

2018 NYC Ferry Expansion
2019 Feasibility Study



NYCEDC

January 11, 2018

Dear Mayor de Blasio,

Since its launch in 2017, NYC Ferry has substantially improved transportation access and quality of life for residents living in 20 waterfront communities across our city. To date, close to eight million riders have traveled along the service's six routes, with landings spanning from Soundview in the Bronx to the Rockaways in Queens. The New York City Economic Development Corporation (NYCEDC) is proud of its role in launching a system that has fundamentally transformed accessibility in neighborhoods that have historically been considered transit deserts. This work has meant increased physical mobility for New Yorkers from all backgrounds, which translates to access to opportunity and the promise of a brighter future.

Recognizing this promise, neighborhood leaders from all five boroughs have requested that NYC Ferry also serve their communities. You responded to their call and this summer instructed NYCEDC to study the feasibility of expanding the system. After six months of rigorous analysis, I am pleased to present the results of that work. This document represents a data-driven analysis of 35 expansion opportunities in all five boroughs, including assessment of physical feasibility, ridership and transportation benefits, and potential for integration into the NYC Ferry system. It presents several viable near-term options for growth that could substantially extend NYC Ferry's benefits to thousands more New Yorkers, and potential future adjustments to improve service further. This study also identifies the efforts that will be needed, and the costs that must be borne, to implement all of these changes successfully.

At a time of record population growth, New York needs infrastructure investments to meet our current and future transit needs. NYCEDC stands ready to help meet that need through additional ferry service.

Thank you for your continued support and recognition of the importance and potential of New York City's waterways.

Sincerely,



James Patchett
President and CEO
New York City Economic Development Corporation

TABLE OF CONTENTS

	EXECUTIVE SUMMARY	01
1	BUILDING ON SUCCESS	05
2	OUR APPROACH	09
3	PUBLIC OUTREACH AND SITE IDENTIFICATION	11
4	SITE ASSESSMENT	21
5	ROUTE DEVELOPMENT AND EVALUATION	25
6	ROUTE FINDINGS	29
7	LOOKING AHEAD	39
	APPENDICES	45



PARK

EXECUTIVE SUMMARY

NYC Ferry provides an affordable, enjoyable way for New Yorkers to connect to jobs and leisure activities around New York City. Since its 2017 launch, NYC Ferry has enjoyed overwhelming success, serving nearly 8 million riders as of this writing and enjoying favorable reviews from 93% of riders. New Yorkers have responded to that success with a desire for new ferry landing sites and routes to expand the reach of the ferry system and their own mobility. Following the completion of the Lower East Side route in August 2018 (the sixth of the current system), Mayor de Blasio instructed New York City Economic Development Corporation (NYCEDC) to examine opportunities for NYC Ferry's growth. This feasibility study is the result of that effort.

This study is informed by NYCEDC's 20 months' experience running NYC Ferry (and six years' experience running the predecessor East River Ferry). It builds upon previous NYCEDC ferry studies undertaken in 2011 and 2013, while accounting for new data that informs ferry ridership estimates, operational and travel time calculations, information on development and neighborhood growth, and growing pressure on other transit modes.

This study is not itself a set of recommendations for new ferry landings or routes. Rather, it is an objective, data-driven analysis of expansion opportunities to inform policy decisions by the de Blasio administration. Over the course of six months, NYCEDC, supported by third party consultants with expertise in maritime transportation planning and ridership modeling (collectively, the "planning team"), analyzed dozens of landing site recommendations made by members of the public. In reviewing these, the planning team was guided by three goals that have driven NYC Ferry since its inception:



Provide affordable and convenient transit for communities, improving overall transportation options



Support growing neighborhoods and connect people to jobs and economic opportunities throughout the city



Increase the resiliency and redundancy of the city's transportation network

Through a three-stage screening process, the planning team has identified opportunities to: (1) extend the existing Soundview route; (2) create two viable new NYC Ferry routes to serve Staten Island and Coney Island; and (3) in the event a Coney Island route is created, adjust the existing South Brooklyn route to improve its performance for riders. Each of these opportunities comes with unique challenges and costs, discussed in further detail below, which will inform the administration's decisions on whether or not to proceed.

THE PROCESS



PUBLIC OUTREACH

In September 2018, NYCEDC issued an open call to New Yorkers seeking recommendations for new NYC Ferry landing sites. Community members and their elected officials, informed by local knowledge of opportunities and constraints, responded online and in person with 3,500 suggestions of neighborhoods and sites to include in the study. The planning team sorted those suggestions by site and ranked them based upon popularity, resulting in an initial study list of 35 sites and neighborhoods for consideration.



SITE ASSESSMENT

The planning team assessed the 35 potential sites in three stages. First, the team reviewed operational and physical constraints, such as bridge clearance heights, shipping channel traffic, and water depths that could cause a site to be unsafe or otherwise infeasible for ferry service. This resulted in the elimination of nine sites. Second, the planning team reviewed the remaining 26 sites using factors that affect potential ridership demand, such as neighborhood population, existing transit options, surrounding land uses and development potential, and accessibility of the potential sites to pedestrians and others modes (where appropriate). Other factors used in the analysis of sites were existing in-water infrastructure, along with navigational considerations at and around the site that could influence travel time and maneuverability. The planning team identified 11 of the 26 sites having sufficient ridership demand base and physical viability to model into study routes for potential NYC Ferry service. Site assessment findings are shown on the following page.



ROUTE DEVELOPMENT AND EVALUATION

Next, the planning team clustered the 11 landing sites into three geographic regions of the city, to analyze as a potential ferry route (or routes, as many of these areas had multiple iterations):

- Staten Island – Hudson River: St. George, Stapleton, Great Kills, Chelsea (Pier 57), West 70th Street, Battery Park City, Midtown / West 39th Street
- Southern Brooklyn: Coney Island Creek, Bath Beach
- Upper East River: Ferry Point Park / Throgs Neck, College Point

The planning team analyzed various combinations of the sites within each region as routes, assessing characteristics such as distance, travel time, frequency of departures, operating hours, and seasonal schedules. These factors informed the ridership modeling profile, which projected how many people would use the service (ridership demand) and the cost of the service to operate.



Site Assessment Findings

	STAGE 1	STAGE 2	STAGE 3	STUDY SITES FOR ROUTE EVALUATION
THE BRONX	City Island / Orchard Beach	City Island / Orchard Beach		The Ferry Point Park / Throgs Neck area has limited transit options. A ferry would provide another transit option with competitive travel times to Lower and Midtown Manhattan for neighboring communities.
	Ferry Point Park / Throgs Neck	Ferry Point Park / Throgs Neck	Ferry Point Park / Throgs Neck	
	Yankee Stadium	Yankee Stadium		
	Mott Haven			
	Co-op City			
BROOKLYN	Coney Island Creek	Coney Island Creek	Coney Island Creek	<p>Coney Island Creek could provide a faster transit alternative to Manhattan for the local community in an isolated part of the peninsula.</p> <p>A ferry landing at Bath Beach could provide the adjacent neighborhoods with more transit options when traveling to Lower and Midtown Manhattan.</p>
	Canarsie Pier	Canarsie Pier		
	Bush Terminal	Bush Terminal		
	Sheepshead Bay	Sheepshead Bay		
	Bath Beach	Bath Beach	Bath Beach	
	Coney Island Beach			
	Gowanus			
MANHATTAN	West 70th Street	West 70th Street	West 70th Street	<p>The West 70th Street site is adjacent to high-density residential buildings, offering an alternative to the subway to Lower and Midtown Manhattan.</p> <p>Chelsea could provide another transit option to an area experiencing rapid growth. Pier 57 is currently being redeveloped as commercial space, and a ferry landing could provide access to jobs at this location. This site is also within walking distance of the popular High Line Park.</p> <p>Battery Park City and Midtown / West 39th Street are existing ferry terminals that connect to jobs in Lower and Midtown Manhattan on the west side.</p>
	West 125th Street	West 125th Street		
	Inwood / Dyckman Street	Inwood / Dyckman Street		
	Randall's Island	Randall's Island		
	East Harlem	East Harlem		
	Chelsea (Pier 57)	Chelsea (Pier 57)	Chelsea (Pier 57)	
	West Village (Christopher Street)	West Village (Christopher Street)		
	Battery Park City	Battery Park City	Battery Park City	
	Midtown / West 39th Street	Midtown / West 39th Street	Midtown / West 39th Street	
QUEENS	College Point	College Point	College Point	A ferry from College Point could provide a faster trip to Lower and Midtown Manhattan for communities adjacent to the landing in another isolated part of the city with fewer public transit options.
	Fort Totten / Bay Terrace	Fort Totten / Bay Terrace		
	LaGuardia Airport	LaGuardia Airport		
	Flushing Bay	Flushing Bay		
	Whitestone	Whitestone		
	JFK Airport			
	Far Rockaway			
STATEN ISLAND	St. George	St. George	St. George	<p>St. George Ferry Terminal is a multimodal hub that connects all of Staten Island to Manhattan via the Staten Island Ferry. NYC Ferry could provide travel time savings for passengers traveling to the west side of Lower Manhattan or Midtown Manhattan.</p> <p>A landing in Stapleton could provide a faster alternative for those in the neighborhood traveling to Manhattan. The site offers a connection to the Staten Island Railroad and proximity to the New Stapleton Waterfront development.</p> <p>A landing at Great Kills Park could provide a faster trip for neighborhoods within a short driving distance of the park.</p>
	Stapleton	Stapleton	Stapleton	
	Great Kills Park	Great Kills Park	Great Kills Park	
	Tottenville	Tottenville		
	New Dorp Beach / Midland Beach			
	Prince's Bay			
	West Shore			

SUMMARY OF ROUTE FINDINGS

STATEN ISLAND – HUDSON RIVER

While the Staten Island Ferry has long served the southern tip of Manhattan, via the Whitehall Terminal, a NYC Ferry route could provide a direct transit connection for Staten Island residents to Manhattan’s lower and midtown west side, with significant savings in travel time compared to existing commute options. Of the five routes evaluated within the Staten Island – Hudson River corridor, the St. George to Battery Park City to Midtown / West 39th Street route clearly shows the most promising ridership relative to operating costs. The inclusion of additional sites along Manhattan’s west side would reduce overall ridership and extend travel times, making ferry service undesirable relative to alternatives.

CONEY ISLAND

In Southern Brooklyn, a Coney Island route would have the potential to improve transit options for residents of that neighborhood. The Coney Island Creek site presents challenges to constructing a landing able to withstand the sandy environment and maintain reliable service throughout the year. However, Coney Island was the most frequently requested Brooklyn site during NYCEDC’s public engagement process, indicating promising ridership potential. Adding Bay Ridge to a new Coney Island route would also provide a faster, more direct trip to Manhattan for riders who today must pass through four different stops on the South Brooklyn route. Additionally, moving Bay Ridge to a new Coney Island route would make the current South Brooklyn route more compact, creating opportunities to modify and improve it further in the future. While many Brooklyn residents expressed interest in service at Bath Beach, that site failed to achieve the travel time savings necessary to justify its inclusion in a new Coney Island route.

THROGS NECK / FERRY POINT PARK

The planning team also considered sites in the Upper East River region as additions to the existing Soundview route. A Ferry Point Park / Throgs Neck site has long had the support of neighborhood advocates and elected officials, and it was the most requested site during the public engagement process in the Bronx. Although Ferry Point Park would be a unique park-and-ride site, it has ample on-site parking available. College Point, Queens was also studied as an additional possible extension for the Soundview route, but the inclusion of other sites on the route would offer limited ridership and extend overall travel times to an unacceptable degree. The College Point site also lacks the parking necessary to support ferry service in that neighborhood.

NEXT STEPS

Implementing a new route requires constructing vessels as well as designing, permitting, and constructing in-water and upland infrastructure at landings. Additionally, reliable and efficient ferry service requires a fleet of well-maintained vessels and operationally efficient terminals to move people quickly and on schedule. Adding service to an existing system requires careful consideration of the total ferry fleet size, management of that fleet through maintenance programs and overnight moorage, and modifying schedules to optimize service for its users. System optimization is ongoing following the launch of the latest new routes and NYC Ferry continues to expand transportation options to the communities of New York City.

PURPOSE

The de Blasio administration launched NYC Ferry in 2017, building off the success of the East River Ferry pilot service and guided by the 2013 Citywide Ferry Study. NYC Ferry quickly established a new waterborne public transit system reaching New Yorkers in traditionally underserved neighborhoods and providing accessible transit in waterfront areas where jobs and housing are growing. Based upon the success of NYC Ferry's existing system, this study examines the feasibility of potential new sites and routes to expand the system to other parts of the city.

NYC FERRY GOALS

Three principle goals drive NYC Ferry, and inform the current study:



Provide affordable and convenient transit for communities' improving overall transportation options



Support growing neighborhoods and connect people to jobs and economic opportunities throughout the city



Increase the resiliency and redundancy of the city's transportation network

NYC Ferry also aligns with the goals of Mayor de Blasio's "One New York: The Plan for a Strong and Just City," which aims to create economic growth and improve New Yorkers' lives by improving citywide connectivity. Whether it is Rockaway residents gaining direct access to growing industry and jobs in Sunset Park and Lower Manhattan, or Soundview residents who have seen their commuting times cut in half, NYC Ferry is supporting economic growth, job access, and development along waterfront neighborhoods.



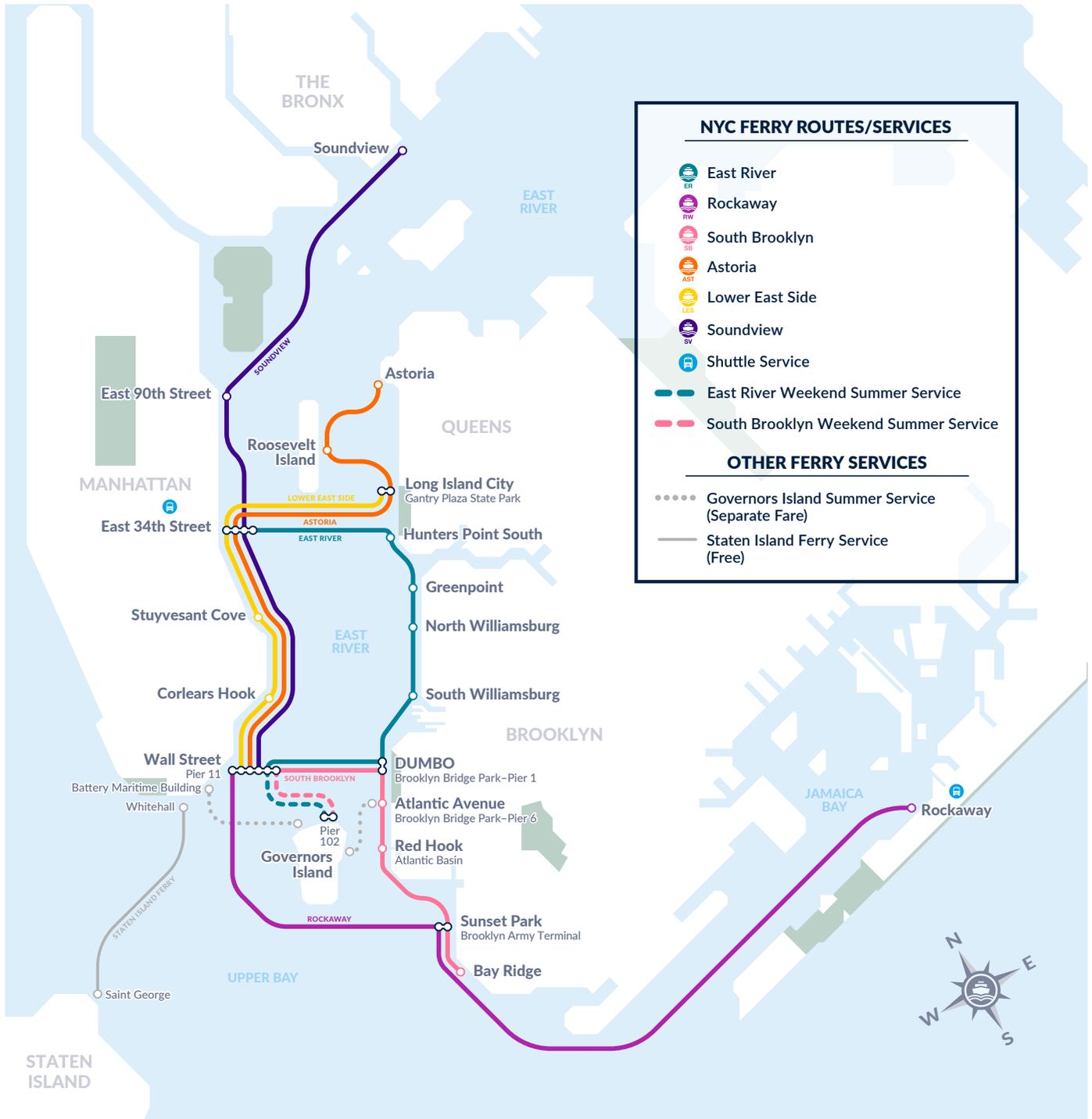
In reaching more communities and connecting residents to jobs, NYC Ferry also has modernized and expanded one of the city's most resilient transit modes. The passenger ferry fleet in the New York Harbor has played crucial roles in providing emergency access, most notably during 9/11 and after Hurricane Sandy, when flooding of the subway system caused significant transit interruptions.

Finally, NYC Ferry increases overall connectivity in isolated neighborhoods, and also offers New Yorkers direct connections to many of the City's open spaces, which help boost the economic impact to those areas (such as the Rockaways).

CURRENT NYC FERRY SYSTEM

NYC Ferry, originally called “Citywide Ferry,” launched in the summer of 2017 with four new routes including the existing East River Ferry route, which began as a pilot service in 2011. NYC Ferry has since grown to six routes across four boroughs, with daily service to 20 landings and a fleet of both 150- and 350-passenger vessels.

Existing 2018 NYC Ferry Map



CURRENT NYC FERRY SYSTEM

CURRENT ROUTES

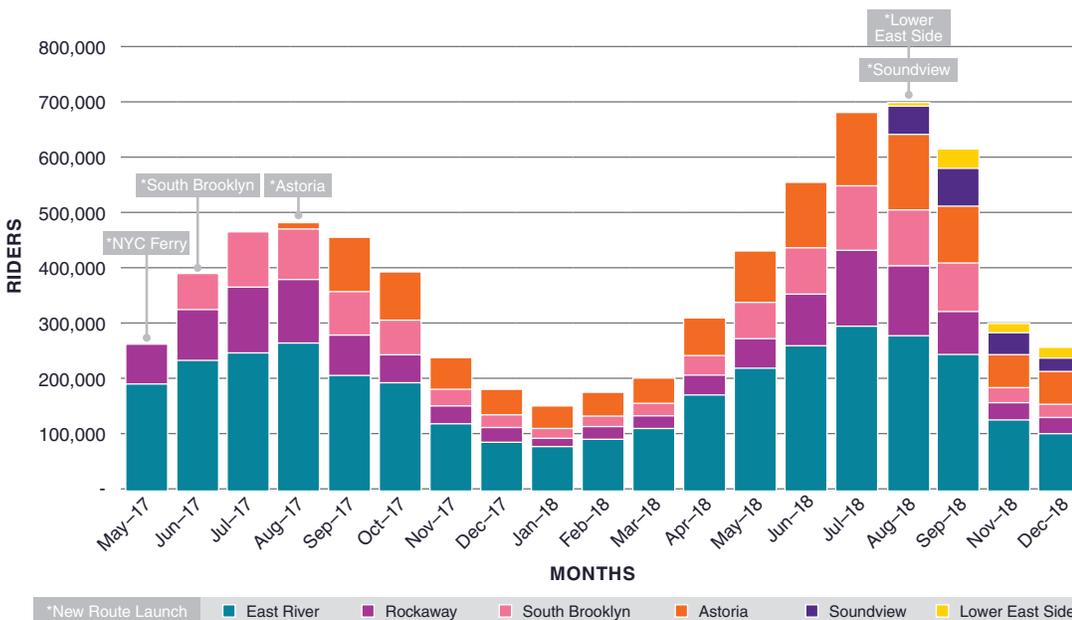
NYC Ferry operates year round on six routes: East River, Rockaway, South Brooklyn, Astoria, Lower East Side, and Soundview. A connection to Governors Island is provided on summer weekends. Each route provides service to a variety of neighborhoods, connecting parts of New York City to one another and offering free transfers at DUMBO, Brooklyn Army Terminal and Long Island City landings as well as the main ferry terminals at East 34th Street in Midtown Manhattan and Wall Street / Pier 11 in Lower Manhattan.

In order to ensure that riders can reliably connect to job centers year-round, NYC Ferry operates with frequent and consistent departures during weekday peak periods. On weekends and off-peak periods, the frequency of departures fluctuates to meet demand with fewer departures per hour in the winter and more per hour in the summer.

RIDERSHIP

Since launching on May 1 2017, NYC Ferry has transported over 7.7 million passengers (as of the end of 2018). As with most ferry services, ridership fluctuates throughout the year with the highest levels in the summer—NYC Ferry transported 700,000 people in August 2018 alone.

PASSENGER FEEDBACK



7.7 M

RIDERS SINCE LAUNCH

20

LANDINGS

21

VESSELS

6

ROUTES

93%

CUSTOMER SATISFACTION

NYC Ferry regularly gathers customer feedback via online and in-person surveys. The majority of riders (83 percent) are New York City residents, and during peak periods most passengers (71 percent) are commuting to and from work or school. Over 70 percent of riders walk or bike to and from the ferry landings. Passengers generally like NYC Ferry, with over 93 percent rating their overall satisfaction at seven or higher out of 10.

Metrics as of December 2018



OUR APPROACH

2

To assess each potential site and the options for assembling landings into NYC Ferry routes, the planning team followed a stepped approach, detailed in the following chapters of this study.



Public Outreach and Site Identification

Local residents and elected officials know their neighborhoods best and are able to provide valuable input on the opportunities and constraints of potential landing sites. To gather this important perspective, NYCEDC worked with all five borough presidents in the fall of 2018 to host meetings with community board leaders and elected officials along the city's waterfront. NYCEDC also launched an online form to identify sites for further assessment, which garnered over 3,500 responses.



Site Assessment

Following the development of a list of potential sites, the planning team assessed and evaluated them to determine feasibility of ferry service. This assessment first involved review of operational constraints, such as navigational considerations due to vessel traffic, the presence of low-clearance bridges, water depths, and other obstructions. The planning team then analyzed the opportunities associated with each site, including review of potential ridership (informed by the presence of existing transit options and travel patterns of the community), as well as current and planned development growth.



Route Development and Evaluation

The planning team then assembled sites that presented ridership potential and that could expand the number of competitive transportation options into potential ferry routes. The planning team considered service frequency, travel time, and other factors to determine if residents were

more likely to use the ferry or other travel modes. These factors informed a more detailed ridership demand model and estimates of capital and operating costs to provide new service.



Route Findings

Assessment, development and evaluation led to an understanding of how many riders would use this service, what it would cost to implement and operate the service, its relationship to existing NYC Ferry service, and how this new transportation option could benefit the surrounding community.

PREVIOUS STUDIES

This NYC Ferry Expansion Feasibility Study builds upon other ferry studies completed over the past 10 years. Some sites from previous studies were included again in 2018 with new and updated data.

2011 In the absence of any existing public ferry service (other than Staten Island Ferry) NYCEDC completed the Comprehensive Citywide Ferry Study in 2011, which provided an overview of development potential for passenger ferry transportation throughout New York City. That study analyzed and prioritized potential corridors of routes drawn from a group of over 40 waterfront sites in the five boroughs. Building upon the recommendations, the City launched the East River Ferry pilot, which today is the East River route of the NYC Ferry system.

2013 Following the success of the East River Ferry pilot, NYCEDC set out to complete a second Citywide Ferry Study in 2013. The recommendations and outcomes of the 2013 Citywide Ferry Study formed the blueprint of a proposal that would later become NYC Ferry. First announced by Mayor de Blasio in February 2015, NYC Ferry began service in May 2017.



PUBLIC OUTREACH AND SITE IDENTIFICATION

3

In the five years since the 2013 Citywide Ferry Study, NYCEDC planners have received requests for ferry service at a number of sites across the city. Starting with its own list of opportunity sites developed over the years, NYCEDC then turned to the public with a broader invitation to provide input on new ferry service.

NYCEDC opened an online input form in September 2018 that allowed members of the public to suggest a location or neighborhood for consideration in the study. From this online portal, NYCEDC received more than 3,500 suggestions over five weeks. The sites most frequently requested generally matched the information NYCEDC gathered from in-person meetings with elected officials and community board representatives during the same period.



Met with over

90

elected officials
& community board
representatives



5

meetings
in 5 boroughs



Received over

3,500

online responses
across all boroughs



500+

miles of coastline
in NYC

PUBLIC OUTREACH AND SITE IDENTIFICATION —

Working with the city's five borough presidents, NYCEDC hosted meetings with elected officials and community board representatives along the city's waterfront to hear where they would like future NYC Ferry service. This engagement led to a better understanding of the unique characteristics, desires, and needs of each neighborhood, as well as the opportunities and constraints of suggested landing sites.

Using the input gathered from their constituents and their knowledge of ongoing and planned projects in their neighborhoods, community board representatives and elected officials voiced support for landing sites that would best serve their constituents on reference maps and National Oceanic and Atmospheric Administration (NOAA) navigational charts.



PUBLIC OUTREACH AND SITE IDENTIFICATION —

In assessing potential new landing sites, each step in the process informed the next: previous studies provided useful background information, public outreach identified potential locations for focus, site viability determined the locations that could move forward to route analysis, and route evaluation and ridership forecasts determined the routes considered for implementation. It is important to note that there are rarely specific rules that would clearly or definitively qualify or disqualify a site from consideration; this planning process attempted to take into consideration community-based feedback, technical and navigational information, and an economic evaluation to determine the routes with the highest potential for being beneficial to local commuters.

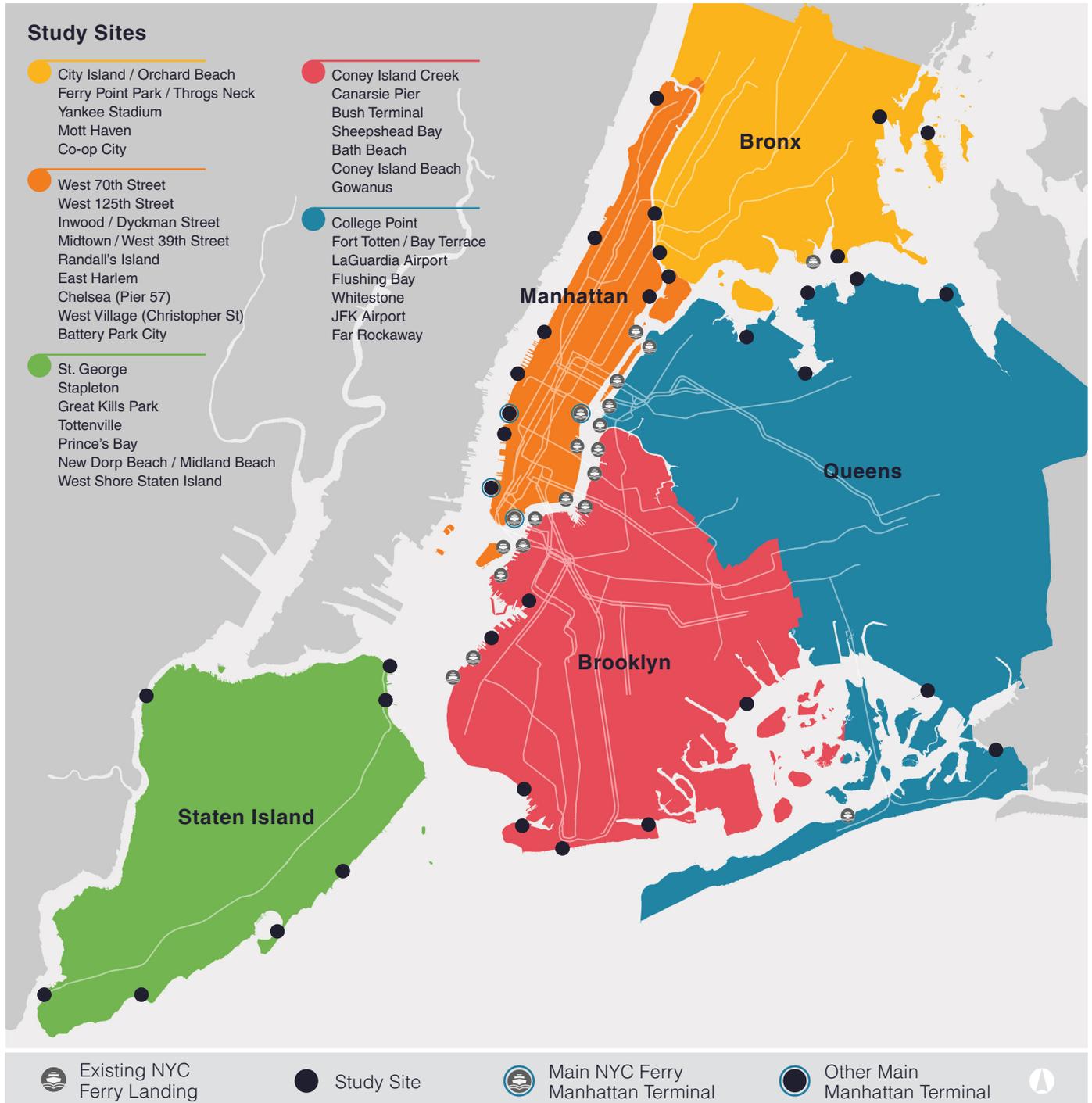
The most frequently requested sites from both the online portal and the borough meetings were included in the study list and are addressed in the remainder of this chapter.





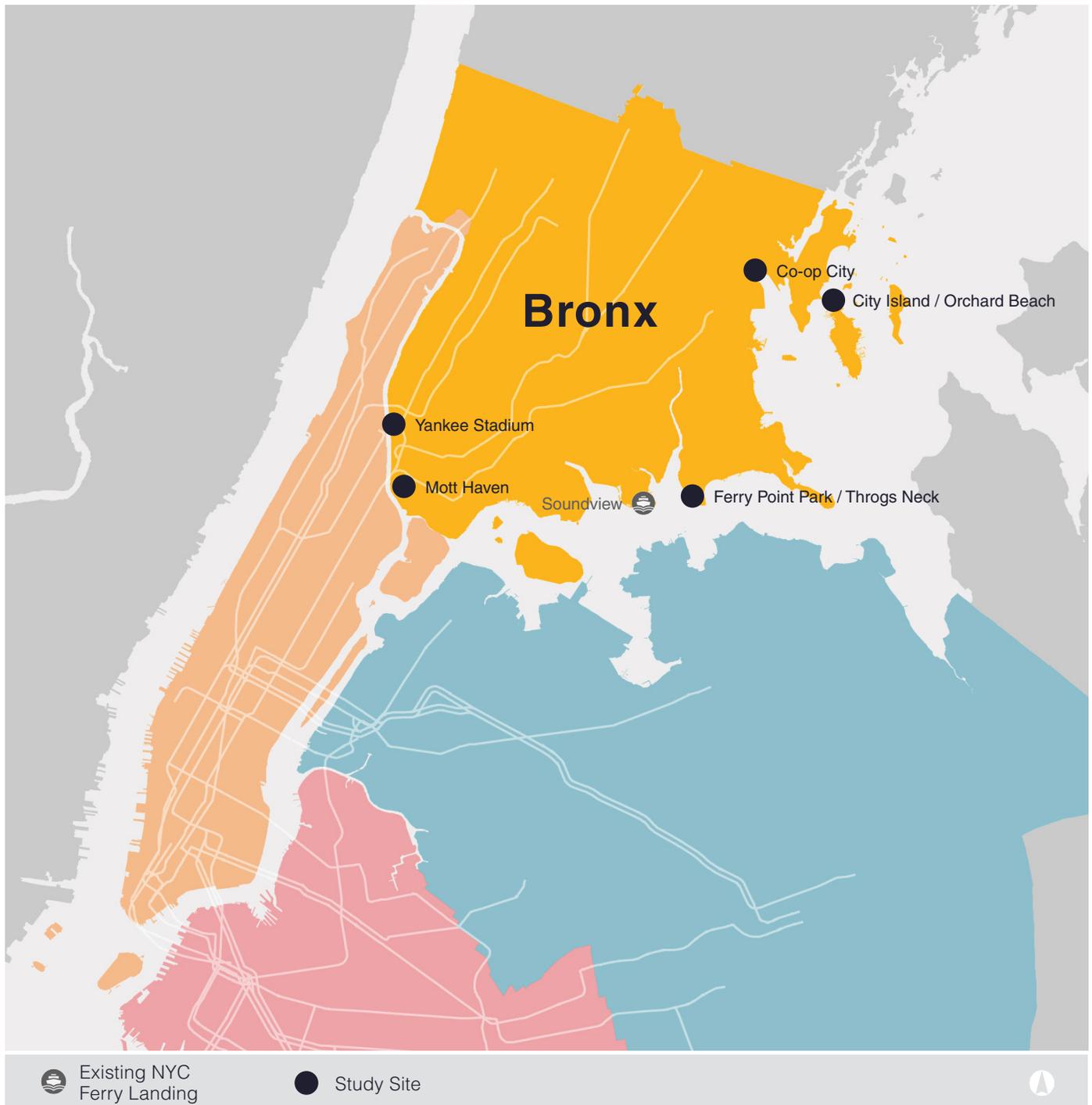
STUDY SITES

The planning team developed and mapped a full list of study sites by borough through public outreach and engagement to understand community priorities. The sites represented on the map below identify the locations most frequently requested during the public input process.



THE BRONX

Soundview, NYC Ferry's first route to the Bronx, has exceeded initial ridership projections or estimates since its launch and cut transit commute times in half for some residents. Requests for additional Bronx service were largely concentrated on the east side of the borough. Support from elected officials and members of the public led to the analysis of five Bronx areas in this study: City Island / Orchard Beach, Co-op City, Ferry Point Park / Throgs Neck peninsula, Mott Haven, and Yankee Stadium.



BROOKLYN

Building upon the existing landings along the East River within Brooklyn, the most frequent request from elected officials and community members was to extend service to southern portions of Brooklyn. Support from elected officials and members of the public led to the analysis of seven Brooklyn sites in this study: Gowanus, Bush Terminal, Bath Beach, Coney Island (creekside and oceanside), Sheepshead Bay / Manhattan Beach, and Canarsie Pier.



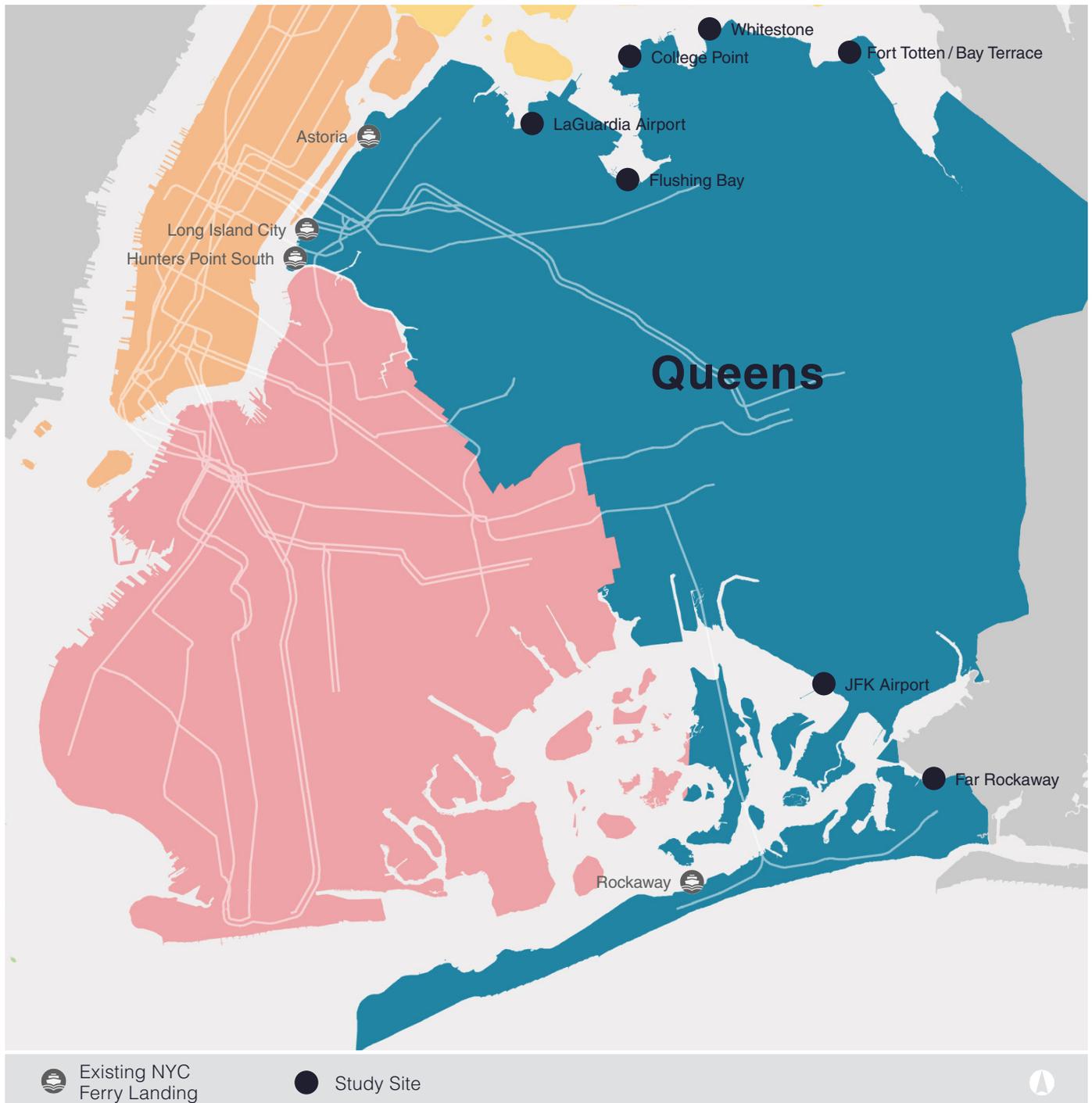
MANHATTAN

Manhattan's existing NYC Ferry routes and landings are all located along the East River. This study expanded its focus to include the west side of Manhattan along the Hudson River, as well as two sites in the northern portion of the East River. Support from elected officials and members of the public led to the analysis of seven Manhattan sites in this study: Chelsea, East Harlem, Inwood, Randall's Island, the West Village, West 70th Street, and West 125th Street. The existing commuter ferry terminals on the Hudson River at Battery Park City and Midtown / West 39th Street were also included in the study as other destination points for Lower and Midtown Manhattan. The main existing ferry terminals in Lower and Midtown Manhattan are detailed in Appendix A: Existing Ferry Terminals in NYC.



QUEENS

Current NYC Ferry landings in Queens are concentrated in the western part of the borough along the East River and in the Rockaways. Community members and elected officials requested consideration of sites in northeastern Queens: Fort Totten / Bay Terrace, Whitestone, College Point, Flushing Bay, and LaGuardia Airport. Seven sites were analyzed in total, the five from northeast Queens, plus Far Rockaway and at JFK Airport in Jamaica Bay.



STATEN ISLAND

NYC Ferry does not currently connect with Staten Island, and apart from the Staten Island Ferry (operated by the New York City Department of Transportation), many Staten Island communities have limited transit options and long travel times to Manhattan. Support from elected officials and members of the public led to the analysis of seven Staten Island sites and geographic areas in this study: Great Kills Park, St. George, Stapleton, Tottenville, the West Shore, Prince's Bay, and New Dorp Beach / Midland Beach.



