimposition of a new concourse. A partial view of the airfield still would be possible from the main TWA Terminal building upper lobby. Disadvantages, on the other hand, would be numerous and severe. On its northern end, the layout provides for seven gate positions on a deadend taxiway, creating a flow problem. The flow problem would be exacerbated by the fact that the terminal would serve JetBlue, an airline that strives for a 35-minute turnaround time. This scheme would not make efficient use of the Terminal 5/6 apron area, since it would create space for only 27 gates where 51 are possible. Another major disadvantage is the development of a new concourse at Terminal 4, which is outside the project area. The gate positions at Terminal 4 could not serve JetBlue as required because it would force JetBlue to be in two separate buildings, making quick connections infeasible.

Similar to Alternative 9, the operating configuration of Alternative 10 creates several issues that would not meet the needs of airlines or passengers. These include confusing passenger wayfinding between Flight Wing 2 and the rest of the complex, long passenger walking distance between connecting flights, long time requirements to reposition the aircraft, an imbalance between arrival and departure capacities, and inability to support a concessions program in the Terminal 5 arrivals hall. An estimated 1,800 feet of total curb frontage would be provided, 1,037 feet shy of the 2,837-foot requirement (Basilio-Avadhani Associates 2000) rendering this alternative infeasible. Another disadvantage would be the juxtaposition of the new terminal, with its significant bulk, adjacent and connected to the historic TWA structure. This would adversely affect the historic scene and compromise the sculptural quality of the Saarinen-designed TWA Terminal. Finally, continued aviation use of the

original TWA Terminal would continue noncompliance with serious deficiencies in passenger, security, ADA and service requirements due to lack of space and flexibility. Alternative 10 would not meet the purpose and needs for which the project was established.

Alternative 11—New Terminal North of TWA Terminal. Alternative 11 (Figure 15 in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*) would retain the entire TWA Terminal complex while adding a large new concourse on Flight Wing 2 and annexing a new terminal structure to the existing north baggage room, facing the frontage roadway. The plan proposes 48 gates, of which 7 would be hardstand positions. Access would be afforded on a bilevel departures/arrivals roadway at the new terminal. The TWA Terminal would accommodate arrivals only. Roughly 1,200 feet of curb frontage would be provided.

Alternative 11 would be neither prudent nor feasible. It would adversely affect historic resources since views of the TWA Terminal would be affected by the large new terminal structure that would be connected to its north side, and views from the north side of the TWA Terminal would be blocked by the new structure. Advantages include full use of the site and retaining the historic resource in its entirety, although significant additions would be required. The original airfield view from the center of the TWA Terminal would remain intact.

Major disadvantages are similar to those described for Alternatives 9 and 10. These issues include confusing passenger wayfinding between Flight Wing 2 and the rest of the complex (see Alternative 9), long passenger walking distance between connecting flights, time and financial requirements to reposition aircraft, an imbalance between arrival and departure capacities, two separate security zones, and inability to support a concessions program in Flight Wing 2. Alternative 11 is infeasible because it would provide roughly 1,200 feet of curb frontage, less than 43 percent of the required 2,837 feet. Alternative 11 would affect the TWA Terminal adversely because much of the new terminal would appear to be out of place when connected to the delicate, sculptured shell of the TWA Terminal. As with Alternatives 9 and 10, Alternative 11 contains a major deficiency—lack of space and flexibility to adapt the TWA Terminal for contemporary operations. Without significant modifications, the terminal would be unable to meet current passenger, baggage, accessibility, and security standards. On the other hand, major modifications, if such could be made, would compromise the historic character of the TWA Terminal and hamper efforts for its full restoration. This alternative would not meet the purpose and needs for which the project was established.

Alternative 12—Four Additions to Existing Terminal 5. This alternative was submitted as an evolution of several earlier alternatives. The meetings described in Section 6 *Public Outreach and Agency Coordination* included discussions about various aspects of the alternatives being considered. This alternative would retain the entire Terminal 5 complex but would make four major additions. First, a new terminal would be constructed adjacent and attached to the north side of the TWA Terminal, facing the same frontage road and connected to Flight Wing 1. Second, a new concourse would be added to Flight Wing 1. Together, the new terminal, Flight Wing 1, and its additional concourse would serve 19 gates. Third, a major concourse would be added to Flight Wing 2 that, together with Flight Wing 2, would serve 30 gates. Fourth, a new arrivals hall and associated arrivals roadways would be constructed below grade to the east of the TWA Terminal, in the area between the terminal and the AirTrain guideway. The new complex would have three new underground access corridors that would connect the two flight wings to each other, to the TWA Terminal, and to the new

terminal. The drawings for Alternative 12 show 2,100 feet of curb frontage for parallel-lane arrivals in a depressed cut that would lie below the current access road to the TWA Terminal, and 1,200 feet for departures on a roadway at grade in front of the existing TWA Terminal. Alternative 12 would provide a total of 49 gates and 4 hardstands.

Because of the strong desire on the part of some of the consulting parties for the main TWA terminal building to continue to be used as a terminal, and because this alternative evolved from other alternatives that were found to be either not prudent or not feasible, this alternative was reviewed in great detail. Alternative 12 would not be prudent, and it would not be feasible. It would cause adverse use of the Section 4(f) resource, because views of the TWA Terminal would be affected by the large new terminal structure that would be connected to its north side and many modifications would be required in the main TWA Terminal building, connector tubes and flight wings. Advantages of Alternative 12 are that it would retain some views from the terminal looking airside and the property would continue to have an aviation use. Disadvantages are discussed below under airside, terminal, and landside issues.

Airside Issues.

Inadequate Taxi-Lane Separation. The taxi-lane separation distance of 75 feet between Terminals 5 and 6 would not be adequate to support Group V aircraft (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK* Figure 18). The taxi-lane at the inner Terminal 6 location would be inadequate to support the Group IV and V aircraft shown. A startup position for these aircraft cannot be established within the taxi-lane because of the jet blast hazard. The aircraft would need to be pushed back into the taxiway system and would then interfere with aircraft traffic on Taxiway Alpha. This procedure would not be acceptable to the FAA air traffic controllers who are responsible for managing aircraft traffic. To meet standards and be consistent with modern airside requirements (FAA Advisory Circular 150/5300-13, *Airport Design*), the aircraft in this area must be downsized to Group III aircraft, which does not meet the project purpose and needs in achieving the flexibility to service Group IV and V aircraft from each concourse.

Inadequate Concourse Size. The new concourse addition to Terminal 5 is inadequately sized to meet needs for passengers and holdrooms (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figure 18). Expansion of the concourse would reduce the apron size and number of gates. Aircraft aprons at the node of the old finger concourses may not be appropriate for aircraft gates. These problems would reduce the flexibility of Alternative 12 and would constrain service to only Group III aircraft, without the possibility of future upgrades. It is not feasible for Group IV and Group V aircraft along each concourse therefore limiting the flexibility of the terminal to serve tenant airlines' varied needs. Alternative 12 would not provide full use of the airfield and thus would not meet the project needs.

Terminal Issues.

Inadequate Departure Terminal Space. The 185,000-square-foot TWA Terminal (roughly 18 percent of the redeveloped Terminal 5/6 space) would process arriving and departing passengers for the 30 gates in Flight Wing 2 (more than 60 percent of all gates in the redeveloped Terminal 5/6). The TWA Terminal had reached capacity when it processed

passengers for 16 gates, at a time when passenger and baggage screening requirements were less stringent (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK,* Figure 20). With the new requirement to screen 100 percent of checked baggage and the additional 14 gates proposed under this alternative (almost doubling the number of gates), the TWA Terminal would not be capable of functioning at an acceptable level of service.

Inadequate Space for Security Checkpoint and Vertical Circulation at CR Location C. Alternative 12 indicates a security checkpoint in Flight Wing 2 to serve the 29 aircraft contact gates proposed for the flight wing and the Y-shaped concourse expansion. The space requirements for the security checkpoint and the separate vertical circulation cores (escalators, elevators, and stairs) required to access the tunnel from the baggage claim area and to access the separate secure tunnel for transfer passengers far exceed the envelope of the existing flight wing and the proposed expansion (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK,* Figure 21). Increasing the building size to accommodate the necessary layout and area would result in a loss of five aircraft contact gates. The large building expansion required would compromise the existing landmark structure.

Inadequate Width of the East Tube Connecting to Flight Wing 2. Alternative 12 proposes that the connecting tube for Flight Wing 2 (the East Tube), which is 300 feet long and 12.5 feet wide, accommodate all departing passengers for the proposed 29 aircraft contact gates proposed for this expanded concourse. In addition, the East Tube must be able to accommodate the reverse flow arrival traffic for those with only carry-on baggage wishing to get to the parking lot or the new parking structure. The most direct access for those passengers would be through the terminal, across the at-grade departures, roadways, and across the depressed arrivals roadways on pedestrian bridges required for that purpose. Based on typical air terminal design standards and guidelines (FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities*), this main passenger circulation path is drastically undersized, especially during high peak hour passenger usage (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK* Figure 22). Therefore, this alternative is not feasible unless substantial modifications are made to the historic, land-marked connector tubes and Flight Wing 1.

Excessive Passenger Walking Distances and Tunnels. Alternative 12 would cause a passenger walking distance, ticket counter to aircraft gate, of 2,100 feet (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK,* Figures 23 and 24). Many terminal planners would consider this distance to be excessive and unacceptable without moving walkways or other passenger assistance devices to improve it's low level of service. FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities* recommends minimizing passenger walking distances (FAA 1988, paragraphs 32(a) and 38(b)). The installation of such devices would require increasing the width of the new concourse areas. The impact of wider concourses on aircraft parking and construction costs would require investigation. Because the new terminal would also process some of the passengers destined for Flight Wing 2, passenger wayfinding would be difficult and would exacerbate the passenger circulation problem. Because Alternative 12 proposes major public spaces below-grade, by their nature, they will have limited ceiling heights and will lack the important element of natural daylight, a significant contributor to the design of user-friendly terminals.

Nonconformance with Americans with Disabilities Act and Low Level of Service to the Elderly. There would be multiple vertical changes for arriving passengers with Alternative 12, which adds to the difficulty of complying with ADA (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figure 27). It is assumed that in the new construction areas, vertical transportation cores consisting of ramps, stair escalators, or elevators will be provided in conformance with ADA. For departing passengers (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figure 28), a vertical change is needed in the TWA Terminal. Previous efforts to install ramps in the area of the main terminal lobby stairs were unsuccessful, and therefore the ramps were subsequently removed and not replaced with any other ADA conforming method. The slopes of the tube ramps do not meet ADA requirements, and no proposal has been shown to bring them into conformance.

Costly Baggage System, Space Requirements, and Tunnels. Baggage handling systems are major factors in the design of terminals and should be considered in the conceptual design phase. Requirements for such systems often influence passenger flow and other major terminal considerations. For Alternative 12, an unobstructed view of the aircraft apron from the main terminal is a stated major design goal. To preserve that view, baggage from the ticket counter to the make-up areas, and baggage from an airside unloading area to the claim devices would be transported through below-grade tunnels. The baggage tunnels must cross the passenger tunnels and therefore must extend deeper below-grade and further into the water table to avoid the passenger tunnels (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figure 31). The baggage tunnels would need to be extremely long and wide in cross sectional area to fit the number of baggage conveyors and maintenance walkways necessary to allow a reasonable level of passenger service. Both the initial cost to construct the tunnels and the operation and maintenance costs to the airlines to keep them operating would be major.

Landside Issues.

Inadequate Landside Development Space. The space available between the TWA Terminal and the AirTrain guideway structures is inadequate for the dimensional width required for the proposed below-grade arrivals level and the dual arrivals roadways proposed by Alternative 12 (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figures 32-34). The area in which below-grade construction can occur is limited by the pile cap and pile foundations of the AirTrain guideway, the pile and concrete foundations of the TWA Terminal concrete shells, and the offsets necessary to protect the structural integrity of both structures. The dimension of the available area varies but is about 180 feet at the most critical point. Roughly 280 feet is required to accommodate properly sized baggage claim devices and clearances sized for the proposed number of aircraft gate positions and aircraft types, properly sized meeter/greeter space, and dual 4-lane frontage roadways with sidewalks. This is 100 feet more than what is available. Because the available space is insufficient to accommodate the below-grade arrivals area, Alternative 12 is infeasible.

Problems with Depressed Roadway. The concept of depressing the arrivals roadway and baggage claim area adjacent to the TWA Terminal has significant geotechnical problems (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figure 34). First, the proximity of the required excavation to the existing terminal would undermine some of the

terminal's foundations, thus requiring the affected structural elements to be supported with underpinning. Also, the proposed roadway and baggage area would be roughly 15 feet below groundwater level. The structure would need a massive base slab, on the order of 7 feet thick, to counteract buoyancy. In addition, the structure would require a durable waterproofing system to prevent groundwater seepage into the depressed structure.

Infeasible Utility Relocations. The below-grade terminal and roadways would be located in one of the areas at JFK most congested with utilities (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figure 35). The area has myriad power, communication, water, sanitation, gas and fire protection pipes, conduits, and sewers running east-west, and main-chilled and high temperature hot water feeder lines from the Kennedy International Airport Cogeneration (KIAC) plant running north-south. Greatly exacerbating this problem is that many of the utilities serve other buildings and sites at JFK. Alternative 12 would require construction and installation of replacement utilities around the below-grade construction site and then reconnection before the existing utilities were removed. The only potentially feasible rerouting path in this highly congested area would be to the east of the AirTrain guideway in the parking lot (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figure 36). Construction of the replacement utilities along the new route would have a major impact on the construction of the new parking structure and will cause delays and higher cost to that project. The parking structure needs to be completed and operational at the same time that the new Terminal 5 goes into operation. In addition, pedestrians connecting between all parking areas and Terminal 6 will be required to cross this construction using temporary bridges and walking between construction barricades. Many of the water and sewer lines are gravity fed and would require pumps and other appurtenances as part of their relocation. The scope and staging of such work would be a complex problem and would add greatly to project costs and ongoing operation and maintenance costs. In addition, and perhaps more critical given JetBlue's need for additional aircraft gates, the work would significantly lengthen the construction period and delay the start of work on the new Terminal 5/6 building. Utility relocations are mandatory to implement Alternative 12, which cannot be modified to avoid them. The ability to do this work in a cost-effective and timely manner is questionable, and the huge costs and schedule extensions would contribute to the imprudence of this alternative.

Lengthy and Complex Construction Phasing. Construction phasing for Alternative 12 is extremely complex and would have considerable adverse impact on Terminal 6 operations during construction of the new Terminal 5/6 (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figure 37). Pedestrian connections from parking and vehicular access and egress to the terminal will require temporary construction and result in a greatly diminished level of passenger service. Construction would need to be done in three main phases, each with several subphases. The main phases would be (1) relocate utilities, (2) restore, refit, and expand Terminal 5, and (3) demolish and rebuild Terminal 6. The overall time period would be lengthened by 2 years because of the utility work, and the extent of below-grade construction and associated protection of existing structures and dewatering requirements would be great. In addition, the temporary means required for pedestrian and vehicular access and egress would add greatly to the complexity and cost.

Phase 1 would be the construction and installation of the replacement utilities in the areas of below-grade construction at both the Terminal 5 and Terminal 6 sites. With the exception of the KIAC lines, which run perpendicular to the roadways, all replacement utilities would be relocated to the parking lot side of the AirTrain guideway. The KIAC replacement lines would need to be located below the planned arrivals roadways. They would be deep into the water table, and their installation would require tunneling or open-cut construction with the necessary roadway staging. The details of this difficult work would require careful analysis with respect to ultimate connection to the main TWA Terminal building and the new utility corridor's impact on the parking structure to be built. Phase 1 must be complete before construction of the roadway and modifications to Terminal 5 could begin.

Phase 2 would consist of restoring, refitting, and expanding Terminal 5. It would include the extremely difficult below-grade work consisting of construction well below the water level and with significant hydrostatic pressure. While the work proceeds, an at-grade temporary roadway would need to be constructed through the parking lot, with a temporary structural bridge over the below water level construction area to maintain access to Terminal 6. This phase of the work would include the final Terminal 5 below-grade arrivals-level egress road and a temporary on-grade departures egress road routed through the parking lot, as well as a temporary structural bridge. Constructing the new roads, while maintaining continuous access and egress from the crossing Terminal 6 roadways, likely would require several subphases of construction in areas of interface. In addition, both temporary roads running through the parking lot must be staged with the parking structure construction and pedestrian access to and from the parking lot.

Following Phase 2, airline operations could start in the expanded Terminal 5 and Phase 3, the demolition of the Terminal 6 and construction of the new terminal, could begin. This work also would be difficult, requiring "bathtub" construction and careful phasing on the airside at the interface the new terminal, aircraft paving, fuel system, etc. in the area of Flight Wing 1 and its expansion. The work in Phase 3 would also include final connection to the below-grade arrivals roadway constructed in the previous phase. This would require excavating adjacent to, and removal of, a recently completed retaining wall that is more than 400 feet long and 20 feet tall. If, due to lack of demand, it is desirable to keep existing Terminal 6 in operation concurrently with the new Terminal 5, issues relating to the crossing of the Terminal 5 temporary departure egress road and the Terminal 6 departure and arrivals access roads must be resolved. A grade separation or a traffic signal at the crossings would be required.

Excessive Construction Cost. Because of the large amount of below-grade terminal and roadway space, the extensive utility relocations, the need for extensive subsurface passenger and baggage tunnels, and the need for structural protection of the Saarinen building and the AirTrain guideway due to their proximity to the underground construction, Alternative 12 would be extremely costly to construct and extremely difficult and costly to phase.

Alternative 12 would cost significantly more than the preferred alternative, without considering the cost of borrowing money. Another important consideration is that a large portion of these additional costs would be required in the first phase of construction. This requirement would place a major burden on financing during the initial stage of operation and would be difficult for cost-sensitive airlines to support.

Conflict for Pedestrians at Frontage Roadway. Alternative 12, because of space restrictions and geometry, proposes dual-frontage roadways (see Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, Figure 38). This roadway design would require passengers using the outer roadway to cross the inner active roadway, thereby diminishing passenger service and impeding vehicular traffic flow.

Inadequate Sight Distances. Under Alternative 12, the frontage roadway ramps would be located too close to the main roadway system. This arrangement would cause very tight turns at merging and weaving intersections and provide inadequate sight distances for vehicles to safely merge, as provided in the FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities.* (FAA 1988, paragraph 149(c)).

Inadequate Arrivals Curb Frontage. Alternative 12 would not meet needs for departure roadway frontage since it would provide only 1,200 feet for departure curb length, about 310 feet less than what is required (Basilio-Avadhani Associates 2000). The effective curb frontage would actually be less than noted in the drawings for Alternative 12 because ramps are not usable as curb frontage, and part of the 1,200 feet indicated would need to be ramped to meet other existing and proposed roadways. Terminal frontage and area access road design guidelines are provided in the FAA Advisory Circular 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities.* (FAA 1988, paragraphs 149(b) and 149(c).

Conclusions. The following significant limitations to Alternative 12 make it neither feasible nor prudent. Alternative 12 proposes:

- A terminal expansion in an area of insufficient size to accommodate the elements necessary for a functional terminal with all the proper facilities to handle the forecast traffic demands. The scheme either is infeasible, or spaces would need to be downsized and contoured to fit the site at the expense of a functional layout, adequate facilities, and a high level of passenger service.
- A terminal expansion in an area requiring the relocation of significant utilities, thereby extending the overall schedule for the project and increasing the construction complexity and cost.
- A terminal expansion requiring significant below-grade construction, adding additional cost and time to the project. This approach adds risk to the project because of the proximity of "bathtub" construction to existing structures, including the historic main TWA Terminal building.
- A terminal expansion that would provide five or more fewer contact aircraft gate positions than proposed because of security, concourse widening, and other unresolved issues in the layout of the Flight Wing 2 concourse expansion.
- A terminal layout that would diminish passenger service relative to the Proposed Project because of frontage roadway crossings, excessive walking distances, numerous level changes, undersized circulation corridors, and generally confusing and unclear passenger flow patterns. In addition the scheme proposes major public spaces below-grade. By their

nature, they would have limited ceiling heights and would lack the important element of natural daylight, a significant contributor to the design of user-friendly terminals.

- A terminal expansion and layout that would cost significantly more, and require a longer schedule to construct, than the preferred alternative.

Alternative 12 would adversely affect the TWA Terminal because the bulk of the new terminal would appear to be out of place when connected to the delicate, sculptured shell of the main TWA Terminal building. As with Alternatives 9, 10, and 11, Alternative 12 contains a major deficiency—the lack of space and flexibility to adapt the TWA Terminal to contemporary operations. Without significant modification, the terminal could not meet current passenger, baggage, accessibility and security standards. If such major modifications could be made, they would compromise the historic character of the TWA Terminal and hamper efforts for its full restoration. Alternative 12 would not meet the purpose and needs for which the project was established.

3.2.4 Preferred Alternative

The airport sponsor's preferred alternative is Alternative 7A. This alternative evolved from Alternative 7, through a series of process meetings held with the consulting parties in September 2003 (refer to Section 6 *Public Outreach and Agency Coordination*) which resulted in the *Revised Concept Master Plan* (Appendix B). The terminal configuration of this alternative for the redevelopment of the Terminal 5/6 site (Figure 3.2-1) is a modern pier terminal complex that will rehabilitate and restore the main TWA Terminal building, retain and rehabilitate the East Tube, evaluate modifications to the West Tube, and house JetBlue Airways, and/or other new or existing airlines. Under this proposal, existing Terminal 6 and the concourse parts of Terminal 5 (Flight Wings 1 and 2) would be demolished in a phased approach as the need arises. Efforts will be made to reuse two of the gate lounge "trumpet" elements found in the existing Flight Wing 2, as well as other architecturally significant elements. Efforts will be made to incorporate these elements as part of the new terminal concourse and gate holdroom. If feasible, all or part of the "trumpets" and their original interiors would be relocated and included as part of the new terminal concourse. The Port Authority's *Concept Master Plan* (Port Authority July 2000, amended February 2001) was amended to include Alternative 7, which retained the entire length of the connector tubes. Alternative 7A, the preferred alternative, (Appendix B *Revised Concept Master Plan*) is the result of extended consultation and alternative analyses.

The Port Authority is studying alternatives for, and has solicited public input on, an acceptable adaptive reuse of the terminal and connector tubes. A fundamental design consideration in these investigations is that the TWA Terminal would remain within a reconfigured roadway and landscape environment with the roadway depressed under the preserved East Tube and the preserved or modified West Tube. The airside flight wings on the Terminal 5 structure would not be removed until a business arrangement for the new terminal is consummated. New vertical circulation (escalators) at the ends of the connector tubes would allow for passage from the new Terminal 5/6 complex to and from the existing main TWA Terminal building. Additional pedestrian access would be provided between the new AirTrain station (associated with the JFK light rail system) and the Terminal 5/6 redevelopment.

The retention and decommissioning of the main TWA Terminal building as an airline terminal provides the opportunity to restore and rehabilitate the unique structure. As noted, the Port Authority plans to pursue the reuse of the building and would make the rehabilitation of the terminal a condition to the reuse. The rehabilitation would include the removal of building structures added to the original Saarinen-designed TWA Terminal since the original construction. As stated above, a minimum of two (2) electronic ticketing machines (kiosks) would be maintained in the main TWA Terminal building for passengers with only carry-on baggage.

Although the end adaptive reuse of the main TWA Terminal building has not yet been established, the building can be readily adapted for a number of airportwide functions. As described in Section 6, *Public Outreach and Agency Coordination*, through December 2001 and February 2002, the Port Authority issued a Solicitation of Interest to provide adaptive reuse proposals that appeared in roughly 20 newspapers, periodicals, trade magazines, and other publications. The Port Authority received 41 expressions of interest, and those entities will receive a Request for Proposal for the restoration/rehabilitation and adaptive reuse of the TWA Terminal. A condition of the redevelopment of the Terminal 5/6 site would be the restoration of the TWA Terminal. The Port Authority would require that any adaptive reuse developer agree to improve the building in accordance with the Secretary of Interior's Standards for the Treatment of Historic Properties. Portions of the building to be demolished (Flight Wing 2) would be recorded to the Level 1 standards and guidelines of the Historical Architectural Building Survey/Historic American Engineering Record of the National Park Service.

Potential adaptive reuses under consideration include a conference center, a lobby and support facility for a new hotel planned nearby (in the Terminal 4 automobile parking area), or as a first class restaurant to serve the entire airport. Prior to redevelopment, it can also be used as an emergency terminal for use in the event of closure of another terminal for emergency or other reasons. Its deficiencies and limitations in terms of level of service, roadway frontage, rain cover, non-modern facilities, and inadequate space for security equipment may be tolerable in an emergency situation but would not be acceptable for long-term operations as described in Section 2 *Purpose and Need*. Additional information on the potential reuse of the TWA Terminal is provided in the *Concept Master Plan* (Port Authority July 2000, amended February 2001) and Appendix A *Section 4(f) Evaluation of TWA Terminal 5/6 Redevelopment at JFK*.

As shown in Figure 3.2-1, the overall site plan for the Terminal 5/6 Redevelopment Project would be constructed within the limits of the current site of Terminals 5 and 6. The new terminal would be constructed airside of the existing main TWA Terminal building. This shift in building placement would retain the TWA Terminal while avoiding any net loss of gates as a result of the more efficient terminal area layout that combines the two former terminal sites with the area between them. The new complex would have a central passenger processing facility, with four pier concourses.

Overall, the new terminal and apron complex is expected to provide 1.5 million square feet of floor space and increase the number of aircraft positions from 37 to as many as 51 aircraft loading positions that still remain within the envelope of the former terminal aprons. Preliminary phasing plans have been developed to assure that the building and apron layouts can be accomplished with minimal impact to ongoing terminal and aircraft

operations. The staging plans will be finalized during the contract documentation preparation stage of the redevelopment project so as to ensure proper coordination with airside operations and terminal construction requirements.

The new Terminal 5/6 complex would be accessed by vehicles via an elevated arrival/departure roadway system. The loop road now used to access the TWA Terminal, Terminal 6 and Terminal 7, would not serve all the proposed Terminal 5/6 redevelopment project, since reconfiguration of these new facilities occurs farther north and east of the existing road. An additional loop road is proposed to be constructed between the existing TWA Terminal and the new Terminal 5/6 complex. The road would be elevated to directly serve the departure curbsides of this redevelopment project.

As previously noted, access to the proposed Terminal 5/6 complex and to the existing Saarinen building will be provided by the AirTrain light rail system which is a separate, active project. A pedestrian walkway from the AirTrain connects to the existing Terminal 6. A new pedestrian walkway from the existing Terminal 6 AirTrain connector to the main TWA Terminal building would be constructed, as per the MOA. Additional connectors to the new terminal would also be constructed to enhance the flexibility of public accessibility to the TWA Terminal and the new terminal. The Port Authority's AirTrain is a light-rail system that links all nine terminals in the CTA at JFK with the rental car facilities at Federal Circle, the Long Island Railroad, the New York City Transit Subway at Jamaica Station, Queens, and the Howard Beach "A" Train, thereby offering fast and dependable service to points throughout New York City and Long Island. Using AirTrain, passengers are able to speed from JFK to Jamaica Station to connect with 740 daily Long Island Railroad trains, three New York City Transit subway lines, and a dozen local bus lines to continue their journeys to points across Long Island, as well as stops throughout Queens, Brooklyn and Manhattan (including Penn Station). The Howard Beach connection serves other stops in the three boroughs. Reversing the trip, a passenger can reach JFK from midtown in less than 45 minutes.

An AirTrain station is located in front of existing Terminal 6, and an access walkway will connect the AirTrain station to the main TWA Terminal building, and to the proposed Terminal 5/6 complex.

Passenger parking for Terminals 5 and 6 is currently provided in the Orange daily parking lot. The surface lot is located on the opposite side of the access roads across from these two terminals, and its capacity is not sufficient to handle existing parking demand. As shown in Figure 3.2-1, the Port Authority is proposing to improve the sizing and access for passenger parking and pickup near these terminals by constructing a multistory parking garage across the access roads from the terminals.

The proposed garage would contain 1,500 parking spaces to accommodate this sector of the CTA. The garage will replace 349 spaces in the Orange daily parking lot. The Port Authority expects that the overall impact of the garage project on the parking supply at the Airport will be to replace parking spaces lost within the CTA as a result of various roadway, AirTrain, and other construction projects, and a slight reduction in parking levels in long term lots, given the availability of parking directly adjacent to the terminal.

4. Affected Environment

This section contains descriptions of land use, zoning, population and housing characteristics, and employment characteristics of the study area. It provides the context within which more specific impact categories are examined in Section 5 *Environmental Consequences*.

4.1 Land Use

4.1.1 Methodology

Land use around the airport is described below, focusing on the area containing potential sensitive receptors. Current New York City and Nassau County land use maps were used to classify properties as a low- or high-density residential, commercial, industrial, public or quasi-public use, open space, and vacant land. Information about proposed development in the study area was derived from the JFK Light Rail *Final Environmental Impact Statement, JFK International Airport Light Rail system* (Port Authority, May 1997), the JetBlue High Density Rule Environmental Assessment (CH2M HILL 1999a), personal and telephone interviews with officials and staff of the New York City Department of City Planning and the New York City Department of Housing, Preservation and Development, and from available documents and publications.

