# Hart Island Transportation Study

# Final Report

June 1, 2022

Hart Island, City Island, and Pelham Bay Park
BOROUGH OF THE BRONX
NYC Parks Contract No.: X370-122M

Prepared for:

NYC Parks

NYC/EDC

NYC Human Resources Administration
Department of Social Services

NEW YORK CITY DOT

NYC Office of the Mayor

NYC Office of Chief Medical Examiner

Prepared by:

NV5

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# I. EXECUTIVE SUMMARY

NV5 has been engaged by the City of New York, through the Department of Parks and Recreation (NYC Parks) to prepare a transportation study focused on improving access to Hart Island, the city's active public cemetery. Hart Island is an approximately 130-acre island located to the east of City Island in the Bronx and is currently only accessible by boat from City Island. The goal of the study is to develop potential conceptual projects to improve public access to Hart Island, serving the needs of those with loved ones on the Island as well as general visitors. The first part of the study focused on documenting existing conditions of landside transportation infrastructure to reach the Fordham Street Pier (current ferry departure location), study parking utilization within the vicinity of the Fordham Street Pier and at the Orchard Beach Parking Lot, summarize the results of an origin study on visitors to Hart Island, and provide an assessment of existing infrastructure utilized by the ferry between City Island and Hart Island. The latter half of the study focused on developing conceptual alternatives to increase the quantity and quality of transportation alternatives to reach Hart Island, reduce travel time for public transit riders, improve the travel experience, and minimize the impact on traffic and on-street parking conditions.

A study advisory group (SAG) was formed to guide the study which included NYC Parks and as well as city agencies NYC Department of Transportation (DOT), NYC Economic Development Corporation (NYCEDC), NYC Human Resources Administration, NYC Office of the Chief Medical Examiner, and NYC Office of the Mayor. A community and stakeholder outreach effort was performed including a Visitor Trip Origin and Stakeholder survey and two public meetings to obtain public input on the conceptual alternatives and address questions and concerns on the study.

The findings of the existing conditions assessment are summarized below.

- The Fordham Street Pier on City Island is a relatively isolated location from the rest of the Bronx and other boroughs of New York City and is difficult to access using public transit.
- Many visitors travelling to visit a gravesite on Hart Island drive to reach the Fordham Street Pier. The majority of visitors park on-street within the vicinity of the Fordham Street Pier, however, parking capacity is limited.
- Orchard Beach Parking Lot in Pelham Bay Park is anticipated to have hundreds of parking spaces available throughout the year, including during the summer months when parking would be utilized by beach goers.
- A study of the origin of past and current Hart Island visitors found that trips made by those visiting to a gravesite were distributed amongst all boroughs of New York City (44%), as well as states in the Northeast US (43%) including other portions of New York State, New Jersey, Connecticut, and Pennsylvania.
- The inspections of existing infrastructure at Fordham Street and Hart Island were conducted according to a Rapid level assessment as defined by the NYCEDC Waterfront Facilities Maintenance Management System (WFMMS) Inspection Guidelines. This assessment concluded that the existing infrastructure is in varying states of repair. The summary of condition ratings given to each infrastructure system is provided in the *Table 1* below.

***Table 1 – Summary of Ferry Infrastructure Investigations***

| Location | Condition Rating |
|---|---|
| Pier/Ferry Dock | |
| Fordham Street Pier | Good |
| Fordham Street Ferry Dock | Fair to Poor |
| Hart Island Ferry Dock | Fair to Poor |
| Hart Island Concrete & Timber Dock | Poor |
| Shoreline | |
| Fordham Street | Fair |
| Hart Island Ferry Dock | Poor |
| Hart Island Concrete & Timber Dock | Fair |

Four Terminal Conceptual Alternatives and six Service Plan Alternatives were developed to provide short-, medium-, and long-term solutions to provide improved transportation access to Hart Island. Alternatives were developed utilizing data collected in the existing conditions assessment, stakeholder input from surveys and public meetings, as well as an assessment of existing and potential new ferry departure points in terms of landside transportation accessibility. Cost estimates were developed for all Terminal and Service Plan Alternatives, and travel times were estimated for both drivers and public transit riders to evaluate the benefits or challenges with each Service Plan Alternative.

