National Park Service
U.S. Department of the Interior

Gateway National Recreation Area, Jamaica Bay Unit
Queens, New York

Gateway National Recreation Area, Jamaica Bay Unit
Alternative Transportation Feasibility Study

PMIS No. 145329A

May 2013

Volpe The National Transportation Systems Center

U.S. Department of Transportation
Research and Innovative Technology Administration

Acknowledgements

The authors of this report appreciate the following Gateway staff for their input into the study and patience with the project team.

Joseph Green
Acting Special Park Uses Coordinator, Office of the Deputy General Superintendent, Gateway National Recreation Area

Rita Mullally
District Ranger, Gateway National Recreation Area, Jamaica Bay Unit

Kathy Ann Taunton
Administrative Assistant, Maintenance Department, Gateway National Recreation Area, Jamaica Bay Unit

David Taft
Acting Site Coordinator, Gateway National Recreation Area, Jamaica Bay Unit

Table of Contents

List of Figures

List of Tables

Chapter 1: Introduction

The National Park Service's (NPS) Gateway National Recreation Area (GATE) was created to provide convenient access to outdoor recreation in the National Park System for millions of residents and visitors to the New York City (NYC) area, the most populous metropolitan area in the nation. Population density and the lack of available space for parking have contributed to the lowest ratio of car ownership in the nation for NYC residents, while simultaneously encouraging the most extensive network of public transit in the United States.

The Jamaica Bay Unit of GATE is at the fringe of NYC. Very little of the existing transit infrastructure effectively transports visitors to and from the unit's three main activity centers: Jamaica Bay Wildlife Refuge, Floyd Bennett Field, and Jacob Riis Park and Fort Tilden. Because of this, the NPS has been investigating the potential for a motorized shuttle system to expand access to park resources and to link resource areas to each other.

The paradox of the Jamaica Bay Unit having limited transit access while in proximity to one of the world's most extensive public transit systems represents a fundamental transportation planning challenge, which is at the heart of this study. How can efficient, cost-effective connections be forged between Jamaica Bay's unique resources and the superlative transit services just beyond the unit's doorstep? This is a crucial objective that would expand access to the unit for the area's vast population, particularly for residents who lack the option of using automobiles and private vehicles.

The potential for ferry service to improve access to the Jamaica Bay Unit has been the focus of considerable attention in years past, due to the location of resource areas along the seacoast. A pilot ferry service that was operated between the unit's Riis Landing site and Manhattan in 2003 failed. NYC later led a two-year pilot, which ended in June 2010, to provide ferry service between the unit's Riis Landing site and Manhattan. A successful privately owned ferry service has operated between Riis Landing and Manhattan every summer since 2009, and NPS operated a shuttle bus pilot during the summer of 2009 to link visitors arriving by ferry at the Riis Landing dock with two of the primary unit resource areas, Jacob Riis Park and the Jamaica Bay Wildlife Refuge.

A range of planning efforts has been undertaken over the past decade to improve access to the Jamaica Bay Unit. The current study builds on these earlier efforts and the experience of the pilot ferry service to assess the feasibility of providing greater access to the Jamaica Bay Unit by alternative modes. The study consists of the following tasks:

- Consolidation and review of existing data and documents relevant to the project, including park visitation/usage/circulation/demographic data, ferry system information (ridership, finances, etc.), information on the local NYC Transit bus routes, traffic data, census data, data from the 2009 pilot shuttle bus services and other related information. The results of this effort are documented in Chapter 2: Review of Existing Conditions and Past Planning Studies.
- Evaluation of the 2009 pilot shuttle bus service, based on direct field observation and data collection by the project staff. An evaluation of the 2009 pilot shuttle bus service is presented in Chapter 3: Evaluation of the 2009 Pilot Shuttle Bus Service.
- Analysis of demand for new shuttle bus services, based on the assessment of needs and patterns of movement throughout the local area, as reported by area businesses and other stakeholders. This effort also included discussions regarding marketing and outreach strategies with relevant park staff, contractors, transit providers, civic leaders, and other stakeholders. Chapter 4: Analysis of Travel Characteristics provides an analysis of travel characteristics in and around the Jamaica Bay Unit, and Chapter 5: Route Analysis provides an analysis of potential routes, assessing individual routes and linkages among potential routes to create an integrated network serving multiple sites.

- Planning and analysis for one or more shuttle services providing access to the Jamaica Bay Unit resource areas of Riis Landing, Jacob Riis Park, Floyd Bennett Field, and the Jamaica Bay Wildlife Refuge visitor center, as well as nearby sites. Route alternatives were identified and analyzed in terms of spatial configuration, travel times, and markets served to assess their feasibility and potential to serve visitors. Chapter 6: Marketing and Outreach considers the marketing activities needed to raise awareness of transit services and the resources available at the Jamaica Bay Unit.
- Section 7: Conclusions and Recommendations provides conclusions from the planning study and discusses the feasibility of improving linkages between Jamaica Bay Unit and the NYC transit system.

These planning elements formed the basis for assessing the viability of potential new transportation connections to the Jamaica Bay Unit, leading to recommendations for new services, implementation strategies, and additional planning efforts that can enhance the prospects for success of proposed transportation initiatives. An important note is that the study was conducted prior to Hurricane Sandy, which occurred on October 29, 2012 and caused widespread damage in the Jamaica Bay area. One notable impact is that the dock facility at Riis Landing was destroyed. The study did not consider any other storm-related effects on resource conditions or transportation infrastructure, some of which may be temporary and others which may require some adaptation or adjustment of the study findings to accommodate altered conditions.

A new General Management Plan (GMP) currently is under development that will foster additional activities and programs at the Jamaica Bay Unit, consistent with NPS goals and the unit's unique resources. Most of the alternative transportation options considered in this report are compatible with the GMP alternatives under consideration, although there are likely to be additional opportunities for transportation connections and possibly some modifications of the options addressed in the report that will correspond specifically to the concepts in the GMP. A related development since this study was conducted is the Jamaica Bay unit has completed a Cooperative Management Agreement (CMA) with the NYC Department of Parks and Recreation that will allow greater visitation, easier access, and other amenities at the unit. Again, this agreement can be expected to reinforce the study recommendations for alternative transportation services, possibly with some modifications to respond to new programs, activities, and marketing opportunities resulting from the CMA. In addition, there is a GATE-wide camping plan under way that will increase the number of public camping sites throughout the Jamaica Bay Unit and potentially an increased desire for alternative transportation.

Chapter 2: Review of Existing Conditions and Past Planning Studies

This section provides an overview of the location, geography, activities, and transportation infrastructure and services in the vicinity of the Jamaica Bay Unit, providing the necessary context for planning and evaluating potential new transportation services.

Location

GATE is located south of Manhattan in several coastal areas situated on Lower New York Bay, Sandy Hook Bay, Jamaica Bay, and the Atlantic Ocean. The entire recreation area consists of three distinct park units: Staten Island, Sandy Hook, and Jamaica Bay. Jamaica Bay, the subject of this study, straddles Queens and Brooklyn, as shown in Figure 1, and is situated around Jamaica Bay near John F. Kennedy Airport and on the Rockaway Peninsula.

The neighborhoods surrounding Jamaica Bay include the Rockaways, Canarsie, Spring Creek, Starrett City, Howard Beach, and Broad Channel. These neighborhoods are home to more than 500,000 residents.[1]

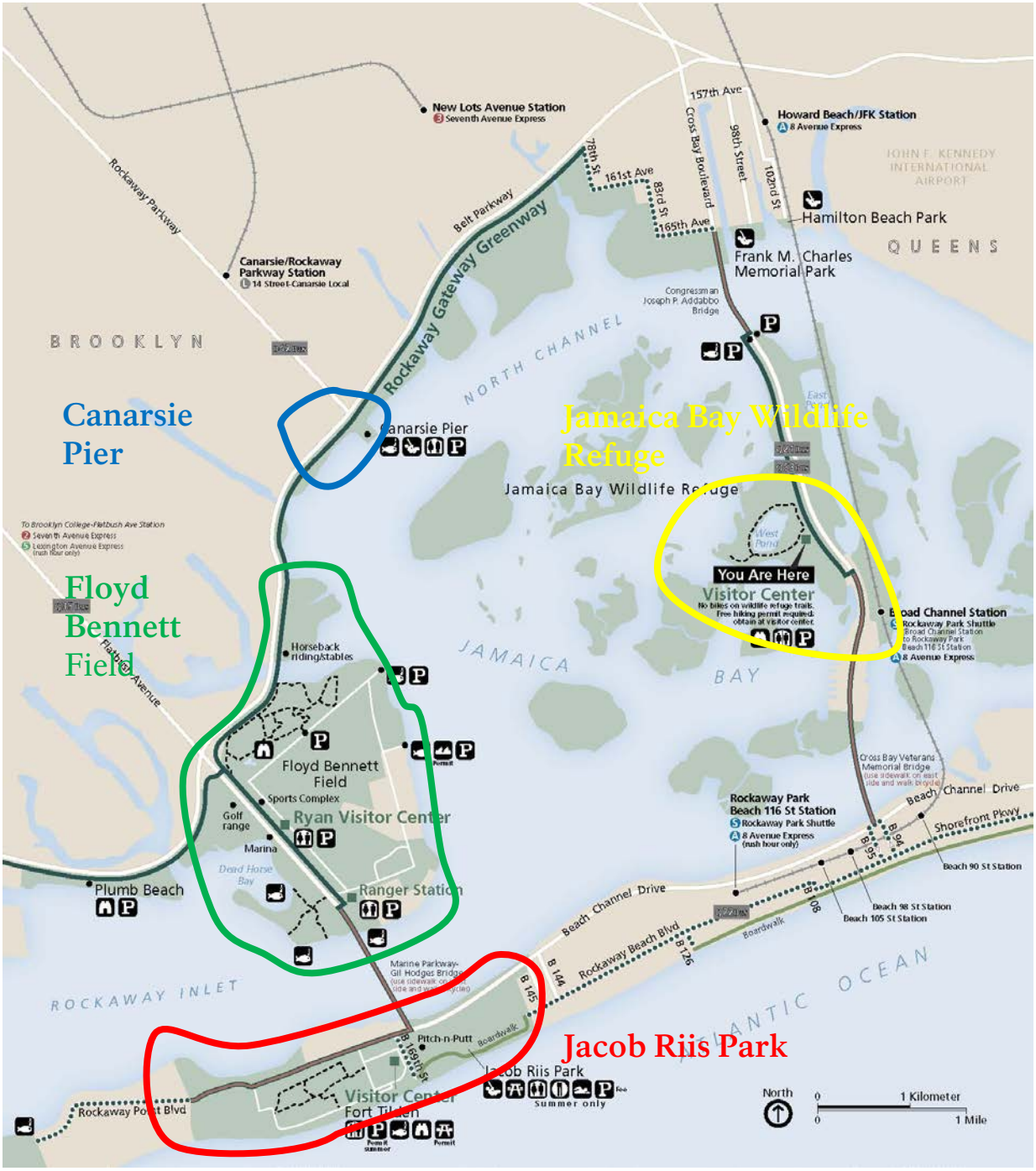
Figure 1
Gateway National Recreation Area
Source: NPS

[1] Jamaica Bay Watershed Protection Plan Advisory Committee, 2007. *Planning for Jamaica Bay's Future: Final Recommendations on the Jamaica Bay Watershed Protection Plan*. Accessed online at http://nbii-nin.ciesin.columbia.edu/jamaicabay/jbwppac/JBAC_Recommendations_Report_060107.pdf on December 22, 2009.

Park Activity Centers

As shown in Figure 2, the primary visitor destinations within the Jamaica Bay Unit are the Jamaica Bay Wildlife Refuge, Floyd Bennett Field, Canarsie Pier, Jacob Riis Park, and Fort Tilden. The unit includes a number of additional resource areas close to the primary activity centers. These other sites are described in Appendix A, which provides more detail on existing conditions.

Figure 2
Gateway National Recreation Area Jamaica Bay Unit
Source: NPS



Jamaica Bay Wildlife Refuge

Jamaica Bay is the only wildlife refuge administered by the NPS. It consists of 9,155 acres of salt marsh, dunes, brackish ponds, woodland, fields, and open water. The refuge is one of the most significant bird

sanctuaries in the Northeastern United States and one of the best places in NYC to observe migrating species. Activities at the refuge include bird watching, hiking, fishing, kayaking or canoeing, and biking along the Jamaica Bay Greenway, a paved multiuse pathway partially encircling the bay. The NPS leads a wide range of nature walks and other events year-round from the wildlife refuge visitor center, a structure that was recently built using sustainable technology.

Floyd Bennett Field

New York City's first municipal airport opened at Floyd Bennett Field in 1931. When flight operations ended in 1971, most of the land was transferred to the NPS. The New York Police Department (NYPD) continues to operate its fleet of Bell Jet Ranger helicopters at Floyd Bennett Field and the property also continues to house headquarters for the NYPD Emergency Services and Driver Training units. The NYPD has an agreement with the NPS to conduct specific operations at Floyd Bennett Field. A number of plans have been proposed for the NYPD to use dedicated space of their own for driving practice and its flying school.

Floyd Bennett Field currently hosts a wide range of activities, including the following:

- Touring the original air administration building and air tower;
- Gardening in the largest community garden in Brooklyn;
- Piloting radio-controlled airplanes at a designated runway and control area;
- Shooting arrows at the archery range;
- Playing individual or team sports at the Aviator Sports and Events Center, including:
  - Ice-skating and hockey;
  - Soccer;
  - Basketball;
  - Football;
  - Gymnastics; and
  - Climbing;
- Fishing at Raptor Point;
- Observing or helping restore historical aircraft;
- Golfing at the Brooklyn Golf Center;
- Hiking;
- Camping, including a new public campground with 20 sites for recreational vehicles and 32 tent sites; and
- Biking the runways or the Jamaica Bay Greenway.

Canarsie Pier

The 600-foot pier, which is located among salt marshes and the shoreline along Brooklyn's Belt Parkway, was built in the 1920s as a commercial dock and was incorporated into the Jamaica Bay Unit in 1973. Today, the pier is a popular site for fishing, picnicking, kayaking, and other recreational activities.

Jacob Riis Park

Jacob Riis Park is located on the ocean side of the Rockaway Peninsula between the communities of Breezy Point and Neponsit. Jacob Riis Park is an ocean beach with a boardwalk and historic bathhouse which is now home to the administrative offices of Gateway National Recreational Area. The park was built by New York planner and administrator Robert Moses, and was named after journalist, photographer, and reformer Jacob Riis, who documented the plight of the poor and working class. A 5,000-space parking lot that was once considered the largest in the world, serves the needs of Jacob Riis Park. Activities at the park include swimming, picnicking, walking, and biking.

Fort Tilden

Fort Tilden is a former United States Army installation that today is largely a natural area of beach, dunes, and maritime forest. Though most of the military installations are abandoned, some buildings have been renovated and are used by local arts groups. A viewing platform atop one of the old batteries offers 360-degree views encompassing the city, New York Harbor, and the Atlantic Ocean. The area, which is popular with bird-watchers and other nature-lovers, is also used for recreational fishing. Fort Tilden is currently closed due to damage caused by Hurricane Sandy and will reopen once necessary repairs are made. Additionally, sea level implications due to global warming and the sound use of coastal features will need to be taken into consideration in future proposals for shoreline transportation.

Stakeholder Interviews

The study team interviewed a broad cross section of user groups as a first step in assessing the potential demand for alternative transportation services to sites within the Jamaica Bay Unit. From February 22 to March 5, 2010, the study team conducted telephone interviews with 18 representatives of 19 groups, which were identified by NPS staff. The interviews were designed to provide an understanding of the need for alternative transportation modes, based on perceptions of visitor demand for travel to various areas of the Jamaica Bay Unit, and the extent to which shuttle bus or other alternatives might meet this demand. Feedback from interviewees is integrated throughout this report and was used to help develop the routes analyzed in this study. The information obtained through the interviews represents only a partial basis for the identification of potential destinations considered for alternative transportation service, however, complementing the objective analysis of data and conditions discussed in subsequent chapters of this report.

Topics addressed in the interviews included the following:

- Activities and events conducted at sites in the Jamaica Bay Unit administered by the organization;
- Schedule (seasonality, weekly, daily hours) of operations and events;
- Number of participants/visitors to sites;
- Visitors' modes of access;
- Transportation and access problems and needs;
- Suggestions for improvement in transportation access; views on potential new shuttle bus service.

Stakeholder groups participating in interviews included:

- Community Groups
    - Broad Channel Civic Association
    - Brooklyn Community Board 5
    - Brooklyn Community Board 15
    - Queens Community Board 14
    - United Canarsie South Civic Association

- Recreation Groups
    - Aviator Sports and Events Center
    - Brooklyn Golf Center
    - Floyd Bennett Garden Association
    - Floyd Bennett Ecology Village
    - Floyd Bennett Cricket Club
    - Jamaica Bay Riding Academy
    - Model airplane enthusiasts

    - Polytechnic Institute of New York University, Athletics

- Naturalists
    - American Littoral Society
    - Audubon NYC
    - Brooklyn Bird Club
    - Long Island Botanical Society

- Other
    - Rockaway Theater Company
    - TWFM Ferry Inc
    - U.S. Park Police
    - U.S. Park Police, Marine Unit
    - Gateway Marina
    - NPS staff

Scheduled Events

The NPS offers a variety of public programs at the Jamaica Bay Unit on weekends throughout the year. Public programs include evening nature walks, photography workshops, spring and fall bird migration walks, stewardship programs (such as cleanups and plantings), and educational workshops. Group size on regularly scheduled public tours and talks varies throughout the year. Some regularly scheduled programs, such as the nature and bird walks, are often filled to capacity (30–50 people); while other programs have smaller participation levels (5–15 people). On two Sunday afternoons and two Thursday evenings in July and August of 2009, the NPS, in collaboration with the NYC Economic Development Corporation and New York Water Taxi, offered ranger-led eco-tours exploring the natural environment of Jamaica Bay. In addition, a weekly Friday night fireworks cruise was operated, stopping at Coney Island for a viewing of the Brooklyn Cyclone's postgame fireworks show. These two popular cruises drew crowds of 85-120 people.

In addition to the events offered by the NPS, a number of non-profit organizations conduct events within the park. Examples of such activities include:

- A sunset cruise of Jamaica Bay offered by the American Littoral Society;
- Educational workshops offered by the Floyd Bennett Gardens Association;
- Lectures, presentations, exhibitions, and special events at the Rockaway Artists Alliance series at Fort Tilden (events are free and open to the public);
- Rockaway Theater Company productions at Fort Tilden's historic Post Theater; and
- An annual Fall Arts and Crafts Festival sponsored by the Rockaway Music & Arts Council. This September event draws crowds of over 10,000 visitors to the area.

Visitation

Annual visitation to the Jamaica Bay Unit has ranged between 2.5 and 4.8 million since 1999. Figure 3 shows annual visitation by site, based on official visitation statistics. These figures indicate that Floyd Bennett Field historically has had the greatest annual visitation, which may be due in part because it offers the greatest variety of activities, several of which are indoors. It is likely that the figures can be inflated, however, inadvertently capturing some of the Marine Reserves and others traveling to the sites occupied by city and other public agencies. Riis Park, however, is a major visitation draw and likely attracts more true visitors than Floyd Bennett Field.

Figure 3
Jamaica Bay Unit Annual Visitation, 1999-2009
Source: NPS

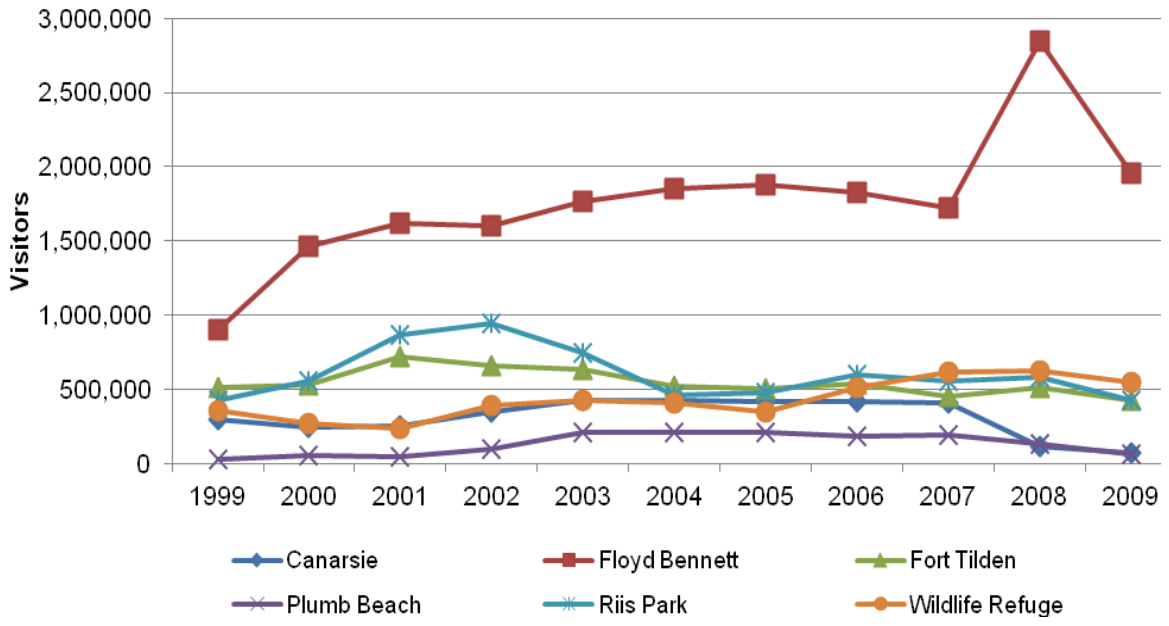
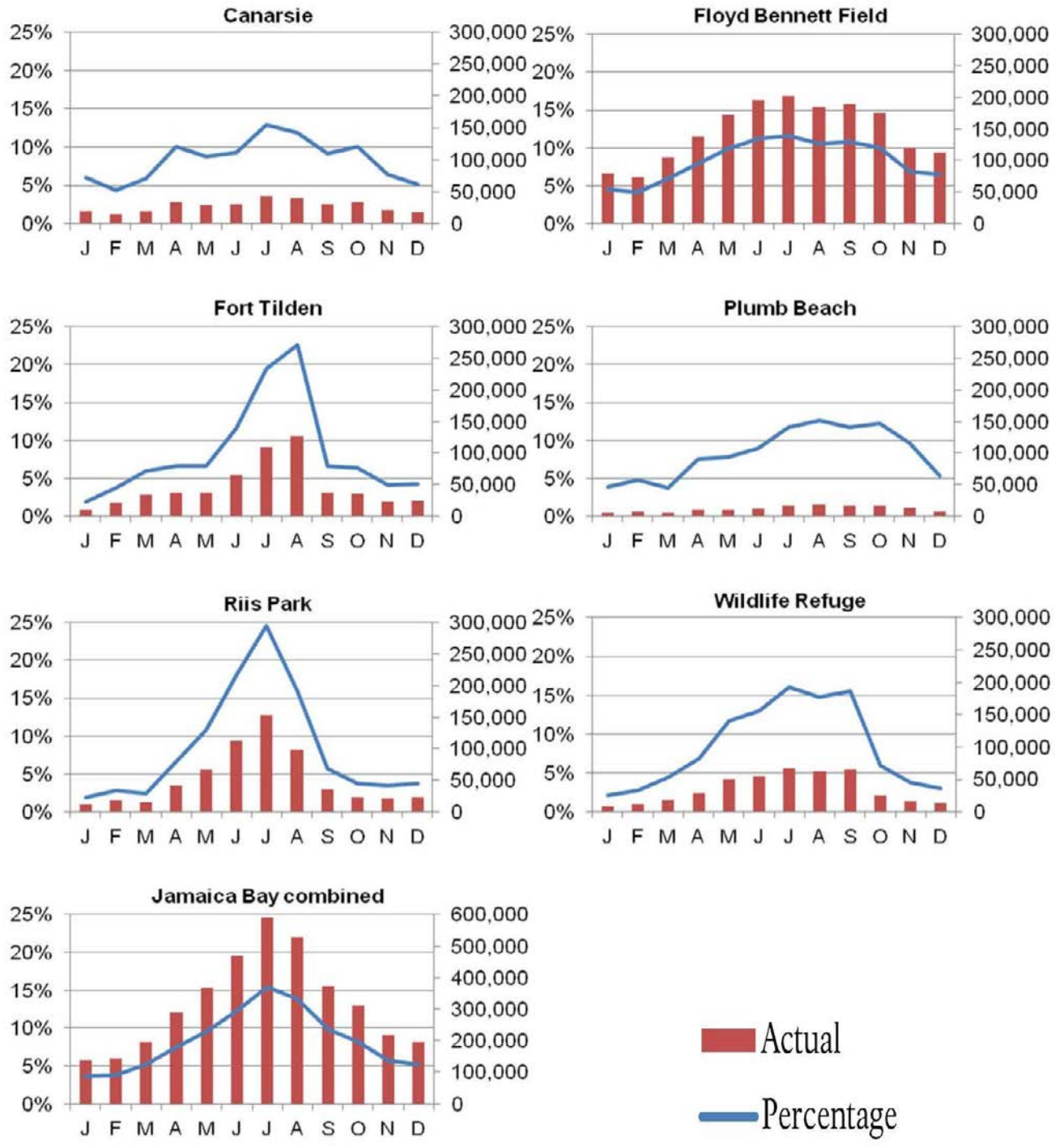


Figure 4 shows the percentage of annual visitation by point of interest for each month. Some sites have more significant seasonal changes in visitation patterns than others. For example, visitation at Fort Tilden and Jacob Riis Park spikes in the warm summer months of June, July, and August. Visitation at the Jamaica Bay Wildlife Refuge is relatively low from October through April and increases dramatically from May through September, as nature lovers take advantage of warm weather and the seasonal migration patterns of shorebirds. Although visitation at Canarsie Pier and Floyd Bennett Field also peak in summer months, the variation is not as pronounced.

Figure 4
Jamaica Bay Unit Actual and Percentage by Month Site Visitation, January 1999–September 2008
Source: NPS



Some visitors to Fort Tilden and Jacob Riis Park tend to take alternative transportation such as bicycles or public transit, while fewer visitors take transit to Canarsie Pier, and fewer still use the bus to access Floyd Bennett Field.

Current Transportation Access

Appendix B provides a description of the transportation systems that provide access to the Jamaica Bay Unit. Despite the high use of public transit by NYC residents and especially those living in Manhattan, the majority of visitors to Jamaica Bay arrive by private automobiles. Overall, transit connections to key park resource areas are inconvenient and time consuming from much of NYC, including the boroughs bordering the Jamaica Bay Unit. Floyd Bennett Field has good bus connections to only two subway lines, and as a practical matter, is inaccessible from the remainder of the Metropolitan Transportation Authority (MTA) system. (Transit connections to activity centers within the Jamaica Bay Unit are discussed in more detail in Chapter 5: Route Analysis.) Overall, use of alternative transit modes such as buses, subways, bicycles, and walking to Jamaica Bay Unit are low. The following section describes how and if visitors use the various existing transportation options available to each of the park activity centers.

Floyd Bennett Field: Organized Activities are the Dominant Uses

A diverse set of user groups visits Floyd Bennett Field for a range of activities. Information collected through interviews with various user groups suggests that current transportation access to the general site is sufficient; however, many of the activity centers within the Floyd Bennett Field area do not have direct access via public transportation. The new public campground implemented since the interviews were conducted is popular and draws a new visitor group to Floyd Bennett Field that may welcome alternative transportation service to other destinations at Floyd Bennett Field or activity centers in the Jamaica Bay Unit. Campers usually carry bulky and heavy equipment and as a result, may find public transit options impractical for travel from their homes or other points of origin to Floyd Bennett Field.

The Q35 bus route has three stops along Flatbush Avenue. Though these bus stops provide direct access to some of the facilities, such as the Aviator Sports Complex, the distance between the bus stops and some of the other activity centers, namely the community gardens and airplane hangar, is substantial. As a result, visitors to these areas rely primarily on private vehicles.

Interview results were corroborated by data from a visitor survey conducted in 2003. Ninety-five percent of survey respondents rely on private vehicles to access Floyd Bennett Field, while only 1 percent reported using buses or the subway.

In addition to private vehicle and public transportation, many of the groups visiting Floyd Bennett Field organize their own transportation, such as school vans/buses to access the area.

The interviews suggest that those visiting Floyd Bennett Field do so for specific activities, and do not travel to other sites within the Jamaica Bay Unit.

Jamaica Bay Wildlife Refuge: Close to the A Train

Based on interviews with user groups, the primary means of transportation to the Jamaica Bay Wildlife Refuge is by private vehicle (either individually or through an organized carpool). Visitors also use the subway—specifically, the A train—to travel to the refuge. Experienced visitors to the refuge prefer to get off at the Rockaway Parkway stop and take the bus south to the refuge. The bus stops at the entrance to the refuge and spares visitors from walking the half mile from the station stop. Some refuge visitors do enjoy bird watching from the train windows and will use the A train to travel all the way to the Broad Channel station stop. Some of those interviewed did not report the distance to be a deterrent for visitors to walk or use public transportation to access the refuge. This perception is open to question and

discussion, since most people currently travel to the refuge by car and the walking distance from the subway may be a deterrent among the population that currently do not visit the site.

Accessing other locations within the Jamaica Bay Unit from the wildlife refuge requires a vehicle. Interviewees noted, however, that most birders are generally unconcerned with visiting other areas.

Jacob Riis Park and Fort Tilden: Potential for Improved Access

Interviewed participants had diverse opinions regarding the quality of access to Jacob Riis Park and Fort Tilden areas. Some community groups noted that the area is not well served by public transportation and additional transportation options are needed. Other participants identified the seasonal parking restrictions at Fort Tilden and the parking fees at Jacob Riis Park as access impediments. While transportation concerns were identified by some, other users felt that access to the area was sufficient and they did not perceive a significant need for alternative transportation. The results of the interviews were therefore inconclusive regarding the need for alternative transportation to the site.