SITE ASSESSMENT

4

After gathering the list of 35 sites to consider, the planning team evaluated the sites to assess their potential for successful integration into the NYC Ferry system. The team also revisited some sites analyzed in previous NYCEDC ferry studies, to assess any changes in growth patterns or community needs. This chapter includes a summary of these findings, while Appendices B and C provide the detailed profile for each site reviewed.

STUDY SITES

The Bronx

- City Island / Orchard Beach
- Ferry Point Park / Throgs Neck
- Yankee Stadium
- Mott Haven
- Co-op City

Queens

- College Point
- Fort Totten / Bay Terrace
- LaGuardia Airport
- Flushing Bay
- Whitestone
- JFK Airport
- Far Rockaway

Manhattan

- West 70th Street
- West 125th Street
- Inwood / Dyckman Street
- Randall's Island
- East Harlem
- Chelsea (Pier 57)
- West Village (Christopher St)
- Battery Park City
- Midtown / West 39th Street

Staten Island

- St. George
- Stapleton
- Great Kills Park
- Tottenville
- Prince's Bay
- New Dorp Beach / Midland Beach
- West Shore Staten Island

Brooklyn

- Coney Island Creek
- Canarsie Pier
- Bush Terminal
- Sheepshead Bay
- Bath Beach
- Coney Island Beach
- Gowanus

STAGE 1

The planning team screened **35** sites for physical limitations and environmental factors that could limit safe passage of a vessel and would be difficult to overcome. Insufficient water depths and low clearance bridge are examples of major physical limitations that resulted in nine sites being screened out at this stage.

Coney Island Beach, Gowanus, Far Rockaway, JFK Airport, Co-op City, the sites on the south and east shores of Staten Island (except Great Kills Park), and the west shore of Staten Island each had physical or operational challenges that made it dangerous or infeasible to provide ferry service at these locations. More details about these sites and their limitations can be found in Appendix B. Following the Stage 1 assessment, the planning team moved 26 sites forward to Stage 2.

SITE ASSESSMENT

A multi-step ferry transportation study assesses many factors to identify a potential landing site. The planning team used a screening process to determine which sites advanced to route profile development.

STAGE 2

The planning team carried **26** sites forward to the next stage, which included review of several factors that are key to a successful ferry service. These factors indicate if there would be fundamental demand from the surrounding neighborhood for regular ferry service and a reason for riders to choose ferries over their current transit option.

Neighborhoods with limited transit options or current commutes that require multiple transfers to reach the central business districts (CBDs) in Manhattan have the potential for ridership if the ferry trip time is shorter or offers other conveniences. Study sites were evaluated based on the existing transit options in the neighborhood, whether ferry service would provide faster access to Manhattan's CBDs, and the physical feasibility of constructing a landing in that area. Specific factors include:

Site conditions

Physical attributes, upland access, adjacent uses, and property ownership

Navigational considerations

Water depths, bridge clearance heights, adequate area for vessels to maneuver, and knowledge of underwater obstructions

Potential for ridership

Number of people traveling to and from the study area based on population and employment density, as well as commuter and recreational travel patterns

Travel time

Sailing time for a potential ferry route and existing transit time in the study area

Terminal Infrastructure needs

Capital cost estimates, permitting and planning requirements, approvals, and timeframe

Neighborhood characteristics

Residential density, transit options, other attractions near the site, and likely access mode to the ferry site (walk, bike, drive/park, etc.)

Planned growth

Development projects in the vicinity of the study site

Based on how the study sites met these criteria, the study team moved sites with more potential for success into route pairings. The factors that contributed to study sites screened out in this stage are in the following table, and site profiles summarizing the findings are included in Appendix C.

SITE ASSESSMENT

Table of Sites Screened out in Stage 2

	Ferry similar or slower than existing transit to Manhattan	Relatively good existing transit provision	Potential navigational, constructibility or upland concerns	Low number of people living within a 10 minute walk of landing	Lower number of commuters to Manhattan	Overall expectation of low ridership
City Island / Orchard Beach			● *	● *	●	●
Yankee Stadium	●	●				●
Canarsie Pier	●	●	●	●		●
Bush Terminal		●			●	●
Sheepshead Bay	●				●	●
West 125th Street	●	●				●
Inwood / Dyckman Street	●	●				●
Randall's Island				●	●	●
East Harlem	●	●				●
West Village (Christopher Street)	●	●				●
Fort Totten / Bay Terrace			●	●	●	●
LaGuardia Airport	●	●	●	●		●
Flushing Bay	●	●	●	●		●
Whitestone			●		●	●
Tottenville	●		●		●	●

* only applies to Orchard Beach

STAGE 3

11 sites with potential to provide a faster commute to the primary job centers in Manhattan from neighborhoods with limited transit options and without insurmountable physical or navigational challenges moved forward to be tested in new or modified route configurations. These sites included:

- Ferry Point Park / Throgs Neck (Bronx)
- Coney Island Creek (Brooklyn)
- Bath Beach (Brooklyn)
- West 70th Street (Manhattan)
- Chelsea (Manhattan)
- Battery Park City (Manhattan)
- Midtown / West 39th Street (Manhattan)
- College Point (Queens)
- St. George (Staten Island)
- Stapleton (Staten Island)
- Great Kills Park (Staten Island)

Site Assessment Findings

	STAGE 1	STAGE 2	STAGE 3	STUDY SITES FOR ROUTE EVALUATION
THE BRONX	City Island / Orchard Beach	City Island / Orchard Beach		The Ferry Point Park / Throgs Neck area has limited transit options. A ferry would provide another transit option with competitive travel times to Lower and Midtown Manhattan for neighboring communities.
	Ferry Point Park / Throgs Neck	Ferry Point Park / Throgs Neck	Ferry Point Park / Throgs Neck	
	Yankee Stadium	Yankee Stadium		
	Mott Haven			
	Co-op City			
BROOKLYN	Coney Island Creek	Coney Island Creek	Coney Island Creek	<p>Coney Island Creek could provide a faster transit alternative to Manhattan for the local community in an isolated part of the peninsula.</p> <p>A ferry landing at Bath Beach could provide the adjacent neighborhoods with more transit options when traveling to Lower and Midtown Manhattan.</p>
	Canarsie Pier	Canarsie Pier		
	Bush Terminal	Bush Terminal		
	Sheepshead Bay	Sheepshead Bay		
	Bath Beach	Bath Beach	Bath Beach	
	Coney Island Beach			
	Gowanus			
MANHATTAN	West 70th Street	West 70th Street	West 70th Street	<p>The West 70th Street site is adjacent to high-density residential buildings, offering an alternative to the subway to Lower and Midtown Manhattan.</p> <p>Chelsea could provide another transit option to an area experiencing rapid growth. Pier 57 is currently being redeveloped as commercial space, and a ferry landing could provide access to jobs at this location. This site is also within walking distance of the popular High Line Park.</p> <p>Battery Park City and Midtown / West 39th Street are existing ferry terminals that connect to jobs in Lower and Midtown Manhattan on the west side.</p>
	West 125th Street	West 125th Street		
	Inwood / Dyckman Street	Inwood / Dyckman Street		
	Randall's Island	Randall's Island		
	East Harlem	East Harlem		
	Chelsea (Pier 57)	Chelsea (Pier 57)	Chelsea (Pier 57)	
	West Village (Christopher Street)	West Village (Christopher Street)		
	Battery Park City	Battery Park City	Battery Park City	
	Midtown / West 39th Street	Midtown / West 39th Street	Midtown / West 39th Street	
QUEENS	College Point	College Point	College Point	A ferry from College Point could provide a faster trip to Lower and Midtown Manhattan for communities adjacent to the landing in another isolated part of the city with fewer public transit options.
	Fort Totten / Bay Terrace	Fort Totten / Bay Terrace		
	LaGuardia Airport	LaGuardia Airport		
	Flushing Bay	Flushing Bay		
	Whitestone	Whitestone		
	JFK Airport			
	Far Rockaway			
STATEN ISLAND	St. George	St. George	St. George	<p>St. George Ferry Terminal is a multimodal hub that connects all of Staten Island to Manhattan via the Staten Island Ferry. NYC Ferry could provide travel time savings for passengers traveling to the west side of Lower Manhattan or Midtown Manhattan.</p> <p>A landing in Stapleton could provide a faster alternative for those in the neighborhood traveling to Manhattan. The site offers a connection to the Staten Island Railroad and proximity to the New Stapleton Waterfront development.</p> <p>A landing at Great Kills Park could provide a faster trip for neighborhoods within a short driving distance of the park.</p>
	Stapleton	Stapleton	Stapleton	
	Great Kills Park	Great Kills Park	Great Kills Park	
	Tottenville	Tottenville		
	New Dorp Beach / Midland Beach			
	Prince's Bay			
	West Shore			

ROUTE DEVELOPMENT AND EVALUATION

5

The planning team grouped sites with higher ridership potential into geographic regions to identify potential new routes or additions to existing routes nearby. Once route options were developed, the next step in evaluating the potential for new or modified routes was to develop profiles for route configurations and forecast ridership demand.

GEOGRAPHIC REGIONS

The planning team took the sites with the highest potential and combined them into routes to test, grouped into three geographic regions:

Staten Island – Hudson River

The Staten Island – Hudson River region covers routes to and from Staten Island as well as along the Hudson River. To avoid duplicating the service from Staten Island to Wall Street / Pier 11 that exists with the Staten Island Ferry Whitehall Terminal, as well as to explore routes on the west side of Manhattan, Battery Park City was assumed to be the main Lower Manhattan ferry terminal. Midtown / West 39th Street was assumed as the main Midtown Manhattan terminal.

Southern Brooklyn

The Southern Brooklyn region covers new landings in Brooklyn that are south and east of the current Bay Ridge landing. These routes assumed Wall Street / Pier 11 as the main Manhattan terminal.

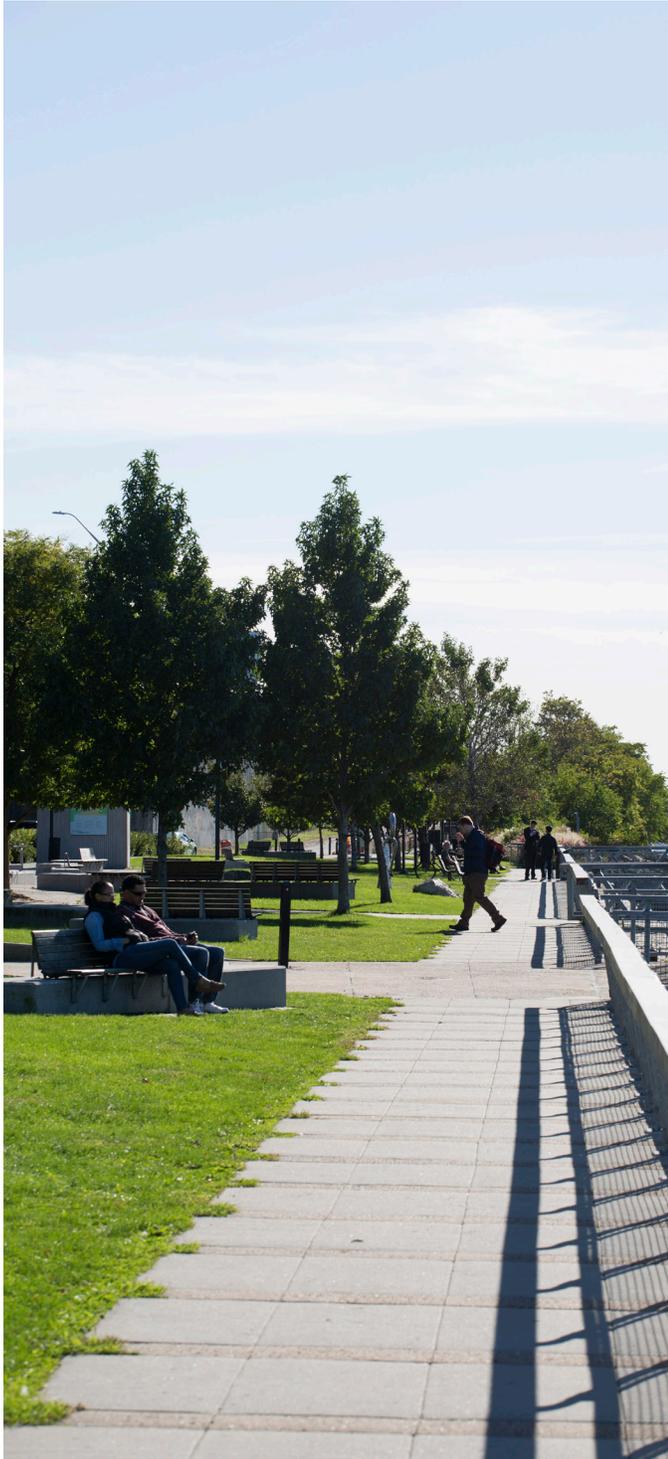
Upper East River

The Upper East River region covers sites in northern Queens and the eastern side of the Bronx. Based on geographic location and travel time, Wall Street / Pier 11 was chosen as the main Lower Manhattan ferry terminal and East 34th Street was chosen for the main Midtown Manhattan terminal.



ROUTE DEVELOPMENT AND EVALUATION

The characteristics that define a route are interrelated and interconnected, with a change in one aspect typically affecting one or more of the others. For example, if sailing frequencies changed, the number of vessels needed to deliver service, ridership demand forecasting, and the operating costs would shift to correspond with the adjusted route.



ROUTE DEVELOPMENT

For each region, the planning team developed several route profiles to test, compare, and evaluate. The route combinations adhered to current NYC Ferry route policies, such as the number of sailings per hour in peak periods and daily, year-round service. Each route profile included the following properties:

Level of service

Number of hours of service varying by day of the week and season.

Route travel times

Distance traveled and vessel speeds between each potential landing site, along with dwell time needed for passenger loading and unloading.

Frequency

How often a ferry would depart from the potential landing site.

Number of vessels

Number of vessels necessary to deliver desired route sailing frequency given total trip time. Service that is more frequent or a route that has high peak ridership could require more vessels to meet the demand.

ROUTE DEVELOPMENT AND EVALUATION

ROUTE EVALUATION

The route profiles provided the number of stops along a route, the frequency of service, the number of required vessels, and the annual operating hours required for that service. These characteristics in turn informed ridership demand forecasting and cost estimates, which fed into the evaluation of the routes:

Ridership

Demand modeling to determine how many people might shift from their current transportation mode (bus, subway, car, etc.) to a ferry for work trips to Lower or Midtown Manhattan. Appendix D contains more details on the technical approach, assumptions, and findings. The ridership model incorporates variables such as:

Travel patterns to Manhattan

The number of people traveling from the potential ferry landing to areas of Manhattan and the purpose of their trips.

Current transit options and cost

Available transit, frequency and cost of the trip for people traveling to Manhattan.

Forecast growth

Projected housing and commercial growth near the potential ferry landing.

Travel time competitiveness

Compared to existing transit, whether the ferry route saves commuters time to reach their destinations.

Capital costs

The number of vessels and landings required to provide a peak service frequency aligned with the current NYC Ferry system, and the landing infrastructure required for ferry service.

Operating costs

Operating costs based on the projected service hours and operating hours of the vessels needed for that route.

Implementation time

The time necessary to implement a new route including design, permitting, and construction, as well as the needed vessel acquisition timeline.

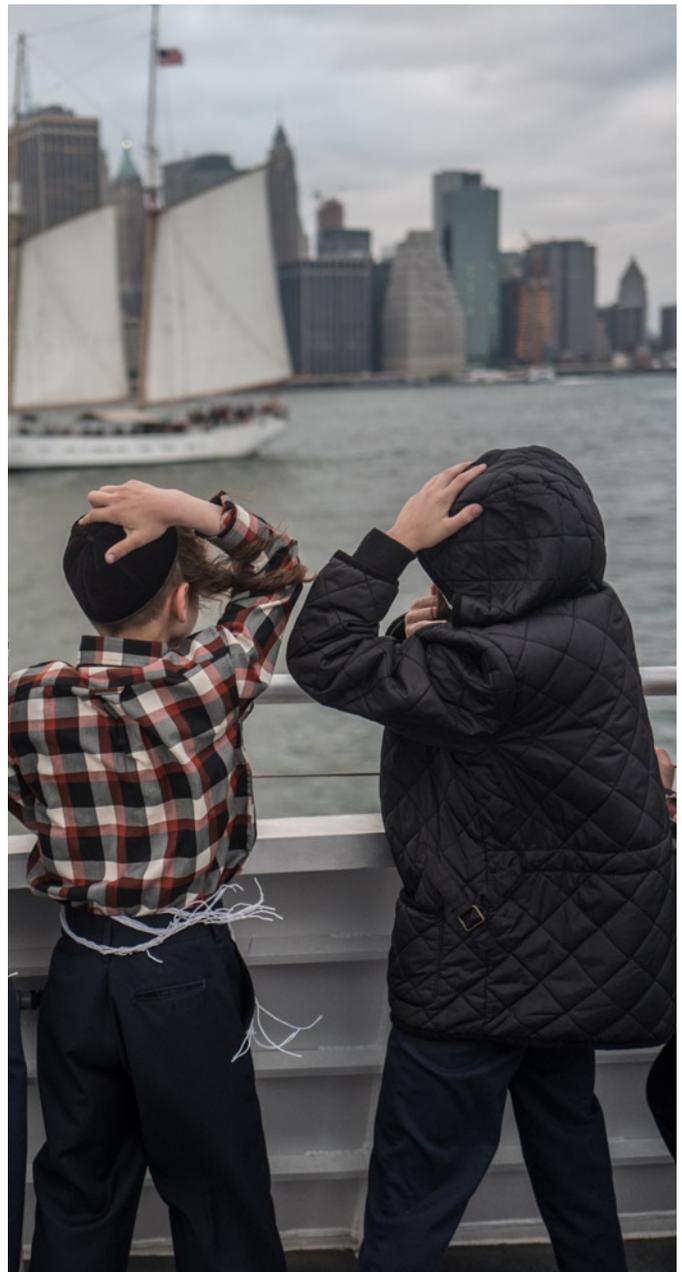
Community benefits

Community interest and opportunities a ferry would provide the neighborhood.

Challenges

Level of risk tied to a specific route associated with potential operational challenges.

The summaries of the route findings for each region are in Chapter 6: Route Findings.





ROUTE FINDINGS

6

The route findings were a culmination of efforts—from the initial community input and data gathered for the site profiles, to the ridership projections and cost estimates that accompanied each route configuration. Each step in the process provided the planning team with information to assess the viability of potential routes. The site combinations reviewed for each region included:

STATEN ISLAND – HUDSON RIVER

- St. George > Battery Park City > Midtown / West 39th Street
- Stapleton > Battery Park City > Midtown / West 39th Street
- St. George > Battery Park City > Midtown / West 39th Street > West 70th Street
- St. George > Battery Park City > Chelsea (Pier 57) > Midtown / West 39th Street
- Great Kills > Battery Park City > Midtown / West 39th Street

SOUTHERN BROOKLYN

The route combination explored for the Southern Brooklyn route included the Coney Island Creek and Bath Beach landing sites. Routes variations tested by the planning team include:

- Coney Island Creek > Bay Ridge > Wall Street / Pier 11
- Coney Island Creek > Bath Beach > Bay Ridge > Wall Street / Pier 11

UPPER EAST RIVER

Sites within the Upper East River region included Ferry Point Park / Throgs Neck and College Point. Based on proximity to the existing Soundview route, the study team evaluated these sites as possible additions to the Soundview route. The routes evaluated include:

- Ferry Point Park / Throgs Neck > Soundview > East 90th Street > East 34th Street > Wall Street / Pier 11
- College Point > Soundview > East 90th Street > East 34th Street > Wall Street / Pier 11



STATEN ISLAND – HUDSON RIVER

New Yorkers have expressed consistent interest in another ferry route from Staten Island to Manhattan and along the Hudson River. For many people in Staten Island, NYC Ferry could provide a faster alternative to current transportation options to other areas like Midtown Manhattan. Along the Hudson River, many Manhattan neighborhoods have good access to the subway, but a ferry would provide an additional means of transportation.

The planning team looked at five route combinations for the Staten Island – Hudson River region, with each including a stop at Lower Manhattan (Battery Park City) and Midtown Manhattan (Midtown / West 39th Street). Routes from Staten Island have higher projected ridership estimates than other routes forecast in this study. The route combinations evaluated for the Staten Island-Hudson River region included:

SI-A: St. George > Battery Park City > Midtown / West 39th Street

SI-B: Stapleton > Battery Park City > Midtown / West 39th Street

SI-C: St. George > Battery Park City > Midtown / West 39th Street > West 70th Street

SI-D: St. George > Battery Park City > Chelsea (Pier 57) > Midtown / West 39th Street

SI-E: Great Kills > Battery Park City > Midtown / West 39th Street



STATEN ISLAND – HUDSON RIVER

Of the route variations considered, SI-A has high projected ridership, and would save commuters travel time (compared to current transit). Given that it connects with existing ferry terminals, the implementation timeframe for this route is among the quickest. A Stapleton route (SI-B) could provide travel time savings over existing transit, but this route is projected to have fewer riders than a route from St. George. Routes with additional stops in Manhattan (options SI-C and SI-D) entail higher capital costs and higher annual operating costs, with less benefit per projected rider when compared to option SI-A. A ferry route from Great Kills (SI-E) would have the least amount of ridership of the options tested, require more capital investment compared to a route from St. George, and have very high operating costs due to the long distance. The following table provides a summary of the route characteristics for the five routes evaluated.

	Ridership	Travel Time Savings	Vessels Required	Capital Cost	Operating Cost	Community Benefits	Challenges
SI - A	~2.0 M	~20 min	4	\$44 M	\$13 M	<ul style="list-style-type: none"> Faster transit option to Midtown 	<ul style="list-style-type: none"> Requires agreement with NYCDOT, NYWW, PANYNJ
SI - B	~1.5 M	~30 min	4	\$54 M	\$13 M	<ul style="list-style-type: none"> Connects to new development 	<ul style="list-style-type: none"> Exposure to weather, lack of transit connectivity/parking Requires agreement with NYWW, PANYNJ
SI - C	~2.0 M	~20 min	5	\$62 M	\$14 M	<ul style="list-style-type: none"> Another transit option along Hudson 	<ul style="list-style-type: none"> Limited ridership increase compared to SI-A Requires agreement with NYCDOT, NYWW, PANYNJ
SI - D	~1.8 M	~20 min	5	\$62 M	\$14 M	<ul style="list-style-type: none"> Connects future development at Chelsea 	<ul style="list-style-type: none"> Less ridership than SI-A Requires agreement with NYCDOT, NYWW, PANYNJ
SI - E	~0.5 M	~10 min	6	\$50 M	\$13 M*	<ul style="list-style-type: none"> Provides mid-Staten Island transit option 	<ul style="list-style-type: none"> Lowest ridership route, driving access time into Great Kills Park challenging Requires agreement with NPS, NYWW, PANYNJ

Notes

Ridership is the estimated annual ridership based on level of service

Travel time savings is estimated average travel time savings potential to Lower and Midtown Manhattan

Number of vessels required includes one spare vessel

Capital costs are estimated based on rough order of magnitude and estimated in 2018 dollars

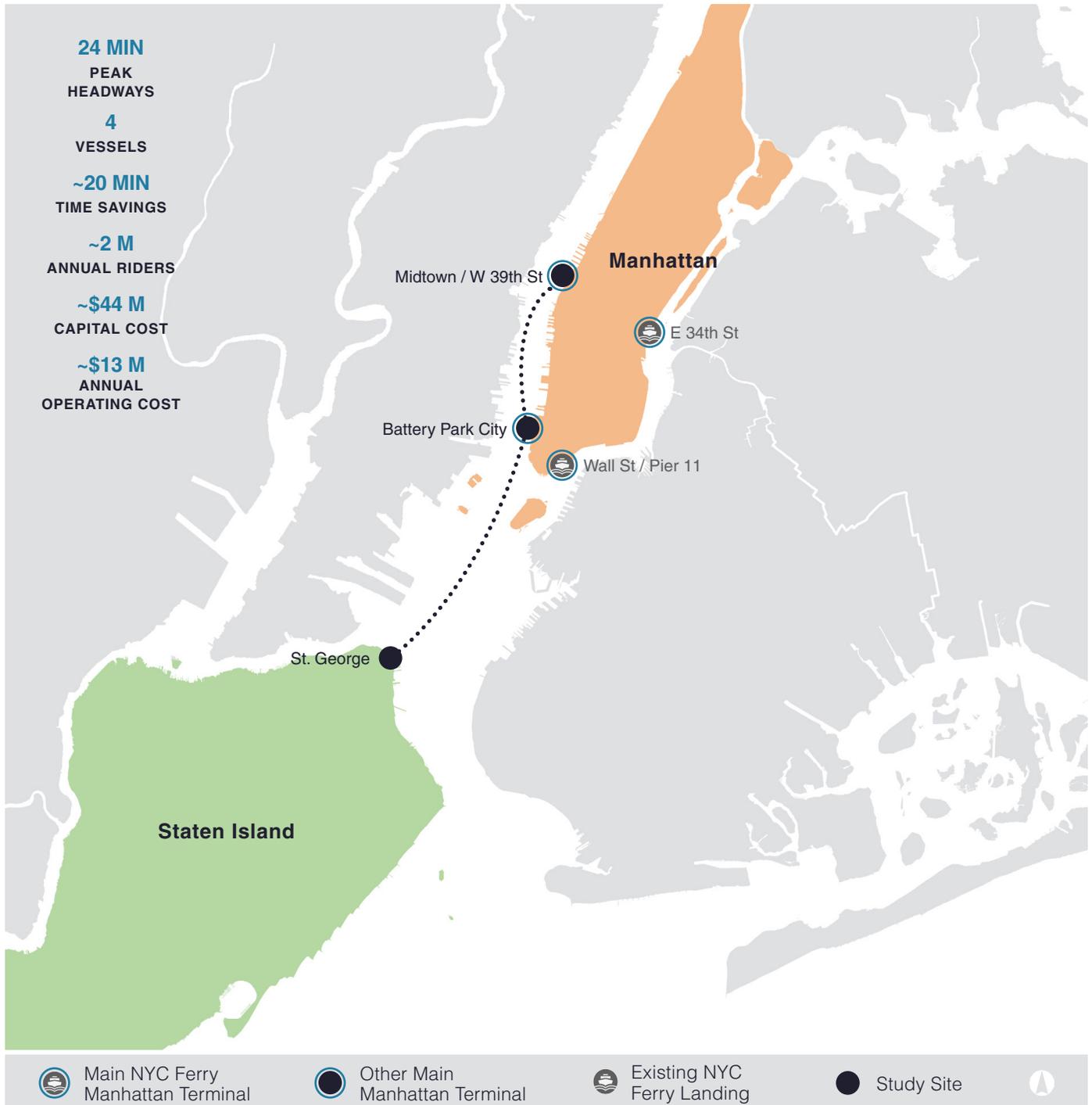
Operating costs would occur annually and estimates are presented in 2018 dollars

*Despite operating more vessels, operating costs are similar to other routes due to operating smaller vessels.

STATEN ISLAND – HUDSON RIVER

The St. George > Battery Park City > Midtown / West 39th Street route is projected to serve the most people for the lowest operating costs of the Staten Island – Hudson River routes. The St. George Ferry Terminal provides transit connections from all areas of Staten Island and could provide a travel time savings for people traveling to Lower and Midtown Manhattan.

St. George > Battery Park City > Midtown / West 39th Street



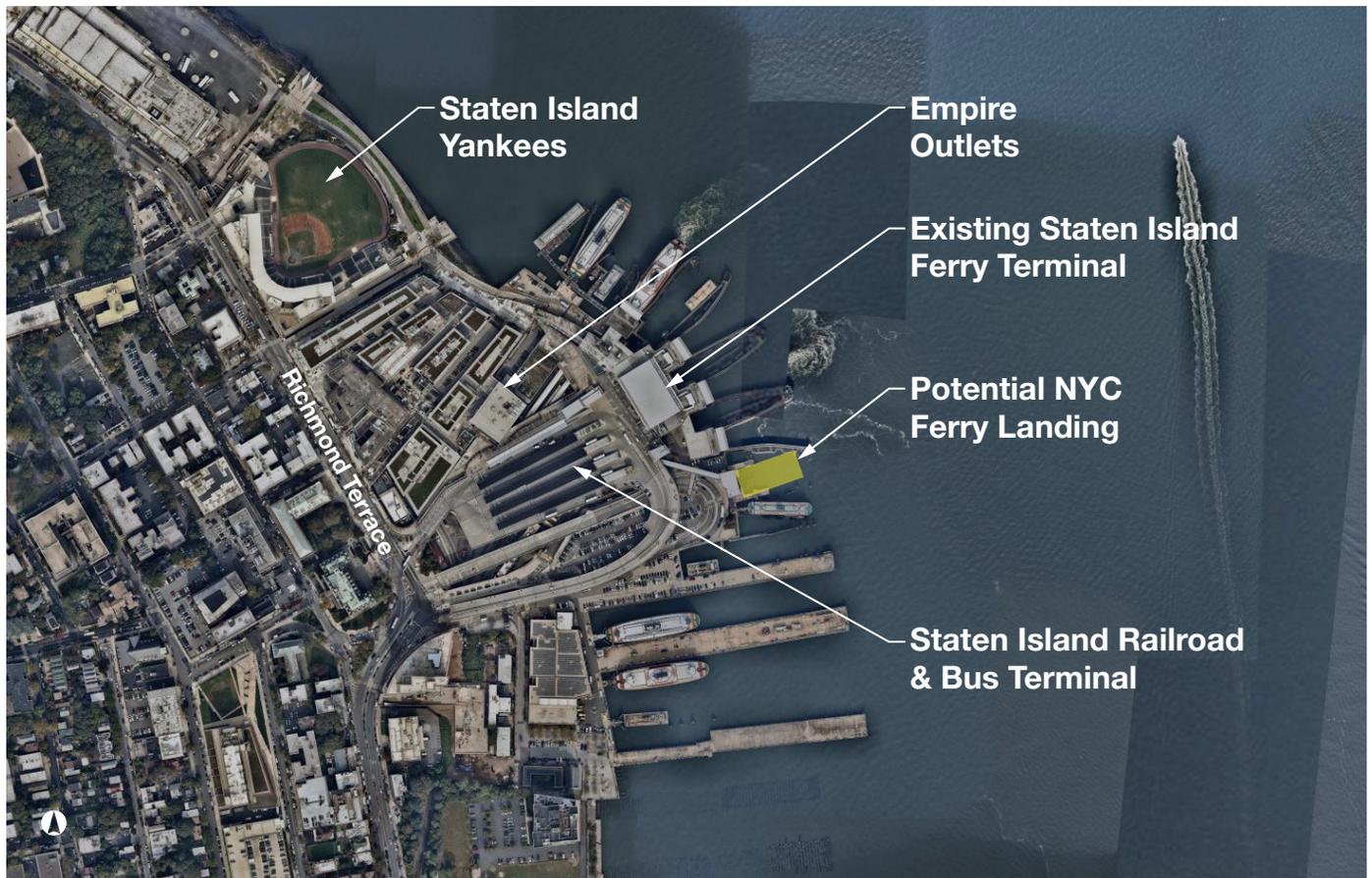
STATEN ISLAND – HUDSON RIVER

CAPITAL INVESTMENTS

New Terminal Facilities

Facility improvements would be required at St. George that include installing a barge in an existing ferry slip (Slip 7). Other required improvements include passenger waiting and queuing space, security integration, signage, wayfinding, and ticketing facilities.

St. George Ferry Terminal



Vessels

Based upon the ridership demand forecast, 350-passenger-capacity vessels would be required to meet demand. Peak times of year may require additional vessel service.

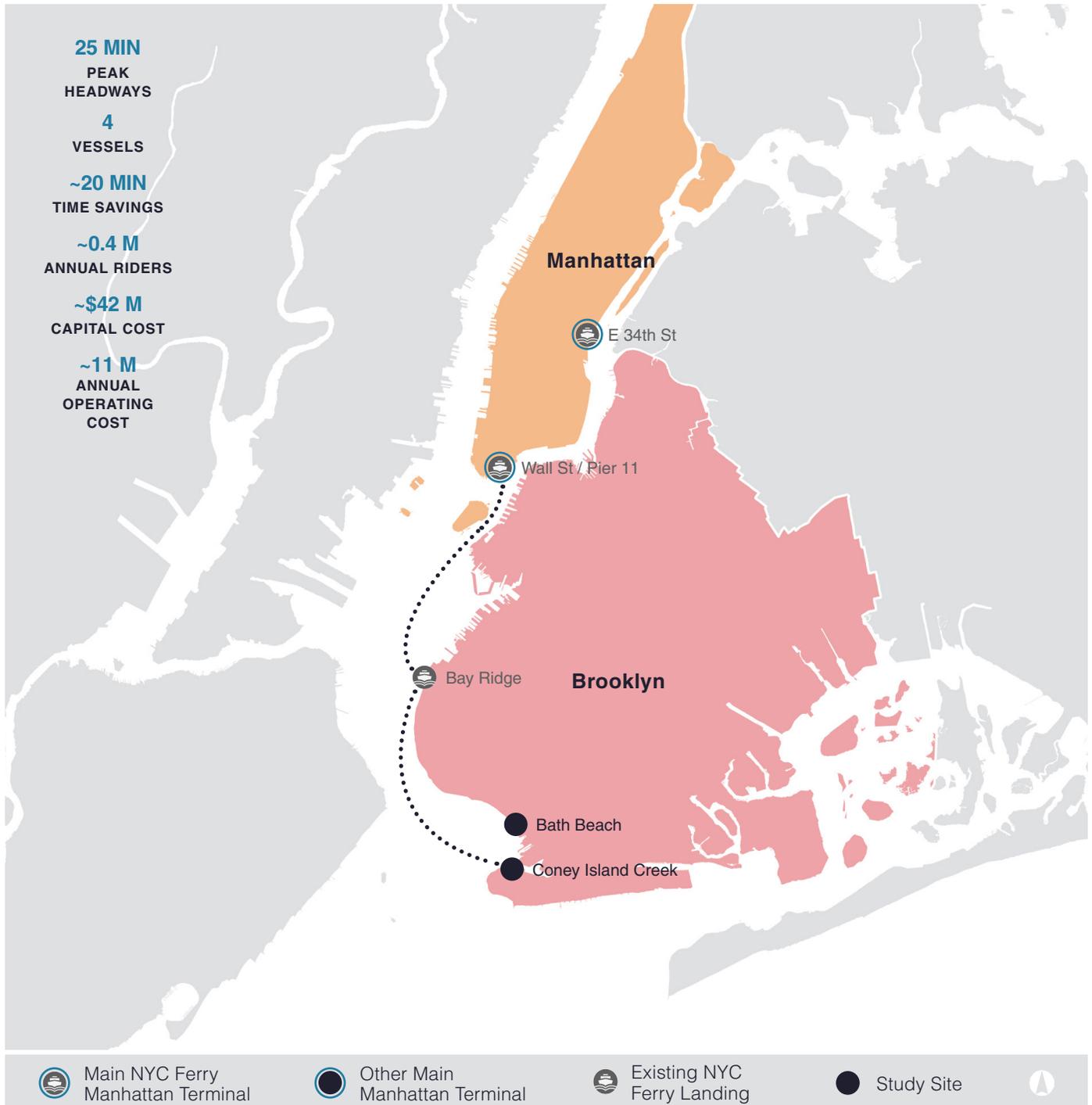
IMPLEMENTATION CONSIDERATIONS

Prior to implementing service, NYC Ferry would have to execute an operating agreement with NYCDOT to gain access to the St. George terminal. Additionally, NYC Ferry currently does not operate from the Battery Park City or Midtown / West 39th Street terminals, and agreements with New York Waterway and the Port Authority of New York and New Jersey would be required. In-water infrastructure and upland improvements would need to be designed, permitted, and constructed prior to implementation.

SOUTHERN BROOKLYN

Of Brooklyn study sites, Coney Island Creek and Bath Beach were carried forward to route profile development. A Coney Island route via Bay Ridge could provide another transportation option supporting resiliency and redundancy in the network as well as improving access to economic opportunities around New York City. A variation of this route added Bath Beach as well, but the time travel savings for that site on this route was less competitive with existing transit, and weather exposure at this site added to concerns over safe and reliable service.

Coney Island Creek > Bay Ridge > Wall St / Pier 11



SOUTHERN BROOKLYN

CONEY ISLAND CREEK > BAY RIDGE > WALL STREET / PIER 11

A Coney Island Creek route could offer significant travel time savings to the Coney Island community, with a 35 minute ferry ride to lower Manhattan. This landing would serve approximately 7,000 residents within a half mile area, including 4,000 NYCHA residents.

If the existing Bay Ridge stop moved from the South Brooklyn to the Coney Island route, Bay Ridge riders would enjoy an even faster (15-minute) trip directly to Wall Street / Pier 11. Coupled with this change is an opportunity to further modify the existing South Brooklyn route, shortening the number of landings by removing Bay Ridge and DUMBO (which is well-served by the East River route). These modifications would reduce the travel times for all passengers traveling on the South Brooklyn route to Lower Manhattan, smooth out operations at DUMBO (one of the most congested landings), and reduce operational expenses on the South Brooklyn route.

Challenges

- Shifting sands and potential dredging for reliable waterside access

Community Benefits

- Improves transit options

CAPITAL INVESTMENTS

Coney Island Creek Site

Potential landing sites at Coney Island Creek have challenges with distribution of sand to the west of the sandspit and the width of entry to the creek. Both present operational risks that will need careful consideration to mitigate during any design and planning phase.



Vessels

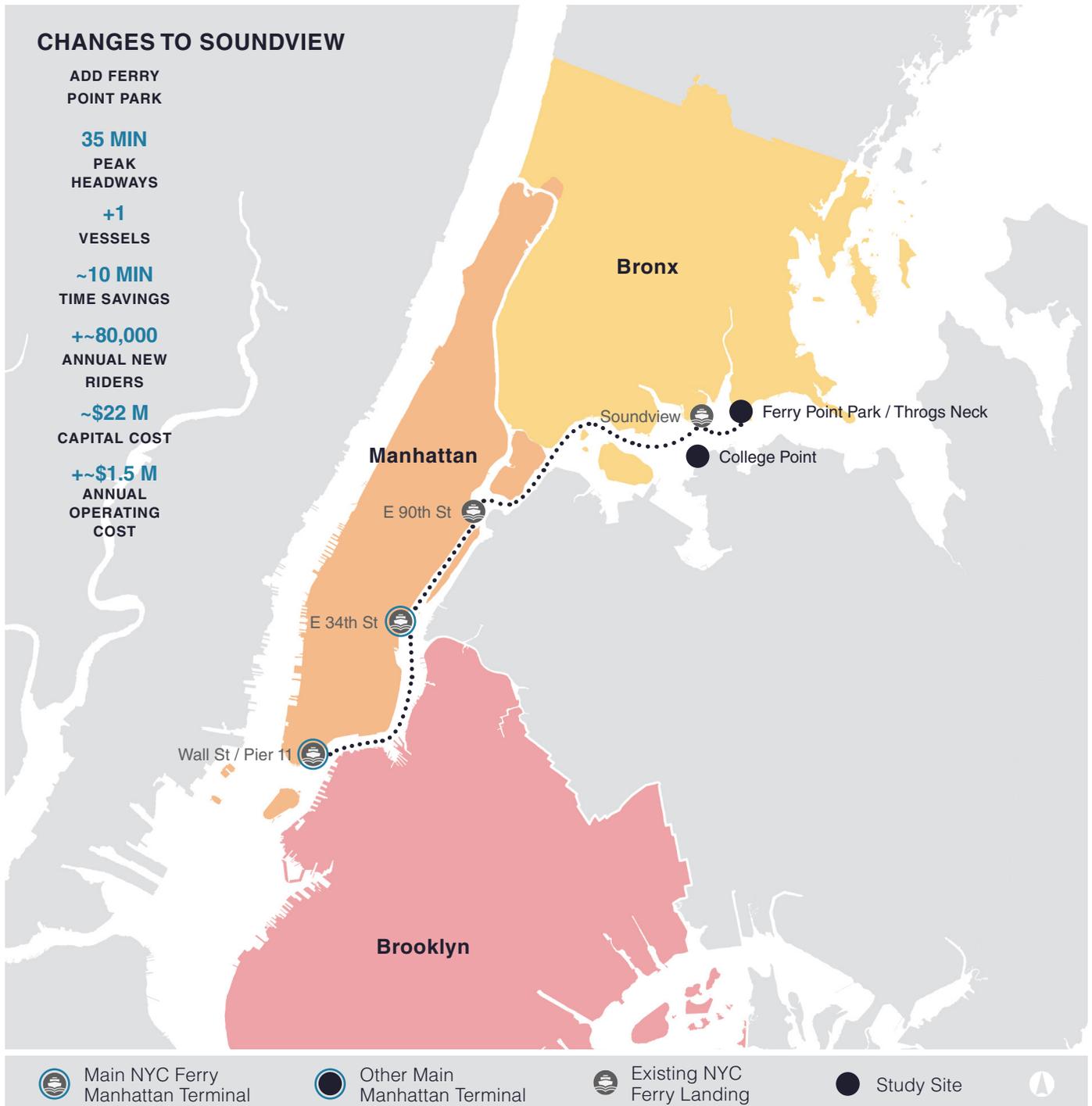
Based on the ridership demand forecast, 150-passenger vessels would likely be sufficient to meet demand for most times of the year. Summer weekends may bring an increase in recreational trips and larger vessels may be needed on occasion.