4.1.2 Generalized Land Use Summary

Land use around JFK consists primarily of varying-density residential areas and national, state, and local parks. There are also small areas of commercial and light manufacturing operations. The residential areas range from detached, single-family dwellings on 40- to 60-foot-wide lots to medium-density, multi-residential structures such as row houses or garden apartments. There are no large apartment buildings (typically 14 stories) in the immediate vicinity of the airport.

Along the southern side of the airport is the Gateway National Recreation Area, which contains the Jamaica Bay Wildlife Refuge. All this area is part of either the National or New York State Park systems.

The commercial areas include general commercial district (shopping centers and offices in more densely built areas), general central commercial district (wide range of high-bulk commercial uses with increased parking requirements), and general service district (automotive sales and service, and heavy commercial services bridging manufacturing and commercial uses such as auto repair).

The airport and numerous small areas around the airport contain and are zoned for light manufacturing operations. These manufacturing operations are generally located adjacent to low-density residential areas.

4.1.3 Local and Regional Plans

Proposed projects in Jamaica include development of an intermodal transportation center intended to reduce traffic and congestion, improve air quality, and enhance economic development. A Congestion Mitigation Air Quality Grant from the federal government to the State of New York financially supports the Jamaica Transportation Center project. The Port Authority is responsible for contractual management and overall administration of the project. The JFK light rail system (AirTrain) is being incorporated into the Jamaica Transportation Center planning.

Transportation system improvements in the area also include the installation of intelligent transportation infrastructure on the Van Wyck Expressway to provide a modicum of operational improvement and the extension of the Nassau Expressway to the Belt Parkway, both initiatives of the New York State Department of Transportation.

4.1.4 Other Projects in the Area

4.1.4.1 Proposed Development Projects

Parts of southeastern Queens, particularly Jamaica Center, are undergoing redevelopment. Recent government efforts at stimulating redevelopment in Jamaica Center include the Social Security Administration Federal Building, the Master Plan at York College, the modernization of the New York City Transit (NYCT) subway system at the Parsons/Archer Station in Jamaica Center, the creation of a transit mall, and the designation of Jamaica as an Economic Development Zone. Other proposed projects in Jamaica include the following:

- Queens Civil Court Building
- FDA Building at York College
- Sony Theater Complex (above the NYCT Parsons/Archer Station)
- New York City Department of Finance Administration's Help Center

The Port Authority is involved in a Redevelopment Program to modernize JFK and to improve its functionality. The improvements have been organized into three operational and physical development groups: the airside, the landside-Central Terminal Area (CTA), and the landside-perimeter. Section 5.24 includes an assessment of the cumulative effects on environmental resources of these and other proposed projects not on airport property.

4.2 Zoning

The zoning maps of the New York City Planning Commission in the project area include the zoning designations defined in Table 4.2-1.

4.3 Population and Housing Characteristics

4.3.1 Population Characteristics

The Proposed Project is located near Queens Community Districts 10 and 12, the Community of Far Rockaway, and the Villages of Lawrence, Cedarhurst, Inwood, Hewlett, and Woodmere. The Districts and Far Rockaway are part of the large area of Queens County surrounding the airport. JFK is located outside these Community Districts and

immediately borders Queens Community Districts 10 and 12 to the north. The airport is also located north and west of Far Rockaway and five other villages. Inwood is part of Far Rockaway but for this discussion is treated separately. Table 4.3-1 summarizes of population, housing, and employment data by Community District and village.[1]

TABLE 4.2-1
Zoning Designations

Residential	
R-1-2	Single-family detached residences. 60-foot lot width. FAR* = 0.5; allows 4 to 7 homes per acre.
R2	Single-family detached residences. 40-foot lot width. FAR = 0.5; allows 11 homes per acre.
R3-1	Single- or two-family residences, detached or semidetached.
R3-2	General residence district. Lowest-density multiresidential with FAR = 0.5. Lowest-density multiresidential, generally row homes and garden apartments.
R4	General residence district. Same as R3-2, but FAR = 0.75 and with a 3-story limit.
R5	General residence district. Like R3-2 and R4, but higher density. FAR = 1.25. Generally row homes and garden apartment.
R6	General residence district. Medium-density housing of 3 to 12 stories. FAR = 0.78 to 2.43, allowing 176 units per acre. Lowest density in Manhattan.
R7-1	General residence district. Medium-density, typically 14 stories, allowing 208 to 226 units per acre. FAR = 0.87 to 3.44.
Commercial	
C1-2, C2-2	Local and communitywide retail zoning.
C1-20	Commercial corridor.
C3-20	Low-density, multiresidential use.
C4-20	Heavy commercial use.
C4-2, C4-6	General commercial district. Shopping centers and offices in more densely built areas. Major commercial center in core area, but outside the central business district. Allows department stores and theaters. FAR = 3.4.
C6-1A	General central commercial district. Regional subcenters. Zoned for a wide range of high-bulk commercial uses in a central business district, but with increased parking requirements.
C8-1	General service district. Automotive sales and service. Heavy commercial services bridging manufacturing and commercial uses such as auto repair. Commercial FAR = 1.0.
Manufacturing	
M1-1	Light manufacturing—high performance. Located adjacent to low-density residential areas. FAR = 1.0.
M-1-2	Light manufacturing—high performance. Older industrial areas. Same as M1-1, but with FAR = 2.0.
M2-1	Medium manufacturing—medium performance. Mainly in older manufacturing. Performance standards lower than M1 areas with FAR = 2.0.

[1]Note that Hispanic origin is a category based on national origin, rather than race. As a result, persons of Hispanic origin can be of any race, and the percentages in the Race and Ethnicity category will not add up to 100 percent.

TABLE 4.2-1
Zoning Designations

Residential
FAR = floor area ratio (total building floor space divided by building footprint area)

TABLE 4.3-1
Demographic Data for the Proposed Study Area

Demographic Data	Queens County District 10	Queens County District 12	Far Rockaway	Queens County	Inwood CDP[a]	Nassau County
Population						
Persons	22,240	34,126	100,730	1,951,598	6,472	1,278,348
Families	5,359	7,679	23,525	490,915	1,687	344,502
Households	6,340	9,646	34,802	720,149	2,301	431,515
Race and Ethnicity						
White	34.79%	15.56%	49.1%	57.9%	65.9%	86.6%
Black	57.44%	62.31%	42.1%	21.7%	30.4%	8.6%
Native American	0.46%	1.25%	0.4%	0.4%	0.0%	0.1%
Asian	3.33%	6.54%	1.5%	12.2%	1.5%	3.1%
Other	3.97%	14.34%	6.9%	7.9%	2.2%	1.6%
Hispanic[b]	12.55%	26.92%	14.3%	19.5%	7.8%	6.0%
Age						
0 to 4	7.64%	7.23%	7.90%	6.2%	6.6%	6.1%
5 to 17	18.01%	20.08%	19.18%	14.7%	14.9%	15.7%
18 to 24	12.39%	11.21%	10.10%	10.2%	10.6%	10.0%
25 to 44	29.19%	34.21%	28.38%	33.5%	29.8%	31.1%
45 to 64	21.70%	18.78%	17.60%	20.6%	20.7%	22.9%
65+	11.06%	8.48%	16.85%	14.8%	17.3%	14.2%
Transportation to Job						
Number of Workers[c]	9,152	15,023	35,299	918,063	2,815	650,947
Drive Alone	38.91%	28.14%	40.60%	33.76%	59.30%	68.17%
Carpool	12.81%	10.46%	13.07%	10.45%	14.80%	9.38%
Bus	11.74%	16.69%	14.61%	10.10%	7.20%	2.55%
Streetcar or Trolley	0.26%	0.00%	0.10%	0.18%	0.00%	0.02%
Subway	30.76%	34.62%	18.74%	34.57%	1.00%	1.13%
Railroad	2.01%	2.02%	1.91%	2.32%	3.80%	11.97%
Ferryboat	0.00%	0.00%	0.00%	0.01%	0.00%	0.00%
Taxicab	0.75%	0.44%	1.02%	0.57%	2.10%	0.28%

TABLE 4.3-1
Demographic Data for the Proposed Study Area

Demographic Data	Queens County District 10	Queens County District 12	Far Rockaway	Queens County	Inwood CDP[a]	Nassau County
Motorcycle	0.00%	0.00%	0.00%	0.05%	0.20%	0.03%
Bicycle	0.00%	0.37%	0.27%	0.17%	0.10%	0.22%
Walk	1.87%	5.20%	7.82%	5.95%	9.70%	3.38%
Other Means	0.00%	0.77%	0.49%	0.41%	0.30%	0.36%
Work at Home	0.90%	1.28%	1.36%	1.46%	1.50%	2.52%
Commute Time						
< 15 minutes	8.14%	10.62%	16.76%	11.98%	36.39%	23.31%
15 to 29 minutes	19.29%	16.57%	19.70%	21.14%	32.51%	29.27%
30 to 44 minutes	18.49%	22.09%	17.67%	24.02%	16.54%	18.17%
45 to 59 minutes	16.46%	17.77%	10.84%	15.83%	6.65%	7.88%
60 to 89 minutes	25.71%	25.13%	21.17%	20.12%	5.49%	13.14%
> 90 minutes	11.02%	6.55%	12.58%	5.46%	1.23%	5.72%
Work at Home	0.90%	1.28%	1.27%	1.46%	1.20%	2.52%
Education[d]						
< 9th grade	10.70%	15.12%	13.08%	12.69%	15.70%	5.97%
9th to 12th grade	24.43%	24.95%	20.96%	16.16%	25.40%	9.82%
High School	34.27%	28.40%	30.60%	29.76%	36.29%	30.22%
Some College	15.70%	16.76%	15.48%	15.60%	10.90%	17.41%
Associate Degree	5.20%	5.32%	4.89%	5.19%	3.10%	6.60%
Bachelor Degree	6.63%	7.24%	9.30%	12.46%	6.40%	16.97%
Graduate Degree	3.07%	2.21%	5.70%	8.12%	2.20%	13.00%
Household Size						
1 person	13.38%	16.14%	30.14%	26.88%	24.08%	16.9%
2 people	24.31%	20.70%	25.29%	28.56%	28.20%	29.8%
3 people	18.36%	20.12%	15.01%	17.04%	16.30%	19.1%
4 people	18.80%	17.13%	13.83%	14.24%	16.00%	19.1%
5 people	11.29%	12.55%	8.26%	7.29%	8.20%	9.6%
6 people	6.51%	5.77%	3.49%	3.29%	5.10%	3.4%
≥ 7 people	7.35%	7.58%	3.99%	2.69%	1.90%	2.0%
Industry						
Persons Employed[e]	9,290	15,383	38,837	938,996	2,876	661486
Agricultural and Mining	0.09%	0.33%	0.34%	0.28%	2.66%	0.86%
Construction	4.64%	5.64%	4.83%	4.95%	7.10%	5.14%
Manufacturing	8.77%	13.01%	7.08%	11.87%	11.80%	11.04%
Transportation and	15.22%	12.59%	10.82%	11.22%	15.80%	8.98%

TABLE 4.3-1
Demographic Data for the Proposed Study Area

Demographic Data	Queens County District 10	Queens County District 12	Far Rockaway	Queens County	Inwood CDP[a]	Nassau County
Communications						
Retail and Wholesale	13.86%	16.78%	15.20%	20.00%	18.50%	20.48%
Finance, Insurance, and Real Estate	13.05%	9.56%	10.59%	11.43%	7.10%	11.68%
Services	38.41%	36.25%	43.91%	35.52%	31.10%	37.09%
Public Administration	6.26%	5.84%	7.23%	4.71%	6.10%	4.74%
Median Income (1989)						
Household Income	$38,860	$34,001	$32,858	$34,186	$26,340	$54,283
Family Income	$41,811	$36,967	$28,471	$40,426	$35,955	$60,619
Per Capita Income	$12,686	$11,073	$14,107	$15,348	$12,366	$23,352
Number Below Poverty	1,996	4,609	18,377	210,057	1,043	47,192
Percent Below Poverty	8.97%	13.51%	15.96%	10.76%	15.35%	3.69%
Housing						
No. of Units	6,687	10,288	38,388	752,690	2,420	446,292
Occupied	96.32%	96.18%	90.85%	96.24%	96.23%	96.69%
Vacant	3.68%	3.82%	9.15%	3.76%	3.76%	3.31%
Owner-Occupied[f]	67.91%	43.61%	32.16%	47.570%	45.79%	80.45%
Renter-Occupied[f]	32.09%	56.39%	67.84%	52.43%	50.45%	19.55%
Median Rent	$655	$596	$461	$513	$533	$678
Median House Value	$154,182	$138,090	$169,300	$191,000	$177,100	$209,500

Note:
Totals may not add to 100 percent due to rounding error.
a. CDP = Census Designated Place
b. Hispanic origin, an ethnic category, is based on national origin rather than race. As a result, persons of Hispanic origin can be of any race and percentages do not add to 100%.
c. The number of workers only counts those workers 16 years and older.
d. Includes only those persons 25 years and older.
e. The number of employed person only counts those persons 16 years and over.
f. Based on the number of occupied housing units, not the total number of housing units.

Source: U.S. Bureau of the Census. 1990. Summary Tape Files 1A and 3A.

4.3.2 Housing Characteristics

4.3.2.1 Community Districts 10 and 12

In Queens County, about 40 percent of the housing units are owner-occupied. Community District 12 is similar to that of the County, with nearly 44 percent owner-occupancy rates; the rate in Community District 10 is much higher at 68 percent. The vacancy rate for

Queens County is only 4 percent. Community Districts 10 and 12 have similarly low vacancy rates.

The median value of owner-occupied housing in Queens County is $191,000. This is much higher than the median housing values of $154,182 in Community District 10 and $138,090 in Community District 12. The median rental in Queens County is lower than that of the two Community Districts.

4.3.2.2 Community of Far Rockaway

There are approximately 38,390 housing units within the Community of Far Rockaway, excluding the Village of Inwood. Of the occupied units, 32 percent are owner-occupied, 68 percent are renter-occupied. Nine percent are vacant. The median cost for houses is $169,300, and the median rent is $461 per month.

4.3.2.3 Village of Lawrence

There are approximately 2,530 housing units within the Village of Lawrence. Of those, 70 percent are owner-occupied, 25 percent are renter-occupied, and 5 percent are vacant. The median cost for houses is $419,800, and the median rent is $733 per month.

4.3.2.4 Village of Cedarhurst

There are approximately 2,690 housing units within the Village of Cedarhurst. Of those, 71 percent are owner-occupied, 24 percent are renter-occupied, and 5 percent are vacant. The median cost for houses is $291,300, and the median rent is $641 per month.

4.3.2.5 Village of Inwood

There are approximately 2,420 housing units within the Village of Inwood. Of those, 46 percent are owner-occupied, 50 percent are renter-occupied, and 4 percent are vacant. The median cost for houses is $177,100, and the median rent is $533 per month. The percentage of owner-occupied housing and the relative cost for housing in Inwood is significantly different than that for other surrounding communities.

4.3.2.6 Village of Hewlett

There are approximately 3,030 housing units within the Village of Hewlett. Of those, 84 percent are owner-occupied, 11 percent are renter-occupied, and 5 percent are vacant. The median cost for houses is $317,700, and the median rent is $786 per month.

4.3.2.7 Village of Woodmere

There are approximately 4,500 housing units within the Village of Woodmere. Of those, 85 percent are owner-occupied, 12 percent are renter-occupied, and 3 percent are vacant. The median cost for houses is $333,700, and the median rent is $843 per month.

4.3.3 Summary of Community Characteristics

4.3.3.1 Queens Community District 10

In 1990, there were 22,240 residents and 6,257 households in Queens Community District 10. The residential areas to the west of the Van Wyck Expressway were predominantly African

American, while the block groups just north of the airport and in Old Howard Beach were almost all white. The community had the second largest percentage of people between the ages of 5 and 17 (18 percent) and the largest percentage of people between 18 and 24 (12 percent) in the study area.

In 1990, 9,290 persons were employed in services (38 percent), transportation and communication (15 percent), retail and wholesale business (14 percent), and finance, insurance, and real estate (13 percent). More people took the subway to and from work (31 percent), and fewer people walked to and work than any other District within the study area. The median household income was $38,860, and 9 percent of the population was below the poverty level. More homes were owner-occupied (68 percent) than in the other Community Districts.

4.3.3.2 Queens Community District 12

There were 34,126 residents and 9,646 households in Queens Community District 12 in 1990. This area had more minority residents than any other District in the study area. In 1990, 16 percent of the residents were white, 62 percent African American, 1 percent Native American, 7 percent Asian, 14 percent "other", and 27 percent Hispanic. The most racially mixed block groups were located in the northwestern corner of the community—the corner opposite JFK. There were also more people under the age of 18 than in any other Community District in the study area.

Of the 15,383 employed residents, 36 percent had positions in the services sector, 17 percent in retail and wholesale business, 13 percent in manufacturing, and 13 percent in transportation and communication. Most residents (35 percent) used the subway to get to and from work. Median household income was $34,001, although per capita income was one of the lowest in the study area at $11,073. Thirteen percent of the residents were living below the poverty level. While this level was the highest for the study area, it was still below the Census Bureau's definition of a "poverty area".

4.3.3.3 Community of Far Rockaway

The Community of Far Rockaway had a population of 100,730 people in 1990 living in 34,802 households. The racial breakdown was 49 percent white, 42 percent African American, 14 percent Hispanic, 2 percent Asian, 7 percent other, and less than 1 percent Native American. Roughly 27 percent of the population is under the age of 18. Of those employed, 44 percent were in the service industry, 15 percent in the retail and wholesale business, 8 percent in manufacturing, and 11 percent in the finance, insurance, and real estate business. Approximately 19 percent commuted on the subway and 15 percent on public buses. Far Rockaway residents relied more on public transportation than adjacent communities. The average household income was $32,858 and the per capita income is $14,107.

4.3.3.4 Village of Lawrence

The population of the Village of Lawrence was 7,264 with 2,396 households in 1990. The racial breakdown was 90 percent white, 4 percent African American, 5 percent Hispanic, and less than 1 percent Native American and other. The largest segment of the residents was between 25 and 44 years of age, and 23 percent had at least a bachelor's degree from college. Approximately 22 percent of the population was under 18 years of age. Almost

half of those employed (47 percent) were in the service industry, 19 percent in the retail and wholesale business, and 13 percent in manufacturing. Over 59 percent drove to and from work daily, and 14 percent commuted on trains. The average household income was $63,113 and the per capita income was $35,376.

4.3.3.5 Village of Cedarhurst

In 1990, the Village of Cedarhurst has a population of 7,198 in 2,558 households. The racial makeup is 94 percent white, 3 percent Hispanic, and 3 percent Native American, African American, and other. The largest segment of the residents was between 25 and 44 years of age, and 23 percent had at least a bachelor's degree from college. Approximately 23.5 percent of the population was under the age of 18. Of those employed, 41 percent were in the service industry, 22 percent in the retail and wholesale business, and 14 percent in manufacturing. More than 66 percent drove to and from work daily, and 15 percent commuted on trains. The average household income was $56,449 and the per capita income was $28,549.

4.3.3.6 Village of Inwood

The 1990 population of the Village of Inwood was 6,472 with 2,301 households. The racial makeup, which was significantly different from the surrounding areas, was 66 percent white, 30 percent African American, 8 percent Hispanic, 1 percent Asian, and 2 percent Native American and other. Approximately 21 percent of the population was under the age of 18. Of those employed, 31 percent were in the service industry, 19 percent in retail and wholesale business, and 16 percent in transportation and communications. More than 59 percent drove to and from work daily, while 15 percent carpooled. The average household income was $26,340 and the per capita income was $12,366.

4.3.3.7 Village of Hewlett

The Village of Hewlett had a population of 8,286 in 1990. The number of households was 2,842. The population was 94 percent white, 3 percent Hispanic and the remaining 3 percent were African American, Native American, and other. Twenty-two percent of the population was under the age of 18. Of those employed, 39 percent were in the service industry, 22 percent in the retail and wholesale business, and 11 percent in manufacturing. Over 67 percent drove to and from work daily, and 15 percent commuted on trains. The average household income was $75,834 and the per capita income was $42,427.

4.3.3.8 Village of Woodmere

In 1990, the Village of Woodmere had a population of 13,460 in 4,390 households. The racial makeup was 92 percent white, 3 percent Hispanic, 2 percent African American, and 2 percent Native American and other. Twenty-six percent of the population was under the age of 18. Of those employed, 47 percent were in the service industry, 20 percent in the retail and wholesale business, and 10 percent in manufacturing. Over 63 percent drove to and from work daily and 16 percent commuted on trains. The average household income was $76,754 and the per capita income was $36,888.

4.4 Employment Characteristics

In the study area, the greatest number of workers were employed in service positions during 1989. The median household income ranged from a low of $27,595 in Inwood to a high of $38,860 in Queens Community District 10. The percentage of persons below the poverty level ranged from a low of 2 percent in Hewlett to a high of 16 percent in Far Rockaway. The Census Bureau defines a poverty rate of 20 percent or higher as a "poverty area" and 40 percent or higher as an "extreme poverty area". No part of the study area met these criteria.

5. Environmental Consequences

This section identifies and quantifies potential environmental impacts predicted to occur with implementation of the Proposed Project (i.e., the full build-out of Alternative 7A and the *Revised Concept Master Plan*). The analysis conducted was based on procedures and data contained in the *Final Environmental Impact Statement, JFK International Airport Light Rail System* (Port Authority, May 1997), the *Environmental Assessment of New Entrant Exemption to the High Density Rule and Operations Specifications for JetBlue Airways Corporation* (CH2M HILL 1999a), and the *American Airlines Terminal EA* (Port Authority 1999). These data have been supplemented by additional information supplied by the Port Authority and airlines operating at JFK, and have been refined to account for specific effects that will result from the Proposed Project.

5.1 Air Quality

The federal Clean Air Act,[1] as amended, requires that states identify areas where the National Ambient Air Quality Standards (NAAQS) are not met for specific air pollutants. The U.S. Environmental Protection Agency (USEPA) has designated such areas nonattainment areas. A state with a nonattainment area must prepare a State Implementation Plan (SIP) that details the programs and requirements that the state will use in order to meet the NAAQS by the deadlines specified in the Clean Air Act Amendments of 1990 (CAAA).[2]

The Clean Air Act, as amended, requires that federal actions conform to SIPs. Projects that do not conform to an SIP will not be approved and may not be eligible for federal highway funding. The USEPA has published a final rule regarding conformity determination.[3] The final rule includes annual emission thresholds for nonattainment areas and maintenance areas that trigger the need for a conformity determination. Generally to comply with the basic conformity requirements, two criteria must be met: (1) total direct and indirect pollutant emissions resulting from a project must be shown to be below *de minimis* emissions levels specified in the conformity rules, and (2) pollutant emissions from the project must be demonstrated not to be regionally significant (i.e., the project will not contribute 10 percent or more of the region's total emissions for a criteria pollutant).

5.1.1 Existing Conditions

The USEPA, pursuant to mandates of the 1970 Clean Air Act (CAA), as amended in 1990, has established primary and secondary NAAQS for six air contaminants or criteria pollutants (40 CFR 50). These pollutants are: carbon monoxide, nitrogen dioxide, ozone, particulate matter, lead, and sulfur dioxide. The primary standards were established at levels sufficient to protect public health with an adequate margin of safety. The secondary standards were established to protect public welfare from other adverse effects of air pollution.

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[1] U.S. Congress. *Clean Air Act of 1970.* Public Law 91-604, December 31, 1970.

[2] U.S. Congress. *Clean Air Act Amendments of 1990.* Public Law 101-49, November 15, 1990

[3] U.S. EPA General Conformity Final Rule, 40 CFR Parts 6, 51, and 93, November 30, 1993.

New York State's Department of Environmental Conservation (NYSDEC) has adopted the federal NAAQS as statewide ambient standards. When USEPA amended the standard for particulate matter (PM), changing the regulated pollutant from total suspended particulates (TSP) to inhalable PM_{10}, NYSDEC adopted the PM_{10} standard but continued to use both PM_{10} and TSP as monitoring indicators for the level of particulate matter. Therefore, the New York ambient air quality standards include all the NAAQS, plus a standard for TSP. Table 5.1-1 is a complete list of the current national and New York State ambient air quality standards. Areas that conform to the NAAQS standards for particular criteria pollutants are designated "attainment" areas for those pollutants; alternatively, areas where criteria pollutants exceed air quality the standards for particular pollutants are designated "nonattainment" areas for those pollutants. Nonattainment areas are further categorized based on the severity of the pollution problem (i.e., marginal, moderate, serious, severe, or extreme). Areas in transition from nonattainment to attainment classification are referred to as "maintenance areas." When insufficient data exist to determine an area's attainment status, it is designated unclassifiable. JFK is located in Queens County, New York, an area with the following air quality designations:

- Maintenance area for carbon monoxide
- Severe-17 nonattainment for ozone
- Attainment for the other criteria pollutants

5.1.2 Environmental Consequences

The environmental consequences of the Proposed Project in relation to air quality are analyzed in the following section by a general conformity analysis, and an air quality hotspot analysis. The analysis was performed in relation to the maximum build-out and represents the worst-case scenario.

5.1.2.1 General Conformity Analysis

The general conformity rules apply to federal actions occurring in nonattainment air basins for the NAAQS or in maintenance areas. Federal actions occurring in air basins in attainment with the NAAQS are not subject to the conformity rules. The Proposed Project will require FAA approval for the related airport layout plan modification. Therefore, the general conformity rule applies to FAA's approval action.

Since ozone is formed principally from nitrogen oxides (NO_x) and volatile organic compounds (VOC) through a series of complex chemical reactions in the atmosphere, the following *de minimis* criteria apply to the nonattainment area within which the project is located:

- 25 tons per year of NO_x or VOC for a severe ozone nonattainment area
- 100 tons per year of carbon monoxide for a carbon monoxide maintenance area

Based on the general conformity rule, any direct or indirect emissions resulting from the Proposed Project, over which the FAA has continuing program responsibility within the nonattainment area, must be included in the applicability analysis.

Emission sources associated with the Proposed Project are in two categories: construction sources and operational sources. Table 5.1-2 presents the emission generating activities in each category.

TABLE 5.1-1
National and New York Air Quality Standards

Pollutant	Averaging Time	Primary Standard[a]	Secondary[a]
Ozone	1-hour Maximum	0.12 ppm[b]	0.12 ppm
	8-hour Maximum	0.08 ppm[c]	0.08 ppm
Carbon Monoxide	1-hour Maximum	40,000[d]	—
	8-hour Maximum	10,000[d]	—
Sulfur Dioxide	Annual Arithmetic Mean	80[e]	
	24-hour Maximum	365[d]	
	3-hour Maximum	—	1300[2]
Nitrogen Dioxide	Annual Arithmetic Mean	100[e]	100
PM_{10}	Annual Arithmetic Mean	50[e]	50
	24-hour Maximum	150[f]	150
$PM_{2.5}$	Annual Arithmetic Mean	15[e]	15
	24-hour Maximum	65[g]	65
TSP	Annual Arithmetic Mean	75	
	24-Hour Maximum	250	
Lead	Quarterly Arithmetic Mean	1.5[h]	1.5

a. All concentrations are in micrograms per cubic meter of air unless designated as parts per million (ppm)
b. Expected number of exceedance days shall not be more than one per year (3-year average).
c. An area will attain the standard when 3-year average of the annual 4th-highest daily maximum 8-hour concentrations is below 0.08 ppm.
d. Not to be exceeded more than once per year.
e. Not to be exceeded during any calendar year.
f. An area will attain the standard when the annual highest 99th percentile of 24-hour concentrations over 3 years is below 150 $\mu g/m^3$.
g. An area will attain the standard when the annual highest 98th percentile of 24-hour concentrations over 3 years is below 65 $\mu g/m^3$.
h. Not to be exceeded in any quarter.

Source: 40 CFR 50; USEPA Fact Sheets, June 1997; 1996 Annual New York State Air Quality Report, June 1997.

TABLE 5.1-2
Emission Sources

Operational Emission Sources	Construction Emission Sources
Aircraft engines	Diesel-powered trucks
Aircraft ground support equipment	Diesel-powered construction equipment
Other stationary sources	

Operational Emissions. The Proposed Project analyzed in this section is a consolidation and reorganization of terminal facilities to handle future projected aviation demand at JFK Airport. As discussed in Section 2, the aircraft landing and take-off operations expected to occur at the airport will be the same with or without the Proposed Project, but without the Proposed Project there would need to be a significant increase in gate utilization, and/or addition of hardstands, that may or may not be feasible. Without additional gates, there

would be an increase in aircraft waiting for a gate to become available, resulting in an increase in idling time and emissions. Additional apron hardstands, if installed under No Action, would likely be insufficient to meet the project needs, and would require bussing of passengers and loading of passengers in an unsheltered environment, with a decrease in the level of service. Emissions would increase from this No Action use of the existing terminal from the resultant additional transport of passengers to aircraft at hardstands and additional emissions from Ground Support Equipment (GSE) at these remote aircraft. The Proposed Project would improve the gate utilization and efficiency, which would avoid these potential No Action adverse air quality impacts. The Proposed Project roadway realignment is expected to improve traffic flow, which would also result in an air quality improvement.