Transportation Deficiencies and Suggestions for Improved Transportation Connections

The interviews provided a number of suggestions for improved transportation connections both to and within the Jamaica Bay Unit. The potential connections listed below, which are not ranked in order of importance, include points external to and within the boundaries of the Jamaica Bay Unit:

- *Connections to and from the Jamaica Bay Unit and other locations:*
  - Coney Island;
  - Sheepshead Bay in Brooklyn;
  - B & Q subway lines;
  - L Train in Canarsie;
  - Canarsie Pier;
  - Kings Plaza;
  - Fountain Avenue and Pennsylvania Avenue, Brooklyn;
  - Manhattan – for specific/special events;
  - Brooklyn Heights – for specific/special events; and
  - Sandy Hook (ferry service from Rockaway)

- *Connections within the Jamaica Bay Unit:*
  - Floyd Bennett Garden to Aviator Center;
  - Golf Center at Floyd Bennett Field to the Brooklyn Golf Center;
  - Floyd Bennett Field to Fort Tilden; and
  - Suggested shuttle route: marina to golf course to Floyd Bennett Field to Riding Academy to Jacob Riis Park.

Review of Past Planning Studies

Interest in enhancing non-automobile access to the GATE has led to several planning and study efforts over the years. Relevant efforts are summarized in Appendix C of this report.

Chapter 3: Evaluation of the 2009 Pilot Shuttle Bus Service

As noted earlier, NPS operated a shuttle bus pilot during the summer of 2009 to connect passengers arriving by ferry at the Riis Landing dock with Jacob Riis Park and the Jamaica Bay Wildlife Refuge. The shuttle bus was in service on weekends from August 1st through September 7th. This report includes an evaluation of this service to determine how well it performed, including its results in terms of attracting ridership.

Operations

Routes, Schedules, and Vehicles

The pilot shuttle program consisted of routes A and B. These routes ran on weekends and holidays, 10:00 am to 6:00 pm, from August 1, 2009 to September 3, 2009 (Labor Day).

Route A, shown in Figure 5 below, provided service between Riis Landing, Jacob Riis Park, Broad Channel Station on the MTA A Line, and Jamaica Bay Wildlife Refuge. (The Route A subway line runs through Manhattan in a north-south direction, crosses through northern Brooklyn, and connects to the Rockaway Peninsula.) Table 1 shows the schedule for Route A.

Figure 5
Pilot Shuttle Route A
Source: Jamaica Bay Unit

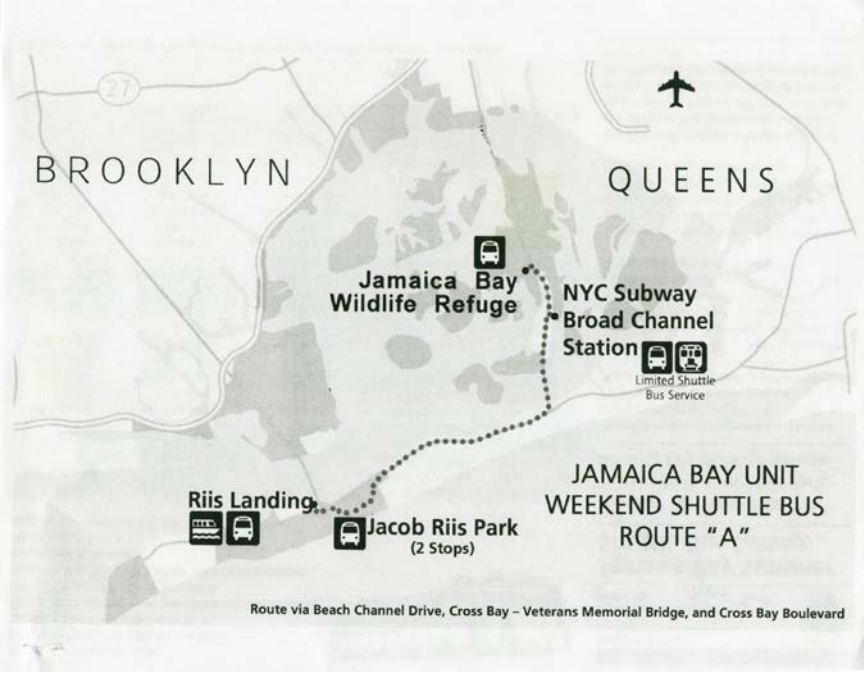


Table 1
Route A Schedule
Source: Jamaica Bay Unit

Riis Landing to Jamaica Bay Wildlife Refuge

Depart Riis Landing	Arrive Bay 9 Boardwalk at Riis Beach*	Arrive Bay 5 Riis Beach Bathhouse *	Arrive Broad Channel Subway Station	Arrive Jamaica Bay Wildlife Refuge**
10:40 am	10:45 am	10:50 am	+11:10 am	11:45 am
1:15 pm	1:20 pm	1:28 pm	*1:46 pm	1:54 pm
3:00 pm	3:05 pm	3:10 pm	-	3:30 pm
4:00 pm	4:05 pm	4:10 pm	> 4:25 pm	4:30 pm
5:10 pm	5:15 pm	5:20 pm	-	-

* Wait 3 minutes before departing stop
+ Wait 30 minutes for 11:34 am S Train
> Pick-up / Drop Off – No Wait
** Wait 5 minutes before departing stop

Broad Channel Train Station to Riis Landing

Arrive Broad Channel Train Station	Arrive Bay 5 Riis Beach Bathhouse	Arrive at Riis Landing
+ 11:55 am	* 12:25 pm	12:40 pm
> 2:05 pm	> 2:15 pm	2:25 pm
-	-	4:00 pm
> 4:40 pm	> 4:50 pm	4:56 pm
-	-	5:30 pm

* Wait 5 minutes before departing stop
+ Wait 15 minutes for the 12:06 pm S Train
> Pick-up / Drop Off – No Wait

Route B, shown in Figure 6, provided service between Riis Landing and activities at Floyd Bennett Field. Table 2 shows the schedule for Route B. As the service was ground-tested, both Routes A and B underwent some modifications, particularly small schedule changes.

The contractor initially provided 50-ft, 55-passenger capacity buses, but the turning radius for a bus of this size was too wide for the maneuvers required on the approach to the Broad Channel Station on East 6th Road and the return to Cross Bay Boulevard via Noel Road. The contractor was forced to hire a subcontractor that could supply a smaller vehicle. Eventually a 30-ft, 28-person bus was found to be appropriate for service on Route A.

Figure 6
Pilot Shuttle Route B
Source: Jamaica Bay Unit

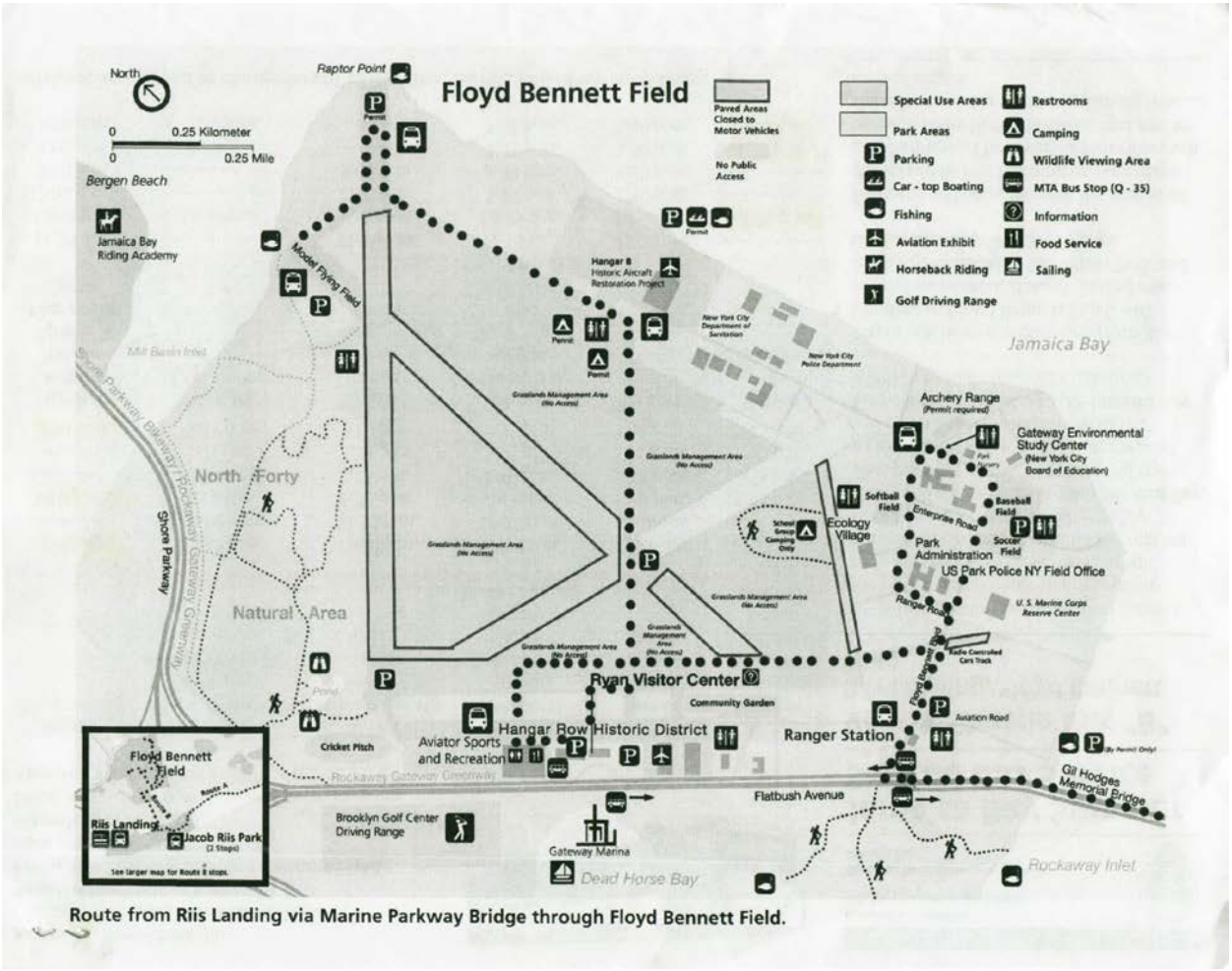


Table 2
Route B Schedule
Source: Jamaica Bay Unit

Riis Landing to Remote Control Aircraft Field & Mill Basin Fishing Area

Depart Riis Landing	Arrive Remote Control Cars & Archery Range*	Arrive Aviator Sports & Events Center*	Arrive Hangar B Aircraft Museum & Hand-launched Boat Landing+	Arrive Raptor Point Fishing Area+	Arrive Remote Control Aircraft Field & Mill Basin Fishing Area*
10:40 am	10:45 am	11:00 am	11:15 am	11:20 am	11:25 am
-	12:00 pm	12:15 pm	12:25 pm	12:30 pm	12:35 pm
1:10 pm	1:15 pm	1:30 pm	1:45 pm	1:50 pm	1:55 pm
-	2:10 pm	2:25 pm	2:40 pm	2:50 pm	2:55 pm
-	3:05 pm	3:30 pm	3:45 pm	3:50 pm	3:55 pm
5:00 pm	5:05 pm	5:20 pm	5:35 pm	5:40 pm	5:45 pm

* Wait 5 minutes before departing stop
+ Pick-up / Drop Off – No Wait

Aviator Sports and Events Center to Riis Landing

Arrive Aviator Sports & Events Center+	Arrive Remote Control Cars & Archery Range	Arrive Riis Landing
11:35 am	11:50 am	-
12:45 pm	-	12:50 pm
2:00 pm	2:10 pm	-
3:00 pm	3:05 pm	-
4:00 pm	-	4:25 pm
5:50 pm	-	6:00 pm

+ Pick-up / Drop Off – No Wait

Ridership

Ridership data from the pilot shuttle were not available for this study. The authors of this report observed the shuttle, however, and conducted passenger counts for the first two trips on each route on Sunday, August 30. The weather on this single day of counting was overcast, but not raining. As a result, ridership may not have been broadly representative of typical summer days. The two trips starting at Riis Landing left the ferry at approximately 10:40 am and 1:10 pm. On both trips, the shuttle departed after the ferry dropped passengers arriving from Manhattan. The first shuttle returned to the ferry dock in time to drop passengers off for an eco-cruise, while the second connected with a return trip to Manhattan.

The study team observed that no riders were present on either of the Route B trips that morning. Based on anecdotal information, this appears to have been typical of most Route B trips. Route A had riders on both trips observed by the study team. Ridership for these two trips is shown in Table 3 and is broken down by route segment. A change in number between segments represents a person boarding or alighting the vehicle. All passengers arriving at the Jamaica Bay Wildlife Refuge Visitor Center alighted. On the first trip, visitors did not approach the shuttle until the ranger entered the visitor center, announced that the shuttle was departing to connect with the eco-cruise, and encouraged visitors to join her. Eight visitors then proceeded to take the shuttle and the eco-cruise, which boarded at Riis Landing. It is expected that at least some of these visitors returned to the visitor center via the shuttle later in the day, although some may have taken the ferry back to Manhattan.

Table 3
Route A Observed Ridership, Sunday, August 30, 2009
Source: Volpe Staff

Route Segment	10:40 am	1:15 pm
Riis Landing to Jacob Riis Park	4	0
Jacob Riis Park to Broad Channel	1	0
Broad Channel to Visitor Center	1	7
Visitor Center to Broad Channel	8	0
Broad Channel to Jacob Riis Park	8	0
Jacob Riis Park to Riis Landing	8	0

Ridership was likely reduced below anticipated levels due to weather conditions on the single day of counting. Moreover, the unusually high number of rainy days throughout the summer likely contributed to poor visitation at the Jamaica Bay Unit generally, and depressed ridership over the entire season. Although high temperatures ranged between 73 and 92 degrees during the season, there was significant cloud coverage on one or more days, except for one weekend. Rain and thunderstorms occurred on 6 of the 13 days the shuttle operated.

Furthermore, two weekends in the period were affected by abnormal weather conditions. Hurricane Bill produced storm conditions on the Long Island coast on August 22nd and 23rd, followed by Tropical Storm Danny on August 29th. Another factor affecting ridership during the weekend when the study team observed the shuttle was that no major events were scheduled. Visitation generally rises when special events occur and are marketed through promotional advertising.

Operational Lessons Learned

Jamaica Bay Unit staff and the Volpe Center study team learned several lessons during the pilot program that may be directly applicable to a potential future shuttle service:

- **Shuttle buses should depart Riis Landing as soon as all likely shuttle passengers are on board.** The ferry was the predominant source of riders for the shuttle service. Once the ferry arrives and unloads its passengers, and those passengers who wish to ride the shuttle buses have boarded, there is no reason to wait until the prescribed departure time. Any additional wait time will be considered an inconvenience by riders. Instead of having a fixed schedule, the shuttle should depart from Riis Landing after all ferry passengers have disembarked. The official schedule should note that the shuttle will wait for all passengers to disembark before leaving.
- **Shuttle bus drivers should actively engage passengers.** Between their arrival and departure at Riis Landing, which could be as long as 15 to 20 minutes, bus drivers spoke on their cell phones, sometimes away from the buses. Parked buses without drivers do not convey an impression of engagement or attentive customer service. If while waiting at Riis Landing where potential passengers are present, bus drivers should be on or in proximity to the bus, engaging passengers and answering their questions about the route and schedule.
- **Shuttle vehicles should be sized to safely maneuver at the Broad Channel subway station.** East 6th Road is particularly narrow, and there are narrow turns from W Road onto Noel Road. Any shuttle vehicle that serves the Broad Channel Station must be small and maneuverable in order to safely negotiate these road sections.
- **Future contracts with bus operators should include penalties in the event of non-performance.** The NPS should have the ability to take action against a contractor who does not

fulfill its obligations under the contract (as in the case of a contractor who could not provide appropriately sized buses).

- **Digital message signs on shuttle buses should display pertinent route information.** On Sunday, August 31, the two shuttle buses operating on both routes were equipped with dynamic message signs on the front that said "HAVE A NICE DAY!" Instead, these signs should be used to communicate key pieces of information to riders and potential riders, namely 1) the shuttle buses are run by the National Park Service, 2) the name of the route, and 3) the name endpoints of the route.
- **Identify the market the shuttle is serving.** The shuttle service between Riis Landing and Floyd Bennett Field was minimally used. Many of the visitors to Floyd Bennett Field come to participate in activities like radio-controlled planes or archery that make travel by public transportation challenging. Other visitors, such as gardeners or recreational sports participants are likely to come from more local destinations. In addition to regular service, special events may be more appropriate for some GATE sites. Extending service to sites and subways in Brooklyn may also boost the value of connections across the Marine Parkway Bridge from resource areas on the Rockaway Peninsula, such as Jacob Riis Park and the Jamaica Bay Wildlife Refuge.

Pilot Shuttle Marketing and Communications

Distribution Channels

A variety of physical and electronic information distribution channels were used to share information with the public and potential shuttle riders.

- Announcements and information regarding the pilot shuttle program were made available at the NPS' Gateway National Recreation Area website.[2] The website published two press releases, routes, maps, and schedules.
- A media press copy was drafted and released to newspaper media by the NPS public information office (PIO).
- Brochures were created for the pilot program and made available along with existing Gateway National Recreation Area and Jamaica Bay Unit brochures. Brochures were loaded into park information kiosks, and kiosks were placed in the following locations: two on the ferry itself; two on the Riis Landing ferry passenger walkway; and one at the Pier 11 ferry dock in Manhattan. Brochures were also made available at the Floyd Bennett Field Ranger Station, Aviator Sports and Events Center, and Jamaica Bay Wildlife Refuge.
- Ferry schedules were made available at NPS visitor contact stations and concessionaire sites including the Aviator Sports and Events Center and Dover Gourmet, Inc. (located on the Jacob Riis Park Boardwalk).
- A poster-sized sandwich board was set up at Riis Landing, and printed pamphlets were available on ferries and at the ferry dock at Riis Landing.
- On each trip, ferry personnel made announcements regarding the pilot shuttle program.
- Jamaica Bay Unit staff intercepted ferry passengers during pilot program hours and informed potential riders about the routes and schedules and handed out pamphlets.
- Specific events, such as the eco-tours, were published in *Time Out New York* magazine.

[2] National Park Service (2009). *Gateway National Recreation Area (U.S. National Park Service)*. Last accessed on October 10, 2009, from http://www.nps.gov/gate/index.htm.

Marketing and Communications Lessons Learned

Jamaica Bay Unit staff learned several valuable lessons during the pilot program related to marketing and communications. Some of these lessons were documented in writing by park staff, while others were shared during the site visit:

- **Additional marketing opportunities should be pursued.** The project manager for the pilot program suggested the following marketing opportunities for future efforts:
    - Increase marketing and awareness of attractions and recreational opportunities at Floyd Bennett Field; and
    - Restore Riis Landing by mowing the grass, weeding, and making other aesthetic improvements. Picnic benches could provide a comfortable location for people to wait for the bus or ferry.
- **Phones should be staffed according to a schedule and answering machines should be active before and after stated hours.** The August 31 ferry eco-tour was listed in the popular entertainment magazine, *Time Out New York*. On August 31, one visitor complained to park rangers that the phone number listed in the advertisement had no answering machine message before 10:00 am. Phone calls should be fielded by both automated machines and live persons to provide accurate and up-to-date information to potential riders.
- **Shuttle information should be available at all shuttle stops.** Several key bus stops along Route A had no signage. In particular, the stop at Broad Channel Station had no signage or information of any kind. The reason given for this was the high expense of temporary signage combined with the high risk of signage being stolen or defaced at the Broad Channel Station. On August 31, several riders suggested they were lucky that they were at the station when the bus arrived. Most stops along Route B at Floyd Bennett Field and Riis Landing were marked by bus stop signs. All bus stops should have signs as well as other relevant information such as route names, maps, and schedules.
- **Provide detailed information regarding all connections.** Marketing materials concentrated on connections between the ferries and shuttle buses, but placed less emphasis on cars, parking, and the transit system. In particular, future shuttle programs should provide detailed connection information regarding the MTA Transit Q22 and Q35 buses. In addition, MTA Transit bus drivers should be aware of the NPS shuttles and be able to direct riders to Riis Landing.
- **Marketing materials should be easy to read and understand.** Although the poster-sized sandwich boards placed at Riis Landing included a great deal of information, they were not legible from a distance and did not quickly convey the existence or aim of the pilot shuttles. Future marketing materials may be improved with less, but more targeted information and larger text.
- **Proofread all marketing materials carefully prior to printing.** NPS staff improved and revised printed marketing materials several times during the pilot shuttle program. While many of these improvements were related to lessons learned, others were corrections that could have been avoided by detailed proofreading.

Pilot Finances

The NPS Northeast Regional Alternative Transportation Program Coordinator approved GATE to operate the pilot shuttle. Operations funding is not available from the alternative transportation program, and since the vehicles and drivers were leased as a single package, the alternative transportation program was not able to fund the portion of the lease that covered labor. While the most likely source of funding was GATE's operating budget project staff, the Volpe Center was not able to confirm that at the time this report was written.

The cost of the contract, which lasted six weekends (two days each weekend, except the last weekend which consisted of three days due to the Labor Day holiday at 8 hours a day) was $38,900. This equates to

about $375 per service hour, which is atypically high. An additional $1,700 was spent on printing 2,000 brochures. A significant amount of staff time, both planning and monitoring the shuttle, was expended. While the staff and pay periods were recorded, the number of hours was not.

Conclusions

The pilot shuttle service provided a good opportunity to test two candidate routes, and gained a better understanding of operating issues and visitor reactions to the shuttle. Due to the fast start-up, short season, and bad weather, it is likely that visitation and ridership were lower than could be expected under more favorable circumstances in the future. Chapter 4: Analysis of Travel Characteristics and Chapter 5: Route Analysis discusses additional research into visitor travel patterns and improved connections between the shuttle and the MTA transit system, and could provide a basis for developing more effective shuttle bus service. Chapter 6: Marketing and Outreach discusses expanded marketing, which also has the potential to increase shuttle ridership.

Chapter 4: Analysis of Travel Characteristics

Introduction

Analysis of the 2009 NPS Jamaica Bay pilot shuttle and changing economic and political conditions suggests that there may be potential for a reconfigured shuttle bus service to provide greater benefits to a greater number of people. Some of the factors affecting ridership potential, as identified in this analysis, are as follows:

- The demand for visits by transit riders to multiple sites within Jamaica Bay is unknown, but thought to be low. For example, the stakeholder analysis found that bird watchers were unlikely to participate in other activities or visit non-birding sites in Jamaica Bay. In general, visitors to the beach may not be interested in airplane restoration or radio-controlled cars at Floyd Bennett Field. Model airplane enthusiasts are not likely to engage in activities other than flying radio-controlled planes at the designated area, and very few gardeners will be seen walking the shoreline of Riis Park. As a result of the recent opening of a popular campground at Floyd Bennett Field, however, there may be greater interest in travel between Floyd Bennett Field and some of the other activity centers.
- Transit access among neighborhoods in Manhattan, Brooklyn, Queens, and sites in Jamaica Bay is costly in terms of time. Although the ferry provided access between Manhattan's Pier 11 and Riis Landing via the Brooklyn Army Terminal in 1 hour and 15 minutes, the future of this service is uncertain.[3]
- During the period when the pilot shuttle bus was in service, beach-going ferry passengers tended to walk from Riis Landing to the beach in good weather. Due to limited marketing efforts and indifferent attitudes of the bus drivers, these visitors may not have understood the buses were provided by the park to take them to the beach.
- Floyd Bennett Field and the activities located there simply may not be compatible with regularly scheduled transit. Floyd Bennett Field is a relatively large and low density site. While it may take pedestrians 20-30 minutes to walk from one location to another, the low volume of visitors may not be sufficient to support a transit route. Furthermore, results of the stakeholder analysis suggest that many activities undertaken at Floyd Bennett Field, including archery, radio-controlled cars and planes, fishing, and community gardening, require personal equipment that is safer and more convenient to transport in personally owned vehicles than on public transit. One activity that may change this significantly in the near future is the growing popularity of camping. Floyd Bennett Field may become an ideal destination for campers, in which case regularly scheduled public transit will be an important consideration. As noted above, demand may increase for travel between Floyd Bennett Field and the other unit sites, specifically to Riis Park and the Jamaica Bay Wildlife Refuge.

The current study expanded upon the insights derived from the pilot shuttle experience and the stakeholder interviews for planning new transportation services. This chapter examines travel characteristics, such as travel times by different modes between selected sets of origins and destinations that serve as determinants of travel demand. The analysis focuses on "last mile" connections to Jamaica Bay to identify specific access improvements GATE may pursue to reduce travel time and inspire more visitors to use transit to reach the park.

[3] Weekend ferry service connecting Manhattan Pier 11, Brooklyn Army Terminal, and Riis Landing was a cornerstone of the route and schedule decisions made for the 2009 pilot shuttle. In February 2010, the New York City Economic Development Corporation announced it would cancel the service due to low ridership and the high per-person city subsidies required to run it. Discussions centered around continuing or altering the ferry service have since ensued, but the future of the ferry and its relationship to Jamaica Bay are unknown at this time.

Technical Approach

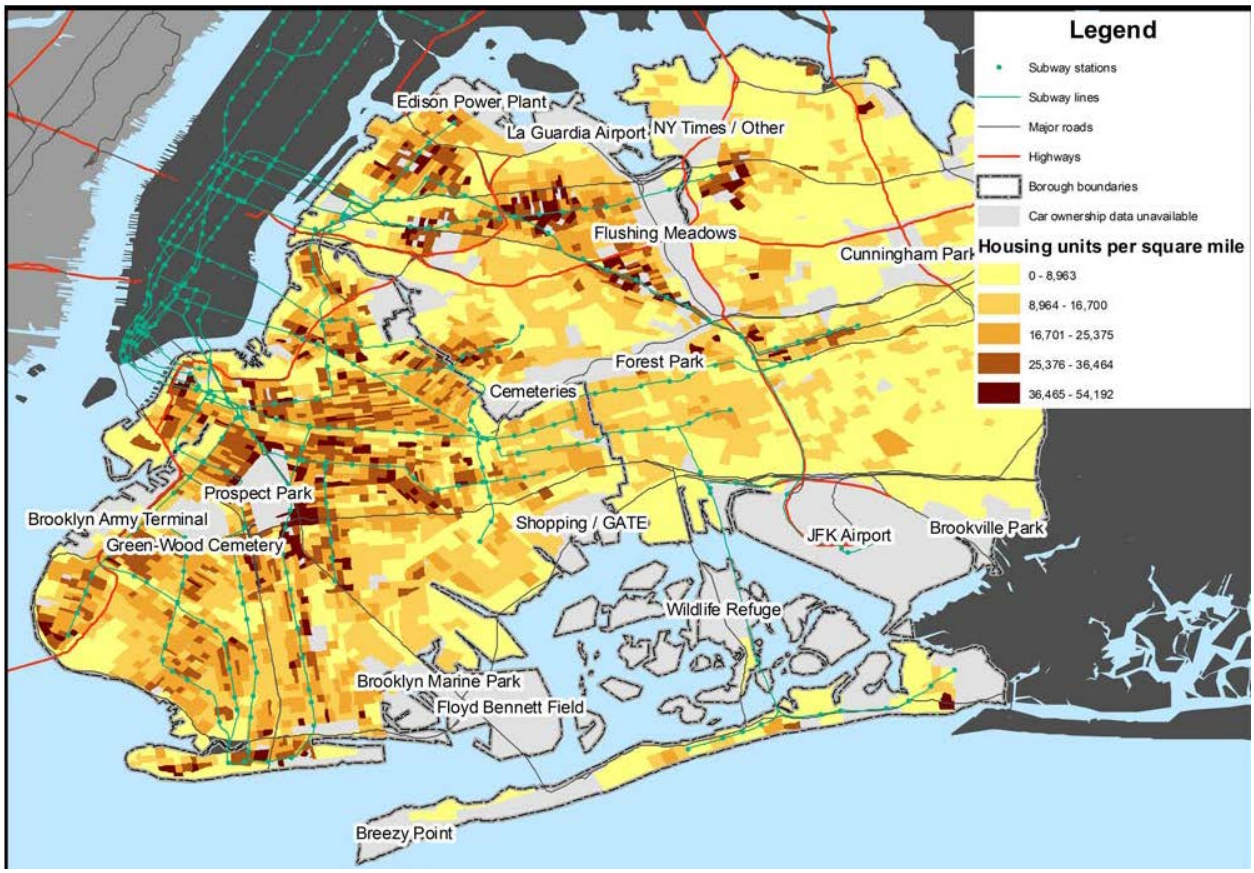
The analysis of transportation characteristics consists of three steps. First, housing, population, and car ownership data from the census and the results of discussions with park staff and stakeholders were considered to identify areas with high levels of latent demand. Areas with relatively high potential demand were characterized as origins and destinations. Second, routes of suspected importance between the origins and destinations were defined. Third, routes between origins and destinations were characterized in terms of transit availability, number of required connections, and transit and driving travel times.

Analyze Potential Demand

The 2009 pilot shuttle served three areas within the Jamaica Bay Unit: Jacob Riis Park, Floyd Bennett Field, and the Jamaica Bay Wildlife Refuge. Park management suggested that in addition to these sites, this analysis also consider Canarsie Pier and perhaps three or four other areas defined by their potential to support transit to and from Jamaica Bay. One origin/destination of interest is Manhattan Island. Manhattan is an unparalled center of concentrated population and low car ownership, and the market for transit trips to Jamaica Bay has been demonstrated by weekend ridership numbers on the ferry.