IMPLEMENTATION CONSIDERATIONS

A landing at Coney Island Creek presents operational risks and is a challenge to design, likely requiring higher maintenance costs due to the dynamic coastal environment. Careful design and planning are required to determine the exact siting during an implementation stage.

UPPER EAST RIVER

Building off the success of the Soundview and Astoria routes, communities in the Bronx and northern Queens have requested additional sites to serve their neighborhoods. Many people commuting from the Bronx and northern Queens experience long transit times to Manhattan. A ferry would provide another option to reach these communities, support economic growth, and provide travel time savings. The two sites that were most feasible from a physical and ridership perspective were Ferry Point Park / Throgs Neck in the Bronx and College Point in Queens. Due to the proximity to the existing Soundview landing, the planning team assessed these sites as modifications to the Soundview route.



UPPER EAST RIVER

SOUNDVIEW ROUTE MODIFICATION OPTIONS

The addition of either Ferry Point Park / Throgs Neck or College Point would not change the travel time for passengers from Soundview to Manhattan. The operating costs are similar at either location. College Point would need a longer ~400-foot pier (and therefore likely higher capital investment) to construct a landing with sufficient water depths. Projected annual ridership from Ferry Point Park is nearly 10,000 more than projections for College Point. Ferry Point Park / Throgs Neck was also the most requested site for study from the Bronx during the public engagement process.

Based on the limited parking options, and water depth challenges, at College Point, the Ferry Point Park / Throgs Neck addition to the Soundview route is preferable from a planning perspective.

FERRY POINT PARK / THROGS NECK

Challenges

- No residential units within walking distance, and requires park-and-ride with an approximate 1/3 mile walk through the park from the parking lot to the landing site

Community Benefits

- Another transit option for the Bronx

CAPITAL INVESTMENTS

Ferry Point Park / Throgs Neck

Ferry Point Park was reviewed as the potential landing site. There is currently no ferry infrastructure in Ferry Point Park and facilities would need to be constructed. The landing would be a short walk from the parking area.



Vessels

Based on the ridership demand forecast, one additional vessel added to the existing Soundview route would likely be sufficient to meet demand for most travel periods.

IMPLEMENTATION CONSIDERATIONS

Either site would require an agreement with the Department of Parks and Recreation. Ferry Point Park would require improvements to pathways in the park and improvements to the parking area to support commuter parking. Additionally, the in-water infrastructure and upland improvements would need to be designed, permitted and constructed prior to implementation.



This feasibility study provides options for service expansion in the near term along with capital investments anticipated for those possibilities. However, prior to the expansion of NYC Ferry service, operational impacts of new service on existing terminal infrastructure, the existing fleet, and maintenance capabilities should be considered to ensure that NYC Ferry continues to provide safe, reliable service to its riders.

In the future, other important factors, such as closer assimilation into the MTA ticketing system and advancement of local urban development and revitalization projects, could improve the viability of some landing sites. Changes to ticketing could simplify the way passengers move between other transit and NYC Ferry. Additionally, planned projects along the waterfront could generate jobs and population growth that could increase demand for ferry service. In considering future route modifications, particular consideration should be given to emerging job clusters, including in the northern portion of Sunset Park where the Made in New York Campus is currently under development. In the event that service to the northern part of Sunset Park is established, it would likely be as a substitute for some service currently provided to the neighborhood at Brooklyn Army Terminal, to ensure the widest possible service coverage for residents and riders.

The following sections provide the next steps to assess the operational impacts of new routes prior to implementation, as well as future considerations for NYC Ferry.

SYSTEM-WIDE OPTIMIZATION

Similar to many transit modes, expansion of ferry service is not as simple as bringing on more vessels and improving or constructing a terminal. Prior to implementation, there are many operational factors to consider for the system as a whole, such as the number and size of vessels in the fleet and the capacity and configuration of terminal and maintenance infrastructure.

If a decision is made to expand current NYC Ferry service, service implementation planning is the next step. This planning provides an opportunity for system-wide optimization and resource planning for the fleet, landing site infrastructure, and operations to ensure safe and reliable service.

FLEET SIZE AND CONFIGURATION

Each ferry route is unique and serviced by vessels with characteristics that enable safe and reliable service that meets the desired schedule. While each route is unique, the ferry service is a system—treated holistically. This feasibility study provides a high-level estimate of the number of vessels needed to deliver service, but it is important to consider the optimum fleet composition for NYC Ferry as a whole. Assessing the optimum fleet composition requires a comprehensive analysis of the current fleet, anticipated frequency of service, projected ridership demand, and route conditions of new service to “right-size” the vessels for route demands, and performance expectations.

FERRY SYSTEM INFRASTRUCTURE

Terminal infrastructure plays a large role in the accessibility of passengers to and from the facility and the ability for vessels to load and unload passengers efficiently. As a result, terminal infrastructure is key to NYC Ferry maintaining a reliable service schedule. Some current NYC Ferry terminals at Wall Street / Pier 11, East 34th Street, and DUMBO already experience capacity challenges, which can lead to delays in service that often trickle throughout the day. Service expansion to these sites in particular should be reviewed to maintain reliable service. Ongoing review should focus on the assessment of schedules (landing and dwell times), terminal capacity (slip availability and assignments), and passenger queuing characteristics.

Another component to reliable ferry service is the ability to maintain vessels and terminal infrastructure as needed and reduce unplanned service interruptions. To do so, there must be the supporting maintenance infrastructure including spare vessels and a place to perform needed maintenance.

FUTURE CONSIDERATIONS

Future considerations for NYC Ferry include assessment of fare policies and fare acceptance to improve the passenger experience as well as conducting future studies as communities and neighborhoods grow and evolve.

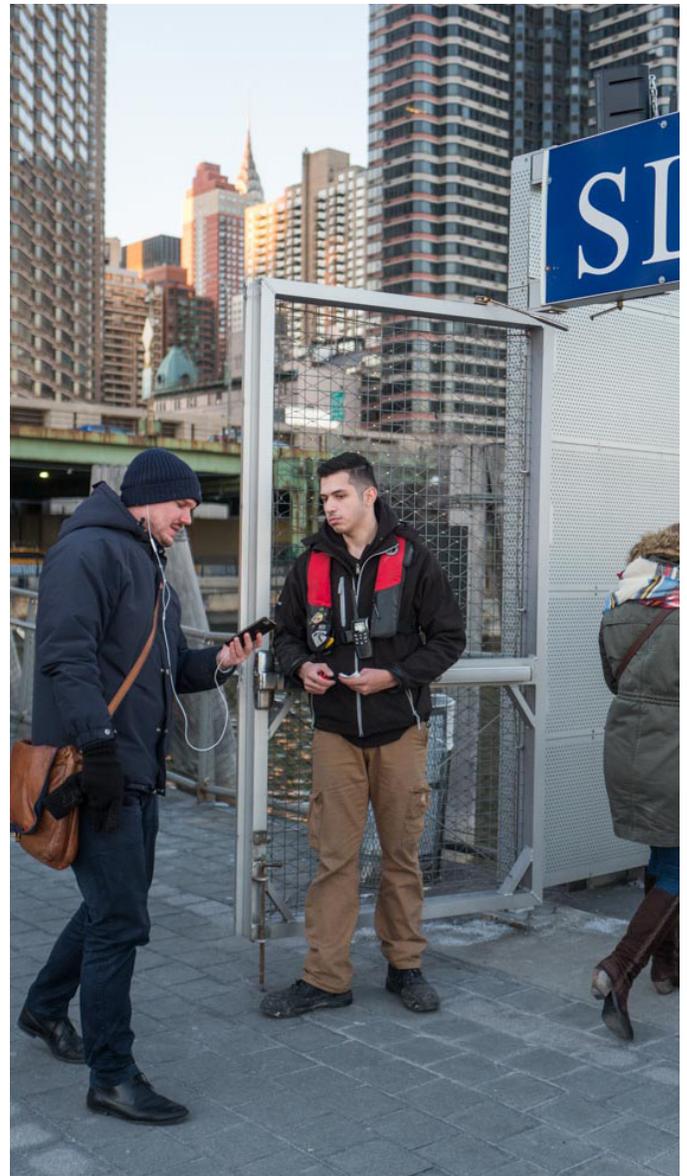
TICKETING

Coordinating acceptance of fare types with other transit modes around the city can have many benefits: increased convenience to passengers by making transfers between modes easier; increasing ridership by making service more attractive to riders; and enhancing operational efficiencies at the terminal. While the benefits are undeniable, there are operational challenges with this integration, and the MTA is in the midst of rolling out a new fare payment system, retiring the legacy MetroCard over the next few years. NYC Ferry will

continue to monitor developments in this area to determine if there could be synergy in the future.

FUTURE STUDIES

Many of the sites considered in this study are undergoing development expansions, and economic and population growth that could increase their viability as a future ferry expansion landing site. Additionally, emerging transportation technologies like autonomous vehicles and micro-transit options like electric scooters and bike share can increase accessibility to potential ferry landings. As NYC Ferry continues to grow, review of other options will continue.







H207
NEW YORK, NEW YORK



6

GLOSSARY

TERMS

Barge	Floating structure placed in the water for a vessel to tie-up while passengers load and unload.
Berth	A place for a vessel to tie-up.
CBD	The central business district is the commercial and business center of a city.
Fetch	The distance traveled by wind or waves across open water.
Jetty	Narrow structure that protects the coastline from currents and tides.
Landing	The ferry terminal facilities that includes a barge, gangway and pier where necessary.
Queue	The line where people wait to board the ferry.
Sandspit	Narrow point of sandy land projecting into the sea.

ACRONYMS

NOAA	National Oceanic and Atmospheric Administration
MTA	Metropolitan Transportation Authority
NYCDOT	New York City Department of Transportation
NYCEDC	New York City Economic Development Corporation
NYWW	New York Waterway
PANYNJ	Port Authority of New York & New Jersey
NYCHA	New York City Housing Authority

PHOTO CREDITS

All photos on pages cover (i), 2, 29, 42, 44, 162, 164, 168, 176 credited to Manish Gosalia and NYC Ferry

All photos on pages 12, 14, 25 credited to NYC Ferry

All photos on pages opposite Executive Summary (iv), 28, 46 credited to Julienne Schaer

Photo on page 5 credited to Michael Appleton

All photos on pages 8, 26, 30 credited to Tagger Yancey IV and NYC & Co.

All photos on pages 10, 27, 40, 41, 52 credited to Francesca Magnani

All photos on pages 13, 58 credited to Kreg Holt

Photo on page 38 credited to DJI Technology Inc.



APPENDICES

A – EXISTING FERRY TERMINALS IN NYC

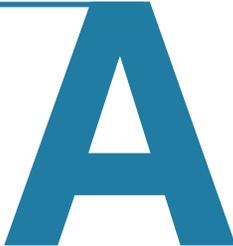
B – STAGE 1 SITE PROFILES

C – STAGE 2 SITE PROFILES

D – RIDERSHIP DEMAND MODELING APPROACH



EXISTING FERRY TERMINALS IN NYC



EXISTING FERRY TERMINALS IN NYC

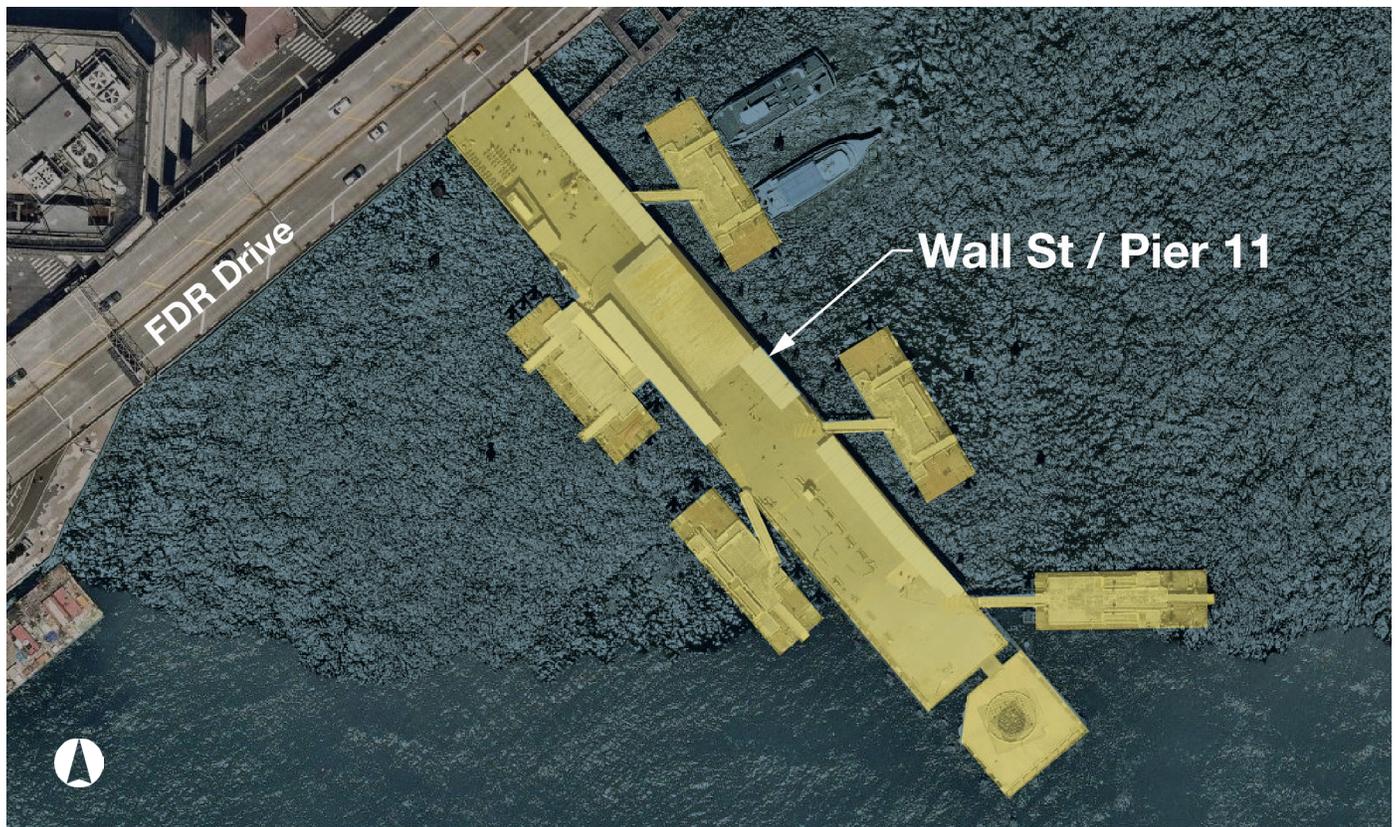
The majority of jobs in NYC are located in Manhattan. However, many people working in Manhattan live in surrounding boroughs and commute to and from work. There are four ferry terminals in NYC located in Lower Manhattan and Midtown Manhattan that connect people to these jobs. NYC Ferry currently operates from Wall Street / Pier 11 and East 34th Street whereas the Battery Park City Terminal and Midtown / West 39th Street are used by other operators.

WALL STREET / PIER 11

Pier 11 is in Lower Manhattan, located at the end of Wall Street. The pier is used by several ferry operators and is the epicenter of NYC Ferry operation as all routes terminate here. The landing primarily serves commuters traveling to the Financial District in the morning and departing in the afternoon. The East River Waterfront Esplanade and bike path run along the waterfront in the vicinity of the landing. The number of ferry operators using Pier 11, the frequency of landings, and the volume of riders queuing on the pier are nearing the capacity of this important ferry terminal. Additional ferry service at this terminal may require further capital improvements to expand capacity.

5 OPERATORS

7 FERRY SLIPS



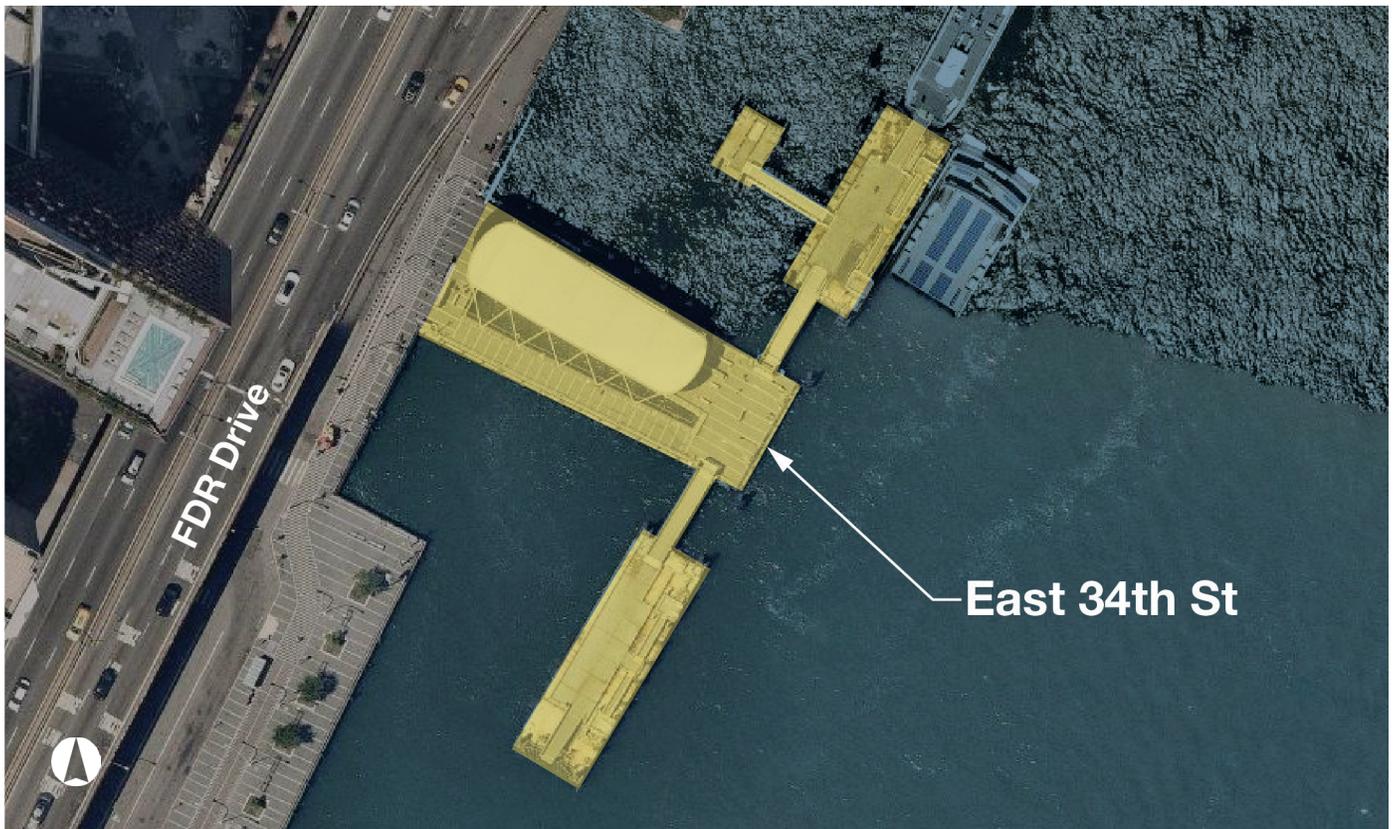
EXISTING FERRY TERMINALS IN NYC

EAST 34TH STREET

The East 34th Street Ferry Landing serves as East Midtown Manhattan's commuter ferry terminal. The landing is located on the East River, just north of East 34th Street by the FDR Drive. The existing ferry landing is adjacent to the East River Esplanade and includes a large covered shelter and ticketing facilities. The number of routes, frequency of landings, and the volume of riders queuing on the pier has reached the capacity of this ferry terminal. It is nearing capacity at peak times and may require further investment in the future.

3 OPERATORS

5 FERRY SLIPS



EXISTING FERRY TERMINALS IN NYC

BATTERY PARK CITY TERMINAL

The Battery Park City ferry terminal is a major ferry landing for commuter service from New Jersey. The ferry terminal is located on the Hudson River at the end of Vesey Street in Hudson River Park in Battery Park City. The existing facility has capacity to accommodate some additional service.

2 OPERATORS

6 FERRY SLIPS

✓ ADDITIONAL LANDING CAPACITY



EXISTING FERRY TERMINALS IN NYC

MIDTOWN / WEST 39TH STREET

Midtown / West 39th Street Ferry Terminal is a major ferry landing for commuter service from New Jersey. It is located at Pier 79 in Hudson River Park adjacent to the West Side Highway at West 39th Street in Midtown Manhattan. The landing predominantly serves commuters traveling from New Jersey to Manhattan in the morning and departing in the afternoon. The existing facility has room to accommodate some additional service.

1 OPERATOR

6 FERRY SLIPS

✓ ADDITIONAL LANDING CAPACITY





STAGE 1 SITE PROFILES

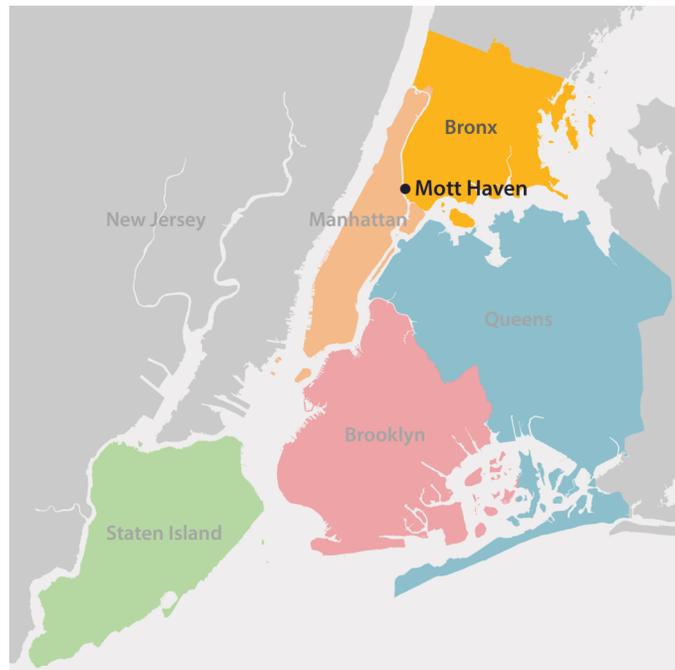
B

Mott Haven (Lower Concourse)

SUMMARY

Mott Haven is a primarily residential neighborhood in the South Bronx. The area has population density, planned waterfront development, and good public transit access.

Beyond a clear publically-owned site, a physical constraint for siting a ferry landing is a live freight railway track that runs along the waterfront. In order to overcome this constraint a new ADA accessible pedestrian bridge would be required to access Mott Haven from a ferry landing. In some areas, upland access is also partially blocked by Interstate 87. In addition, the Willis Avenue Bridge, across the Harlem River, has a low vertical clearance which would require some modification to NYC Ferry vessels in order to safely travel under the bridge.



Co-op City

SUMMARY

Co-op City is located in the Baychester area of northeast Bronx. Significant affordable high-density residential development and a large shopping mall are located there.

Accessing Co-op City by water is problematic for NYC Ferry because of bridge heights. When closed, Pelham Bay Bridge and Hutchinson River Bridge have a vertical clearance that is too low for NYC Ferry vessels to traverse. Both bridges can be raised to allow vessels to pass through, but the cost and disruption to car traffic and Amtrak service to accommodate frequent and regular ferry service is unlikely to be acceptable.



Coney Island Beach

SUMMARY

Coney Island is located at the southernmost point of Brooklyn, bordering the Atlantic Ocean. Coney Island is currently in the midst of a revitalization process, which is stimulating local neighborhood development and attracting visitors from locations beyond the peninsula. Steeplechase Pier has been considered as a possible future ferry landing, but general conclusions below apply to the whole southern shoreline of Coney Island.

Siting a ferry landing on the southern shoreline of Coney Island is problematic. The primary concern is the exposure to ocean swells and strong southeast winds, which would lead to the landings being inoperable under certain weather and ocean conditions. Although some protection could be provided by an offshore wave attenuator structure, this has very large capital costs. Given these constraints an alternative site at Coney Island Creek, which is more protected from weather, is also being considered in this study.



Gowanus

SUMMARY

The Gowanus Canal is a 1.8-mile-long canal in Brooklyn. The canal is used occasionally for the movement of goods by small boats, tugs, and barges.

Operating a ferry around the Gowanus Canal is problematic for several reasons, primarily related to vessel navigation of the bay and canal. There is inadequate water depth and channel width for an NYC Ferry vessel to operate safely, making docking and departing difficult. In addition, the narrow dimensions of the canal and bay would significantly reduce the speed at which a vessel could navigate thus the ferry commute time would not be competitive with other transportation alternatives.



Far Rockaway

SUMMARY

Far Rockaway is a neighborhood on the eastern end of the Rockaway Peninsula in the borough of Queens. The main constraint of siting a landing in the Downtown Far Rockaway or Edgemere neighborhood is bridge height clearance.

Ferry service to Far Rockaway would require vessels to pass under the A-train Bridge to the Rockaways. There is insufficient clearance for NYC Ferry vessels to pass under the bridge safely year round. While the swing bridge could open for marine traffic, this would significantly disruptive subway service to the Rockaways. Bridge height is an issue for vessel access north and south of Broad Channel.



Alternative ferry sites on the ocean side of the Rockaways are extremely challenging due to water depths, high winds, and ocean swell.

JFK Airport

SUMMARY

Waterside access to JFK Airport has the same bridge height issue as a site at Far Rockaway.

In addition, the waterside access to most of the airport leads to active runways, blocking easy upland access to the terminals. This runway and terminal configuration mean it would be challenging to provide riders easy passage from the ferry landing to the Airport's passenger terminal.



West Shore Staten Island

SUMMARY

Operating a ferry service along the West Shore of Staten Island and anywhere along the North Shore east of St. George is challenging because of the high level of marine traffic in the water channel.

The Kill Van Kull tidal strait, between Staten Island and New Jersey is one of the most heavily travelled waterways in the Port of New York and New Jersey. Large container vessel prioritization and marine protocol in this heavily trafficked water limit the extent that reliable passenger ferry service can be operated.

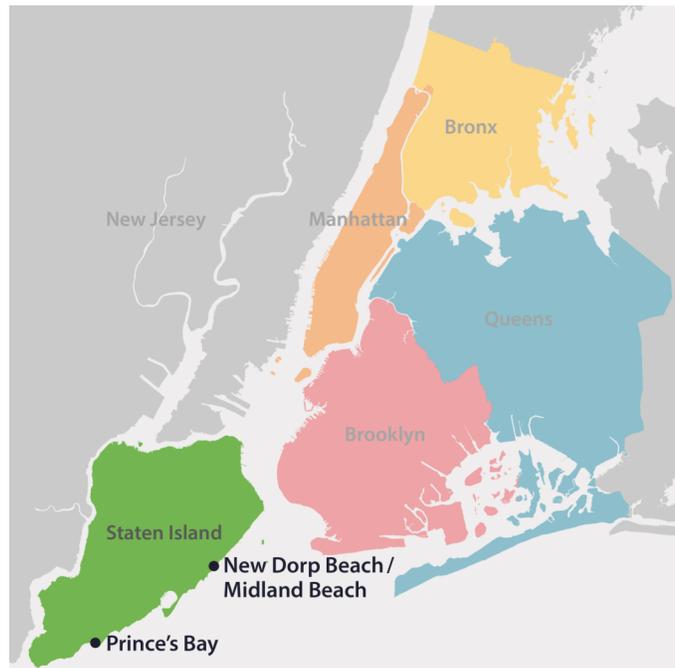


South & Mid Shore

SUMMARY

Apart from Great Kills and Tottenville, the majority of the South Shore and Mid Island beaches have insufficient water depths to accommodate ferry service. Sites requested for inclusion in the study but ultimately not moved further along in the process include Prince's Bay/Mount Loretto, New Dorp Beach, and Midland Beach.

All areas require pier structures of several thousand feet long to reach adequate water depths, making them both impractical and very expensive. Any dredging comes at significant cost and is a reoccurring expense.





STAGE 2 SITE PROFILES

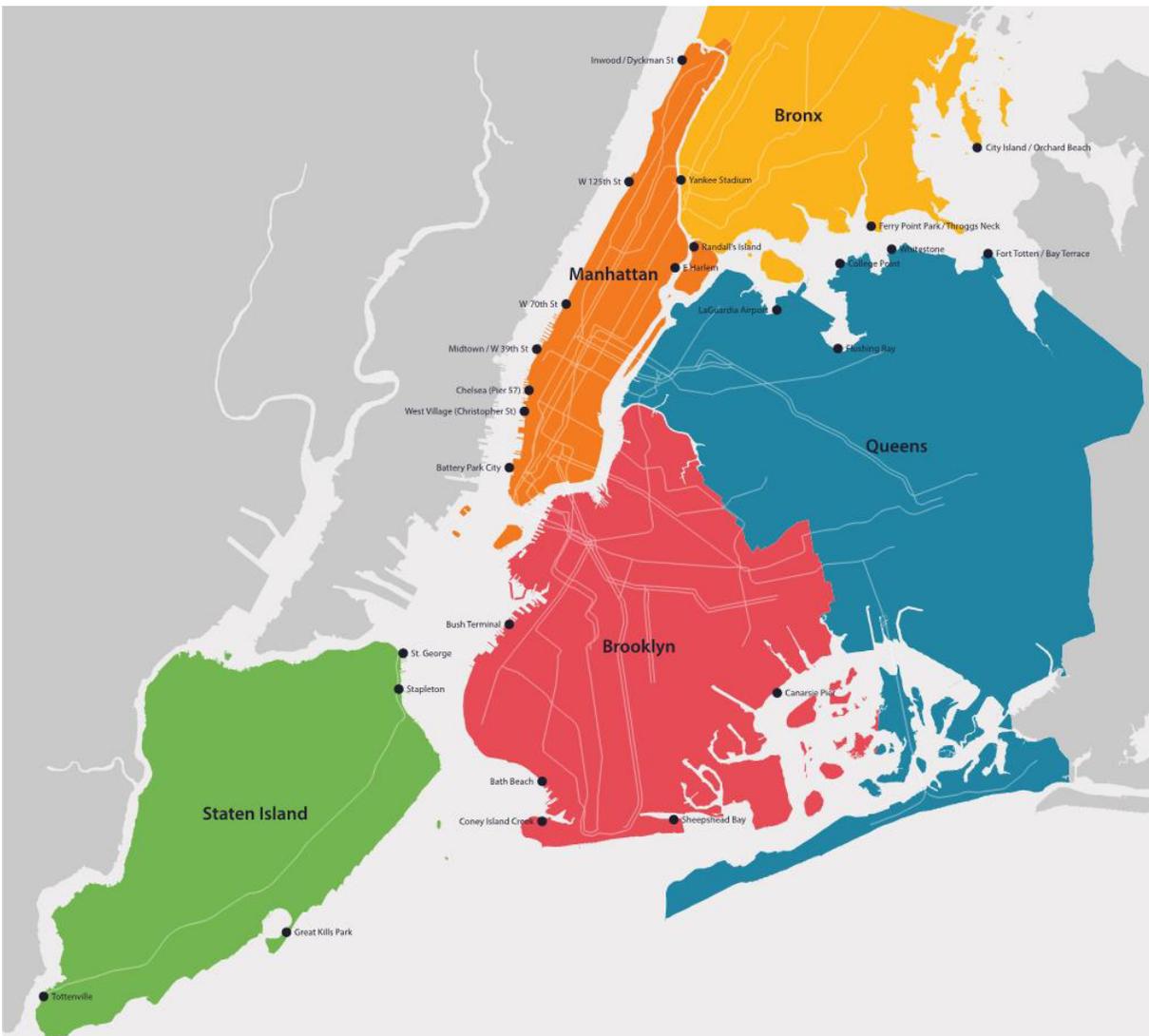


SITE PROFILES

There were several geographic areas that contained physical or geographic barriers to implementing NYC Ferry service, such as bridge height clearances that were too low, or coastline beach conditions with water depths that were too shallow, and these sites were screened from further study in the first phase.

Potential sites that did not have major environmental and physical constraints restricting a potential ferry landing were assessed for viability by developing in-depth site profiles for each potential location. Site profiles considered a number of factors including: defining the anticipated market area; assessing travel time of both current transit as well as potential ferry; gathering background information on site and neighborhood characteristics; and assessing development considerations. This information was used to compare sites and determine which were most suited to carry forward to route development and evaluation.

Site profiles were developed for the following areas illustrated by borough:



STAGE 2 SITE PROFILE METHODOLOGY

The following sections provide context to each section of the site profiles and serves as a reference guide.

COLOR KEY

The color band at the top of each site profile corresponds to the borough where each site is located as indicated below:

Bronx
Brooklyn
Manhattan
Queens
Staten Island

SUMMARY SECTION

The summary section is intended to provide a brief overview of the findings relevant to the decision making process.

MARKET AREA SECTION

Market area is an approximate area where the majority of ferry riders might live and travel from to reach a specific landing. The size of this area varies for each site and is based on the number of people living within the vicinity of a potential ferry landing and how they would access the landing (walking, driving, etc.). This area provides the baseline for calculating the number of commuting trips to Lower or Midtown Manhattan from that potential ferry landing site.

Transit access indicates the existing transit options to Lower and Midtown Manhattan from the study area.

Assumptions/Definitions for Section

- Number of Daily Commute Transit Trips
 - The total number of transit-only commute trips starting from the market area based on an average weekday. This excludes trips starting and finishing within the same market area.
 - From the total market area, the number of transit-only commute trips starting from the market area to Lower and Midtown Manhattan were identified.

- The number of trips was calculated using AirSage data that distinguishes between commute-only transit trips and non-commute transit trips. The Ridership Memo in Appendix D provides more detail on this data.
- Transit Access
 - Using Google Maps and crosschecked by MTA’s travel data, identified the proximity and route for bus and subway to the potential ferry landing. Weekday arrival time of 9 AM was used to estimate travel times.

BACKGROUND INFORMATION SECTION

Other factors provide context to the potential viability of a site and how many people might be interested in using a ferry service. Understanding the surrounding neighborhood, special or unique attractions and planned development near the potential landing illustrates how a ferry might be used. There could be a unique site that people want to travel to or the neighborhood could be lower density residential with limited transit options and a ferry would provide an alternative transit option.

Assumptions/Definitions for Section

- Neighborhood characteristics describes the surrounding development based on review of the zoning adjacent to the potential landing.
- Site visits and aerial photographs helped determine the adjacent properties, waterways, and uses.
- Active construction permit activity, zoning amendments, and press releases assisted with determining if there has been or there is planned significant development near the landing.
- Both the previous 2011 and 2013 Citywide Ferry Studies provided some historic information on areas studied in the past.

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS SECTION

For a landing to be viable, it must be able to support reliable ferry operations with few navigational challenges and provide safe access for passengers getting onto and disembarking the vessel. It is also important to know how much it would cost to construct the required landing infrastructure and how long it might take to implement.

This section reviewed water depths and navigational considerations needed to support ferry operations as well as the existing infrastructure and what improvements would be needed at the site. Once the necessary development for a landing was identified, the regulatory process, timeframe and rough order of magnitude costs were estimated. Further due diligence will be required before a landing could be designed and implemented.

Assumptions/Definitions for Section

- Pedestrian access was evaluated based on site visits and review of aerial photos. For some sites that did not have good pedestrian or transit connections, a shuttle or parking was assumed.
- National Oceanic and Atmospheric Administration (NOAA) charts, site visits and discussions with local operators provided information on navigational considerations. NOAA charts include water depth information and known obstructions in the marine environment. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites. Bathymetric surveys provide the specific water depths in marine areas and are recommended early in the planning process for those sites moving forward.
- NYC maps including zoning and land use (ZoLa) maps, Department of City Planning (DCP) maps and zoning text were used to determine site ownership and zoning.
- An assessment of capital infrastructure needs was based on visual observations of existing infrastructure. Further assessment would be necessary prior to designing and constructing a new landing.
- Implementation timeframes based on previous NYC Ferry landing construction.
- Costs are rough-order of magnitude for planning purposes and only include the cost to construct the landing, it does not include the cost to procure or operate vessels. These costs were estimated based on historic costs for NYC Ferry landing construction as well as industry knowledge of costs for marine structures.

TRAVEL TIME COMPARISON SECTION

The travel time comparison is a metric to determine if people are likely to choose a ferry compared to other travel options. If a direct ferry trip would take significantly longer than other modes to reach Manhattan, the NYC ferry service with additional stops may not see the same ridership demand compared to those routes that provide a time savings compared to existing travel options. This evaluation was focused on comparing commute travel times under the following definitions:

Assumptions/Definitions for Section

- Travel times were based on point-to-point connections under best case scenario where each connection is made and there are no delays. This is most applicable to ferry and transit times, whereas car trips include a range of estimated travel times given the variability of traffic conditions.
- Origin points were estimated based on a half mile of the landing or expanded in certain cases if necessary (i.e. parking availability or other transit connections). Destination points were identified in the central business districts of Lower and Midtown Manhattan within walking distance to the main Manhattan terminals. The origin and destination points were used to assess an average trip time for comparative purposes only to relate direct ferry and direct transit trips.