An air quality analysis was performed to determine the overall operational air quality impact of the garage project. This section summarizes the results of an air pollutant emissions analysis that was performed to determine (1) if the proposed parking garage could adversely affect ambient air quality and (2) whether the project will result in exceedances of USEPA *de minimis* standards for carbon monoxide, VOC, and oxides of nitrogen. The analysis was conducted for 2005, the year the garage was originally expected to be completed. Although the current construction schedule indicates the garage will be completed by the first quarter of 2008, the analysis remains valid because this portion of the project has not changed, and overall ground emissions in and around the airport from other sources are expected to be similar over time, with use of better air pollution controls on vehicles and equipment.

The USEPA's New Jersey-New York-Connecticut Interstate Air Quality Control Region, which includes JFK, is classified a severe-17 nonattainment region for ozone. Within this region, a subregion consisting of the five boroughs of New York City, Nassau County, and Westchester County is also designated a maintenance area for carbon monoxide.

Emissions and Dispersion Modeling System. The development of an air pollutant emissions budget for the proposed parking garage was conducted using the Emissions and Dispersion Modeling System (EDMS). EDMS is a combined emissions and dispersion model developed by the FAA in cooperation with the United States Air Force. EDMS is the USEPA's preferred guideline model for air quality analyses at airports.

The primary applications of the EDMS are (1) generating an inventory of emissions caused by sources on and around an airport or air base, and (2) calculating pollutant concentrations in the surrounding environment. The back-end for both the emissions inventory and dispersion modeling components of EDMS is a comprehensive database comprising tables for system data and user-created sources and results. System data tables include emissions factors for civilian and military aircraft, civilian ground support equipment, and civilian motor vehicles. Civilian motor vehicle emissions factors for vehicle fleets between 1997 and 2020 are based on MOBILE5a, the latest model available at the time of the analysis. The latest available version of EDMS, an emissions inventory module that incorporates USEPA-approved methodologies, was used for calculating aircraft emissions, on- and off-road vehicle emissions, and stationary source emissions.

Alternatives. Air pollutant emissions were calculated for two scenarios: the Proposed Project, which assumes that a four-story parking garage will be operating in the Terminal 5/6 parking area in 2008, and the No Action Alternative, which assumes that parking demand in 2008 will be accommodated in the Orange surface parking lot and the existing adjacent parking garage and surface parking lot. Emissions associated with each scenario were compared to determine the net change in air emissions that will result from the implementation of the proposed parking garage. Under the current construction schedule, the parking garage will be operating in 2008, however, the analysis remains valid because this portion of the project has not changed, and overall ground emissions in and around the airport from other ground sources are expected to be similar over time, with use of better air pollution controls on vehicles and equipment.

Methodology and Analysis. Parking lot emissions are a function of parking lot traffic volumes (expressed as peak hour volume or annual traffic volume), the time vehicles spend idling in the lot, and the distance vehicles travel in the lot between entering and exiting. The methodology used to model parking lots in the action Alternatives and the No Action Alternative is described in the sections that follow.

Traffic/Parking Area Volumes. Traffic volumes used to represent parking demand in the Terminal 5/6 area were derived from the daily parking counts collected by Five Star Parking through its revenue control system. Parking transaction counts on peak days (Thursdays) in an average parking demand month (March) were combined, and an average representative parking demand was derived. This representative parking demand was then increased in direct proportion to existing projections of enplaned air passenger demand at JFK for the period 2000 to 2005. This resulted in a parking demand of 3,136 transactions per day. This representative daily parking demand for the Terminal 5/6 area was used for both the Proposed Project and the No Action Alternative.

Vehicle Idle Time. In EDMS the default time vehicles spend idling in parking lots is 1.5 minutes. Due to the absence of data for the proposed garage, the default idle time was used in the modeling of the Proposed Project and the No Action Alternative.

Vehicle Travel Distance. Based on a review of preliminary plans for the proposed parking garage and conversations with Port Authority staff regarding parking lots in the Central Terminal Area (CTA), average parking lot travel distances were computed for the Proposed Project and the No Action Alternative. Due to the compact and efficient layout of a structured parking garage as compared to an expansive surface parking lot, it was estimated that motorists would on average travel up to ¼ mile less under the Proposed Project than under the No Action Alternative.

Analysis Results and Environmental Consequences. Table 5.1-3 summarizes the results of the EDMS analysis for the proposed parking garage. It is expected that there will be a net decrease in air pollutant emissions if the new proposed parking garage is constructed as compared to the No Action Alternative. The reason for the net decrease is due primarily to the compact and efficient layout of a structured parking garage when compared to an expansive surface lot. It is also anticipated that implementation of the proposed garage will decrease roadway pollutant emissions in the CTA since airport passengers will not be required to travel to other parking lots when the Terminal 5/6 parking lot is full.

TABLE 5.1-3
Pollutant Emissions: Proposed Garage

Project	Pollutant (tons/year)				
	Carbon Monoxide	Hydrocarbons	Nitrous Oxides	Sulfur Oxides	PM_{10}
Proposed Action	74.6	8.0	3.8	0.2	0.0
No Action	96.4	10.4	5.2	0.2	0.2
Net emissions change	(21.8)	(2.4)	(1.4)	—	(0.2)

Note: A negative number indicates an emissions reduction occurs under the "Build" scenario. Calculations were performed for 2005. The completion year is now anticipated to be 2008. The analysis remains valid because this portion of the project has not changed.

In light of these findings, it is expected that the net emissions associated with the proposed parking garage will be below USEPA *de minimis* criteria, and the parking garage project will therefore conform with the rules and requirements of the Clean Air Act and the Clean Air Act Amendments of 1990. This analysis was based on estimates of enplaned passenger demand projected to be in place by 2005. As outlined in Section 2 *Purpose and Need* of this document, the economic downturn coupled with the events of September 11, 2001 have resulted in a significant reduction in aircraft operations and passenger traffic at JFK and other airports nationwide. However, the aviation passenger traffic at Terminal 6 at JFK has increased substantially with JetBlue's operations, and passenger traffic at other airports worldwide is projected to continue to increase. Therefore, the Proposed Project and parking garage are needed now, and the analysis contained herein remains valid because the traffic volumes generated by the Proposed Project are expected to be similar to the volumes used in the analysis.

Construction Emissions. Under the General Conformity regulations, emissions associated with construction must be calculated, added to operational period emissions if appropriate, and the total compared to the annual *de minimis* standards/levels for criteria pollutants. Because the Proposed Project will not change or alter projected aircraft operations, and the Proposed Project will reduce parking emissions and improve traffic flow-related emissions, only construction-related emissions associated with the Terminal 5 and 6 Redevelopment Project were compared to applicable *de minimis* levels. Since JFK is within a maintenance area for carbon monoxide and a severe-17 nonattainment area for ozone, pollutants evaluated in the construction emissions analysis included carbon monoxide and ozone precursors: VOC and NO_x.

Construction Schedule. Initial construction timetables and schedules were developed in 2000 and early 2001 by the airlines participating in the Terminal 5 and 6 Redevelopment Project at that time (JetBlue, United and TWA) and by the Port Authority for proposed roadway and garage improvements. The construction schedule estimated for the construction and demolition sequencing of the Proposed Project, due to the conceptual level of project design, was used to determine annual estimates of pollutant emissions. Initial annual emissions estimates were calculated for an eight -year construction period (i.e., 2000–2008). At present, the construction schedule for the full build out scenario would still be eight years, or possibly longer depending on market conditions. Construction of the JetBlue terminal, the

parking garage, the new roadway system, and public access connections from AirTrain would start during the first quarter of 2005 and be completed during the first quarter of 2008. Full build out of all terminal concourses of the Terminal 5/6 site would be completed by 2012. Therefore, the analysis still remains valid because this portion of the project will be the same or less extensive than what was analyzed, and ground emissions are expected to be similar or better over time, with use of better air pollution controls on vehicles and equipment.

Sixteen separate construction increments were identified. Estimated construction hours associated with the projects were distributed over the 8-year construction schedule based on input from construction managers and consultants. Emissions estimates presented in this section represent total cumulative emissions that would be generated by construction equipment operated by the airlines and their respective contractors in a given year.

The methodology used to determine annual construction-related emissions estimates is discussed below.

Methodology. Construction related emissions are a factor of (1) the type and horsepower of the construction equipment; (2) the operating time of the equipment (expressed in annual hours or number of vehicle miles traveled); (3) equipment fuel type; (4) equipment age (newer construction equipment is assumed to be subject to stricter emissions standards); (5) equipment loading (load factor); and, (6) local climatic variables. The respective airlines and the Port Authority provided construction equipment types, model year, and equipment usage data. These data are provided in Appendix F, *Air Quality Analysis*.

For the construction emissions analysis, it was assumed that the age of construction equipment used onsite in a given year will be 9 years or younger. For example, the oldest piece of construction equipment used in 2008 would have been manufactured in 1999.This is a conservative evaluation because newer equipment with betterair pollution controls may actually be used. It was also assumed that the construction site would be wired for electricity by the end of the second year of construction. Provision of electronic power from the grid eliminates the need for local fuel powered generators or gas powered equipment (gas compressors) after the second year. Emissions caused by nonroad equipment (bulldozers, loaders, and cranes that cannot travel on highways and local roadways) and by onroad equipment (tractor trailers, light duty trucks, employee travel vehicles) were evaluated separately to account for national emissions standards in place for onroad vehicles. Emissions from these broad types of construction equipment were summed to determine total annual construction emissions. Table 5.1-4 presents annual construction emissions for the eight-year construction period.

Diesel and Gasoline Engine Nonroad Equipment Emissions. Emission factors for nonroad diesel equipment were derived from the following sources:

- Uncontrolled emission factors provided in *Non-road Engine and Vehicle Emission Study Report* (USEPA November 1991) for equipment models manufactured before 1996
- Tier 1 controlled emission standards regulated under *40 CFR, Part 89.112* (USEPA September 1997) for equipment models built since 1996

Emissions factors for nonroad gasoline equipment were based on the gasoline emission factors in *AP-42: Compilation of Air Pollutant Emission Factors, Mobile Sources* (USDOT April 1998)

Horsepower data for each equipment type were obtained either from the *Caterpillar Performance Handbook* (Caterpillar October 1999) or from the USEPA document *Non-road Engine and Vehicle Emission Study Report* and subsequent reports.

Vehicle emission factors, expressed in grams per hour per horsepower, for the three criteria pollutants of interest (carbon monoxide, VOC, NO_x) were multiplied by the estimated running time, load factor, and horsepower for each piece of construction equipment. In this manner, it was possible to calculate the total pollution (in grams) emitted from each piece of equipment for each year of the emissions analysis. Estimates of pollutant emissions were subsequently converted from grams to tons.

USEPA recommends the following technique for calculating hourly emissions from nonroad engine sources, such as loaders:

TABLE 5.1-4
Construction Emissions by Project Year

		HC	CO	NO_x
Year 1	Nonroad	0.36	0.86	5.59
	Onroad	0.63	5.35	1.57
	Total	**0.98**	**6.20**	**7.16**
Year 2	Nonroad	1.69	18.31	13.29
	Onroad	1.33	12.00	2.90
	Total	**3.02**	**30.31**	**16.19**
Year 3	Nonroad	1.25	3.73	18.21
	Onroad	2.71	27.30	4.08
	Total	**3.96**	**31.03**	**22.29**
Year 4	Nonroad	3.27	51.19	13.28
	Onroad	2.45	24.88	3.59
	Total	**5.72**	**76.07**	**16.88**
Year 5	Nonroad	2.29	27.78	14.14
	Onroad	5.92	62.53	7.58
	Total	**8.21**	**90.32**	**21.72**
Year 6	Nonroad	0.62	1.68	7.92
	Onroad	1.27	10.51	3.22
	Total	**1.90**	**12.19**	**11.14**
Year 7	Nonroad	0.20	0.59	2.35
	Onroad	0.44	3.92	0.96
	Total	**0.64**	**4.51**	**3.31**
Year 8	Nonroad	0.08	0.30	1.06
	Onroad	0.22	1.96	0.47
	Total	**0.30**	**2.25**	**1.53**

Note that the construction is currently anticipated to begin in the first quarter of 2005

$$M_i = N \times hp \times LF \times EF_i$$

where:

M_i = mass of emissions of i^{th} pollutants during inventory period
N = source population (units)
hp = average rated horsepower
LF = typical load factor
EF_i = average emissions of i^{th} pollutant per unit of use (e.g., grams per horsepower-hour)

A sample calculation of NO_x emissions from a grader (CAT 12G-1988 model) expected to be used during the first 12 months of construction, is provided below:

Operational hours	1,040 hours (provided by the contractor)
Total Emissions	1,040 hours/year × 140 hp × 61% × 9.6 grams/hp-hr = 852,634 grams/year = 0.94 tons/12-month

Table 5.1-4 summarizes estimates of nonroad equipment emissions for each year of the 8-year construction schedule.

Diesel and Gasoline Engine Onroad Equipment Emissions. During construction, light duty trucks will be used to move construction materials and people on and off the project site. Emissions factors for these onroad motor vehicles were determined using the USEPA-approved software model, MOBILE5b. As noted, motor vehicle emissions factors are a function of speed, ambient temperature, vehicle classification, mode of operation, and other factors. In developing emissions factors for construction-related motor vehicles, no emission credit was taken for the use of wintertime oxygenated gasoline.

Emissions factors calculated by MOBILE5b are supplied in the form of grams per mile traveled. For the construction emissions analysis, the number of vehicle miles traveled in a year by each piece of onroad construction equipment was multiplied by the MOBILE5b emissions factor to calculate the total pollutant emissions by equipment (in grams per year). This figure was then multiplied by a conversion factor to convert from grams to tons.

The following formula details the process of calculating pollutant emissions associated with onroad construction equipment.

$$M_i = N \times DY \times EF_i$$

where:

M_i = mass of emissions of i^{th} pollutants during inventory period
N = source population (units)
DY = distance traveled per year
EF_i = average emissions of i^{th} pollutant per unit of use (e.g., grams per hp-hr)

A sample calculation of NO_x emissions from two trucks that would be used during the first 12 months of construction, is provided below:

Operational miles	1,040 miles (provided by contractor)
Total emissions	2 trucks × 1,040 miles/year × 1.35 grams/mile = 2,808 grams/year = 6.19 tons/12-month

Table 5.1-4 summarizes estimates of onroad equipment emissions for each year of the 8-year construction schedule.

Conclusion. Based on the foregoing analysis, the Proposed Project (as a full build-out "worst case" scenario) would conform to the New York SIP. As shown in Table 5.1-4, the Proposed Project

will not result in construction-related emissions that equal or exceed the following applicable *de minimis* threshold rates:

- 25 tons per year of NO_x or VOC for a severe ozone nonattainment area
- 100 tons per year of carbon monoxide for a carbon monoxide maintenance area

The project would not be considered "regionally significant" with regard to air pollution emissions because project emissions will be a minute fraction of the total emissions in the region. A formal conformity determination, therefore, is not legally required for this project.

USEPA's rules and guidance are clear: where the net emissions increase resulting from the project do not exceed the applicable threshold rates, there are no further obligations regarding the conformity rules. Thus, the proposed airport improvements are consistent with the SIP.

5.1.2.2 Air Quality Hot Spot Analysis

An air quality hot spot analysis was performed to determine if the Proposed Project alternative at JFK would impact ambient air quality, primarily in the area immediately in front of the proposed terminal complex that would replace existing Terminals 5 and 6. This section quantifies carbon monoxide concentrations at full build-out under both the Proposed Project (i.e., split-level and frontage reorientation and improvement), as well as under the No Action Alternative (i.e., combined, at-grade arrivals and departures at Terminal 5 and separated, but at-grade, arrivals and departures at Terminal 6).

Hotspot Analysis Procedures. The air pollutant of most concern for hotspot analysis is carbon monoxide because ambient concentrations of carbon monoxide are predominantly influenced by motor vehicle emissions. Carbon monoxide is a colorless and odorless gas that results from the incomplete combustion of gasoline and other fossil fuels. Because carbon monoxide disperses quickly, the concentrations can vary greatly over relatively short distances. Elevated concentrations are usually limited to locations near intersections and along congested roadways. Carbon monoxide estimates reflect the sum of a local increment generated by local sources and a background increment generated by sources over a wider area.

Locally Generated Carbon Monoxide Concentrations. Dispersion models are used to simulate mathematically how emissions sources, meteorology, and geometry combine to affect pollutant concentrations. CAL3QHC (Version 2.0), and a USEPA-approved dispersion model, was used to estimate carbon monoxide concentrations from traffic associated with arrivals and departures in front of Terminals 5 and 6 under the No Action Alternative and in front of the new combined terminal complex under the Proposed Project. The analysis corresponds to 2008, the 1st year of operations under the completed combined terminal complex.

CAL3QHC is a line dispersion model widely used for predicting pollutant concentrations near roadway segments and intersections. The model assumes that the dispersion of pollutants downwind of a source follows a Gaussian distribution. (A Gaussian distribution is a bell-shaped curve.) Figure 5.1-1 shows receptor locations used to evaluate the No Action Alternative; Figure 5.1-2 shows the receptor locations used to evaluate the Proposed Project. These receptor locations remain valid. Even though the new terminal configuration has been modified from earlier drafts of this EA, the roadway system remains the same as in the original Proposed Project.

EXEMPTION (4) – DRAWINGS OF NON-PUBLIC AREAS

CAL3QHC uses an approach that separates idle emissions from the rest of the emissions. Separate links are set up for "idle" emissions and for "speed" emissions. For this analysis, "parking lanes" were modeled as "idle" emissions links and "through" lanes were modeled as "speed emissions links." Passenger loading and unloading activities in front of the terminals (in the parking lanes) were modeled like an intersection where the light stays red for 3.3 minutes in a 3.5-minute cycle. Average speeds for lanes adjacent to the parking lanes were assumed to be 12.5 miles per hour. Average speeds for lanes used for recirculation, ingress to the terminal area, and egress from the terminal area were assumed to be 15 miles per hour. The *Combined Terminals 5 and 6 Preliminary Frontage, Intersection Capacity and Parking Analyses Report* (Basilio-Avadhani Associates 2000) was used to develop a vehicle fleet mix that would be representative of conditions in 2008 (i.e., the relative percentage of light-duty and heavy-duty onroad vehicles).

CAL3QHC generates 1-hour average concentration estimates. To estimate the local incremental 8-hour-average carbon monoxide concentration, a persistence factor of 0.7 was applied to the 1-hour-average concentration. CAL3QHC requires certain input data, including the coordinates of the road links included in the modeling effort, meteorological assumptions, traffic volumes on each link, and emissions factors.

Meteorological Assumptions. The principal meteorological factors that influence the transport and concentration of pollutants from vehicular sources are wind speed and wind direction. The carbon monoxide hot spot analysis was performed by assuming a worst-case wind speed of 1.0 meter per second, atmospheric stability class D, and mixing height of 1,000 feet. To ensure the worst impacts are reported, the carbon monoxide dispersion calculation was conducted for various wind directions to determine the worst-case wind direction resulting in maximum concentrations at each receptor site.

Traffic Volumes. Traffic volumes used for this analysis were derived from the *Combined Terminals 5 and 6 Preliminary Frontage, Intersection Capacity and Parking Analyses Report* (Basilio-Avadhani Associates 2000). Peak-hour traffic volumes under the No Action Alternative reflect vehicular activity once associated with United Airlines and TWA for 2008. Under the No Action Alternative, JetBlue would reach a level of operations by 2008 that cannot be served within Terminal 6. Therefore, a worst-case scenario of JetBlue operating at an undetermined alternate location was assumed for the No Action Alternative for the hot spot analysis. Peak-hour volumes under the Proposed Project reflect projected vehicular activity associated with the airlines in 2008 (which under the current schedule would occur in 2012), ensuring the greatest difference, and thus worst-case scenario, between the No Action and Proposed Project carbon monoxide emissions. These data remain valid as the construction time has been deferred, but does not differ in duration from the analysis.

MOBILE5b Emissions Factors. Composite motor vehicle emissions factors were developed using MOBILE5b, USEPA's most recently approved motor vehicle emissions model at the time that the analysis was conducted. Motor vehicle emissions are a function of speed, ambient temperature, vehicle classification, mode of operation, and other factors. Average vehicle speeds are discussed above in connection with adaptation of CAL3QHC to a terminal frontage roadway situation. The emissions factors reflect a temperature range of 25 to 38 degrees Fahrenheit. In developing emissions factors, no emissions credit was taken for the use of wintertime oxygenated gasoline, given that USEPA has approved the removal of the "oxyfuel" program from the carbon monoxide SIP (USEPA and USDOT April 2000).

Vehicle classifications refer to categories of motor vehicles, such as cars, light-duty trucks, and buses. For most lanes, a mix of 95 percent gasoline-powered automobiles, 4 percent light-duty gasoline-powered trucks, and 1 percent heavy-duty diesel-powered buses was assumed. For bus and shuttle lanes, the mix was assumed to be 25 percent light-duty gasoline-powered trucks and 75 percent heavy-duty diesel vehicles.

Different modes of vehicle operation include "cold start," "hot start," and "hot stabilized." Carbon monoxide emissions are highest under "cold start" mode and lowest under "hot stabilized" mode. In general, "cold start" mode applies to a vehicle that had been turned off for more than 1 hour prior to use. "Hot start" mode applies to a vehicle that had been turned off within the hour prior to use. Both modes last until a vehicle has warmed up and attained "hot stabilized" mode, which is typically within several minutes of startup. For this analysis, all vehicles were assumed to operate under the following typical P.M. peak-hour conditions: 65.5 percent hot stabilized, 26.3 percent cold start, and 8.2 percent hot start (USDOT June 1997).

Background Concentrations. Background concentrations are carbon monoxide levels not directly accounted for through the dispersion modeling analysis. These background levels must be added to the modeling results to obtain total pollutant concentrations. Carbon monoxide background concentrations within the project area in 2008 are 3.3 parts per million (1-hour average) and 2.3 parts per million (8-hour average; USDOT, June 1997). Although the end of construction is now anticipated to occur in 2012 or later, levels would be expected to be similar to those projected for 2008 due to overall greater controls on equipment and improvement in air quality.

Analysis Results and Environmental Consequences. Using the hotspot analysis procedures described above, the modeled 1-hour and 8-hour locally generated carbon monoxide concentrations resulting from terminal frontage traffic at each analysis site were added to the background concentrations to predict total carbon monoxide pollutant concentrations. The worst-case carbon monoxide concentrations are summarized in Table 5.1-5 for the No Action Alternative and Table 5.1-6 for the Proposed Project. In Tables 5.1-5 and 5.1-6, receptor sites are identified by number; however, receptor location #1 in Table 5.1-5 is not the same spot as receptor location #1 in Table 5.1-6, since the physical configuration of the terminal frontage roadways would differ under the two scenarios.

TABLE 5.1-5
Estimated Maximum Carbon Monoxide Concentrations Under No Action Alternative

	Carbon Monoxide Concentration (ppm)					
	1-Hour Average			8-Hour Average		
Receptor	Maximum Local Increment	Background	Total	Maximum Local Increment	Background	Total
1	7.6	3.3	10.9	5.3	2.3	7.6
2	7.8	3.3	11.1	5.5	2.3	7.8
3	8.7	3.3	12.0	6.1	2.3	8.4
4	8.6	3.3	11.9	6.0	2.3	8.3
5	6.0	3.3	9.3	4.2	2.3	6.5
6	4.1	3.3	7.4	2.9	2.3	5.2
7	4.7	3.3	8.0	3.3	2.3	5.6
8	6.0	3.3	9.3	4.2	2.3	6.5
9	2.8	3.3	6.1	2.0	2.3	4.3
10	2.8	3.3	6.1	2.0	2.3	4.3
11	2.4	3.3	5.7	1.7	2.3	4.0
12	4.4	3.3	7.7	3.1	2.3	5.4
13	4.2	3.3	7.5	2.9	2.3	5.2
14	4.3	3.3	7.6	3.0	2.3	5.3

TABLE 5.1-6
Estimated Maximum Carbon Monoxide Concentrations Under Proposed Project

	Carbon Monoxide Concentration (ppm)					
	1-Hour Average			8-Hour Average		
Receptor	Maximum Local Increment	Background	Total	Maximum Local Increment	Background	Total
1	6.5	3.3	9.8	4.6	2.3	6.9
2	5.4	3.3	8.7	3.8	2.3	6.1
3	5.6	3.3	8.9	3.9	2.3	6.2
4	6.6	3.3	9.9	4.6	2.3	6.9
5	4.8	3.3	8.1	3.4	2.3	5.7
6	6.5	3.3	9.8	4.6	2.3	6.9
7	6.3	3.3	9.6	4.4	2.3	6.7
8	5.3	3.3	8.6	3.7	2.3	6.0
9	5.2	3.3	8.5	3.6	2.3	5.9
10	5.1	3.3	8.4	3.6	2.3	5.9
11	4.6	3.3	7.9	3.2	2.3	5.5
12	4.0	3.3	7.3	2.8	2.3	5.1
13	4.0	3.3	7.3	2.8	2.3	5.1
14	4.7	3.3	8.0	3.3	2.3	5.6
15	3.5	3.3	6.8	2.5	2.3	4.8
16	4.8	3.3	8.1	3.4	2.3	5.7
17	4.6	3.3	7.9	3.2	2.3	5.5
18	3.5	3.3	6.8	2.5	2.3	4.8
19	4.1	3.3	7.4	2.9	2.3	5.2
20	3.2	3.3	6.5	2.2	2.3	4.5

Under the No Action Alternative, the highest carbon monoxide concentrations would be approximately 12.0 parts per million (1-hour average) and 8.4 parts per million (8-hour average), including the applicable background concentrations. Under the Proposed Project, the highest carbon monoxide concentrations would be approximately 9.9 parts per million, 1-hour average, and 6.9 parts per million, 8-hour average, including the applicable background concentrations. All estimated concentrations under both the No Action and Proposed Project Alternatives are below (within) the standards, which are 35 parts per million, 1-hour average, and 9 parts per million, 8-hour average.

Conclusion. The hot spot analysis result shows that the Proposed Project will not create any new violation, nor increase the frequency or severity of any existing violations of the national standards. Therefore, the Proposed Project will not delay the timely attainment of the national standards, and the project complies with the conformity rules and the requirements of the Clean Air Act. The analysis was originally performed for the full build out scenario. Although

the full build out may occur later than originally anticipated (depending on market conditions), the analysis remains valid because overall emissions in and around the airport from other sources are expected to be similar over time, with use of better air pollution controls on vehicles and equipment.

5.1.3 Summary of Findings

As discussed in Sections 5.1.2.1, General Conformity Analysis, and 5.1.2.2, Air Quality Hot Spot Analysis, the Proposed Project will not result in operational or construction related emissions that equal or exceed applicable *de minimis* threshold rates, nor increase the frequency or severity of any existing violations of the national standards. Based on the foregoing analyses, it is assumed that the Proposed Project will conform to the New York SIP and the conformity rules and requirements of the Clean Air Act. NYSDEC comments on Air Quality have been adequately addressed (see Appendix G *State Agency Correspondence*).

The analyses were originally performed for the full build out scenario, which would occur over an eight year period. Although the start date has shifted, and the full build out may occur later than the originally anticipated (depending on market conditions), the analysis remains valid because the Proposed Project will be the same or less extensive than what was analyzed, and overall emissions in and around the airport from other sources are expected to be similar over time, with use of better air pollution controls on vehicles and equipment.

5.2 Biotic Communities

5.2.1 Existing Conditions

JFK is bordered by Jamaica Bay on the south, Bergen Basin on the west, the Head of Bay on the east, and Thurston Basin on the northeast. With its complex of salt marshes, Jamaica Bay supports the only major biotic communities in the vicinity of the airport. It has been designated a State Significant Fish and Wildlife Habitat and a State Critical Environmental Area. A Critical Environmental Area is a geographic reach identified by a state agency as having exceptional or unique characteristics that make it environmentally important. A large part of the bay and its adjoining shoreline are now a component of Gateway National Recreation Area; a National Wildlife Refuge is part of the Gateway complex.

Jamaica Bay provides habitat to a relatively diverse group of biotic life, given its urban setting and the stress placed on it by point and areawide pollution sources. One area within the Bay, Joco Marsh, supports the only known colony of laughing gulls on Long Island. Although there are over 60 species of finfish and shellfish within Jamaica Bay, their numbers are low, productivity is poor, and there are several aquatic species that are principally associated with polluted conditions. The aquatic biota of the tidal ditch at the northern end of Hawtree Basin is typical of that found within subtidal mudflats, which are found around the airport. This community includes snails (*Nassarius*), sandworms (*Nercis*), and killifish (*Fundulus*), a species commonly found in shallow-water tidal ditches located at a distance from larger open-water areas.

The biotic community around the airport does not function at a high level of diversity. On the perimeter of JFK, Jamaica Bay and its tidal waters penetrate Bergen and Thurston basins. Bergen Basin contains the discharge point for the Jamaica Water Pollution Control Facility (WPCF) and stormwater outfalls from JFK. Thurston Basin also contains stormwater outfalls.