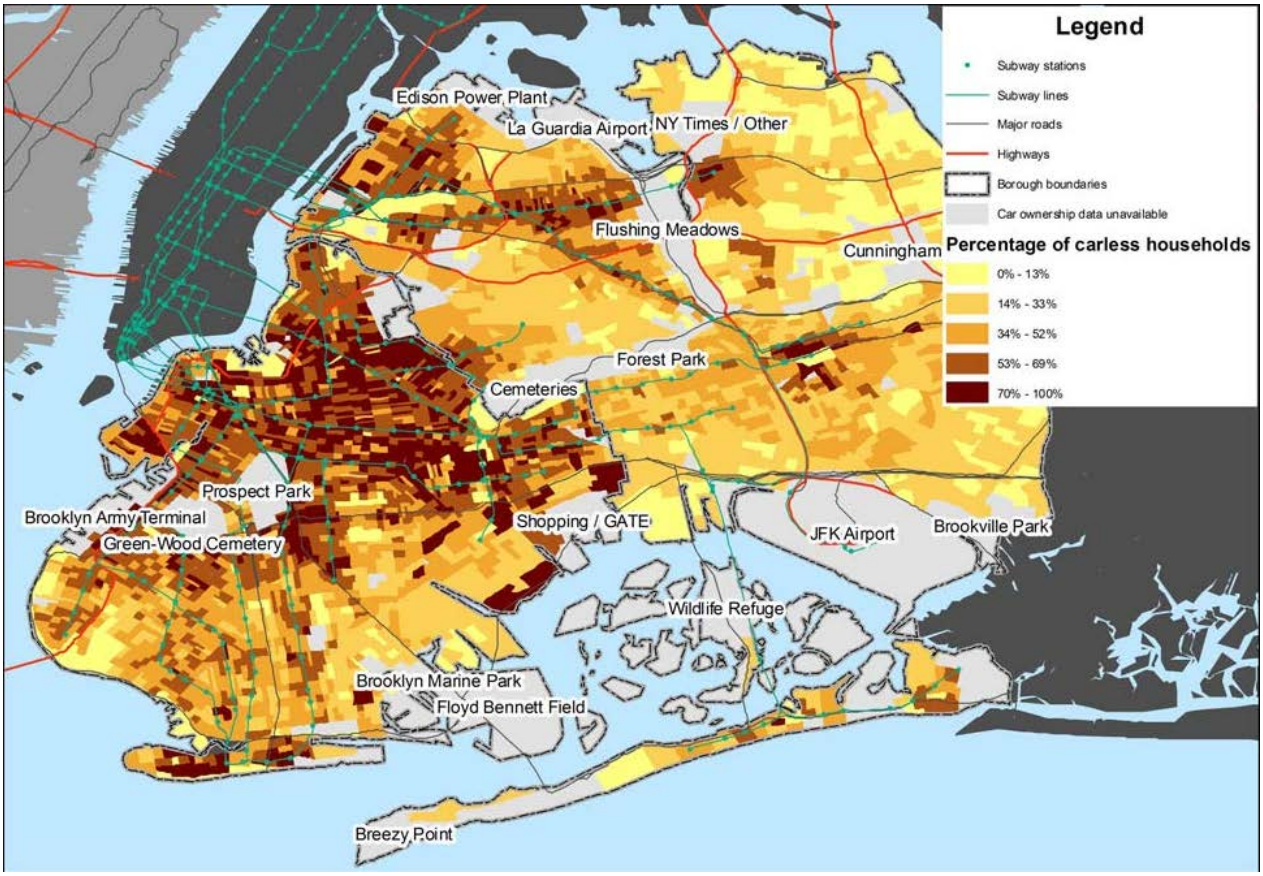
Census data were analyzed to identify two or three additional locations in Queens and Brooklyn where demand for alternative transportation to the Jamaica Bay area may be high, based both on housing density and the rates of vehicle ownership. Although household density is generally high in many parts of Brooklyn, several areas stand out: the areas around Prospect Park, Park Slope, Fort Hamilton, and some small pockets on Coney Island (Figure 7).

Figure 7
Housing Density, Brooklyn and Queens
Source: 2000 U.S. Census



Concentrated areas with lowest car ownership include Prospect Park in Brooklyn and Jackson Heights and Forest Hills in Queens. Figure 8 shows the percentage of households in a given block group that do not own a car. Over 70 percent of block group households in Brooklyn do not own a car. In Queens, subway access is convenient in several sections where households have low rates of car ownership, particularly in the case of the 7 and E, F, G, and R lines.

Figure 8
Percentage of Carless Households by Block Group, Brooklyn and Queens
Source: 2000 U.S. Census



Based on desires of park management, comments from stakeholders, analysis of household density, and rates of vehicle ownership, the following locations were identified as origins and destinations for the study:

- Brooklyn - Prospect Park (Church Av & 18th St E);
- Brooklyn - Coney Island (Stillwell Av & Surf Av);
- Queens - Jackson Heights (Roosevelt Av & Broadway);
- Manhattan - Union Square (Broadway and E 14th St);
- Floyd Bennett Field;
- Jacob Riis Park;
- Canarsie Pier; and
- Jamaica Bay Wildlife Refuge.

In addition to having relatively high housing density and low car ownership, the choice of Coney Island as an origin was based on stakeholder comments suggesting that Coney Island and nearby neighborhoods may desire improved transit access to Jamaica Bay Unit sites.

Define Routes

To determine the ease of accessing routes between origins and destinations, the existing transportation routes for each pair were characterized with respect to transit availability, number of required connections, and transit and driving travel times. Driving times and the number of transfers required for transit trips between origin and destination pairs are shown in Appendix D, which also includes tables showing detailed data for individual trip segments.

Table 4 shows average transit travel time among origin and destination pairs. Transit travel times are relatively long for all the pairs that include neighborhoods external to the Jamaica Bay Unit. These long travel times are a crucial factor limiting the attractiveness of existing transit service as a mode of unit access. The shortest transit travel time between a neighborhood and the Jamaica Bay Unit is for the Jackson Heights-Jamaica Bay Wildlife Refuge connection, while the transit travel time between the unit and Prospect Park is about the same—50 minutes. Travel times exceed an hour for all the other pairs that include a trip end external to the Jamaica Bay Unit. The longest transit trip is 98 minutes between Coney Island and the Jamaica Bay Wildlife Refuge. Other long trips include those that begin in Jackson Heights, likely due to the long distance from Jamaica Bay, and the trip between the Jamaica Bay Wildlife Refuge and Canarsie Pier. The latter trip covers a comparably short distance with other long trips and may provide an opportunity for improvement. Another impediment to using transit is the need to transfer between different buses or subways and buses. Transit users find transfers inconvenient, particularly when they are carrying items, and the transfers contribute to long travel times. Traveling between most of the neighborhoods and the Jamaica Bay Unit requires two transfers—a significant impediment to the use of transit. If shuttle bus service can reduce travel times and/or the number of transfers required to travel to and from activity centers in the Jamaica Bay Unit, there is a potential for the service to attract substantial ridership.

Table 4
Average Travel Time, Transit
Source: MTA Trip Planner; Google Maps Transit

Origins	Destinations			
	Floyd Bennett Field	Jacob Riis Park	Canarsie Pier	Jamaica Bay Wildlife Refuge
Brooklyn - Prospect Park (Church Av & 18th St E)	50 mins.	50 mins.	50 mins.	72 mins.
Brooklyn - Coney Island (Stillwell Av & Surf Av)	63 mins.	62 mins.	74 mins.	98 mins.
Queens - Jackson Heights (Roosevelt Av & Broadway)	94 mins.	83 mins.	83 mins.	47 mins.
Manhattan - Union Square (Broadway and E 14th St)	75 mins.	71 mins.	60 mins.	70 mins.
Floyd Bennett Field		29 mins.	68 mins.	67 mins.
Jacob Riis Park	26 mins.		61 mins.	35 mins.
Canarsie Pier	74 mins.	74 mins.		77 mins.
Jamaica Bay Wildlife Refuge	62 mins.	41 mins.	80 mins.	

Table 5 shows the ratio of drive times to transit times (e.g., trips from Prospect Park to Floyd Bennett Field via car take 30 percent of the time compared with transit). All of the trips take at least twice as long by transit as by driving, and most take several times as long. Assuming that parking is available, most visitors to the Jamaica Bay Unit who travel from neighborhoods included in the analysis can be expected to drive a car or other private vehicle. Transit trips that take more than five times the length of automobile trips are enclosed in squares. The longest transit trips relative to automobile trips are between Coney Island and Floyd Bennett Field or Canarsie Pier, Canarsie Pier and Floyd Bennett Field or Jacob Riis Park, and the Jamaica Bay Wildlife Refuge and Canarsie Pier. Canarsie Pier is either an origin and destination in four of the five routes listed in the table, and may be a candidate for additional transit investment.

Table 5
Ratio of Drive Time to Transit Travel Time
Source: MTA Trip Planner; Google Maps Transit; Google Maps

Origins	Destinations			
	Floyd Bennett Field	Jacob Riis Park	Canarsie Pier	Jamaica Bay Wildlife Refuge
Brooklyn - Prospect Park (Church Av & 18th St E)	0.3	0.38	0.26	0.32
Brooklyn - Coney Island (Stillwell Av & Surf Av)	0.16	0.21	0.14	0.2
Queens - Jackson Heights (Roosevelt Av & Broadway)	0.28	0.34	0.24	0.49
Manhattan - Union Square (Broadway and E 14th St)	0.4	0.48	0.47	0.41
Floyd Bennett Field		0.17	0.06	0.21
Jacob Riis Park	0.23		0.16	0.29
Canarsie Pier	0.11	0.14		0.12
Jamaica Bay Wildlife Refuge	0.24	0.24	0.18	

Chapter 5: Route Analysis

The analysis of potential shuttle bus routes builds on the results of analysis performed earlier in this study and documented in Chapter 3: Evaluation of the 2009 Pilot Shuttle Bus Service and Chapter 4: Analysis of Travel Characteristics. Critical gaps in transit access are identified that could be filled by new shuttle bus services based at the Jamaica Bay Unit of Gateway NRA. Primary factors considered in identifying these gaps were the size of geographic markets, the types of activities provided at various sites within and near the Jamaica Bay Unit, and the quality of current transit access between key activities and potential markets. Specifically, the current analysis consisted of three steps based on these factors:

1. Seventeen potential route segments close to the Jamaica Bay Unit were identified that would provide service to markets of substantial size, i.e. markets with potentially high demand;
2. Route segments were organized into seven sets based on the geographic area they serve in the transportation network, to optimize alternative routes in terms of demand potential and scheduling. The resulting alternative routes are:

   - Rockaway Peninsula Routes
   - Cross Marine Parkway Bridge Link
   - SW Brooklyn/B Subway Line–Floyd Bennett Field (FBF) Access
   - Brooklyn (2/5 Subway Line)-Jacob Riis Park (via FBF)
   - Canarsie Connector
   - Coney Island–FBF Access
   - FBF Shuttle (Distributor)

   Travel times for these routes were estimated as a basis for developing illustrative schedules for potential shuttle bus routes. The potential to extend routes further by creating additional route linkages was considered (e.g. Rockaway Peninsula routes and Cross Marine Parkway Bridge Link connecting FBF to Jacob Riis Park and Jamaica Bay Wildlife Refuge), to demonstrate trade-offs in travel times and to integrate the routes into a coordinated route structure.
3. In order to extend service to the greatest number of visitors, routes with the highest potential to attract substantial riders and draw visitors to Jamaica Bay Unit sites were identified and strategies for phased implementation of the shuttle bus service were developed.

Identification of Route Segments

The first step in the route analysis was to identify candidate routes connecting significant markets with destinations in the Jamaica Bay Unit and surrounding area. There are several key criteria that were applied to determine the size of potential markets for new shuttle bus services.

- Market analysis: Type and scale of "destination" resources and activities at Jamaica Bay sites;
- Quality of existing transit access between individual Jamaica Bay sites and geographic subareas with potential markets for Jamaica Bay resources and activities, particularly subareas with large "transit dependent" populations that have low rates of private vehicle ownership;
- "Gaps" in transit service close to the Jamaica Bay Unit that impede transit access from populous subareas;
- Travel times via transit, including new shuttle bus connections, between Jamaica Bay and potential markets.

Transit Access

As previously discussed, the Jamaica Bay Unit is located at the periphery of southern Brooklyn and Queens and has limited transit access relative to most of NYC. On the Brooklyn side of the bay, the closest subway stops to Floyd Bennett Field are several miles away. While the Q35 bus line runs along Flatbush Avenue from the Brooklyn College/Flatbush Avenue 2 and 5 subway station across the Marine Parkway Bridge to Beach Channel Drive, with stops close to both Floyd Bennett Field and Jacob Riis Park, most areas of the city lack viable access to Jamaica Bay sites via transit services in this corridor. Local subway and bus stops near Jamaica Bay are shown in Figure 9.

Brooklyn

The objective of operating new shuttle bus service on the Brooklyn side of Jamaica Bay would be to provide direct access to additional sections of the city and/or connections to additional corridors served by MTA subways or buses. Shuttle bus routes would be short and selected to fill strategic gaps close to the Jamaica Bay Unit. Shuttle bus services are not intended as a substitute for longer bus routes that would more appropriately be under the authority of the MTA.

Canarsie is served by the L Line subway, with a stop at Rockaway Parkway and Glenwood Road, about 1 ½ miles from the pier, and several bus routes. The B42 bus connects the subway with the pier, and two bus routes connect the subway to points within closer walking distance of the pier: the B103 bus between Canarsie and Downtown Brooklyn, with a stop on Avenue M Street a little over .5 miles from the pier, and the B17 bus, which stops less than 1,000 feet from the pier. The BM2 Express bus provides service between Avenue M in Canarsie and Manhattan on weekdays and Sundays. Canarsie is about 4 miles from Floyd Bennett Field and farther yet from Jacob Riis Park and the Jamaica Bay Wildlife Refuge. There are no transit connections between these primary sites in the Jamaica Bay Unit.

Queens

On the Queens side of the bay, the A subway line serves Rockaway Peninsula, with a station about 3/4 mile from the Jamaica Bay Wildlife Refuge Visitor Center, and a terminal station, which also serves the Rockaway Parkway Shuttle S Line, at 116th Street and Rockaway Park, about a ½ hour walk to Jacob Riis Park. The Q22 and Q53 bus lines provide direct, frequent service to Jacob Riis Park and subway passengers have the option of transferring to these bus routes. The need to transfer or walk substantial distances reduces the convenience of using these transit services and results in prohibitively long travel times for travelers originating outside a short and narrow corridor. Even travel times between the Jamaica Bay Wildlife Refuge and Jacob Riis Park are lengthy–approximately twice as long as driving a car or private vehicle. Moreover, subway riders going to 116th Street have access to several attractive beaches that are quieter than Jacob Riis Park and are within reasonable walking distance (about 1,000 feet) from the A Line. There are a number of beautiful and more private beaches in proximity to 116th Street in the Rockaways (Belle Harbor and Neponsit). Potential visitors to Riis Park may be more inclined to visit these beaches than walking the additional .5 miles to Riis Park. In addition, the very effective limiting factor of available street parking during beach season is not an issue for visitors who take the train to visit the shoreline.

A high-quality shuttle bus connection between the 116th Street A Line station and Jacob Riis Park may prove attractive to beach goers, because the shuttle bus would take riders directly to Jacob Riis Park and the walking distance would be reduced relative to other nearby beaches. Providing improved direct linkages among the A Line, Jacob Riis Park, and Jamaica Bay Wildlife Refuge represents the most practical approach to improving visitor access to resources on the Queens side of the bay.

This analysis identified the following 17 individual routes:

1. Riis Landing-Jacob Riis Park
2. Jacob Riis Park-Broad Channel Station-Jamaica Bay Wildlife Refuge

2a. Riis Landing-Jacob Riis Park/Broad Channel Station-Jamaica Bay Wildlife Refuge

3. Jacob Riis Park-Floyd Bennett Field
4. Jamaica Bay Wildlife Refuge-Broad Channel Station-Jacob Riis Park-Floyd Bennett Field
5. Floyd Bennett Field(northbound)/Golf Center(southbound)-Sheepshead Bay Subway Station
6. Floyd Bennett Field-Golf Center(southbound)/Ryan Visitor Ctr.-Floyd Bennett Field(northbound)-King's Plaza-King's Highway Subway Station
7. Jacob Riis Park-Ryan Visitor Center-Floyd Bennett Field(northbound)/Golf Center(southbound)/Ryan Visitor's Center/Floyd Bennett Field(northbound)-Sheepshead Bay Subway Station
8. Jacob Riis Park-Floyd Bennett Field(northbound)/Golf Center(southbound)/King's Plaza-King's Highway Subway Station
9. Jacob Riis Park-Floyd Bennett Field(northbound/Golf Center(southbound)/King's Plaza-Brooklyn College/Flatbush Avenue Subway
10. Floyd Bennett Field-Rockaway Parkway/Canarsie Subway
11. Jacob Riis Park-Floyd Bennett Field(northbound)/Golf Center(southbound)-Rockaway Parkway/Canarsie Subway
12. Floyd Bennett Field-Golf Center(southbound)/Riding Academy(northbound)-Canarsie Pier
13. Jacob Riis Park-Floyd Bennett Field (northbound)/Riding Academy (northbound) Golf Center(southbound)-Canarsie Pier
14. Floyd Bennett Field-Golf Center(southbound)/Riding Academy-Coney Island
15. Floyd Bennett Field-Shore Parkway/Emmons Avenue/Brighton Beach Avenue/Sheepshead Bay and Ocean Avenue Subway Stations-Coney Island (Limited Schedule/Event-Based)
16. Floyd Bennett Field Internal Distributor

Table 6 shows the travel times for each route. Routes are depicted in Figure 10.

Market Analysis

The primary Jamaica Bay Unit destinations that could potentially be served by shuttle buses are Floyd Bennett Field and Canarsie Pier on the Brooklyn side of Jamaica Bay and Jacob Riis Park, Fort Tilden, and the Jamaica Bay Wildlife Refuge in Queens. Floyd Bennett Field, Jacob Riis Park, and the Jamaica Bay Wildlife Refuge are all resources that attract visitors from a relatively wide geographic area spanning Brooklyn, Queens, and Manhattan. In the case of the Jamaica Bay Wildlife Refuge, the geographic range of the visitor market is in fact much wider, extending beyond NYC to the northeastern United States and beyond. Currently, Canarsie Pier primarily serves as a local resource, although improved transit access could potentially expand the geographic area from which visitors originate.

The beach at Jacob Riis Park is a resource with a popular appeal, and is therefore a primary potential destination for the shuttle bus system. If the proposed campground at Fort Tilden is approved, the market for Riis Park/Fort Tilden may grow further. The Rockaway Beach Ferry owned and operated by American Princess has provided weekend service between Manhattan and Riis Landing during the summer since 2011, carrying passengers destined for Jacob Riis Park. Reinstating shuttle bus service in future years between Riis Landing and Jacob Riis Park (provided as a pilot service in 2009) would benefit these visitors, assuming that the Rockaway Beach Ferry is again in service in future years.

While the market for the Jamaica Bay Wildlife Refuge is more diffuse, improved connections to the vast NYC transit system operated by the MTA could play a crucial role in making this regional resource available to a greatly expanded market. Floyd Bennett Field draws visitors from considerable distances, but the markets are focused on specific activities that are often event-based and therefore concentrated in particular time periods, with the net result that shuttle buses are likely to draw substantial numbers of riders only when events occur. While the new campgrounds are popular, most campers travel by car to Floyd Bennett Field because they carry equipment that is difficult to transport by transit. The new Ryan

Visitor Center could provide a central focus or hub for shuttle bus operations at Floyd Bennett Field. Campers may wish to use the shuttle to travel from the campground to other locations at Floyd Bennett Field or to other activity centers in the Jamaica Bay unit, such as the beach at Riis Park and the Jamaica Bay Wildlife Center.

In concept, the market for these shuttle bus routes should be sizeable, due to the attractiveness of the resources and the large population in target market areas, particularly people without access to private vehicles. A key consideration is whether *total* travel times between the places where people live and destinations within the Jamaica Bay Unit are reasonable using the shuttle bus and connecting public transit services.

Figure 9
Subway and Bus Stops near Jamaica Bay
Source; Google Maps

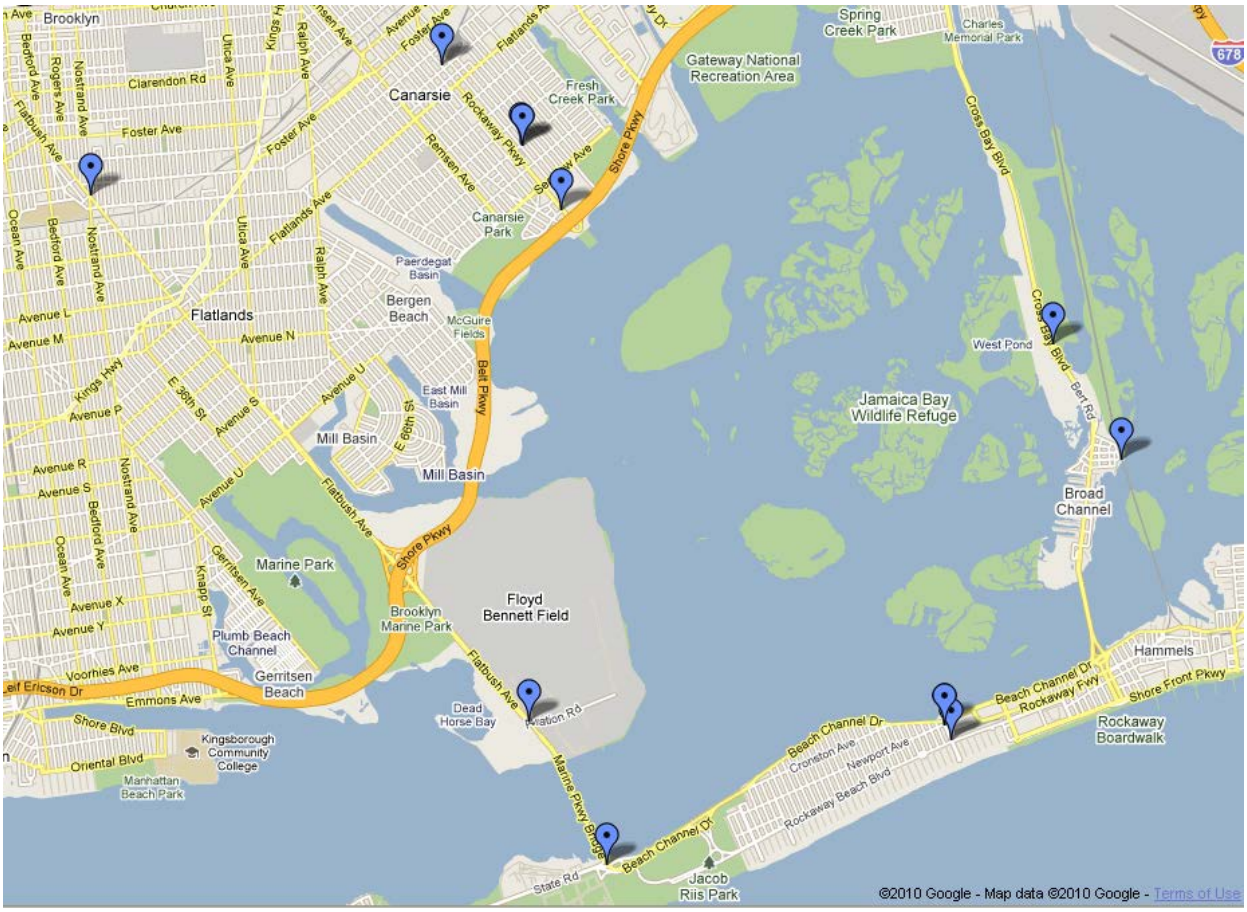
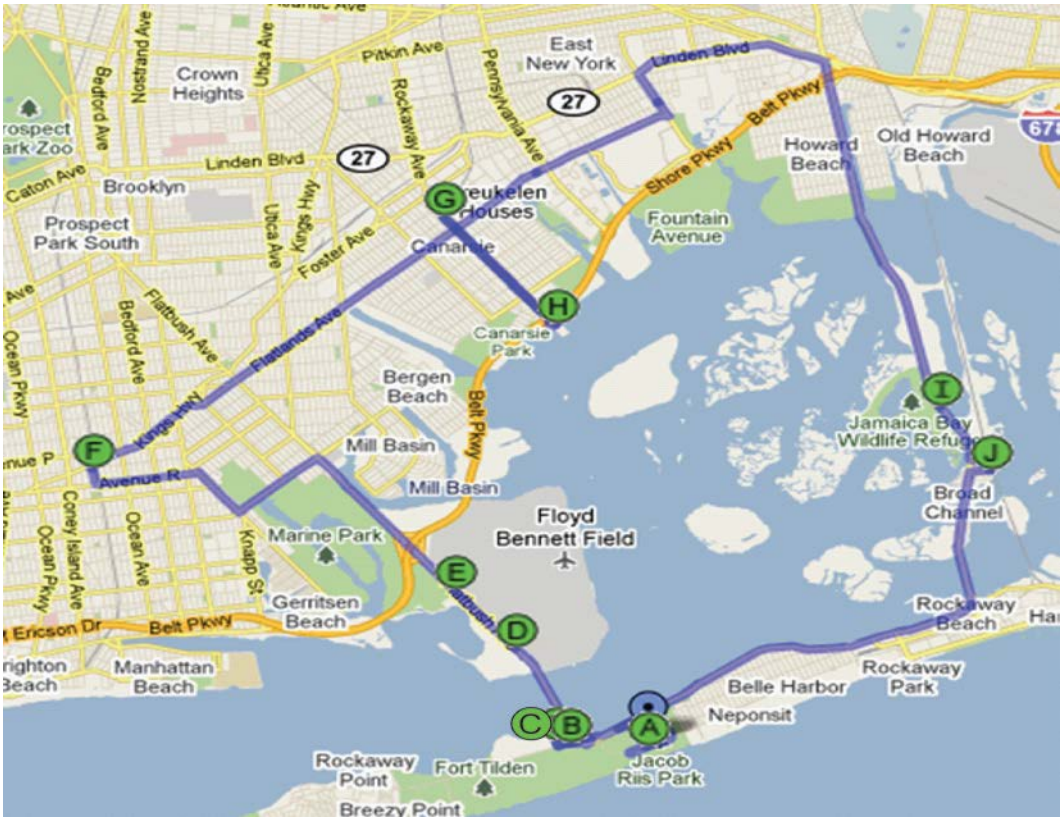


Table 6
Potential Shuttle Bus Route Segments

	Endpoint	Intermediate Stops	Endpoint	In-Vehicle Time	Boarding	Total Travel Time (minutes)		Headway (Minutes)	Round Trips/Day
						One Way	Round Trip		
1	Riis Landing	-	Riis Park	3	7	10	20	20	3
2	Riis Park	Broad Channel Station	JB Wildlife Refuge	14	6	20	40	45	10.7
2a	Riis Landing	Riis Park/Broad Channel Station	JB Wildlife Refuge	17	15	32	64	60	6.0
3	Riis Park	-	FBF	5	5	10	20	20	24.0
4	FBF	Riis Park/Broad Channel Station	JB Wildlife Refuge	19	11	30	60	60	8.0
5	FBF	Golf Center	Sheepshead Bay Subway	9	8	17	34	35	13.7
6	FBF	Golf Center/King's Plaza	King's Highway Subway Station	14	11	25	50	50	9.6
7	Riis Park	FBF/Golf Center	Sheepshead Bay Subway	14	11	25	50	50	9.6
8	Riis Park	FBF/Golf Center/King's Plaza	King's Highway Subway Station	19	13	32	64	65	7.4
9	Riis Park	FBF/Golf Center/King's Plaza	Brooklyn College/Flatbush Ave. Subway	18	13	31	63	65	7.4
10	FBF	-	Rockaway Parkway/ Canarsie Subway	23	5	28	56	60	8.0
11	FBF	FBF/Golf Center	Rockaway Parkway/ Canarsie Subway	28	7	35	70	70	6.9
12	Riis Park	Golf Center/Riding Academy	Canarsie Pier	10	7	17	34	35	13.7
13	Riis Park	FBF/Golf Center/Riding Academy	Canarsie Pier	15	10	25	50	50	9.6
14	FBF	Golf Center/Riding Academy	Coney Island	18	7	25	50	50	9.6
15	FBF	-	Coney Island	-	-	-	-	-	-
16	FBF Internal Distributor			10	10				

Figure 10
Jamaica Bay Sites and Potential Shuttle Bus Connections



A – Jacob Riis Park
B – Beach 169th & Rockaway Park Blvd.
C – Riis Landing
D – Floyd Bennett Field
E – Golf Center/Marina
F – Kings Highway Subway (B/Z) at E.15th St.
G – Rockaway Parkway/Canarsie Subway (L)
H – Canarsie Pier
I – Jamaica Bay Wildlife Refuge
J – Broad Channel Station

Individual Route Segments

A brief description of each route segment and the reasons for its selection as a candidate for shuttle bus service are provided in Appendix E.

Consolidated Route Options

Many of the individual route segments identified above vary from one another in terms of specific route endpoints within geographic subareas. For example, on the Brooklyn side of Jamaica Bay, a number of different route segments connect to different subway lines e.g. (the B/Q, L, and 2/5 Lines) or stations. In other cases, the route segments represent combinations of two other route segments, such the addition of the Floyd Bennett Field – Jacob Riis Park link (Route Segment 3) to the Floyd Bennett Field - Canarsie

Pier link (Route Segment 9) to produce Route Segment 13, extending from Canarsie Pier to both Floyd Bennett Field and Jacob Riis Park.

A number of additional variations combining specific route endpoints are possible. The route options described below reflect the organization of different route segments into groupings that illustrate the service concept for individual geographically-based market areas. It is possible to substitute alternative route segments or routing variations for some of the specific route segments selected for these consolidated route options, while preserving the essential service concepts.

Rockaway Peninsula Routes: This set of routes connecting Jacob Riis Park, Riis Landing (when the Rockaway Beach Ferry is in service), Broad Channel Station, and the Jamaica Bay Wildlife Refuge forms the "core" of a potential shuttle bus system, with Jacob Riis Park functioning as a hub. These linkages have the greatest overall market potential and level of benefits, in terms of providing improved transit access and the opportunity to enjoy the park's resources by the greatest number of people. The reasons that Jacob Riis Park and the Jamaica Bay Wildlife Refuge are principal activity centers are described above, as are concerns related to low ridership on the 2009 pilot shuttle. These factors are addressed in relation to the recommended implementation strategy in the study conclusions. As noted previously, it is unlikely that many visitors would travel to both Jacob Riis Park and the Jamaica Bay Wildlife Refuge on the same day. The advantage of this route configuration, however, is that it consolidates markets for two of the primary sites on a single route. In addition, serving both sites on a single route can promote awareness of the Jamaica Bay Wildlife Refuge among Jacob Riis Park visitors and vice versa. The *Rockaway Peninsula Routes* include stops at Jacob Riis Park, Riis Landing when the Rockaway Beach Ferry is in service, the Jamaica Bay Wildlife Refuge, and the Broad Channel Station. The other routes do not extend to the Jamaica Bay Wildlife Refuge or the Broad Channel Station, but connect sites on the Brooklyn side of the bay to Jacob Riis Park. While service concepts do not focus on the Riis Landing-Jacob Riis Park connection, it is necessary to provide this connection in conjunction with these routes.