- Direct ferry transit time was calculated includes the estimated time to walk to the site from the origin, direct trip from the site to Lower Manhattan and Midtown Manhattan as well as the walk time to the destination point for Lower Manhattan and Midtown Manhattan. The following information was used for these calculations:
 - Distances measured by Google Maps
 - Speeds vary by route segment distance and based on actual operating speeds:
 - Less than 2 mile route = 18 knots or 20.7 miles per hour
 - More than 2 miles but less than 5 miles = 22 knots or 25.3 miles per hour
 - Greater than 5 miles = 24 knots or 27.6 miles per hour
 - Maneuvering distance is estimated at 0.25 miles at each end of the segment with a speed of 7 knots or 8.1 miles per hour
- Transit time was calculated based on the following:
 - Calculated using Google Maps for an arrival time of 9:00 AM on weekdays. The MTA trip planner was also used to confirm transit options.
- Car travel time
 - Ranges were derived from Google Maps with an arrival time of 9:00 AM on weekdays
 - Cost estimated based on distance in Google Maps using \$0.545/mile (IRS standard)

REFERENCES

- Google Earth
- NearMap aerial imagery
- Zola – <https://zola.planning.nyc.gov/>
- NYC Active Major Construction – <https://www1.nyc.gov/assets/buildings/html/nyc-active-major-construction.html>
- NOAA navigational charts
- AirSage data to generate transit trip tables for the market area
- New York State Department of Environmental Conservation, Environmental Resource Mapper <http://www.dec.ny.gov/gis/erm/>

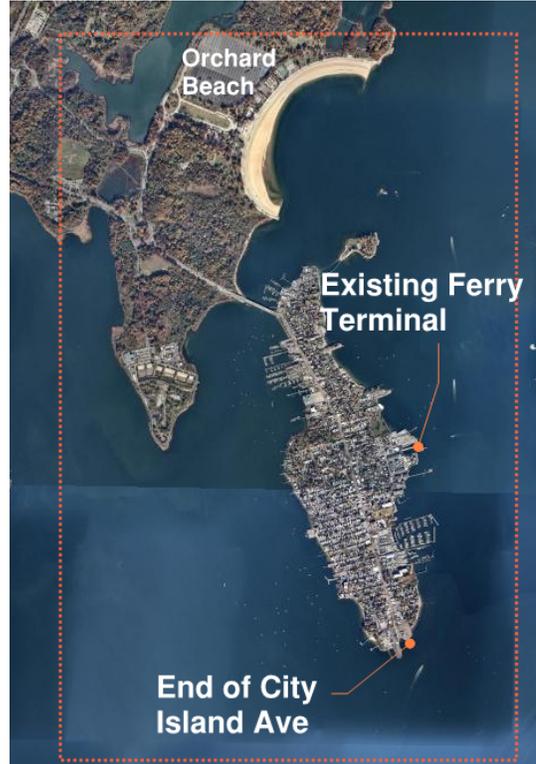
City Island / Orchard Beach

SUMMARY

City Island is a lower-density area in the northern Bronx, with Orchard Beach to the north.

City Island includes two potential pier options: the existing Hart Ferry Terminal and at the end of City Island Avenue. Construction of a new landing facility would likely be required at either location. Although a ferry could potentially provide a faster option for those travelling to Manhattan, there are few people living on City Island that currently commute to Manhattan. The likelihood of additional travelers coming from off island to use the ferry landing to access Manhattan is low, in part because of the lack of parking near the existing ferry terminal. The ferry might bring additional visitors to the Island.

Orchard Beach has very shallow water depths in most of Pelham Bay, making the siting of any ferry landing difficult. A pier constructed at the outer edges of the beach would require a 10-minute walk from the parking lot. The closest residential neighborhood to the beach is at least a 10-minute drive. Ferry service from this location is not competitive with existing transit for the surrounding neighborhoods, especially with the additional access time to reach a pier at the edge of the beach. The remainder of this site profile focuses on City Island.



MARKET AREA

The market area for potential ferry trips from this location includes all of City Island, but does not extend to the rest of the Bronx.



» Daily Commute Transit Trips: ~400

- Trips to Lower Manhattan: Less than 50
- Trips to Midtown Manhattan: Less than 50

» Transit Access: Bus: Bx29 and BxM8

» Ferry Travel Time to Manhattan: Faster than existing transit to Lower Manhattan and Midtown East.

City Island / Orchard Beach

BACKGROUND INFORMATION

Neighborhood Characteristics

City Island consists of low density residential with neighborhood commercial uses along City Island Avenue.

Adjacent Properties / Waterway Use / Special Sites

City Island is part of a Lower Density Growth Management Area with primarily R3A zoning that allows for single-family development. There are private boat yards and marinas along the waterfront of City Island / Orchard Beach.

Recent and Planned Substantial Development near Potential Sites

On the Sound, a 43-unit condominium was recently completed near the proposed Hart Island Ferry Terminal site.

Latitude,	40.837193,
Longitude	-73.782732
Census Tract	516
Approx. Location	Hawkins St and Fordham St, Bronx, NY 10464
Previously Studied by EDC	2011, 2013
Borough	Bronx
Borough President	Ruben Diaz Jr.
City Council District	13
Council Member	Mark Gjonaj
Community Board	10

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Fordham Street dead-ends at the NYCDOT dock and does not have sidewalks or bike lanes. A public park, Fordham Street Promenade, accesses Fordham Street near the dock. Access to the Hart Island Ferry dock is currently restricted and it would likely be necessary to build a new facility at this location.

If the landing were located at the south end of City Island Avenue, there are sidewalks leading up to the park area.



Hart Island Ferry Terminal

City Island / Orchard Beach

Existing Infrastructure

The existing Hart Island ferry terminal is located at the end of Fordham Street and is operated by NYC DOT. The terminal is designed to support the car ferry with a vehicle ramp and wingwalls sized to fit the existing ferry.

The existing ferry terminal infrastructure may be able to support passenger-only ferry services, infrastructure requirements for the NYC Ferry vessels to operate from this location would need to be assessed.

There is no in-water infrastructure at the south end of City Island. This location would require a new pier structure and a standard NYC Ferry barge.



Photo shows the south end of City Island Ave.

Waterside Access

Waterside access to either site at City Island would be through the East River and western Long Island Sound, with sufficient well-marked navigational channel to support ferry operations. If located near the existing ferry terminal on the eastern shore of the island, the landing would be at the western end of Long Island Sound, with considerable distance for easterly storms to build fetch generated waves.

If located at the southern tip of the island at the end of City Island Avenue, a pier would be required to reach water depths to support ferry operations. This location would be exposed to the weather from multiple directions, representing an operational challenge.

- » **Ownership:** NYC Department of Small Business or One City Island Avenue
- » **Zoning:** M1 (Hart Island Ferry) or R3A (south end of City Island)

Implementation Requirements

- » An assessment of the Hart Island Ferry Terminal would be required to determine if this site could support NYC Ferry service.
- » If a landing were located at the south end of the island, a pier and barge would need to be installed.
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; agreement with New York City Department of Transportation, New York City Department of City Planning, New York City Department of Parks and Recreation; Mayoral Zoning Override
- » **Estimated Capital Cost:** \$8 million, plus the cost of a pier depending on the length.

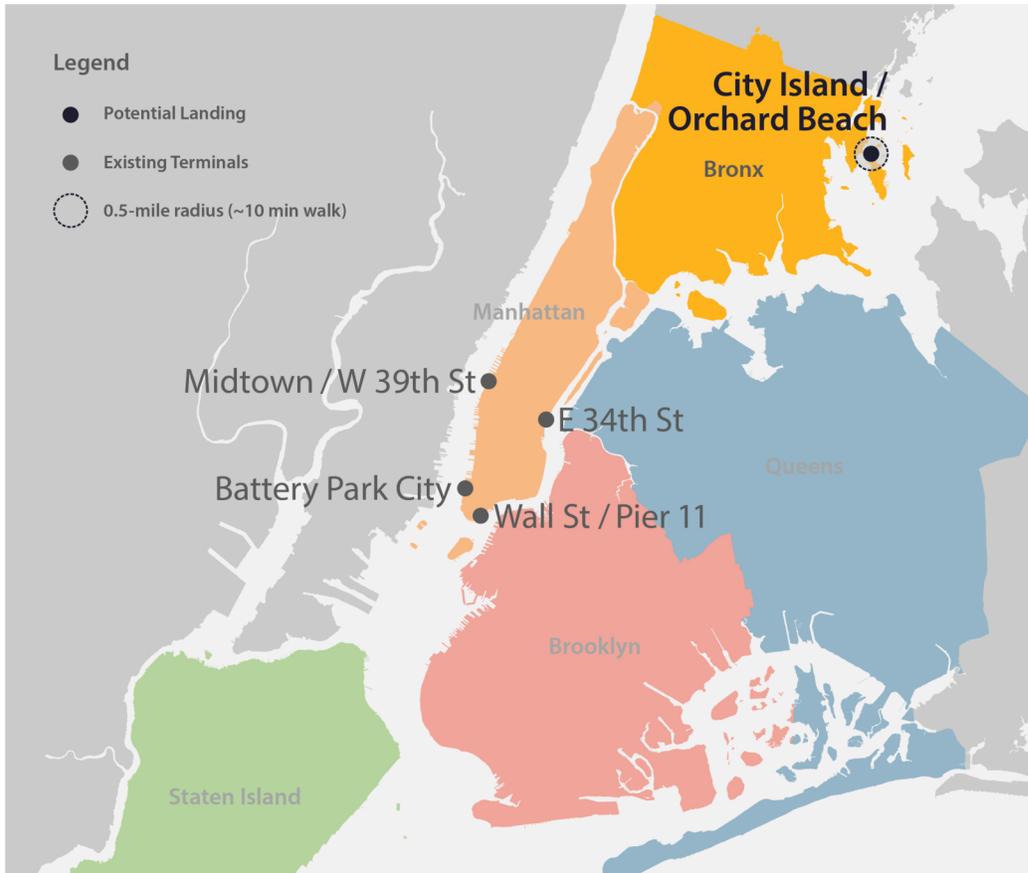


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

City Island / Orchard Beach

TRAVEL TIME COMPARISON

While a direct ferry would be faster than transit to Lower Manhattan and Midtown East, combining the City Island or Orchard Beach stop with another route, such as Soundview, would dictate whether ferry service would be time competitive, and in the case of Orchard Beach also be hampered by the driving and walking time to reach the landing. From City Island to Midtown East, there is a transit option (Bus: BxM8) that does not require a transfer but is a longer trip than those with transfers.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the City Island study neighborhood, including some walk time to/from transit or ferry.

Destination	Car	Transit	Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Wall St / Pier 11)	55-100 min / \$11.50	(3 transit legs) 86 min / \$6.50	(~20 miles) 58 min / \$2.75	-28 min
Midtown East (E 34th St)	45-85 min / \$8.99	(2 transit legs) 79 min / \$6.50	(~16 miles) 54 min / \$2.75	-25 min

Ferry Point Park / Throgs Neck

SUMMARY

Ferry Point Park is located in the Throgs Neck peninsula of the Bronx. The park is located just to the west of Whitestone Bridge and Highway I-678. It is comprised of considerable green areas with sports fields, with an associated parking area.

Given this distance from residential areas, driving or biking is required to access the site. With the water depths in Westchester Creek, a landing location would need to be near the southern end of the park. A potential ferry landing would be about 0.3 miles from the existing parking, or roughly an 8- to 10-minute walk.

This study considered other areas along the Throgs Neck peninsula closer to residential areas, but no viable public sites with adequate water depths were found.



MARKET AREA

The market area for potential trips includes the area east of the Hutchinson River Expressway (I-678), south of the Cross Bronx Expressway (I-295) and west of Hollywood Avenue.



- » **Daily Commute Transit Trips:** ~2,350
 - **Trips to Lower Manhattan:** ~50
 - **Trips to Midtown Manhattan:** ~175
- » **Transit Access:** BxM9 express bus, Bx40 and BX42
- » **Ferry Travel Time:** Faster than transit to Lower Manhattan and Midtown East.

Ferry Point Park / Throgs Neck

BACKGROUND INFORMATION

Neighborhood Characteristics

The Throgs Neck neighborhood is comprised of primarily low-density residential development but is also home to SUNY Maritime College and a City-owned golf course. Retail and commercial services are available along East Tremont Avenue.

Adjacent Properties / Waterway Use / Special Sites

Sites adjacent to Ferry Point Park and Throgs Neck are zoned for manufacturing to the north and primarily residential to the east. Throgs Neck is located within the Lower Density Growth Management Area.

Recent and Planned Substantial Development near Potential Site

There are no major planned development activities near the potential landing site.

Latitude,	40.806258,
Longitude	-73.836865
Census Tract	110
Approx. Location	10 Hutchinson River Pkwy, Bronx, NY 10465
Previously Studied by EDC	2011, 2013
Borough	Bronx
Borough President	Ruben Diaz Jr.
City Council District	13
Council Member	Mark Gjonaj
Community Board	10

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Vehicle access to the site is a one-way loop, located inland from the water. Pedestrian access requires a long walk from the parking lot. Parking is currently available, but is an 8-10 minute walk from where a landing would likely be located.



Ferry Point Park / Throgs Neck

Existing Infrastructure

No marine infrastructure currently exists at this location. Riprap covers the shoreline. The park site totals approximately 400 acres and includes sports fields and walkways, but with no piers or waterside access.



» **Ownership:** NYC Parks and Recreation

» **Zoning:** PARK

Implementation Requirements

» A fixed pier would likely be necessary to move the gangway away from the rock/riprap shoreline, along with the installation of required gangway and guide piles for ferry service.

» **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; and an agreement with Department of Parks and Recreation

» **Estimated Capital Cost:** \$8 million, plus the cost of a pier depending on the length

Waterside Access

Waterside access to this location would use the East River, which is deep and well marked. Vessel approaches using Westchester Creek would be unacceptable due to limited water depths, with the only location within the park that provides sufficient water depths at the far southern end. Any potential location would take into account water depths, currents, and sea conditions near the area.

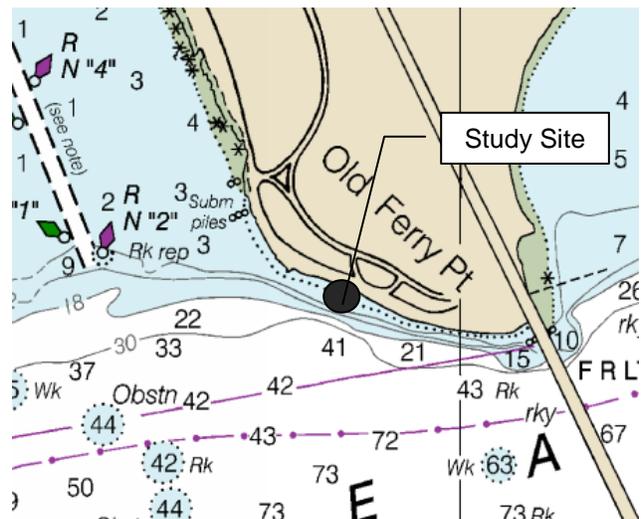


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Ferry Point Park / Throgs Neck

TRAVEL TIME COMPARISON

A ferry from Ferry Point Park to the Wall Street / Pier 11 or East 34th Street is faster than existing transit options.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	Car	Transit	Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Wall Street / Pier 11)	60-110 min / \$8.93	(2 transit legs) 90 min / \$2.75	(~14 miles) 56 min / \$2.75	-30 min
Midtown East (East 34th Street)	45-100 min / \$8.67	(1 transit leg) 80 min / \$2.75	(~10 miles) 52 min / \$2.75	-20 min

Yankee Stadium

SUMMARY

Yankee Stadium has an existing ferry landing along the Harlem River, occasionally used for Yankee Stadium-related events but not for commuter ferry service. Active freight railway tracks separate the landing from the neighborhood, making site access problematic.

Waterside access to this site would be up the Harlem River, requiring passage under seven bridges, three of which have a 25-foot clearance at high water, limiting the vessels available for a route to this area. The Willis Avenue Bridge across the Harlem River has a low vertical clearance, which would require modifications to NYC Ferry vessels for safe passage under the bridge. The navigational challenges represented by this narrow waterway and other marine traffic would slow ferry speed, increasing transit times.

The area has competitive existing transit. Properties adjacent to the landing are largely commercial entities with several sports complexes. Residential properties are approximately 0.5 miles away. Waterfront areas around the landing are likely to grow in the future, particularly to the south with developments like Bronx Point.



MARKET AREA

The market area for potential ferry trips from this site is predominately from Concourse Village and along the Harlem River from Macombs Dam Bridge to Third Avenue Bridge.



- » **Daily Commute Transit Trips:** ~12,400
 - **Trips to Lower Manhattan:** ~300
 - **Trips to Midtown Manhattan:** ~800
- » **Transit Access:** Bus and Rail
 - **Bus:** Bx13 ~0.3 miles from site
 - **Rail:** Yankees-E 153 St Station ~0.2 miles from site
 - **Subway:** 161 Street – Yankee Stadium 4, B and D Lines ~0.5 miles from site.
 - **Subway:** 149 Street – Grand Concourse, trains 2, 4, 5 ~0.7 miles from site
- » **Ferry Travel Time to Manhattan:** Faster than transit to Lower Manhattan and slower than transit to Midtown.

Yankee Stadium

BACKGROUND INFORMATION

Neighborhood Characteristics

The study site is located within the west portion of the Concourse Village neighborhood in the Bronx.

Adjacent Properties / Waterway Use / Special Sites

The site contains commercial and recreational uses. Residential areas are located less than 0.5 miles from the landing. The landing site is located approximately 0.5 miles away from Yankee Stadium, with Joseph Yancey Track and Field, Heritage Field, and Stadium Tennis Center all less than this distance from the site.

Recent and Planned Substantial Development near Potential Site

In 2016, the NYCEDC requested proposals for an extensive development project called Bronx Point, along the Harlem River waterfront near the study site. This development project would include over 1,000 housing units, community space, commercial and retail space as well as a museum. Phase one of the development project is anticipated to be complete in 2022.

Latitude,	40.825033,
Longitude	-73.932869
Census Tract	63
Approx. Location	725-780 Exterior Street; Bronx, NY 10451
Previously Studied by EDC	2011, 2013
Borough	Bronx
Borough President	Ruben Diaz Jr.
City Council District	8
Council Member	Diana Ayala
Community Board	4

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Current pedestrian access from the landing to the upland is not ideal and would require riders to cross an active freight railway track. An at-grade walkway appears to have restricted access for non-game days.

Improvement to upland access would be important for regular commuter ferry operation.



Yankee Stadium

Existing Infrastructure

The existing ferry terminal infrastructure at this site accommodates bow-loading ferries similar to those operated by NYC Ferry. Use is currently for chartered service during games and events.

The barge may need an assessment to determine if replacement is required prior to implementing service.

Waterside Access

Ferry waterside access to this location would be up the East and Harlem Rivers. The Harlem River is a relatively narrow channel, with NOAA charts indicating sufficient water depths throughout the length of the transit.

Traveling up the Harlem River to this site would require transit under seven bridges, with three of them at 25-foot clearance at mean high tide. Typically, a safety factor would be employed by any vessel transiting under these bridges to ensure no interactions. The existing NYC Ferry River Class vessels closely approach this height and the larger vessels exceed this height, meaning that ferry transits would potentially be restricted to avoid high tides. Further transit up the Harlem River represents some navigational challenges with multiple bridge abutments and other vessel traffic likely necessitating slower speeds to ensure safety of navigation.

- » **Ownership:** New York State Department of Transportation (site connected to dock) / State of New York (adjacent parking facilities)
- » **Zoning:** M2-1

Implementation Requirements

- » Replacement of the barge may be needed. Typical NYC Ferry barge would need to be installed. Structural and mechanical survey of the existing barge is recommended.
- » **Approvals needed:** Environmental Review; New York City Department of City Planning; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; Mayoral Zoning Override
- » **Estimated Capital Cost:** \$8 million for barge replacement if required

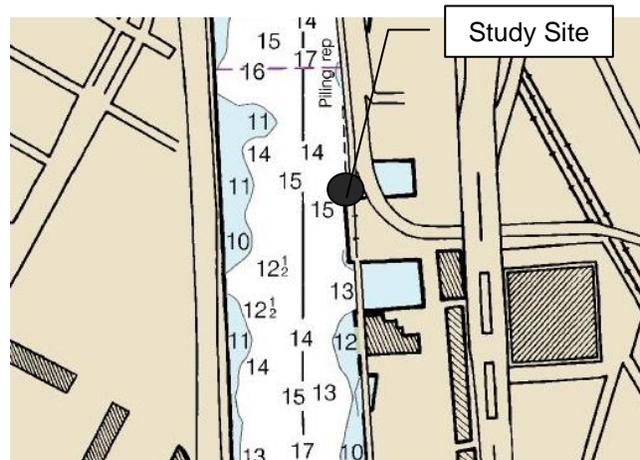


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Yankee Stadium

TRAVEL TIME COMPARISON

A direct ferry would be faster than transit to Lower Manhattan but slower to Midtown East. Ferry travel times would also increase with other stops added along any potential route, making it less competitive to existing transit options.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Wall Street / Pier 11)	35-60 min / \$7.03	(1 transit leg) 52 min / \$2.75	(~10 miles) 39 min / \$2.75	-13 min
Midtown East (East 34th Street)	30-55 min / \$5.07	(2 transit legs) 32 min / \$2.75	(~6 miles) 36 min / \$2.75	+4 min

Coney Island Creek

SUMMARY

The Coney Island Creek site is located at the western end of Coney Island in Brooklyn. This creek is somewhat sheltered from weather-generated sea conditions, which is an important reason why other sites on the southern beach side of Coney Island are not suitable for a ferry landing.

Ferry service here would help Coney Island residents to commute more quickly into Manhattan and would provide a new mode of transportation for people to visit Coney Island's attractions.

Placement of a landing needs careful consideration as shifting sands, fog, and high winds would be an ongoing challenge to maintaining safe and reliable commuter ferry operations here. A ferry landing on either side of the sandspit is included in the study, though both options present operational and navigational risks, requiring careful design and mitigation.



MARKET AREA

The market area for potential ferry trips from Coney Island Creek includes the area south of Belt/Shore Parkway and west of Shell Road.



- » **Daily Commute Transit Trips:** ~6,500
 - **Trips to Lower Manhattan:** ~700
 - **Trips to Midtown Manhattan:** ~400
- » **Transit Access:** Bus and Subway
 - **Bus:** B36 and B74 adjacent to the site
 - **Subway:** D, F, N, and Q lines ~1.3 miles from the site
- » **Ferry Travel Time to Manhattan:** 25- 36 minutes faster than other transit to Lower and Midtown Manhattan.

Coney Island Creek

BACKGROUND INFORMATION

Neighborhood Characteristics

The neighborhood surrounding the potential landing is primarily residential with a strip of commercial shops along Mermaid Ave. West of the landing is the private community of Sea Gate. South and east of the landing is a mixture of residential homes and medium density public housing. Farther east are cultural and entertainment amenities including restaurants, MCU Stadium, Amusement District, and New York Aquarium.

Adjacent Properties / Waterway Use / Special Sites

Adjacent parcels are zoned R5 and R6 for low to medium density housing (low-rise attached houses, to apartment buildings).

Recent and Planned Substantial Development near Potential Site

While no specific plans were identified, in December 2017, Brooklyn borough president Eric L. Adams, unveiled his recommendations as part of a Uniform Land Use Review Procedure (ULURP) response to approve with conditions an application submitted by the SP North of North Limited Partnership in Coney Island to facilitate a zoning map amendment to rezone portions of a block bounded by Mermaid and Neptune avenues at West 29th Street. The proposal would facilitate the development of the Harbor Houses project, including two eight- and seven-story buildings with a total of 153 residential units, all of which will be affordable including 25 percent permanently affordable units. A residential development including 311 units is currently under construction at 3514 Surf Avenue and will be delivered in 2019.

Latitude,	40.581254,
Longitude	-74.000703
Census Tract	336/330
Approx. Location	W 33 Street and Bayview Avenue; Brooklyn, NY 11224
Previously Studied by EDC	2013
Borough	Brooklyn
Borough President	Eric Adams
City Council District	47
Council Member	Mark Treyger
Community Board	13

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

There is an existing sidewalk and trail along Bayview Avenue. There is limited street parking along Bayview Avenue.



Coney Island Creek

Existing Infrastructure

There is no existing infrastructure for a ferry landing in Coney Island Creek Park, requiring upland improvements that would allow access from the street to the vessel.

However, if the landing was located inside the creek, there is an existing fishing pier of approximately 180 feet long by 10 feet wide, which would need to be carefully considered in relation to a ferry landing.

Waterside Access

Located on the northwest side of Coney Island, the potential sites would be accessed from Graveshead Bay. There are prominent and shifting sands in this area that have the potential to be an ongoing challenge to ferry operations.

Site Option 1: Ferries approaching the Coney Island Creek site to the west of the sandspit would have easy/direct access, but the water depths are shallow on this approach due to the build up of sand along the shore. This site would require a new pier of significant length, adding to its exposure and perhaps requiring dredging to ensure adequate depths are maintained. This approach would also be exposed to occasional bad weather coming from the northwest which may impact reliability of service.

Site Option 2: Access to the Kaiser Park site (east of the sandspit) would require transiting the channel into Coney Island Creek, with a navigational channel less than 120 feet across, but with good water depths once through the channel all the way to the fishing pier. This landing possesses deep water and is protected from ocean swells, with adequate maneuvering area. However, the channel passage would likely represent unacceptable navigating risk without a mitigation solution like dredging.

Some small-scale recreational boat activities occur inside the creek and would need to be taken into consideration.

- » **Ownership:** NYC Parks and Recreation
- » **Zoning:** PARK

Implementation Requirements

- » A fixed pier and landing barge would need to be constructed on the Coney Island Creek Park side of the spit.
- » If the Kaiser Park Fishing Pier were used, improvements would likely be required to the existing pier.
- » The Coney Island Park site would require a relatively lengthy pier or gangway, or inshore dredging, to ensure adequate water at low tides. The Kaiser Park site may necessitate some dredging of the channel to accommodate transit.
- » Mitigation efforts could be accomplished in Coney Island Creek area with existing marine wreck removal.
- » **Approvals needed:** Environmental review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; and an agreement with Department of Parks and Recreation
- » **Estimated Capital Cost:** \$8-12 million, plus addition cost for a pier structure depending on length.

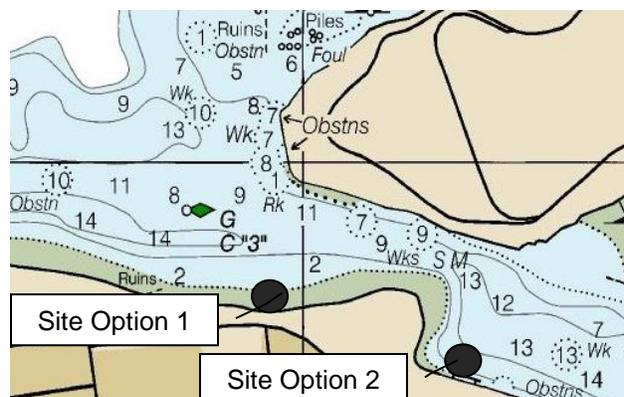
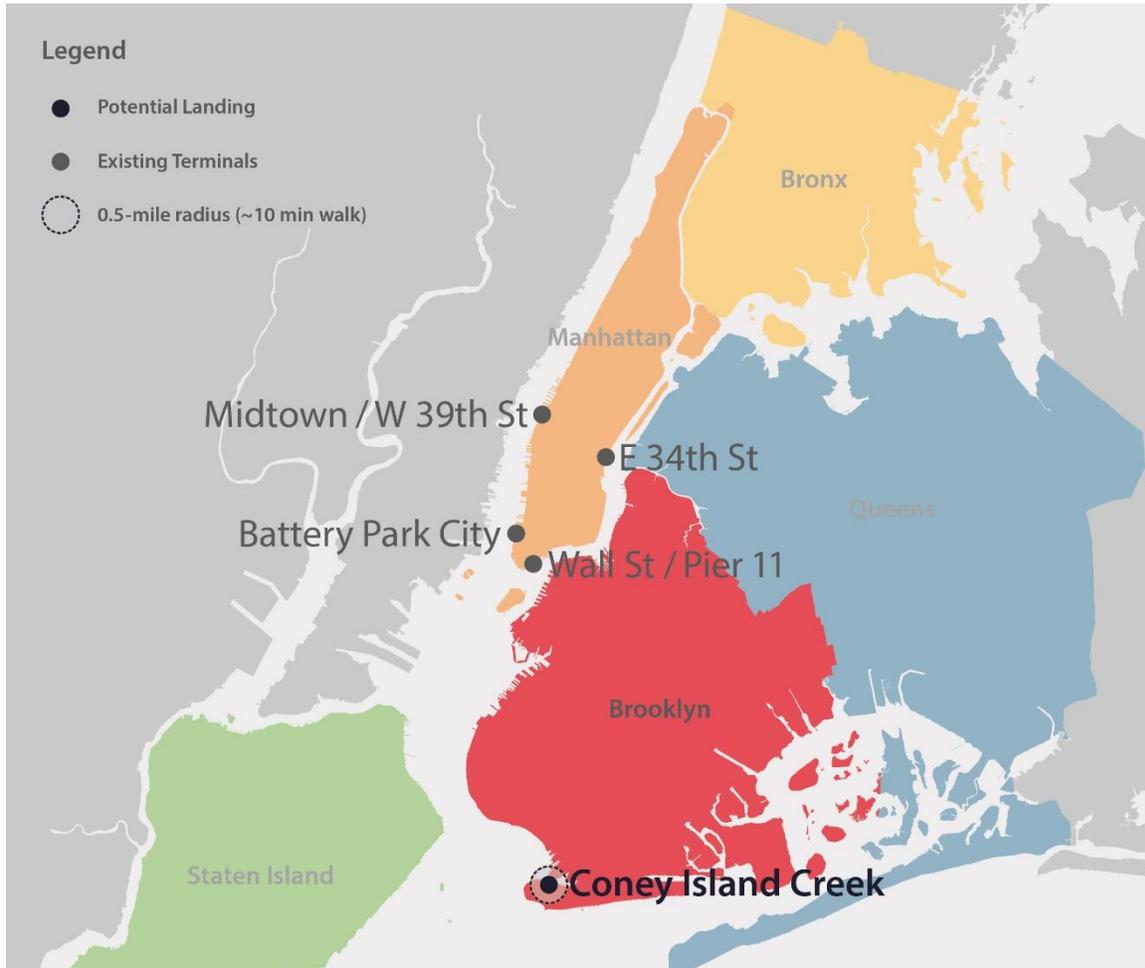


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Coney Island Creek

TRAVEL TIME COMPARISON

A direct ferry trip to Manhattan would offer a faster trip time than public transit from this location, but the inclusion of a Coney Island Creek stop in a route with other stops would dictate whether ferry service would be time competitive.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	30-75 min / \$7.47	(1 transit leg) 76 min / \$6.50	(~7 miles) 40 min / \$2.75	-36 min
Midtown West (Midtown / West 39th Street)	40-100 min / \$9.10	(2 transit legs) 77 min / \$2.75	(~ 10 miles) 52 min / \$2.75	-25 min

Canarsie Pier

SUMMARY

The study site is located at Canarsie Pier adjacent to the Canarsie neighborhood. Access to the site is predominately by car or via bus with a bus stop within a short walk from the site.

The site has a very large existing pier structure that supports park activities, such as recreational fishing. There are adequate water depths in vicinity of the pier with easy access through the relatively protected waters of Jamaica Bay.

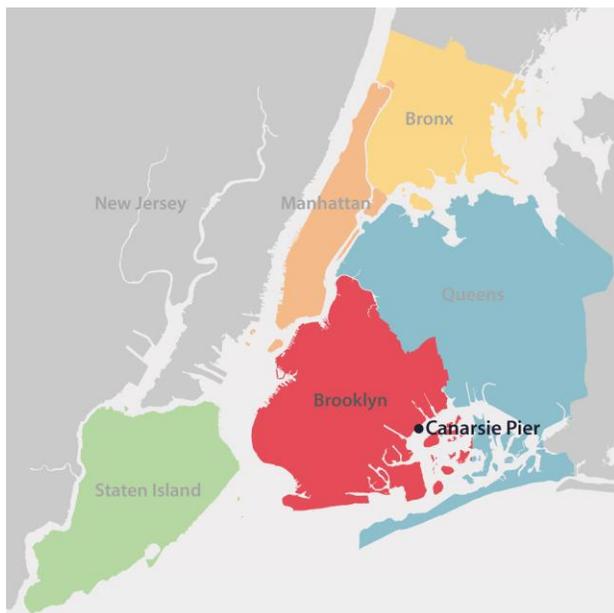
The site is owned and managed by the National Park Service. How potential ferry use and the need for commuter parking would affect existing pier activities would need to be considered.



Many trips from Canarsie to Manhattan rely on the L train. On average, the L provides a faster trip to Manhattan with more transfer options than potential ferry service. This site has been proposed by community members as a mitigation solution to the Canarsie tunnel repair project expected to start in April 2019, but the timeline to permit and construct a ferry landing at Canarsie Pier does not make a ferry a feasible mitigation option.

MARKET AREA

The market area for potential ferry trips from Canarsie Pier includes the area east of Flatbush Avenue, south of Flatlands Avenue, and west of Fountain Avenue.



- » **Daily Commute Transit Trips:** ~19,800
 - **Trips to Lower Manhattan:** ~2,000
 - **Trips to Midtown Manhattan:** ~2,000
- » **Transit Access:** Bus: B42 ~0.18 mile from site
- » **Ferry Travel Time to Manhattan:** Similar to transit to Lower Manhattan, but slightly longer than transit to Midtown Manhattan.

Canarsie Pier

BACKGROUND INFORMATION

Neighborhood Characteristics

Canarsie Pier is located in Brooklyn in an area of primarily mid-density residential development, with neighborhood commercial sites located inland from the park along Rockaway Parkway and Flatlands Ave.

Adjacent Properties / Waterway Use / Special Sites

The site is part of the National Park Service. The majority of the surrounding area is mapped parkland. Adjacent parcels are zoned R5 for low/mid-density housing (low-rise attached houses to small multifamily apartment buildings).

Recent and Planned Substantial Development near Potential Site

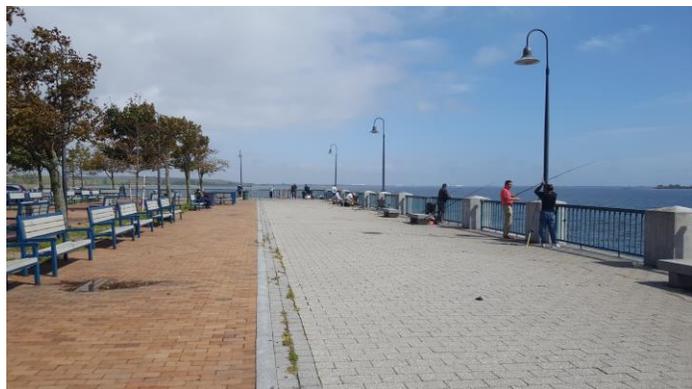
No major residential or commercial development noted.

Latitude,	40.629497,
Longitude	-73.884858
Census Tract	1028 and 1034
Approx. Location	Canarsie Veterans Cir, Brooklyn, NY 11236
Previously Studied by EDC	No
Borough	Brooklyn
Borough President	Eric Adams
City Council District	46
Council Member	Alan N. Maisel
Community Board	18

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Vehicles access the pier from Canarsie Veterans Circle, which connects to Rockaway Parkway and Shore Parkway on- and off-ramps. The Jamaica Bay Greenway bicycle and pedestrian path runs parallel to Shore Parkway and past the pier. Parking is available on the pier but currently restricted from commuters.



Canarsie Pier

Existing Infrastructure

A large recreational pier (approximately 400 by 625 feet) built in 1926 with parking in the center and tree lined walkway around the edge. Existing pier structure should be assessed to determine if it could support ferry services, but would need some improvements to allow for access to/from a barge and the ferry. Consideration would be required for how ferry service would affect the recreational activities, like fishing, that take place at the pier.



- » **Ownership:** National Park Service
- » **Zoning:** PARK

Implementation Requirements

- » A standard NYC Ferry landing would need to be installed along the pier for ferry service.
- » A preferred location would need to be determined for a barge, with guide piles and access to the pier, along the pier to berth a vessel for ferry service.
- » Coordination with National Parks Service would be required to incorporate the ferry landing in an environmentally sensitive way.
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; agreement with National Park Service
- » **Estimated Capital Cost:** \$8 million

Waterside Access

Water depths in vicinity of the pier appear adequate (15 to 29 feet), making vessel access and approach feasible from either the southwest or northeast side of the pier. Access from the Southeast would likely be preferred operationally. However, the charts indicate more water to northeast for approach and turning. A pile field is located on the west side of pier, which may impact the approach from this side. However, removal of the pile field may represent a mitigation strategy for installation of a barge at this location. Inside Jamaica Bay, this site should be relatively protected from significant wave generation (limited swell, but some wind generated waves). The beach next to the pier supports canoe/kayak launch with recreational traffic in this area and should be considered.

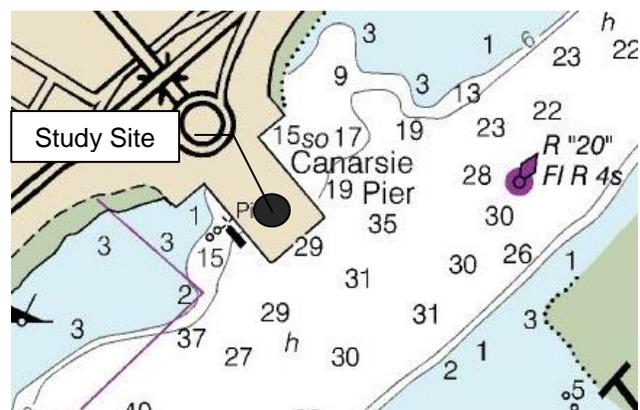


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Canarsie Pier

TRAVEL TIME COMPARISON

The estimated non-stop ferry trip time is slightly slower to other modes of transit to Lower Manhattan, and 6 minutes longer than an estimated transit trip to Midtown. Ferry travel time would increase with additional stops along a potential route, thereby making it even less competitive to existing transit.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	40-80 min / \$11.06	(3 transit legs) 65 min / \$2.75	(~22 miles) 67 min / \$2.75	+2 min
Midtown West (Midtown / West. 39th Street)	45-110 min / \$9.10	(3 transit legs) 74 min / \$2.75	(~25 miles) 80 min / \$2.75	+6 min

Bush Terminal

SUMMARY

The Bush Terminal site is located at the end of 43rd Street in the Sunset Park neighborhood of Brooklyn. The site is near the planned Made in New York campus as well as the Industry City complex and the South Brooklyn Marine Terminal.

The wider Bush Terminal area is both an employment hub and part of the Sunset Park residential neighborhood.

Waterside access to this site is similar to the existing NYC Ferry landing at Sunset Park/Brooklyn Army Terminal, located a mile to the southwest. Due to this proximity, the route relationship between these two sites would need careful consideration.



A landing would need a barge with piles and potentially a fixed pier in order to berth a vessel for ferry service at this site.

Depending on the route configuration, a landing at this site could provide a faster connection to Manhattan compared to existing transit options, given that this growing waterfront job center is approximately a 15 walk from the closest subway.

MARKET AREA

The market area for potential ferry trips from Bush Terminal includes the area from Prospect Expressway (Route 27) to Gowanus Expressway (I-278), and extending as far as 4th Avenue.



» **Daily Commute Transit Trips:** ~5,700

- **Trips to Lower Manhattan:** ~980
- **Trips to Midtown Manhattan:** ~745

» **Transit Access:** Bus and Subway

- **Bus:** B11 ~0.4 miles from site
- **Subway:** N and R lines ~0.6 miles from site

» **Ferry Travel Time to Manhattan:** Direct ferry trip would be faster than transit.

Bush Terminal

BACKGROUND INFORMATION

Neighborhood Characteristics

The site is located in the Sunset Park neighborhood. Surrounding uses are primarily manufacturing and industrial use.

Adjacent Properties / Waterway Use / Special Sites

The existing Sunset Park/Brooklyn Army Terminal landing site is located approximately 0.75 miles southwest along the waterfront. Industry City is located nearby. The South Brooklyn Marine Terminal is located three blocks to the north, also along the waterfront.