High biological oxygen demand, heavy metals, and hydrocarbon levels in Jamaica Bay near the airport have resulted in a biologically "stressed" environment, where the biotic community functions at relatively low levels.

5.2.2 Effect of Proposed Project

As noted in Section 5.16, the project is not expected to have significant impacts to Jamaica Bay surface water quality. As noted in Section 5.17, the project is also not expected to affect the bay's shoreline or wetlands. For these reasons, the project will not cause adverse impacts to the bay's existing ecological resources. Since there are no sensitive biological communities near the proposed terminals, no significant adverse biological impacts will occur.

5.3 Coastal Barriers

The Coastal Barrier's Resources Act of 1982 [PL 97-348] prohibits, with some exceptions, federal financial assistance for development within the Coastal Barrier Resources System, which consists of undeveloped coastal barriers along the Atlantic and Gulf coasts. JFK does not fall within the Coastal Barrier Resources System, and the Act does not apply to the Proposed Project.

5.4 Coastal Zone Management

5.4.1 Existing Conditions

The Coastal Zone Management Act of 1972 established the Federal Coastal Zone Management Program to encourage and assist states in preparing and implementing management programs to *"preserve, protect, develop, and, where possible, to restore or enhance the resources of the nations coastal zone."*

Pursuant to the Coastal Zone Management Act, New York State adopted its Waterfront Revitalization and Coastal Resources Act (1981), which created the New York State Coastal Management Program under direction of the New York State Department of the State. The program encourages coordination among all levels of government to promote sound waterfront planning and requires government to consider the goals of the program in making land use decisions. The Coastal Management Program consists of 44 policies and applies to all areas within the designated coastal zone boundary. JFK, and much of its surroundings, are located within the designated coastal zone, and so federal and state actions at JFK must be reviewed in light of New York's 44 policies. A letter to the Department of State requesting a coastal zone management consistency determination was transmitted by the Port Authority on November 21, 2000. The Department's reply, dated December 18, 2000, provides the determination that the Department has no objection to the proposed modification. A copy of the letter and all other correspondence is included in Appendix G, *State Agency Correspondence.*

5.4.2 Effect of Proposed Project

The Proposed Project is expected to have no impact on coastal zone management because there will be no exterior construction activities that can affect the coastal zone. Moreover, JetBlue and tenant airlines plan to implement measures to minimize the potential for any pollutant releases to the coastal zone (e.g., Policy 38 requires that the quality of surface water and groundwater is preserved and protected).

5.5 Endangered and Threatened Species

The Endangered Species Act, as amended, provides for the protection of certain plants and animals as well as the habitats in which they are found. The Act places protected plants and animals into two classifications: "endangered" and "threatened." New York State has adopted these classifications and also has designated a third category for species of "special concern." Endangered species are defined as flora and fauna faced with the danger of imminent extinction. Threatened species are in less danger, but require special protection to maintain their populations and prevent them from becoming endangered. Species that are of "special concern" in New York State are those for which welfare concerns or risk of endangerment have been documented.

The primary source for information pertaining to endangered and threatened species is the *Final Environmental Impact Statement, JFK International Airport Light Rail System* (Port Authority, May 1997). The U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service, and the NYSDEC New York State Natural Heritage Program (NYSNHP) served as sources for information on the potential occurrence of federal- and state-listed endangered, threatened, candidate, and proposed species of special concern. In addition, published and unpublished reports were reviewed.

5.5.1 Flora

Neither the USFWS nor the NYSNHP report any recent records of occurrence for plant species of special concern at JFK. The NYSNHP reported several historical records from the late 1800s to early 1900s in the general vicinity of the airport. Since these species were not observed during the studies conducted for the light rail system, they are assumed to have been extirpated due to continued environmental alterations.

5.5.2 Fauna

The USFWS reports that, with the exception of transient individuals, there are no federal species of special concern in the area of JFK.

The National Marine Fisheries Service reports that no threatened or endangered marine species under its jurisdiction are known to occur near the airport. While Jamaica Bay and its environs support marine turtles that are listed as federal and state special-status species, no marine turtles are anticipated to occur at the airport due to the absence of appropriate habitat.

The NYSNHP reports several occurrences of the federal- and state-endangered peregrine falcon (*Falco peregrinus)* within the general area of the airport. The species is known to have established nesting sites on some buildings and bridges within the metropolitan area. There are no potential nesting sites for the species at the airport. Habitats near the airport that peregrine falcons may use for hunting include waterfowl concentration areas, such as Jamaica Bay. These habitats will not be affected by the Proposed Project.

No other species of special concern are reported within the area of JFK.

5.6 Energy Supply and Natural Resources

FAA Order 1050.1D identifies two types of energy impacts to be analyzed in an EA:

- Changes in demand by stationary facilities (e.g., buildings and hangars). The purpose of this analysis is to identify changes to facilities that would have a measurable effect on local energy supplies, and to identify opportunities to reduce those effects.
- Movement of aircraft and ground vehicles. Increased consumption of fuel by aircraft needs to be examined if operating times increase substantially without offsetting efficiencies in operating procedures. Ground vehicle fuel consumption needs to be examined if there is a significant increase in access time or a substantial change in movement patterns.

Since the Proposed Project will not increase aircraft operating times, ground vehicle fuel consumption, access time, or change movement patterns, this section provides only an analysis of the energy impacts from stationary facilities resulting from the Proposed Project.

No unusual materials or materials in short supply are required for the Proposed Project, so no use of natural resources other than fuel are evaluated in this section.

5.6.1 Stationary Facilities

5.6.1.1 Existing Conditions

Electrical power for most existing Port Authority operations in New York State is presently supplied by the New York Power Authority. The electricity produced by the onsite Kennedy International Airport Cogeneration (KIAC) plant is sent back to the Con Edison grid outside the airport. The KIAC plant at JFK became operational within the past 9 years. This power plant produces over 100 megawatts of power available to the Port Authority. Based on an energy audit conducted during the week of June 1, 1999 (CH2M HILL 1999), operations at Terminal 6 used 8,936 megawatt-hours of electricity and 33,639 million British thermal units of energy for heating and chilling water. Current gate facilities at Terminal 6 do not provide 400-Hz electricity or preconditioned air supply to aircraft. In addition, energy facilities and fixtures at Terminal 6 are outdated and inefficient. The No Action Alternative would not improve the existing facilities.

5.6.1.2 Effect of the Proposed Project

The Proposed Project includes the construction of new buildings, a parking garage, and other airside improvements. The new terminal facilities would be designed to minimize the consumption of energy resources, especially fossil fuels. The use of new, energy-efficient lighting and air conditioning systems, hot water and chilled water systems at Terminals 5 and 6 would reduce energy consumption per gate compared to No Action. It is estimated that use of more energy efficient systems under the Proposed Project will reduce electricity consumption and annual heat consumption per square foot.

In addition to the energy savings measures noted above, preconditioned air systems and 400-Hz electrical outlets would be installed at each gate at the new Terminal 5/6 complex. The effect of these improvements would be to reduce operating time (and expense) for aircraft auxiliary power units, energy consumption, and air pollutant emissions at the replacement gates. Due to the addition of gates, the overall consumption of energy may be greater or less than utilized by the existing Terminal 5 and Terminal 6, however, there is sufficient energy capacity, and

therefore, there would be no adverse effects on energy demand from the Proposed Project for stationary sources.

5.6.2 Aircraft and Ground Support Equipment

The major energy use category is the amount of fuel required for aircraft operations. No additional energy consumption is expected, based on the premise that the same number of passengers will fly to and from the airport with or without changes in the terminals. It is anticipated that GSE will run on alternative fuels, and regional petroleum and gas companies would be expected to meet the aircraft and GSE fuel demands. Expected electricity demand for GSE is relatively small compared to the amount of power the KIAC produces, and energy efficient equipment will be used where practical. Therefore, energy use and fuel consumption from these sources will not increase as a result of the Proposed Project.

5.6.3 Motor Vehicles

The Proposed Project will not cause a direct increase in passenger volumes and employment levels at JFK or result in an increase in the number of JFK-access trips. This analysis is based on the premise that the same number of passengers will fly to and from the airport with or without changes in the terminals. As a result, the net effect of the Proposed Project is that there will be no increase in fuel consumption and energy use by motor vehicles.

5.6.4 Summary

Based on the above analysis and the availability of fuel and electric power reported by JFK, the amount of energy consumed by the Proposed Project can be accommodated by existing supplies and will not cause significant adverse effects to energy or natural resources.

5.7 Environmental Justice Evaluation

5.7.1 Executive Order 12898

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, directs all federal agencies to develop a strategy to address environmental justice concerns in its programs, policies, and regulations, including the National Environmental Policy Act (NEPA). Its purpose is to achieve environmental justice by having each federal agency identify and address disproportionately high and adverse impacts on minority and low-income populations with respect to human health and the environment. The memorandum accompanying Executive Order 12898 identifies the following ways to consider environmental justice:

- Each federal agency should analyze environmental and social effects on minority populations, low-income populations, and Native American tribes.
- Mitigation measures, whenever feasible, should address the effects.
- Each federal agency must provide opportunities for effective community participation in the NEPA process.
- A review of the degree to which the project complies with this order should be conducted in conjunction with the NEPA process.

In response to the directive that each federal agency identify and address environmental justice impacts, the USDOT has set forth four broad objectives in its implementation of Executive Order 12898:

- Improve the environment and public health and safety in the transportation of people and goods, and the development and maintenance of transportation systems and services.
- Harmonize transportation policies and investments with environmental concerns, reflecting an appropriate consideration of economic and social interests.
- Consider the interests, issues, and contributions of affected communities, disclose appropriate information, and give communities an opportunity to be involved in decision making.
- Implement Executive Order 12898 by integrating its provisions into existing USDOT programs, policies, activities, regulations, and guidance to the greatest extent possible.

5.7.2 Environmental Justice Methodology

The CEQ's "Environmental Justice: Guidance Under NEPA" (December 1997) defines a minority as an American Indian or Alaskan Native; Asian or Pacific Islander; Black, not of Hispanic Origin; or Hispanic. A minority population should be identified where either the minority population of the affected environment exceeds 50 percent or the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population. As shown in Table 4.3-1 in Section 4.3, the populations of both Queens County Community Districts had a majority of minority population groups (65 percent for District 10 and 84 percent for District 12). Far Rockaway, also within Queens County, had a minority population roughly half that of the total population. These statistics are in contrast to the overall population of Queens County, where the overall population identified themselves as white (58 percent). For these reasons, the populations living in Community Districts 10 and 12, as well as the Community of Far Rockaway, are identified as minority populations for purposes of this analysis. In contrast, the community of Inwood has a large white population (69 percent). Nassau County, where Inwood is located, also has a large white population (87 percent). For this reason, the community of Inwood is not identified as a minority population for this analysis.

The CEQ's guidance states that low-income populations in an affected area should be identified with the poverty thresholds from the Census Bureau. The poverty rate describes the number of people or families living below the poverty threshold and is based on the annual income and number of persons in the family. The poverty rate for Queens County is 11 percent, whereas the rate is 9 percent for District 10 and 14 percent for District 12. Poverty rates were similar for the communities of Far Rockaway (16 percent) and Inwood (15 percent). Neither District meets the Census Bureau's criteria for a "poverty area" or "extreme poverty area." For this reason, none of the areas adjacent to the airport are identified as low-income for purposes of this analysis.

5.7.3 Environmental Justice Evaluation

The Proposed Project was evaluated to determine if there were adverse impacts to human health or environmental or social effects as a result of project implementation. The project area,

as described in Section 4.3, includes Community Districts that are considered to include minority populations.

Although there is a large minority population in Community Districts 10 and 12 adjacent to the airport, the Proposed Project would not result in significant adverse social or environmental impacts for the following resource areas: air quality (5.1); biotic communities (5.2); coastal barriers (5.3); coastal zone management (5.4); endangered and threatened species (5.5); energy supply and natural resources (5.6); historic, architectural, archeological, and cultural resources (5.8); induced socioeconomic impacts (5.9); land use (5.10); noise (5.11); Section 4(f) lands (5.12); social impacts (5.13); solid waste (5.14); surface transportation (5.15); water and wastewater quality (5.16); wetlands (5.17); construction impacts (5.18); and cumulative impacts (5.20). Consequently, no disproportionately high or adverse effects on minority populations would occur, and no mitigation measures are needed pursuant to Executive Order 12898. The Proposed Project would cause an adverse impact on the historic TWA Terminal (Section 5.8 and 5.12) due to the demolition of Flight Wing 2 and modification of the West Tube; however, measures are proposed to mitigate the impact. The demolition of Flight Wing 2 and rehabilitation of the main TWA Terminal building does not cause an adverse impact to the minority population in Community Districts 10 and 12.

The results of the analyses indicate that the Proposed Project would not disproportionately affect the health or the environment of minority populations. The analysis documented in this *EA* and summarized above supports the conclusion that the Proposed Project has been planned in accordance with the provisions of Executive Order 12898.

5.8 Historic, Architectural, Archaeological, and Cultural Resources

5.8.1 Existing Conditions

5.8.1.1 Previous Analyses

Most of the information in this section was obtained from the *Final Environmental Impact Statement, JFK International Airport Light Rail System* (Port Authority, May 1997). The area of potential effects for the light rail (AirTrain) system encompasses the same area applicable to this project. In the course of preparing the *Final Environmental Impact Statement, JFK International Airport Light Rail System* (Port Authority, May 1997), historic and archeological resources were inventoried in compliance with Section 106 of the National Historic Preservation Act of 1966 as amended; Section 4(f) of the Department of Transportation Act; Section 101(b)(4) of NEPA; the amended procedures for Protection of Historic and Cultural Properties (36 CFR Part 800); and the New York CEQ.

In the *Final Environmental Impact Statement, JFK International Airport Light Rail System* (Port Authority, May 1997), background information was derived from secondary histories, archaeological reports, historical maps, and structure and site inventories. Data were gathered from the New York State Office of Parks, Recreation and Historic Preservation (the State Historic Preservation Officer [SHPO]), Albany; the New York State Museum, Albany; the New York State Library and Archives, Albany; the New York City Landmarks Preservation Commission, Manhattan; the New York Public Library, Manhattan; and the Queens Borough Public Library (Long Island Division), Jamaica, Queens. A reconnaissance level survey was

performed to record any historic properties that were not previously inventoried and to evaluate potential impacts. Previously recorded archaeological sites in the project vicinity were inventoried. The determination of archaeological sensitivity was based on consideration of the location of known archaeological sites, models of prehistoric settlement, and assessment of environmental changes and landscape alterations that affect archaeological site preservation.

The inventory of historic properties included those listed or eligible for listing on the National Register of Historic Places (NRHP), New York City landmarks, and buildings more than 50 years old that required evaluation for historic or architectural significance. The evaluation of significance of inventoried historical properties follows NRHP criteria (NRHP 1991). Historical and archaeological sites are considered significant if they possess integrity of location, design, setting, materials, workmanship, feeling, and association, and if they:

- Are associated with events that have made a significant contribution to the broad patterns of our history;
- Are associated with persons significant in our past;
- Embody the distinctive characteristics of a type, period, or method of construction; or that represent the work of a master; or that possess high artistic values; or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Have yielded, or may be likely to yield, information important in prehistory or history.

Based on the survey conducted for the *Final Environmental Impact Statement, JFK International Airport Light Rail System* (Port Authority May 1997), the site of the TWA Terminal has been determined to be eligible for listing on the NRHP and the State Register of Historic Places. As an NRHP-determined-eligible "historic property," the TWA building at Terminal 5 is also a Section 4(f) property. (See Appendix A, *Section 4(f) Evaluation for the Terminal 5/6 Redevelopment at JFK*). Additionally, the original 1962 part of the TWA Terminal is a New York City Landmarks Preservation Commission designated landmark structure, having been granted this status in 1994.

5.8.1.2 Airport Historical Background

The airport originally was to occupy 1,600 acres in the area around the former Idlewild Golf Course. By the time the airport opened for service in 1948, the scope of the project had quadrupled in size to 4,900 acres and had undergone at least four master plan designs. Throughout the history of the airport, numerous master plans were introduced, updated, abandoned or revised over the years as JFK's planners have continually tried to keep pace with technological innovations and the explosive increase in air passenger travel.

JFK opened to commercial traffic in July 1948 under the name New York International Airport. From the date of its opening until December 1957, all passenger traffic was handled in a temporary terminal of Quonset-hut type buildings. Between 1948 and 1953, the temporary terminal was expanded five times.

In 1955, the Port Authority presented a new master plan for a Terminal City at the airport. The Terminal City master plan envisioned a central international arrivals terminal with seven smaller unit terminals for American Airlines as well as other supporting structures, including the control tower—the only permanent structure that had been erected to date. The first completed building

of the Terminal City project was the International Arrivals Building and Airline Wings (now Terminal 4), which opened in December 1957. The first unit terminal to open was the Eastern Airlines terminal, which opened for service in October 1959. The American Airlines Terminal, the United/Delta Airlines Terminal, and the Pan Am Terminal opened in quick succession between February and July 1960. In March 1961, Braniff, Northeast, and Northwest Airlines opened a joint terminal. Other buildings that were part of the original Terminal City plan included the Central Heating and Refrigeration Plant, the Gulf gas station (1959) and the chapels, which opened in 1966. The TWA Terminal, which opened in May 1962, was the last of the unit terminals to be completed, and thus marked the substantial completion of the Terminal City project (although other terminals continued to be planned and constructed).

In December 1963, the City of New York officially changed the name of New York International Airport to John F. Kennedy International Airport. In September 1966, the Port Authority announced a new 10-year improvement plan designed to handle both jumbo jets and the much-anticipated supersonic airplanes of the 1970s. Under this plan, Terminal City would be expanded from 655 acres to 837 acres through the removal of one runway and some taxiway area. In 1967, TWA became the first airline to expand upon its original unit terminal design when it announced an improvement of its terminal to accommodate jumbo jets and increased passenger traffic. In 1970, Pan Am opened a second terminal at its site, and that same year, BOAC (now British Airways) became the first foreign carrier to open a terminal of its own. In 1972, the National Airlines Sundome (now Terminal 6) opened.

Since 1972, the original Terminal City plan has been further eroded. Most of the unit terminals have been demolished, and new multiairline megaterminals (now identified by number, not airline) have taken their place. As with the initial construction of Terminal City, much of the current construction program is taking place while the existing buildings continue to operate. The redevelopment of the terminal core at the airport continues in the same central area first set aside for terminal buildings in 1942. The scale of the new development is much larger than its predecessor. In addition to the recently completed Terminal 1, further potential development is slated in the areas of Terminals 2 (Delta) and 3 (Delta, formerly Pan Am), a new Terminal 4 was completed, Terminal 7 was expanded (British Air), and the redevelopment of Terminals 8 and 9 (American Airlines) is under way. In addition to the new terminals to be constructed, the Port Authority is undertaking other infrastructure improvements, most notably the recently completely construction of the AirTrain that connects the terminal core to the rental car businesses at Federal Circle, outlying parking lots, and existing New York City public transit hubs at Howard Beach and Jamaica Station.

5.8.1.3 TWA Terminal (Saarinen Building): Historical Background

The TWA Terminal is one of nine original terminal structures built in accordance with the Port Authority's 1955 Master Plan. Arrayed in a circular plan around a loop road and facing a 160-acre landscaped plaza that included reflecting pools and parking, the terminals were designed for individual airlines by internationally known architects. This plan became known as Terminal City. Terminal 4, also known as the International Arrivals Building, was the first to be completed in 1957, and the TWA Terminal was the last of the signature buildings to open in 1962. The highly sculptural design of the TWA Terminal is considered to be an iconic symbol of the Modern Architectural movement of the 1960s.

The TWA Terminal consists of three main elements—a concrete shell main terminal building with outlying wings, two flight wings and gate lounge structures, and two connector tubes that link the main building to the flight wings. The original Saarinen design included the main terminal building, Flight Wing 2 with its departure lounges, and the west-connecting passageway. Flight Wing 1 and its connecting passageway were not completed until 1970 along with east and west baggage additions. Additional baggage handling structures were built in the 1990s. A detailed description of the architectural features and unique engineering/design achievements incorporated into the construction of the main terminal and connector tubes is provided in Appendix A *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK.*

TWA ceased operations at the terminal in October 2001 and in January 2002, American Airlines (who purchased TWA assets in mid-2001) formally vacated the TWA Terminal and returned the building to the Port Authority. The terminal is unoccupied, and through a public request for proposals (RFP) process, the Port Authority will seek proposals for the adaptive reuse of the terminal (see Appendix D *Memorandum of Agreement*). Use of the property as a public facility would ensure the main TWA Terminal building and the East Tube passageway are restored and/or rehabilitated, that the West Tube is restored or modified for future use, that the structural and surface features are maintained to the level needed to meet building health and safety standards, and that their historical features will restored or rehabilitated and survive into the future.

5.8.1.4 TWA Terminal (Saarinen Building): Physical Characteristics

The TWA Terminal is adjacent to Terminal 4, at the apex of a curve in the airport service road. The main building is flanked by wing-shaped single-story extensions on either side, which follow the curve of the service road. Two raised walkways extend from the rear of the Terminal and connect to the satellite gate structures (Flight Wings 1 and 2).

The interior of the terminal is divided into three levels. A theater-like waiting area facing the runway originally was located on the main level of the Terminal, connected to the entrance hall by a wide central flight of stairs divided by two landings. The waiting area has since been raised up to the height of the main level. Flowing staircases connect the main level to two balconies at the upper level, which contain restaurants, lounges and first-class waiting areas. The balconies are connected at the upper level by a reinforced-concrete bridge. The walkways leading to the gate structures are entered at the main level. The main area of the east gate structure (Flight Wing 2) consists of an open-plan area organized around a central core, with floor-to-ceiling window walls around the perimeter. Two triangular departure lounges are connected to the main gate structure by glazed concourses.

The design for Flight Wing 1 followed Saarinen's original concept for the flight wings; however, its size, scale and detailing, particularly on the interior, were different. Flight Wing 1 provided gates for 10 jets, versus 7 gates at Flight Wing 2, and was set at a slightly higher elevation to accommodate the larger 747 jumbo jets. The new flight wing was connected to the main terminal structure by a much longer (220-foot) tube walkway. The interior finishes were not consistent with those in the rest of the terminal, or they have been removed. Flight Wing 1, which opened in 1970, was larger in floor area than the entire original TWA Terminal, in part because it contained four levels within.

Other additions were also completed during the early years of the terminal. Like Flight Wing 1, they were not executed with the same level of design and detail as the original construction,

but in plan they reflect some of the original design intent. As constructed, the baggage handling area had been accommodated within the concrete shell structure of the terminal, but it proved inadequate. Additional space was also required for ticketing and general operations. Consequently, one addition was constructed to expand the baggage handling function, which was connected to Flight Wing 1 by an underground people-mover. Ticketing counters expanded into the area originally designated for baggage handling. On the other side of the terminal, behind the original ticketing area, another addition was constructed to accommodate offices and other back-of-house functions. These additions are tucked in behind the wings of the original terminal building and have little impact from the landside view; however, they certainly changed the footprint of the original construction and their installation altered or obscured the facade on the airside of the building. Other, later, alterations at the TWA Terminal have further eroded the visual quality of the original Saarinen design.

The TWA Terminal at JFK is an excellent example of 20th Century modern architecture and engineering, designed by one of the preeminent architects of midcentury modernism in America. Its use of satellite passenger loading areas was an influential innovation in airport terminal design. The architect for the TWA Terminal was Eero Saarinen & Associates. The TWA Terminal was one of Eero Saarinen's last projects and was one of his most revolutionary and influential designs. Eero Saarinen (1910–1961) designed several important works of the post–World War II era.

Although major alterations have been undertaken at the site, the TWA Terminal remains a masterpiece of post–War Modern architecture in America. Today, the TWA Terminal retains its integrity of location, design, and workmanship. Adaptive reuse will breathe life into the building and ensure its visibility and revitalization in the future.

5.8.2 Effect of Proposed Project

The preferred alternative will require the demolition of the original Flight Wing 2 and Flight Wing 1, and potential modification of the West Tube. Without mitigation, this action could be considered a significant adverse effect of the project on historical resources. As part of the mitigation of removing Flight Wing 2, the Port Authority modified earlier concept designs and created the preferred alternative, which retains the full length of the connector tubes. The East Tube will be preserved in its entirety and will connect the Saarinen-designed TWA Terminal building to the new terminal, providing public access between the two structures. Modifications to the West Tube will be evaluated per the Port Authority's October 10, 2003 consultation report, which is part of the *Revised Concept Master Plan* (Appendix B), and the executed Memorandum of Agreement (Appendix D *Memorandum of Agreement*). Access from the AirTrain to the TWA Terminal and the new terminal will also be enhanced through new pedestrial connectors. Additional access will be provided via the roadway network at both the frontages of the Saarinen-designed TWA Terminal building and the new terminal. In accordance with 36 CFR Part 800, mitigation measures have been established to minimize harm to the facility (see below).

Several alternative design schemes were developed and evaluated (see Section 3 *Alternatives*, and Appendix A, *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*). Construction of the terminal at another location was found to be not feasible. The No Action Alternative does not meet the purpose and need. Of the remaining twelve alternatives evaluated, all except Alternative 7 and Alternative 7A resulted in either a significantly reduced number of aircraft gates or limitations on aircraft size, an unacceptable roadway configuration, an inability to meet

the project purpose and needs, excessive construction issues (infeasible), or adverse effects on the TWA Terminal. The proposed design (Alternative 7A) achieves the goals of both preserving and enhancing public use of the TWA Terminal, and restoring the East Connector Tube, and evaluating a hierarchy of options for the West Tube to enhance its use, while also providing for a new contemporary airline terminal with flexibility and the required space and number of aircraft gates.

The proposed design optimizes the potential of the Terminal 5/6 site for the future needs of JFK and guides the development to balance the airside and landside parts of the project, while allowing for the restoration, preservation, and adaptive reuse of the main TWA Terminal building and the East Tube. The proposed design, which resulted in the culmination of the consulting parties process, is believed to be the most prudent of all schemes evaluated in terms of sound preservation strategy and terminal redevelopment. Although the two flight wings would be demolished, and the West Tube potentially modified, the impact would be mitigated through and terminal redevelopment documentation and other measures specified in Section 5.8.3.

The proposed parking garage structure associated with the Proposed Project will be located approximately 10 to 20 feet from the AirTrain Guideway, and within the footprint of the current open area parking lot. The roof parking level of the proposed garage is roughly the same elevation as the top of the Air Train Rotunda. An evaluation of the impact of the Air Train structure on Terminal 5, which was conducted as part of *Final Environmental Impact Statement, JFK International Airport Light Rail System* (Port Authority May 1997), concluded that the AirTrain structures, as designed and sited, would have no adverse effect on the historic character of Terminal 5. Given that the parking garage will be no higher than the AirTrain Rotunda, and is further away from the terminal than the AirTrain structure, there will be no adverse effect on Terminal 5.

The Proposed Project does result in an adverse effect to an historic resource, namely, the demolition of Flight Wing 2 and potential modification of the West Tube. The Proposed Project would, however, preserve and restore the remaining historical resources. Through the public process, measures have been developed to mitigate the adverse effect. The Proposed Project would preserve the main TWA Terminal building, retain the East Connector Tube, and potentially modify the West Tube, which would connect the main TWA Terminal building to the new terminal, allowing access to the new adaptive reuse. It would allow for restoration, rehabilitation, and access by the public. The Proposed Project will allow extensive restoration of the interior, removing a series of accretions that detract from Saarinen's original plan. The exterior would be restored, and its numerous recent accretions (vestibules, baggage handling facilities, conveyers, etc.) would be removed to return the TWA Terminal to its original design condition , which would be a beneficial effect on historical resources. It would enhance views from the landside and original airside of the terminal. Implementation of these measures would provide for ample mitigation of these adverse effects on historical, architectural, archaeological, or cultural resources.

The No Action Alternative will not require demolition of parts of the TWA Terminal, nor construction of a new Terminal 5/6 complex. Under this alternative, this structure would remain in its present state, would not be restored, mitigation measures would not be required to be undertaken, and public access would not be available while the Terminal is unoccupied. Thus, the No Action Alternative would have an adverse effect on this historic resource.

No other historic, architectural, archaeological, or cultural properties would be affected by either the Proposed Project or the No Action Alternative.

5.8.3 Mitigation Measures

The Proposed Project results in an adverse effect to the historic resource, namely, the demolition of Flight Wing 2 and modifications to the West Tube. The Proposed Project would, however, preserve and restore the remaining historical resources. As described in Appendix A, *Section 4(f) Evaluation of TWA Terminal 5/6 Redevelopment at JFK*, a mitigation plan has been developed and agreed to as part of the signed MOA (Appendix D *Memorandum of Agreement*).