Cross Marine Parkway Bridge Link: While the connection between Jacob Riis Park, Floyd Bennett Field, and the nearby Golf Center and Marina serves the purpose of allowing visitors to travel among those sites, its primary role is to provide improved transit connections between Jacob Riis Park and Brooklyn points of origin as well as Floyd Bennett Field and Queens, including the Broad Channel Station on the A Line. This route functions primarily as an extension of the Rockaway Peninsula Routes to Brooklyn, although connecting primary sites within the Jamaica Bay Unit is a secondary purpose.

SW Brooklyn/B Subway Line-Floyd Bennett Field Access: This group includes Route Segment 5, Floyd Bennett Field-Sheepshead Bay Subway Station and Route Segment 6, and Floyd Bennett Field-King's Highway Subway Station. These routes are likely to be most viable when operated on a limited schedule and timed to connect to the Cross Marine Parkway Bridge Link to Jacob Riis Park and Rockaway Peninsula.

Brooklyn (2/5 Subway and B/Q Line)-Jacob Riis Park (via Floyd Bennett Field): These routes would provide direct connections between the subway lines and Jacob Riis Park. In common to all three route segments included in this group are the connection to Jacob Riis Park across the Marine Parkway Bridge. On the Brooklyn side of the bridge, Route Segment 7 connects to the Sheepshead Bay Subway Station (B/Q Line), Route Segment 8 connects to the King's Highway Station (B/Q Line), and Route Segment 9 connects to the Brooklyn College/Flatbush Avenue Station (2/5 Line). Route Segment 7 and 9 could be connected to other route segments on the Brooklyn side of the bay. Route Segment 8 probably would not be connected to other route segments on the Brooklyn side of the bay due to the resulting long distances and travel times. In the case of the King's Highway Station, it would be more efficient to have a single connection to the B/Q subway line.

Canarsie Connector: This option combines Routes 11 and 13, connecting both Rockaway Parkway/Canarsie Station and Canarsie Pier to Floyd Bennett Field and Jacob Riis Park.

Coney Island-Floyd Bennett Field Access: Two route options would connect Coney Island to Floyd Bennett Field: Route Segment 14 is a relatively direct connection via the Belt Parkway and Route 15 would serve several subway stations and operate on local roads. Figure 11 shows these route options.

Floyd Bennett Field Shuttle: The only route segment included in this category is the Floyd Bennett Field Internal Distributor, which would circulate among the attractions along a loop route slightly longer than 4 miles. As noted above, this route could connect to any of the other routes with stops at Floyd Bennett Field. The route is illustrated in Figure 12.

Figure 11
Coney Island-Floyd Bennett Field Route

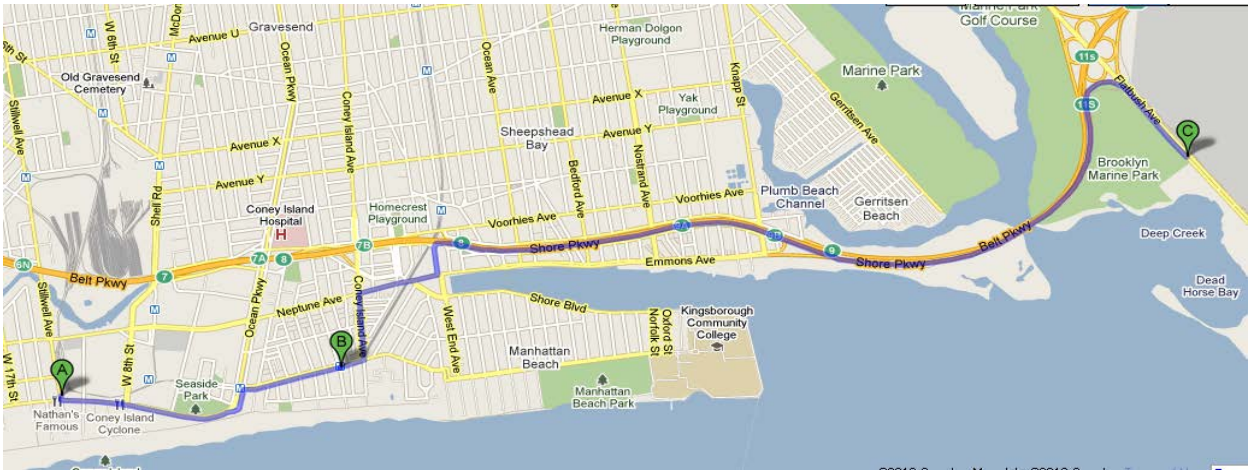
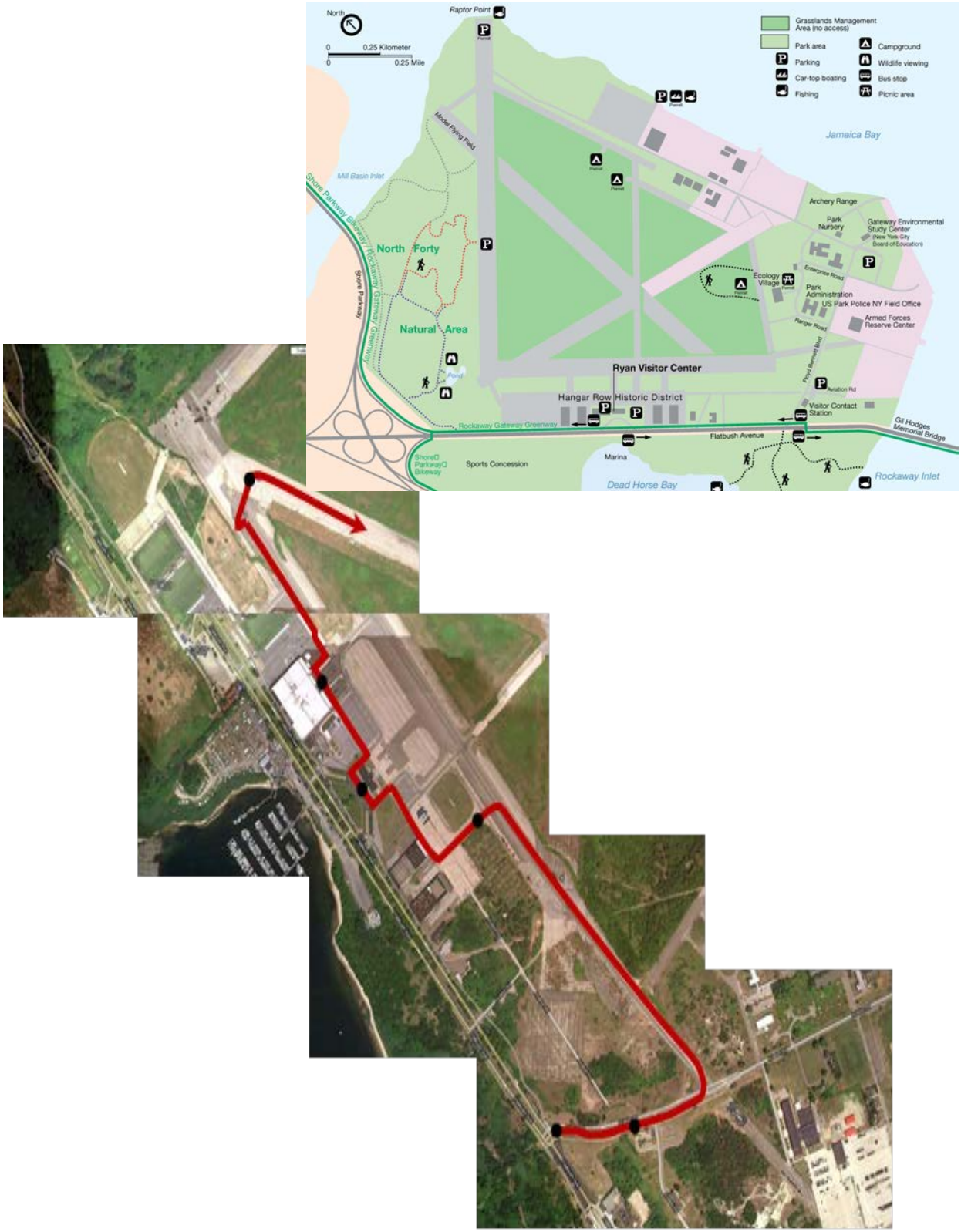


Figure 12
Floyd Bennett Field Shuttle Route



Route Schedules

Illustrative daily schedules are presented in Appendix E for four of the primary route options: the Rockaway Peninsula Routes, Cross Marine Parkway Bridge Link, Canarsie Pier Connector (including the link to Jacob Riis Park/Landing), and the Canarsie Connector (including Rockaway Parkway/Canarsie Subway, Canarsie Pier, and the link to Jacob Riis Park/Riis Landing.

In the case of the *Coney Island–Floyd Bennett Field Access* route, the most viable approach to operations is likely to be providing service on an event-based schedule, at least initially. While some resources at Floyd Bennett Field, such as the Historic Aircraft Hangar, are unique attractions that may draw significant numbers of Coney Island residents, in other cases, similar recreational activities are available locally and therefore, demand for shuttle bus service on this route is likely to be low on a daily basis. Similarly, demand for shuttle bus service to Jacob Riis Park can be expected to be relatively low because beaches are available closer to Coney Island. A linkage to the Jamaica Bay Wildlife Refuge may be attractive, however, and could be considered if the Rockaway Peninsula Routes prove to be successful in drawing significant ridership during an initial trial period.

Phased Implementation

System Start-Up

As summarized earlier, market analysis suggests that the most promising shuttle bus routes, in terms of potential ridership, are the *Rockaway Peninsula Routes*, due to the popularity of Jacob Riis Park and the broad geographic scale of the market for the Jamaica Bay Wildlife Refuge. A logical approach to implementing shuttle bus service, therefore, would be to begin with the Jacob Riis Park–Broad Channel Station–Jamaica Bay Wildlife Refuge, with a stop at Riis Landing when the Rockaway Beach Ferry is in service. This route would be operated on a trial basis between Memorial Day and Labor Day. Bus shuttle schedules could be altered to extend seasonal service in the spring and/or fall between Broad Channel Station and the Jamaica Bay Wildlife Refuge, without service to Jacob Riis Park, as visitation patterns may indicate. As discussed previously, it is not anticipated that significant numbers of riders will visit both Jacob Riis Park and the Jamaica Bay Wildlife Refuge on a single day. Including both of these destinations on a single route during the summer season may result in people who go to one of the sites on one day, becoming aware of the other site, and visiting there on another day.

If successful, this initial service could serve as the nucleus of a shuttle bus system that includes one or more of the other routes analyzed above. For example, a Cross Marine Parkway Bridge route could be added that would connect to Canarsie Pier, Rockaway Parkway/Canarsie Station on the L subway line, or the Sheepshead Bay SubwayStation on the B/Q subway line, with intermediate stops at Floyd Bennett Field, the Golf Center, and Gateway Marina. A Canarsie Pier Connector route also could include a stop at the Riding Academy (in the northbound direction only if the service operates on the Belt Parkway).

Alternatively, the Canarsie Connector between Rockaway Parkway/Canarsie Station, Canarsie Pier, Floyd Bennett Field, and Jacob Riis Park could be the initial route, or both the *Rockaway Peninsula* route and the *Canarsie Connector* could be implemented concurrently. If funding allows, service can be provided to link Rockaway Parkway/Canarsie Station, Canarsie Pier, Floyd Bennett Field and nearby sites, Jacob Riis Park, the Broad Channel Station and the Jamaica Bay Wildlife Refuge, with two routes connecting at Jacob Riis Park. While the market appears to be strongest for the *Rockaway Peninsula* route, the existing transit connection between Canarsie and the other Jamaica Bay Unit sites is poor, yielding a clear gap in existing service and suggesting that this route merits priority in an initial field test of shuttle bus market potential. The connection to Rockaway Parkway/Canarsie Station would be included to increase ridership above the levels that are likely to be generated solely by a route between Canarsie Pier and Jacob Riis Park. As noted previously, the shuttle bus connection to the L subway line at the Rockaway Park/Canarsie Station would provide access to the Jamaica Bay Unit from large population centers in northern Brooklyn and lower Manhattan. The trade-off in adding the subway stop to the route would be

to increase travel time by about 10 minutes in each direction, reducing the frequency of service to Jacob Riis Park and Riis Landing.

Crucial Program Elements

One of the options suggested for the initial service of the *Rockaway Peninsula Routes*, is essentially the same as the 2009 pilot shuttle Route A. The two factors that are critical to increasing the future prospects for success with this route are: (1) marketing, and (2) service quality. A strong marketing program is essential for publicizing the availability and schedule of the shuttle bus service to potential riders. This includes residents in areas served by the A Line, because the Broad Channel Station would be a primary access point to the shuttle bus. Marketing and outreach efforts, which are discussed in more detail in Chapter 6: Marketing and Outreach, should also target the sites within the Jamaica Bay Unit (i.e. Riis Point and the Jamaica Bay Wildlife Refuge) where shuttle bus stops would be located. Visitors to each site would become aware of the available resources and the availability of the shuttle bus service to travel to that location. Visibility of the service, including signage and posting of schedules at shuttle bus stops, is a key element of marketing. As shuttle bus service is extended to Floyd Bennett Field and possibly Canarsie Pier and/or subway stops in Brooklyn, the marketing program should also target these sites, providing information on other resources within the Jamaica Bay Unit and also the availability of shuttle bus connections to these resources.

In addition to a strong marketing initiative, it will be critical to coordinate bus routing and scheduled transit with the Aviator Sports and Events Center. Discussions with Aviator Sports and other larger concessions may be valuable in assessing schedules and the number of available buses. Perhaps Aviator Sports could pay for some of the buses that travel to and from their events, as well as for other occasions around the park. Further discussion with the Office of Business Management would be valuable in this effort.

Service quality is also crucial to attract ridership, including return visitors. Important attributes of service quality include adherence to schedule, vehicle comfort and cleanliness, and having drivers who are courteous and knowledgeable. Service visibility, including having well-marked boarding areas, is not only an element of marketing but also of service quality. Marketing and service quality are critical factors regardless of which initial routing is chosen and would apply equally to a start-up with the Canarsie Pier Connector.

Another route that may be implemented either in conjunction with or as an alternative to daily service is an event-based shuttle bus that would be operated on a limited schedule. A logical candidate for a field test of this service concept would be the *Coney Island–Floyd Bennett Field Access* route or one of the other routes that provide connections with Brooklyn subway stops. Service on these routes would be provided only when an event takes place at Floyd Bennett Field. Daily service could be provided on Rockaway Peninsula Routes using private contractor vehicles and drivers under a Commercial Use Authorization (CUA) or some other contractual agreement identified by Gateway NRA's Office of Business Management.

Circulator System

The approach to phased service implementation described above is based on starting first with the routes that have the strongest demand potential. This would allow for the most efficient and cost-effective operations providing the most frequent service to the sites with the strongest potential to attract visitors. Testing these relatively high-demand linkages would provide the greatest prospects for success.

On a longer-term basis, if these initial routes show promise in terms of attracting riders, the Jamaica Bay Unit can consider a more integrated service concept, in which all the sites within the unit are served by a single "Circulator" loop route around Jamaica Bay. The route could operate either on local roads or – with authorization from the NYC Parks and Permits Division – the Belt and Shore Parkways. Construction of overpasses and other transportation features will continue along the Belt and Shore Parkways until 2020. This will need to be taken into consideration for more than just mass transit.

Bicycling and walking will be affected as these overpasses will be closed intermittently, even for pedestrians. The alignment of these routes would include a segment north of the Jamaica Bay Wildlife Refuge on the Cross Bay Boulevard, connecting to the Belt Parkway and Canarsie Pier to the south. A commercial vehicle license would be required for shuttle bus operations on the parkway system.[4] The advantages of this system configuration would be its simplicity and associated "readability" by the public, as well as its value in providing service to - and connections among - all the sites within the Jamaica Bay Unit, in addition to nearby destinations such as the Jamaica Bay Marina and Riding Academy. The disadvantage relative to the shorter routes described previously is that service to each destination would be less frequent and convenient. Ridership could decline as a result.

Several different variations of the Circulator loop route concept are reviewed in Appendix E. A "simple" circulator operating on the parkway system could connect the following sites:

- Canarsie Pier
- Riding Academy
- Floyd Bennett Field
- Jacob Riis Park
- Broad Channel Station
- Jamaica Bay Wildlife Refuge

Total estimated travel time for this route is 37 minutes. Each of the sites would be served every 37 minutes, if a single vehicle is in service. A "detailed" circulator route operating on the parkway system could include a stop at the Sheepshead Bay Subway Station on the B/Q subway line, with total travel time of 52 minutes. If a commercial vehicle license cannot be obtained for the shuttle bus service, the route could be operated on local roadways, with stops added at the Rockaway Parkway/Canarsie L line subway station and the King's Highway subway station on the B/Q subway line. Total travel time with this configuration would exceed 1 hour.

Canarsie Ferry Service

Another possible transportation connection would be a ferry service operated between Canarsie Pier and Riis Landing. The primary objectives of this service would be to connect the Canarsie neighborhood with the beach at Jacob Riis Park and the Jamaica Bay Wildlife Refuge. This service could also be operated in concert with a Rockaway Peninsula shuttle bus service, allowing riders originating at Canarsie to travel by ferry to Riis Landing and then connect by shuttle bus to Jacob Riis Park and the Jamaica Bay Wildlife Refuge. The Canarsie ferry could operate on a limited weekend, summer schedule. The distance between Canarsie Pier and Riis Landing is approximately 4 miles. One-way travel time for a boat moving at approximately 20 knots would be 12-15 minutes. Round trip travel time would be 30-40 minutes.

Financial Analysis

The cost for contracting shuttle services is assumed to be $65 per hour, which includes vehicles. This estimate is in the upper range for small shuttle operations in the northeast, and is therefore reasonably conservative. The cost of 8 hours of daily operation is $520. The schedules for each of the consolidated shuttle bus options discussed above can be operated with a single vehicle in service. Longer routes provide less frequent service to each stop.

If the shuttle bus service is operated by a private provider under contract with a single vehicle, the estimated total cost of daily operations on an 8-hour per day schedule from Memorial Day (May 28) through Labor Day (September 3) in 2012 would be approximately $52,520. The estimated cost of

[4] The Volpe Center undertook an initial inquiry with the NYC Parks and Permits Division regarding the prospects for obtaining a commercial vehicle license to operate shuttle buses on the parkway system, as would be required. The initial response from the Division indicated that substantiating the purpose and need for the shuttle system's use of the parkways would be a significant factor in determining whether the license would be issued.

weekend-only service (including 3 days for the Memorial Day weekend) would be $8,840. Providing service on a limited schedule between Coney Island and Floyd Bennett Field, either as the sole shuttle bus service or in addition to one of the other routes operated throughout the day, can be assumed to cost about $200 for 3 hours.

While charging a fee or fare to shuttle bus riders is a possibility, the result would be to lower potential ridership. Administrative costs are also associated with fare collection that would reduce revenues, although these costs would be streamlined under a CUA. The estimated cost of operating a ferry service between Canarsie Pier and Riis Landing with a 16-passenger vessel is $95 per hour, exclusive of profit to a private provider,[5] based on cost data for a wide range of existing private ferry operations. Assuming 6 service hours daily for weekends from Memorial Day through Labor Day in 2012, the total estimated cost is $9,700 for the season. This estimate approximates the cost to a concessioner, which would charge a fare sufficient to provide a reasonable return on investment. The cost to NPS of a service contract, assuming 10 percent profit to the private operator, would be approximately $10,700.

[5] Ferry cost estimate includes amortized capital cost of vessel.

Chapter 6: Marketing and Outreach

This chapter identifies marketing and outreach strategies that the Jamaica Bay Unit can pursue to encourage visitors to take public transit to access the park. It builds upon the market and route analysis presented in previous chapters, which identified three primary opportunities to improve transit access to the four sites in Jamaica Bay:

1. Implement changes to existing transit services,
2. Increase outreach and marketing of existing transit options to access the park, and
3. Create new transit services.

The strategies outlined in this chapter are designed to both promote the existing transit services provided by the MTA and additional alternative transportation services provided by the NPS.

Review of Existing Marketing

Current Gateway marketing efforts are limited in scale and scope. The two primary sources of information dissemination are through:

- the NPS Gateway website http://www.nps.gov/gate/index.htm,
- an extensive email distribution list.

Additional information on the NPS website, email list, and other existing promotional efforts are provided in Appendix F.

Website

The NPS Gateway website provides visitors with a great deal of information to help plan their visit to the park. From the Gateway homepage, it takes three clicks to access the public transportation directions for Jamaica Bay. Once there, a visitor can find subway and bus directions for four locations: Floyd Bennett Field, Jacob Riis Park/Fort Tilden, Canarsie Pier, and the Jamaica Bay Wildlife Refuge. Visitors are also provided a link to the MTA homepage for schedules, maps, and additional information on public transportation options to access the area. Gateway's public transportation directions webpage does not provide any maps or trip planning tools.

Promotional Efforts

Gateway maintains an extensive email distribution list for sending out seasonal program guides and other mailings. In previous years, there was a more coordinated effort to promote park activities. Recently, individual park staff have taken greater responsibility for promoting their own programs. In addition to the NPS marketing efforts, partner organizations who conduct events within the park also market events individually.

Marketing Objectives

The strategies outlined in this chapter address the following objectives:

1. **Build greater awareness of the existing transit services available to access the park.** Educate visitors and potential visitors on the transit services available to access the park's various activity centers.
2. **Make the system easier to understand through enhanced information and signage**. Update Gateway's website and maps and install or update physical signage to allow visitors to more easily understand public transportation routes to the park.
3. **Increase visibility of new shuttle services.** Establish a coordinated brand for transit vehicles, stops, and materials to increase visibility and improve knowledge of the new shuttle service.

Target Markets

As highlighted in the stakeholder analysis and demand evaluation, travel to the Jamaica Bay sites via existing MTA transit service can take two to nine times longer than similar trips by automobile. Due to these longer trips, the existing transit service is likely not attractive enough to change a visitor's mode choice from driving to taking public transportation. As a result, Gateway should focus its marketing and outreach efforts on current and potential new visitors who regularly ride or are dependent on transit. Visitors to the New York City region are another important target market for Gateway. Many visitors to the area will not have access to a private vehicle and will be dependent upon public transportation.

Recommended Outreach Activities

The vast majority of stakeholders interviewed were unaware of the pilot shuttle service offered during the summer of 2009.

Suggestions for outreach strategies to inform stakeholders about future alternative transportation services include:

- Presentations and/or distribute flyers at community board meetings;
- Announcements/advertisements in the surrounding communities' newspapers;
- Post flyers at public transportation stations;

Make announcements on connecting public transportation services (the subway, Q35 bus, ferry, etc). Unfortunately, Gateway does not have detailed demographic data for park visitors. As this information would be helpful in developing marketing strategies to reach specific target audiences, Gateway should consider future surveys or data collection to better understand their visitor profile.

Marketing Strategies

Marketing strategies are grouped by the three marketing objectives outlined above.

Objective 1: Building Awareness of Transit Access to the Park

The following strategies are designed to educate visitors and potential visitors of the public transportation services available to access Jamaica Bay Unit attractions. Gateway staff can implement some of the strategies listed below on their own, while others will require coordination with partner organizations.

Partner with the MTA to Implement a Poster Campaign in Transit Vehicles and Stations

An ideal venue to reach Gateway's primary target audience (individuals who regularly ride or are dependent on transit), is through MTA's vehicles and stations.[6] Gateway can implement an advertising poster campaign on MTA buses or transit stations near the park or in targeted stations as outlined below. The cost to advertise with MTA is high compared to other marketing strategies; however, this high visibility campaign has the greatest potential to reach Gateway's target audience.

Bus Interior Posters

Promotional signs, such as the sample shown in Figure 13, can inform bus riders about park attractions and their proximity to public transportation. A basic poster campaign on MTA buses would include 300 11"H x 28"W posters. The cost to display the posters is $3,600 for four weeks or $10,800 for 12 weeks. The estimated cost to produce each poster is approximately $2.10 (or $650 for 300), plus additional costs for graphic design. Gateway would be responsible for printing the posters; however, the MTA has a list of recommended vendors.

[6] CBS Outdoor manages advertising for the MTA's buses, subway cars and stations.

Poster campaigns are distributed by bus depot and would involve several bus lines. Because buses are not always assigned to the same route, it is not possible to select individual bus routes to target in the poster campaign. In order to increase the effectiveness of the poster campaign, Gateway should focus on the bus depots that operate bus lines serving the Jamaica Bay area that have the highest ridership levels.

Figure 13
Sample Bus Poster
Source: Volpe Center, 2010

Subway Platform Posters

Subway stations are another location to promote Jamaica Bay destinations. Posters, similar to those developed for the bus campaign, can be displayed in select subway stations to promote Jamaica Bay Unit attractions and quickly convey the message that it is possible to access these sites via the MTA.

Subway station posters, which are 46"H x 60"W, should be bold, creative, and include:

- Park photos, highlighting destinations and recreation activities
- Gateway website
- Bus and transit routes and directions

Information should be simple enough for visitors to remember destinations or routes to plan future trips. The MTA recommends four to six posters per station. The cost to display signs in three stations for four weeks is $500 per poster (total cost of four posters would be $6,000) though the cost can be negotiated with higher quantities or a longer time period. The estimated cost to produce each poster is $30, plus additional costs for graphic design and printing.

Ideally, Jacob Riis Park would obtain visitor demographics to determine the appropriate stations to target. In absence of this information, the park should target stations with high traffic in relative proximity to the park. Atlantic Avenue and Broadway Junction stations are good candidates. Atlantic Avenue is a major transfer for several subway lines including five that serve the Jamaica Bay area (the B, Q, R, 5, and 2 subway lines). Broadway Junction is a transfer point for additional subway lines serving the Jamaica Bay sites (the L, A, and S subway lines).

Feature Park Destinations on MTA's "Deals, Getaways, and Destinations" Website

The MTA website features a *Destinations* page that highlights many of the region's natural and cultural destinations that are accessible by public transit.[7] The Jamaica Bay Wildlife Refuge is listed on this site, with a link to the National Parks of New York Harbor Conservancy's website.[8] The park should coordinate with the MTA to feature Jacob Riis Park, Fort Tilden, and Floyd Bennett Field on the MTA Destinations website, with a link to the New York Harbor Parks website or the NPS Jamaica Bay Unit website.

Highlight Transit Access in Jamaica Bay Program Guide and Other Park Materials

All of the Jamaica Bay Unit's promotional materials should highlight the park's accessibility via transit and provide a link to the public transportation directions webpage. In addition, Gateway can provide flyers promoting public transit when mailing the seasonal Program Guide, State of the Park report, or other standard mailings to visitors. The flyer should include a simple map of buses and subway stops located near Gateway destinations as well as additional information, such as approximate walking distances from the transit stop to the park, may be helpful for visitors when planning their trip.

Additionally, park staff can advocate for public transit. Maps and directions should be available at visitor centers to provide information on public transit options. Training sessions and map materials can help make this a successful effort.

Partner with Stakeholders to Promote the Use of Public Transportation

Gateway staff can work with partner organizations to promote the use of public transit to reach the park. Several partner organizations, including the Floyd Bennett Garden Association, the Aviator Sports and Events Center, the Jamaica Bay Riding Academy and Gateway Marina, maintain their own websites and/or distribute monthly newsletters. The Jacob Riis Park should encourage its partners to highlight the public transit accessibility in their promotional materials and include public transportation directions on their websites.

Gateway should also coordinate with local public libraries, hotels, and education centers to display park brochures and maps in high-traffic areas.

Increase Media Exposure

Gateway staff should conduct targeted media advertising and promotion, especially around special events, to attract potential visitors and promote the park's accessibility to public transportation. Suggested publications and tourism sites to target include *Time Out New York*,[9] NYC GO, Metro, ILOVENY.com, and NYC.com. Gateway should produce press releases for special events to encourage the use of public transportation, and work with magazine or website managers to include this information in their publications.

In addition, Gateway staff should take the opportunity to highlight the park's accessibility by transit in all media and public relations pieces. For example, in 2009, the NY Times wrote an article on Floyd Bennett Field, with quotes from Gateway's lead park ranger. The article ended with:

> *Standing at the water's edge near the end of one mile-long runway, flanked by contemplative fishermen, Mr. Daskalakis pointed to the spire of the* Empire State Building*, distant but clearly visible. Floyd*

[7] MTA Destinations, Deals & Getaways at http://www.mta.info/mta/destinations.htm

[8] National Parks of New York Harbor's website at http://www.nyharborparks.org/visit/jaba.html

[9] You do not have to pay a fee to be listed in *Time Out New York* magazine or their website. Submit information about the event by mail or fax to the editor of the section you wish to be listed. Event information must be submitted 10 days before publication. See http://newyork.timeout.com/22869/get-listed for more details on submitting event information.

Bennett Field may feel far removed from Manhattan in space and time, he said, but it's only a subway-and-bus ride away.[10]

This is an excellent example of how to incorporate the park's accessibility by transit into media or promotions.

Objective 2: Make the System Easier to Understand through Enhanced Information and Signage

The following strategies are designed to improve a visitor's understanding of how to access the Jamaica Bay Unit with public transportation. The strategies are targeted at both existing and new visitor groups.

Enhance the Public Transportation Section of the Jamaica Bay Website

Website

The Gateway website currently provides directions to Jamaica Bay Unit attractions. The main directions webpage provides driving directions, and visitors must click a separate link to access the public transportation directions. By making some minor improvements to the website, Gateway staff can help visitors and future visitors more easily get to the park via public transit. The cost and effort to update the website is minimal and can be implemented immediately.