Recent and Planned Substantial Development near Potential Sites

NYCEDC is developing the Made in New York campus adjacent to Bush Terminal Piers Park, anticipated to complete construction in 2020. The site will include a 200,000-square-foot garment manufacturing hub, and a 100,000-square-foot film and television production facility, and is anticipated to create 1,500 jobs. Further investment in Industry City is expected.

Latitude,	40.654899,
Longitude	-74.017061
Census Tract	18
Approx. Location	Marginal St and 43rd St, Brooklyn, NY 11232
Previously Studied by EDC	No
Borough	Brooklyn
Borough President	Eric Adams
City Council District	38
Council Member	Carlos Menchaca
Community Board	7

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

The most likely site for a ferry landing would be the end of 43rd Street by the northwestern entrance to Bush Terminal Piers Park, which has both bicycle and pedestrian access. The blocks adjacent to the site are mainly industrial. The park has a small parking lot (approximately 50 spaces) in proximity to the potential ferry landing.



Bush Terminal

Existing Infrastructure

There are no servicable pier structures remaining at this location; rather, much of the park consists of walkways built on rock/rubble jetties that form the boundaries of the park. New NYC Ferry facilities would need to be installed and would likely require a new pier.

- » **Ownership:** NYC Department of Small Business Services
- » **Zoning:** M3-1

Implementation Requirements

- » Requires installation of a standard NYC Ferry landing including a barge and gangway. Depending upon the water depths in the preferred location, a fixed pier may be necessary to move the barge away from the rock/rubble jetties.
- » The extent of the offshore pier ruins may need to be determined to assess safe waterside access.
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; Mayoral Zoning Override
- » **Estimated Capital Cost:** \$8-12 million depending on the length and cost of pier

Waterside Access

Waterside access would be through the waters of New York Harbor Upper Bay and across the Bay Ridge Channel. This access would be very similar to waterside access to the existing ferry service at Sunset Park/Booklyn Army Terminal. Water depths appear adequate, but pier ruins and pile remnants in proximity to the site would need to be assessed for safe in-close navigation.

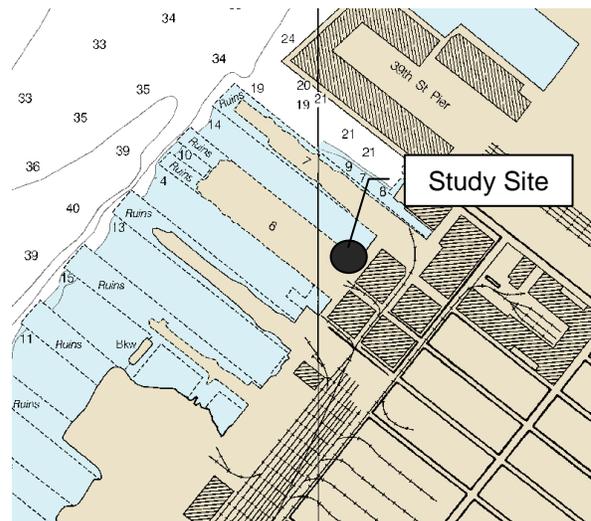


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Bush Terminal

TRAVEL TIME COMPARISON

The estimated direct ferry travel time is faster than transit, but the inclusion of a Bush Terminal stop in a route with other stops would dictate whether ferry service would be time competitive.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	24-55 min / \$3.11	(1 transit leg) 43 min / \$2.75	(~4 miles) 26 min / \$2.75	-17 min
Midtown West (Midtown / West 39th Street)	30-75 min / \$4.74	(1 transit leg) 48 min / \$2.75	(~8 miles) 37 min / \$2.75	-11 min

Sheepshead Bay

SUMMARY

Sheepshead Bay ferry landing could be located inside Sheepshead Bay at either the eastern end of Manhattan Beach adjacent to Kingsborough Community College or across the Bay at the terminus of Brigham Street, both in southern Brooklyn.

There is no existing landing infrastructure at either location.

Sheepshead Bay experiences relatively heavy recreational boating traffic, with an active vessel anchorage area throughout the Bay, representing a navigational challenge that would need to be managed. Locations further into the Bay were not considered because of the volume of recreational traffic, the varying water depths, and the slow speeds required within the Bay. The beach on the southern shore of Manhattan Beach was also explored, but the site was determined to be too exposed to adverse weather conditions to be considered as a ferry landing site.

On average, a non-stop ferry trip would only be similar to existing transit travel times to Lower and Midtown Manhattan.



MARKET AREA

The market area for potential ferry trips from Sheepshead Bay includes the area east of Coney Island Avenue, south of Avenue V, and west of Gerritsen Avenue. This market area would be different depending on which side of the Bay the ferry landing was located.



- » **Daily Commute Transit Trips:** ~7,200
 - **Trips to Lower Manhattan:** ~800
 - **Trips to Midtown Manhattan:** ~700

- » **Transit Access:** Bus
 - **Bus:** B1 and B49 ~.3 miles from site
 - **Subway:** B and Q Lines ~1.5 miles

- » **Ferry Travel Time to Manhattan:** Direct ferry trip would be similar to transit to both Manhattan destinations.

Sheepshead Bay

BACKGROUND INFORMATION

Neighborhood Characteristics

The Manhattan Beach and Sheepshead Bay neighborhood is primarily residential, comprised of single-family homes. Kingsborough Community College is located at the eastern end of Manhattan Beach.

Adjacent Properties / Waterway Use / Special Sites

The site is adjacent to the 71-acre Kingsborough Community College, which has approximately 20,000 students. Manhattan Beach Park is located nearby.

Recent and Planned Substantial Development near Potential Site

No major recent or potential developments in proximity to the sites were identified.

Latitude,	40.581056,
Longitude	-73.937286
Census Tract	616
Approx. Location	Shore Blvd and Pembroke St, Brooklyn, NY 11235
Previously Studied by EDC	No
Borough	Brooklyn
Borough President	Eric Adams
City Council District	48
Council Member	Chaim M. Deutsch
Community Board	15

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

The Manhattan Beach site is easily accessible for pedestrians via a 17-foot-wide waterfront walkway. Limited on-street parking is available on Shore Boulevard and in the neighborhood. A gangway would likely need to be constructed from the seawall to move passengers to a fixed barge accommodating ferry operations.

The Bringham Street site consists of a public right of way with vehicle parking on the east and west sides of the street with limited pedestrian improvements. Pedestrian and bicycle infrastructure improvements would likely be needed for safe access to a landing at this location.



Seawall along the south side of Sheepshead Bay.

Sheepshead Bay

Existing Infrastructure

There is no existing in-water infrastructure suitable for NYC Ferry. A typical NYC Ferry bow-loading landing would need to be constructed. Siting and configuration of a new barge would need to be coordinated with NYC Parks to ensure safe ferry operations and minimize the impact on recreational boat traffic.



Looking southeast at the entrance of Sheepshead Bay.

Waterside Access

Waterside access to this site would be from Rockaway Inlet into Sheepshead Bay through well-marked waterways. Sheepshead Bay is an active recreational boating area, possessing two anchorages for vessels separated by a marked channel. Ferries entering Sheepshead Bay would need to slow to a safe navigating speed.

The center of the channel is approximately 200 feet north of the southern shore. The entrance to Sheepshead Bay is wide enough to support ferry transits but sand build up on the southern edge of the entrance may need to be managed over time to ensure continued adequacy of water depths. The mooring bouys in the anchorage are managed by NYC Parks, and coordination would be required with Parks to establish a permanent access through the south anchorage area for ferry operations.

- » **Ownership:** City Ownership
- » **Zoning:** R3-1

Implementation Requirements

- » Construct standard NYC Ferry landing from the seawall at either location.
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; agreement with New York City Department of City Planning New York City Department of Parks and Recreation; Mayoral Zoning Override
- » **Estimated Capital Cost:** \$8 million

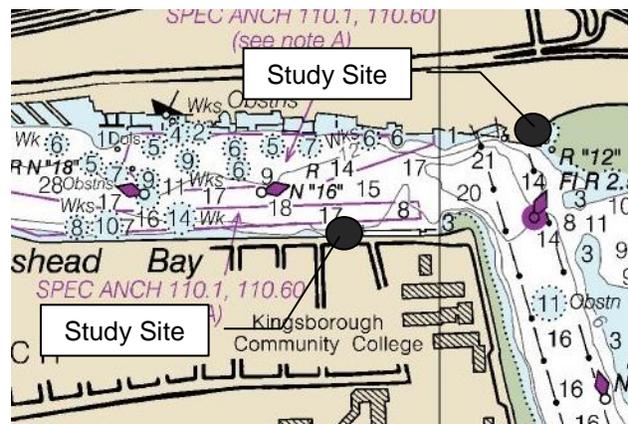


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Sheepshead Bay

TRAVEL TIME COMPARISON

A direct ferry service from Sheepshead Bay to the Battery Park City or Midtown / West 39th Street Terminal would be comparable to existing transit options. Travel time estimates to the terminals at Wall St/Pier 11 and East 34th Street ferry terminals would be comparable.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	Car	Transit	Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery park City)	35-75 min / \$8.56	(3 transit legs) 60 min / \$2.75	(~16 miles) 56 min / \$2.75	-4 min
Midtown West (Midtown / West 39th Street)	40-100 min / \$9.92	(2 transit legs) 71 min / \$2.75	(~19 miles) 68 min / \$2.75	-3 min

Bath Beach

SUMMARY

The Bath Beach site is located in southern Brooklyn at the end of Bay Parkway and is adjacent to Bensonhurst Park and Caesar's Bay Shopping Center. There is no supporting waterfront infrastructure at this location, so a new landing facility would need to be installed.

A terminal at this location could provide a faster alternative to existing transit options for people traveling to/from Lower and Midtown Manhattan.

This site is relatively exposed to the sea and wind coming from the southwest. This could lead to times of vessel-dock interface issues that may make reliable service from this site problematic.



MARKET AREA

The market area for potential ferry trips from Bath Beach includes the area east of 18th Avenue, south of Bay Ridge Parkway and Avenue P, west of Coney Island Avenue, and north of Belt Parkway.



- » **Daily Commute Transit Trips:** ~23,350
 - **Trips to Lower Manhattan:** ~3,000
 - **Trips to Midtown Manhattan:** ~2,555

- » **Transit Access: Bus**
 - **Bus:** B6, B82, X28, X38 ~0.3 miles from site
 - **Subway:** D Line ~0.7 miles

- » **Ferry Travel Time to Manhattan:** A direct ferry offers a slightly faster trip than transit to both Manhattan destinations.

Bath Beach

BACKGROUND INFORMATION

Neighborhood Characteristics

The community of Bath Beach is comprised of mainly semi-attached houses and low-rise apartment buildings, with a mix of commercial properties.

Adjacent Properties / Waterway Use / Special Sites

The properties adjacent to this location are Bensonhurst Park and Caesar's Bay Shopping Center. The Adventures Amusement Park is located approximately a half a mile south.

Recent and Planned Substantial Development near Potential Site

No substantial development plans were noted in this area.

Latitude,	40.594147,
Longitude	-74.002164
Census Tract	292 / 294
Approx. Location	Bay Pkwy and Shore Pkwy, Brooklyn, NY 11214
Previously Studied by EDC	No
Borough	Brooklyn
Borough President	Eric Adams
City Council District	43
Council Member	Justin Brannan
Community Board	11

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

In proximity to this site, Bay Parkway has wide sidewalks on both sides and perpendicular parking spaces on both sides. A pedestrian and bike path runs along the waterfront of Bensonhurst Park and connects to the site. There is a large parking lot adjacent to the site connected to the Caesar's Bay Shopping Center.



Bath Beach

Existing Infrastructure

There is no existing in-water infrastructure at the site. A standard NYC Ferry landing with a barge and gangway would need to be constructed.



- » **Ownership:** NYC Parks and Recreation
- » **Zoning:** C4-2A

Implementation Requirements

- » Requires installation of a standard NYC Ferry landing including a barge and gangway
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits, Mayoral Zoning Override
- » **Estimated Capital Cost:** \$8 million

Waterside Access

Access to this site would be straightforward through Gravesend Bay. Water depths appear adequate up to a location directly off the street end and up to the existing promenade where they may be too shallow, which would likely require a fixed pier to get to sufficient water depths. A detailed water depth survey would be required to confirm feasibility. The location may receive some protection from weather by Norton Point on Coney Island, but the site is open to the southwest winds that would be considerable. These winds could lead to times of vessel-dock interface issues that may make reliable service from this site problematic.

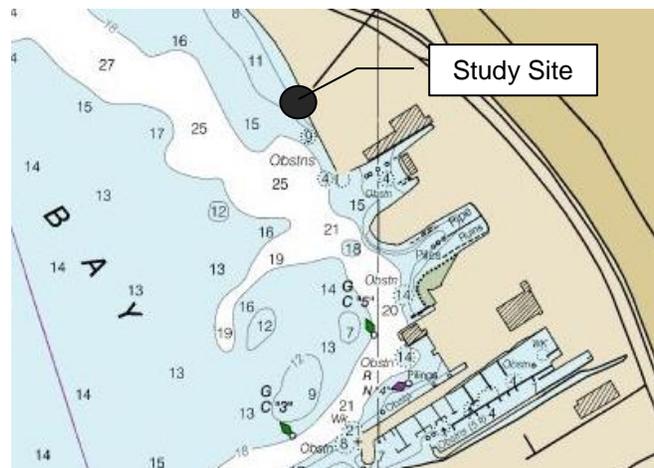
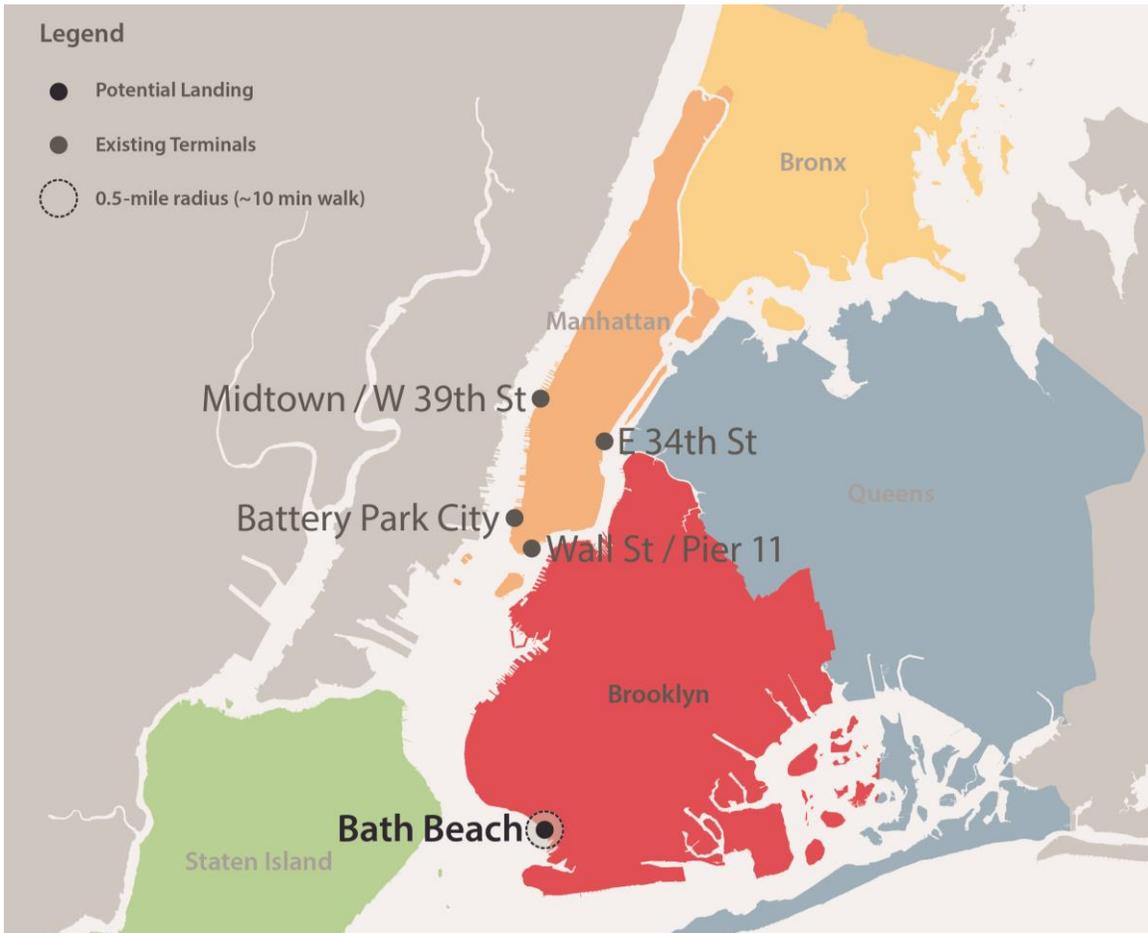


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Bath Beach

TRAVEL TIME COMPARISON

The estimated direct ferry travel time is marginally faster than transit, but the inclusion of a Bath Beach stop in a route with other stops would determine whether ferry service would be time competitive to existing transit options.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	Car	Transit	Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	25-65 min / \$6.65	(2 transit legs) 50 min / \$2.75	(~10 miles) 44 min / \$2.75	-6 min
Midtown West (Midtown / West 39th Street)	35-85 min / \$8.07	(2 transit legs) 60 min / \$2.75	(~14 miles) 56 min / \$2.75	-4 min

West 70th Street

SUMMARY

The pier at West 70th Street is located in the Upper West Side neighborhood of Manhattan along the Hudson River Park. With high-density residential development adjacent to the pier, this site could serve commuters living close to the water who would normally walk east to access the subway. The ferry could provide comparable travel times as other transit options to other Manhattan destinations.

While there is an existing pier structure, modifications would be required to the pier to accommodate the requisite ferry infrastructure. A new NYC Ferry landing would need installation of a gangway, guide piles, and a barge.

This site profile examines the West 70th Street Pier specifically, but other sites between West 55th Street and West 70th Street could be alternatives to ferry landing placement within the neighborhood.



MARKET AREA

The market area studied is within approximately 0.5 miles (58th Street to 82nd Street) of the study site.



- » **Daily Commute Transit Trips:** ~34,700
 - **To Lower Manhattan:** ~1,100
 - **To Midtown Manhattan:** ~5,700

- » **Transit Access:** Bus and Subway
 - **Bus:** M72 is adjacent to the site. M5, M11, M57, M66, M104 ~0.5 miles from site
 - **Subway:** 1, 2 and 3 Trains ~0.5 miles from site

- » **Ferry Travel Time to Manhattan:** Similar transit to Lower Manhattan, slower than transit to Midtown.

West 70th Street

BACKGROUND INFORMATION

Neighborhood Characteristics

The adjacent neighborhood consists of high-density residential development. There is a commercial area parallel to the waterfront that serves the residential districts within the neighborhood.

Adjacent Properties / Waterway Use / Special Sites

The landing is located immediately adjacent Riverside Park to the north and south with a café adjacent to the pier. There is a walk up a short hill and at-grade crossing of the West Side Highway to access the neighborhood east of the landing. Adjacent land uses also include predominately residential with commercial further east.

Recent and Planned Substantial Development near Potential Site

Three active construction projects within near the site would add 120 residential units in the future.

Latitude,	40.779798,
Longitude	-73.989279
Census Tract	155/159
Approx. Location	500 W 70th St, New York, NY 10069
Previously Studied by EDC	2011, 2013
Borough	Manhattan
Borough President	Gale Brewer
City Council District	6
Council Member	Helen Rosenthal
Community Board	7

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Pedestrian access is via a wide waterfront sidewalk and Riverside Park. The Hudson River Greenway parallels the waterfront, providing pedestrian and bike access. There is no parking located directly near the site.



West 70th Street

Existing Infrastructure

The infrastructure at this location consists of a relatively new approximately 700-foot-by-60-foot pier, which is part of the Riverside Park. The pier does not include a gangway, barge, and guide piles that would support ferry operations, but it does have locations appropriate to add them. A ferry barge would likely be located along the pier rather than near the shore.



- » **Ownership:** NYC Parks and Recreation
- » **Zoning:** PARK

Implementation Requirements

- » A gangway, barge and guide piles to berth a ferry.
- » Design and placement of a barge need to consider the Pier 1 Gantry ruins.
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits
- » **Estimated Capital Cost:** \$8 million

Waterside Access

The applicable water depth chart does not show the relatively new pier at the end of West 70th Street, but clearly shows where the pier is located. Waterside access on the up-river side of the pier appears unencumbered, except the water depths may be reduced near shore and would need to be confirmed if the new landing were constructed in this location.

On the down-river side of the pier, the water depths appear adequate, but remnants from the Pier 1 Gantry structure remain. These ruins may represent an impediment for inshore ferry operations, but appear not to interfere with offshore maneuvering. Site selection on this side of the pier would need to consider these potential obstructions.

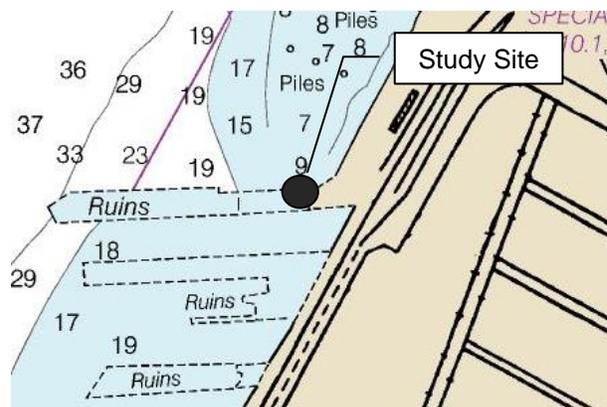


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

West 70th Street

TRAVEL TIME COMPARISON

The direct ferry trip time to Lower Manhattan would be similar to transit, but transit is significantly faster than a ferry trip to Midtown Manhattan.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	18-50 min / \$2.89	(1 transit leg) 30 min / \$2.75	(~5 miles) 31 min / \$2.75	+1 min
Midtown West (Midtown / West 39th Street)	8-22 min / \$0.98	(1 transit leg) 19 min / \$2.75	(~ 2 miles) 29 min / \$2.75	+10 min

West 125th Street

SUMMARY

The West 125th Street study site is located at the West Harlem Piers adjacent to the Manhattanville / West Harlem neighborhoods. The potential landing is located along the Hudson River greenway trail system with good pedestrian and bicycle access. Columbia University is in the process of building a new Manhattanville campus in this neighborhood.

The majority of residential density is located inland closer to the subway, which makes ferries less competitive as a mode. Generally, the subway offers faster travel times and more connections to lower and midtown Manhattan compared to a ferry route.



MARKET AREA

The market area for potential ferry trips is within an approximate 0.5 miles (116th Street to 150th Street) of the site.



- » **Daily Commute Transit Trips:** ~50,600
 - **Trips to Lower Manhattan:** ~1,000
 - **Trips to Midtown Manhattan:** ~2,700
- » **Transit Access:** Bus and Subway
 - **Bus:** M4, M5, M11, M11 and M1.04 ~0.5 miles from site
 - **Subway:** 72nd Street/Broadway Station (lines 1 and 2) ~0.5 miles from site
- » **Ferry Travel Time to Manhattan:** Comparable to transit to Lower Manhattan, longer than transit to Midtown.

West 125th Street

BACKGROUND INFORMATION

Neighborhood Characteristics

The West 125th Street landing is adjacent to the Manhattanville / West Harlem neighborhoods. The area has primarily of high-density residential and neighborhood commercial development. The wider neighborhood is also home to Columbia University.

Adjacent Properties / Waterway Use / Special Sites

The pier connects to West Harlem Piers Park via an existing trail system along the waterfront. East of the pier is residential and commercial development. The site is approximately 0.25 miles from the Riverside Park Community, with 1,200 apartment units.

Recent and Planned Substantial Development near Potential Site

Columbia University is building a new campus near this location; the first buildings opened in 2018.

Latitude,	40.819924,
Longitude	-73.960456
Census Tract	219
Approx. Location	Marginal St and W 132nd St, New York, NY 10027
Previously Studied by EDC	2011, 2013
Borough	Manhattan
Borough President	Gale Brewer
City Council District	7
Council Member	Mark Levine
Community Board	9

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Pedestrian access would be to/from the waterfront sidewalk. The Hudson River Greenway parallels the waterfront, providing pedestrian and bike access. There is limited street parking available near the site.



West 125th Street

Existing Infrastructure

At this location on the Hudson River, there are two potential sites. The West Harlem Pier is a relatively new pier that does not currently possess a barge that would accommodate ferry operations, but a barge could be added to this location. Just down river from this location is the USS Baylander museum that does incorporate a barge with the capability to accommodate a single bow-loader ferry at the southern offshore end of the barge.



- » **Ownership:** NYC Department of Small Business
- » **Zoning:** M1-1

Implementation Requirements

- » Depending upon the site selection, a gangway, barge and guide piles may need to be installed at this location.
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; Mayoral Zoning Override
- » **Estimated Capital Cost:** \$8 million

Waterside Access

This site possesses easy access from the Hudson River. However, the applicable NOAA chart does not show the West Harlem Pier structures. Accordingly, the adequacy of water depths in proximity to the up-river pier is unknown. However, given the proximity of deep water to shore, the use of gangway and barge to attain safe navigation would likely be possible. The down-river site has an existing bow-loading barge and gangway that would appear to accommodate ferry operations. The level of currents in this area are not known, but are not anticipated to interfere with bow-loader ferry operations.

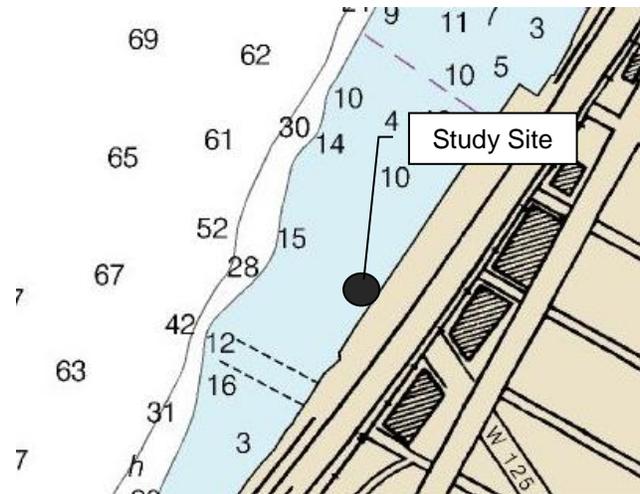


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

West 125th Street

TRAVEL TIME COMPARISON

On average, a direct ferry trip would be comparable to transit when traveling to Lower Manhattan but longer than existing transit when traveling to Midtown. Ferry travel times would increase on a route with multiple stops.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	Car	Transit	Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	24-55 min / \$4.80	(1 transit leg) 41 min / \$2.75	(~8 miles) 38 min / \$2.75	-3 min
Midtown West (Midtown / West 39th Street)	16-35 min / \$3.11	(1 transit leg) 25 min / \$2.75	(~5 miles) 37 min / \$2.75	+12 min

Inwood / Dyckman Street

SUMMARY

The ferry study site is located at the end of Dyckman Street at the southern waterfront end of Inwood Hill Park in Manhattan.

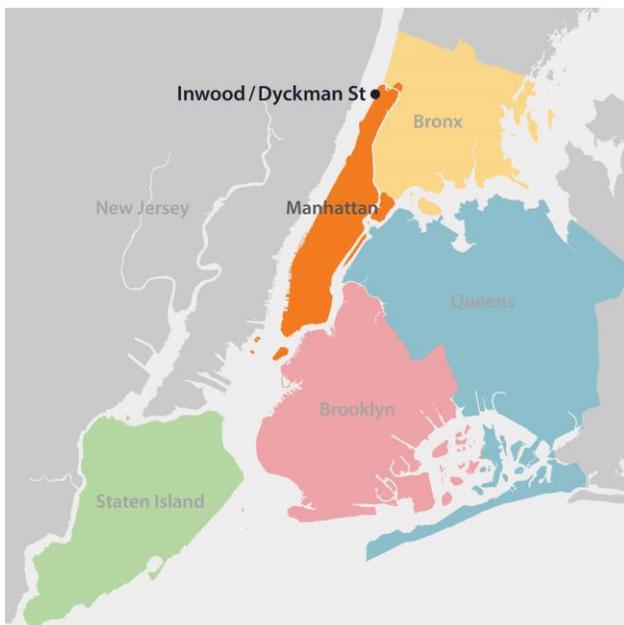
The Inwood neighborhood begins about 800 feet east of the ferry site and has two subway lines, which are faster than any potential ferry route.

An existing pier that would likely require modifications to support a ferry barge. The site appears to have adequate water depths and no noted navigational obstacles.



MARKET AREA

The market area for potential ferry trips from Inwood / Dyckman Street includes all areas within approximately 0.5 miles (190th Street to northern edge of Manhattan) of the site.



- » **Daily Commute Transit Trips:** ~19,100
 - **Trips to Lower Manhattan:** ~290
 - **Trips to Midtown Manhattan:** ~640
- » **Transit Access:** Bus and Subway
 - **Bus:** M4, and M100 within 0.35 miles from site
 - **Subway:** Dyckman Street Station (A Train) is ~0.35 miles from site; 1 Train is ~0.65 miles from site
- » **Ferry Travel Time to Manhattan:** Comparable to transit to Lower Manhattan, longer than transit to Midtown Manhattan.

Inwood / Dyckman Street

BACKGROUND INFORMATION

Neighborhood Characteristics

The Inwood neighborhood that borders the park area is primarily low-density commercial and mid-density residential with commercial space at street level. The intersection of Broadway and Dyckman Street, two of Inwood’s major commercial corridors, is about 0.3 miles away from the potential ferry landing.

Adjacent Properties / Waterway Use / Special Sites

There is park space and greenways along the waterfront to the north and south of the potential landing. Immediately south of the landing is a small recreational marina, and south of the marina is a community canoe and kayak club.

Recent and Planned Substantial Development near Potential Site

In August 2018, the City Council approved a rezoning and Inwood NYC Action Plan for \$200 million investment to the neighborhood, with goals that include connecting the neighborhood to the Harlem River and improving infrastructure for increased connectivity.

Latitude,	40.869401,
Longitude	-73.932164
Census Tract	287/297
Approx. Location	348 Dyckman St, New York, NY 10034
Previously Studied by EDC	2011, 2013
Borough	Manhattan
Borough President	Gale Brewer
City Council District	10
Council Member	Ydanis Rodriguez
Community Board	12

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Pedestrian access is available via sidewalk and the Inwood Hill Park walkways. The Hudson River Greenway parallels the waterfront, providing pedestrian and bike access. There is a small parking lot located near the marina.



Inwood / Dyckman Street

Existing Infrastructure

The pier at the Dyckman Marina is an L-shaped pier. The offshore side of this pier could accommodate a gangway and barge that would be necessary to support ferry operations. Structural modifications to the existing pier, or construction of a new pier, are likely necessary to accommodate the gangway and barge.

The Inwood Action Plan includes \$22 million for repairs to Dyckman Pier and improvements to access the pier to encourage cultural and excursion vessels to use the facility.

Waterside Access

The Hudson River provides ready access to this location from either the south or north. The river depths would support ferry operations up to and around the pier. There may be river currents at this location, but they should not interfere with ferry operations. The Hudson River Community Sailing marina is located down river to the south, as well as the Inwood Canoe Club.

» **Ownership:** NYC Parks and Recreation

» **Zoning:** R7-2

Implementation Requirements

» A structural inspection would be necessary to determine if structural modifications are required to accommodate a gangway and barge.

» Coordination with the marina and canoe club.

» **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; Mayoral Zoning Override

» **Estimated Capital Cost:** \$8 million

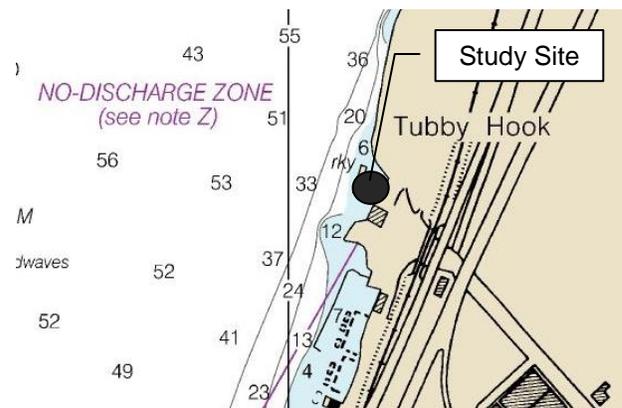


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Inwood / Dyckman Street

TRAVEL TIME COMPARISON

A direct ferry would be a little slower than current transit when traveling to Lower and Midtown Manhattan, though additional stops on the route would slow the ferry time even more.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	28-60 min / \$6.65	(2 transit legs) 41 min / \$2.75	(~12 miles) 44 / \$2.75	+3 min
Midtown West (Midtown / West 39th Street)	20-40 min / \$5.01	(1 transit leg) 35 min / \$2.75	(~8.5 miles) 42 / \$2.75	+7 min

Randall's Island

SUMMARY

The Randall's Island study site focused on the existing ferry landing on the northwestern corner of the island. Sports fields and facilities, plus a wastewater treatment plant and hospitals predominantly occupy Randall's Island.

The primary users of the existing ferry landing are charter vessels for special events and festivals.



MARKET AREA

The market area for potential ferry trips from this location includes all of Randall's Island.



- » **Daily Commute Transit Trips:** ~3,000
 - **Trips to Lower Manhattan:** Less than 30
 - **Trips to Midtown Manhattan:** Less than 30
- » **Transit Access:** Bus
 - M35 bus stops are ~0.4 miles away.
- » **Ferry Travel Time to Manhattan:** Direct ferry could be faster than transit to Lower Manhattan and comparable to Midtown East.

Randall's Island

BACKGROUND INFORMATION

Neighborhood Characteristics

The Island is primarily a park with a water treatment facility on the east side of the island and some hospitals, shelters, and other activities to the south.

Adjacent Properties / Waterway Use / Special Sites

The park consists of sports fields and trails. On the east side of the island there is a water treatment facility. Randall's Island Park frequently hosts special events like music festivals and art fairs. Private ferry companies currently provide chartered service to the island.

Recent and Planned Substantial Development near Potential Site

Planning is underway for a new golf center nearby the existing ferry landing, anticipated to be complete by 2020.

Latitude,	40.797368,
Longitude	-73.927246
Census Tract	240
Approx. Location	1 Randall's Is. Rd, New York, NY 10035
Previously Studied by EDC	2011
Borough	Manhattan
Borough President	Gale Brewer
City Council District	8
Council Member	Diana Ayala
Community Board	11

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

The Harlem River Pathway parallels the waterfront, providing pedestrian and bike access. Car access to the island is via the RFK (Triborough) Bridge. There is free parking on the island.



Randall's Island

Existing Infrastructure

This site on Harlem River possesses an existing barge that connects via gangway to shore at Randall's Island Road. The gangway and barge could support NYC Ferry operations. The barge is fit with three bow-loading slips, providing good flexibility and redundancy.



- » **Ownership:** NYC Parks and Recreation
- » **Zoning:** PARK use

Implementation Requirements

- » Vessel fit-up and alignment would need to be validated.
- » **Approvals needed:** Department of Parks and Recreation
- » **Estimated Capital Cost:** If the existing structure can be utilized, less than \$2 million for anticipated upgrades

Waterside Access

Waterside access to this site would be through the Harlem River, which is connected directly to the East River, providing straightforward and well marked vessel access. The NOAA chart indicates shallow water near shore to the down-river side of the existing barge, but this should not represent a navigational impediment to service at this location.

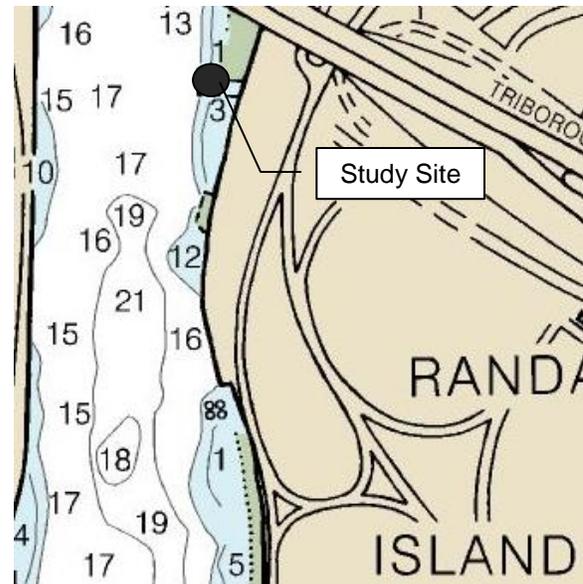


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Randall's Island

TRAVEL TIME COMPARISON

A direct ferry trip would be faster than transit to Lower Manhattan and slightly faster than transit to Midtown East.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Wall Street / Pier 11)	30-55 min / \$5.78	(2 transit legs) 52 min / \$2.75	(~8 miles) 43 min / \$2.75	-9 min
Midtown East (East 34th Street)	26-50 min / \$3.76	(2 transit legs) 41 min / \$2.75	(~4 miles) 40 min / \$2.75	-1 min

East Harlem

SUMMARY

The East Harlem waterfront was requested by the general public and elected officials to include in the 2018 study. The area between East 102nd and East 117th streets were looked at, with consideration to where a ferry landing could be placed that is near pedestrian crossings over FDR Drive.

The neighborhood consists primarily of medium-density residential and neighborhood commercial development. The waterfront is four blocks from the Lexington Avenue subway, and Phase 2 of the Second Avenue subway could bring further transit connectivity in the future.



Within the study area, there is an existing NYC Parks and Recreation pier at 107th Street, though it is currently closed to the public. Either repair of this pier or an entirely new pier structure would be required in order to reach the water depths needed for ferry service. At this part of the East River a pier would need to extend into the channel 300 to 400 feet.

MARKET AREA

The estimated market area for potential ferry passengers is between 94th Street and 105th Street east of 3rd Avenue and approximately from 105th Street to 132nd Street east of 5th Avenue.



- » **Daily Commute Transit Trips:** ~10,200
 - **Trips to Lower Manhattan:** ~200
 - **Trips to Midtown Manhattan:** ~1,200
- » **Transit Access: Bus**
 - **Bus:** M106, M15, M15-SBS are located within ~0.4 miles from the site.
 - **Subway:** 110 St Station 6 line ~0.6 miles from site
- » **Ferry Travel Time to Manhattan:** Direct ferry would be faster than transit to Lower Manhattan, slower than transit to Midtown.

East Harlem

BACKGROUND INFORMATION

Neighborhood Characteristics

The site borders the East Harlem North and South neighborhoods that are primarily medium-density residential housing. There are neighborhood commercial areas concentrated along 2nd Avenue and Lexington Ave west of the landing.

Adjacent Properties / Waterway Use / Special Sites

The sites are near the 1199 Plaza development, which include 1,500 housing units. Thomas Jefferson Park is located one block to the north of the landing site, and includes sports facilities and a pool.

Recent and Planned Substantial Development near Potential Sites

NYCEDC and NYC Parks and Recreation have identified this section of waterfront for a restoration and preservation project as part of the continuous waterfront esplanade.

Separately, a rezoning plan was approved in November 2017 for the East Harlem neighborhood to allow higher density development.

Latitude,	40.791431,
Longitude	-73.935448
Census Tract	162/178
Approx. Location	East 111th St & FDR Dr, New York, NY 10029
Previously Studied by EDC	No
Borough	Manhattan
Borough President	Gale Brewer
City Council District	8
Council Member	Diana Ayala
Community Board	11

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

The East 111th Street pedestrian bridge is located adjacent to the site and provides pedestrian access over FDR Drive. Bobby Wagner Walk is a pedestrian and bike pathway running along the Harlem River waterfront. Although Pier 107 is adjacent to the riverfront walkway, there is no access to the dilapidated pier.