The MOA lists stipulations to be taken to mitigate the adverse effect to the historic site. The stipulations were developed with comment and input from the signatories (the FAA, SHPO, Port Authority, and Council) and consulting parties listed previously. The mitigation measures include five major sections: Formation of a Redevelopment Advisory Committee; Planning; Interim Maintenance; Restoration and Rehabilitation; and Ongoing Maintenance and Preservation. The stipulations of the MOA include adaptive reuse of the TWA Terminal and include the preparation of a Level 1 recordation document (Historic American Buildings Survey/Historic American Engineering Record), nomination for listing on Federal and State Historical Registers, maintenance and preservation guidelines for the TWA Terminal until an appropriate reuse is determined, public education efforts, and preparation of a rehabilitation and reuse plan. The MOA provides for specific actions to be taken and for formation of a Redevelopment Advisory Committee, to provide future input on the Terminal 5/6 Redevelopment Project as details are developed. The consulting parties to the Section 106 process commented on the draft MOA prior to its execution by the signatories and were invited to concur on its stipulations. Through the public process, measures have been developed to mitigate the adverse effect. The MOA provides for mitigation of these adverse effects on historical, architectural, archaeological, or cultural resources.

5.9 Induced Socioeconomic Impacts

FAA Order 1050.1D defines examples of socioeconomic impacts as "shifts in patterns of population movement and growth, public service demands, and changes in business and economic activity to the extent influenced by the airport development."

The Proposed Project would induce some positive socioeconomic impacts in the project area. Such impacts would benefit surrounding communities during construction by increasing employment opportunities and expenditures on local services and materials. JFK employs more than 37,000 people and contributes more than $20 billion in economic activity to the metropolitan region. During the project's operational phase, the upgraded terminals would provide additional long-term employment opportunities for local residents as a result of an increase in terminal concessions, such as food-beverage, news-gift, and other retail. This increase in employment would result in the payment of salaries and operating expenditures such as materials, services, and utilities supplied to the airlines and airport. There would also be beneficial indirect effects to those industries supplying goods and services to the airport and airlines and induced expenditures spurred by increased wages and salaries. The multiplier effect of these expenditures on salaries and services will boost the economy of the airport and the area without affecting patterns of population growth, land use, public service demands, and changes in business or economic activity. The net socioeconomic impacts induced by the

Proposed Project would be positive. Therefore, there would be no significant adverse impacts as a result of the Proposed Project.

Neither the Proposed Project nor the No Action Alternative would incur shifts in patterns of population movement or growth, and public service demands in the surrounding communities would remain at similar levels to present. As a result, no mitigation measures would be required.

5.10 Land Use

5.10.1 Existing Conditions

Land use around JFK consists primarily of varying density residential areas, federal and state parklands, and also small areas of commercial and light manufacturing operations. The residential areas range from detached, single-family dwellings on 40- to 60-foot-wide lots, to medium-density, multiresidential structures such as row houses or garden apartments. There are no large apartment buildings (typically 14 stories) in the immediate vicinity.

Along the southern side of the airport is the Gateway National Recreation Area, which contains the Jamaica Bay Wildlife Refuge. The commercial areas include general commercial districts (shopping centers and offices in more densely built areas), general central commercial districts (wide range of high-bulk commercial uses with increased parking requirements), and general service districts (automotive sales and service, heavy commercial services bridging manufacturing, and commercial uses such as auto repair).

The airport and numerous small areas around the airport contain and are zoned for light manufacturing operations. These manufacturing operations generally are located adjacent to low-density residential areas. Along with the on-airport aviation facilities, the airport land uses onsite consist of office use in Federal Circle, as well as commercial activity, including car rental and cargo services.

5.10.2 Effect of Proposed Project

The greater area around JFK is highly developed with typical urban commercial, residential, transportation, and industrial uses. The Proposed Project is compatible with existing zoning, the area's land use plans and the land uses on the airport and in the surrounding area. Given the nature of the Proposed Project and the highly developed nature of most of the surrounding area, there would not be any adverse land use impacts outside the boundaries of JFK as a result of the Proposed Project.

The Proposed Project would not result in impacts exceeding thresholds of significance that have land use ramifications such as disruption of communities, relocation of residences or businesses, or impact to natural resources areas. The Proposed Project is located entirely within the limits of the JFK complex. A review of land use around the proposed terminal indicates that all proximate uses are dedicated to airport operations, including taxiways, runways, other airline terminals, and associated maintenance functions. Thus, the project is completely compatible and consistent with adjoining land uses.

The project site is located within the much larger JFK complex, and the Proposed Project would not have a direct impact on either the residential land uses situated beyond the encompassing roadway system or the nearby parks and recreational facilities. Project impacts to regional

socioeconomics, air quality, and nonaircraft-related noise are discussed in their appropriate sections of this environmental assessment.

The project site is not located in a critical environmental area. The Proposed Project would be constructed completely within the limits of the JFK complex. The land that would be occupied by the proposed terminal is already highly disturbed and in airport use. The Proposed Project would not create a wildlife hazard, nor is it located adjacent to ponds or drainage areas, putrescible waste disposal, or other uses adopted by wildlife for feeding, loafing, or reproduction as described in FAA AC 150/5200-33.

5.11 Noise

5.11.1 Existing Conditions

Noise levels in and around JFK are shown in Figure 5.11-1. *The Environmental Assessment, New Entrant Exemption to the High Density Rule and Operations Specifications for JetBlue Airways Corporation,* dated September 1999, updates the existing noise conditions as follows:

- Slight increases in day-night average sound level are expected to occur primarily under arrival paths to Runways 13L, 31R, 31L, 22L, and 04R. The affected locations include areas between Woodmere Country Club and the Meadowmere Park area in Nassau County; Inwood Country Club, areas along the east and north sides of Brookville Park in Rosedale; areas west of JFK between the Nassau Expressway and the Belt Parkway; and areas south of the airport in Arverne.
- The overall land area affected by aircraft noise day-night average sound levels of 65 or above is expected to increase by a maximum of 2.3 percent.

JetBlue currently operates out of Terminal 6 and these noise conditions exist with or without the Proposed Project.

5.11.2 Effect of Proposed Project

The Proposed Project would not increase the expected number of flights from JetBlue or tenant airlines. The future number of flights would be the same with or without the Proposed Project.

5.11.3 Conclusions

Since the Proposed Project is not expected to induce a change in either the type or number of aircraft flight operations, but rather reorganize the available aircraft parking positions (see above), there would be no change in noise levels experienced by communities in the vicinity of JFK as a result of the proposed terminal redevelopment.

5.12 Section 4(f) Lands

5.12.1 Existing Conditions

Section 4(f) of the Department of Transportation Act of 1966 establishes a federal policy that special effort should be made to preserve the natural beauty and to minimize adverse effects of transportation projects on the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites (49 U.S.C. 303).

EXEMPTION (4) – DRAWINGS OF NON-PUBLIC AREAS

The Secretary of Transportation cooperates and consults with the Secretaries of the Interior, Housing and Urban Development, and Agriculture, and with the states, in developing transportation plans and programs that include measures to maintain or enhance the natural beauty of lands crossed by transportation activities or facilities.

The Secretary of Transportation may approve a transportation project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance under two conditions:

- There is no prudent and feasible alternative to using that land.
- The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use.

Publicly and privately owned historic sites of national, state, and local significance are protected under this statute and are subject to Section 4(f) evaluation when applicable.

Use of a Section 4(f) property occurs in any of the following ways:

- When land is permanently incorporated into a transportation facility
- When there is temporary occupancy of land that is adverse in terms of the Section 4(f) preservationist purposes
- When there is a constructive use of land (i.e., when the project's proximity impacts are so severe that the Section 4(f) property is substantially impaired)

This project will be located in its entirety on JFK lands that are currently part of the CTA. Therefore, no public parks, recreation areas, or wildlife refuges will be affected by the project.

However, the main TWA Terminal building, the connector tubes, and Flight Wing 2 are eligible for listing on the National and State Registers of Historic Places. The New York City Landmarks Preservation Commission has designated these facilities as landmarks. Appendix A, *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*, describes significant features of this Section 4(f) property and evaluates various alternatives considered. Section 5.8 of this document describes the historic background of this structure, effects of the Proposed Project, and mitigation measures that would be implemented. The demolition of Flight Wing 2 of the TWA Terminal is part of the Proposed Project.

5.12.2 Effect of Proposed Project

The Proposed Project will result in the unavoidable use of and adverse impacts to a portion of the Section 4(f) land (i.e., the demolition of Flight Wing 2 and the potential modification of the West Tube). However, the actions described in Section 5.8 and the MOA (Appendix D *Memorandum of Agreement*), are designed to mitigate to this. The activity resulting from the proposed redevelopment of the Terminal 5/6 complex is similar to and compatible with the normal activity (airline terminal) previously associated with the land.

A detailed Section 4(f) evaluation of the project was performed and is included in this *EA* as Appendix A, *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK*. The report contains a thorough discussion of the architectural significance of the Saarinen design and its building components. It presents the alternative concept plans studied for the redevelopment of the

Terminal 5/6 site. The feasibility, prudence, and impact to the Section 4(f) property were evaluated for each alternative. The discussion below summarizes the report's primary findings.

There are no feasible and prudent alternatives that would avoid all impacts to the historic structure, including construction at an alternative site, relocation of tenant airlines to other terminals, and construction of new facilities at the Terminal 5/6 site. Therefore, it was concluded that the project would have an unavoidable adverse effect on the resource.

All alternative schemes that were developed for the Terminal 5/6 site were considered and evaluated from the standpoint of aircraft parking, maneuvering, and servicing, terminal area and configuration, and roadway capacity and curb frontage. Each design element was to be incorporated into the alternatives in layouts that satisfied the overall terminal passenger demands and balanced these needs with the desire to preserve the TWA Terminal for suitable alternative use. Alternative 7A, which is the Proposed Project, uses the full potential of the airside area of the site while retaining and rehabilitating the main TWA Terminal, and the East Connector Tube in their entirety, and potentially retaining and modifying for use the West Tube. This design renews views of the Section 4(f) property that have been compromised over the years, and allows for restoration and adaptive reuse of the Section 4 (f) property.

Without the Proposed Project, the TWA Terminal property and facilities would remain in their present state and not be restored. Measures have been identified and will be taken to minimize the effects of the Proposed Project on the TWA Terminal. Through the Port Authority's intermediate and long-term efforts to restore and reuse the facility, this Section 4(f) property would be preserved and enhanced, in keeping with the statutes for improving lands that are protected by Section 4(f).

5.12.3 Mitigation Measures

The Port Authority is committed to taking measures to minimize harm to the TWA Terminal. Upon approval of this project, these strategies would include:

- A tiered approach to modification of the West Tube, to enhance public access
- The rehabilitation and restoration of the TWA Terminal and the East Tube
- Sinking of the departures roadway below grade to retain the entire lengths of the East Tube and the West Tube
- Developing a public plaza between the new and historic terminals to enhance views of the structure
- Restoring the signature view of the site by removing clutter and post-1960s structures now located in front of the terminal
- Prior to demolition of the flight wings, recordation of the main TWA Terminal building, the connector tubes, and Flight Wing 2 to the Level 1 standards and guidelines of the Historic American Building Survey and Historic American Engineering Record (HABS/HAER) section of the National Park Service (NPS)
- Nomination to listing of the site on the National and State Registers of Historic Places
- Implementation of the stipulations in the signed *Memorandum of Agreement* (Appendix D), including formation of a Redevelopment Advisory Committee

Nomination to listing of the site on the National and State Registers of Historic Places. As noted in Sections 1.2, 5.8, and elsewhere in this document, the Port Authority is pursuing

adaptive reuse options that would retain the signature landside view of the terminal and provide for the much needed restoration of the terminal building within a reconfigured roadway and landscape environment. Until the final designs and improvements can be made, the Port Authority is maintaining the now vacated TWA Terminal structure and premises.

The adaptive reuse of the TWA Terminal will require the rehabilitation and restoration of the main TWA Terminal building and the East Connector Tube and potential modification of the West Tube consistent with the original Saarinen design. The structures are expected to undergo major rehabilitation of mechanical, electrical, and life safety systems, in addition to removal of inappropriate features that were added since the original Saarinen design was executed. Moreover, the new Terminal 5/6 complex will be designed to complement the main TWA Terminal building. Adaptive reuses that have been studied include:

- Conference center facility to serve business travelers
- Restaurant with kitchen, dining, lounge, and meeting spaces

The SHPO, the FAA, and the ACHP, consulting parties to the Section 106 process, and other interested parties are being consulted concerning the Proposed Project. As stipulated in the MOA, measures will be taken to maintain, rehabilitate, and reuse the historic structure.

5.13 Social Impacts

The Proposed Project would not result in adverse social or economic impacts, and no changes in population or nearby communities would occur. Demands for public services would be supplied by existing resources. The Proposed Project would be constructed entirely within the limits of the JFK complex. Therefore, construction of the new terminal facilities would not involve residential or business relocations, divide or disrupt established communities, or disrupt planned community development.

There would be long-term benefits to local communities within the project vicinity. As discussed in Section 2.1, JFK is the largest employer of the commercial passenger airports serving the New York metropolitan area, having a reported workforce of 37,365 in 1997, or 57.4 percent of the combined employment at the three airports. This is a reduction from the period of 1984 to 1991, when employment exceeded 40,000 workers and reached as high as 46,000 in 1 year. The payroll from this employment has a substantial benefit in the region. It was estimated that in 1997, workers at JFK received $1.9 billion in payroll. As discussed in Section 2.1, the Proposed Project would support JFK as a major employer in the region, which provides an important foundation for the regional economy and its growth.

In addition to supporting JFK and its importance to the regional economy, the Proposed Project would provide an important economic benefit to the regional economy by accommodating existing and future passenger demand with remodeled and renovated facilities. The New York metropolitan region has 18 million residents and is the largest travel market in the nation. New York consistently ranks as one of the busiest city market pairs in the country.

5.14 Solid Waste Impacts

5.14.1 Existing Conditions

Solid wastes at JFK are generated by terminal service to passengers travelling through the airport (including building maintenance) and by cargo and aircraft maintenance operations.

The quantity waste materials collected at JFK, measured at the time of the first draft of this *EA* by Baisley Park Carting Company, Inc. (the contractor responsible for more than 95 percent of JFK's solid waste removal), averages roughly 200,000 compacted cubic yards per year for total airport operations. According to Baisley, 70,000 cubic yards are attributed to terminal operations, with the remainder attributed to maintenance and cargo facilities. Nearly 40 percent of the terminal operation's solid waste results from international flights and require handling in accordance with specific regulations.

The remaining waste is sorted for recyclable materials, which are distributed to various recycling companies in the metropolitan area. The nonrecycled portion is hauled to Environmental Services, a transfer station in Brooklyn. When the nonrecycled solid waste reaches Environmental Services, it is again sorted, and any remaining recyclable mixed paper or metal is recycled. The remaining nonrecyclable waste is bailed and shipped to various landfills.

5.14.2 Effect of Proposed Project

Solid waste from the Proposed Project would be generated both during construction at Terminals 5 and 6 and the parking garage, and in the future as JetBlue and tenant airlines continue operations at JFK. The types and quantities of waste generated during these two periods are expected to differ.

5.14.2.1 Construction Period

The existing airport infrastructure would support terminal, roadway, and airline operations (parking, concessions, retail, and maintenance areas, and storm and sanitary sewer systems). Therefore, the only construction waste expected would be from the demolition and renovation of the interior of Terminals 5 and 6 and construction of roadways and parking garages.

Construction wastes that can be expected include:

- Formwork and other wooden debris
- Scrap metal
- Demolition debris
- Lead-based paint debris, if found
- Asbestos waste, if found
- Fluorescent lamps and ballasts
- Used oil
- Scrap metal
- Left-over painting supplies
- Other left-over supplies (glues, adhesives)
- Left-over construction materials (walls, pipes, tiles)
- Heating, ventilating, and air conditioning (HVAC) system-related waste (refrigerants and used oil)

Construction contractors would manage the storage and disposal of all construction waste in accordance with applicable federal, state, and New York City requirements. Some waste streams would require special management and disposal (e.g., asbestos waste would be handled in accordance with the Rules of the City of New York Department of Sanitation Title 16, Chapter 8; lead-based paint would be handled in accordance with New York Code of Rules and Regulations, Part 371).

Attempts would be made to return construction supplies that are not used to suppliers or to donate the supplies (e.g., painting supplies) to a local organization that can use them. Some construction waste would be recycled in accordance with New York City requirements (New York City Administrative Code Title 16, Chapters 1 to 3). Wastes that may be recycled include demolition debris, fluorescent lamps and ballasts, scrap metal, and HVAC system-related waste (e.g., refrigerants and used oil).

5.14.2.2 Operations Period

Operations wastes generated during operations of Terminal 5 /6 would be associated with:

- Use of the terminals by passengers
- Maintenance of the space occupied by airlines inside Terminal 5/6

Airlines would be responsible for storing and disposing of wastes generated from terminal, hangar and aircraft maintenance. The airlines would manage the storage and disposal of these wastes in accordance with the federal, state, and New York City requirements applicable to their waste classification (e.g., used oil would be managed in accordance with New York Code of Rules and Regulations Title 6, Part 360 Subpart 360-14 and Part 374 Subpart 374-2). Waste streams would be recycled where possible (e.g., used oil and fluorescent lamps). The airlines would establish contractual agreements with permitted haulers and recycling or disposal facilities that would handle all wastes in accordance with applicable regulatory requirements. Although these contractual agreements have not been established at the time of preparation of this *EA*, prospective contractors will be required to demonstrate sufficient capacity to handle each airline's types and quantities of wastes before their services are retained.

Solid wastes generated from terminal services to passengers would be collected for disposal by the Port Authority, which has overall management responsibilities for JFK. Each airline would source-separate recyclable materials from nonrecyclable trash prior to the collection and transportation of these materials offsite by the Port Authority's contractor. The recycling program would cover the following wastes:

- Metal cans, glass bottles, plastic bottles, and aluminum foil products
- Paper materials including high-grade office paper, newspaper, magazines, catalogs, telephone books, and corrugated cardboard

Recyclable wastes, as well as nonrecyclable trash, would be stored in containers meeting New York City requirements (Title 16 New York City Administrative Code, Chapters 1 to 3 and Title 16 Rules of the City of New York Chapter 9 Subchapter B Section 12). The containers would be stored in a manner to minimize the potential for accidental releases from the containers to JFK's storm sewer system and any associated impacts on surface water quality.

TABLE 5.14-1
Types of Wastes Expected from Terminal Operations

Terminal Service	Terminal Building Maintenance
Solid waste	Used oil
Kitchen grease	Refrigerants
Paper materials:	Cleaning solvents
High-grade office paper	Rags
Newspaper	Painting supplies
Magazines	Janitorial supplies
Catalogs	Fluorescent lamps
Telephone books	Ballasts
Corrugated cardboard	Batteries
Metal cans	Tiles, carpet
Glass bottles and jars	Scrap metal
Plastic bottles and jars	Wood
Aluminum foil products	Other

The contractor used by the Port Authority to handle solid wastes from JFK has sufficient capacity to handle the additional solid waste that would be generated from Terminal 5/6 operations. Specifically, in 2001, the Port Authority predicted that by 2003 the number of passengers passing through JFK would increase by 30 percent (or 7 to 8 million passengers) to slightly more than 34 million. This additional passenger volume is expected to result in 20,000 cubic yards, or nearly 30 percent, more solid waste from terminal operations. According to Baisley, the existing solid waste collection and disposal infrastructure (carting companies, trucks, personnel, and landfill space) is capable of handling more than double the current total quantities of solid waste. Therefore, the additional solid waste generated by operations at the renovated terminal could easily be accommodated.

In summary, the Proposed Project would generate solid wastes that would be stored, transported, and recycled or disposed of in accordance with applicable federal, state, and New York City regulatory requirements. JetBlue and tenant airlines would establish contractual agreements for the offsite transportation and recycling or disposal of its wastes. The remaining solid wastes would be collected for recycling or disposal by contractors working for the Port Authority. All contractors have sufficient capacity to handle the increased wastes. Therefore, no significant impacts from solid waste generated by JetBlue and tenant airlines are expected.

5.15 Surface Transportation

The Proposed Project would change surface transportation circulation patterns and parking within the CTA, specifically the curbside roadways serving Terminals 5 and 6 (Figure 1.2-1).

5.15.1 Existing Conditions

5.15.1.1 Existing Approach Routes to JFK

Direct access to and from JFK is provided primarily by the Van Wyck Expressway, the JFK Expressway (also called the Nassau Expressway; see Figure 1.2-1). Primary feeder routes to the Van Wyck and JFK expressways from the greater New York area include the Belt Parkway, the Long Island Expressway, and the Southern State Parkway. The Belt Parkway primarily serves

traffic from Brooklyn and Staten Island. The Long Island Expressway primarily serves traffic from Manhattan, Westchester, Connecticut, and northern New Jersey, while the Southern State Parkway primarily serves traffic from Long Island.

5.15.1.2 Public Transportation to JFK

Airport employees and passengers are able to access JFK by several modes of public transportation, including bus, rail, and subway. Primary access modes and locations for passengers and employees using public transportation include:

- New York City Transit subway via the Howard Beach station or the Sutphin Blvd. – Archer Ave. Jamaica Station. The AirTrain provides access to the airport terminals
- Long Island Railroad (LIRR) via Jamaica Station. The AirTrain, taxi, and bus service connect passengers to the airport terminals
- New York City Transit bus service

Other combinations of bus, rail, and subway travel also are used by those wishing to access JFK; however, uncertain travel times, numerous required transfers, and inconveniences limit the number of people accessing the airport in this manner.

Various private taxi services, express shuttles, and buses also provide transportation to and from JFK. Travel times may vary substantially, especially during peak periods. According to the *Airport Guide: A Professional Travel Planner's Reference*, travel times to JFK from various areas of the City are approximately as follows:

- Manhattan 40 to 70 minutes
- Queens 15 to 30 minutes
- Brooklyn 20 to 60 minutes
- Bronx 60 minutes
- Staten Island 60 minutes

5.15.1.3 On-Airport Access at JFK

Access to the Central Terminal Area is provided by the AirTrain and the Van Wyck and JFK expressways (Figure 1.3-1). Connections to long-term parking, employee parking, and rental car operations are provided by the AirTrain and these two expressways as well as a network of on-airport service roads. Cargo operations use the expressways and on-airport service roads to traverse the airport grounds.

Terminals 5 and 6 are served by a single level roadway and curbside network, separating the arriving and departing vehicular activity horizontally, through lane changes (Figure 1.2-1). Terminal 5 handles departing passengers sequentially, in the first segment of curbside (adjacent to ticketing), while arriving passengers continue past the first segment using the left bypass lanes and weave to the right to enter the second segment of curbside (adjacent to baggage claim). Terminal 6 has a separate ticketing and baggage claim building layout, and the arrivals curbside veers far right from the bypass lanes to serve baggage claim while the departures curbside is adjacent to the bypass lanes to serve ticketing.

5.15.1.4 Frontage Level of Service

At an airport terminal curb, service levels are related to the amount of double to triple parking (congestion) that occurs. The following section describes the frontage Level of Service (LOS).

LOS A represents vehicular operations at the curb where motorists experience free flow conditions. Arriving drivers can stop immediately adjacent to the curb at a location they select. LOS B describes relatively free flow conditions, however, limited to double parking can be observed at check-in doors along the frontage. LOS C is indicative of activity observed at most major peak hours and represents operating conditions where double parking near doors is common and some intermittent triple parking occurs. LOS D exhibits conditions where triple parking becomes mode prominent and vehicle maneuverability is somewhat restricted. LOS E occurs at a curb when motorists experience major delays and queues. Both congestion and multiple parking are evident throughout the entire terminal curb frontage area. Momentary breakdowns in operation occur as the flow of vehicles comes virtually to a halt.

The curbside levels of service and effective curb length can be summarized as follows:

- LOS A: Effective area length equal to 1.0 × length of curb loading area
- LOS B: Effective area length equal to 1.1 × length of curb loading area
- LOS C Effective area length equal to 1.3 × length of curb loading area
- LOS D: Effective area length equal to 1.7 × length of curb loading area
- LOS E: Effective area length equal to 2.0 × length of curb loading area

For example, at LOS C the effective length is equal to 1.3 times the length of the curb loading area. This means that the inner loading time is 100 percent used and the outer loading 30 percent used. Similarly, for LOS D, the inner curb lane is 100 percent used and the outer lane 70 percent used. If both the loading lanes are fully used, then the vehicles from the inner curb lane would have difficulty in getting out of that lane, thereby, resulting in LOS E. The Port Authority's JFK Redevelopment Program stipulates an operating LOS C or better for most of CTA's landside facilities.

5.15.1.5 Planned Roadway/Transit Improvements at JFK

Planned improvements to off-airport roadways serving JFK do not include providing additional capacity. However, reconstruction projects are planned for several East River Bridge crossings, the Long Island Expressway, the Van Wyck Expressway, and the Belt Parkway.

5.15.2 Effect of Proposed Project

5.15.2.1 Approach Routes to JFK

No change in the vehicular demand volume on approach routes to JFK is anticipated from the Proposed Project. Therefore, no significant adverse effects on transportation would occur.

5.15.2.2 On-Airport Access at JFK

The Proposed Project would change the curbside roadways serving Terminals 5 and 6 (see Figure 3.2-1). Specifically, it would provide a new two level curbside system fronting the new Terminal 5/6 that would serve JetBlue and other terminal airlines. The main building of the current Terminal 5 (Saarinen building) will be accessed by an enhanced single level roadway system in front of the terminal.

5.15.2.3 Departures Level Roadway

The Proposed Project's departures level roadway is projected to carry 1,058 vehicles during the composite peak hour. This composite peak hour volume is based on the maximum number of passengers at curb combined from the airlines that were then converted to peak hour vehicles.

The peak hour traffic volume of 1,058 vehicles (Basilio-Avadhani Associates 2000) dictates a 4-lane roadway to provide sufficient roadway capacity for the proposed gates at a design LOS of C. This would result in a 1,510-foot active length of curb (Table 5.15-1). The 4 lanes are to include 2 travel lanes and 2 frontage lanes.

5.15.2.4 Arrivals Level Roadway

The required arrivals curb frontage for JetBlue and other airlines is 412 feet, 450 feet, and 465 feet to meet the LOS C requirement (Basilio-Avadhani Associates 2000). Based on this information, the total arrivals frontage length required for all three airlines is 1,327 feet (Table 5.15-1). While the tenant airlines who eventually occupy Terminal 5/6 may differ from those indicated on the Table, their requirements for arrivals curb frontage are anticipated to be similar.

TABLE 5.15-1
Summary of Required Frontage for LOS C

	Autos		Taxi		HOV		Total	
Airline	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures	Arrivals	Departures
United	250	362	77	-1	123	123	450	485
JetBlue	212	417	77	-1	123	123	412	540
TWA	250	362	92	-1	123	123	465	485
TOTAL	712	1,141	246	0	369	369	1,327	1,510

Measurements in ft.
Source: Basilio-Avadhani Associates 2000

5.15.2.5 Intersection Analysis

While the proposed changes to the roadway configuration serving the new replacement terminal are in the preliminary design phase, certain criteria were analyzed to ensure consistency with the JFK Redevelopment Program guidelines. One of the key criteria is the proposed intersection No. 3. This key intersection was selected as the potentially worse case scenario as a result of the proposed changes. Intersection No. 3 occurs where the two-level roadway transitions together at grade and joins the other on-airport access roads at JFK—the most complicated movement of the proposed roadway changes.

According to the *Combined Terminals 5 and 6 Preliminary Frontage, Intersection Capacity and Parking Analyses Report* (Basilio-Avadhani Associates 2000), Intersection No. 3 will operate at an overall LOS B. As shown in Table 5.15-2, the expected LOS for Intersection No. 3 is an overall grade of B. The JFK Redevelopment Program of the Port Authority stipulates an operating LOS C or better for most of the CTA's landside facilities. The Proposed Project exceeds the criteria suggested by the Redevelopment Program.

TABLE 5.15-2
LOS of Intersection No. 3

Approach	V/c	Delay	LOS
T56.DEP (Left-turn movement)	0.60	13.9	B
T56.DEP (Through movement)	0.60	14	B
T56.ARR	0.79	26.7	C
Overall	0.67	19.4	B

Source: Basilio-Avadhani Associates 2000

5.15.3 Conclusions

The approach routes to JFK would not be affected by the Proposed Project. The Proposed Project, therefore, would not have any net impacts on the approach routes to JFK.

The proposed changes to the curbside roadways serving the replacement terminal are consistent with guidelines of the JFK Redevelopment Program. The Proposed Project may offer an improvement in the on-airport access roads at JFK. Intersection No. 3 is expected to provide an overall LOS of B, which is superior to the Redevelopment Program guidelines of a LOS of C. The Proposed Project therefore, would not net any adverse impacts to the on-airport access roads at JFK.

5.16 Water and Wastewater Quality

5.16.1 Existing Conditions

JFK is bordered on the south by Jamaica Bay, on the west by Bergen Basin, on the east by the Head of Bay, and on the northeast by Thurston Basin. Consequently, operations and discharges at JFK (including operations at Terminals 5 and 6) have the potential to affect the quality of the bordering water bodies, as well as underground water quality, if contaminants were allowed to reach these waters. In addition, JFK operations discharge to the New York City sewer system and Jamaica Water Pollution Control Plant (WPCP) . The current surface and underground water quality and discharges in the region and from JFK that may affect water quality are described briefly below.

5.16.1.1 Surface Water Quality

Jamaica Bay, bordering JFK to the south, covers an area of 13,000 acres including open waters, tidal flats, bordering marshes, and several islands. The Bay has been extensively modified through dredging and filling operations resulting in a net loss of 12,000 acres over the years. Through continued dredging, the mean depth has gone from 3 to 16 feet, and the residence time has increased from 10 to 35 days.