Adding maps and *trip planning tools* to the public transportation directions can attract new riders and help them visualize the transit routes to better understand how to access the park by public transportation. The trip planning tool can also help existing transit riders discover new routes to access the area. The public transportation directions website could be updated to more prominently feature links to MTA's transit trip planner. Gateway staff should also modify the current link to the MTA website so that it opens in a new window or tab, as visitors currently leave the Gateway website altogether when clicking on the link.

Gateway staff should also embed the Google Public Transit planning tool in the public transportation directions webpage to make it even easier for visitors to plan their trip via public transportation. The Google Maps API is free for commercial use provided that the site on which it is being used is publicly accessible and does not charge for access.[11] An illustration of the Gateway website with the Google Transit feature added is shown in Appendix F, which also shows the HTML code that visitors can use to obtain transit information from a starting point of their choice.

Maps

The NPS has created two maps, one for Floyd Bennett Field[12] and one of the larger region,[13] that highlight the public transportation services and stops near the park. These informative maps are currently not accessible from the main Jamaica Bay Unit website or the directions page. The two maps should be added to the main directions section of the website, as well as the public transportation directions section. In addition, adding the bus stop locations on the broader Jamaica Bay Unit map can further help visitors visualize available public transportation options.

Improve Wayfinding from Public Transportation to Jamaica Bay Activity Sites

Providing wayfinding information at subway and bus stops and the adjacent streets can further simplify use of public transportation to access Jamaica Bay destinations.

Install Pedestrian Signage

Posting directional signs, similar to those featured in Figure 14, can orient visitors on how to access the Jamaica Bay Unit sites from bus and subway connections. Gateway can work with the New York City

---

[10] Strausbaugh, J. NY Times (July 9, 2009*) Where New Yorkers First Took Flight.* http://www.nytimes.com/2009/07/10/arts/10explorer.html?_r=1

[11] For more infomraiton about Google Maps API, including terms of service, see http://code.google.com/apis/maps/terms.html.

[12] Floyd Bennett Field detailed map: http://www.nps.gov/archive/gate/jbu/pdf_files/map_floyd_bennett_field.pdf

[13] Jamaica Bay Region map: http://www.nps.gov/archive/gate/jbu/pdf_files/map_jamaica_bay_wildlife_refuge.pdf

Department of Transportation (NYCDOT) and the MTA to install directional (or "trailblazer, as called by NYCDOT) signage around train stations or bus stops where directions to the park destinations may not be obvious.[14] In particular, wayfinding signage should be posted at the Broad Channel Station and adjacent streets to direct visitors who arrive by subway on how to walk to the Jamaica Bay Wildlife Refuge. The Canarsie Pier area would also benefit from pedestrian signage at the Canarsie Rockaway Parkway subway and bus station on the L subway line and its adjacent streets, including the B42 bus route.

Figure 14
Directional/Trailblazer Sign
Source: www.mta.info

Provide Enhanced Information Displays at Bus Stops

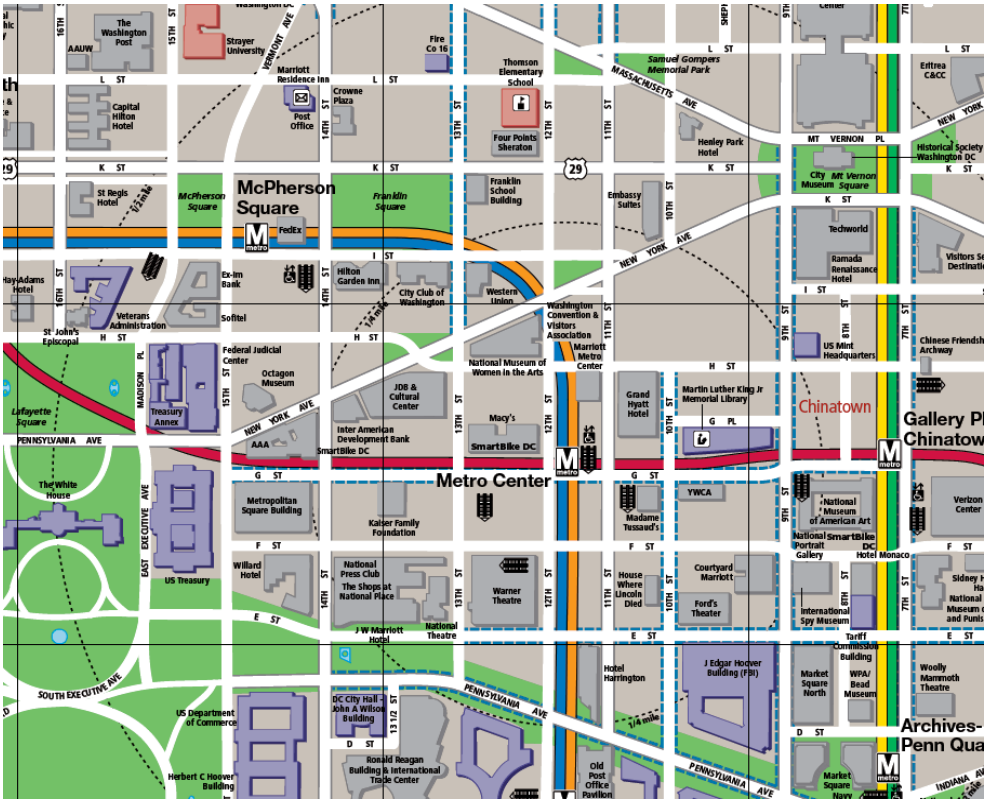
Gateway staff should coordinate with the NYCDOT to install bus shelters at stops located near the park in order to provide comfortable waiting facilities for visitors. Bus shelters also serve as a visual cue to non-transit users of the availability of public transit. The NYCDOT is currently working with neighborhood communities to identify locations for new bus shelters as part of its Coordinated Street Furniture Franchise project,[15] which is aimed at unifying the look and feel of the city's street furniture.

Gateway staff should also coordinate with the NYCDOT to install maps of the local road network, similar to the one depicted in Figure 15, in bus shelters located near park destinations. The maps should show the local road network and clearly feature Jamaica Bay Unit attractions. Such maps would help to orient visitors to Jamaica Bay sites from the bus stop.

[14] All requests for trailblazers should be sent to the DOT Division of Highway Design and Construction (HDC), 28-11 Queens Plaza North, Long Island City, New York 11101.

[15] Information on the Coordinated Street Furniture Franchise project, including siting criteria and instructions on how to request bus shelters is available at http://www.nyc.gov/html/dot/html/sidewalks/streetfurniture.shtml.

Figure 15
Station Area Map
Source: Washington Metropolitan Area Transit Authority



The Washington Metropolitan Area Transit Authority Metrorail station area maps, which are located on station platforms and mezzanines, provide customers with a 360-degree view of a station's surrounding area, up to three-quarters of a mile away.

Redesign MTA Transit Maps to Show Jamaica Bay Park Destinations

The current MTA Brooklyn bus map (Appendix F) has legend boxes positioned over the Gateway area, making it difficult for riders to identify the locations of bus stops near the park. Gateway staff should coordinate with MTA to discuss the possibility of redesigning the map so that the legends do not block the Gateway area.

Objective 3: Increase Visibility of New Shuttle Service

If the park implements a new shuttle service serving Gateway's destinations, park staff will need to communicate the availability of this new service to new and existing visitors. The park should use the previous two strategies to market the new service. In addition, staff should also consider additional promotional and branding strategies to announce the new service.

Strategies

- Brand the shuttle to communicate association with NPS and the Jamaica Bay Unit.
- Shuttle drivers should actively engage passengers. Between their arrival and departure at Riis Landing, which could be as long as 15 to 20 minutes, bus drivers spoke on their cell phones, sometimes away from the buses. Buses without drivers do not convey immediacy or attentive customer service. Instead, while waiting at Riis Landing, if potential passengers are present, bus

drivers should be on the bus or outside the door of the bus, actively engaging potential passengers, answering their questions, and informing them of the route and schedule.

- The digital message signs on the shuttle buses should display pertinent route information. On Sunday, August 31, the two shuttle buses operating on both routes were equipped with dynamic message signs on the front that said "HAVE A NICE DAY!" Instead, these signs should be used to communicate key pieces of information to riders and potential riders, namely 1) the shuttle buses are run by the National Park Service, 2) the name of the route, and 3) the name endpoints of the route.
- Issue a series of press releases to announce the introduction of the service.
- Shuttle information should be available at all shuttle stops. During operation of the pilot shuttle bus service in 2009, several key bus stops along Route A had no indicative signage. In particular, the stop at Broad Channel Station lacked signage or information of any kind. The explanation for this omission was the high expense of temporary signage, combined with the high risk of signage being stolen or defaced at the Broad Channel Station. On 8/31/09, several riders suggested they were lucky that they were at the station when the bus arrived. Most stops along Route B at Floyd Bennett Field and Riis Landing were marked by bus stop signs. All bus stops should have signs as well as other relevant information such as route names, maps, and schedules.
- Provide detailed information regarding all connections. Marketing materials for the 2009 pilot shuttle bus service concentrated on connections between the ferries and shuttle buses, but placed less emphasis on cars, parking, and the transit system. In particular, future shuttle programs should provide detailed connection information regarding the MTA Transit Q22 and Q35 buses. In addition, MTA Transit bus drivers should be aware of the NPS shuttles and be able to direct riders to Riis Landing.
- Marketing materials should be easy to read and understand. Poster-sized sandwich boards were printed and placed at Riis Landing for the 2009 pilot shuttle bus. Though the sandwich boards included a great deal of information, they were not legible from a distance and did not quickly convey the existence or aim of the pilot shuttles. Future marketing materials may be improved with targeted (but less) information and larger text.

Section 7: Conclusions and Recommendations

The GMP development effort currently in progress will provide recommendations for new ferry service, shuttle systems, improved public transportation, and improved Jamaica Bay Greenway access at each of GATE's three units. Also, a major feature of the GMP is the multiple-day experience, in which improved transportation will be an important factor to its success. The recommendations in this report provide a foundation for evaluating the emerging set of GMP recommendations and developing alternative transportation services compatible with the expanded set of activities envisioned in the GMP. This report has presented the results of a planning study designed to determine the feasibility of creating improved connections between the Jamaica Bay Unit and the world-class transit system serving New York City. The study considered visitor markets, transportation conditions, modal and route options for improving transportation service, and approaches for building awareness of the resources provided at the Jamaica Bay Unit and alternative means of getting there. Conclusions and recommendations are summarized below:

- **Re-launch the pilot service** on *Rockaway Peninsula Routes,* connecting Jacob Riis Park,[16] Riis Landing when the Rockaway Beach Ferry is in service, the Jamaica Bay Wildlife Refuge, and the Broad Channel Station. The set of routes, which could form the "core" of a potential shuttle bus system, with Jacob Riis Park functioning as a hub, consolidates markets for two of the primary Jamaica Bay sites. This plan has the greatest overall market potential and level of benefits, in terms of providing improved transit access and the opportunity to enjoy the park's resources by the greatest number of people. Serving both sites on a single route can serve to promote awareness of the Jamaica Bay Wildlife Refuge among Jacob Riis Park visitors and vice versa. The re-launched pilot would include a systematic evaluation that includes specific performance measures addressing factors critical to success, as discussed below in connection with *crucial program elements*.
- **Implement crucial program elements** in support of a re-launched *Rockaway Peninsula* route**:** (1) marketing and (2) service quality. A strong marketing program is essential to publicize the availability and schedule of the shuttle bus service to potential riders, including residents in areas served by the A subway line, because the Broad Channel Station would be a primary access point to the shuttle bus. Marketing also should target the sites within the Jamaica Bay Unit (i.e. Jacob Riis Park and the Jamaica Bay Wildlife Refuge) where shuttle bus stops would be located. Visitors to each site would become aware of both the resources at the other site and the availability of the shuttle bus service to travel to that site.

  Visibility of the service, including signage and posting of schedules at shuttle bus stops, is a key element of marketing. Service quality is also crucial for attracting ridership, including return visitors. Q*uality specifications* should be identified clearly, with corresponding *performance measures*. Important attributes of service quality are adherence to schedule, vehicle comfort and cleanliness, and having drivers who are courteous and knowledgeable. Marketing and service quality should be addressed in detail as part of service implementation.
- **Expand and develop in greater detail** the marketing plan prepared under the current study, incorporating social media and local communications networks that are unique to the Jamaica Bay market area and responding to the specific service configurations implemented.
- **Extend the initial *Rockaway Peninsula* service, if successful, to provide cross-bay connections to Brooklyn**. For example, a Cross Marine Parkway Bridge route could be added that would connect to Canarsie Pier, Rockaway Parkway/Canarsie Station on the L subway line, or the Sheepshead Bay Subway Station on the B/Q subway line, with intermediate stops at Floyd Bennett Field, the Golf Center, and Gateway Marina. The shuttle bus connection to the L subway

[16] The study analysis and conclusions related to Riis Landing are based on the assumption that the dock, which was destroyed by Hurricane Sandy, will be rebuilt.

line at the Rockaway Park/Canarsie Station could provide access to the Jamaica Bay Unit from large population centers in northern Brooklyn and lower Manhattan.

- Consider implementing a ***Canarsie Connector*** shuttle bus route between Rockaway Parkway/Canarsie Station, Canarsie Pier, Floyd Bennett Field, and Jacob Riis Park as an initial shuttle bus route, either as an alternative or in addition to the *Rockaway Peninsula* route. If sufficient funding is available, the *Rockaway Peninsula Route* and *Canarsie Connector* can be implemented concurrently, with the two routes connecting at Jacob Riis Park.
- **If shuttle bus service is extended from Rockaway Peninsula to Floyd Bennett Field and possibly Canarsie Pier and/or subway stops in Brooklyn, target these sites through the marketing program**, providing information on other resources within the Jamaica Bay Unit and also the availability of shuttle bus connections to these resources.

  Consider an event-based shuttle bus service that would be operated on a limited schedule, either in conjunction with or as an alternative to daily service. A logical candidate for a field test of this service concept would be the *Coney Island – Floyd Bennett Field Access* Route or one of the other routes that provide connections with Brooklyn subway stops. Service on these routes would be provided only when an event takes place at Floyd Bennett Field. If daily service is provided on *Rockaway Peninsula Routes*, vehicles and drivers may be provided under a CUA, or some other contractual arrangement identified by Gateway NRA's Office of Business Management.
- **Consider a ferry service** between Canarsie Pier and Riis Landing.[17] The primary objectives of this service would be to connect the Canarsie neighborhood with the ocean beach at Jacob Riis Park and the Jamaica Bay Wildlife Refuge. This service could also be operated in concert with a Rockaway Peninsula shuttle bus service, allowing riders originating at Canarsie to travel by ferry to Riis Landing and then connect by shuttle bus to Jacob Riis Park and the Jamaica Bay Wildlife Refuge. The Canarsie ferry could operate on a limited weekend, summer schedule.
- **Encourage continuation of the existing Manhattan-Jacob Riis Park Rockaway Beach Ferry.** A weekend-only service has been provided during the summer season for a number of years and a daily service was implemented on a temporary basis in the aftermath of Hurricane Sandy. While the government-subsidized ferry service that operated a few years ago was terminated due to financial difficulties, it could become financially viable again with specific changes to the service plan. Some financial data should be available for the earlier service and the temporary service implemented as a Hurricane Sandy relief measure because they received public funding. Review of these data could be a component of an updated feasibility study for this service, which also could involve interviews with the operator of the previous service and other knowledgeable sources.
- **Conduct research to gain a better understanding of the actions that would be effective in encouraging visitation at Jamaica Bay Unit sites among urban residents**. This type of research addresses the goal of encouraging diverse populations to visit national park sites. The effort to develop and apply innovative, unconventional marketing methods should specifically consider communication channels, including community-based organizations. The intent is to reach different demographic markets, including communities that traditionally have not taken advantage of the resources provided by the Jamaica Bay Unit specifically and NPS generally.

[17] Again, it is assumed that the dock at Riis Landing will be rebuilt.

Appendix A
Supplementary Information on Existing Conditions in the Jamaica Bay Unit

Description of Existing Conditions

There are three main districts within the Jamaica Bay Unit: the Jamaica Bay Wildlife Refuge, the North Shore District, and the Breezy Point District. Details are provided below to supplement the information on existing conditions included in Chapter 2: Review of Existing Conditions and Past Planning Studies of this report. In some instances, information is repeated to provide the context necessary to enhance reader comprehension.

North Shore District

The North Shore District includes all the Gateway properties along the north shore of Jamaica Bay in Brooklyn. This district contains over 2,000 acres of open space and facilities. Properties within this district include:

- ***Floyd Bennett Field*** – Floyd Bennett Field, which opened in 1931, was New York City's (NYC) first municipal airport. The airport never fully developed as a commercial hub but instead was used for general aviation, freight shipments, and eventually by the Naval Air Reserve, New York Police Department, U.S. Coast Guard, and the U.S. Navy. Flight operations ended in 1971 and most of the land was transferred to the National Park Service (NPS). The New York Police Department (NYPD) continues to operate its fleet of Bell Jet Ranger helicopters from the space that was once the U.S. Coast Guard Air Station Brooklyn. The property also continues to house headquarters for the NYPD Emergency Services and Driver Training units.
- ***Canarsie Pier*** – Canarsie Pier is located along Brooklyn's Belt Parkway. The 600-foot pier, built in the 1920s as a commercial dock, was incorporated into the Jamaica Bay Unit in 1973. Today, the pier is a popular site for fishing, picnicking, kayaking, and recreation. The pier is surrounded by shoreline and salt marsh.
- ***Bergen Beach*** – Bergen Park extends east from Floyd Bennett Field to Canarsie Pier. Bergen Park was formerly home to the Percy Williams Amusement Park, which drew crowds to the Ferris wheel, casino, roller skating rink, and beach. In 1920, the amusement park closed. Today, much of the area is the residential community of Bergen Beach surrounded by low salt marsh and protected by the NPS. Included on this property is the Jamaica Bay Riding Academy, a concession that provides the public with the opportunity to ride horses on trails and along the beachfront.
- ***Plumb Beach*** – Plumb Beach offers vital habitat to threatened shorebirds, horseshoe crabs, and a myriad of other wildlife. The beach has a variety of habitat types, including tidal mud flats, low salt marsh areas, a tidal lagoon, a fragile dune system, and several scattered woodland thickets. Recreation opportunities at Plumb Beach include fishing, parasailing, and sunbathing. The NPS manages the beach area, while the parking lot is still owned by the city.
- ***Dead Horse Bay*** – From the nineteenth to the twentieth century, the Dead Horse Bay area had been used in a variety of ways, including manufacturing fertilizer from the remains of dead animals, producing fish oil from menhaden caught in the bay, and most recently serving as a landfill for NYC's garbage. In 1926, the salt marshes surrounding Dead Horse Bay and the rest of Barren Island were filled and connected to the land mass of Brooklyn. Today, school groups are taken to Dead Horse Bay on a regular basis to walk the Millstone Trail, catch fish in nets, and learn about the natural and cultural history of the area.

Breezy Point District

The Breezy Point District includes approximately 1,059 acres and 4.5 miles of ocean beach. Properties within this district include:

- ***Jacob Riis Park*** – Jacob Riis Park is located on the ocean side of the Rockaway Peninsula between the communities of Breezy Point and Neponsit. Jacob Riis Park is an ocean beach with a boardwalk and historic bathhouse that has art deco elements. The bathhouse is listed on the National Register of Historic Places and houses administrative offices of the Gateway National Recreational Area. Jacob Riis Park was built by New York planner and administrator Robert Moses, and named after journalist, photographer, and reformer Jacob Riis, who documented the plight of the poor and working class. The park, which is close to the city, was originally intended for poor immigrants and was accessible by public transportation. The park also boasts a parking lot with over 5,000 spaces; at one time considered the largest in the world. Activities at Jacob Riis Park include swimming, picnicking, walking, and biking.
- ***Fort Tilden*** – Fort Tilden is a former United States Army installation that today is largely a natural area of beach, dunes, and maritime forest. Though most of the military installations are abandoned, some buildings have been renovated and are used by local arts groups. A viewing platform atop one of the old batteries offers 360-degree views encompassing the city, New York Harbor, and the Atlantic Ocean. The area is popular with bird-watchers and other nature lovers and is used for recreational fishing.
- ***Riis Landing*** – Located nearby, across Rockaway Point Boulevard/State Boulevard on the Jamaica Bay side of the peninsula, is Riis Landing. Riis Landing serves as the dock for weekday and weekend ferry service to Manhattan and Brooklyn, and is described further in the following section.
- ***West Beach*** – West Beach is the former location of an abandoned half-finished complex of high-rise buildings. The NPS took over ownership of the site in 1972, and demolished the buildings in the early 1980s. Today, West Beach provides habitat for shorebirds, and the surrounding grasslands are utilized by local fauna, such as cottontail rabbits.
- ***Breezy Point Tip*** – Breezy Point Tip is the westernmost point of the Rockaway Peninsula. One of the most undisturbed natural areas of the park, the "Tip" contains over 200 acres of sand dunes, salt and brackish marshes, and grasslands. Throughout the summer, the protected ocean beach of Breezy Point Tip provides nesting habitat for threatened shorebirds like the piping plover, roseate tern, least tern, common tern, black skimmer, and American oystercatcher.

Ridership

Figures A.1 through A.8 show average monthly access by mode from 1999 through 2008 for Canarsie Pier, Floyd Bennett Field, Fort Tilden, and Jacob Riis Park. Some visitors to Fort Tilden and Jacob Riis Park tend to take alternative transportation such as bicycles or public transit, while fewer visitors take transit to Canarsie Pier and very few use the bus to access Floyd Bennett Field.

Figure A.1
Average Monthly Canarsie Pier Visitation, 1999-2008
Source: NPS

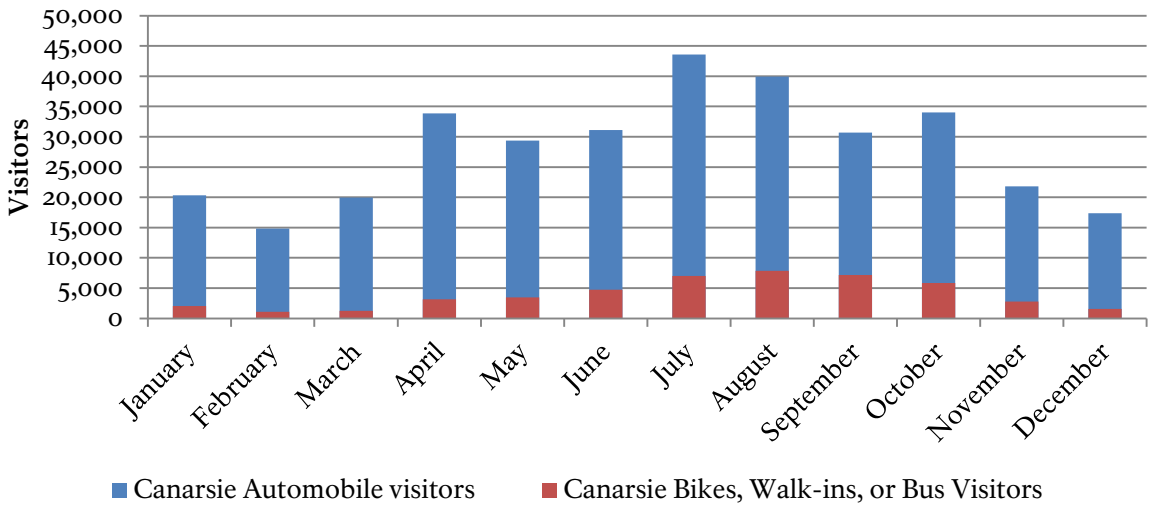


Figure A.2
Average Monthly Floyd Bennett Field Visitation, 1999-2008
Source: NPS

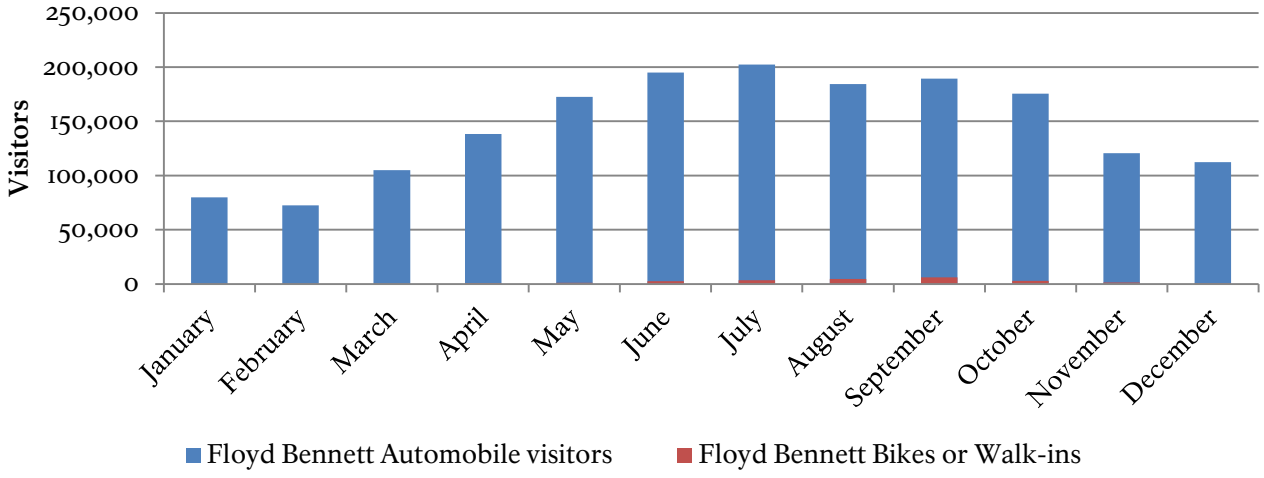


Figure A.3
Average Monthly Fort Tilden Visitation, 1999-2008
Source: NPS

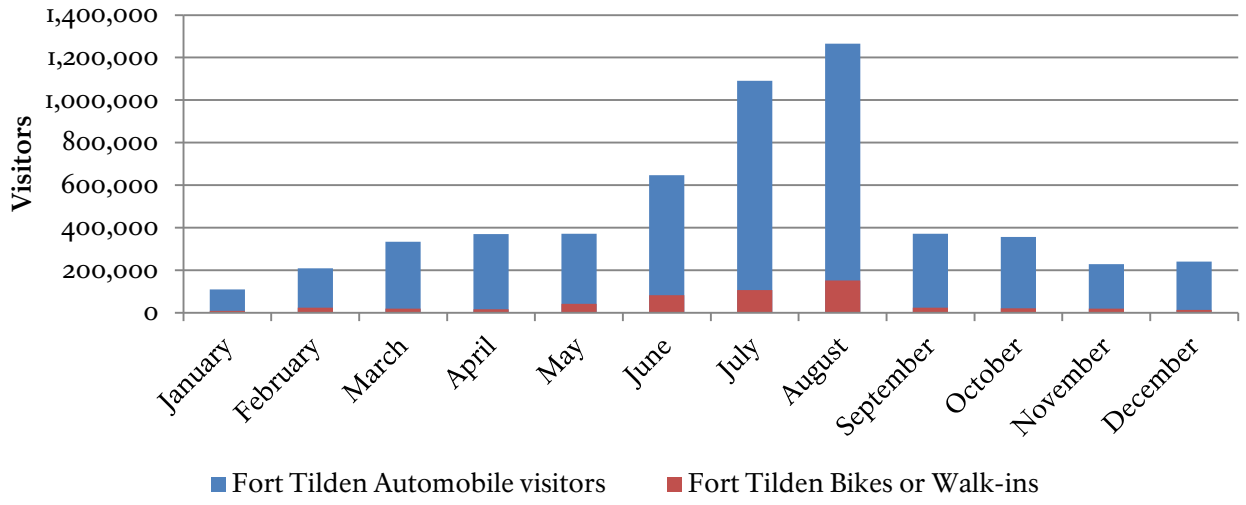
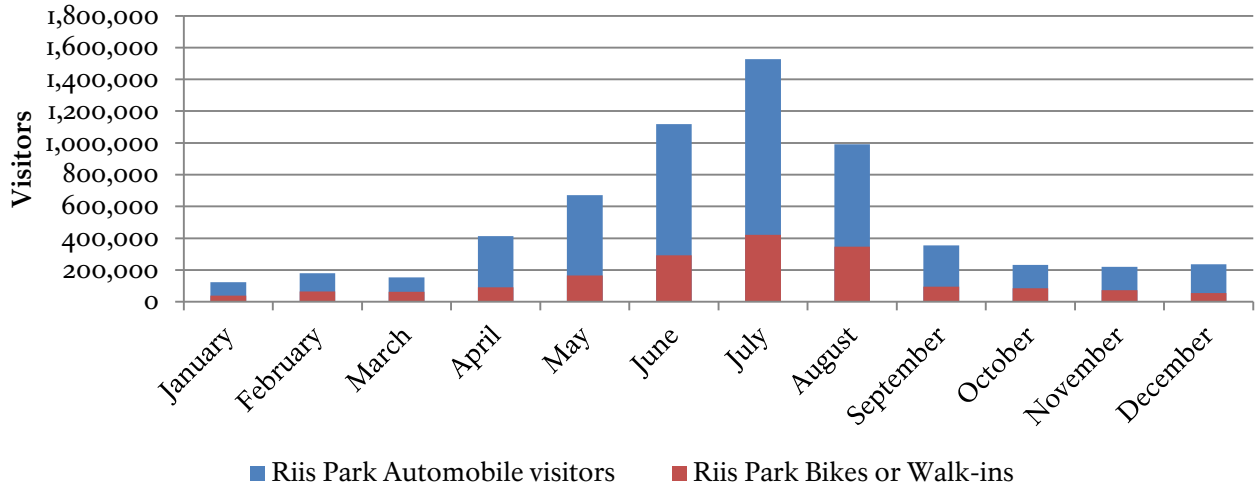