The East 107th Street pier can be accessed by crossing FDR Drive from the neighborhood or along the riverfront walkway.



Photo shows East 111th Street Pier.

East Harlem

Existing Infrastructure

A new gangway and barge would be required for passenger ferry service, built off a 300- to 400-foot pier to allow for sufficient water depths for ferry service. There is an existing pier at 107th Street, but is in need of costly capital repairs and currently closed to the public.



Photo shows East 107th Street Pier.

» **Ownership:** NYC Parks and Recreation

» **Zoning:** R7-2

Implementation Requirements

» The existing 107th Street pier would need costly structural repairs.

» A 300- to 400-foot pier that extends into the Harlem River would be required to attain adequate water depths, along with a standard NYC Ferry bow-loading barge.

» **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permit; agreement with New York City Department of City Planning and New York City Department of Parks and Recreation; Mayoral Zoning Override

» **Estimated Capital Cost:** ~\$12+ million depending on pier requirements

Waterside Access

Waterside access to this site would be through the Harlem River, transiting through Hell Gate and into the East River.

Water depths in proximity to the location of the current pier are insufficient for ferry operations.

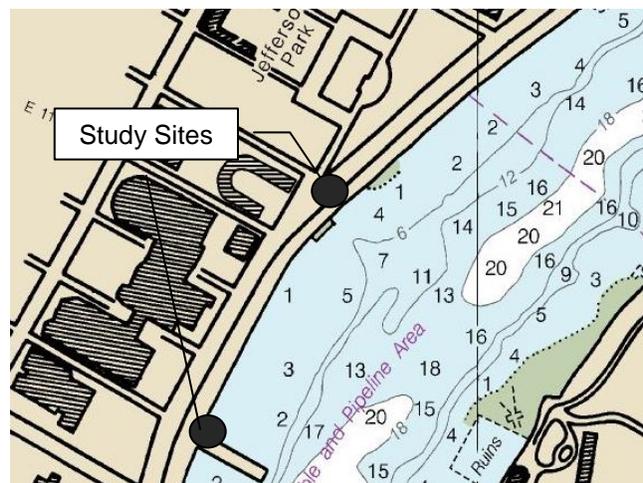


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

East Harlem

TRAVEL TIME COMPARISON

A direct ferry trip from this location to Lower Manhattan would be slightly faster than transit, but slower than transit to Midtown East. However, the inclusion of an East Harlem stop in a route with other stops would dictate whether ferry service would be time competitive.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Wall Street / Pier 11)	24-45 min / \$4.69	(2 transit legs) 45 min / \$2.75	(~5 miles) 38 min / \$2.75	-7 min
Midtown East (East 34th Street)	20-40 min / \$2.67	(1 transit leg) 29 min / \$2.75	(~ 2 miles) 35 min / \$2.75	+6 min

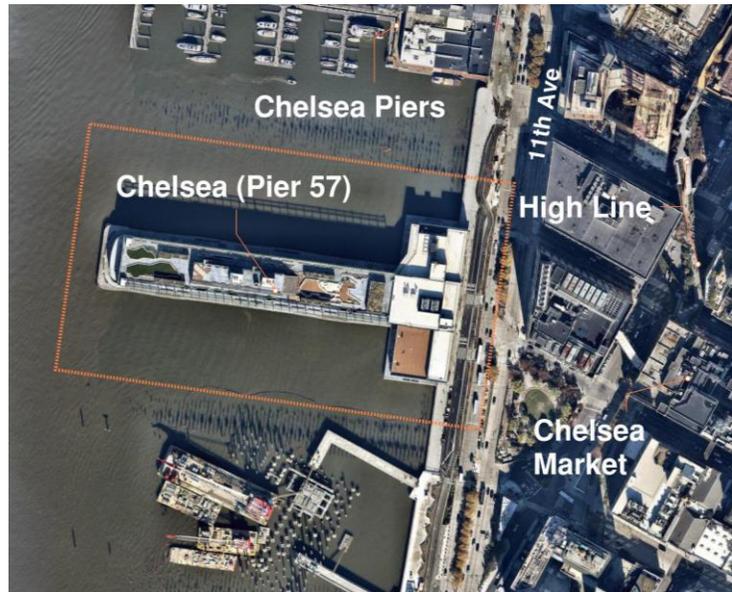
Chelsea (Pier 57)

SUMMARY

The neighborhood of Chelsea was included in the ferry study, with focus on the Pier 57 site on the Hudson River at the intersection of 11th Avenue and 15th Street. The pier is owned by the Hudson River Trust and leased to Google, but retains public access at the perimeter.

There is no ferry infrastructure in place at this location. For NYC Ferry service, a newly constructed barge would need to be located near the western end of the pier to ensure adequate water depths.

Ferry service to Lower and Midtown Manhattan ferry terminals would be longer than existing transit options.



MARKET AREA

The market area for potential ferry trips from Chelsea (Pier 57) includes the area between Lincoln Tunnel, 10th Ave, and West 23rd Street and the area south of 23rd Street, west of 6th Avenue, and north of the Holland Tunnel.



- » **Daily Commute Transit Trips:** ~36,000
 - **Trips to Lower Manhattan:** ~6,000
 - **Trips to Midtown Manhattan:** ~5,100
- » **Transit Access:** Bus and Subway
 - **Bus:** M14A, M14D, and M11 ~0.15 miles from site
 - **Subway:** 14th Street Station - A, C, and E ~0.45 miles from site
- » **Ferry Travel Time to Manhattan:** Comparable trip time with existing transit to both Manhattan destinations.

Chelsea (Pier 57)

BACKGROUND INFORMATION

Neighborhood Characteristics

The Chelsea neighborhood is primarily residential, with a mix of mid- to high-density housing including apartment buildings, public housing, and townhouses, plus a mix of retail businesses and tech companies.

Adjacent Properties / Waterway Use / Special Sites

One block west of Pier 57 is the Chelsea Market and the High Line, a popular elevated park. Additionally, the Chelsea Piers Sports and Entertainment Complex is located to the north of the site and the Whitney Museum to the south.

Recent and Planned Substantial Development near Potential Site

Google has signed a lease on 250,000 square feet of office space at the pier expected to open in late 2020. The Pier 55 park and performing arts center is currently under construction, along with substantial residential and office development in progress along the High Line corridor.

Latitude, Longitude	40.743686, -74.011944
Census Tract	99/79
Approx. Location	57 Hudson River Greenway, New York, NY 10011
Previously Studied by EDC	No
Borough	Manhattan
Borough President	Gale Brewer
City Council District	3
Council Member	Corey Johnson
Community Board	4

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Access to the pier is across 11th Avenue and the Hudson River Greenway. The final location of a potential ferry landing infrastructure would drive the formation and layout of upland access to the ferry, which could be either through the pier structure or off the adjacent promenade.



Chelsea (Pier 57)

Existing Infrastructure

Pier 57 originally opened in 1954, and is currently being renovated to include a mix of office, retail, and recreation space. The pier structure includes a concrete basement below the waterline and two stories above.

Access to a new landing would either be through the building under renovation or from the adjacent promenade.

Because no ferry landing exists at this location, a new gangway and NYC Ferry standard bow-loading barge landing would need to be installed.



» **Ownership:** New York State Parks and Recreation, Hudson River Park Trust

» **Zoning:** M1-5

Implementation Requirements

» Construct new gangway and standard bow-loading barge from existing pier structure or promenade.

» **Approvals needed:** Environmental Review; Department of City Planning; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits

» **Estimated Capital Cost:** ~\$8 million

Waterside Access

Waterside access is generally good in the Hudson River all along the west side of Manhattan. There are pile remnants located both up and down river from the Pier that may need to be addressed to facilitate safe ferry approach and departure. Further, the potential for short term operational impacts associated with vessel traffic to/from the Chelsea piers would need to be assessed. Additional bathymetry may be needed to confirm adequate water depth to the landing barge location.

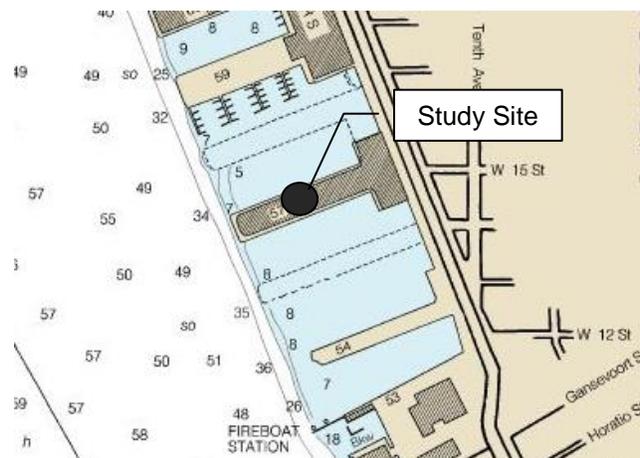


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Chelsea (Pier 57)

TRAVEL TIME COMPARISON

A direct ferry trip from this landing would provide a longer trip time than transit when traveling to either Lower or Midtown Manhattan.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	12-28 min / \$1.47	(1 transit leg) 13 min / \$2.75	(~2 miles) 26 min / \$2.75	+13 min
Midtown West (Midtown / West 39th Street)	9-22 min / \$0.93	(1 transit leg) 10 min / \$2.75	(~2 miles) 30 min / \$2.75	+20 min

West Village (Christopher Street)

SUMMARY

The existing Christopher Street / Pier 45 is adjacent to the West Village and is part of the Hudson River Park system. Pedestrian and bike access is available via the Hudson River Greenway paralleling the waterfront, but there is limited street parking near the site.

The pier contains an existing bow-loading ferry slip where ferry service used to come into Pier 45. However, a new barge and landing would likely be necessary with water depths and navigational maneuverability considered in siting the new barge along the pier.

While there is some high-density development in the neighborhoods closest to the terminal, the subway provides the neighborhood with faster travel times to points in Lower and Midtown Manhattan. The estimated ferry trip time would be longer than most existing transportation options.



MARKET AREA

The market area for potential ferry trips from Christopher Street includes the area within approximately 0.5 miles (14th Street to World Trade Center, and west of 6th Avenue) of the site.



- » **Daily Commute Transit Trips:** ~23,000
 - **Trips to Lower Manhattan:** ~5,000
 - **Trips to Midtown Manhattan:** ~2,600
- » **Transit Access:** Bus and Subway
 - **Bus:** M8 adjacent to the site
 - **Subway:** Christopher Street Station (PATH) ~0.2 miles from site, 1 and 2 Train ~0.45 miles from site
- » **Ferry Travel Time to Manhattan:** Longer than all other modes to Midtown and Lower Manhattan.

West Village (Christopher Street)

BACKGROUND INFORMATION

Neighborhood Characteristics

The existing pier is located at the edge of the West Village, with a mix of historic low-density and newer high-density residential bordering the waterfront. The residential neighborhood is separated from Pier 45 by West Street.

Adjacent Properties / Waterway Use / Special Sites

The pier is located immediately adjacent to the Manhattan Waterfront Greenway, a popular public walkway and bike path that connects the Hudson River Park. Adjacent land uses include historic, medium and high-rise residential and commercial buildings.

Recent and Planned Substantial Development near Potential Site

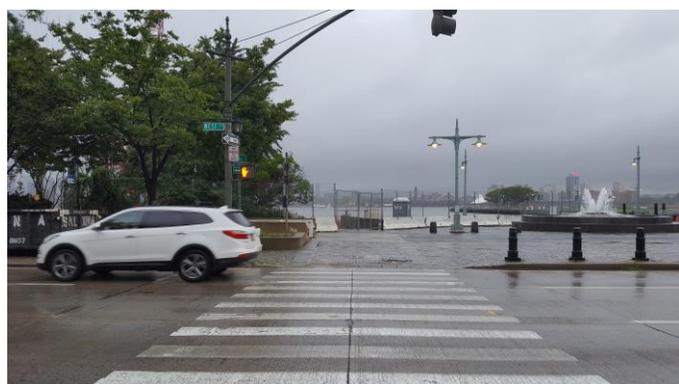
There is a 12-story office building planned for to provide nearly 600,000 square feet of commercial space with anticipated completion in 2022 located about four blocks south of this site.

Latitude,	40.733207,
Longitude	-74.011113
Census Tract	75
Approx. Location	West St and West 10th St, New York, NY 10014
Previously Studied by EDC	2013
Borough	Manhattan
Borough President	Gale Brewer
City Council District	3
Council Member	Corey Johnson
Community Board	2

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Pedestrian access is available via a wide waterfront sidewalk. The Hudson River Greenway parallels the waterfront, providing pedestrian and bike access. There is limited street parking near the site.



West Village (Christopher Street)

Existing Infrastructure

This site on the Hudson River side of Manhattan at Pier 45 is part of the Hudson River Park, which includes an 850-foot-by-100-foot pier, and an old bow-loader ferry barge on the near-shore south side of the pier. This barge would likely need to be replaced and water depths confirmed to support current ferry operations, which require a minimum of 12 feet for safe operations. The offshore side of the existing barge would provide easy access. However, it appears that the inshore side of the barge could encounter some navigational challenges getting in and out of the slip, particularly at low tides due to close proximity to shore. These factors would need to be considered in siting the new barge.



- » **Ownership:** Hudson River Park Trust, NYC Parks
- » **Zoning:** M2-3

Implementation Requirements

- » New piles and a barge would need to be installed for ferry service
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permit; Mayoral Zoning Override
- » **Estimated Capital Cost:** \$8 million for a new barge

Waterside Access

Waterside access to this site would be straightforward navigation from the Hudson River along the south side of Pier 45. The next pier to the south is Pier 40, which is the location that Hornblower Events operate out of, but there appears to be adequate open water and this should not represent any navigational challenges. A review of navigational charts indicates that there is deep water to the head of the pier, but the depths along the pier are not detailed. There are likely adequate water depths to support ferry operations, but an actual water depths survey would be necessary to confirm details for any final site selection.

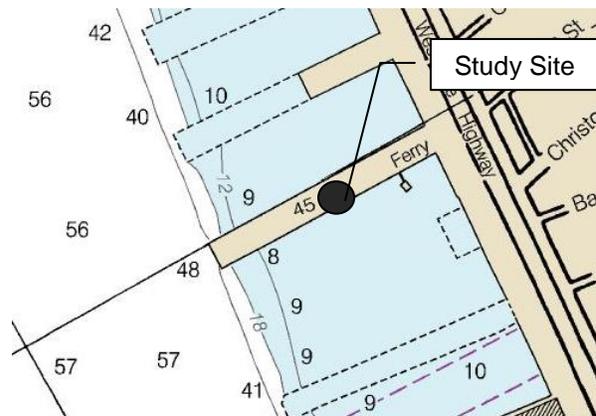


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

West Village (Christopher Street)

TRAVEL TIME COMPARISON

A direct ferry trip would be longer than all other modes to both Midtown and Lower Manhattan.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	5-16 min / \$0.65	(1 transit leg) 12 min / \$2.75	(~1 mile) 26 min / \$2.75	+14 min
Midtown West (Midtown / West 39th Street)	12-30 min / \$1.47	(1 transit leg) 18 min / \$2.75	(~2 miles) 33 min / \$2.75	+15 min

College Point

SUMMARY

The ferry study site is in Hermon A. MacNeil Park, located in the College Point neighborhood of Queens. This neighborhood has relatively few transit options to Lower and Midtown Manhattan, with each requiring multiple connections.

The neighborhood is comprised primarily of lower density residential developments, with a small number of commute trips to Manhattan. On average, direct ferry journey times would be significantly faster than existing modes of transit to Manhattan.

There is no existing in-water infrastructure for a ferry landing.

Accordingly, construction would include a new pier, gangway, barge, and guide piles to support a ferry landing within the park. Due to shallow water depths, bringing ferry service to this location would require a ~400-foot pier off the point of the park, exposing the landing to potential seas and current in the upper East River. Currently, there is limited street parking available near the site.



MARKET AREA

The market area for potential ferry trips from College Point includes the area north of 22nd Avenue, west of 150th Street and the Whitestone Bridge.



» Daily Commute Transit Trips: ~2,600

- Transit to Lower Manhattan: ~150
- Transit to Midtown Manhattan: ~370

» Transit Access: Bus

- Bus: Q25 is just outside the park along Poppenhusen Avenue

» Ferry Travel Time to Manhattan: Direct ferry would be faster than transit to Lower and Midtown Manhattan.

College Point

BACKGROUND INFORMATION

Neighborhood Characteristics

The College Point neighborhood is primarily low to mid-density residential development, varying between single-family detached and small multifamily apartment buildings. The commercial hub of this neighborhood is located over 0.5-miles from Hermon A. MacNeil Park to the south along College Point Boulevard.

Adjacent Properties / Waterway Use / Special Sites

Southeast of the park are single-family homes. The park also has a kayak launch.

Recent and Planned Substantial Development near Potential Site

No major development within the vicinity of the park was identified. Permit activity within 0.5 miles of the site consists of low-density development. A project to repair the waterfront pathway and seawall in the park is currently planned by NYC Parks for a 2019 completion.

Latitude,	40.794334,
Longitude	-73.852991
Census Tract	929
Approx. Location	Poppenhusen Ave, College Point, NY 11356
Previously Studied by EDC	No
Borough	Queens
Borough President	Melinda Katz
City Council District	19
Council Member	Paul Vallone
Community Board	7

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

The park does not have parking, but limited street parking is available on the adjacent neighborhood streets. There are paved pathways throughout the park for pedestrian and bicycle access. Due to water depths, a ferry landing would need to be at the north end of the park, which would require a 5-minute walk through the park to the pier. The seawall repair project is currently underway to improve the waterfront walkway.



College Point

Existing Infrastructure

Hermon A. MacNeil Park is a 29-acre neighborhood park with restrooms, sports courts and a canoe/kayak launch. There are existing paved trails within the park for pedestrian and bicycle access. However, there are no existing facilities to support ferry operations.

Waterside Access

Waterside access to this site would be from the upper East River. Care would need to be exercised to avoid College Point Reef on approach or departure. Ferry access to all sides of the park would be challenged by shallow water with obstructions, with the shortest distance to deep water directly off the point of the park. A pier length of approximately 400 feet would be needed to reach adequate water depth from the northern end of the park, potentially exposing the landing to wind, waves and current in this area of the East River.



- » **Ownership:** NYC Parks and Recreation
- » **Zoning:** PARK

Implementation Requirements

- » Requires a pier, gangway, piles and barge. A fixed pier of roughly 400 feet in length is needed to get to adequate water depth from the northern end of the park.
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; agreement with Department of Parks and Recreation
- » **Estimated Capital Cost:** \$12 million, including pier

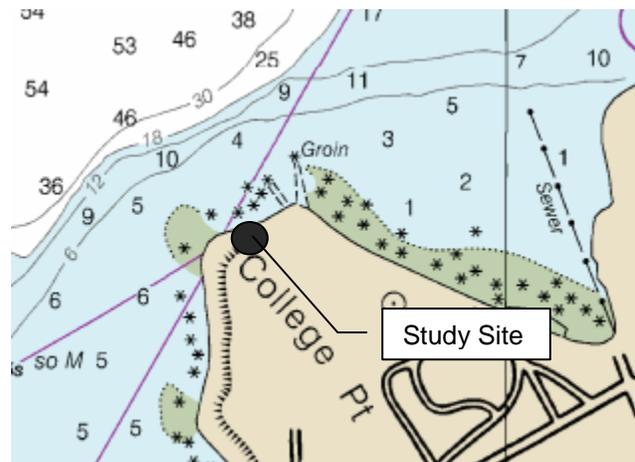
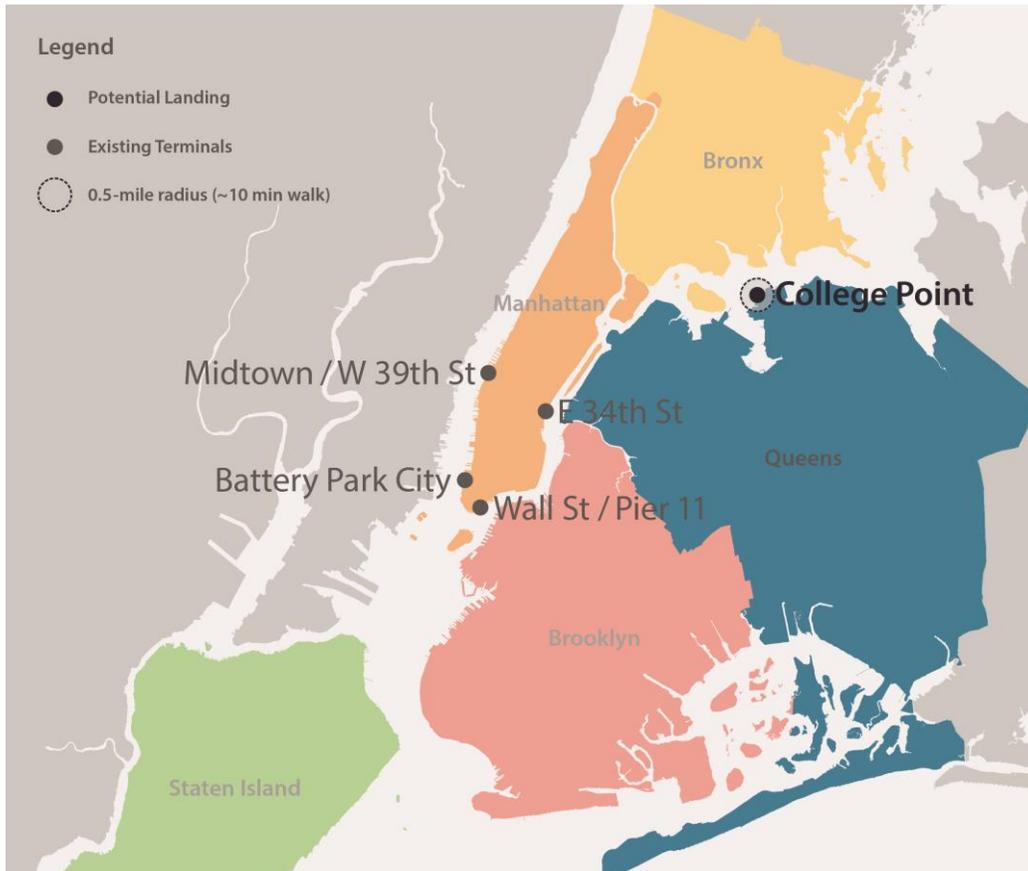


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

College Point

TRAVEL TIME COMPARISON

A direct ferry trip would be considerably faster than transit to both Lower and Midtown Manhattan, but adding a College Point stop in a route with other stops, such as the existing Soundview route, would dictate whether ferry service would be time competitive.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Wall Street / Pier 11)	50-100 min / \$9.10	(3 transit legs) 78 min / \$2.75	(~13 miles) 46 min / \$2.75	-32 min
Midtown East (East 34th Street)	35-75 min / \$6.70	(2 transit legs) 65 min / \$6.50	(~9 miles) 42 min / \$2.75	-23 min

Fort Totten / Bay Terrace

SUMMARY

The study looked at the Bay Terrace neighborhood as well as Fort Totten in northern Queens.

Due to shallow water depths along both Little Bay and Little Neck Bay the only potential site identified was at the tip of Fort Totten Park, though this site would still require a pier to reach adequate depths. However, a pier would be highly exposed to adverse sea conditions along the East River which may impact the reliability of ferry service.

Due to the site's location, most local residents would need to drive and then walk 10 minutes through the park to access the ferry landing. A ferry service at this location would provide limited travel time savings to Manhattan compared with existing transit.



MARKET AREA

The market area for potential ferry trips from Fort Totten / Bay Terrace includes the area north of 35th Avenue and east of Clearview Expressway (1-295).



- » **Daily Commute Transit Trips:** ~6,000
 - Trips to Lower Manhattan: ~350
 - Trips to Midtown Manhattan: ~800

- » **Transit Access:** Bus
 - **Bus:** Q13 ~0.5 miles from site

- » **Ferry Travel Time:** Direct ferry would be comparable to existing transit to Lower Manhattan and Midtown East.

Fort Totten / Bay Terrace

BACKGROUND INFORMATION

Neighborhood Characteristics

Bay Terrace is primarily a single-family neighborhood with some low-density apartment blocks.

Adjacent Properties / Waterway Use / Special Sites

Adjacent to the site is a trail system (Little Bay Park Greenway) that extends through Fort Totten on the waterside of Cross Island Parkway. The single family neighborhood is accessed by crossing Cross Island Parkway.

Recent and Planned Substantial Development near Potential Site

No major identified development in this area.

Latitude,	40.796109,
Longitude	-73.779814
Census Tract	999
Approx. Location	Totten Road, Bayside, NY 11359
Previously Studied by EDC	No
Borough	Queens
Borough President	Melinda Katz
City Council District	19
Council Member	Paul Vallone
Community Board	7

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Vehicle and pedestrian access to the site is only from Cross Island Parkway and would require a 15-minute walk from the parking lot through Fort Totten.



Fort Totten / Bay Terrace

Existing Infrastructure

There is no existing infrastructure at this site that would support ferry operations. There is an old pier in Fort Totten that would require assessment to determine if it could support an NYC Ferry.



- » **Ownership:** New York City Fire Department
- » **Zoning:** PARK

Implementation Requirements

- » A pier, barge and piles would need to be constructed.
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits, Mayoral Zoning Override
- » **Estimated Capital Cost:** \$8-12 million

Waterside Access

NYC Ferry vessels require 11 feet minimum to operate. The NOAA chart shows water depths that are too shallow along most of Little Neck Bay and on the west shore of Fort Totten. The west shore would be highly exposed to adverse sea conditions.

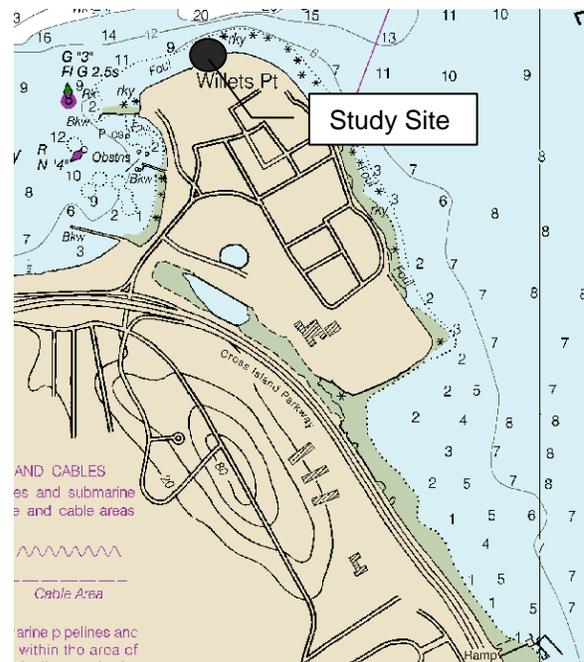


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Fort Totten / Bay Terrace

TRAVEL TIME COMPARISON

A direct ferry trip could be slightly faster than transit to Lower Manhattan and comparable to transit when traveling to Midtown East, but the inclusion of a Fort Totten stop in another route with other stops would dictate whether ferry service would be time competitive. This area is also served by the QM2/QM20 bus that provides a slower trip but does not require a transfer.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Wall Street / Pier 11)	55-90 min / \$11.17	(3 transit legs) 71 min / \$10.25	(~18 miles) 65 min / \$2.75	-6 min
Midtown East (East 34th Street)	40-80 min / \$7.96	(3 transit legs) 61 min / \$10.25	(~14 miles) 61 min / \$2.75	0

LaGuardia Airport

SUMMARY

The potential landing site would be located adjacent to Terminal A at LaGuardia Airport in Bowery Bay. A ferry could provide another option for passengers and/or employees traveling to and from the airport but would require a shuttle bus connection to reach the main terminals. On average, a direct ferry would take around the same amount of time as existing transit options.

A new landing and upland improvements would be required to accommodate NYC Ferry vessels. Accommodations would need to be implemented to ensure passengers are safely transported between the ferry landing and the terminal building. Delta previously ran a market-rate ferry service to Terminal A between 1988 and 2000, but it had low ridership and was not financially viable.

Waterside access through Bowery Bay would require additional bathymetry to assess adequacy of water depths to support commuter ferry service. Dredging might be required to provide long-term reliable service.



MARKET AREA

The market area is unique and would likely be people who are traveling to areas near Manhattan ferry terminals.



» Transit Access: Bus

- **Bus:** Q47 and Q48 ~0.1 miles from Terminal A; Q70, Q72 and M60 SBS also provide service to and from LaGuardia Airport.

- ### » Ferry Travel Time to Manhattan:
- Direct ferry would be comparable to transit to Lower and Midtown Manhattan. With typical traffic congestion, ferry transit time would likely be comparable to a car.

LaGuardia Airport

BACKGROUND INFORMATION

Recent and Planned Substantial Development near Potential Site

Jet Blue and Alaska Airlines currently have operations from Terminal A. LaGuardia is undergoing major development with the goals of improving passenger movement, accommodating future growth, and improving the level of service. Part of the redevelopment project is to provide additional transportation options and improve reliability in accessing the airport with an emphasis on improving multimodal connections to the airport. AirTrain LaGuardia, a proposed 1.5-mile-long elevated railway scheduled to open in 2022, will connect LaGuardia to the subway and Long Island Rail Road in Willets Point.

Latitude,	40.774328,
Longitude	-73.885694
Census Tract	331
Approx. Location	Bowery Bay Blvd, East Elmhurst, NY 11371
Previously Studied by EDC	2011, 2013
Borough	Queens
Borough President	Melinda Katz
City Council District	21
Council Member	Francisco Moya
Community Board	1 and 3

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Pedestrians would access the landing from the terminal via an at-grade crossing of Bowery Bay Boulevard. A crosswalk would need to be added for safe pedestrian access to the landing, and access to the airport would require a sidewalk and crosswalk from Terminal A along with wayfinding signage. A shuttle bus is needed to transport passengers to the central terminals.



LaGuardia Airport

Existing Infrastructure

This site at Terminal A has an existing pier and barge for smaller security boats. A new facility would likely be required to accommodate NYC Ferry vessels. This would include constructing a pier and installing a standard NYC Ferry barge.



» **Ownership:** City

» **Zoning:** M1-1

Implementation Requirements

» Construction of a pier, gangway, piles and barge.

» Additional bathymetry required to locate operating channel and pier.

» **Approvals needed:** Port Authority, and New York City Department of Correction; Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits, Mayoral Zoning Override

» **Estimated Capital Cost:** \$8-12 million depending on length of pier

Waterside Access

Waterside access to this site would be from the East River, under the Riker's Island Bridge and through Bowery Bay. The Bridge has sufficient vertical clearance (52 feet) to allow for ferry operations. There are no marked channels through Bowery Bay, and water depth barely meet the minimum 15 feet required for NYC Ferry operations. Additional bathymetry would be needed to locate and mark an operating channel through Bowery Bay. Dredging may be needed to ensure safe transit to this site.

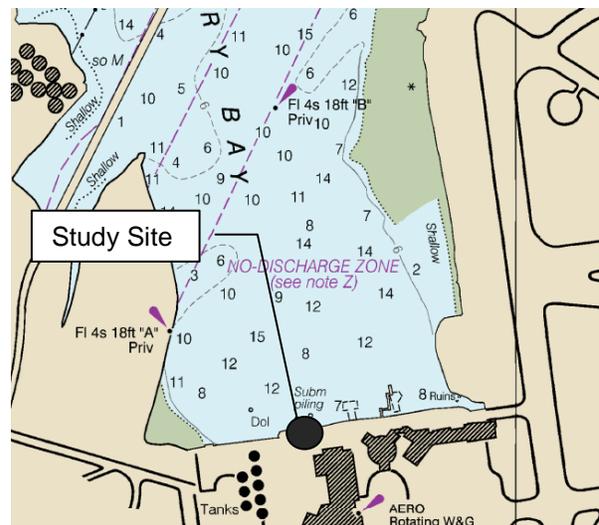
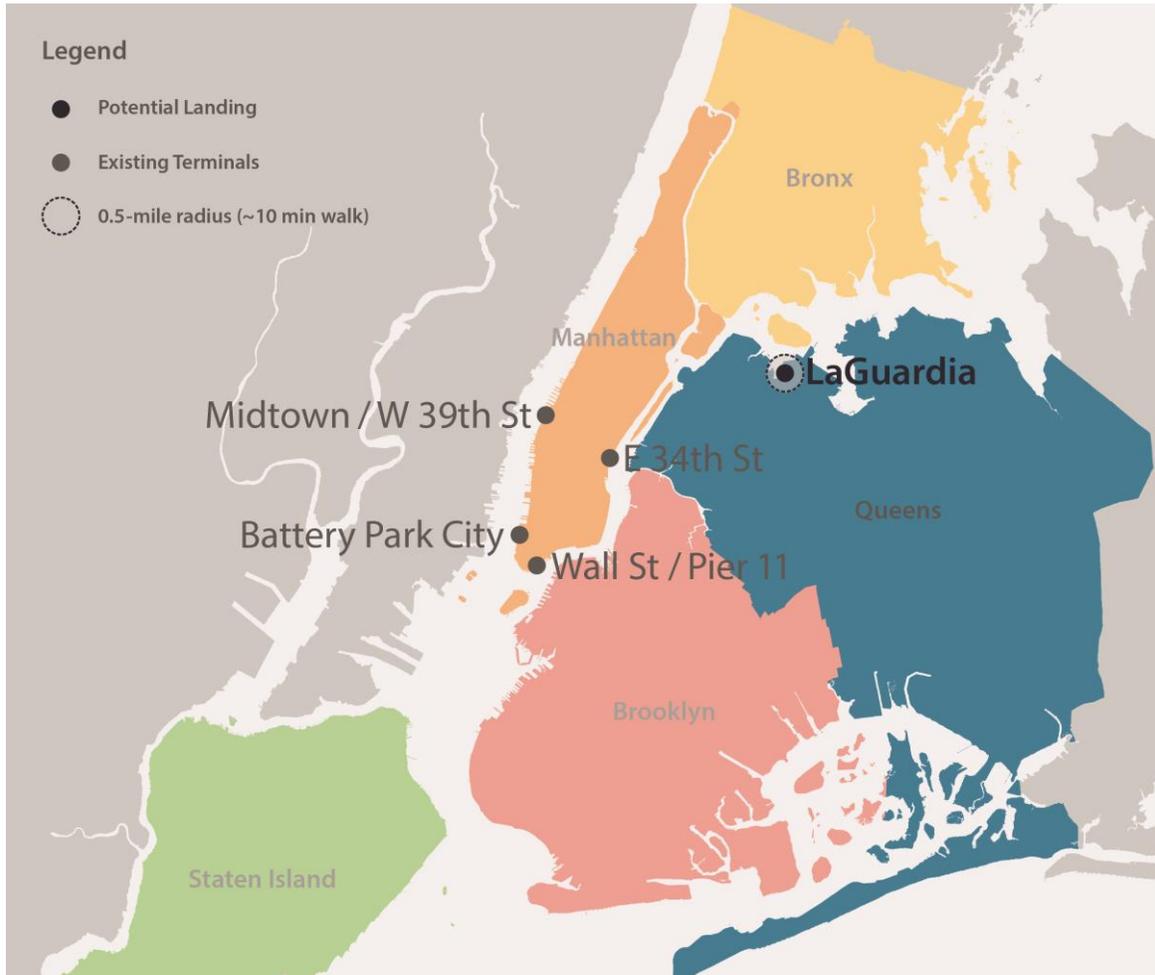


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

LaGuardia Airport

TRAVEL TIME COMPARISON

A direct ferry trip would provide a similar travel time to existing transit options to the airport. However, additional stops along the route would dictate the actual travel time. The AirTrain could be a competitive alternative travel option when it is operational (est. 2022).



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry. Car cost estimate includes average cost of a taxi.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Wall Street / Pier 11)	45-70 min / \$50-60	(3 transit legs) 59 min / \$2.75	(~11 miles) 56 min / \$2.75	-3 min
Midtown East (East 34th Street)	26-60 min / \$50-60	(2 transit legs) 48 min / \$2.75	(~7 miles) 47 min / \$2.75	-1 min

Flushing Bay

SUMMARY

Flushing Bay and World's Fair Marina was a frequent request for ferry service to northeast Queens from both the general public and elected officials.

Grand Central Parkway and Whitestone Expressway severely limits public transit and walking access to sites along Flushing Bay. However, there is ample parking space available closer to Citi Field, though heavily used during sports events.

Potential ferry service is likely to have a similar or slower journey time than existing transit options.



MARKET AREA

The primary market area for potential ferry trips from Flushing Bay includes the area east of 108th Street, north of Elder Avenue, south of 20th Avenue, and west of I-678 (Van Wyck Expressway/Whitestone Expressway). A wider driving market also exists.



Daily Commute Transit Trips: ~28,000

- **Trips to Lower Manhattan:** ~2,000
- **Trips to Midtown Manhattan:** ~5,700

» **Transit Access:** Bus and Subway

- **Bus:** Q66 and Q19 ~0.2 miles from site
- **Subway:** Mets-Willets Point Station (Lines 7 and 7x) ~0.5 miles from site

» **Ferry Travel Time to Manhattan:** A direct ferry trip would be faster to Lower Manhattan but slower to Midtown.

Flushing Bay

BACKGROUND INFORMATION

Neighborhood Characteristics

To the west are the residential neighborhoods of Corona and Jackson Heights. To the south is Citi Field and other major sport facilities. Willets Points to the east has historically housed auto repair shops and industrial uses.

Adjacent Properties / Waterway Use / Special Sites

The Marina contains multiple piers with recreational boating access. Across the expressway is Citi Field.

Recent and Planned Substantial Development near Potential Site

The NYC Parks Department is reconstructing Pier 1 of World’s Fair Marina. The reconstruction project will improve accessibility and extend the pier further into the bay. Potential future residential development at Willets Point could increase ridership demand from within a walking distance to this site.

Latitude,	40.760334,
Longitude	-73.849275
Census Tract	383.01
Approx. Location	1 Marina Rd, Flushing, NY 11368
Previously Studied by EDC	2011, 2013
Borough	Queens
Borough President	Melinda Katz
City Council District	21
Council Member	Francisco Moya
Community Board	7, 81

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

The waterfront promenade provides pedestrian access to the site. Pedestrian access from the site to residential areas is difficult and limited.

The site has good vehicle access. There are on- and off-ramps to Northern Boulevard located nearby. There is also surface street access under Northern Boulevard and from the eastern end of the site.

There are parking lots surrounding the Marina with a fee charged during events at Citi Field.



Flushing Bay

Existing Infrastructure

The existing World's Fair Marina at this site possesses a large L-shaped pier structure that is currently out of commission for a multi-year reconstruction project. There is a public boat launch about 2,000 feet to the northeast of the Marina at the Flushing Meadows Corona Park Kayak/Canoe Launch Site.

Waterside Access

Waterside access would be through the East River, around Riker's Island, along LaGuardia Airport and through a marked channel in Flushing Bay. The NOAA chart indicates that this channel maintains approximately 150 feet wide and 14 feet deep throughout its length. Once departing the channel, the water depths approaching the Marina at low water show 5 feet. NOAA charts indicate inadequate water depths in the bay for NYC Ferry vessels, further diligence and bathymetry testing is required to determine the feasibility of service.

The waters to the east of the Marina are designated a special anchorage area, which would limit ferry operations to the western side of the Marina. There is also tug and barge traffic that accesses the industrial sites on the east side of Flushing Bay and to Flushing Creek.