Water flows into the Bay from several major tributaries including Bergen and Thurston basins. Much of the flow entering the Bay through these tributaries carries pollutants from sewage treatment plant effluent discharges, combined sewer overflows, and rainfall from streets and

roadways. These sources have contributed to water quality problems in the tributaries and the Bay.

Jamaica Bay is connected to the Lower Bay of New York Harbor by Rockaway Inlet, through which all tidal waters enter. The average tidal range is approximately 5 feet. There is a low rate of tidal flushing (exchange of fresh water with ocean water), thereby resulting in conditions where pollutants discharged to the Bay tend to remain in the Bay for some time rather than being dispersed by currents.

The waters of Jamaica Bay and Head of Bay are classified SB by the NYSDEC; SB waters are considered suitable for primary and secondary contact recreation and any other use except shellfishing for market purposes. SB waters are generally referred to as swimming waters. All the waters within the tributaries are classified as "I." I waters are considered suitable for secondary contact recreation and other usage except for primary contact recreation and shellfish for market purposes.

5.16.1.2 Groundwater Quality

Similar to surface water quality, groundwater quality in Queens has been affected greatly by urbanization. The groundwater is recharged mainly by precipitation, subsurface inflow from Brooklyn and Nassau County, and leakage and breaks in the city water supply mains. Recharge from precipitation has been reduced by the increase of impervious surfaces and water diversion by the sewer system. Reduced recharge and large-scale withdrawals have resulted in a drop of groundwater levels from 5 to 10 feet above sea level to 35 to 40 feet below sea level. With this decrease came an increase in saltwater intrusion and degradation of the water quality. In addition, contamination by industrial sources (e.g., underground and aboveground storage tanks) has adversely affected the quality of the groundwater. Jet fuel is present on top of the groundwater surface under parts of JFK (Port Authority July 2001). The jet fuel is the result of spills from airplane fueling operations and other airport operations and storage. The spills are being remediated through Consent Orders between the NYSDEC and the identified responsible parties.

Water in the upper manmade fill layer generally is under water table conditions, although in some areas the water may be confined by clay and silt beds. Some of the water moves laterally through the layer and eventually discharges into streams or nearby bodies of water. The remaining water percolates downward toward the deep aquifers.

The water supply of Queens County is provided by the City of New York from upstate surface waters and from local wells operated by the Jamaica Water Supply Company. Groundwater also is used in industrial processes, air conditioning, lawn watering, and cleaning. Jamaica Water Supply Company is the last remaining private water supply company in New York City that draws water for potable supply from the underlying aquifers. Wells 11, 14, and 32 are located near JFK. Groundwater at the airport generally flows to the south and away from these water supplies.

In 1984, the USEPA designated the Brooklyn/Queens Aquifer system underlying Kings and Queens counties a Sole Source Aquifer System (49 CFR 2950, designated January 24, 1984). A sole source aquifer is one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer, with no alternative drinking water sources that could physically, legally, and economically supply water to all who depend on the aquifer for drinking water.

According to Section 142(e) of the Safe Drinking Water Act, proposed actions that would receive federal assistance that "may contaminate such an aquifer through a recharge zone so as to create a significant hazard to public health" will be subject to USEPA review that may involve redesign such that this contamination does not occur. A "significant hazard" is deemed to occur when contamination exceeds maximum contaminant levels at any point where water may be used or may otherwise threaten human health or result in the need for additional treatment. Operations at the project site are not expected to result in a significant hazard.

According to the USEPA Fact Sheet on the Brooklyn/Queens Aquifer system, eighty percent (80%) of the water used by the Jamaica Water Supply Company is derived from ground water in the southern portion of Queens County. The fact sheet also states that with the exception of the Lloyd Aquifer underlying the airport, water quality has been steadily declining. This poor water quality is due to the high population density, leaking sewers, past and present industrial practices, lawn fertilization practices, and saltwater intrusion. The NYSDEC classifies all groundwater in New York State as GA. The best usage of GA waters is as a source of potable water supply. Groundwater depth varies from 3 to 8 feet below grade at the site, and the groundwater generally flows southward toward Jamaica Bay.

5.16.1.3 Sanitary Wastewater and Stormwater Discharges Affecting Water Quality

Regional Discharges. There are many sources of water quality impairment in Jamaica Bay and its tributaries. Four WPCPs discharge into the Bay and its tributaries: Jamaica WPCP (which receives sanitary wastewater from JFK and sanitary and storm water from the southeastern portion of Queens), Rockaway WPCP, Coney Island WPCP, and 26th Ward WPCP. On average, the four WPCPs discharge 268 million gallons per day (mgd) of treated effluent into the Bay. During high flows, the sanitary and stormwater collected for treatment may overflow to Jamaica Bay and its tributaries through CSOs. There are more than 25 CSOs that discharge directly into the Bay.

Other sources of surface water pollution include raw sewage discharges from improper housing connections and stormwater runoff from streets and roadways discharging to the Bay through the storm sewer system. Roughly 78 percent of the 26,000 acres served by the Jamaica WPCP are provided with separate sanitary and storm sewers. In that area, stormwater that carries urban pollutants is discharged to the Bay directly through the separate storm sewer system.

The effects of these discharges on water quality vary across the Bay and its tributaries. In general, the discharges have resulted in high coliform levels, fluctuations in dissolved oxygen, excessive algae growth, floating materials (e.g., oil, grease, food waste, plastics, timber, and personal hygiene products), deposition of solids/sediments, shallow water conditions, and odors. In addition to these nuisance conditions, various pollutants (e.g., heavy metals) have been measured in sediments in Jamaica Bay.

The City of New York has monitored water quality in New York Harbor for the past 80 summers. This has created a tremendous database of short- and long-term trends in the water quality of the harbor and its tributaries. Based on the most recent report as of the first draft of this *EA*, (September 1998), water quality conditions in New York Harbor (including nuisance conditions and pollutants) have improved steadily over the years. To achieve improvements, the City has implemented a suite of aggressive pollution control programs and is continually upgrading the City's sewer systems and treatment facilities.

Regional factors that affect groundwater quality include high population density, leaking sewers, past and present industrial practices (e.g., leaks from aboveground and underground fuel storage tanks), present lawn fertilization practices, leachate from three closed landfills, and saltwater intrusion.

Discharges from JFK. JFK is served by a separate sanitary and storm sewer system. The sanitary sewer system discharges to the Jamaica WPCP and the storm sewer system discharges directly to Jamaica Bay. JFK constitutes the major industrial activity discharging to the Jamaica WPCP. Specifically, only 17 percent of the Jamaica WPCF drainage area is occupied by industrial activity, of which JFK is the major contributor (4,500 acres). Other land uses contributing to the flow to the Jamaica WPCF include 3.3 percent of the land occupied by commercial activity, 5 percent occupied by open spaces such as parks and cemeteries, and over 74 percent devoted to housing.

Flows to the sanitary sewer system at JFK are from:

- Passenger facilities (e.g., bathrooms and kitchens)
- Building maintenance areas (e.g., boiler and HVAC rooms)
- Fuel storage areas
- Vehicle maintenance facilities (e.g., vehicle, floor wash water, and discharges through neutralization pits and oil/water separators)
- Aircraft maintenance facilities (e.g., aircraft, floor wash water, and discharges through neutralization pits and oil/water separators)

The stormwater collected by the storm sewer system is from parking areas, runways, rooftops, and fuel storage areas. Some stormwater also flows as sheet flow directly to Jamaica Bay and the basins surrounding JFK.

The USEPA, Occupational Safety and Health Administration, and NYSDEC have established regulations regarding the prevention of stormwater pollution. The USEPA regulations are found in 40 CFR 122, NPDES Regulations for Stormwater Discharges. There are also regulations under the Resource Conservation and Recovery Act (RCRA) in 40 CFR 260–262 and 270–272, Hazardous Waste Management. The regulations are found in 29 CFR 1910 Subparts G–K, Hazardous Materials, Environmental Controls, and Personnel Protection and 29 CFR 1910.1200 OSHA Hazard Communication Standard.

The Port Authority has a Best Management Practices (BMP) Plan for the airport that includes baseline and activity-specific management practices to prevent or minimize pollutants from contaminating stormwater runoff. The BMPs control potential adverse effects on surface water quality in and around the airport from point and nonpoint source stormwater runoff. They also help reduce the potential of stormwater becoming contaminated if chemicals used in certain activities at the airport are improperly used or spilled. Examples of the activities conducted in the Terminal 5/6 area to which BMPs apply include:

- Airplane deicing
- Airplane lavatory servicing

- Airplane or vehicle fueling
- Cargo handling
- Materials storage
- Spills or releases

Application of BMPs to the above activities reduces the potential for discharge of fuels, sanitary waste, hazardous substances or wastes, silt and sediment, and debris into surface waters adjacent to the airport.

5.16.2 Effect of Proposed Project

5.16.2.1 Construction Period

Groundwater may seep into excavated pits during construction. This groundwater seepage would be withdrawn in compliance with JFK's Long Island Well permit, and either recharged onsite or discharged to the airport stormwater collection system. The permit has been applied to dewatering activities at other redevelopment sites within the CTA and would be applicable to the project site. Most groundwater encountered during construction is expected to meet the applicable limitations for discharging without treatment. However, several areas of subsurface contamination have been identified adjacent to Terminal 6. If necessary, groundwater withdrawn from those areas would be treated to reduce contaminants to acceptable levels so that discharge quality would comply with the Port Authority permit. Therefore, dewatering and groundwater recharge during construction would have no significant impact on groundwater quality, and may have a beneficial impact on groundwater that is already degraded.

The NYSDEC regulates stormwater runoff during construction under the State Pollution Discharge Elimination System program. The program mandates the implementation of a Storm Water Pollution Prevention Plan that would include BMPs to prevent stormwater contamination during construction. BMPs include provisions for the control of erosion from soil and debris storage piles, containment of construction materials (hydraulic fluids, fuel, etc.), washing of construction vehicles, cleaning of cement mixers, and so on. The BMPs would be incorporated into the project's construction documents and would, therefore, become an obligation of each contractor on the site. The Port Authority would monitor compliance with BMPs and assure that stormwater discharges meet acceptable quality standards. Therefore, stormwater runoff and discharge into Jamaica Bay would have no significant impact on surface water quality.

5.16.2.2 Operations Period

Current discharges (regional and from JFK) would continue. The quantity of sanitary wastewater flow to the sanitary sewer system is expected to increase slightly due to the additional terminal building maintenance. The Jamaica WPCP has a capacity of 126 mgd and discharges 77 mgd. The discharge includes treated wastewater from all current operations at JFK. The projected increase of sanitary wastewater flow in 2007 is slightly more than 116 mgd, which is below the 126-mgd treatment capacity.

The quality of the wastewater generated from the Terminal 5/6 operation would be consistent with that of the wastewater currently discharged by JFK. The new terminal would meet all

limits for discharges to New York City sewers and, where required, provide the necessary pretreatment. For example, as required by Title 15 RCNY Chapter 19-11, grease traps would be provided for discharges from cafeteria and other food facilities at the Terminals.

The Port Authority has been issued a State Pollution Discharge Elimination System discharge permit in compliance with the NYSDEC for the entire airport that includes monthly monitoring requirements for specified water quality constituents. The constituents and their discharge limitations have been chosen, in consultation with NYSDEC, to specifically address issues relating to airport operations. Discharges through the stormwater conveyance system would be in accordance with requirements set forth in the Port Authority's permit. The quantity and quality of surface runoff from the airport is expected to remain the same after the terminals are completed. This is because any new facilities (e.g., increase in paved areas, which would increase stormwater runoff) would be designed and constructed to accommodate the increase in runoff. Occasional accidental discharges of pollutants to storm sewers (e.g., spills from aircraft operations) may occur. However, these would be cleaned up immediately, consistent with JFK's and the airlines' contingency plans.

JFK operations after the implementation of the Proposed Project would be similar to current operations and are not expected to affect existing groundwater quality. The contingency plans, which the airlines would implement at the terminals, will include immediate cleanup of all spills, thus minimizing the possibility for impacts on groundwater quality.

Airline operations in the renovated facilities are not expected to have any significant affects on the quality of wastewater currently discharged from JFK to the Jamaica WPCP. The quantity of wastewater is expected to increase but can be accommodated by the WPCP's existing capacity. No significant impacts on the quantity or quality of surface runoff from the airport are expected, since existing facilities would be used. Finally, no impacts on underground water quality are expected because there are no planned discharges to underground water.

5.16.3 Mitigation

Because routine airline operations are not expected to have any significant impact on water quality, mitigation measures will need to be established only as required by regulatory agencies to deal with the accidental discharges of products used in JFK operations. The mitigation measures will consist of a contingency plan requiring that all accidental discharges be cleaned up immediately and will describe the procedures and supplies to be used. This measure would prevent any significant impact on water quality from accidental discharges.

5.17 Wetlands

5.17.1 Existing Conditions

Freshwater and tidal wetland resources within the project area were identified through a review of:

- USFWS National Wetlands Inventory maps
- NYSDEC Tidal Wetlands maps and Freshwater Wetlands maps

Because the Proposed Project would use existing JFK facilities during both construction and operation, field verification of the identified wetlands was not conducted.

The USFWS classifies the wetlands bordering the airport as Estuarine, Intertidal, Flat, regular or intermittently exposed during tides (E2FLM or E2FLM) and as Palustrine, Emergent, temporary tidal (PEMSA). The NYSDEC classified the tidal wetlands around JFK as Littoral Zone, Intertidal Marsh, High on Salt Marsh, or Shoals and Mudflats.

Based on the information reviewed, there are no wetland areas at or near Terminals 5 or 6, although JFK itself is bordered by wetlands. Wetlands can be found along Jamaica Bay and parts of the Bergen and Thurston basins. There are no freshwater wetlands bordering the airport.

5.17.2 Effect of Proposed Project

According to NYSDEC Tidal Wetland Maps, there are no identified wetlands or regulated adjacent areas on the project site at JFK. The nearest wetlands are found along the airport's perimeter. The project would not involve the modification of delineated wetlands. Thus, the Proposed Project will have no significant adverse impacts on wetlands.

5.18 Wild and Scenic Rivers

The Wild and Scenic Rivers Act describes river areas that are eligible to be protected under the act as free flowing and possessing "outstanding remarkable scenic, recreational, geologic, fish and wildlife, historic, cultural, or other similar values." No rivers exist within or near the project site or JFK, so there would be no significant adverse impacts to wild and scenic rivers.

5.19 Floodplains

The Proposed Project is not located in the base floodplain and is not a critical action in the 500-year floodplain. Under the Proposed Action, flood effects (1) would not create an added dimension of disaster; (2) would provide for adequate warning lead time because the size of the area in the floodplain is more likely to result in sheet flows during flooding rather than in more narrowly confined, higher intensity flows; and (3) would not involve the loss of irreplaceable records, utilities, or emergency services. Actions could be taken to minimize harm where necessary, such as closing the facility to public use. For these reasons, the Proposed Project is not considered a "critical action" in which there is unusual or extraordinary risk to life and shelter. Since the project is not located in the base floodplain or the 500-year floodplain, it is not expected to have any significant impacts on floodplains.

5.20 Farmland

The Farmland Protection Policy Act authorizes the Department of Agriculture to develop criteria for identifying effects of federal programs on the conversion of farmland to nonagricultural uses. The Proposed Project does not involve acquisition or conversion of farmland, and so it will not have any significant impacts on farmland.

5.21 Light Emission

Light emissions from the Proposed Project have been considered to evaluate whether an annoyance may occur in residential areas around JFK. Since the terminal would be built in the south section of the JFK complex, removed from the residential areas along the north border of the airport, no lighting would be directed to residential areas. Therefore, no light emission impacts are anticipated to occur under the Proposed Project.

5.22 Construction Impacts

Potential impacts to water quality will be minimized or avoided through the use of the Port Authority's adopted BMPs. BMPs address soil erosion and sediment control and potential impacts on water that could result from excavation dewatering. As noted in Section 5.16, all wastewater, including contaminated groundwater, will be discharged in accordance with appropriate regulations and permits. In addition, BMPs would be implemented to prevent and respond to accidental spills. Contractors will be required to comply with all applicable federal, state, and local laws and regulations including guidance contained in FAA. Advisory Circular 150/5370-10A, *Standards for Specifying Construction of Airports* (February 17, 1989).

5.22.1 Air Quality

Emissions from construction equipment are discussed in Section 5.1, Air Quality. Air quality impacts resulting from construction are addressed in that section under "Construction Emissions." As discussed in Section 5.1.2.1, a general conformity analysis was performed for project related construction and operation emissions, and included the emissions from a variety of nonroad and onroad construction equipment. Emissions resulting from construction related activities were determined to be less than or equal to applicable *de minimis* threshold rates and did not increase the frequency or severity of any existing violations of national standards. The analysis concluded that the Proposed Project would conform to the New York SIP and the conformity rules and requirements of the Clean Air Act.

Air quality construction impacts can be reduced through application of appropriate air quality mitigation measures. To ensure that construction mitigation measures are used, the Port Authority would require that all construction contracts specify procedures set forth in FAA. Advisory Circular 150/5370-10A, *Standards for Specifying Construction of Airports* (February 17, 1989), as well as Port Authority's *Good Environmental Practices Manual for JFK* (December 1997). These procedures restrict the emission of dust (particulate matter) and provide a series of measures that can be taken to prevent particulate matter from becoming airborne. Such measures assure that construction related air quality impacts are minimized.

5.22.2 Noise

Operators of the equipment and other nearby construction workers typically experience relatively high levels of noise from various types of construction equipment. Appropriate measures should be taken to protect operators and workers from excessive noise exposure. There is no residential development near the proposed construction site. Therefore, no residents are anticipated to be significantly affected by construction noise.

5.22.3 Surface Traffic Congestion

Daily construction materials supply and removal activities would be scheduled during off-peak traffic periods to the maximum extent possible. Routes used by trucks transporting materials to and from the construction site would be specified to minimize the number of project-related vehicles on the roadways in the airport environs at any one time. Due to the coordination of these measures, no significant impacts in relation to construction surface traffic are anticipated.

5.22.4 Potential Impacts to Airside Operations

Construction of the Proposed Project could affect airside operations. This disruption can be attributable to several factors such as project mobilization, demolition, and removal requirements; locations and haul routes in and out of laydown areas and equipment yards; delivery of construction materials; building construction and airside paving; additions of roadways and pedestrian bridges; and numerous other needs and activities associated with the project. The airfield must remain operational and the airline passengers must be processed.

Carrying out construction at the scale required to implement the Proposed Project generally is similar to what has occurred on other development projects in the CTA. It is also comparable to what has occurred at other airports in the U.S. where major redevelopment programs have been undertaken. The large international airports in Seattle, Miami, Washington DC, and Chicago are a few such facilities that have carried out similar programs. All these airports, including JFK, have had to deal with generally similar construction activities and disruptions in the completion of their respective development programs.

The effects of construction on airfield and landside operations are reduced and minimized through various standardized techniques. Careful scheduling and project controls involving short-term changes and temporary closures, nighttime and off-peak construction to the extent possible, and extensive public notification and awareness, are some of these methods.

The impacts of terminal redevelopment construction activity generally are not considered to be significant because they are limited to specific periods that are short term or of limited duration. They are carried out in accordance with known BMPs and rigid scheduling that minimizes, if not eliminates, airfield disruption. The tenant airlines and the public will demand that this be so, and the Port Authority would expect nothing less of its contractors.

5.23 Other Considerations

5.23.1 Possible Conflicts

There are no known conflicts between the Proposed Project and the objectives of federal, state, regional, or local land use plans, policies, or controls for the JFK area.

New York State Department of the State has reviewed the proposed development for consistency with the state and city coastal management program policies. As a result of its review, the agency has concluded that the proposed development is consistent with state and city coastal policies. As described above, several environmental approvals are needed to implement the project. Applications for approvals will be submitted to NYSDEC or other appropriate agencies. The design and construction of the project will follow the requirements

of applicable building codes and other relevant local regulations. Thus, the project is not likely to be inconsistent with any federal state or local law or administrative determination relating to the environment.

5.23.2 Inconsistency with Approved Plans or Laws

The Proposed Project is not inconsistent with plans or laws of federal, state, regional, or local laws or administrative determinations relating to the environment. The City of New York has expressed its policy that JFK remain the primary international gateway to the U.S. Modernization of JFK is critical if this policy is to be achieved, especially since an increasing number of U.S. airports provide international service. Therefore, the project is reasonable and consistent with plans, goals, policies, and controls that have been adopted in the region.

5.23.3 Means to Mitigate Adverse Impacts

Means of mitigating potential environmental impacts are incorporated into the plans for operating the project, where noted, in the above impact categories.

5.23.4 Degree of Controversy on Environmental Grounds

The public is aware of proposed development at JFK through various news reports regarding airport plans. The Terminal 5/6 Redevelopment Project has been reported in local newspapers and is periodically discussed at meetings of the Port Authority Board of Commissioners. Neither the USDOT nor the FAA nor the Port Authority were aware of any major environmental controversy that has been generated from notices regarding the Proposed Project, other than the interest expressed in preserving and re-using the TWA Terminal, as described in Section 3, Section 5.8, Section 6, , and Appendix A, *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK.*

Due to the historic significance of the TWA Terminal, the connecting tubes, and Flight Wing 2, the Proposed Project generated a great deal of controversy, particularly with regard to the adaptive reuse of the TWA Terminal and the connector tubes, and public access to these structures. Nine consulting parties participated in development of the preferred alternative and in development of an MOA which describes details and future processes for the rehabilitation, restoration and reuse. The executed MOA is provided in Appendix D *Memorandum of Agreement* . The project would increase terminal operational efficiency but would not affect flight patterns, runway use, or number of passengers. The Proposed Project is consistent with the historical pattern of progressive improvements of terminal infrastructure that have occurred over time at JFK. Operation of the project would have no significant environmental impacts, and mitigation is proposed for impacts to the historical resources.

5.24 Cumulative Impacts Analysis

The CEQ NEPA regulations (40 CFR 1508.7) define a cumulative impact as "the impact on the environment, which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or nonfederal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time." This cumulative impact analysis was conducted in accordance with FAA Order 1050.1D and DOT Order 5610.1C and the January 1997 CEQ guidance.

This section addresses cumulative impacts that could occur as a result of the Proposed Project. A discussion of the environmental setting of JFK and the immediate region is followed by an overview of the JFK Redevelopment Program, including background on projects recently completed, under development or planned in the foreseeable future. An analysis of the specific cumulative impacts that could occur is provided below for each environmental category addressed in FAA Order 5050.4A, *Airport Environmental Handbook.* The impacts of the Proposed Project are restated, and the combined cumulative impacts with other projects are analyzed. Information regarding impacts for a specific project is provided if available. It should be noted that several projects are still in the planning stages, and specific information on associated impacts may not be available. The following summarizes information known at this time.

The construction schedule of the Proposed Project would overlap those of other airport projects described below, including the American Airlines Terminal Redevelopment which is underway with the current phase anticipated to be complete by 2007. The cumulative environmental impact of these projects is expected to be minimal, as most of the projects under development at JFK will provide positive air quality benefits when operational. Extensive mitigation procedures will be put into place to alleviate potential adverse impacts during construction. As described below, the Proposed Project is in keeping with the overall planning mission of the Port Authority and would not result in unmitigated adverse cumulative impacts.

5.24.1 Environmental Setting

The environment of southeastern Queens has undergone tremendous urbanization over the past century that reflects general growth trends in the New York City metropolitan area—namely, an increase in the demand for lower-density housing and the development of a transportation system to serve the movement of people and goods. Meanwhile, JFK grew as the airline industry and demand for air service grew, consuming a greater area of what was marsh and open water adjacent to Jamaica Bay for airport and airport-related business facilities.

The net effect of urbanization, transportation system development, and development of JFK has been an irreversible alteration of the landscape of southeastern Queens. Projects undertaken in the latter half of the century to minimize, control, or prevent further deterioration of the environment of southeastern Queens have included creation of the Jamaica, Bay National Wildlife Refuge within the Gateway National Wildlife Area (USFWS and NPS respectively) and the installation of sewage treatment plants by the NYCDEP. Current planned efforts include the control of leachate at landfills around Jamaica Bay by the NYCDEP, the development of the shoreline Parkway Bicycle Path by the NYC Department of Parks and Recreation, and the improvement of the Jamaica WPCF.

5.24.1.1 Historical Development and Planning at JFK

The ongoing Redevelopment Program at JFK is consistent with long-range planning for the airport and reflects the need to modernize JFK in the face of continued economic improvement in the New York metropolitan area. Past planning efforts undertaken by the Port Authority and other regional planning agencies have recommended redevelopment of the terminal and other landside facilities at JFK to meet the growing air service demands of the region and to enhance the airport's ability to serve the needs of the airline industry.

Terminal Improvements. JFK opened to commercial traffic in July 1948 as New York International Airport. Until 1957, passenger traffic was handled in Quonset-hut type buildings. A new master plan for the airport conceived in 1955 envisioned a Terminal City —a central international arrivals terminal ringed by smaller unit terminals. This concept was carried out in the design of Terminal 4 (the International Arrivals Building and Airline Wings), which opened in December 1957. Unit terminals for Eastern Airlines, American Airlines, United/Delta Airlines, Pan Am, and Braniff/Northeast/Northwest Airlines opened between 1959 and 1961. The TWA Terminal was the last of the signature buildings to open in 1962.

Although the Port Authority and airlines undertook improvement programs in the late 1960s to accommodate jumbo jets and increased passenger traffic at JFK, no major improvements have been made to Terminal 5 or Terminal 6 in over 30 years. The now outmoded facilities, designed to handle a different class of commercial aircraft and fewer operations and passengers, are in critical need of improvement.

The current redevelopment of the terminal core at JFK continues in the same central area first set aside for terminal buildings in 1942; however, the scale of this Redevelopment Program is much larger than its predecessor. In addition to recently completed Terminal 1, Terminal 4, and Terminal 7, and others are being modernized or redeveloped (Terminals 8 and 9), with further development being considered at Terminals 2 (Delta) and 3 (Delta, formerly Pan Am). In addition to the new terminals to be constructed, the Port Authority is undertaking other infrastructure improvements. Several cargo facility modernization projects have been completed or are under way in response to continued improvement in the national and global economies and growth in air passenger demand.

Roadway and Public Transit Improvements. The ground transportation system serving JFK had long been recognized as inadequate to serve airport access and regional transportation needs. Plans for improving transit and highway access to JFK have been proposed by regional transportation and planning agencies for more than 30 years.

Numerous studies have documented the need for enhanced rail connections between JFK and downtown Manhattan. A 1968 study by the Metropolitan Transportation Authority (MTA) recommended a connection between the LIRR's Jamaica Station and JFK. In 1969 the Port Authority, the MTA, and the airlines studied other alternative ways to connect JFK to the LIRR. In 1971, the MTA initiated design on the recommended alternative—extension of the Rockaway Beach Branch line to Howard Beach and the CTA. Several public transportation initiatives, including a 1978 "Train to the Plane" initiative called the JFK Express, proved unsuccessful or were never implemented.

A key focus of the JFK2000/CTA Redevelopment Program, initiated in 1988, was to improve ground access at JFK to reduce passenger delays. The program recommended major improvements to the roadway system within the CTA, development of an on-airport people mover system that ultimately could connect with the LIRR at Howard Beach Station, and improved bus connections from the CTA to airport parking, rental car and other regional transportation facilities. While some improvements were implemented, others, including the people mover system, never materialized.

In the early 1990s, acknowledging that Redevelopment Programs under way at the three New York metropolitan airports would improve operational efficiency and improve passenger level of service, the Port Authority recognized that development of more efficient airside and

terminal facilities would only further constrain the already strained ground access system serving the airports. At JFK, The Port Authority began to reevaluate the implementation of transportation system improvements that would enhance access to, from, and within JFK for both air passengers and airport employees.

In the *Final Environmental Impact Statement, JFK International Airport Light Rail System* (Port Authority, May 1997), the Authority evaluated nine alternatives to improve airport access including additional roadway improvements, subway and rail extensions, and busways. The *Final Environmental Impact Statement, JFK International Airport Light Rail System* (Port Authority, May 1997) recommended the development of an 8.4-mile light rail system that would connect the CTA at JFK with the New York City Transit system at Howard Beach Station and the LIRR at Jamaica Station. The AirTrain project was recognized as critical to maintaining JFK's capacity and efficiency, meeting anticipated growth in air passenger demand, reducing congestion on the Van Wyck Expressway, improving air quality, and ensuring the long-term health of the regional economy. The AirTrain became fully operational in December 2003, and is expected to alleviate surface traffic congestion and impacts on the environment.

5.24.2 The JFK Redevelopment Program Goals

This section discusses the JFK Redevelopment Program and outlines its goals through discussions of aviation activity forecasts, passenger level of service, safety, airline competitiveness, and environmental benefits.

5.24.2.1 Accommodate Forecast Aviation Demand

Section 2 *Purpose and Need* outlines the FAA's and the Port Authority's recent aviation activity forecasts for JFK. An estimated 42 million annual air passengers will use JFK in 2012, compared to 29 million in 2002. This estimate reflects the underlying passenger growth that would be supported by reasonably strong domestic and international economies. It is expected that higher economic growth will induce greater passenger growth and intensify competition.