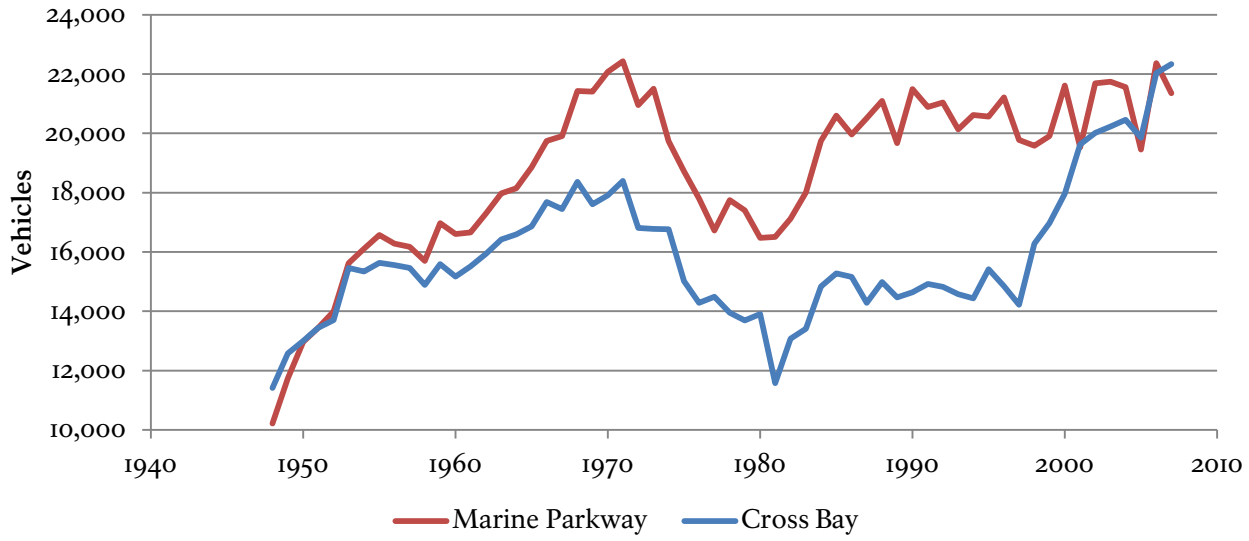
Figure A.4
Average Monthly Jacob Riis Park Visitation, 1999-2008
Source: NPS



Traffic Data for the Marine Parkway and Cross Bay Bridges

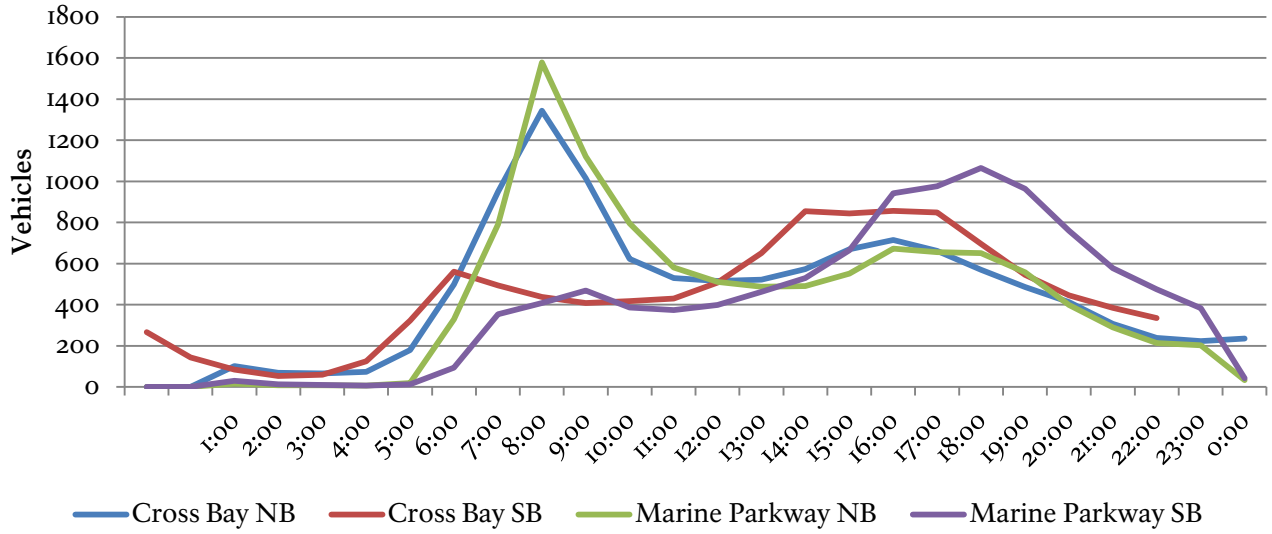
The Marine Parkway and Cross Bay Bridges are both classified as minor arterial roads and carry just over 20,000 vehicles daily. As seen in Figure A.5, since the mid-50s, the more western of the two bridges, the Marine Parkway Bridge, had significantly higher traffic volumes in the past. In the late 1990s and early 2000s, traffic increased dramatically on the Cross Bay Bridge and now appears to be again equivalent to that of the Marine Parkway Bridge.

Figure A.5
Bridge Two-Way Average Daily Traffic Volumes, 1948–2007
Source: NYC DOT



No hourly weekend traffic data were available for either the Cross Bay or Marine Parkway Bridges, but hourly weekday traffic data[18] shown in Figure A.6 shows typical commute patterns with peak northbound traffic off of the Rockaway Peninsula between 7:00 and 8:00 am, and southbound peak traffic occurring between 5:00 and 6:00 pm.

Figure A.6
Hourly Traffic Volumes, 2007
Source: NYC DOT



[18] New York City Bridge Traffic Volumes 2007. NYC DOT, December 2008.

Summer 2008 and 2009 Ferry Service Boardings

Weekend ridership for the ferry service is shown in Figure A.7. The service gained popularity over time as more visitors learned about it and American Princess continued to operate the summer weekend ferry service in subsequent years, up to the present time. Seasonal boardings were far greater in 2009 than in 2008 – 7,785 in 2009 versus 4,123 in 2008. Daily boardings averaged 299 in 2009 versus 172 in 2008. The majority of weekend riders used the ferry to travel from Manhattan and Brooklyn to the beach, although some riders were seen boarding at Riis Landing to spend the day in Manhattan. Boardings were relatively low four weekends in a row in August 2009 as Hurricanes Bill and Danny forced the NPS to close the beach at Jacob Riis Park.

Figure A.7
Ferry Boardings, 2008 and 2009
Source: NYC DOT

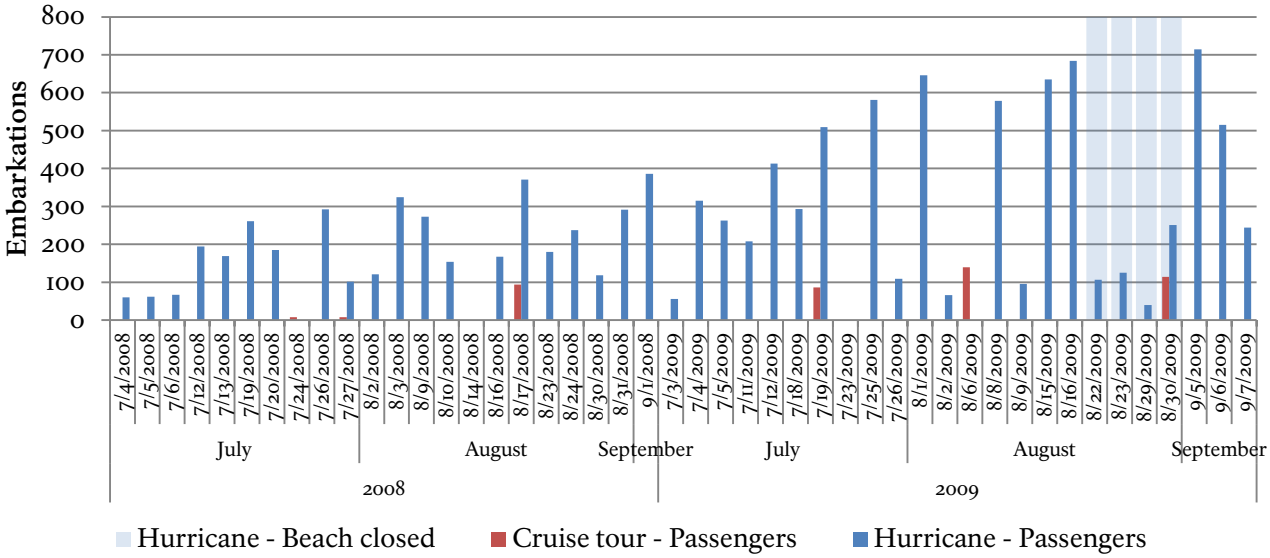
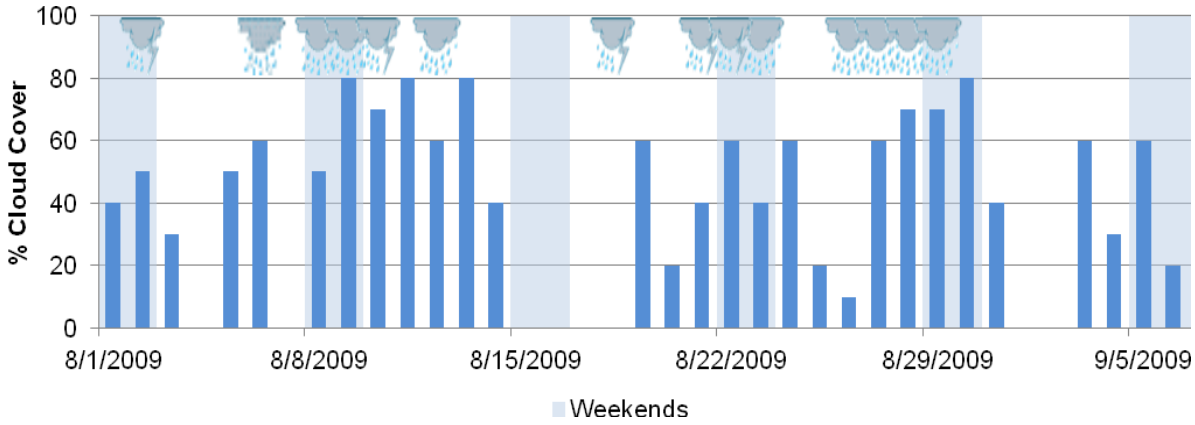


Figure A.7 shows boardings for four ferry cruises that were offered during the summers of 2008 and 2009. Weather conditions during the summer of 2009 when the pilot shuttle bus was in service are depicted in Figure A.8.

Figure A.8 Percent Cloud Cover and Rain and Thunderstorms during Pilot Shuttle Period
Source: New York John F. Kennedy Airport weather station



Appendix B
Transportation Access to Jamaica Bay Unit

Private Automobile

The primary roadways that serve the area are the Belt Parkway, Flatbush Avenue, and the Cross Bay Boulevard.

- Belt Parkway crosses through the southern section of Brooklyn, following the shoreline to Floyd Bennett Field, where it crosses Flatbush Avenue, and on the north shore of Jamaica Bay connecting Floyd Bennett Field and Canarsie Pier.
- Flatbush Avenue runs from the Manhattan Bridge southeast to Jamaica Bay, where it connects to the Marine Parkway and the Marine Parkway Gill Hodges Memorial Bridge, a 4-lane bridge linking the Floyd Bennett Field area in Brooklyn with the Jacob Riis Park and Fort Tilden area on the Rockaway Peninsula.
- The 6-lane Cross Bay Boulevard runs north-south from the Howard Beach neighborhood in Queens, about three and one-third miles to the northeast of the Marine Parkway Bridge, crossing over the Cross Bay Veterans Memorial Bridge to the Rockaway Peninsula. The northern span of the Cross Bay Bridge lies adjacent to the Jamaica Bay Wildlife Refuge, while the southern span leads to the Rockaway community's beaches and boardwalks. Vehicles crossing both the Marine Parkway and Cross Bay bridges pay a toll, which ranges from $2.75 for non-Rockaway residents paying in cash to $1.71 for E-ZPass users. The toll for Rockaway residents is $1.54 for those paying with a token and $1.13 with E-ZPass.[19] The Marine Parkway and Cross Bay Bridges are both classified as minor arterial roads and carry just over 20,000 vehicles daily.

Parking

The Jamaica Bay area includes a number of sizable parking lots. Riis Landing has approximately 80 free parking spaces, which are intended for ferry riders. The Jamaica Bay Wildlife Refuge has approximately 75 free parking spaces for refuge visitors.

The fee for parking at the immense 5,000-space Jacob Riis Park lot is $5 per day.

Ferry and Cruise Service

In 2008 and 2009, the New York Economic Development Corporation, New York Water Taxi, and the NPS cooperated to provide ferry service connecting Pier 11 near Wall Street, Manhattan, the Brooklyn Army Terminal (BAT), Brooklyn, with Riis Landing, Rockaway, and New York. Riis Landing, where the ferry docked at the Jamaica Bay Unit, is approximately 0.5 miles to the nearest section of the beach at Jacob Riis Park and 1.6 miles from the entrance to Floyd Bennett Field, across the Marine Parkway Bridge. Weekday service was tailored toward commuters, while weekend service was provided for recreational visitors in the summer, from July 4th weekend through Labor Day weekend. One-way tickets cost $6, while a 10-trip book cost $60, and a 40-trip book is $216. The 95-foot mono-hull ferry could transport 250 people at a time and accommodate bicycles, strollers, and beach equipment, such as chairs, coolers, umbrellas, and boogie boards. Table B.1 below shows the 2009 ferry schedule.

[19] Toll rates are for 2-axle cars.

Table B.1
Rockaway/BAT Ferry Service Schedule (2009)
Source: New York Water Taxi and Circle Line Downtown

Weekday Commuter Schedule						Summer Weekend and Holiday Schedule					
To Wall Street Departs/Arrives			To Rockaway Departs/Arrives			To Rockaway Departs/Arrives			To Wall Street Departs/Arrives		
Riis Landing	BAT	Pier 11	Pier 11	BAT	Riis Landing	Pier 11	BAT	Riis Landing	Riis Landing	BAT	Pier 11
5:45 am	6:25 am	6:45 am	6:45 am	-	7:45 am	9:15 am	9:40 am	10:30 am	10:30 am	-	11:45 am
7:45 am	8:25 am	8:45 am	3:30 pm	3:50 pm	4:30 pm	11:45 am	12:10 pm	1:00 pm	2:30 pm	3:20 pm	3:45 pm
4:30 pm	-	5:30 pm	5:30 pm	5:50 pm	6:30 pm	3:45 pm	-	5:00 pm	5:00 pm	5:50 pm	6:15 pm

The ferry and cruise service gained popularity over time as more visitors learned about it. Seasonal boardings were far greater in 2009 than in 2008–7,785 in 2009 versus 4,123 in 2008. Daily boardings averaged 299 in 2009 versus 172 in 2008. The majority of weekend riders used the ferry to travel from Manhattan and Brooklyn to the beach, although some riders boarded at Riis Landing to spend the day in Manhattan. Boardings were relatively low four weekends in a row in August 2009 as Hurricanes Bill and Danny forced NPS to close the beach at Jacob Riis Park.

In addition to the regular ferry service, four ferry cruises were also offered during the summers of 2008 and 2009. Despite the beach closure due to Hurricane Danny on August 30th, ferry boardings and tour participation were higher on that day than on any other in August 2009 when the beach was closed. From mid-June through August, Friday night cruises departed from Riis Landing for viewing of the Coney Island fireworks show. Tickets cost $15 per person. On two Sunday afternoons and two Thursday evenings in July and August 2009, NPS and the ferry service ran ranger-led eco-tours exploring the natural environment of Jamaica Bay. The tours lasted 1.5 hours and cost $6 per person. NPS staff provided interpretation during the cruises.

Although the 2009 pilot ferry service was cancelled in June 2010, a new weekday commuter ferry service was started in November 2012 on an emergency basis following Hurricane Sandy, which destroyed a section of aboveground subway track on the A Line.[20] This most recent service operates from a dock at Beach 108th Street and Beach Channel Drive on the Rockaway Peninsula, with eight daily trips to Pier 11 on Wall Street; five of the trips continue to a dock at East 54th Street in Manhattan. The one-way fare for this service is $2.00.

Bus

The Metropolitan Transportation Authority (MTA) operates several bus and subway lines that provide service to the area surrounding the Jamaica Bay Unit, as shown in Figures B.5-B.8.

[20] The emergency ferry service is anticipated to operate for several months, at the time of this writing, until service on the A Line subway is fully restored.

Figure B.1
Public Transit at GATE
Source: National Parks of New York Harbor Conservancy[21]

The New York City Transit Q22 and Q35 bus lines stop at Beach 169th St & Rockaway Point Boulevard, only a few blocks from Riis Landing, as shown in Figure B.1. The Q22 route operates between Beach 169th St and Rockaway Point Boulevard and the Far Rockaway/Mott Avenue subway station. The Q35 route operates between Newport Avenue and Beach 116th Street and Flatbush Avenue and Nostrand Avenue at the Brooklyn College/Flatbush Avenue subway station. The approximate frequency for these bus routes is shown in Table B.2.[22]

[21] National Parks of New York Harbor Conservancy (2008). *New York Harbor Transportation Strategy Building Connections to National Parks and Other Destinations*.
[22] For a detailed schedule, please see the official MTA Transit schedules.

Figure B.2
MTA Rockaway Bus Service
Source: MTA New York City Transit

Table B.2
Q22 and Q35 Bus Approximate Weekend Service Frequency, Minutes
Source: MTA New York City Transit

Q22 bus			Q35 bus		
5:30 am – 10:00 am	10:00 am – 7:00 pm	7:00 pm – 1:00 am	2:30 am – 8:30 am	8:30 am – 6:00 pm	6:00 pm – 12:00 am
15-20	9-11	15-30	30	12-15	15-30

The MTA Q21 and Q53 bus lines stop at several locations along Cross Bay Boulevard near the Jamaica Bay Wildlife Refuge and on Rockaway Beach Boulevard near Rockaway Park as shown in Figure B.2. The Q21 route operates between Queens Boulevard and Woodhaven Boulevard at the Woodhaven Boulevard subway station and Beach 116th Street and Rockaway Beach Boulevard at the Rockaway Park–Beach 116th Street subway station. The Q53 route operates between Beach 116th Street and Rockaway Beach Boulevard at the Rockaway Park–Beach 116th Street subway station and the Woodside/61st Street subway station. Table B.3 shows the approximate frequency for these bus routes.

Table B.3
Q21 and Q53 Bus Approximate Weekend Service Frequency, Minutes
Source: MTA New York City Transit

Q21	Q53					
Saturday and Sunday	Saturday			Sunday		
8:00 am – 10:30 pm	6:30 am – 8:00 am	8:00 am – 11:00 pm	11:00 pm – 1:00 am	6:30 am – 9:00 am	9:00 am – 8:45 pm	9:00 pm – 1:00 am
30	30	10-15	20	15-20	10	15-20

The B42 bus shuttles riders between the end of the L-line at Canarsie-Rockaway Parkway station and Canarsie Pier, shown in Figure B.3. The route is about 1.5 miles in one direction and takes roughly 7 minutes. The B17 bus brings riders from Crown Heights to Seaview Avenue, roughly 0.5 miles from Canarsie Pier. Riders may walk or transfer to the B42 bus shuttle.

Figure B.3
MTA Southern Brooklyn Bus Service
Source: MTA New York City Transit

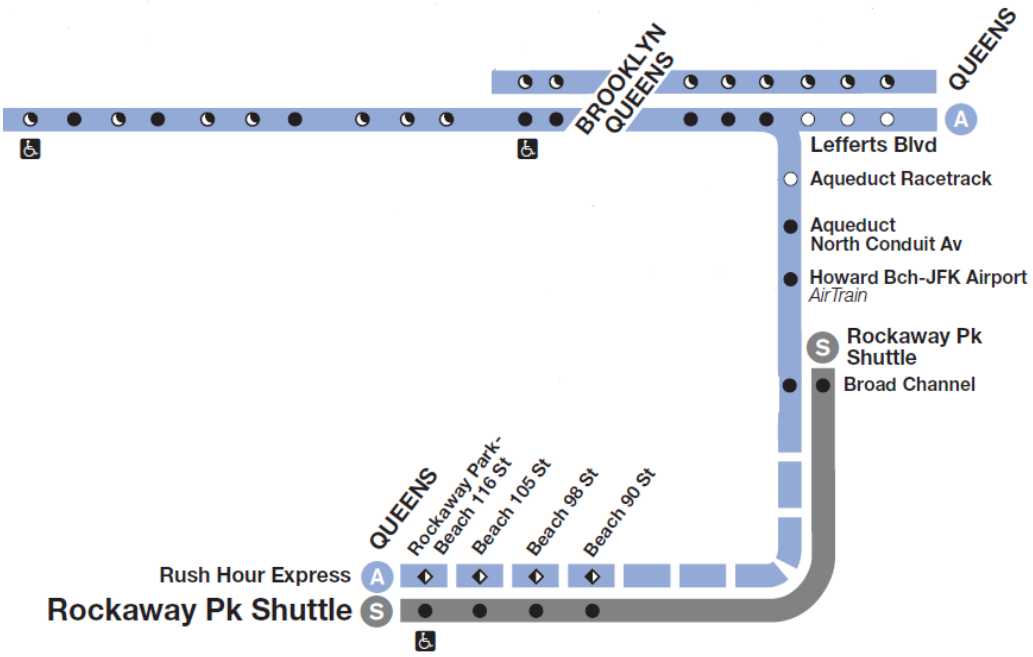
Table B.4
B17 and B42 Bus Approximate Weekend Service Frequency, Minutes
Source: MTA New York City Transit

B17 bus		B42 bus	
2:00 am – 6:00 am	6:00 am – 2:00 am	2:30 am – 4:30 am	8:30 am – 6:00 pm
60	7-15	20	10-15

Subway

The S and A trains serve the southern part of Rockaway Peninsula, with a terminus at Rockaway Park–Beach 116th Street as shown in Figure B.4. The A train operates from Manhattan, through Brooklyn, and into Queens. From Broad Channel Station to Rockaway Park–Beach 116th Street, the A train operates as a rush hour express and runs only on weekdays. The S train, known as the Rockaway Park Shuttle, connects with the A train at Broad Channel Station. Broad Channel Station is approximately one mile from the Jamaica Bay Wildlife Refuge Visitor Center. The Rockaway Park–Beach 116th Street Station is approximately 2 miles from Jacob Riis Park. The approximate frequency for these subway routes is shown in Table B.5.[23]

Figure B.4
A and S Lines Serving Rockaway Peninsula
Source: Metropolitan Transportation Authority



[23] For a detailed schedule, please see the official MTA Transit schedules: http://new.mta.info/.

Table B.5
Rockaway Park Shuttle, S Train, Approximate Weekend Daytime Service Frequency, Minutes
Source: New York City Transit

A train – 207 St, Manhattan to Broad Channel, Queens	S train – from Broad Channel to Rockaway Park – Beach 116 St	
Saturday and Sunday	Saturday	Sunday
16-20	12-21	10-24

In addition to the A and S trains that serve Rockaway Peninsula, a number of subway lines that terminate in Brooklyn have connecting buses that serve Jamaica Bay Unit sites in both Brooklyn and Queens. These lines include the 2 or 5, which connect to the Q35 bus, serving Floyd Bennett Field and Jacob Riis Park, and the L line, which connects to the B42 to serve Canarsie Pier.

Transit Gaps

Overall, transit connections are inconvenient and time consuming from much of NYC, including the boroughs bordering the Jamaica Bay Unit, to key park resource areas. Floyd Bennett Field has good bus connections to the 2 and 5 subway lines, but as a practical matter is inaccessible from the remainder of the MTA system.

Pilot Shuttle

In the summer of 2009, the NPS piloted a free shuttle bus service to many sites around Jamaica Bay. The shuttle, which operated on weekends from 10:00 am to 6:00 pm, from August 1st through September 7th, transported visitors from Riis Landing to Jacob Riis Park, Floyd Bennett Field, and the Jamaica Bay Wildlife Refuge. The shuttle service consisted of two routes:

- Route "A" – From Riis Landing to Jacob Riis Park Boardwalk, Broad Channel Subway Station, Jamaica Bay Wildlife Refuge, with return service; and
- Route "B" – From Riis Landing to Floyd Bennett Field, with return service.

Chapter 3: Evaluation of the 2009 Pilot Shuttle Bus Service contains a detailed analysis of the pilot shuttle service, including a summary of observations and lessons learned.

Non-Motorized Transportation

The Jamaica Bay Greenway, a segment of the NYC Greenway, is a 10-mile multiuse pathway circling the northern shores of Jamaica Bay. The 10-mile path extends from Floyd Bennett Field to Canarsie Pier to Cross Bay Boulevard to the Jamaica Bay Wildlife Refuge. The GATE, in collaboration with partners at the city and state levels, has worked to connect the missing piece of the network, the link between Jamaica Bay Wildlife Refuge and Jacob Riis Beach.

Traveler Information

The NPS Gateway website[24] has detailed driving and transit directions to many of the key sites within the Jamaica Bay Unit. The New York Harbor Parks website[25] also provides clear driving and transit directions to each site. Both websites provided information about the NY Water Taxi service to Riis Landing when it was in operation. In addition, the MTA website provides detailed bus and subway maps and schedules. It is likely that these sources reach only a fraction of the potential visitor market for the Jamaica Bay Unit and that many residents of Brooklyn, Queens, and Manhattan are unaware of their existence, location,

[24] Gateway directions, http://home.nps.gov/applications/hafe/hfc/carto-detail.cfm?Alpha=GATE
[25] New York Harbor Parks website: http://nyharborparks.org/index.html

and how they could travel there. Marketing of existing and potential new transportation services is discussed in Chapter 6: Marketing and Outreach.

Appendix C
Review of Earlier Studies

Interest in enhancing non-automobile access to the GATE has led to several planning and study efforts over the years. The relevant efforts are summarized below.

National Parks of New York Harbor Waterborne Transportation Study, Draft Final Report, April 10, 2001, Volpe Center and Cambridge Systematics.

In 2001, the NPS published a study on the viability of water transportation as an access mode serving Gateway and other assets of the National Parks of New York Harbor. The study resulted in a preliminary ferry service concept plan, including recommended routes and docking locations, to serve the needs of park visitors.

The primary elements of the ferry concept plan included the establishment of permanent dock facilities at four locations:

- Torpedo Pier at Fort Wadsworth;
- Riis Landing at Breezy Point;
- Fort Hancock at Sandy Hook; and
- Battery Park in Lower Manhattan, adjacent to Castel Clinton.

The core ferry routes included in the concept plan are:

- Riis Landing-Fort Wadsworth-Battery Park: commuter and visitor; and
- Sandy Hook-Fort Wadsworth-Battery Park: primarily seasonal, visitor-oriented service in initial phase.

Potential secondary sites that could serve as direct feeders into this core network include:

- Fulton Ferry Landing in Brooklyn;
- Brooklyn Army Terminal;
- Canarsie Pier at the Jamaica Bay Unit; and
- New Jersey sites on the Hudson River.

Gateway Integrated Transportation Strategy and Implementation Plan, March 2004, Volpe Center and Norris and Norris Architects.

Building upon the 2001 Waterborne Transportation Study, the NPS initiated a study to explore the opportunities to increase water transportation to the Gateway National Park. The study evaluated the route, service, and infrastructure possibilities for each of the four proposed dock facilities sites - Sandy Hook/Fort Hancock, Jamaica Bay/Riis Landing, Staten Island/Fort Wadsworth, and Battery Park. The study produced specific action items for each of the four sites analyzed, as well as the following general recommendations and next steps for Gateway as a whole:

1. Refine procedures for collecting ferry ridership;
2. Collect new survey data for continuous market monitoring;
3. Monitor operator costs to ensure effective concessions; and
4. Continue coordination with other New York Harbor stakeholders.

September 24, 2007 Draft Memorandum from Sam Schwartz PLLC; Re: Jamaica Bay Wildlife Refuge Access.

The National Parks Conservancy asked Sam Schwartz PLLC (SSC) to review non-automobile access to the Jamaica Bay Wildlife Refuge. This memorandum outlines the existing and available transportation and provides recommendations to improve and expand these services. SSC recommended that weekend bus service be provided from late spring through early fall. The ideal service would operate from the Broad Channel Station to the refuge on frequent headways of 15-20 minutes, and the schedule would be coordinated with subway arrival and departure times in order to attract the greatest ridership. The proposed route from the refuge to the station was Cross Bay Boulevard to E 6th Road to West Road. The route from the station to the refuge was Noel Road to Cross Bay Boulevard. The estimated daily operating cost for a two-vehicle shuttle fleet of 22-passenger vehicles was found to be roughly $1,700 per day, based on bidding for a similar project in Brooklyn in 2007.

In addition to the shuttle service, SSC recommended the creation of a waterborne eco-tour to bring visitors out to Jamaica Bay. The eco-tours that operated during the summer of 2009 were similar in their interpretive content to the one recommended by SSC, but used a much larger ferry and launched from a different location.

November 1, 2007 Draft Memorandum from Sam Schwartz PLLC; Re: Jamaica Bay Wildlife Refuge Eco-Tours.

Following upon the eco-tour recommendation presented by Sam Schwartz PLLC (SSC) in their report of September 24, 2007, SSC examined four existing eco-tour services in urban areas and provides recommendations for implementing a similar service at the Jamaica Bay Wildlife Refuge. The existing examples outlined in the memo include the Hudson River Part Trust in New York, the Toronto Bay Initiative and Humber River Adventures, both in Toronto, and the Everglades National Park Boat Tour in Florida. The memo suggests that the Jamaica Bay eco-tour utilize a war canoe, kayak, or motorized vessel to take visitors on a guided tour of the wetlands. Recommended launch sites for the vehicles are either the base of the Congressman Joseph P. Addabbo Bridge or another marina on Jamaica Bay.

New York Harbor Transportation Strategy: Building Connections to National Parks and Other Destinations, Jonathan Rose Companies for NPNH Conservancy, revised May 2008.

The purpose of this study was to recommend treatments to improve connections to 23 NPS destinations and many other sites along New York Harbor. The NPS sites included six within the scope of this particular project: Jamaica Bay, Jacob Riis Park, Fort Tilden, Breezy Point, Floyd Bennett Field, and Canarsie Pier.