- » **Ownership:** NYC Parks and Recreation
- » **Zoning:** PARKS

Implementation Requirements

- » A barge with guide piles would likely be necessary.
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits
- » **Estimated Capital Cost:** \$8 million for a ferry barge, depending on Parks marina design

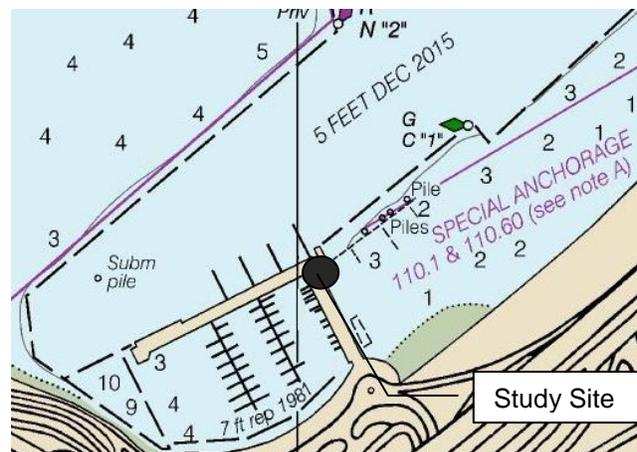


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Flushing Bay

TRAVEL TIME COMPARISON

Direct ferry service from this location would be a little faster than transit to Lower Manhattan and slightly slower than transit to Midtown East. From Flushing Bay to Midtown East, there is a transit option (Subway: 7) that does not require a transfer but is a longer trip (approx. 60 minutes) than those with transfers and would be comparable to a direct ferry trip.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Wall St / Pier 11)	40-80 min / \$8.07	(3 transit legs) 65 min / \$2.75	(~14 miles) 56 min / \$2.75	-9 min
Midtown East (East 34th Street)	26-60 min / \$5.23	(3 transit legs) 50 min / \$2.75	(~10 miles) 53 min / \$2.75	+3 min

Whitestone

SUMMARY

The Whitestone site is located in Francis Lewis Park, which is part of the Whitestone neighborhood in Queens. The neighborhood consists primarily of single-family detached homes. The transit options to Lower and Midtown Manhattan are limited and most require multiple transfers.

Currently, the park has existing paved pathways for pedestrian and bicycle access but does not have any in-water infrastructure for a ferry landing. There is a kayak launch in the park. There are not adequate water depths within 1,000+ feet of the edge of the park to support a ferry landing. The waterside location is also exposed to river currents and rough seas.



MARKET AREA

The market area for potential ferry trips is between the Throgs Neck Bridge, Cross Island Parkway and the Bronx-Whitestone Bridge and includes the area north of 20th Avenue between 125th Street and 150th Street.



- » **Daily Commute Transit Trips:** ~5,800
 - **Trips to Lower Manhattan:** ~340
 - **Trips to Midtown Manhattan:** ~870
- » **Transit Access:** Bus
 - **Bus:** Q15A ~0.7 miles from site, QM32 ~0.8 miles from site
- » **Ferry Travel Time to Manhattan:** A direct ferry would be faster than transit to Lower and Midtown Manhattan.

Whitestone

BACKGROUND INFORMATION

Neighborhood Characteristics

Francis Lewis Park is located in the Whitestone neighborhood in Queens that is primarily lower density residential development. There is a commercial center nearly one mile south of Francis Lewis Park.

Adjacent Properties / Waterway Use / Special Sites

The properties bordering the park are primarily single-family residential homes. Adjacent private properties along the waterfront consist of single-family homes with private piers.

Recent and Planned Substantial Development near Potential Site

There are no major planned developments occurring within 0.5 miles of Francis Lewis Park. The majority of the permitting activity includes active permits for single-family development.

Latitude,	40.797492,
Longitude	-73.825436
Census Tract	973
Approx. Location	3rd Ave, College Point, NY 11356
Previously Studied by EDC	No
Borough	Queens
Borough President	Melinda Katz
City Council District	19
Council Member	Paul Vallone
Community Board	7

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Limited street parking is available near this site. There are existing paved trails within the park for pedestrian and bicycle access. Depending on the location of the landing site, access to the pier through the park from the roadway could be up to 800 feet plus an additional 1,000 feet to reach the end of the pier.



Whitestone

Existing Infrastructure

Francis Lewis Park includes restrooms, sports courts, and a kayak/canoe launch. There is currently no in-water infrastructure at the park.



Waterside Access

Waterside access would be through the East River just to the east of the Whitestone Bridge. Water depth charts suggest adequate water depths starting about 1,000 feet offshore, which is both infeasible and impractical to build. At this distance offshore, the barge would be accessible by ferry, but there are potentially significant safety impacts of river currents and sea conditions to a landing at this location.

» **Ownership:** NYC Parks and Recreation

» **Zoning:** PARK

Implementation Requirements

» Construction of a pier, piles and a barge.

» Dredging or a pier about 1,000-feet-long from walkway around bridge support to support a ferry landing barge in adequate depth water.

» **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits; agreement with Department of Parks and Recreation

» **Estimated Capital Cost:** \$20-25 million depending on pier costs

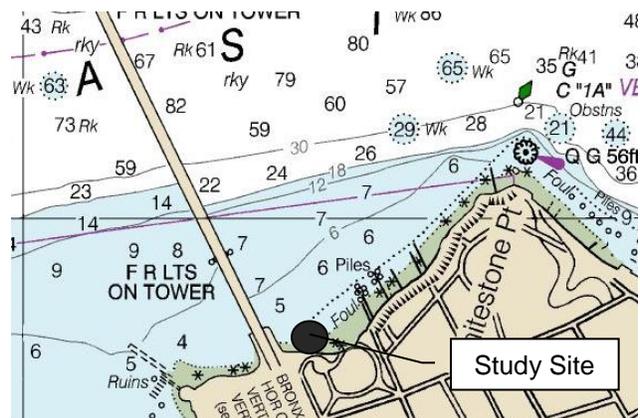
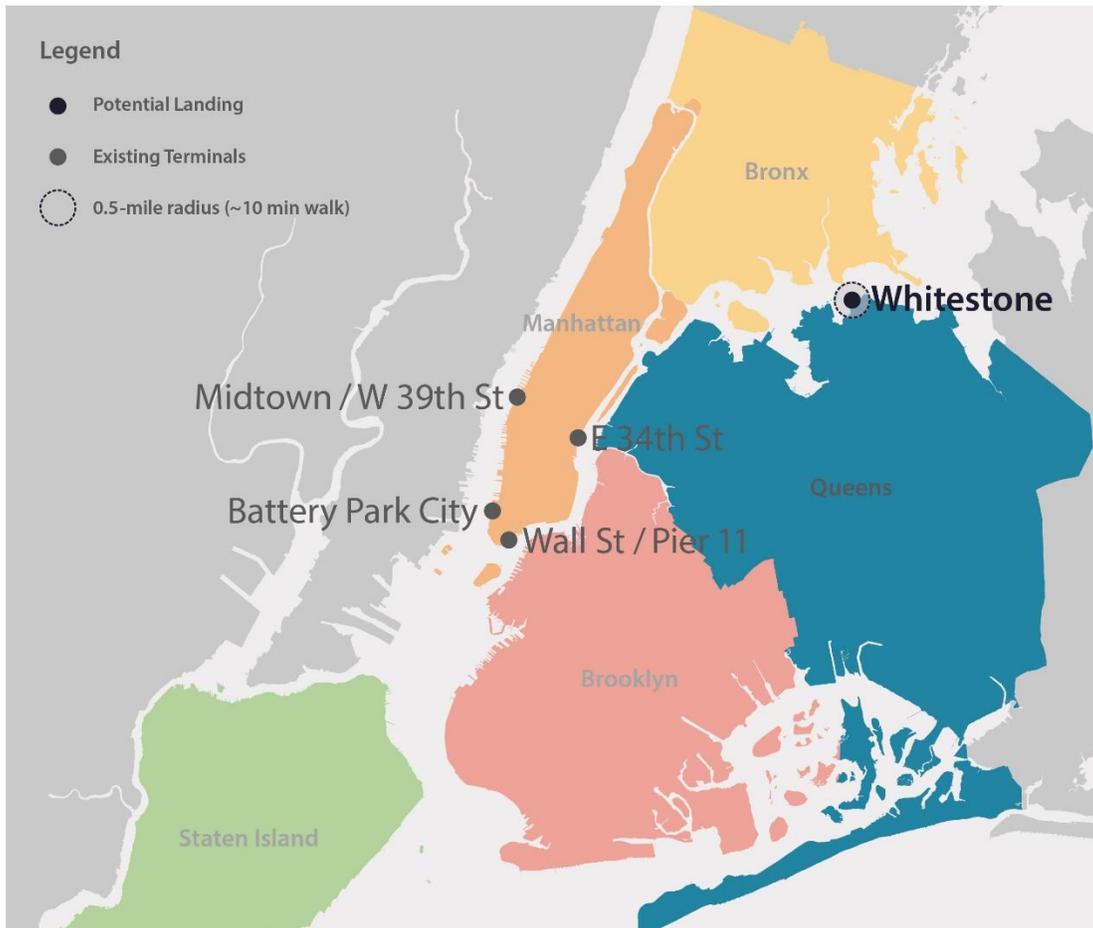


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Whitestone

TRAVEL TIME COMPARISON

A direct ferry trip to Manhattan could be faster than transit to both Lower and Midtown Manhattan, but adding this stop to other routes such as the existing Soundview route, would dictate whether ferry service would be time competitive with existing transit.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Wall St / Pier 11)	55-85 min / \$9.97	(3 transit legs) 86 min / \$2.75	(~14 miles) 52 min / \$2.75	-34 min
Midtown East (East 34th Street)	35-75 min / \$6.81	(1 transit leg) 64 min / \$6.50	(~10 miles) 48 min / \$2.75	-16 min

St. George

SUMMARY

The St. George ferry terminal is an existing multimodal transit hub where the Staten Island Ferry, operated by the NYC Department of Transportation (DOT), carries over 23 million passengers annually. There are several existing ferry slips for the large Staten Island Ferry passenger vessels. One of the existing ferry slips, referred to as Slip 7, previously housed a passenger ferry barge that was appropriate for the size of vessel used by NYC Ferry. The passenger gangway and barge would need to be re-installed to support NYC Ferry operations.



The St. George ferry terminal location is set up to serve people from the entire island due to the transit connections and parking facilities offered at the terminal. A direct NYC Ferry trip would provide a significantly faster trip time to Lower and Midtown Manhattan than other transit connections. The terminal is also within walking distance of the new Empire Outlets north of the existing ferry terminal.

NYC Ferry operations would need to be coordinated with the existing DOT Staten Island Ferry operations, but there is sufficient open water to make safe passing arrangements and requisite safety and security procedures can be established.

MARKET AREA

The market area for potential ferry trips from St. George includes all of Staten Island.



- » **Daily Commute Transit Trips:** ~51,100
 - **Trips to Lower Manhattan:** ~13,600
 - **Trips to Midtown Manhattan:** ~12,300
- » **Transit Access:** Bus, Rail, Ferry
 - **Bus:** S40, S74, S90, S48, S98, S62 and S92 within 0.35 miles from site
 - **Rail:** Staten Island Rail adjacent to site
 - **Ferry:** Staten Island Ferry
- » **Ferry Travel Time to Manhattan:** Faster than existing transit (including Staten Island Ferry) to Manhattan destinations.

St. George

BACKGROUND INFORMATION

Neighborhood Characteristics

Adjacent to the St. George Ferry Terminal is primarily commercial development. Further west of the commercial area is low-rise and multifamily residential development.

Adjacent Properties / Waterway Use / Special Sites

St. George is currently a multimodal transit and ferry terminal where the Staten Island Ferry provides service to the Whitehall Terminal in Lower Manhattan.

Recent and Planned Substantial Development near Potential Site

Several development projects are located adjacent to the St. George Ferry Terminal. Lighthouse Point will add a dynamic, mixed-use development (including approximately 120 residential units, grocery store, and co-working space), and Empire Outlets will house a large retail complex.

Latitude, Longitude	40.644010, -74.072014
Census Tract	3
Approx. Location	1 Bay St, Staten Island, NY 10301
Previously Studied by EDC	2013
Borough	Staten Island
Borough President	James Oddo
City Council District	21
Council Member	Deborah Rose
Community Board	1

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Vehicle access is via the Ferry Terminal Viaduct, and two DOT-owned parking lots are located at the terminal. Slip 7 is directly adjacent to the pick-off/drop-off area for the St George terminal. There is a large bus terminal located just outside of the ferry terminal, and the Staten Island Railroad has a stop within the ferry terminal, both of which are adjacent to the potential NYC Ferry site and would provide easy connections. Ferry travelers would access the new landing via an existing sidewalk adjacent to the landing.



St. George

Existing Infrastructure

The St. George site is located at the Staten Island Ferry Terminal on Staten Island. Small vessel passenger-only ferry operations were conducted out of the lower lever previously. However, the gangway and barge have been removed and would need to be reinstalled. These facilities would be adequate to support a new NYC Ferry route.

This site would require operational coordination with Staten Island Ferries, as it resides in and is integral to the existing ferry terminal infrastructure. This is particularly true with respect to safety and security protocols in and around the terminal.

- » **Ownership:** NYC Department of Transportation
- » **Zoning:** M1-1

Implementation Requirements

- » The gangway and barge would need to be reinstalled, and access to this area for loading and unloading would need to be coordinated with Staten Island Ferry.
- » Passenger queuing and shelter may need to be constructed.
- » Landings and departures would need to be coordinated with the existing Staten Island Ferry departures.
- » **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water construction permits
- » **Estimated Capital Cost:** \$4 million

Waterside Access

Located at the northeastern point of Staten Island, waterside access would be directly from New York Inner Harbor, with adequate water depths and no known navigational restrictions.

Due to the proximity to Staten Island Ferry operations, sailing coordination would need to occur to ensure safe navigation during approach and departure. However, there is sufficient clear water offshore to establish any needed operating protocols.

Transit to Manhattan would follow traditional shipping lanes, but any route that included a landing in Brooklyn from this site would require a new crossing of a heavily used shipping lanes in the New York Harbor, requiring extra navigational care particularly in conditions of reduced visibility.

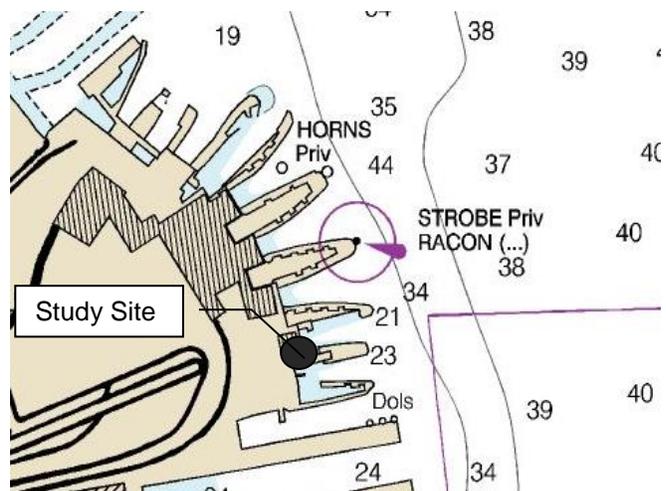
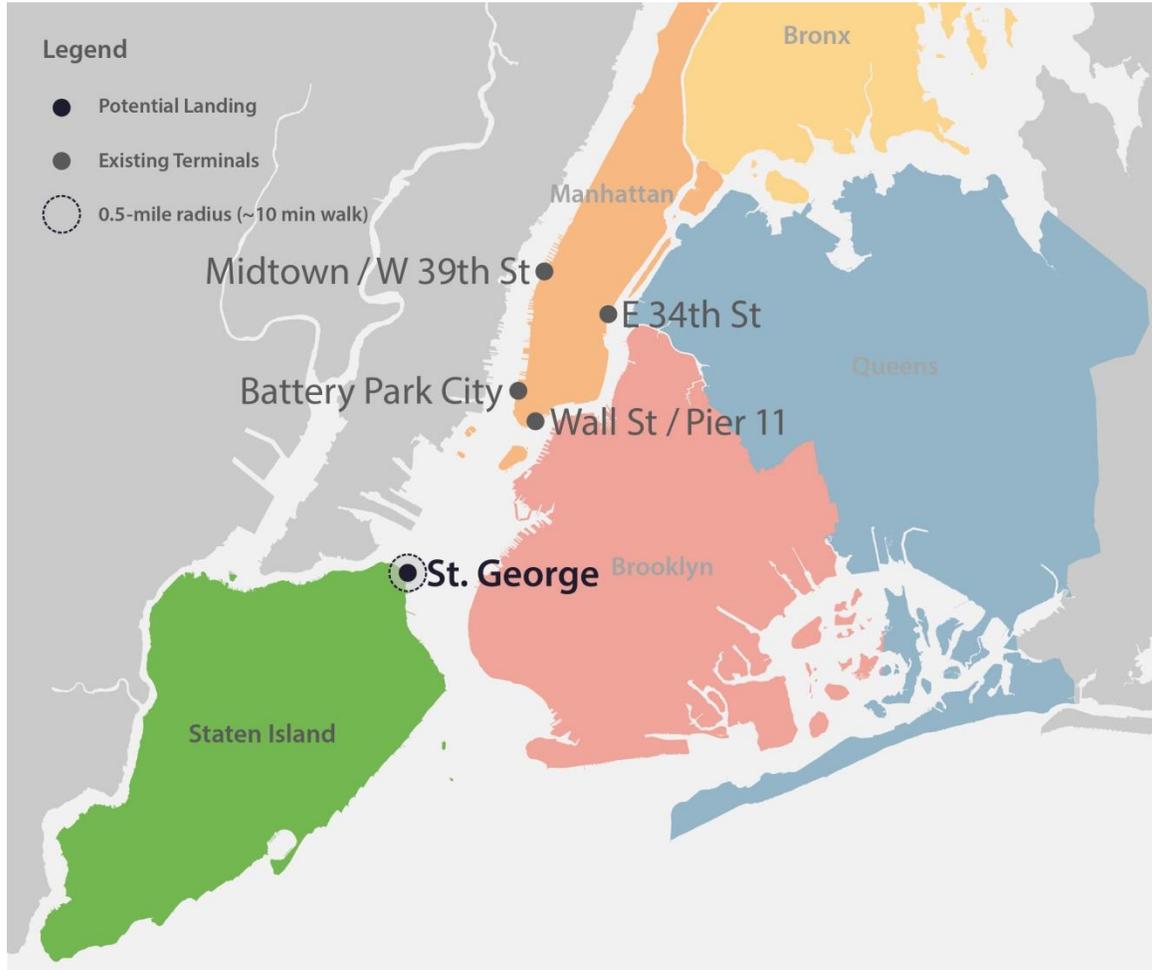


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

St. George

TRAVEL TIME COMPARISON

The total estimated direct travel time when taking the ferry would be faster than existing transit, to both the Lower and Midtown Manhattan destinations. Ferry service to Wall Street / Pier 11 was not strongly considered given its proximity to the existing Staten Island Ferry Whitehall Terminal.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	Car	Transit	Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	35-90 min / \$8.12	(2 transit legs) 60 min / \$6.50	(~6 miles) 32 min / \$2.75	-28 min
Midtown West (Midtown / West 39th Street)	40-85 min / \$14.93	(3 transit legs) 74 min / \$6.50	(~9 miles) 45 min / \$2.75	-29 min

Stapleton

SUMMARY

Stapleton is a neighborhood in northeastern Staten Island. The area is primarily single-family and low-density multi-family development with neighborhood commercial properties located along Bay Street. With close proximity to the Staten Island Railroad, Stapleton has the opportunity to serve residents who travel via rail. The New Stapleton Waterfront development, with 571 units currently under construction, could eventually include upwards of 2,000 residential units along with associated commercial and community space. A direct ferry would be a similar travel time to Lower Manhattan, but could provide a faster trip to Midtown, when compared with existing transit options.

The existing pier along the waterfront is home to the New York Fire Department marine unit and associated vessel tie-ups. Large vessels use the pier through the DockNYC program. As such, a ferry landing on the pier may not be compatible with these uses.

A landing from the promenade outside of the breakwater to the north or south may be possible, but exposure to rough weather coming straight through the Verrazzano-Narrows would have an impact on reliable operations and safety. There are adequate water depths along the waterfront for a ferry.



MARKET AREA

The market area for potential ferry trips from Stapleton includes the southern portion of Staten Island along the Staten Island Railway.



- » **Daily Commute Transit Trips:** ~36,600
 - **Trips to Lower Manhattan:** ~9,500
 - **Trips to Midtown Manhattan:** ~8,900
- » **Transit Access:** Bus, Rail, Staten Island Ferry
 - **Bus:** S51, S74, S76 and S86 ~0.25 miles from site
 - **Rail:** Staten Island Rail ~0.25 miles from site
- » **Ferry Travel Time to Manhattan:** Faster than existing transit to Lower and Midtown Manhattan.

Stapleton

BACKGROUND INFORMATION

Neighborhood Characteristics

The neighborhood is primarily single-family and low-density multi-family development with neighborhood commercial properties located along Bay Street. The first phase of the New Stapleton Waterfront mixed-use development was recently completed.

Adjacent Properties / Waterway Use / Special Sites

An existing pier houses a Fire Department of New York (FDNY) vessel. Adjacent to the site is a public park and esplanade that are part of the New Stapleton Waterfront development, as well as retail and restaurant space.

Recent and Planned Substantial Development near Potential Landing

NYCEDC has gradually been redeveloping the New Stapleton Waterfront, a decommissioned U.S. Naval Base that will activate and expand an underutilized waterfront, as well as unlock the opportunity for new development opportunities including affordable housing, retail, and new public infrastructure. Phase 1 will deliver 571 units, 25,000 square feet of commercial space, and 348 parking spaces. Future phases may include up to 1,600 additional units, along with commercial space and additional open space.

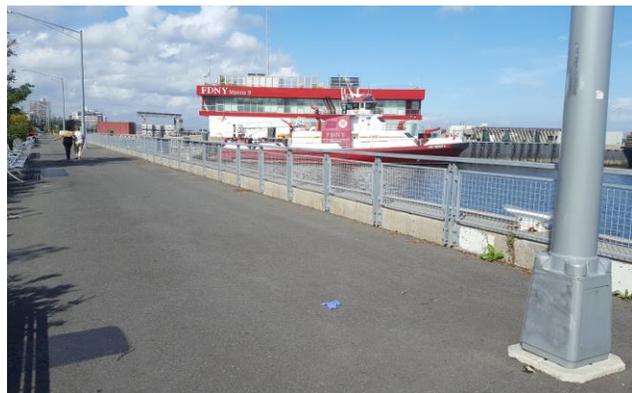
Northwest of the New Stapleton Waterfront, the Bay Street Corridor Plan aims to increase density and promote mixed-use development as well as connecting the New Stapleton Waterfront with future development along Bay Street.

Latitude,	40.6299,
Longitude	-74.0721
Census Tract	21
Approx. Location	305 Front St, Staten Island, NY 10304
Previously Studied by EDC	2011, 2013
Borough	Staten Island
Borough President	James Oddo
City Council District	49
Council Member	Deborah Rose
Community Board	1

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Pedestrian access is available via sidewalk connection from Murray Hulbert Ave and driveway/walkways through the New Stapleton development. After the New Stapleton development is complete, this area will have limited parking available to commuters.



Stapleton

Existing Infrastructure

This site includes an existing pier roughly 1,400 feet long by 100 feet across that is the current home of the New York Fire Department marine unit - FDNY Marine 9.

On the south side of the pier, the fire boat is moored with a breakwater located to south and offshore. There is insufficient room within the breakwater on the pier to support ferry operations; however, there may be sufficient room within the protected breakwater if the landing were to come off the bulkhead along Waterfront Park but requires an agreement with FDNY Marine 9. The FDNY Marine 9 barracks and offices are located at the head of the pier. This pier structure may provide moorage for other government vessels, such as United States Coast Guard and United States Navy.

The north side of the pier or bulkhead north of the pier may offer space that could work for a ferry landing. However, exposure to rough sea and wave conditions leads to concern with safety and reliable operations.

The promenade is higher than the water level and would need a ramp structure to achieve Americans with Disabilities Act (ADA) slope requirements.

Waterside Access

Located on the northeastern shore of Staten Island, waterside access to this site is direct and straightforward from New York Harbor Upper Bay. There are adequate water depths to support ferry service. If located within the existing breakwater, navigational safety would need to be coordinated with FDNY. If the landing is located outside of the existing breakwater, a wave attenuator or floating breakwater would ensure safer vessel-landing interface in rough weather.

» **Ownership:** NYC Parks and Recreation

» **Zoning:** C4-2A

Implementation Requirements

» Requires new piles, barge and gangway

» **Approvals needed:** Environmental Review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water permits

» **Estimated Capital Cost:** \$12-16 million depending on the need for a wave attenuator

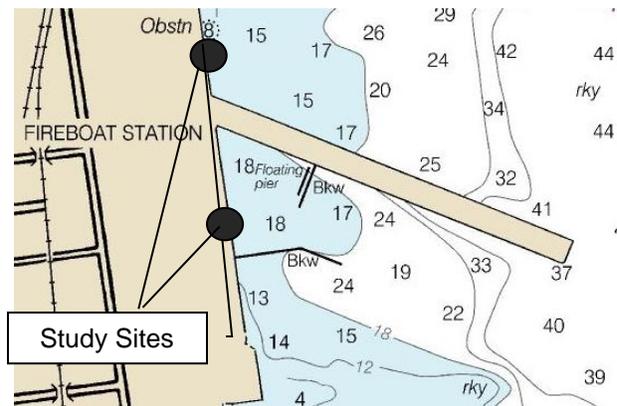
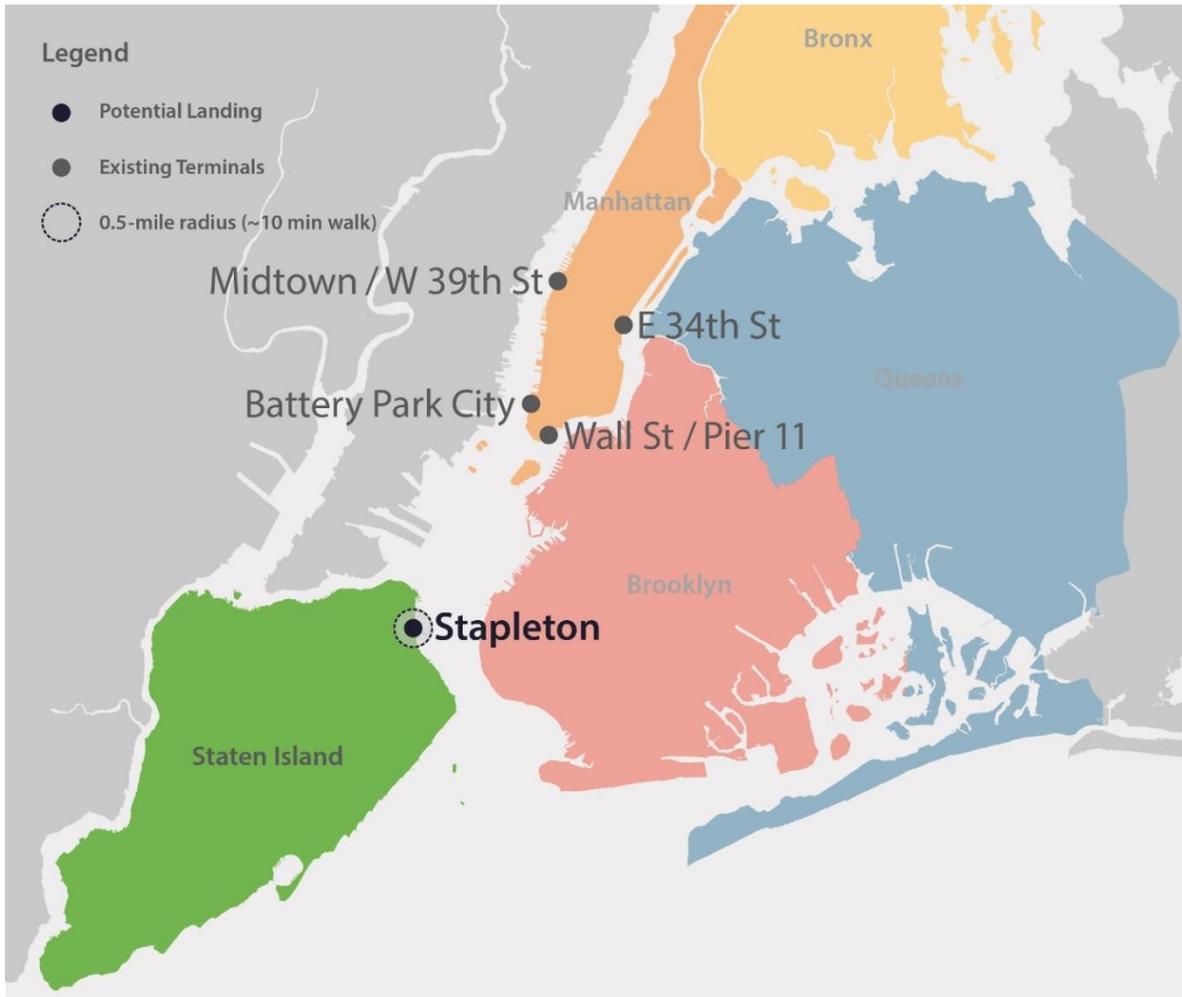


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Stapleton

TRAVEL TIME COMPARISON

The total estimated direct ferry travel time would be faster than existing transit to Lower or Midtown Manhattan. From Stapleton to Midtown, there is a transit option (Bus: SIM30) that does not require a transfer but is a longer trip than those with transfers (approx. 90 minutes).



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	28-80 min / \$6.59	(2 transit legs) 42 min / \$6.50	(~7 miles) 40 min / \$2.75	-2 min
Midtown West (Midtown / West 39th Street)	35-75 min / \$8.28	(3 transit legs) 75 min / \$6.50	(~ 10 miles) 52 min / \$2.75	-23 min

Great Kills

SUMMARY

This study site is located on the southeastern shore of Staten Island in Great Kills Park. The harbor is protected from the exposed waters of the ocean as it enters the New York Harbor. The Great Kills harbor is dredged to accommodate usage by boaters approaching the north and south shore marinas or anchoring in Great Kills. A potential landing could be located within Great Kills Park to the northeast of the Nichols Marina. Based on the distance from the nearest residential area this landing would likely require users to drive or take a shuttle bus. A non-stop ferry trip to Manhattan could provide a faster trip for adjacent neighborhoods compared to existing transit.



Following Hurricane Sandy, NYC DOT ran a temporary ferry service and shuttle from this location, discontinued after three months due to low ridership. New landing facilities would be required at this location for NYC Ferry operations to allow for bow-loading vessels.

MARKET AREA

The market area for potential ferry trips from Great Kills Park includes areas along the Staten Island Railroad and south of New Dorp Lane.



- » **Daily Commute Transit Trips:** ~14,600
 - **Trips to Lower Manhattan:** ~4,000
 - **Trips to Midtown Manhattan:** ~4,300
- » **Transit Access:** Bus and Rail
 - **Bus:** SIM1, SIM4, SIM5, SIM6, SIM7, SIM9, S10 ~1.6 miles from site
 - **Rail:** SIR, Bay Terrace, ~2.4 miles from site
- » **Ferry Travel Time to Manhattan:** A direct ferry could be faster than existing transit to Manhattan destinations.

Great Kills

BACKGROUND INFORMATION

Neighborhood Characteristics

The adjacent neighborhoods are mainly low-density residential.

Adjacent Properties / Waterway Use / Special Sites

The Nichols Great Kills Park Marina is located adjacent to Great Kills Park, a 580-acre area of marsh, beach, and woodlands that is part of the Gateway National Recreation Area. Nichols Marina has 250 slips for small recreational boats. In proximity to the potential site to the northeast is a public boat ramp, allowing recreational boaters to launch and haul out vessels, including kayaks.

Recent and Planned Substantial Development near Potential Site

No identified development in proximity to this site.

Latitude, Longitude	40.537344, -74.131653
Census Tract	154
Approx. Location	3270 Hylan Blvd, Staten Island, NY 10306
Previously Studied by EDC	No
Borough	Staten Island
Borough President	James Oddo
City Council District	51
Council Member	Joseph C. Borelli
Community Board	3

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Access to the site would be via Buffalo Street through Great Kills Park. There is a Gateway Park parking lot adjacent to the site with roughly 70 spaces, which would be challenging to accommodate a robust commuter ferry service. The Gateway Park area has an additional large parking lot off Buffalo Street, a mile from the potential ferry landing site location. The Nichols Marina offers some parking, and has a large lot currently used for boat storage. An agreement with the National Parks Service would be required to allow for ferry access and commuter parking.



Great Kills

Existing Infrastructure

There is currently no bow-loading ferry infrastructure in place at this location. A single 6-foot-wide gangway serves the floating docks at the Nichols Great Kills Marina on the south side of the harbor, serving up to 250 vessels and posing a capacity constraint to any NYC Ferry service. As an alternative NYC Ferry could sideload from the 10-foot-wide offshore main barge, with a ramp to make up the freeboard difference; however, this approach would be inconsistent with NYC Ferry operations.

A typical NYC Ferry landing (which would allow both bow- and side-loading vessels) could be installed to the northeast of Nichols Marina, with access from the existing promenade.



Waterside Access

The Great Kills Harbor entrance is a dredged channel through Crookes Point; however, most of the dredged channel is located on the northwest side of the harbor, opposite the potential landing site. Water depths on the southeast side of the harbor are adequate for ferry operations; however the harbor is subject to shoaling and water depths may change throughout ferry operations and could require dredging in the future.

- » **Ownership:** NYC Parks and Recreation and part of the National Park Service
- » **Zoning:** PARK

Implementation Requirements

- » Construct a new pier and gangway, plus install piles and a new barge of standard NYC Ferry design.
- » Agreement to use parking area for commuter parking.
- » Coordination with National Parks Service would be required to incorporate the ferry landing in an environmentally sensitive way.
- » **Approvals needed:** Environmental review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water permit; approvals from New York City Department of Parks and Recreation and National Parks Service
- » **Estimated Capital Cost:** \$8-12 million depending on length and cost of a pier.

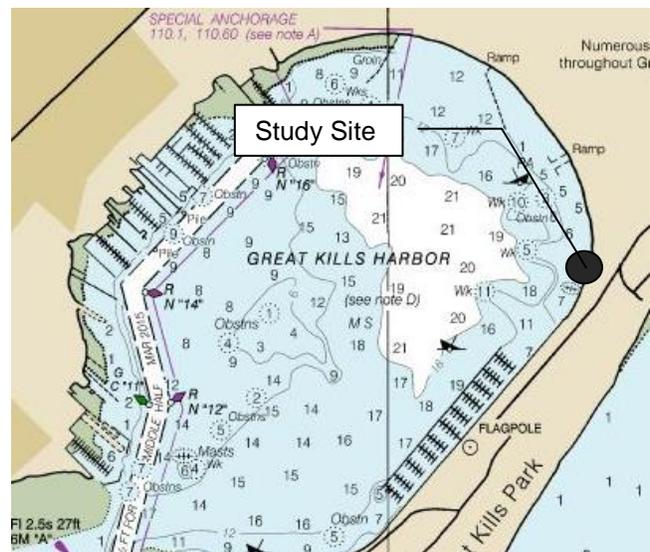


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Great Kills

TRAVEL TIME COMPARISON

A direct ferry trip would provide a faster trip time than transit to both Lower and Midtown Manhattan. The ferry trip time below includes drive time to the landing site.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	Car	Transit	Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	40-110 min / \$9.48	(1 transit leg) 65 min / \$6.50	(~17 miles) 59 min / \$2.75	-6 min
Midtown West (Midtown / West 39th St)	55-105 min / \$16.19	(1 transit leg) 85 min / \$6.50	(~20 miles) 71 min / \$2.75	-14 min

Tottenville

SUMMARY

The study site is located next to a Staten Island Railway station in Tottenville at the southwestern corner of Staten Island. Tottenville is fairly low density residential area made up of mainly single family homes. On average, a direct ferry to Lower Manhattan would be faster than existing transit options. A direct ferry to Midtown Manhattan would likely be slower than existing transit options.

Currently there is no marine infrastructure or off-street parking at the site. A pier, gangway, and barge with piles would need to be installed to support a ferry at this location. Ferry travel through the Arthur Kill and Kill Van Kull

waterways on the west and north sides of Staten Island would likely be unrealistic due to significant marine traffic in narrow waterways that would make safe and reliable ferry service challenging. Travel around the southeastern shore of Staten Island is more preferable, but would be exposed to potentially significant weather conditions for a large portion of the trip.



MARKET AREA

The market area is comprised of the Tottenville shore on Arthur Kill to Richmond Avenue (north of Amboy Road) and Arden Avenue (south of Amboy Road), as well as the eastern border by the Eltingville Staten Island Railway station.



- » **Daily Commute Transit Trips:** ~4,400
 - **Trips to Lower Manhattan:** ~900
 - **Trips to Midtown Manhattan:** ~1,500

- » **Transit Access: Bus**
 - **Bus: S78** ~0.2 miles from site

- » **Ferry Travel Time to Manhattan:** Faster trip than transit to Lower Manhattan and longer than transit to Midtown West.

Tottenville

BACKGROUND INFORMATION

Neighborhood Characteristics

Tottenville is primarily a lower-density single-family neighborhood with single-story retail and businesses along Amboy Street.

Adjacent Properties / Waterway Use / Special Sites

There are old pilings where there was historically a pier. The Tottenville Staten Island Railway station is located immediately adjacent to the site.

Recent and Planned Substantial Development near Potential Site

There are two major proposed projects in the Tottenville area: the proposed Riverside Galleria Mall that included a waterfront promenade and the redevelopment of the Nassau Smelting and Refinery site that included a senior housing complex of over 600 units.

Latitude,	40.512130,
Longitude	-74.253032
Census Tract	248
Approx. Location	7 Bentley St, Staten Island, NY 10307
Previously Studied by EDC	2011, 2013
Borough	Staten Island
Borough President	James Oddo
City Council District	51
Council Member	Joseph C. Borelli
Community Board	3

PHYSICAL AND NAVIGATIONAL CONSIDERATIONS

Upland Access

Pedestrian, bike and vehicle access to this site would be via Bentley Street, which has sidewalk on one side. Limited parking is available along Bentley Street, but additional parking would likely be required to support ferry service.



Tottenville

Existing Infrastructure

Located at the end of Bentley Street in Tottenville, Staten Island, this site contains no existing infrastructure. It is likely that a new pier, gangway, and barge with piles would be necessary at this location.



Waterside Access

Waterside access to this location could be from the navigable waterway known as the Arthur Kill that separates Staten Island from New Jersey, or around the southern tip of Staten Island through Raritan Bay.

Travel through the marked channels of Arthur Kill and Kill Van Kull, while possible, would represent a long transit through highly congested waters that would likely be incompatible with maintaining a ferry schedule.

Travel around the southeastern shore of Staten Island through Lower Bay of New York Harbor would provide direct and straightforward access, but would represent a long trip by ferry that is exposed to potentially rough sea conditions for a considerable distance.

Near-shore water depths at this location appear to be adequate, but would need to be evaluated in more detail as existing charts provide insufficient clarity, particularly with existing remnants of past marine structures in this area.

» **Ownership:** NYC Parks and Recreation

» **Zoning:** R3X

Implementation Requirements

» Requires new pier, gangway, barge and piles. Offshore there are remnants of previous piers and structures, creating a pile field that would need to be eliminated.