5.24.2.2 Improve Passenger Level of Service

Passenger LOS is a driving factor in the redevelopment of terminal facilities at JFK. It is part of the Port Authority's mission to establish efficient and productive transportation facilities to support the economic growth and development of the regional economy. The Port Authority and its tenants will invest more than $9 billion at JFK over the next 10 years. Without improvements, the LOS will decline, resulting in increased user costs, processing delays because of outmoded facilities, possible compromises in safety for workers and airport operations, and reduced environmental quality.

As discussed in Section 2, the Proposed Terminal 5/6 Redevelopment Project is designed to upgrade Terminals 5 and 6 at JFK to meet modern aviation planning standards, improve overall efficiency and enhance customer level of service. Terminals 5 and 6 were designed and constructed more than 40 years ago. Major changes in the industry and technology, coupled with the advanced age of the facilities, have greatly reduced the viability of the buildings. The Proposed Project meets the Port Authority's goals for providing improved level of service to airport customers. It will accommodate the existing and planned growth of the airlines at a high LOS for both domestic and international operations in an individual terminal, eliminating existing deficiencies in the passenger terminal facilities and enhancing compliance with disability regulations and other terminal area restrictions and shortcomings.

The additional contact gate capacity provided by the Proposed Project would improve passenger LOS, as fewer bussing operations between the terminals and remote parked aircraft would be required. The associated 1,500-space parking structure and connecting walkway to the terminals would further enhance customer service and provide airport patrons with the efficient parking options they expect and desire.

Overall, the Terminal 5/6 Redevelopment Project would improve passenger LOS by creating a single development terminal that would accommodate both domestic and international passengers and meet the modern planning and level of service criteria established in FAA Advisory Circulars 150/5360-13, *Planning and Design Guidelines for Airport Terminal Facilities* (1988), and 150/5300-13, *Airport Design* (September 1989).

5.24.2.3 Enhance Safety

The need for enhanced safety of aircraft operations and terminal area activities is required now and will be further implemented by the Proposed Project. The aircraft operating requirements in this area of the airport, particularly near Terminal 6, are complex because of the number and location of buildings and the limited space available for aircraft maneuvering and parking. A simplified terminal area aircraft parking layout is needed to enhance operational safety and provide for adequately sized gates, basic building configurations, and maximized terminal frontage. The proposed airside building and parking layout satisfies this need by providing apron and building geometry and development that is easily comprehended from the airside and improves upon aircraft routings and the complex taxiing that occurs now to reach certain gates. Safety enhancements are also needed in the interior of terminal buildings to improve passenger security screening, and to update and modernize environmental and life support systems. The Terminal 5/6 Redevelopment Project addresses these concerns and provides for the needed safety improvements.

5.24.2.4 Improve Airline Competitiveness

The airlines' ability to remain competitive in the marketplace requires upgrading Terminals 5 and 6. Construction of Terminal 1 within the CTA was completed in May 1998. Delta Airlines is interested in modernizing and improving Terminals 2 and 3. A $1.2 billion terminal redevelopment project, under way at Terminal 4 since May 1997, was completed in May 2001. British Airways recently completed upgrades to Terminal 7. American Airlines has begun construction of a new terminal development project that will eventually replace Terminals 8 and 9 at a cost of nearly $1 billion.

In an industry where the competitive environment includes passenger convenience and airline image, the current and future tenants of Terminals 5 and 6 must undertake improvements to remain competitive, to expand their customer base and meet travelers' expectations.

5.24.2.5 Environmental Benefits

Increased Operating Efficiency. The JFK modernization program is designed to improve overall airport efficiency. Ongoing terminal redevelopment projects improve operating efficiency by consolidating passenger-processing facilities, thereby reducing split operations of some carriers, improving passenger flow, and reducing delays. American Airlines' Terminal 8/9 Redevelopment Project provides major operational enhancements, as the new consolidated facility will alleviate delays, congestion, and confusion related to deficiencies in the existing terminal configuration. Cargo modernization projects will benefit airlines operating at JFK

today by providing modern facilities that can accommodate the larger aircraft and increased air cargo tonnage handled at the airport.

Energy-Efficient Building Systems. Many of the buildings at JFK were constructed in the 1950s and 1960s and have not been upgraded since the 1970s. A major benefit of the JFK Redevelopment Program is the installation of modern, energy-efficient electrical, heating and cooling systems. For many of the projects recently completed, under development, and proposed, energy savings are expected as a result of improvements in design, materials, and equipment. Some projects (e.g., the American Airlines terminal redevelopment) result in greater energy consumption as a result of increased demand for electricity from facility improvement, but the increase in demand is primarily due to the use of 400-Hz power systems that will have air quality benefits, as described below. Other projects such as the Airis cargo development take advantage of energy-efficient building systems and use less energy.

Air Quality and Surface Transportation Benefits: Terminal, Roadway, Parking, and HOV Mode Improvements. Several initiatives associated with the JFK Redevelopment Program result in positive air quality impacts. The Proposed Project and other terminal modernization projects would provide long-term air quality benefits as a result of increased use of contact gate positions, and roadway and parking facility improvements. Improvement of contact gate positions would reduce the number of ground service vehicle trips and airside busing operations required. In addition, 400-Hz power systems at contact gate positions eliminate the need to run auxiliary power units (small jet engines within the aircraft) while aircraft are being serviced, reducing the emission of criteria pollutants to the benefit of air quality. Increased use of alternative fuel vehicles, including electrically powered ground service equipment vehicles, will result in additional air quality improvements. In accordance with the Energy Policy Act of 1992, the Port Authority has been purchasing alternative fuel vehicles and recently applied for a federal grant under AIR21 to further this initiative. On May 22, 2001 the FAA announced the selection of 10 public-use airports, including JFK and LaGuardia Airports, to participate in the Inherently Low-Emission Airport Vehicle Pilot Program. The intent of the program is to improve air quality at the nation's airports by encouraging the use of alternative fuel vehicles. Under the program, each airport sponsor is eligible to receive up to $2 million in grants through the Agency's improvement program. The Port Authority received their requested grant.

As a whole, the JFK redevelopment projects are expected to reduce roadway congestion and increase HOV mode share at the airport. While these projects are intended to increase operational efficiency, they are not expected to result in increased operations at JFK, and would not, therefore, result in increased on-airport surface traffic. The JFK AirTrain system, in particular, is expected to relieve surface traffic congestion on the roadways near JFK, and greatly improve transit access for airport passengers.

Proposed changes to the curbside roadways and development of enclosed parking facilities to serve the replacement terminal, under the Proposed Project, are expected to improve circulation within the CTA and reduce vehicle miles traveled. By adding parking closer to the terminals, passenger level of service also will be improved over existing conditions.

The Proposed Project, in conjunction with other projects under development in the CTA, will not adversely affect air quality or surface transportation in the region.

5.24.3 Related Projects

This Proposed Project has been evaluated in this *EA* with consideration of other on- and off-airport actions, which include the development of the Jamaica Transportation Center, startup of JetBlue operations at JFK, construction at other terminal buildings, and the JFK light rail (AirTrain) system. These actions are evaluated separately in other environmental documents. The cumulative impact analysis presented in this *EA* includes a review of available environmental documents for other projects at JFK and extensive discussions with Port Authority and FAA staff.

5.24.3.1 Local and Regional Plans

Proposed projects in Jamaica include development of an intermodal transportation center to reduce traffic and congestion, improve air quality, and enhance economic development. The Jamaica Transportation Center project is supported financially by a Congestion Mitigation Air Quality grant from the federal government to the State of New York. The Port Authority is responsible for contractual management and overall administration of the project. The JFK light rail system is being incorporated into the Jamaica Transportation Center planning.

Other improvements in the area include installation of intelligent transportation infrastructure on the Van Wyck Expressway to provide some operational improvement and the extension of the Nassau Expressway to the Belt Parkway, both initiatives of the New York State Department of Transportation.

Parts of southeastern Queens, particularly Jamaica Center, are undergoing redevelopment. Recent government efforts at stimulating redevelopment in Jamaica Center include the Social Security Administration Federal Building, the Master Plan at York College, the extension of the New York City Transit subway system to the Parsons/Archer Station in Jamaica Center, the creation of a transit mall, and the designation of Jamaica as an Economic Development Zone. Other proposed projects in Jamaica include the following:

- Queens Civil Court Building
- FDA Building at York College
- Sony Theater Complex (above the New York City Transit Parsons/Archer Station)
- New York City Department of Finance Administration's Help Center

5.24.3.2 JFK Redevelopment Program

The Port Authority's JFK Redevelopment Program will vastly improve the airport's functionality and enhance customer service. The various improvement projects have been analyzed within three operational and physical development groups: airside, landside-CTA, and landside-perimeter. Projects denoted as "landside-CTA" are within the CTA and provide landside support for aviation activity at JFK. Landside projects include passenger-processing functions, such as terminal development, as well as light rail, curbside, and access roadway development. Projects denoted as "landside-perimeter" are located on the north and southwest sides of JFK. They include cargo and maintenance facilities that support aviation activity at JFK. The following summarizes ongoing or recently completed projects and projects anticipated in the foreseeable future.

Airside. These projects comprise improvements to the airfield, including modifications to the runways and supporting taxiways and taxilanes at JFK:

- **New Large Aircraft (NLA) Implementation Plan.** Proposed projects that are being planned to the runways and taxiways should the NLA be developed within the next 5 to 10 years consist of the Rehabilitation/Relocation of Taxiway "A", Rehabilitation/Relocation of Taxiway "Q", Strengthening of Taxiway Bridges, Rehabilitation and Widening of Runways 13L-31R and 13R-31L. These projects are dependent upon the modifications of standards that are currently being submitted to the FAA and may not occur if such modifications are not granted. This is in the study and planning stage. A *Draft EA of Improvements to Accommodate the A380 at JFK* (Port Authority, March 2004) was submitted to the FAA for their review on March 12, 2004. There would be no known adverse cumulative effects with the Proposed Project since NLA would be quieter and less polluting than the aircraft being replaced. NLA are expected to result in positive environmental impacts.

- **Taxiway "K" and "C" Rehabilitation.** Work includes upgrading two hold bars and milling/overlaying portions of Taxiways "K" and "C". This project is expected to begin in June 2003 and be complete at the end of the year. A categorical exclusion was approved for this project in March 2003. There would be no known cumulative effects with the Proposed Action.

- **Rehabilitation of Taxiway "B", Phase 1.** Work includes re-paving large portions of the taxiway and electrical infrastructure work. The taxiway width will remain the same (75 feet) since this project is not related to NLA. The work is being divided into three separate projects due to budget constrictions. A Form A was submitted in May 2003 for the first portion of the project, which is expected to begin in July 2003 and be complete by the year's end. Work on the remaining two sections of the taxiway will be done in 2004 and 2005. A categorical exclusion was approved for this project in May 2003.

- **Runway Hold Bar Upgrades.** Work includes upgrading hold bars at 24 areas to bring the hold bars into compliance with FAA standards. Work began in August 2003 and is expected to be complete by August 2004. A Categorical Exclusion was approved for this project in May 2003.

- **Sanitary Sewer Micro - Tunneling to Extend Service to CTA.** Work includes micro--tunneling to provide a sanitary sewer link between the CTA and the City sewer main north of the airport. Work has begun and should be complete by April 2004. There would be no known cumulative effects with the Proposed Action.

- **Runway 4L-22R Bypass Taxiway.** The scope of work for this project includes a new feeder taxiway to Runway 4L that is located across the CTA to the southeast. Design should begin in 2005 and construction is planned for 2007. Construction of the action proposed in this document will be completed by the time construction begins on the Runway 4L-22R Bypass Taxiway. Therefore, there would be no cumulative construction effects and no ongoing cumulative effect.

- **Runway 4R-22L Rehabilitation and Widening.** Components of this project include placement of asphalt concrete overlay and grooving, widening the runway pavement to 200 feet from 150 feet and adding shoulder pavement, improving the non-paved runway safety areas (RSAs) to current FAA standards, rehabilitation of the electrical, lighting, and navigational aid systems, and relocation of an existing patrol road further away from the runway. This project received a Finding of No Significant Impact (FONSI) in April 2002.

This project was completed in December 2003. There would be no known cumulative effects with the Proposed Action.

- **Firefighting Training Facility Phase II.** This project involves construction of additional simulator pad with aircraft fuselage for internal firefighting training activities, and is located on the northeast portion of the airfield. A Categorical Exclusion was approved for this project in July 2003. Construction began in July 2003 and should be completed by the third quarter of 2004. There are no known cumulative effects.

- **Upgrade of Runway 4L-22R to Cat II/IIIb Capability.** This development concept is in the feasibility study phase. The first phase - a cost/benefit analysis- has been completed. Additional studies are required prior to commencing design. As part of the program, the feasibility of removing the displaced threshold on Runway 22R would be addressed. Since the Proposed Project does not affect runway usage, no cumulative effects would occur.

- **Inherently Low-Emission Airport Vehicle (ILEAV) Pilot Program.** Japan Airlines (JAL) proposes to construct a compressed natural gas (CNG) station for its fleet of GSE vehicles at Building 151. JetBlue is also in discussion with the Kingdom Group to do the same at Terminal 6. The ILEAV Program is in progress.

- **New York/New Jersey Airspace Study.** This project is in the planning phase to improve the airspace capacity and efficiency for the overall airport system within the New York City area. Definite plans for the redesign of the airspace in the area have yet to be developed. This project is not defined, but is not expected to have cumulative effects.

- **Relocation of Visual Approach Slope Indicator (VASI).** Plans are underway to relocate the VASI associated with Runway 13R. There would be no known cumulative effects with the Proposed Action.

- **Interim Repairs of Runway 13R/31L.** Interim repairs are proposed for this runway in order to extend its serviceable life into the next paving cycle after year 2006. The scope of work consists of repairs to 14 transverse cracks, mill/overlay three inches of asphalt pavement in the keel area (75-feet wide), replace deteriorated concrete at the east end near Runway 4L and seal coat the taxiway stubs. Work is proposed for the Q2 (second quarter) 2004 and should take 12 months. An FAA Form A will be submitted in the near future. This runway is not scheduled to be widened under the NLA program until 2007.

- **Rehabilitation of Runway 13L/31R.** This runway will receive periodic minimal rehabilitation in order to extend its serviceable life into the next paving cycle in 2016 when it is scheduled to be widened to 200-feet under the NLA program. Work is proposed for Q3 (third quarter) 2004 and should take one year. An FAA Form A will be submitted soon.

- **Replacement of Engineered Material Arresting System (EMAS) bed at the end of Runway 4R.** Work was completed in October 2002. A Categorical Exclusion (CATEX) was approved for this project in June 2002. This project was completed in October 2002.

Landside-CTA. These projects are within the CTA that provides landside support for aviation activity at JFK. Landside projects include passenger-processing functions, such as terminal development, as well as light rail, curbside, and access roadway development.

- **Parking Garage at Terminals 8 & 9.** Build an open, six-story parking garage that will be comprised of ground level parking and five elevated levels parking structure to accommodate the expansion and modernization of Terminals 8 & 9 (Red) Quadrant by American Airlines. This project received a FONSI in April 2003. Work is expected to start in the fourth quarter of 2004 and be complete by the end of 2006.

- **Light Rail System (LRS) / AirTrain Project.** This project connects the JFK CTA with the Long Island Railroad and the New York City subway at Jamaica Station, Queens, through a LRS. The environmental approval process for this project was approved and construction is complete, and the AirTrain is fully operational. The AirTrain is expected to provide positive environmental benefits in terms of air quality and surface transportation in the environs of JFK.

- **Terminal 7 - Expansion of British Air Terminal.** The project scope includes the renovation of the terminal with an 18,000 square feet expansion to the frontage as well as a parking deck and roadway reconfiguration. The parking deck and roadway reconfiguration portion of this project was the subject of a written reevaluation of the JFK-2000 *EA*. This project is complete.

- **Rent-A-Car Site.** The proposed redevelopment would include roadway modifications to be constructed by the Port Authority and tenant redevelopment of their individual rental car facilities. Construction began in December 2002 and is schedule for completion by the December 2004. This project received a FONSI in September 2002.

- **Relocation of Interline Baggage Operation.** Stage 1 design plans have begun to shift the interline baggage operation to the CTA.

- **Terminals 2 and 3 - Delta Air Lines Terminal Redevelopment.** Delta intends to renovate their terminals, baggage system, roadways and access to AirTrain. Work is expected to begin by the third quarter of 2004 and take several years to complete.

- **Terminal 4.** The new 1.5 million square foot terminal is a replacement for the former International Arrivals Terminals (IAT). Construction started in 1997 and is complete.

- **Terminals 8/9 - American Airlines Terminal Redevelopment.** This project includes demolition of Terminals 8 and 9 and construction of a new 1.9 million square foot replacement terminal complex with 56 gates. The Port Authority completed an *EA* for this project in August 1999 and the project subsequently received a FONSI determination from the FAA. The redevelopment project is currently under construction with a partial completion scheduled for the first quarter of 2005 and full completion (39 gates) in 2007. No plans are underway for American to build all 56 gates.

- **Renovate and Expand the General Aviation Terminal (Building 145).** Work has begun and is expected to be complete by December 2004. A Categorical Exclusion was approved for this project in June 2002.

- **JFK Cogeneration Plant.** The FAA has approved the installation of a third exhaust stack. Commencement of construction will begin after negations between Calpine and Port Authority are completed.

- **American Airlines GSE Building.** American plans to build a 5,766-square foot, six bay, single story building to support their fleet of ground support equipment for Terminals 8 and 9. The project is in the design phase and construction is planned for 2006.

Landside-Perimeter. The landside-perimeter projects are located on the north and southwest sides of JFK. They include cargo and maintenance facilities that support aviation activity at JFK.

- **JetBlue Support Operations Campus at Building 179/81.** The new facilities will include a 2-bay narrow body maintenance hangar for Type A maintenance checks for Airbus A320/A321 aircraft, routine provisioning, material services, GSE maintenance, office/administration/staffing functions, and parking. The project received a FONSI in May 2003. Work began in the fall of 2003 and should be complete by mid-2005.

- **Hangars 3, 4, and 5.** The Port Authority has issued an RFP for redevelopment of this cargo leasehold and Trammel Crow, a developer has been selected. Design has begun and work is scheduled to begin in late 2004 and be complete by 2006. This project received a FONSI on August 28, 2003.

- **Hangar 12 Demolition and Redevelopment .** This project is in the planning/design stages to reuse this hangar for a future cargo building. The project would include the demolition and replacement of Hangar 12, truck docking and parking and automobile parking.

- **Relocation of Guard Post "R" and Redevelopment of North Hangar Road.** This project is in the design phase and consists of constructing an air operations area fuel parking area, relocating existing Guard Post 'R', pavement markings for the restricted vehicle service road and widening/alignment modifications to existing North Hangar Road. Work is planned for the third quarter of 2004.

- **Phase-I Deicing Facility.** This project consists of installing two clamshell facilities using infrared (IR) technology to remove snow/ice from aircraft. The goal of this facility is to reduce the airport's use of chemical deicing fluids by 75%. A categorical exclusion was approved for this project in September 2002. Work is on hold.

- **Phase-II Deicing Facility.** Consists of expanding the Phase-I leasehold, installing two additional deicing clamshell facilities, a new taxiway cut, demolition of buildings 95 and 96 and construction of a new blast fence. This project is contingent upon the success of the Phase-I Deicing Facility.

- **Continental Cargo Processing Facility.** Construction of a new 57,000 sq. ft. cargo processing facility and aircraft apron area project has been completed. A FONSI was received for this project.

- **Airis Development Air Cargo Terminal.** The Airis Development Corp. plans to develop an air cargo terminal consisting of two state-of-the-art cargo facilities in the vicinity of the former United Airlines Cargo Building that was demolished in 2000. The larger cargo building (approximately 279,000 sq. ft.) will include five aircraft parking positions and will be leased by Lufthansa. The second building will be designed as a multi-tenant facility (approximately 150,000 sq. ft.) and will provide two aircraft parking positions. This project is intended to provide modern replacement cargo facilities for existing air carriers at JFK and is expected to provide safety, operational, and environmental benefits. The FAA issued

a FONSI in November 2000 for an *EA* prepared for this project. Construction was completed in the fourth quarter of 2003.

- **Central Taxi Hold Improvement.** The scope of work includes demolition of Building 199 and expansion of the taxihold lot. This project will result in environmental benefits in the form of enhanced circulation. Construction was completed in 2001.
- **Reconfiguration of 130th Place and Bergen Road.** Work includes reconfiguring the roadway to accommodate increased traffic. Work was completed in December 2003.
- **FAA Office Building.** A new building for the Eastern Region has been completed off-airport in 2000. The site is north of JFK off the Nassau Expressway.
- **Ferry Service to Manhattan.** A high-speed ferry service is proposed between Bergen Basin and Manhattan. This project is in the conceptual design stage. Work is planned for 2005.

5.24.4 Cumulative Impacts by Environmental Category

5.24.4.1 Noise

As stated in Section 5.11, the Proposed Project is not expected to cause significant noise impacts. Since the Proposed Project is not expected to induce a change in either the type or number of aircraft flight operations, there would be no change in noise levels experienced by communities near the airport as a result of the proposed terminal redevelopment project. None of the identified landside-CTA, landside-perimeter, or airside projects is expected to produce significant changes in noise levels in the airport environs. Therefore, no cumulative noise impacts will occur.

5.24.4.2 Compatible Land Use

The area adjacent to the airport primarily includes airport-compatible land uses that would not be affected by or sensitive to activities associated with the Proposed Project. The greater area surrounding the airport is highly developed or over water and would be unaffected by the Proposed Project. Other projects at the airport would not affect the compatibility of adjacent land uses. Because neither the Proposed Project nor other projects would adversely affect land use compatibility near the airport, no significant adverse cumulative impacts are likely to occur.

5.24.4.3 Social Impacts

Because no relocation is involved and no other adverse effects on the social environs would occur, the Proposed Project would not be expected to contribute to any significant adverse cumulative social impacts when considered in conjunction with other landside and airside projects at JFK.

5.24.4.4 Induced Socioeconomic Impacts

The Proposed Project would benefit the local and regional economies through increased employment, more efficient air travel, and cumulative regional growth. Relatively minor increases in public service demands and benefits to local businesses and the economy would result from the Proposed Project, in conjunction with other actions under development, planned or under consideration by the FAA and the Port Authority. Existing airport and

municipal government organizations can meet the cumulative airport demand on public services. The economic needs of other projects are expected to be easily served by the businesses, labor, materials, and equipment available in the New York metropolitan area. Therefore, no significant changes in population movement, growth, public service demands, or businesses would be generated by these other projects.

In summary, there do not appear to be any potentially significant adverse cumulative socioeconomic impacts that would be induced from the Proposed Project in combination with these other activities.

5.24.4.5 Air Quality

The Proposed Project will not result in operational or construction related emissions that equal or exceed the applicable *de minimis* threshold rates, nor increase the frequency or severity of any existing violations of the national standards. Based on the analyses presented in Section 5.1, the Proposed Project conforms to the New York SIP and the conformity rules and requirements of the Clean Air Act.

Overall, the proposed Terminal 5/6 Redevelopment and other terminal redevelopment projects are expected to improve air quality as a result of reduced energy consumption, improved circulation within the CTA, and increased operating efficiency. In conjunction with other projects recently completed, under construction or planned in the foreseeable future at JFK, no cumulative adverse air quality impacts are anticipated from the Proposed Project. In fact, in combination with other projects, positive air quality impacts are likely. Recent environmental assessments for other projects indicate that long-term air quality benefits are anticipated from these modernization projects. The air quality impacts of three representative projects are discussed below.

AirTrain. The AirTrain project is expected to improve regional motor vehicle pollutant emissions, as it will reduce vehicle trips within the metropolitan area. The system is electrically powered, so emissions of particulates are not expected. Minimal induced traffic at the New York City Transit Howard Beach and Penn Stations will have a negligible impact on air quality. Overall, the AirTrain project is not expected to create any new violation or increase the frequency or severity of any existing violations of the NAAQS.

American Airlines Terminal. When operational, the new American Airlines terminal is expected to greatly improve air quality emissions over existing conditions as a result of the addition of electrified contact gates, more efficient gate utilization, and use of electric and alternative fuel ground support equipment vehicles. The new terminal will provide contact gate positions for all aircraft, with each gate designed to supply power and preconditioned air to parked aircraft. Under the No Action Alternative, American Airlines would have continued to use remote aircraft parking positions to support its operations at JFK. Remote positions require portable equipment to supply power and preconditioned air, and require passenger bussing between the remote aircraft parking positions and the terminal. Additional air quality benefits are expected as a result of improvements to the terminal frontage roadway and curbside, which will reduce congestion and dwell time. Consequently, the redevelopment project will have major air quality benefits.

Other recently completed terminal projects provide similar air quality benefits by providing state-of-the-art facilities that accommodate modern aircraft, provide more efficient lighting,

heating and cooling systems, and include more contact gate positions that require fewer ground vehicle trips. The proposed Terminal 5/6 Redevelopment project offers comparable air quality benefits.

Airis Cargo Modernization Project. The Airis Cargo Modernization Project, in addition to other air cargo redevelopment projects under way and recently completed at JFK, also contributes to net air quality benefits when considered in conjunction with the Proposed Project and other projects at the airport. The new Airis facilities will replace facilities at Buildings 8 and 9/9A. The project will allow more efficient management of cargo-related aircraft and truck traffic at the airport. The new cargo buildings will accommodate 7 aircraft parking positions, compared with 10 positions at the existing facilities. The project will not result in additional airside or landside capacity to handle aircraft and vehicular traffic.

Lufthansa plans to move its cargo operations from Building 261 to the Airis facility under construction on the North Service Road. The new cargo facilities are located closer to Lufthansa's passenger terminal, reducing the length of cargo tug trips. Overall, the location and design of the facility will result in fewer aircraft delays, fewer air emissions, and greater energy savings.

Substantial cargo building modernization over the last decade has not resulted in additional all-cargo operations at the airport. Despite construction of more than 1 million square feet of modern air cargo facilities at JFK since 1990, air cargo operations have remained relatively flat as air cargo is increasingly carried in the belly of passenger aircraft. The trend toward increasingly larger aircraft in the air passenger market at JFK is anticipated to further diminish the number of all-cargo operations in the future, without associated decreases in the amount of air cargo tonnage handled at the airport. Therefore, while the number of all-cargo operations is expected to remain flat, the demand for air cargo processing facilities is expected to increase. Modernization of cargo facilities has enabled airlines more efficiently to handle growth in air cargo tonnage without associated increases in emissions from aircraft operations, aircraft taxiing or increased vehicle miles traveled.

Summary. In general, the various airside and landside projects under development and proposed for JFK will improve overall airport efficiency. Many of the projects also yield improvements to air quality by reducing vehicular trips and aircraft delays, and incorporating energy efficient building systems. As a result, no significant cumulative adverse impacts to air quality are expected to result from the Proposed Project in combination with the other projects identified herein.

5.24.4.6 Water Quality

The Proposed Project involves construction that would result in the incremental increase in impervious surface area. This increase would contribute a proportionate additional volume of surface water runoff. Because operations have previously occurred at the site, existing discharge systems would be adequate to meet applicable local, state, and federal regulations. All operations in the area that might affect water quality would be performed in accordance with relevant regulations and BMPs. Such procedures are implemented routinely for all airport projects. Based on information supplied by the Port Authority regarding other projects at JFK, no significant adverse cumulative water quality impacts are expected.

5.24.4.7 Department of Transportation Act, Section 4(f)

The Proposed Project includes the use of or adverse impacts to Section 4(f) land (i.e., the removal of Flight Wing 2 from the TWA Terminal and potential modification of the West Tube for future use). No cumulative impacts would affect 4(f) lands because no similar impacts would occur as a result of other projects. No other FAA, airline, or Port Authority projects are expected to affect public parks, recreation areas, wildlife or waterfowl refuges or other historic sites in the airport area. The main TWA Terminal building, the connecting tubes, and Flight Wing 2 are the only structures at JFK eligible for listing in the National Register of Historic Places. Therefore, based on the information supplied by the FAA, other airlines and the Port Authority, no significant adverse cumulative impacts are expected to occur.

5.24.4.8 Historic, Architectural, Archaeological, and Cultural Resources

The Proposed Project provides mitigation that avoids significant adverse impacts to historic resources and enhances and restores the historic TWA main building and the East Connector Tube. The West Connector Tube will under a hierarchy of options for enhanced public access and use. No cumulative impacts would affect historic, architectural, archaeological, or cultural resources because no similar impacts would occur as a result of other projects.

5.24.4.9 Biotic Communities

The Proposed Project would not affect areas containing biotic communities. Because construction is planned in areas that previously were heavily disturbed and do not support any biotic communities, and because no new land will be used, there are not expected to be any cumulative adverse impacts on biotic communities.

5.24.4.10 Endangered and Threatened Species of Flora and Fauna

Because construction is planned in areas that were previously heavily disturbed and do not support biotic communities, and because aircraft operations will follow existing flight paths and procedures, based on information on other projects provided by the Port Authority, there are not expected to be any significant adverse cumulative impacts on endangered and threatened species of flora and fauna.