The report displays three proposed ferry shuttle routes that would serve the NPS Jamaica Bay Unit:

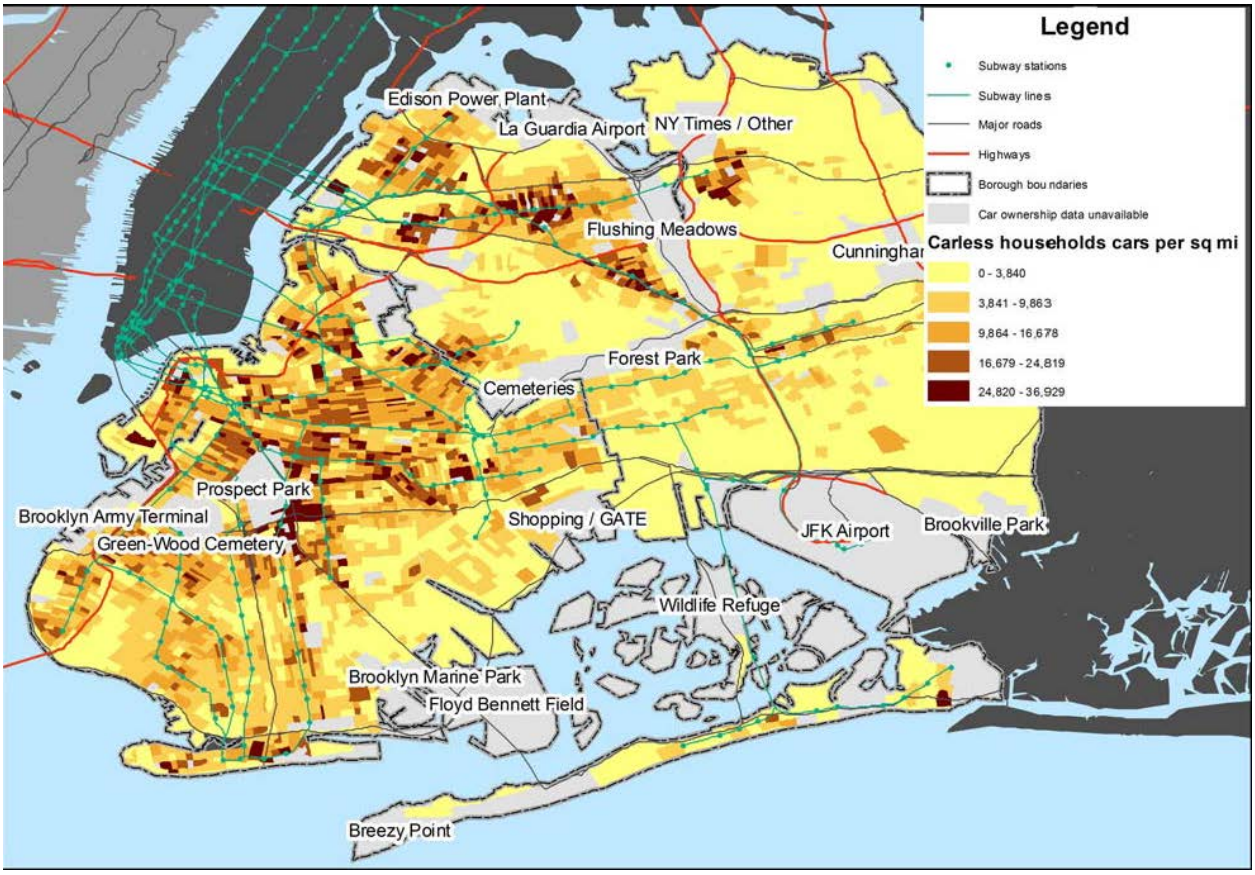
1. A previously proposed new commuter service from Riis Landing at Jacob Riis Park. This route would also stop at the Brooklyn Army Terminal before making two stops in Manhattan; one at Pier 11 in Lower Manhattan, and one at East 34th Street in Midtown Manhattan. The study recommended two runs in the morning and two runs in the afternoon. A trial project was then slated to begin in summer 2008.
2. A "hop-on-hop-off" service with several stops in Brooklyn and Manhattan, including a stop at Floyd Bennett Field. It is recommended that the Gateway Marina be evaluated for future water access feasibility, as it is the proposed docking point at Floyd Bennett Field.
3. An Environmental Harbor Tour route that does a loop around Jamaica Bay before returning to three different stops in Manhattan.

The study also proposes programmatic recommendations at the Jamaica Bay Wildlife Refuge, which include a seasonal bus service connecting the Broad Channel Station to the refuge, and also to the newly proposed water eco-tour and low-impact boat tour launching points.

Appendix D
Supplementary Data Considered in Demand Analysis

Transit-Dependent Households (Representing Prime Market for Shuttle Bus Service)

Figure D.1
Density of Carless Households by Block Group, Brooklyn and Queens
Source: 2000 U.S. Census



Travel Times

Given eight origins and destinations there are 64 possible origin/destination pairs for the Jamaica Bay Unit. In order to simplify the analysis, origin/destination pairs were removed under the following assumptions:

- The analysis assumes travel characteristics between each origin/destination pair are roughly the same in the "to" direction as they are in the "from" direction.
- The analysis would not consider origin/destination pairs for which the destination end is not in the Gateway National Recreation Area.

- The analysis assumes that residents near Coney Island prefer to use the nearby beaches rather than take transit to Jacob Riis Park beaches.

A matrix of origin destination pairs is shown in Table D.2. Dark cells marked with an "X" represent origin/destination pairs that have been removed from consideration according to the assumptions above. Table D.3 shows the number of MTA transit transfers.

Table D.2
Origin/Destination Pair Matrix
Source: MTA Trip Planner; Google Maps Transit

Origins	Destinations							
	Prospect Park	Coney Island	Jackson Heights	Man-hattan	Floyd Bennett Field	Jacob Riis Park	Canarsie Pier	Jamaica Bay Wildlife Refuge
Prospect Park	X	X	X	X				
Coney Island	X	X	X	X		X		
Jackson Heights	X	X	X	X				
Union Square	X	X	X	X				
Floyd Bennett Field	X	X	X	X	X	X	X	X
Jacob Riis Park	X	X	X	X		X	X	X
Canarsie Pier	X	X	X	X			X	X
Jamaica Bay Wildlife Refuge	X	X	X	X				X

Table D.3
Number of Transit Transfers
Source: MTA Trip Planner; Google Maps Transit

Origins	Destinations			
	Floyd Bennett Field	Jacob Riis Park	Canarsie Pier	Jamaica Bay Wildlife Refuge
Brooklyn - Prospect Park (Church Av & 18th St E)	1-2	1-2	1	3
Brooklyn - Coney Island (Stillwell Av & Surf Av)	2	2	2	2
Queens - Jackson Heights (Roosevelt Av & Broadway)	1	1	2	0
Manhattan - Union Square (Broadway and E 14th St)	2	2	1	1
Floyd Bennett Field		0	2	1-2
Jacob Riis Park	0		2	1
Canarsie Pier	2	2		3
Jamaica Bay Wildlife Refuge	1	1	2-3	

Table D.4 shows the amount of time required to drive between origins and destinations. Trips of more than 20 minutes are enclosed in squares. Trips with the longest times generally correspond with trips of the farthest distance. Trips from Manhattan and Jackson Heights take the longest. Trips between Prospect Park and the Jamaica Bay Wildlife Refuge also took 23 minutes.

Table D.4
Average Driving Time, No Traffic
Source: Google Maps

Origins	Destinations			
	Floyd Bennett Field	Jacob Riis Park	Canarsie Pier	Jamaica Bay Wildlife Refuge
Brooklyn - Prospect Park (Church Av & 18th St E)	15	19	13	23
Brooklyn - Coney Island (Stillwell Av & Surf Av)	10	13	10	20
Queens - Jackson Heights (Roosevelt Av & Broadway)	26	28	20	23
Manhattan - Union Square (Broadway and E 14th St)	30	34	28	29
Floyd Bennett Field		5	4	14
Jacob Riis Park	6		10	10
Canarsie Pier	8	10		9
Jamaica Bay Wildlife Refuge	15	10	14	

Tables D.5 through D.12 show trip details for each of the routes between the origin/destination pairs considered in the report.

Table D.5
From Prospect Park (Church Ave & E 18th St)
Source: MTA Trip Planner; Google Maps Transit; Google Maps

	MTA Trip Planner		Google Trip Planner		Driving Directions	
	Details	Time (min)	Details	Time (min)	Details	Time (min)
Floyd Bennett Field	***One-way Trip***	**51**	***One-way Trip***	**49**	***One-way Trip***	**15**
	Bus B35	6	Walk	3	Flatbush Ave	
	Transfer	8	Bus B41	14		
	Subway 2	4	Transfer	4		
	Transfer	12	Bus Q35	20		
	Bus Q35	12	Walk	8		
	Walk	9				
Jacob Riis Park	***One-way Trip***	**50**	***One-way Trip***	**51**	***One-way Trip***	**19**
	Bus B35	6	Walk	5	Flatbush Ave	
	Transfer	8	Bus B41	13		
	Subway 2	4	Transfer	4		
	Transfer	12	Bus Q35	20		
	Bus Q35	20	Walk	9		
Canarsie Pier	***One-way Trip***	**44**	***One-way Trip***	**57**	***One-way Trip***	**13**
	Bus B35-LTD	15	Walk	3	Linden Blvd	
	Transfer	7	Bus B35-LTD	19	Remsen Ave	
	Bus B17	15	Transfer	11		
	Walk	7	Bus B17	14		
			Walk	10		
Jamaica Bay Wildlife Refuge	***One-way Trip***	**73**	***One-way Trip***	**72**	***One-way Trip***	**23**
	Subway B/Q	3	Subway Q	10	Linden Blvd	
	Transfer	8	Transfer	1	Pennsylvania Ave	
	Subway S	7	Subway R	2	Shore Pkwy	
	Transfer	6	Transfer	11	Cross Bay Blvd	
	Subway A	20	Subway A	22		
	Transfer	8	Transfer	8		
	Bus Q21	21	Bus Q21	18		

Table D.6
From Coney Island (Stillwill Ave & Surf Ave)
Source: MTA Trip Planner; Google Maps Transit; Google Maps

	MTA Trip Planner		Google Trip Planner		Driving Directions	
	Details	Time (min)	Details	Time (min)	Details	Time (min)
Floyd Bennett Field	***One-way Trip***	***59***	***One-way Trip***	***67***	***One-way Trip***	***10***
	Subway F	6	Subway Q	12	Shore Pkwy	
	Transfer	8	Transfer	6		
	Bus B3	25	Bus B100	10		
	Transfer	5	Transfer	11		
	Bus Q35	6	Bus Q35	20		
	Walk	9	Walk	8		
Jacob Riis Park	***One-way Trip***	***58***	***One-way Trip***	***67***	***One-way Trip***	***13***
	Subway F	6	Subway Q	12	Shore Pkwy	
	Transfer	8	Transfer	6	Flatbush Ave	
	Bus B3	25	Bus B100	10		
	Transfer	5	Transfer	11		
	Bus Q35	14	Bus Q35	20		
			Walk	8		
Canarsie Pier	***One-way Trip***	***76***	***One-way Trip***	***73***	***One-way Trip***	***10***
	Subway D	9	Subway Q	16	Shore Pkwy	
	Transfer	5	Transfer	8		
	Bus B6	40	Bus B6	29		
	Transfer	8	Transfer	5		
	Bus B17	7	Bus B42	10		
	Walk	7	Walk	5		
Jamaica Bay Wildlife Refuge	***One-way Trip***	***103***	***One-way Trip***	***93***	***One-way Trip***	***20***
	Subway F	34	Subway F	34	Shore Pkwy	
	Transfer	12	Transfer	10	Cross Bay Blvd	
	Subway A	27	Subway A	22		
	Transfer	9	Transfer	9		
	Bus Q21	21	Bus Q21	18		

Table D.7
From Jackson Heights (Roosevelt & Broadway)
Source: MTA Trip Planner; Google Maps Transit; Google Maps

	MTA Trip Planner		Google Trip Planner		Driving Directions	
	Details	Time (min)	Details	Time (min)	Details	Time (min)
Floyd Bennett Field	***One-way Trip***	**94**	***One-way Trip***	**95**	***One-way Trip***	**26**
	Bus Q53	58	Walk	2	Brooklyn Queens Expy	
	Walk	3	Bus Q53	60	Grand Central Pkwy	
	Transfer	10	Transfer	12	Van Wyck Expy	
	Bus Q35	16	Bus Q35	16	Shore Pkwy	
	Walk	7	Walk	5	Flatbush Ave	
Jacob Riis Park	***One-way Trip***	**75**	***One-way Trip***	**92**	***One-way Trip***	**28**
	Bus Q53	58	Walk	2	Brooklyn Queens Expy	
	Transfer	9	Bus Q53	63	Grand Central Pkwy	
	Bus Q22	7	Transfer	5	Van Wyck Expy	
	Walk	1	Bus Q22	12	Shore Pkwy	
			Walk	10	Flatbush Ave	
Canarsie Pier	***One-way Trip***	**88**	***One-way Trip***	**79**	***One-way Trip***	**20**
	Subway E	22	Subway G	21	Brooklyn Queens Expy	
	Transfer	7	Transfer	4	Grand Central Pkwy	
	Subway L	38	Subway L	26	Van Wyck Expy	
	Transfer	8	Transfer	14	Shore Pkwy	
	Bus B42	10	Bus B42	9		
	Walk	3	Walk	5		
Jamaica Bay Wildlife Refuge	***One-way Trip***	**43**	***One-way Trip***	**52**	***One-way Trip***	**23**
	Q53	43	Walk	2	Brooklyn Queens Expy	
			Bus Q53	50	Grand Central Pkwy	
					Van Wyck Expy	
					Shore Pkwy	
					Cross Bay Blvd	

Table D.8
From Manhattan (Union Square)
Source: MTA Trip Planner; Google Maps Transit; Google Maps

	MTA Trip Planner		Google Trip Planner		Driving Directions	
	Details	Time (min)	Details	Time (min)	Details	Time (min)
Floyd Bennett Field	***One-way Trip***	*73*	***One-way Trip***	*78*	***One-way Trip***	*30*
	Subway 4	22	Walk	2	Broadway	
	Transfer	7	Subway 4	21	Brooklyn Bridge	
	Subway 2	11	Transfer	2	Brooklyn Queens Expy	
	Transfer	12	Subway 2	12	Gowanus Expy	
	Bus Q35	12	Transfer	8	Shore Pkwy	
	Walk	9	Bus Q35	20	Flatbush Ave	
			Walk	13		
Jacob Riis Park	***One-way Trip***	*72*	***One-way Trip***	*74*	***One-way Trip***	*34*
	Subway 4	22	Walk	2	Broadway	
	Transfer	7	Subway 4	21	Brooklyn Bridge	
	Subway 2	11	Transfer	2	Brooklyn Queens Expy	
	Transfer	12	Subway 2	12	Gowanus Expy	
	Bus Q35	20	Transfer	8	Shore Pkwy	
			Bus Q35	20	Flatbush Ave	
			Walk	9		
Canarsie Pier	***One-way Trip***	*63*	***One-way Trip***	*57*	***One-way Trip***	*28*
	Subway 4	25	Subway L	34	Park Ave	
	Transfer	5	Transfer	9	Queens Midtown Tunnel	
	Bus B17	26	Bus B42	9	Long Island Expy	
	Walk	7	Walk	5	Van Wyck Expy	
					Shore Pkwy	
Jamaica Bay Wildlife Refuge	***One-way Trip***	*74*	***One-way Trip***	*67*	***One-way Trip***	*29*
	Subway 4	6	Subway L	24	Park Ave	
	Transfer	6	Transfer	5	Queens Midtown Tunnel	
	Subway R	18	Subway A	10	Long Island Expy	
	Transfer	14	Transfer	10	Van Wyck Expy	
	Bus Q53	30	Bus Q21	18	Cross Bay Blvd	

Table D.9
From Floyd Bennett Field
Source: MTA Trip Planner; Google Maps Transit; Google Maps

	MTA Trip Planner		Google Trip Planner		Driving Directions	
	Details	Time (min)	Details	Time (min)	Details	Time (min)
Jacob Riis Park	***One-way Trip***	***17***	***One-way Trip***	***42***	***One-way Trip***	***5***
	Walk	9	Walk	13	Flatbush Ave	
	Bus Q35	8	Bux Q35	20		
			Walk	9		
Canarsie Pier	***One-way Trip***	***70***	***One-way Trip***	***67***	***One-way Trip***	***4***
	Walk	7	Walk	10	Flatbush Ave	
	Bus Q35	11	Bus Q35	17	Shore Pkwy	
	Transfer	16	Transfer	10		
	Bus B82	15	Bus B103	16		
	Transfer	7	Transfer	5		
	Bus B17	7	Bus B42	4		
	Walk	7	Walk	5		
Jamaica Bay Wildlife Refuge	***One-way Trip***	***61***	***One-way Trip***	***74***	***One-way Trip***	***14***
	Walk	9	Walk	13	Flatbush Ave	
	Bus Q35	8	Bus Q35	32	Shore Pkwy	
	Transfer	9	Transfer	8	Cross Bay Blvd	
	Bus Q22	6	Bus Q53	21		
	Transfer	17				
	Bus Q53	12				

Table D.10
From Jacob Riis Park
Source: MTA Trip Planner; Google Maps Transit; Google Maps

	MTA Trip Planner		Google Trip Planner		Driving Directions	
	Details	Time (min)	Details	Time (min)	Details	Time (min)
Floyd Bennett Field	***One-way Trip***	**14**	***One-way Trip***	**39**	***One-way Trip***	**6**
	Walk	1	Walk	10	Flatbush Ave	
	Bus Q35	6	Bus Q35	19		
	Walk	7	Walk	10		
Canarsie Pier	***One-way Trip***	**55**	***One-way Trip***	**67**	***One-way Trip***	**10**
	Walk	1	Walk	10	Flatbush Ave	
	Bus Q35	10	Bus Q35	17	Shore Pkwy	
	Walk/Transfer	9	Transfer	10		
	Bus B103	12	Bus B103	16		
	Transfer	12	Transfer	5		
	Bus B17	4	Bus B42	4		
	Walk	7	Walk	5		
Jamaica Bay Wildlife Refuge	***One-way Trip***	**30**	***One-way Trip***	**40**	***One-way Trip***	**10**
	Walk	1	Walk	2	Beach Channel Drive	
	Bus Q22	6	Bus Q22	11	Cross Bay Blvd	
	Transfer	11	Transfer	5		
	Bus Q53	12	Bus Q53	21		
			Walk	1		

Table D.11
From Canarsie Pier
Source: MTA Trip Planner; Google Maps Transit; Google Maps

	MTA Trip Planner		Google Trip Planner		Driving Directions	
	Details	Time (min)	Details	Time (min)	Details	Time (min)
Floyd Bennett Field	***One-way Trip***	**67**	***One-way Trip***	**81**	***One-way Trip***	**8**
	Walk	7	Walk	10	Shore Pkwy	
	Bus B17	8	Bus B17	9	Flatbush Ave	
	Transfer	6	Transfer	6		
	Bus B82	16	Bus B82	15		
	Walk/transfer	12	Walk/Transfer	13		
	Bus Q35	9	Bus Q35	20		
	Walk	9	Walk	8		
Jacob Riis Park	***One-way Trip***	**66**	***One-way Trip***	**82**	***One-way Trip***	**10**
	Walk	7	Walk	10	Shore Pkwy	
	Bus B17	8	Bus B17	9	Flatbush Ave	
	Transfer	6	Transfer	6		
	Bus B82	16	Bus B82	15		
	Walk/Transfer	12	Walk/Transfer	13		
	Bus Q35	17	Bus Q35	20		
			Walk	9		
Jamaica Bay Wildlife Refuge	***One-way Trip***	**77**	***One-way Trip***	**78**	***One-way Trip***	**9**
	Walk	1	Walk	5	Shore Pkwy	
	Bus B42	9	Bus B42	10	Cross Bay Blvd	
	Transfer	8	Transfer	13		
	Subway L	9	Subway L	10		
	Transfer	7	Transfer	3		

Table D.12
From Jamaica Bay Wildlife Refuge
Source: MTA Trip Planner; Google Maps Transit; Google Maps

	MTA Trip Planner		Google Trip Planner		Driving Directions	
	Details	Time (min)	Details	Time (min)	Details	Time (min)
Floyd Bennett Field	***One-way Trip***	**52**	***One-way Trip***	**72**	***One-way Trip***	**15**
	Bus Q53	16	Walk	1	Cross Bay Pkwy	
	Walk/Transfer	13	Bus Q21	18	Beach Channel Dr	
	Bus Q35	16	Transfer	11	Flatbush Ave	
	Walk	7	Bus Q35	32		
			Walk	10		
Jacob Riis Park	***One-way Trip***	**28**	***One-way Trip***	**54**	***One-way Trip***	**10**
	Bus Q21	12	Walk	3	Cross Bay Pkwy	
	Transfer	8	Bus Q53	24	Beach Channel Dr	
	Bus Q22	7	Transfer	5		
	Walk	1	Bus Q22	12		
			Walk	10		
Canarsie Pier	***One-way Trip***	**82**	***One-way Trip***	**78**	***One-way Trip***	**14**
	Bus Q53	19	Walk	15	Cross Bay Pkwy	
	Transfer	10	Subway A	22	Liberty Ave	
	Subway J	15	Transfer	4	Long Island Expy	
	Transfer	6	Subway L	9	Van Wyck Expy	
	Subway L	8	Transfer	14	Shore Pkwy	
	Transfer	11	Bus B42	9		
	Bus B42	10	Walk	5		
	Walk	3				

Appendix E
Detailed Information on Potential Shuttle Bus Routes

1. Riis Landing – Jacob Riis Park: During the summer, the beach at Jacob Riis Park is a major attraction for residents of much of New York City. Operation of the Rockaway Beach Ferry Service as a private business between Manhattan and Riis Landing during summer weekends is evidence of the substantial market for the Jacob Riis Park resource in areas beyond the immediate vicinity of Jamaica Bay, particularly among transit-dependent populations lacking convenient access to Jacob Riis Park via existing public transportation services. Jacob Riis Park is a prime destination for potential shuttle bus service. Providing a link to Riis Landing to meet the ferry when it is in service is a logical core shuttle bus linkage.

2. Jacob Riis Park – Broad Channel Station – Jamaica Bay Wildlife Refuge: Broad Channel Station can be a gateway from the A Line of the MTA subway system to Jacob Riis Park and the Jamaica Bay Wildlife Refuge, which is over a mile from the Broad Channel Station. The limit of convenient walking distance to a subway station is known to be .5 miles for most people. Moreover, the walk between the station and the refuge is unpleasant, as pedestrians must walk for about 3,000 feet along the Cross Bay Boulevard and cross over this busy multilane highway. This shuttle route would also link Jacob Riis Park to the Jamaica Bay Wildlife Refuge, although it is unclear whether there is a substantial market of visitors who would like to go to both sites on a single day, particularly because there are no lockers at either Jacob Riis Park or the refuge and visitors would need to carry their beach equipment. Providing this link, however, may build awareness of the Jamaica Bay Wildlife Refuge among beach visitors–as well as awareness of the beach among Jamaica Bay Wildlife Refuge visitors – for future visits to the Jamaica Bay Unit.

2a. Riis Landing – Jacob Riis Park/Broad Channel Station – Jamaica Bay Wildlife Refuge: This variation on Route Segment 2 includes the connection to Riis Landing on summer weekends to meet the Rockaway Beach Ferry at Riis Landing. This route segment is the same as Route A of the 2009 pilot shuttle and should have relatively high ridership compared to many other possible routes.

3. Jacob Riis Park – Floyd Bennett Field: Provides a link between these major Jamaica Bay Unit sites across the Marine Parkway Bridge. While the number of people wanting to visit both sites on the same trip to Jamaica Bay may be small, providing the connection across the bridge, with the addition of new links to the MTA subway network on the Brooklyn side of the bay, may improve access to Jacob Riis Park for a sizeable potential Brooklyn-based market. Another variation for this route segment is to focus operation of the shuttle bus on a limited schedule to serve events at Floyd Bennett Field that attract large numbers of people. As noted previously, the new Ryan Visitor Center may attract additional visitors to Floyd Bennett Field. This link is a component of a number of other longer route segments described below.

4. Broad Channel Station – Jacob Riis Park – Floyd Bennett Field: This route segment extends the Jacob Riis Park – Floyd Bennett Field segment to provide a connection to Broad Channel Station. As a result, the route provides improved access to Floyd Bennett Field from the entire A Line subway corridor in Queens. As with Route Segment 3 above, a cost effective approach may be to limit operations to time periods when events are scheduled at Floyd Bennett Field.

5. Floyd Bennett Field – Sheepshead Bay Subway: This route segment provides direct access to Floyd Bennett Field (northbound direction) and the nearby Golf Center and Gateway Marina (southbound direction) from the B/Q subway line, which serves densely populated sections in the heart of Brooklyn, Manhattan, and northern Queens, including large numbers of transit dependents. As with all route segments serving Floyd Bennett Field, a practical approach to providing service may be to confine operations to times when events are scheduled. The shuttle could serve the Ryan Visitor Center in the

northbound direction and the Golf Center and Marina, which are across Flatbush Avenue from Floyd Bennett Field, in the southbound direction.

6. Floyd Bennett Field – Golf Center (southbound)/King's Plaza – King's Highway Subway Station: The concept for this route segment is similar to that of Route Segment 5 above, except that the subway connection is at the King's Highway station, still on the B/Q line. The shuttle bus stop at this location would provide a direct transit link to the Jamaica Bay Unit for both subway riders and residents of the densely populated neighborhoods surrounding the station and along the shuttle bus route.

7. Jacob Riis Park – Floyd Bennett Field (northbound)/Golf Center (southbound) – Sheepshead Bay Subway Station: This route segment adds a link across the Marine Parkway Bridge to Route Segment 5, thereby combining the functions of Route Segment 5 and Route Segment 3, as described above.

8. Jacob Riis Park – Floyd Bennett Field (northbound)/Golf Center (southbound)/King's Plaza – King's Highway Subway Station: This route segment adds a link across the Marine Parkway Bridge to Route Segment 6, thereby combining the functions of Route Segment 6 and Route Segment 3, as described above. The total distance of this route is relatively long at 5.5 miles, and total one-way in-vehicle travel time, not accounting for boarding, is 16 minutes.

9. Jacob Riis Park – Floyd Bennett Field (northbound)/Golf Center (southbound)/King's Plaza – Brooklyn College/Flatbush Avenue Subway Station: Route segment along Flatbush Avenue would supplement existing MTA Q35 bus service.

10. Floyd Bennett Field – Golf Center (southbound)/Riding Academy (northbound) – Rockaway Parkway/Canarsie Subway: The connection to the L subway line would provide access to Jamaica Bay from some of the most densely populated sections of northern Brooklyn and lower Manhattan.

11. Jacob Riis Park – Floyd Bennett Field – Golf Center (southbound)/Riding Academy (northbound) – Rockaway Parkway/Canarsie Subway: This route segment adds a link across the Marine Parkway Bridge to Route 10, thereby combining the functions of Route Segment 10 and Route Segment 3, described above.

12. Floyd Bennett Field – Golf Center/Riding Academy – Canarsie Pier: Links Floyd Bennett Field with Canarsie Pier with intermediate stops at the Golf Center/Marina and Riding Academy (northbound only if shuttle operates on parkways). If shuttle buses are not allowed on parkways due to restrictions on commercial vehicle use, the shuttle bus would operate on local roadways and service to the Riding Academy would be provided in both directions. This routing concept presents opportunities for both regular daily operations and limited event-based service.

13. Jacob Riis Park – Floyd Bennett Field (northbound)/Golf Center (southbound)/Riding Academy – Canarsie Pier: This route segment adds a link across the Marine Parkway Bridge to Route Segment 12, thereby combining the functions of Route Segment 12 and Route Segment 3, as described above.

14. Floyd Bennett Field – Golf Center (southbound)/Riding Academy (northbound) – Coney Island: Connects Floyd Bennett Field to Coney Island, where the percentage of households without access to private vehicles is exceptionally high.

15. Floyd Bennett Field – Shore Parkway/Emmons Avenue/Brighton Beach Avenue/Sheepshead Bay and Ocean Avenue Subway Stations – Coney Island/Stillwell Avenue (event-based shuttle service): This route would be operated only when events are scheduled at Floyd Bennett Field, not only connecting the highly transit-dependent residents of Coney Island, but also populous neighborhoods in southwest Brooklyn and Manhattan on the F and B/Q subway lines. The choice of Coney Island as an origin was based in part on stakeholder comments suggesting that Coney Island and nearby neighborhoods may desire improved transit access to Jamaica Bay Unit sites, but also because of its high housing density and low car ownership, as discussed in Chapter 3.

16. Floyd Bennett Field Internal Circulator: A loop route at Floyd Bennett Field including stops at (1) Cricket/North 40; (2) Aviator Sports and Events Center; (3) Ryan Visitor Center; (4) Community Garden; (5) Visitor Contact Station; (6) MTA Bus Stop; (7) Environmental Study Center; (8) Archery Range; (9) Historic Aircraft Hangar; (10) Raptor Point; (11) Model Flying Field/North 40 (see graphic). Walking distances from some of these sites to others is 1 or more miles from Flatbush Avenue, where bus stops on existing and potential new external bus routes are located. The Circulator route would distribute riders on these external routes to individual sites on Floyd Bennett Field, enhancing the convenience of transit access to these sites. This route could be paired with any of the shuttle bus route segments that include stops at Floyd Bennett Field.