» **Approvals needed:** Environmental review; New York State Department of Environmental Conservation and United States Army Corps of Engineers in-water permit; approvals from New York City Department of Parks and Recreation and National Parks Service

» **Estimated Capital Cost:** \$8 million

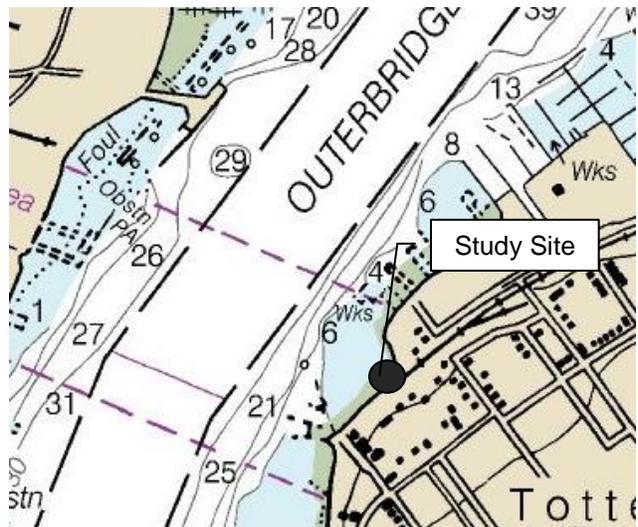


Figure shows water depth in feet at mean lower low water. NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites.

Tottenville

TRAVEL TIME COMPARISON

A direct ferry trip from Tottenville would be faster to Lower Manhattan but slower to Midtown Manhattan, compared to transit options today. The route travel time would be longer and less competitive as other stops are typically included in the route.



The table below shows approximate travel times to Lower and Midtown Manhattan from a central address in the study neighborhood, including some walk time to/from transit or ferry.

Destination	 Car	 Transit	 Direct Ferry	Direct Ferry vs. Existing Transit
Lower Manhattan (Battery Park City)	40-100 min/ \$13.57	(3 transit legs) 92 min / \$6.50	(~ 24 miles) 78 min / \$2.75	-14 min
Midtown West (Midtown / West 39th Street)	40-75 min / \$15.75	(1 transit leg) 78 min / \$6.50	(~ 28 miles) 90 min / \$2.75	+12 min



NYC

6

RIDERSHIP DEMAND MODELING APPROACH



INTRODUCTION



PURPOSE

Building on the success of NYC Ferry's current system of six routes, this planning study, commissioned by the New York City Economic Development Corporation (NYCEDC), examines potential new landings and routes to expand ferry service within New York City (the City). This appendix presents the methodology of the ridership demand forecasting process for potential new NYC Ferry routes.

As with any study seeking to expand transit service, it is important to understand the ridership potential of any site considered for new service. The ridership models previously used in the 2013 Citywide Ferry Study were available for use in this study. However, the models used in the earlier study had known shortcomings that suggested the need for improvements and updates.

While the models used in the 2013 Citywide Ferry Study were able to replicate the observed ridership on the East River Ferry, they tended to under-estimate ridership on proposed new routes. Since these models were initially developed in 2009 for the Port Authority of New York and New Jersey (PANYNJ), their underlying parameters were already in need of updating. Finally, the models did not perform particularly well when modeling the choice between a new ferry route and the free Staten Island Ferry¹.

For these reasons the choice was made to update the ridership models used for this new study. The model updates incorporate information collected in the first year of NYC Ferry's expanded service, data collected from the 2018 summer passenger survey on NYC Ferry's routes, and 2018 GPS data on trip-making within the City as provided by, the data provider AirSage. This study also takes advantage of the models developed specifically for trips to and from Staten Island as part of analysis completed for NYCDOT in 2017. The Staten Island models were developed based on survey data collected in 2017 providing a recent understanding of passenger decision making regarding the choice between new ferry routes and the Staten Island Ferry (SIF). The ridership forecasting approach and model updates are detailed below.

1. The original model contains explicit choices between ferries and subways or express buses, but not between two different passenger ferry types.

INTRODUCTION

APPROACH

Ridership forecasts were produced by identifying the “in-scope” market (the potential users) and mode choice models were applied to simulate the choice between existing transportation options and a new ferry service. The current study builds off the 2013 ridership forecasting work, while incorporating extensive new modeling insights. Each aspect of this process has benefited from new information or data obtained as part of this study as follows:

In-scope market

The process of identifying the in-scope market for each site is based on identifying catchment areas for each site and then identifying the volume of trips from the site’s catchment area to other landings’ catchments. Previously the catchment areas were estimated as the area within ½ mile of the landing. In this study, catchment areas are based on actual origin and destination data collected from surveys during the course of this study, a significant improvement compared to the 2013 study. This improvement captures the varying characteristics between accessing a ferry landing in dense areas compared to areas of less density, such as Rockaway or Soundview, by basing the catchment areas of potential sites on the actual catchment size of comparable existing NYC Ferry landings.

Trip volumes

While the previous study relied on census data to estimate commuting volumes, the current study derived its trip volumes from cell phone based GPS data obtained from AirSage. The use of cell phone based GPS data eliminated the need to roughly estimate the volume of non-journey-to-work trips as those trips were part of the GPS data.

Mode choice model

Significant improvements were implemented in the application of the mode choice models used to predict those users who would switch their current mode of travel to a new ferry service. The present study uses two sets of estimated mode choice models, the Citywide Ferry Study (CFS) models and the Staten Island Ferry (SIF) models instead of simply using the CFS models as the 2013 study did. The CFS models have difficulty modeling the choice between the Staten Island Ferry and potential NYC Ferry services, a known difficulty in

the 2013 study. Previous work completed for NYCDOT included the development of a Staten Island specific mode choice model, the SIF model, from a stated preference (SP) survey conducted in the summer of 2017. By using the SIF model for trips to and from Staten Island, the choice between the SIF and new services is more accurately modeled. In addition to providing a new model for trips to and from Staten Island, the analysis also provided insights into developing a non-commute CFS model.

Non-commute market

As previously mentioned, the 2013 study relied primarily on journey-to-work (JTW) data and as such only utilized a commuter mode choice model. With the non-JTW trip data provided by the GPS data and an understanding on the non-JTW market provided by the NYCDOT analysis, the team developed mode choice models for the non-JTW trips. These models were applied to estimate diversion rates within the non-JTW market.

Value of time

The value of time (VOT) measures were revisited. Data collected from the customer survey conducted on NYC Ferry’s routes in the summer of 2018 was used to confirm the VOT in the CFS models were accurate. As the JTW CFS model was initially developed in 2009, it was important to confirm the VOT measures were still accurate nearly a decade later.

All of these improvements to the model have enabled the team to more accurately model behavior across NYC Ferry’s current system as seen through this study’s calibration process, which is described in the Mode Choice Model section of this appendix. Complete details on each improvement and the calibration are discussed in the following section.

MODELING APPROACH

The model for forecasting ferry demand implements a well-established three-stage process. In the first step, the in-scope travel market is estimated. In the second step, the mode shares of the proposed ferry services are calculated using mode choice models. The mode shares are applied to the travel market demand to obtain an estimate of the number of trips diverted to the new ferry service. In the third step, the growth of the travel markets to future years is estimated.

This section documents the ridership forecasting approach used in this study, which follows the three-process highlighted above:

- Identify the in-scope market for potential ferry sites/routes, focusing on existing transit trips;
- Apply a mode choice model to forecast diversion to the proposed routes in the base year of 2018; and
- Grow the forecast ridership in future years.

In addition to outlining the approach, this section also notes key improvements undertaken in the modeling process compared to the 2013 Citywide Ferry Study's modeling exercise. For each step in the forecasting process, the overall process is described, noting improvements from the previous study, and identifying data sources.

IN-SCOPE MARKET

Approach

The determination of the in-scope market is instrumental to producing robust forecasts. As such, the sizing of the market was the subject of most of the model improvements implemented in this study. Those improvements included the use of GPS data (provided by AirSage) for the trip tables and sizing site catchment areas based on observed catchments in the NYC Ferry network.

The use of cell-phone based GPS data allowed for the modeling of both commuters and non-commuters as opposed to the earlier 2013 study which was based solely on modeling the JTW market. The estimation of the non-JTW market was possible because the cell phone based GPS data collects information on all trips,

regardless of trip purpose and mode. While the GPS data contains information about trips made by cars, these are generally removed from the trip tables as auto users are currently expressing a strong preference for car use by not using the City's expansive transit network. The GPS data also covered weekdays and weekends allowing for weekends to be modeled in addition to weekdays. The cell phone based GPS data classifies trips based on their starting and ending locations as being home, work or other. Home and work locations are identified for each device based on where the device spends the majority of its time during the day and night. This approximation of trip purposes provided a summary of trips by their origin and destination type, for example a home-based work trip or home-based other trip.

In addition to using GPS data sources for the trip tables, observed NYC Ferry data was used to develop the catchment areas for each potential site. Surveys of current ferry customers were conducted in the summer of 2018 and collected information on ferry users' origin and destination. The information, collected at the ferry route level, allowed the team to define more accurately the ferry sites' catchment area.

In the previous study, a site's catchment area was based on a generic ½ mile semicircle around the site - with special allowances made for certain sites that might be expected to draw from a larger area due to bus lines or parking lots. The semicircle approach was based on an understanding of the East River market as seen on the East River Ferry; however, this approach was not applicable in all parts of the City. While the ½ mile catchment was a good approximation for the Astoria landing, as shown in Figure 2.1, the same logic failed for the Rockaway landing, shown in Figure 2.2. Rockaway's catchment area effectively covers an eight mile stretch of Rockaway. The figures show the origins (green) and destinations (red) of ferry riders using the Astoria or Rockaway landings. This data was collected as part of the 2018 summer survey.

MODELING APPROACH

Figure 2.1: Astoria Catchment

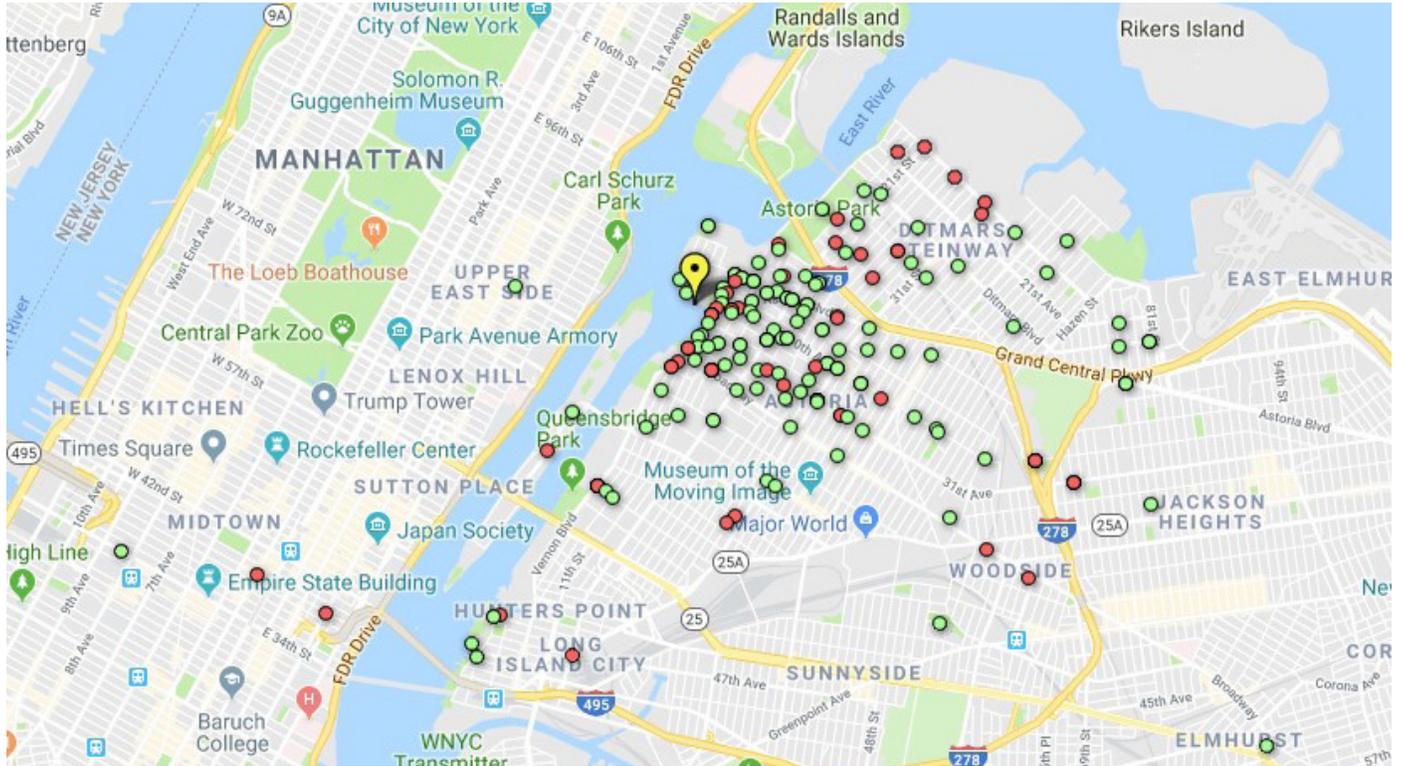
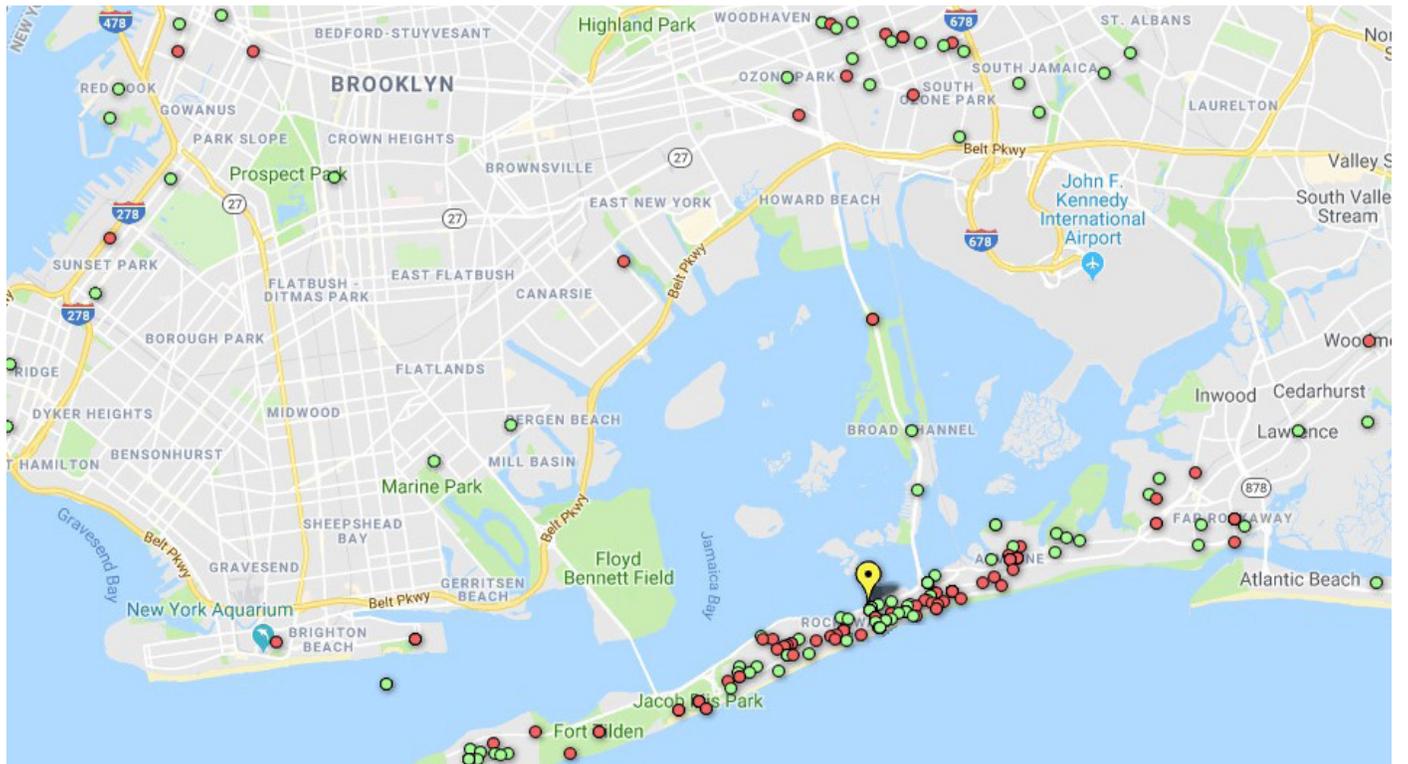


Figure 2.2: Rockaway Catchment



MODELING APPROACH



The move away from Census data to cell phone based GPS data, combined with the new site-specific catchment areas, required that the whole system be calibrated and validated against known traffic and ferry and transit ridership. The AirSage data and validation processes are detailed below with the model validation process to follow.

GPS Data Summary

AirSage provided GPS-based trip data for April 2017 covering weekday and weekend trips within the five boroughs between 6am and 10:30pm. The AirSage GPS data is anonymous, contains no personally-identifiable information and does not enable targeting specific individuals in any manner. AirSage aggregated the data into the average weekday day and the average weekend day, with each having 25 million and 18 million daily trips respectively. The trips were split into three time periods:

- AM: 6am-10am
- Mid-Day: 10am-4:30pm
- PM: 4:30pm-10pm

There were approximately 5.8M trips in the AM time period, 9.9M in the mid-day and 9.5 in the PM time period. The data was further classified into the following nine trip purposes:

- HBW: Home-based work
- HBH: Home-based home
- HBO: Home-based other
- WBH: Work-based home
- WBW: Work-based work
- OBO: Other-based other
- OBH: Other-based home
- OBW: Other-based work

The AirSage data was collected geographically using a zone system that provides more granularity along the ferry accessible waterways. The zone system used for the GPS data is displayed below in Figure 2.3. The 70 zones used for collecting the GPS data were disaggregated into the 200 zones used in the forecasting model. This disaggregation was done based on population distributions within the larger zones.

MODELING APPROACH

Validation of the GPS data

In order to confirm the validity of the GPS data, the GPS data was compared to the American Community Survey (ACS) data which includes data on resident's places of work and residence. In addition to the ACS data, the New York Metropolitan Transportation Council's (NYMTC) Best Practice Model (BPM) was also used as a comparison point. Comparing the numbers of commuters by borough pair between the three data sources allowed for a classification of some non-home based trips to be part of commutes (it is quite common for commuters to stop along their commute, and the GPS data would produce one HBO trip and one OBW trip).

The comparison of the three data sources is shown in Table 2.1 below.

Table 2.1: Comparison of Commuter Volumes in GPS, ACS CTPP and BPM Data Sources

Key Borough Pair	GPS	ACS*	BPM (2017)	GPS vs ACS	GPS vs BMP
Brooklyn – Brooklyn	807,615	717,177	1,116,898	13%	-28%
Queens – Brooklyn	205,536	207,857	106,212	-1%	94%
Staten Island – Brooklyn	48,612	49,265	76,670	-1%	-37%
Bronx – Manhattan	236,872	294,031	620,994	-19%	-62%
Brooklyn – Manhattan	653,128	557,577	300,438	17%	117%
Manhattan – Manhattan	865,562	935,429	1,312,058	-7%	-34%
Queens – Manhattan	586,570	524,552	918,584	12%	-36%
Staten Island – Manhattan	53,721	73,056	33,554	-26%	60%

While the GPS data differs from the ACS and the BPM data, it generally falls between the two. In addition to the BPM and ACS comparisons, the resulting GPS-based trip table was compared to the trip table used in the NYCDOT analysis. The trip tables produced by both analyses of trips between Manhattan and Staten Island were nearly identical, providing increased confidence in the GPS data.

Based on this validation process, the decision was made to proceed with the use of the GPS data as the model's trip tables. Once validated, the trip table was disaggregated from the 70 AirSage zones into the 200 model zones so that individual landing catchment areas could be identified.

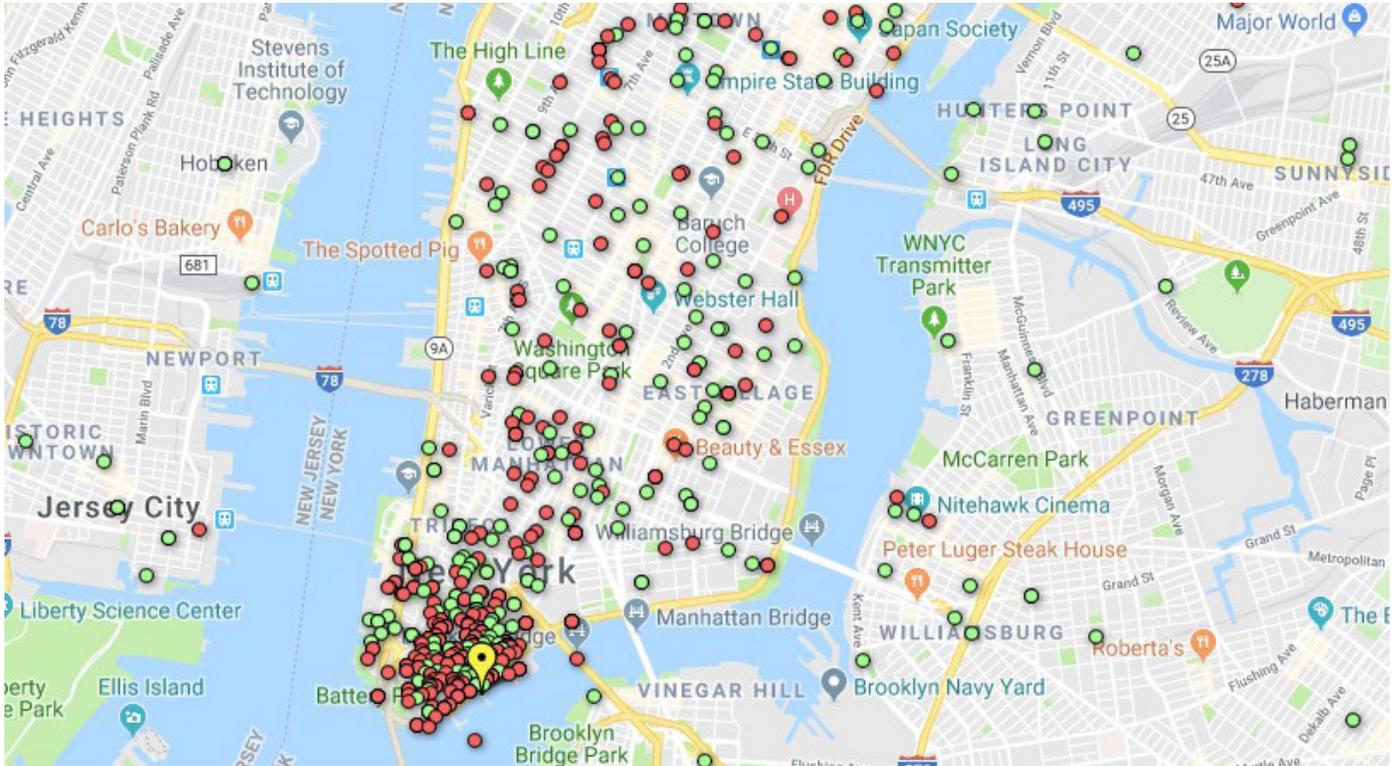
Landing Catchment Areas

A landing catchment area is defined as the geographic area near the landing where most ferry riders are coming from. The identification of landing catchment areas is crucial to accurately modeling ferry ridership. As was previously mentioned, the 2018 customer survey on NYC Ferry's routes included questions about riders' origins and destinations. These questions were used to identify the catchment areas for each of the existing landings. Generally, the previous assumptions from the 2013 model were proven to be reasonable. For the most part, the survey confirmed the ½ mile semicircle. While confirming several catchment areas, the survey provided new information for sites like Rockaway and Pier 11. Notably, origins and destinations of ferry riders at Pier 11 show that a significant number of riders are also using the subway for a portion of their trip as seen in Figure 2.5 Additionally, riders of the Rockaway route come from a much larger catchment than previously expected.

MODELING APPROACH

These improvements to identifying the in-scope market enable more detailed modeling than previously used in the 2013 Citywide Study. The next step in forecasting ridership is to apply the mode choice models to the in-scope markets. This process is described in the following section.

Figure 2.5: Origins and Destinations Ferry Riders at Pier 11



MODE CHOICE MODEL

Approach

Following the identification of the in-scope markets, the next step is to apply mode choice models to estimate the number or trips that will be diverted to the potential new routes. Staten Island residents' preferences and ferry usage is different than those from the other boroughs. Accordingly, separate behavioral models were developed.

Two sets of mode choice models were used for this study: the SIF mode choice models used in the NYCDOT analysis were used for State Island-based ferry routes, while the CFS mode choice models were used on the other routes. The CFS models were able to successfully replicate ridership on the East River route, and the SIF models were recently developed and tested in the 2017 Staten Island study and were customized to the Staten Island market.

The two sets of models and their key differences are outlined below. Ultimately, both models were combined into a single tool to estimate ridership potential on the proposed ferry routes.

MODELING APPROACH

SIF Models

The Staten Island Ferry (SIF) mode choice models were used in the NYCDOT analysis to estimate ridership. There are two models, one for express bus users and one for SIF users. The express bus model was previously developed for the PANYNJ while the model for SIF users was developed as part of the NYCDOT analysis. This effort included a Stated Preference (SP) survey to evaluate travel preferences of Staten Island travelers currently using the SIF (between St. George and Whitehall).

Within this study, the SIF models are used only for people traveling between Staten Island and the other boroughs. These travelers are split into two user types: existing SIF travelers and existing express bus users. The two user types are expected to have different travel preferences and used two different mode choice models.

The 2017 SP survey revealed differences in preferences by trip type – commuters have a higher value of time than non-commuters. Therefore, mode choice models were developed for SIF commuter and non-commute trips separately. The coefficients for all Staten Island models are shown below:

Table 2.2: Staten Island Model Coefficients

Market	Mode	Out of Vehicle Time	In-vehicle Time	Total Time	Transfers	Headway	Fare	Female Constant	Potential Ferry Constant
All	xBus	-0.20	-0.10			-0.08	-0.60	-0.99	-3.91
Commutation	SIF			-0.052	-0.13	-0.006	-0.30*		-0.35
Non-Commutation	SIF			-0.049	-0.19	-0.004	-0.28*		-0.44

* The fare coefficient for SIF travelers is a function of income ($Cost / \ln(\text{Income } (\$k))$), meaning that travelers with higher incomes are less price sensitive than those with lower incomes. The coefficients listed are for a representative \$80k income.

These coefficients imply that express bus is preferred to ferry and the existing SIF (St. George – Whitehall) ferry is preferred to a new ferry service. Mode choice model coefficients can be more readily interpreted when converted into time and monetary values. As used in travel demand modeling, the VOTs represent the amount of money that a traveler would be willing to pay in order to save a unit of time. These models' VOTs are within the \$10-11 dollar per hour range (2017 \$s), with SIF users having a higher VOT than express bus users and commuters having a higher VOT than non-commuters.

CFS models

The CFS tool was developed in 2013 and used mode choice models developed for PANYNJ in 2010. The mode choice models differentiate preferences between subway and bus travelers. They were applied to business travelers only in the 2013 Citywide study. In this effort, non-business models were developed using differences in VOTs seen in the 2017 Staten Island SP survey.

The coefficients for the CFS (excluding express bus) are shown below for subway and bus trips. Multi-modal trips, such as a trip using both the subway and buses, used a combined model.

MODELING APPROACH

Table 2.3: Citywide Ferry Study Coefficients

Market	Mode	Out of Vehicle Time	In-vehicle Time	Headway	Fare	Female Constant	Potential Ferry Constant
Commutation	Bus	-0.20	-0.10	-0.08	-0.60	-0.99	1.15
Non-Commutation	Bus	-0.16	-0.08	-0.06	-0.49		0.92
Commutation	Subway	-0.06	-0.07	-0.06	-0.48	-0.60	0.56
Non-Commutation	Subway	-0.06	-0.06	-0.05	-0.39		0.45

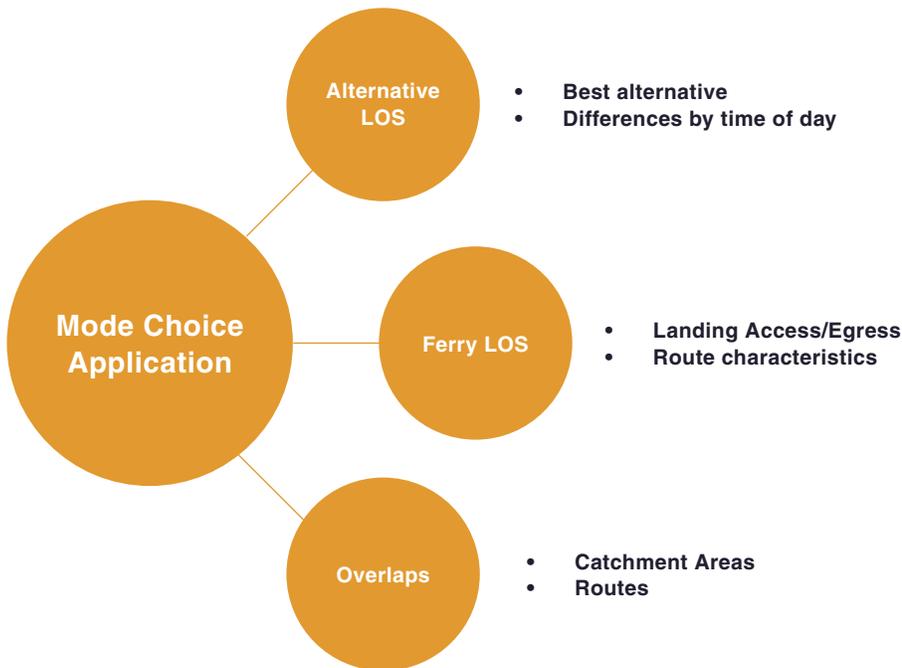
The coefficients imply that ferry is preferred to bus and subway alternatives. Values of time are in the \$8-9 per hour range. These VOTs were confirmed in the 2018 survey of NYC Ferry riders. While transfers are not penalized in these models, out of vehicle and in-vehicle time are valued differently.

Mode Choice Model Application

This study involved the development of a new demand tool that combined previous work on the 2013 Citywide Ferry Study and in the 2017 Staten Island study. The aforementioned models (CFS and SIF models) were both used; this section outlines how the models were applied.

Any trips to or from Staten Island used the SIF models, while all other trips used the CFS model. All modeled trips followed a similar process aside from the coefficient selection. This process is summarized graphically in Figure 2.6.

Figure 2.6: Mode Choice Application – Levels of Service



MODELING APPROACH

Central to the mode choice application is the identification of levels of service (LOS) for proposed ferry routes and best available transit alternatives. A script was developed to pull the best transit options from Google Maps for the non-ferry alternatives. Additionally, the best transit options were used for the ferry access and egress. Ridership was estimated for weekends and peak and off-peak weekdays separately, necessitating differing LOS by time of day and day of week when appropriate.

Proposed ferry route characteristics were developed and joined together with the access and egress characteristics in the demand tool. Ferry to ferry transfers were not permitted in this tool; survey data from NYCEDC suggests a very small percentage (<2%) of NYC Ferry riders transfer between ferries.

Another component of evaluating the proposed ferry routes against existing alternatives is properly handling overlapping routes. Travelers that have, for example, two ferries that could help them complete their trip essentially have better service than if they have only one. This is because the combined frequencies result in more frequent ferry service for the user.

To accurately reflect this overlap in the demand tool, a “blended ferry option” was modeled for overlapping routes, which calculated frequency-weighted LOS for the combined ferry service. The mode choice models then evaluated the blended ferry option versus the alternative transit option. The routes were also estimated individually, to obtain ratios to split the blended ferry ridership onto individual routes.

In some cases, catchment areas for the proposed NYC Ferry landings overlapped. One example along existing routes is North and South Williamsburg. Travelers starting their trips in Williamsburg likely can walk to either landing. In the event of overlapping catchment areas, travelers are assigned to the closest landing.

Calibration

A key metric for evaluating the demand tool and mode choice models is how well they reproduce existing NYC Ferry ridership. April 2018 NYC Ferry ridership data was used to calibrate the model to observed ridership on the East River (ER), Astoria (AS), Rockaway (RW), and South Brooklyn (SB) Routes. Route-level calibration results are shown in Table 2.4:

Table 2.4: Route-Level Calibration Results

Route	Average Daily Boardings			Average Weekday Boardings			Average Weekend Boardings		
	Target	Model	% Diff	Target	Model	% Diff	Target	Model	% Diff
AS	2,248	2,186	-3%	2,314	2,232	-4%	2,081	2,071	-0.05%
ER	5,882	5,824	-1%	5,470	5,827	7%	6,910	5,816	-16%
RW	1,135	1,006	-11%	1,151	1,109	-4%	1,093	748	-32%
SB	1,226	2,082	70%	1,087	2,158	99%	1,574	1,893	20%

MODELING APPROACH

These results highlight a few important findings:

- The models and tool perform well on weekdays and on the system as a whole.
- South Brooklyn modelled ridership comes in very high; possibly due to imperfect splitting of overlapping service with East River.
- Rockaway consistently modelled low compared to actual ridership. A Rockaway-specific factor was used to get the average weekday ridership close to observed.
- Weekend ridership, except for South Brooklyn, models low compared to actuals.

To evaluate the model performance at a landing level, landings in the same region were grouped together. Average weekday ridership for existing site groupings is shown in Table 2.5.

Table 2.5 indicates that the model does a fairly good job at replicating ridership for the key groups of landings.

Additional takeaways are:

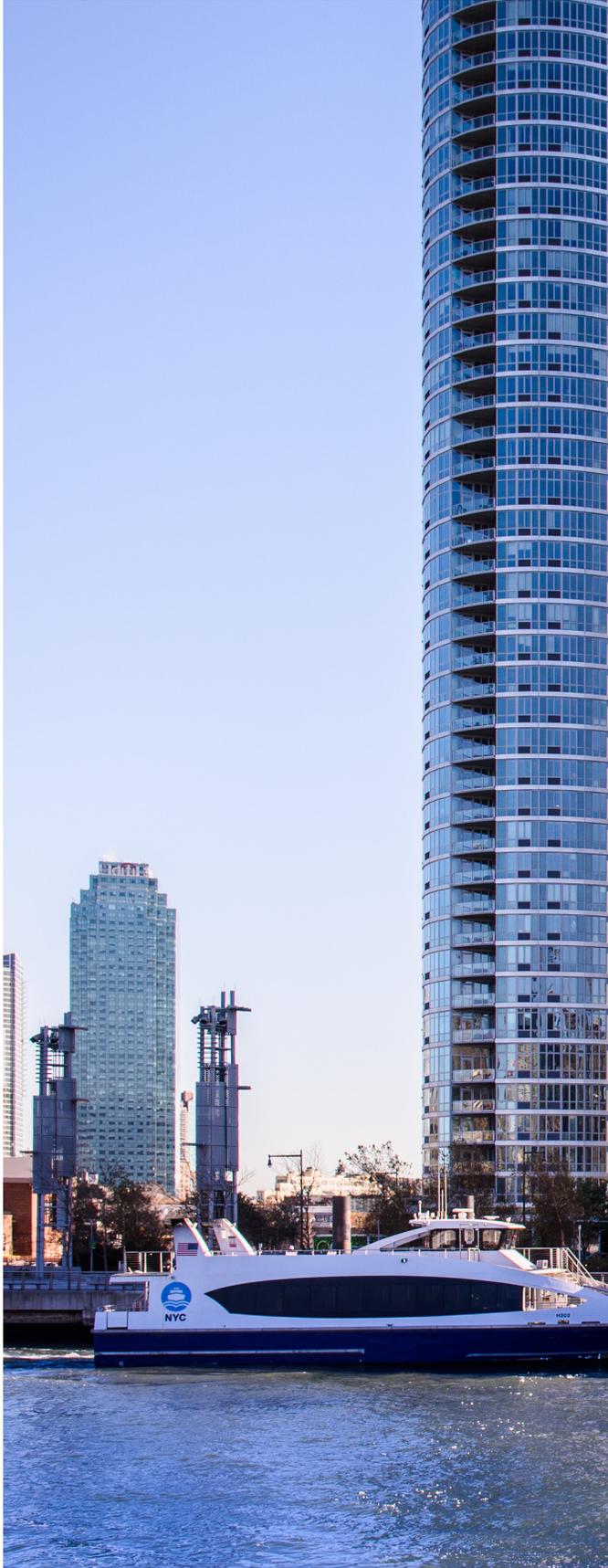
- High ridership at Brooklyn Army Terminal is contributing to South Brooklyn’s route modeled ridership being high. This should be considered when evaluating modifications to the South Brooklyn route.
- North Williamsburg ridership is modelled low, whereas South Williamsburg and Greenpoint see higher modelled ridership than observed. This is likely due to an imperfect zone system and method for modelling overlapping routes.

Finally, while reviewing the average daily ridership results, the model ability to estimate the commute versus non-commute trips was evaluated. The 2018 EDC summer survey provided that about 35-45% of trips on the NYC Ferry System are commute trips. The calibrated model has a trip purpose split of 35-37% commuting trips for most routes, with 61% on the Rockaway route.

Table 2.5: Landing-Level Calibration Results for Average Daily Ridership

Group for Calibration	Target	Model	% Diff
Long Island City - South	524	578	10%
Long Island City - North	501	618	23%
Astoria	397	273	-31%
Total - Queens ER	1,422	1,470	3%
Pier 6	130	191	47%
Dumbo	1,365	1,354	-1%
Total - Dumbo / BK Heights	1,495	1,545	3%
S Williamsburg	464	665	43%
N Williamsburg	1,180	533	-55%
Greenpoint	519	875	69%
Total - North Brooklyn	2,162	2,073	-4%
Bay Ridge	200	181	-10%
Brooklyn Army Terminal	197	297	51%
Red Hook	159	200	26%
Total - South Brooklyn	556	678	22%

MODELING APPROACH



After calibrating the demand tool to existing ridership in April 2018, Steer ran the full NYC Ferry System as it is today: with the Lower East Side and Soundview routes in addition to the four calibrated existing NYC Ferry routes.

The additional routes used the available ridership counts as of November 2018 as their targets. The Lower East Side route modelled high in the 2013 study, with 3,400 modelled daily riders compared to its target of 1,060 daily riders. Soundview modelled low, with 1,300 modelled daily riders compared to its target of 2,160.

The Lower East Side results indicates that the model does not predict intra-Manhattan trips very well. The percent difference between modelled and actual ridership on the Lower East Side Route was used to modify proposed routes with intra-Manhattan trips. The reasoning here is that the trip tables used do not exclude walkers, bikers or other route captives (people who will not change their route at all, potentially due to an attraction or important intermediate stops like dropping children off at school).

The Soundview results suggest that our catchment area for Soundview might be too small. Modifications to the Soundview route should be and were compared against the modelled existing route.

GROWTH ASSUMPTION

Growth in future ferry ridership is provided by NYMTC's socioeconomic forecasts. NYMTC provides population and employment projects at the traffic analysis zone (TAZ) level. These forecasts are aggregated into the model zones and catchment areas. They are then applied on an OD-basis, where population growth in potential ferry riders' origins and employment growth in their destinations are combined to produce forecast growth rates.

The introduction of a new transportation service will improve the overall level of service for travel within the study area. The introduction of new ferry route may result in trips being made that were not made before. These are called induced trips. The final step in the ridership forecasting process can therefore be to forecast the volume of these induced trips brought about by the new ferry routes.

MODELING APPROACH

No additional induced trips have added to the forecasted results. The estimation of induced demand requires a complex sets of inputs including local economic and demographic conditions, the quality and availability of alternative transportation options, and information on the decision-making processes of thousands of individual actors that are difficult to quantify with certainty. Therefore, it is preferable to assume minimal induced demand.

NYCEDC **kpff** **steer**