5.24.4.11 Wetlands

The Proposed Project would affect only existing buildings on airport property. No indirect effects on wetlands are expected because the area of the Proposed Project serves the same airport use. Therefore, the Proposed Project is not expected to contribute to cumulative adverse impacts on peripheral wetlands.

5.24.4.12 Floodplains

Because the Proposed Project involves existing developed airport property that is not in the base-floodplain, no impacts to floodplain areas are expected. Because all projects in the airport area will be required to meet all building regulations pertinent to the local floodplain area, and the Proposed Project will be located outside the area of a 100-year floodplain, no cumulative adverse impacts involving floodplains are expected.

5.24.4.13 Coastal Zone Management Program

Because the Proposed Project would not affect the coastal zone for the State of New York, cumulative adverse impacts to the coastal zone are not expected.

5.24.4.14 Coastal Barriers

Because the airport is not within the Coastal Barrier Resources System, neither the Proposed Project nor other projects would be capable of causing cumulative adverse impacts.

5.24.4.15 Farmland

Because no farmland exists in the airport area, no cumulative farmland impacts would occur.

5.24.4.16 Energy Supply and Natural Resources

The Proposed Project would not significantly increase use of energy or natural resources. The new terminal will be designed to minimize consumption of energy resources through the use of well-insulated building materials and other design elements, thereby reducing the consumption of fossil fuels. The Proposed Project and improvements to terminals at JFK would make energy-saving changes. Other projects by the Port Authority, other airlines, or the FAA in the planning or construction stages do not appear to include any activities that would require new sources of energy that could not be accommodated by existing facilities. The combination of these projects with the Proposed Project does not appear to require major changes in energy facilities or use. Based on the list of proposed projects, cumulative adverse impacts on energy supply or natural resources are not expected.

5.24.4.17 Light Emissions

The Proposed Project is not expected to contribute adverse impacts from light emissions. Based on the list of projects provided by the Port Authority, FAA, and other airlines, there do not appear to be other projects that, when combined with the Proposed Project, would add light emissions that would affect residential areas or other sensitive developments. Therefore, significant adverse cumulative impacts from light emissions are not expected.

5.24.4.18 Wild and Scenic Rivers

Because no wild or scenic rivers exist within the area where other projects would be constructed, neither the Proposed Project nor other projects would be capable of causing cumulative adverse impacts.

5.24.4.19 Solid Waste Impact

Neither the Proposed Project nor other projects are expected to change significantly the quantity of solid waste generated at the airport. Therefore, based on the information provided by the Port Authority, FAA, and other airlines, significant adverse cumulative impacts are not expected to occur.

5.24.4.20 Construction Impacts of Air/Noise/Traffic

As noted in Section 5.22, the Proposed Project is not anticipated to cause any significant impacts in relation to construction. This is due to the short term nature of construction and mitigation procedures set forth in FAA Advisory Circular 150/5370-10A, *Standards for*

Specifying Construction of Airports (February 17, 1989) as well as Port Authority's *Good Environmental Practices Manual for JFK* (December 1997).

Air Quality Impacts. As discussed in Section 5.22.1, the incorporation of the above referenced procedures into the Proposed Project's construction specifications would restrict the emission of particulate matter and prevent it from becoming airborne. Such measures would assure that construction related air quality impacts are minimized. Of all related projects in the landside CTA, the only foreseeable potential projects of relatively large scale whose construction phases might overlap with that of the Proposed Project are the American Airlines Terminal 8/9 construction and Terminals 2 and 3 - Delta Air Lines Terminal Redevelopment. All related projects at JFK are subject to similar construction mitigation measures and are isolated from any neighboring community by the surrounding airfield. Thus no significant cumulative impacts are expected to occur due to the Proposed Project with respect to construction-related air quality. As noted in Section 5.24.2.5, the benefits to the projects within the JFK Redevelopment Program extend to air quality improvements when operational.

Noise Impacts. As discussed in Section 5.22.2, the only potential impacts of the Proposed Project due to construction noise are to operators of construction equipment and nearby construction workers. Construction noise is not expected to affect nearby communities. Potential construction noise impacts are a localized phenomenon. Related projects may have similar localized impacts and may add to ambient noise levels in the CTA. Because the CTA is isolated from any neighboring community by the surrounding airfield, no significant cumulative impacts are expected to occur due to the Proposed Project in relation to construction noise.

Surface Traffic Congestion. Due to the coordination of off-peak scheduled material transfer and specific route management measures discussed in Section 5.22.3, no significant impacts in relation to construction surface traffic are anticipated due to the Proposed Project. Related projects at JFK are subject to similar coordination measures, therefore no significant cumulative impacts are expected to occur due to the Proposed Project in regards to construction related surface traffic.

5.24.5 Summary of Cumulative Impacts

The cumulative impact of the Proposed Project, when added to the other past, present, and reasonable foreseeable future actions described above, is collectively insignificant given the history of intense urbanization that has occurred in the New York City metropolitan area. Jamaica has emerged from this urbanization with a regional transit focus. JFK, and also the Proposed Project, will continue to have effects on Jamaica similar to those already existing. The beneficial effects are primarily economic and employment-related, and they extend beyond southeastern Queens. There would also be a beneficial effect on the historic TWA building and connecting tubes when it is rehabilitated, restored, and adaptively reused. The adverse effects are related primarily to the demolition of Flight Wing 2.

When considered with the other projects recently completed, under way, and proposed at JFK, the Proposed Project is consistent with the long-range planning goals for the CTA. Terminals 5 and 6 are among the few terminal facilities still in need of modernization at the airport. These facilities no longer meet the needs of the aviation users at JFK in terms of safety, accessibility, customer service, and overall efficiency.

Other projects described in this section will provide similar long-term benefits—enhanced operating efficiency, reduced energy consumption, and improved functionality and customer service—to the Proposed Project. The cumulative impact of these actions is generally expected to be positive. Extensive construction mitigation procedures will be put into place to alleviate potential adverse impacts. As a whole, these projects will allow JFK to better serve its customers, continue to prosper as a major economic engine, and provide positive environmental and social benefits to its neighbors.

5.25 Adverse Impacts That Cannot be Avoided if the Project Is Implemented

The Proposed Project results in an adverse effect to the historic resource, namely, the demolition of Flight Wing 2, and potential modification of the West Tube. The Proposed Project would, however, preserve and restore the remaining historical resources. The modification to the West Tube would occur only to enhance use of the tube. The main TWA Terminal building will undergo adaptive reuse including the installation of electronic ticketing kiosks to allow retention of an aviation function. Through the public process, measures have been developed to mitigate the adverse effect. Execution of the MOA would provide for ample mitigation of these adverse effects on historical, architectural, archaeological, or cultural resources. The interior and exterior of the main TWA Terminal building and the East Tube would be restored and/or rehabilitated, and numerous building accretions (vestibules, baggage handling facilities, conveyers, etc.) would be removed to return the TWA Terminal closer to its original condition when constructed, which would be a beneficial effect on the historical resource. As part of implementation of the MOA, a Redevelopment Advisory Committee would be formed to provide input on redevelopment alternatives. There are no other adverse environmental impacts.

6. Public Outreach and Agency Coordination

The Port Authority and FAA have involved the public, coordinated with agencies, and engaged with consulting parties regarding this project and issues addressed in this EA, as part of the NEPA process and as part of the process for Section 106 of the National Historic Preservation Act. The Port Authority began the public involvement process in September 1999 and continued to engage interested parties (including consulting parties when they were formed) and the regulatory community throughout the past five years until the subject *EA* was completed. As indicated in a signed Memorandum of Agreement (MOA) (refer to Section 6.5 below and Appendix D *Memorandum of Agreement)*, Port Authority coordination with the consulting parties will continue throughout the implementation phases of the project. A consultation under Section 106 of the National Historic Preservation Act (NHPA) has occurred as part of the environmental planning for this project because the project involves resources eligible for listing in the National Register of Historic Places. Both NEPA and NHPA and their associated regulations, require public and agency involvement before the lead federal agency (the FAA in this case) can render a decision to approve the project. The intent of public and agency involvement is to ensure that the public and resource agencies can contribute to the scoping and analysis of the project, thereby enhancing the level of information available for the federal decision-making agency (FAA).

6.1 NEPA Process

NEPA directs agencies to disclose the effects of federal actions on the environment in a systematic and interdisciplinary approach. The NEPA process informs and provides an important forum for input from the public, state, local, and tribal governments, as well as federal agencies. NEPA involves "widespread coordination, review, and public disclosure." NEPA provides a process by which public and agency concerns are identified, and environmental issues are examined.

6.2 Section 106 Process

Section 106 of the National Historic Preservation Act requires that federal agencies consider the effects their undertakings or projects may have on historic resources. Section 106 also requires the lead federal agency (the FAA in this case) to involve the public and other stakeholders in the decision making process when federal action will have an adverse effect on an historic resource.

Under regulations governing the Section 106 process, the federal agency must determine whether the proposed undertaking has the potential to cause an adverse effect on historic resources listed in or eligible for listing in the National Register of Historic Places. If the agency determines that the undertaking will have an adverse effect on historic resources, it must coordinate the steps of the Section 106 process, as appropriate, with the overall planning schedule for the undertaking and with any reviews required under other authority such as NEPA and Section 4(f) of the Department of Transportation (DOT) Act. The objective of the Section 106 process is for the lead federal agency, the SHPO, the Council, and any consulting

parties with duties to agree on how best to avoid, minimize and mitigate any unavoidable adverse effects of a given federal action. As part of this process, once the federal agency finds that an undertaking will have an adverse effect on the historic resource, it must inform the Advisory Council on Historic Preservation ("Council") of its finding. FAA informed the Council of the adverse effect concerning the Terminal 5/6 Redevelopment Project in June 2001. If the Council determines that its involvement in the Section 106 process is necessary to ensure that the purposes of Section 106 are met, the Council may enter the process as per 36 CFR Part 800.2(b)(1). The Council responded to FAA in July 2001 and stated that it would participate in the Section 106 process. Individuals and organizations with a demonstrated interest in the undertaking may participate as consulting parties in the 106 process (36 CFR Part 800.2(c)(5)). For the subject project, FAA coordinated with nine separate consulting parties (see Section 6.4 below).

The New York State Historic Preservation Office's (SHPO) role in the Section 106 process is to advise and assist federal agencies in satisfying the Section 106 process. The SHPO cooperates with such agencies, local governments, organizations, and individuals to ensure their interests in the historic properties are taken into consideration. If the Council decides to participate in the consultation, the lead agency consults with the SHPO, the Council, and other consulting parties to seek ways to avoid, minimize, or mitigate the adverse effects. The final product of the Section 106 process is recorded in an MOA, as was done for this project (Appendix D *Memorandum of Agreement*). The lead federal agency for the subject project is the FAA, and the signatories to the MOA are the FAA, the Council, the SHPO, and the Port Authority. In addition, the nine consulting parties who participated in the Section 106 process provided input in the development of the MOA, and were invited to concur.

6.3 Public Participation

The Port Authority initiated the public and agency involvement process for the redevelopment of the Terminal 5/6 site at JFK in 1999. Figure 6-1 *Interaction Timeline* illustrates the NEPA public participation and the Section 106 agency and consulting party interaction.

In 1994 the New York City Landmarks Preservation Commission designated the main TWA Terminal building, connector tubes, and Flight Wing 2 a New York City Landmark. The Commission, having a great deal of interest in this project, assumed an advisory role in the review of this undertaking. In the early planning stages of the project, Several meetings with staff from the New York City Landmarks Preservation Commission, the SHPO, and the Port Authority were held in 1999 and 2000 to explain the purpose and need for the project and to inform members of the public and these agencies of developments regarding the project. Comments received were both supportive of aspects of the project and against certain aspects of the project.

In response to comments received from the New York City Landmarks Preservation Commission and others, the Port Authority made a significant change to Alternative 7 as presented in the original *Concept Master Plan* of July 2000. The amended *Concept Master Plan* of February 2001 presented a design that retained the full length of the connector tubes that would allow for access and egress to and from the TWA Terminal and the new terminal structure. The tubes would be integrated into the new terminal, allowing passengers in the new terminal and the general public to travel between the new terminal and the TWA Terminal. The arrival roadway would be depressed four feet to provide clearance under the connector tubes. On August 14 2001, the New York City Landmarks Preservation Commission held a public hearing on the project. As discussed below, Alternative 7A,

which represents the Proposed Project, and the *Revised Concept Master Plan* (Appendix B), were developed in the fall of 2003 with the input of the consulting parties to the Section 106 process.

Also early in the process, the Port Authority presented Alternative 7 to the Airport Advisory Council of the Queens Borough President's office, the local Community Boards, and the Municipal Art Society of New York. Appendix H *Public and Consulting Party Involvement*, lists the meeting dates. Meetings were held frequently with regulatory agencies and consulting parties, as described above, and also as listed in Appendix H *Public and Consulting Party Involvement*.

As part of the NEPA process, the Port Authority published a Notice of Availability of a draft EA for the Redevelopment of Terminals 5/6 at JFK in *New York Newsday* on March 20, 2001. In June and July 2001, the Port Authority circulated the draft EA for comments from the public and agencies. Copies of the *EA* were mailed to various federal, state, and local government resource agencies and known regional and local stakeholders. Additionally, a Notice of Public Hearing was published in *The New York Times* on June 14, 2001.

On Wednesday, June 27, 2001, two sessions of the Public Hearing were held at the Ramada Plaza Hotel at John F. Kennedy International Airport, Van Wyck Expressway, Jamaica, NY 11430. The afternoon session was conducted from 2:00 PM to 4:00 PM, and the evening session was conducted from 6:00 PM to 8:00 PM. The sessions were held to inform the public about the project, and to address FAA's and Port Authority's interest in including the public in the processes by receiving public input. Each session began with an introductory statement briefly outlining the Terminal 5/6 Redevelopment Project and the purpose of and need for the major construction project. In an effort to provide information about the scope of and need for the Terminal 5/6 Redevelopment Project, the Port Authority prepared an illustrated presentation detailing the terminal redevelopment in the context of the overall JFK master plan, and emphasizing the preservation and restoration plans and the alternatives under review by the FAA and Port Authority. The presentation also explained the NEPA process and its relevant related processes (i.e. Section 106). Attendees were provided the opportunity to make public or private statements about the project.

Appendix H *Public and Consulting Party Involvement*, contains a copy of the Notice of Availability and Notice of Public Hearing, transcripts of the sessions, and written comments submitted at the sessions.

In response to the Notice of Availability in March 2001, the public distribution of the draft EA in June 2001, and the Public Hearing, verbal and written comments were received from several private entities and organizations. The comments received ranged from support of the redevelopment proposal to opposition of any changes to the original TWA Terminal building, and its subsequent additions, as it exists today. The Port Authority created a database identifying the author of the letter, their affiliation, and date. The database categorized the type or types of comment in the letter. The Port Authority responded to many of the letters at the time they were submitted. The comments and concerns in the letters were considered in the development and evaluation of alternatives. The attack on the World Trade Center on September 11, 2001, resulted in the loss of most of the original comment letters, the Port Authority's replies, and other related documents. However, the database summary of comment letters and copies of all available letters are provided in Appendix H *Public and Consulting Party Involvement*. All public responses received by the Port Authority on the *Draft EA* focused on the Saarinen-designed TWA Terminal, in the context of its architectural value and its formal designation as a New York City Landmark.

On August 14, 2001 an additional Public Hearing was held in the offices of the New York City Landmarks Preservation Commission. Several statements in support and opposition of the project were received at this Hearing.

As described below in Section 6.3 *Coordination with Agencies and Consulting Parties*, meetings were agencies and consulting parties were held in October 2001, December 2001, and on several other occasions in 2002 through the fall of 2003. Figure 6-1 *Interaction Timeline* identifies these meetings. As a result of this input, Alternatives 8 through 11 were included and evaluated in a subsequent *Draft EA*(Port Authority, June 2003).

In the June 2003 *Draft EA*, the Port Authority produced a DOT *Section 4 (f) Evaluation of Terminal 5/6 Redevelopment at JFK* which included the description and evaluation of all alternatives that were analyzed, and which described changes to the project that occurred as a result of September 11, 2001 and changes in the operations of the tenant airlines. The documents were circulated to various federal, state, and local government resource agencies and regional and local stakeholders with the intent to seek additional comment. The Port Authority also published a Notice of Availability and Notice of Public Hearing in *The New York Times* and *Newsday* on June 18, 2003. The Notice was published to inform the general public that the Port Authority, as project sponsor, was making the documents available at various locations and upon request, and was holding two Public Information Sessions and Public Hearings on the project.

On Tuesday, July 15, 2003, two sessions of the second Public Hearing for this project were held at the Port Authority Administration Building at John F. Kennedy International Airport, Van Wyck Expressway, Jamaica, NY 11430. The afternoon session was conducted from 3:00 PM to 5:00 PM, and the evening session was conducted from 7:00 PM to 9:00 PM. The sessions were held to inform the public about the project, and to address FAA's and Port Authority's interest in including the public in the processes by receiving public input. Each session began with an introductory statement briefly outlining the Terminal 5/6 Redevelopment Project and the purpose of and need for the major construction project. In an effort to inform the public of the scope of and need for the Terminal 5/6 Redevelopment Project, the Port Authority again gave an illustrated presentation. The presentation described the redevelopment in the context of the overall JFK master plan, and emphasized the preservation and restoration plans and the alternatives under review by the FAA and Port Authority. Attendees of the Information Sessions and Hearings were also given an opportunity to obtain information regarding the NEPA process, the Section 106 process, the DOT Section 4(f) process, and environmental impacts of the project, and to provide comments on this aspect of the approval process.

Appendix H *Public and Consulting Party Involvement*, contains a copy of the June 18, 2003 Notice of Availability and Notice of Public Hearing, transcripts of the sessions, and written comments submitted at the sessions. Ten statements were made during the afternoon session, and three statements were made during the evening session.

The comment period closed on July 30, 2003. Written comments on the June 2003 *EA* were received from several private entities and organizations. The comments received ranged from support of the redevelopment proposal to opposition of any changes to the original TWA Terminal building, and its subsequent additions, as it exists today. Numerous form letters were also received in support of the project and in support of another alternative that was evaluated. All public responses received by the Port Authority on the *Draft EA* focused on the Saarinen-designed TWA Terminal, in the context of its architectural value and its formal designation as a New York City Landmark. All comments and correspondence have been considered, and Appendix H *Public*

and Consulting Party Involvement provides specific and general responses to the comments on the June 2003 *EA* and DOT *Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK.*

6.4 Coordination with Agencies and Consulting Parties

As stated earlier, all interest in the Proposed Project has related to the historic TWA Terminal. As part of the Section 106 process, the FAA determined that the undertaking would have an adverse effect on the TWA Terminal. After being notified by the FAA of its determination, the Council notified the FAA that the criteria for its involvement in review of individual 106 cases applied, and accordingly, the Council would enter the consultation on the project.

Pursuant to 36 CFR Part 800.2(a)(4), the FAA has also granted the requests of other interested parties to become consulting parties in the Section 106 process for the TWA Terminal. The views of consulting parties and the public at large are essential to informed federal decision-making in the Section 106 process. For the Terminal 5/6 Redevelopment Project, nine parties have been invited to enter into the Section 106 process as consulting parties. These entities are:

- The New York Landmarks Conservancy
- The Municipal Art Society of New York
- The National Trust for Historic Preservation
- John Cullinane Associates
- Documentation and Conservation of Buildings, Sites, and Neighborhoods of the Modern Movement (DOCOMOMO)
- The New York City Partnership
- The Consulate General of Finland, New York
- JetBlue Airways
- The New York Building Congress

The Port Authority held the first of three meetings with the consulting parties to the process on October 29, 2001, to discuss the future use, preservation, and restoration of the TWA Terminal, and the redevelopment of the Terminal 5/6 site. Also in attendance were the FAA, SHPO and the Council; a full attendance sheet is provided in Appendix H *Public and Consulting Party Involvement.* On November 15, 2001, the Port Authority distributed to all consulting parties at that time the illustrative presentation compact disk (CD) given at the June 2001 Public Hearing and the October meeting of the consulting parties. The November 15, 2001, letter transmitting the CD also requested advice from the consulting parties on entities who might be interested in receiving a solicitation of interest for adaptive reuse of the TWA Terminal. On November 30, 2001, a solicitation of interest was advertised in the newspapers and periodicals listed in Appendix H *Public and Consulting Party Involvement.* The public is aware of the Port Authority's plans to redevelop this site. The *New York Times* and other prominent publications reported about the development in several articles during 2001 through 2003.

At a meeting with the FAA and Port Authority on December 18, 2001, the Municipal Art Society presented four new conceptual alternatives that addressed the Municipal Art Society's desire to maintain the TWA Terminal for exclusive use as an airline terminal. These are treated in Section 3 *Alternatives, Affected Environment,* and Appendix A *DOT Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK.* In July 2002, the Port Authority distributed the June 2002 *Draft EA* to the consulting parties. This document considered airport operational and tenant changes that had

occurred as a result of changes to the airline industry and the events of September 11, 2001, and treated four alternatives presented by the Municipal Art Society. A second of three consulting party meetings was held on July 31, 2002. The goals of this meeting were to discuss the additional project alternatives proposed by the Municipal Art Society that were included in the June 2002 *Draft EA*, and for the potential signatories to the MOA to obtain input on the draft MOA, which details specific measures to be taken by the Port Authority in relation to the rehabilitation/restoration and adaptive reuse of the TWA Terminal. Following this meeting, in August 2002, the consulting parties provided comments on the draft MOA for the Section 106 process. An additional alternative developed and submitted by the Municipal Art Society in November 2002 is included as Appendix I *Municipal Art Society Alternative 12*. The November 2002 alternative represented an evolution of earlier Municipal Art Society alternatives; it was offered after distribution of the June 2002 *Draft EA* and after the public meeting. This alternative has been included in Appendix A *DOT Section 4(f) Evaluation of Terminal 5/6 Redevelopment at JFK* and is also treated in Section 3 *Alternatives, Affected Environment*. In December 2002, a revised draft MOA was recirculated to the consulting parties.

The third of three consulting parties meeting was held on September 18, 2003. The public comments received on the June 2003 *Draft EA* were summarized and described, and parties in attendance discussed the Proposed Project and expressed their support or concern. The Municipal Art Society presented a new alternative that retained the original function of the TWA Terminal and the consulting parties discussed their individual objectives. At the conclusion of the third consulting parties meeting, the FAA directed the Port Authority and interested consulting parties engage in an intensive alternatives analysis over the course of 15 days. The goal of this process was for the consulting parties, the Port Authority, and JetBlue to arrive at a mutually agreeable project alternative. The Advisory Council for Historic Preservation and the SHPO supported this approach. Meetings between the Port Authority, JetBlue and interested consulting parties were held on September 19, September 24, and September 30, 2003. Attendance sheets are provided in Appendix H *Public and Consulting Party Involvement*.

On October 10, 2003, the Port Authority submitted to the FAA a letter on the results of the 15-day consultation process. (See Appendix B *Revised Concept Master Plan* and Appendix D *Memorandum of Agreement*). The Port Authority's proposed Alternative 7 and the *Concept Master Plan* were modified in response to input from the participating consulting parties. The preferred alternative is designated as Alternative 7A, which is the Proposed Project.

The success of this process led to a signed MOA (refer to Section 6.4 below and Appendix D *Memorandum of Agreement*) between the Port Authority, the SHPO, the Advisory Council on Historic Preservation, and the FAA, in which the agreements reaching during the 15-day consultation process are set forth, in addition to mitigation and preservation measures for the TWA Terminal and its rehabilitation/ restoration and adaptive reuse. The consulting parties were invited to concur with the terms of the MOA.

6.5 The Memorandum of Agreement

The parties to the Section 106 process developed an MOA in conformance with the requirements of the Section 106 process. The MOA lists agreed-to stipulations to be taken to mitigate the adverse affect to the historic site. The stipulations were developed with comment

and input from the signatories (the FAA, SHPO, Port Authority, and Council) and consulting parties listed above. The stipulations of the MOA include restoration, rehabilitation, and adaptive reuse of the TWA Terminal, creation of a Redevelopment Advisory Committee (RAC) composed of interested consulting parties who will review and comment on aspects of the project that relate to the historic resource, incorporation of electronic self-service ticketing machines within the main TWA Terminal building to retain its aviation function, preservation in its current configuration of the original connector tube serving Flight Wing 2 (the East Tube) except for necessary structural modifications, investigation of options for the future use of the connector tube serving Flight Wing 1 (the West Tube), investigation of the reuse of two of the gate lounge trumpets and other architecturally significant elements; providing direct access from the TWA Terminal main building to the new terminal via enclosed connectors from the AirTrain, use of the imagery of the landmark terminal as part of the airport and the Terminal 5 and 6 site, the preparation of a Level 1 recordation (Historic American Buildings Survey/Historic American Engineering Record) document, maintenance and preservation guidelines for the TWA Terminal until an appropriate reuse is determined, public education efforts, and preparation of a rehabilitation and reuse plan. The MOA provides specific actions to be taken, and a plan and process to address the issues raised by the public in relation to the Proposed Terminal 5/6 Redevelopment Project (also refer to Section 5.8.3 Mitigation Measures). The signed MOA is provided in Appendix D *Memorandum of Agreement*.

GENERAL TIMELINE OF KEY MILESTONES - EA AND SECTION 106 PROCESSES

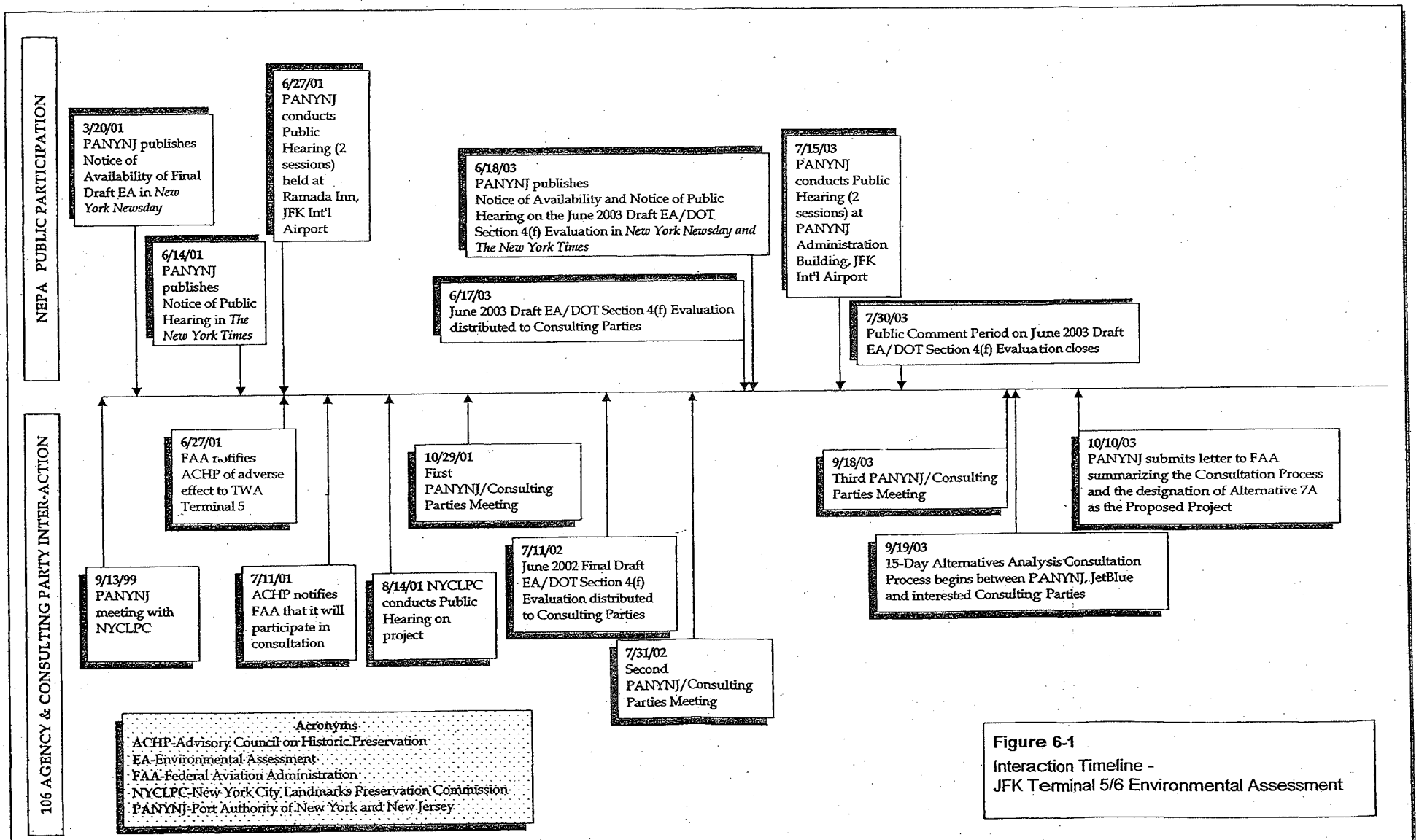

Figure 6-1
Interaction Timeline -
JFK Terminal 5/6 Environmental Assessment

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