Table E.1
Illustrative Shuttle Bus Schedules

Schedule: Rockaway Peninsula Routes			**Cross Marine Parkway Bridge Link—Jacob Riis Park**		
Schedule Timed to Meet Ferry at Riis Landing					
Departure Times			**Departure Times**		
Riis Landing	Jacob Riis Park	JB Wildlife Refuge	FBF	Riis Landing	Jacob Riis Park
		9:10	9:00	-	9:10
	9:40	10:00	9:20	-	9:30
-	10:20	-	9:40	-	9:50
10:30	10:40	11:00	10:00	-	10:10
-	11:20	12:00	10:20	10:30	10:40
-	12:20	-	10:50	-	11:00
12:50	1:10	1:20	11:10	-	11:20
-	1:40	2:00	11:30	-	11:40
-	2:20	-	11:50	-	12:00
2:30	2:40	3:00	12:10	-	12:20
	3:20	3:40	12:30	-	12:40
	4:00	4:20	12:50	1:00	1:10
	4:40	-	1:20	-	1:30
5:00	-	-	1:40	-	1:50
			2:00	-	2:10
			2:20	2:30	2:40
			2:50	-	3:00
			3:10	-	3:20
			3:30	-	3:40
			3:50	-	4:00
			4:10	-	4:20
			4:30	-	4:40
			-	4:50	
# Stops/ Day					
4	12	9	22	4	22

Table E.1
Illustrative Shuttle Bus Schedules

Schedule: Rockaway Peninsula Routes				Cross Marine Parkway Bridge Link—Jacob Riis Park			
Schedule: Canarsie Pier Connector				**Schedule: Canarsie Subway Line Connector**			
Departure Times				Departure Times			
Canarsie Pier	FBF	Riis Landing	Jacob Riis Park	Canarsie Subway Line Connector	FBF	Riis Landing	Jacob Riis Park
9:00	9:17	-	9:25	9:00	9:28	-	9:35
-	9:35	-	-	-	9:45	-	9:55
9:52	10:10	-	10:17	-	10:05	-	10:15
-	10:25	10:35	10:45	-	10:25	10:35	10:45
	10:53	-	11:00		10:53	-	10:40
11:10	11:27	-	11:35	11:22	12:00	-	12:08
	11:45	-	12:25		12:15	-	12:25
12:02	12:20	-	12:30		12:35	-	12:45
	12:40	1:00	1:10		-	1:00	1:10
	1:20	-	12:20		1:20	-	12:20
1:37	1:54	-	2:10	1:48	2:16	-	2:23
	2:20	2:30	2:40		2:38	2:30	1:10
	2:50	-	3:10		1:20	-	1:30
3:00	3:17	-	3:25		1:40	-	1:50
	3:35	-	2:10		2:00	-	2:10
3:52	4:10	-	4:20		2:20	2:30	2:40
4:47	4:30				2:50	-	3:00
		-		3:18	3:46	-	3:55
8	17	3	16		4:05	-	4:14
				4:35		-	-
# Stops/Day	22	4	22		2	28	19

Table E.2
Number of Daily Stops on Illustrative Routes

	Stops				
Routes	**Jamaica Bay Wildlife Refuge**	**Jacob Riis Park**	**Floyd Bennett Field**	**Canarsie Pier**	**Canarsie Subway**
Rockaway Peninsula	9	12	-	-	-
Cross Marine Parkway Bridge	-	22	22	-	-
Canarsie Pier Connector	-	16	17	8	-
Canarsie Connector	-	19	18	-	5

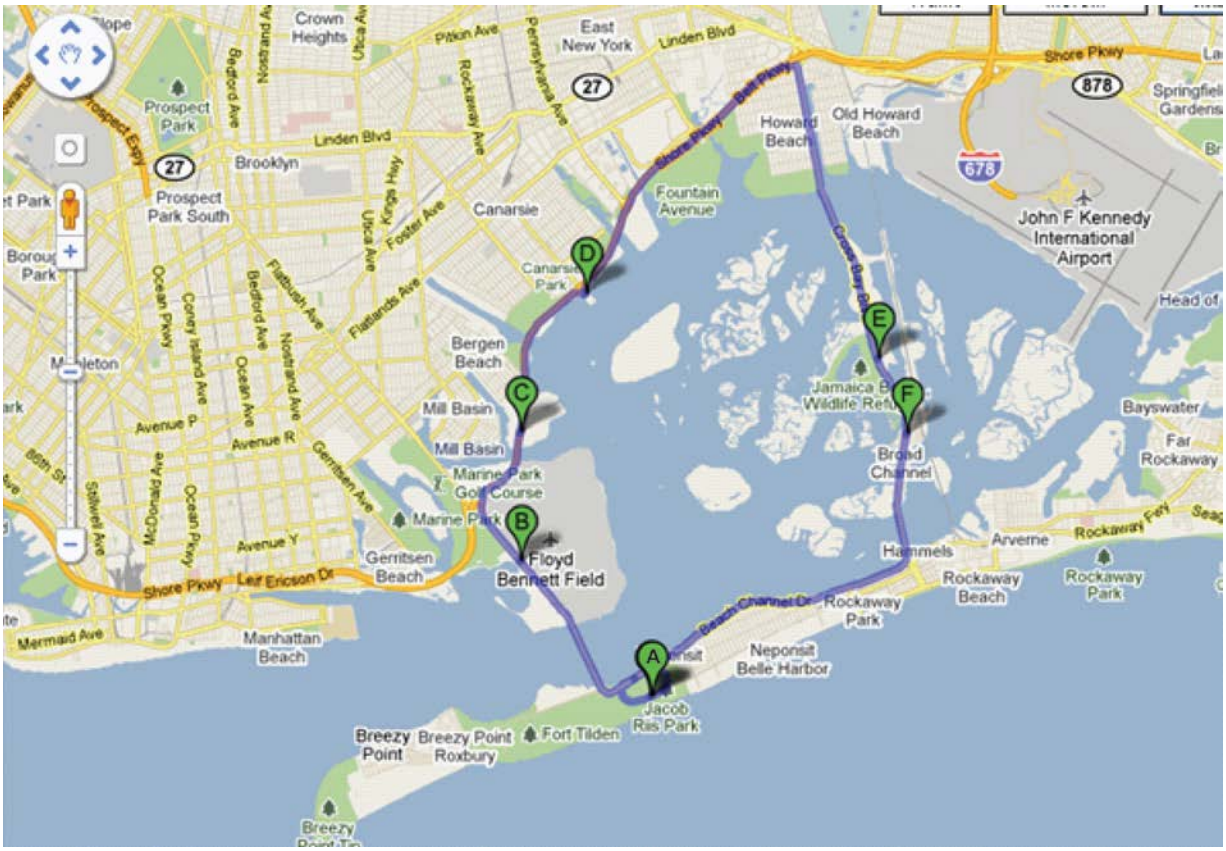
Circulator Route Options

Several different variations of the Circulator route concept presented in Chapter 5: Route Analysis are shown in Figures E.1 and E.2. A "simple" circulator operating on the parkway system could connect the following sites:

- Canarsie Pier
- Riding Academy
- Floyd Bennett Field
- Jacob Riis Park
- Broad Channel Station
- Jamaica Bay Wildlife Refuge

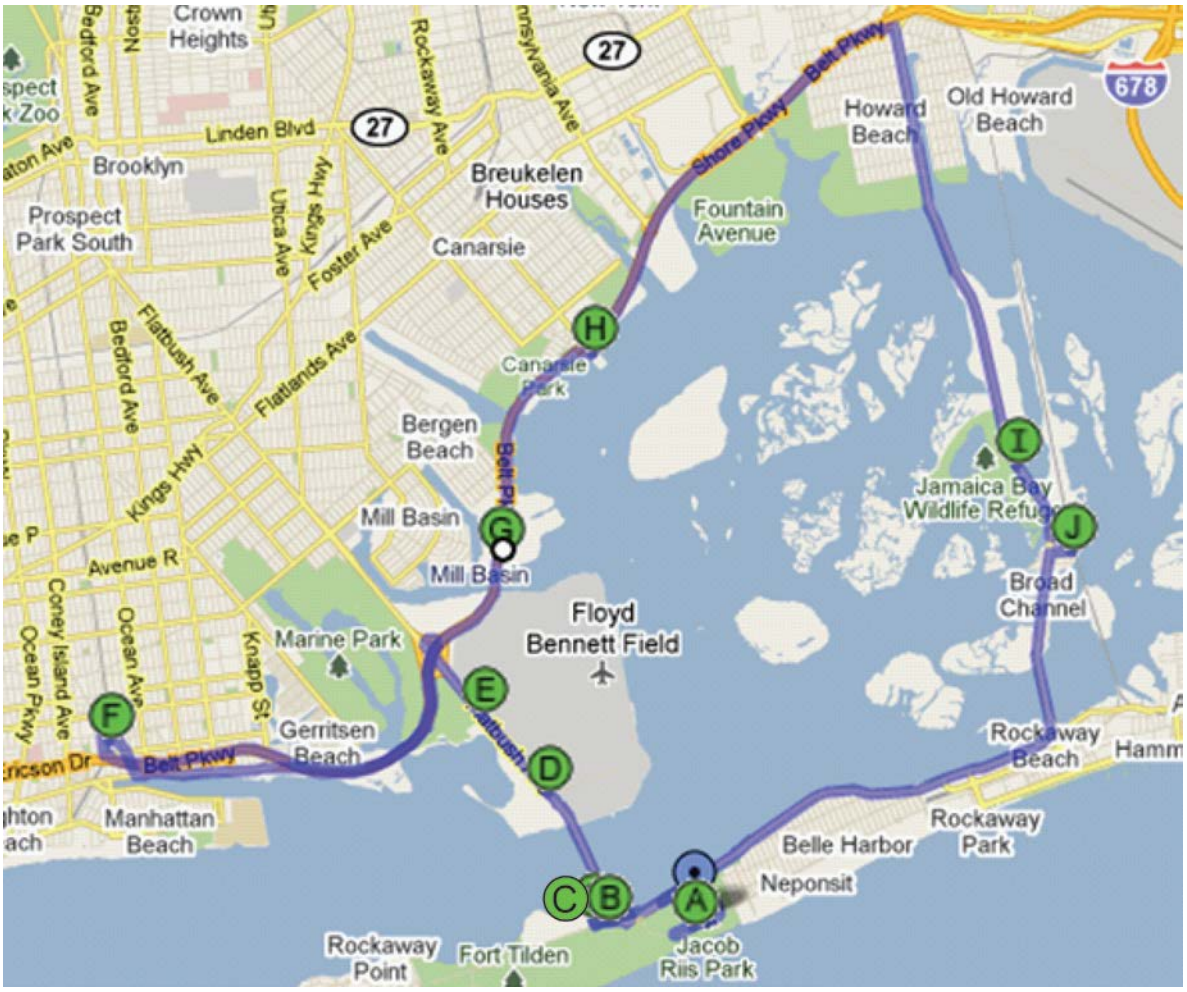
Total estimated travel time for this route is 37 minutes. Therefore, each of the sites would be served every 37 minutes, if a single vehicle is in service. A "detailed" circulator route operating on the parkway system could include a stop at the Sheepshead Bay Subway Station on the B/Q subway line, with total travel time of 52 minutes. If a commercial vehicle license cannot be obtained for the shuttle bus service, the route could be operated on local roadways, with stops added at the Rockaway Parkway/Canarsie L line subway station and the King's Highway subway station on the B/Q subway line. Total travel time with this configuration would exceed 1 hour.

Figure E.1
Simple Circulator



A – Jacob Riis Park
B – Floyd Bennett Field
C – Riding Academy
D – Canarsie Pier
E – Jamaica Bay Wildlife Refuge
F – Broad Channel (Cross Bay Blvd and Noel Rd)

Figure E.2
Detailed Circulator



A – Jacob Riis Park
B – Beach 169th & Rockaway Park Blvd
C – Riis Landing
D – Floyd Bennett Field
D – FBF Internal Circulator
E – Golf Center/Marina
F – Sheepshead Bay Subway (B/Q)
G – Riding Academy
H – Canarsie Pier
I – Jamaica Bay Wildlife Refuge
J – Broad Channel Station

Appendix F
Supplementary Marketing Material

Website

An illustration of the Gateway website with the addition of the Google Transit feature is shown below in Figure F.1. Figure F.2 shows the HTML code, supplied by Google and modified by the Volpe team, which the Gateway staff can add to the public transportation directions webpage to allow visitors to obtain transit information from locations of their choosing. The Google Transit directions should open in a new window or tab, so that visitors are not directed away from the Gateway website.

Figure F.1
Gateway Website Mock-Up with Google Public Transit Planning Tool Feature
Source: Volpe Center, 2010

Figure F.2
HTML Code for Google Transit Feature
Source: Volpe Center, 2010

HTML code for Google Transit feature

```
<form action="http://www.google.com/transit"> <input type="hidden" name="ie" value="UTF8"> <input type="hidden" name="f" value="d"> Start adress <input type="text" style="width:20em" size="20" name="saddr" tabindex="1" maxlength="2048"/> <br> Jacob Riis Park (157 Rockaway Beach Blvd, Queens, NY 11694)

<input type="hidden" name="daddr" value="157 Rockaway Beach Blvd, Queens, NY 11694" <input type="hidden" name="ttype" value="arr"> <input type="hidden" name="date" value="Today"> <input type="hidden" name="time" value="10:00am">

<input type="hidden" name="sspan" value="0.1232,0.2211"> <input type="hidden" name="sll" value="37.7587,-122.4415">

<br><input type="submit" value="Get Directions" /> </form>
```

The text in red can be exchanged for other destinations, such as Floyd Bennett Field or the Jamaica Bay Wildlife Refuge, and inserted in the directions page.

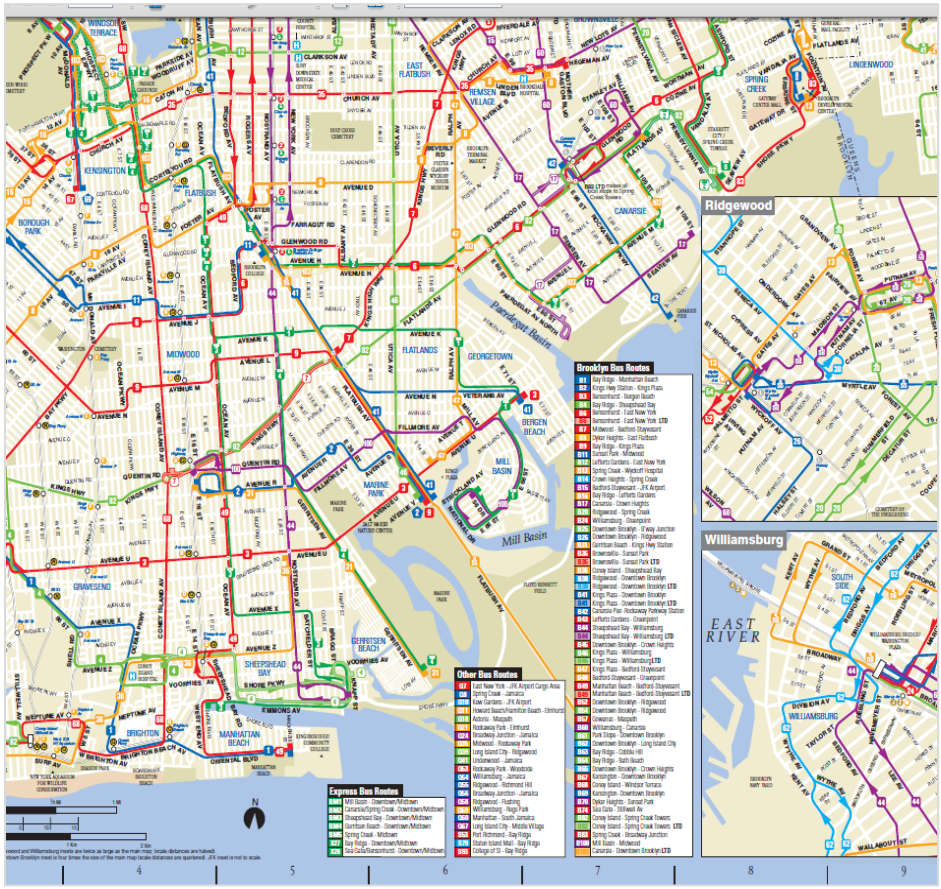
Additional Website Improvements

The public transportation directions page currently includes the line "Call 718-338-3799 for information and reservations for special events." It is unclear if this number is for the park or the MTA, and it is also unclear how it is related to public transportation directions. The park should clarify this information.

Modification of Existing Brooklyn Bus Map

The existing MTA Brooklyn Bus Map has legend boxes positioned over sections of the Jamaica Bay Unit (Figure F.3). GATE should work with MTA to explore redesign options for the legend boxes to provide greater visibility for Floyd Bennett Field and Canarsie Pier.

Figure F.3
Brooklyn Bus Map
Source: MTA (http://www.mta.info/nyct/maps/busbkln.pdf)



Appendix G
Annotated Marketing and Outreach Bibliography

Arpi, Ethan. December 8, 2009. Transit Agencies Need to Invest in Marketing: A Lesson from Los Angeles. The City Fix.
http://thecityfix.com/transit-agencies-need-to-invest-in-marketing-a-lesson-from-los-angeles/

This article describes the Los Angeles Metro's recent rebranding and marketing campaign. In 2009, after Metro released its revised brand campaign, the agency saw a significant increase in discretionary riders. Discretionary riders are those who are not reliant on public transit, but rather choose to use it based on its merits. The marketing and rebranding campaign employed the use of vibrant colors and humor to entice new and discretionary riders.

Borrie, William T.; Christensen, Neal; Watson, Alan E.; Miller, Theron A.; McCollum, Daniel W. 2002. Public purpose recreation marketing: a focus on the relationships between the public and public lands. Journal of Park and Recreation Administration. 20(2): 49-68.
http://www.fs.fed.us/rm/pubs_other/rmrs_2002_christensen_n001.pdf

This article discusses the benefits of "relational" marketing in public lands, as opposed to more general marketing approaches. The article indicates that the target audience for public lands is a consumer and also a shareholder. Marketing should be based on the relationship between the public agency and visitor, focusing on the visitor's expectations of the public agency's role in the public lands. Relationships should focus on trust, commitment, and social responsibility as main elements to build strong relationships between the public agency and target market.

Cain, A. 2007. Are Printed Transit Information Materials a Significant Barrier to Transit Use? Journal of Public Transportation. 10(2): 33-52.
http://www.nctr.usf.edu/jpt/pdf/JPT%2010-2%20Cain.pdf

The article presents the results of a study completed by the National Center for Transit Research, titled "Design Elements of Effective Transit Information Materials." The study sought to determine the extent to which transit information materials are a barrier to transit use. The study's literature review indicated that many transit users are unable to plan their trips successfully using printed information materials. The study found that the critical problem lies in users' ability to use the schedule to determine the times to board and disembark the transit service. The study recommends three options to improve schedule design:

1. Investigate the use of alternatives to tabular schedule such as the clock-face template or headway approach.
2. Provide simplified text-based summary of the schedule.
3. Provide instruction or training on transit-trip planning.

City of Decatur. Marketing and Education Initiatives for Encouraging Alternative Transportation in Decatur.
http://www.decaturga.com/client_resources/transportation%20plan/chapter12%20marketing%20and%20education%20initiatives.pdf

The document identified and defines potential marketing and education opportunities to encourage the use of alternative transportation in the city of Decatur. The city's marketing program follows eight steps:

1. Know your audience: the city conducted a survey of residents to determine preferences, knowledge, and needs.
2. Target individuals: identify niche users to target individual households with location-specific information. Such a targeting marketing campaign can be time consuming and costly, however,

lower cost options, such as creating materials for high-density residential locations (i.e. condo buildings) is possible.
3. Establish partnerships: partner with local employers and organizations to increase use of alternative transportation.
4. Promote the benefits: highlight the many positive aspects of alternative transportation, including improved physical health, lower financial costs, and the prestige of mode choices;
5. Build a toolbox: provide a system users guide with the necessary information about local routes, resources, and proper usage of alternative transportation modes.
6. Follow the money: help make alternative transportation a lower-cost option.
7. Incorporate feedback: establish a system to gather feedback and address problems or concerns as they arise.
8. Connect to the regional system: connect local alternative transportation routes with the regional transit system.

Cronin, J. and Hightower, R. 2004. An Evaluation of the Role of Marketing in Public Transit Organizations. Journal of Public Transportation. 7(2): 17-36.
http://www.nctr.usf.edu/jpt/pdf/JPT%207-2.pdf#page=22

This document describes the current use of marketing in public transit, determines specific marketing educational needs of transit managers, and identifies the role educational centers can play in addressing the needs of transit managers. Based on responses to surveys sent to transit agencies, the following information was found:

1. Radio is perceived to be the most effective media for advertising campaigns
2. Public service announcements are perceived to be the least effective for advertising campaigns.
3. Usage (heavy users, light user, nonusers) is identified as the most common market segmentation.
4. Word of mouth is the most commonly used form of advertising, followed by direct mail but other media outlets should be used more.
5. Ninety-eight percent of transit organizations currently use information brochures as marketing tools.
6. Promotions (free rides, etc) were used by many transit organizations; however, many organizations felt these should be used less.
7. Partnerships with employers should be used more to encourage ridership.

Hess, D.B. and Bitterman, A. 2008. Bus Rapid Transit Identity: An Overview of Current "Branding" Practice. Journal of Public Transportation. 11(2): 19-42.
http://www.nctr.usf.edu/jpt/pdf/JPT11-2Hess.pdf

This article discusses the emergence of bus rapid transit (BRT) and BRT branding. As a new form of transit, BRT has an opportunity to improve public perceptions of public transportation. There is currently a lack of literature on branding specific to BRT, due to the relative age of BRT systems. The authors offer suggestions for effective BRT branding, based on 22 BRT branding cases. Successful BRT branding tactics include:

1. "Clean" vehicles – single color palette and typeface ("unique" color, such as gold, if the parent system already uses colors)
2. Specific name of BRT line, not parent system acronyms (example –Metro Rapid, Albany GoBus!, Denver SpeedLink)
3. Linear graphic element to suggest speed
4. Differentiate the BRT from a regular bus, which typically is not well regarded

Johnson, Belinda. Modern Transit Marketing. Modern Transit Marketing Part II: How to Pull it Together.
http://www.majicconsulting.com/user/Modern%20Transit%20Marketing%20Part%20II.pdf

The document describes branding and positioning strategies, which are the focal point of a strategic marketing plan. Branding defines the personality of the transit service. It personifies the image and identity of the service to form the opinions and attitudes people have of your service and organization. Positioning describes the place your service holds relative to the competition. Your positioning strategy describes how your service is unique and distinctive from these other modes. The document suggests that when developing branding and positioning strategies for a transit service, focus on the inherent drama in the service. An example is Boulder, Colorado's Community Transit Network, which named its bus routes Hop, Skip, Jump, Leap, and Bound. This captures the unique identity of the system.

Johnson, Belinda. Modern Transit Marketing. Modern Transit Marketing Part III: How to Make it Work.
http://www.majicconsulting.com/user/Modern%20Transit%20Marketing%20Part%20III.pdf
This document provides guidance on how to implement a marketing plan. The document recommends that a transit agency's marketing budget should be in the range of 3 to 7 percent of its operating budget; slightly higher if a new service is being launched. The document summarizes the effectiveness of various types of media as shown in the table below:

	Awareness	Information	Excitement	Influence	Price
Print	Weak	Excellent	Satisfactory	Satisfactory	Excellent
Broadcast	Satisfactory	Satisfactory	Excellent	Satisfactory	Satisfactory
Out-of-home	Excellent	Weak	Satisfactory	Weak	Weak
Direct mail	Excellent	Excellent	Satisfactory	Satisfactory	Satisfactory
New media	Weak	Excellent	Weak	Weak	Satisfactory
Event marketing	Satisfactory	Weak	Excellent	Satisfactory	Weak
Public Relations	Satisfactory	Excellent	Excellent	Excellent	Weak

The document also advises that when designing a message, the following five rules should be followed:

1. Message must be consistent throughout;
2. Message should focus on the benefits to potential customers;
3. Facts must support claims;
4. Marketing message should be unpredictable (use creativity to deliver your message);
5. Keep the message positive.

Majic Consulting. November/December 2008. Maximizing Exposure Using Online Media.
http://www.majicconsulting.com/pdf/Online_Media.pdf
This newsletter provides an overview of various forms of new media. Websites such as Twitter and Facebook, help agencies create an online community to keep riders informed at low or no cost to the agency. The newsletter also recommends that an agency's website reflect its brand. In addition, if passengers cannot find the agency's ride guide or route schedule in the first 30 seconds, then the website needs to be revamped.

National Center for Transit Research. February 2010. Utilizing Information Technology in Innovative Marketing Approaches for Public Transportation.
http://www.nctr.usf.edu/pdf/77810.pdf

This document lists examples of innovative social media tools used in transit marketing found through a detailed internet scan and describes trends in new media. The document has an accompanying website, www.gosocialtransit.com, which provides further information on social media and its applications in transit marketing. In 2008, when the study began, the fastest growing segments of new media included:

- Blogs
- Social networks
- Video webcasts

Other forms of media, such as radio and local news programs have experienced declining audiences. Important to note is social media and new media as a solution to increasing demand for instant information. Audiences can engage with social media outlets and access information quickly to meet their transportation needs.

Transit Marketing. June 2004. Gorge Trans-Link Transit Marketing Plan.
http://www.gorgetranslink.com/pdf/GorgeTranslinkMarketingPlan.pdf

The document outlines a plan to market public transit services in a five-county region of Oregon and Washington. The plan includes a needs assessment, which identifies the agency's target markets and the challenges the agency faces in reaching those markets. The plan includes numerous recommended strategies and tactics to reach the target audience and meet the agency's objectives. Specific strategies fall within five overall goals:

1. Establish regional transit identity/brand
2. Enhance user-friendliness
3. Build awareness
4. Create an inclusive image
5. Encourage usage

Transit Marketing. July 2006. Paso Robles City Area Transit System: Market Assessment and Marketing Plan.
http://www.prcity.com/government/departments/adminservices/pdf/Final%20Transit%20Marketing%20Plan%20Jul%2006.pdf

The document is comprised of two sections: 1) a market assessment, which provides the basis for the recommended marketing plan, and 2) the marketing plan for the area transit system. The assessment includes an overview of the agency's current services and environment, including rider characteristics, as well as a review of the agency's current marketing efforts. The marketing plan outlines the agencies objectives, its target markets, and identifies an action plan of strategies to pursue the identified target markets and objectives. The strategies are grouped into five areas: customer service, system identity/branding, passenger information, public relations/media advertising, and targeted outreach.

Transport Canada. December 2008. Marketing and Branding for Bus Rapid Transit.
http://www.tc.gc.ca/media/documents/programs/cs67e-market.pdf

This document describes a transit agency trend in Canada and the United States to employ sophisticated marketing and branding campaigns to increase ridership, especially on new BRT lines. In the past, transit was not "sold" to its audiences, a trend that is beginning to change.

Transit agencies are beginning to target marketing based on audience segmentation, which can more accurately address the needs of different types of transit users. This document highlights three BRT marketing best practices:

1. Create a separate brand identity
2. Focus on positive and unique qualities

3. Target market identification

TTI. 1999. Texas Transportation Institute, South West Transit Association, and the University of Wisconsin-Milwaukee. A handbook of proven marketing strategies for public transit. TCRP Report 50. Washington, DC: TRB, National Research Council.

This handbook provides general guidance for transit agencies to develop marketing strategies. The guidebook also offers a methodology for agencies to determine the best strategies for their particular service or campaign, as well as evaluation tools. It contains detailed guidance on subjects such as spokesperson behavior, event planning, surveys and other data collection, and customer service.

Some techniques listed for raising awareness of a new service include:

1. Work with partners (including local businesses, media) when instituting a new service
2. Rewarding riders can encourage increased ridership
3. Seasonal promotions or special events can help raise awareness

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

1. REPORT DATE *(DD-MM-YYYY)*	2. REPORT TYPE	3. DATES COVERED *(From - To)*
01-05-2013	Final	August 2009 - May 2013

4. TITLE AND SUBTITLE

Gateway National Recreation Area, Jamaica Bay Unit
Alternative Transportation Feasibility Study

5a. CONTRACT NUMBER

F4505087777

5b. GRANT NUMBER

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Filosa, Gina; Fisher, Frances; Laube, Melissa; Linthicum, Alex; Mejias, Luis; Duffy, Catherine

5d. PROJECT NUMBER

NP72

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

U.S. Department of Transportation
Research and Innovative Technology Administration
John A. Volpe National Transportation Systems Center
55 Broadway, Cambridge, MA 02142

8. PERFORMING ORGANIZATION REPORT NUMBER

DOT-VNTSC-NPS-13-22

9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)

Peter Steele, Northeast Regional Office
National Park Service
15 State Street
Boston, MA 02109

10. SPONSOR/MONITOR'S ACRONYM(S)

NPS

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

646/121735

12. DISTRIBUTION/AVAILABILITY STATEMENT

Public distribution/availability

13. SUPPLEMENTARY NOTES

14. ABSTRACT

The National Park Service Gateway National Recreation Area (GATE) was created to provide convenient access to outdoor recreation in the National Park System for residents and visitors to the New York City (NYC) area. The Volpe Center completed a number of tasks to analyze the feasibility of transit service at the Jamaica Bay Unit of GATE. Planning efforts have been undertaken over the last 10 years to improve access to the Jamaica Bay Unit. The current study builds on these earlier efforts and the experience of a pilot ferry service to determine the feasibility of providing greater access to the Jamaica Bay Unit by alternative modes. This report discusses: 1) Consolidation and review of existing conditions, data, and documents relevant to the project; 2) Evaluation of the 2009 pilot shuttle bus service, based on field observation and data collection by project staff; 3) Analysis of demand for a new shuttle bus service based on needs and patterns of movement throughout the local area; 4) Planning and analysis for one or more shuttle services to provide access to Jamaica Bay Unit resource areas and amenities; and 5) Recommendations and conclusions regarding the viability of improving transit linkages between the Jamaica Bay Unit and the NYC transit system.

15. SUBJECT TERMS

GATE, shuttle, Jamaica Bay Unit

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			Frances Fisher
None	None	None	N/A	93	19b. TELEPHONE NUMBER *(Include area code)* 617-494-3442

Reset

Standard Form 298 (Rev. 8/98)
Prescribed by ANSI Std. Z39.18

As the nation's principal conservation agency, the Department of the Interior has the responsibility for most of our nationally owned public lands and natural resources. This includes fostering sound use of our land and water resources; protecting our fish, wildlife, and biological diversity; preserving the environmental and cultural values of our parks and historic places; and providing for the enjoyment of life through outdoor recreation. The department assesses our energy and mineral resources and works to ensure that their development is in the best interests of all our people by encouraging stewardship and citizen participation in their care. The department also has a major responsibility for American Indian reservation communities and for people who live in island territories under U.S. administration.

646/121735 /May 2013