A summary comparison table of the four Terminal Conceptual Alternatives (1-4) is provided in *Table 2* below. Terminal Conceptual Alternative 1 focuses on maintaining a good state of repair at existing facilities serving the NYC DOT Ferry. Terminal Conceptual Alternatives 2, 3, and 4 propose to construct a new ferry terminal to accommodate an NYC Ferry vessel at Hart Island. Terminal Conceptual Alternative 2 proposes to rehabilitate the Coal Pier at Hart Island and construct a gangway and NYC Ferry Terminal. Terminal Conceptual Alternative 3 proposes to completely reconstruct the Coal Pier, providing increased longevity, while also constructing a new gangway and NYC Ferry Terminal. Terminal Conceptual Alternative 4 proposes to construct a gangway and NYC Ferry Terminal from a newly reconstructed bulkhead just south of the Hart Island Ferry Dock. While Terminal Conceptual Alternatives 2, 3, and 4 each have their respective benefits and challenges, a new NYC Ferry Terminal at Hart Island will require an electrical power source, highlighting a potential feasibility issue and consideration for future plans on Hart Island.

A summary comparison table of the six Service Plan Alternatives is provided in *Table 3* below. Service Plan Alternatives S1 and S2 proposes shuttle bus services to Fordham Street for drivers and public transit riders benefit. Service Plan Alternative M1 proposes a new standalone ferry service between the NYC Ferry Ferry Point Park Terminal and a new Hart Island Terminal, with increased frequency of service envisioned in Service Plan Alternative L1. Service Plan Alternative M2 proposes an extension of the NYC Ferry Soundview Route from the Ferry Point Park Terminal to a new Hart Island Terminal, with increased frequency of service envisioned in Service Plan Alternative L2.

Service Plans Alternatives S1 and S2 (shuttle bus) would provide a substantial benefit by providing parking for Hart Island visitors that would not impact City Island on-street parking for a relatively low annual operating and maintenance costs. Service Plan Alternative S2 has further advantages by serving public transit riders in addition to drivers, reduces typical public transit travel times to Hart Island, and has a similar total annual operating and maintenance cost compared to Service Plan Alternative S1.

Service Plan Alternatives M1/L1 & M2/L2 would require considerable capital investment with the construction of a new NYC Ferry compatible terminal at Hart Island, however, these alternatives would significantly increase the number of public transit alternatives to reach Hart Island by providing a

connection to the NYC Ferry Soundview Route. Public transit travel times are anticipated to be reduced compared to the existing condition as well. The Stand-Alone Ferry (Service Plan Alternative M1) and Soundview Route Extension to Hart Island (Service Plan Alternative M2) are estimated to have relatively similar annual operating and maintenance costs, and similar benefits of average travel time reductions for public transit riders. However, Soundview Route Extension (Service Plan Alternative M2/L2) is anticipated to be more cost effective from an annual operating and maintenance cost perspective as service is increased in Long Term Alternative L2, this alternative requires a larger upfront cost to purchase an additional NYC Ferry Vessel to operate along the NYC Ferry Soundview route.

The intention of this report is to be used by NYC agencies for the planning and implementation of potential future transportation improvement projects to increase accessibility to Hart Island. While a specific alternative is not recommended, this report provides a detailed evaluation of potential alternatives to inform future planning decisions for Hart Island.

***Table 2 – Terminal Conceptual Alternatives Comparison Table***

| Terminal Conceptual Alternative | Timeline | Description | Benefits | Challenges | Capital Costs |
|---|---|---|---|---|---|
| 1 | Short-Term | State of Good Repair<br>Improvements to Existing Infrastructure | -Extend Service Life of Existing Infrastructure for both Burial and Passenger Ferry Operations<br>-Minimal Interruption to Existing Operations | -Coal Pier Remains in State of Disrepair | $16.8 M |
| 2 | Medium-/Long-Term | New Ferry Terminal at Coal Pier<br>Rehabilitation of Coal Pier | -Utilizes Existing Infrastructure<br>-Continued Use of Coal Pier for Future Material Barge Operations | -No Existing Electrical Power Source on Hart Island, Required For New Terminal<br>-Cost vs. Service Life (Shorter Service Life For Rehabilitated Structures)<br>-Distance From Existing Hart Island Roadways (May Require Additional Upland Improvements) | $19.6 M[1] |
| 3 | Medium-/Long-Term | New Ferry Terminal at Coal Pier<br>Reconstruction of Coal Pier | -Continued Use of Coal Pier for Future Material Barge Operations<br>-Opportunity for Floating Dock and Gangway | -No Existing Electrical Power Source on Hart Island, Required For New Terminal<br>-Most Costly Concept<br>-Distance From Existing Hart Island Roadways (May Require Additional Upland Improvements) | $29.0 M[1] |
| 4 | Medium-/Long-Term | New Ferry Terminal at Hart Island Terminal | -Minimal Interruption to Existing Operations<br>-Location Closest to Existing Hart Island Roadways | -No Existing Electrical Power Source on Hart Island, Required For New Terminal<br>-Requires Bulkhead Reconstruction<br>-Coal Pier Remains in State of Disrepair | $25.7 M[1,2] |

Notes

[1] Capital Costs Include Allowance For Electrical Power Source (Gas Powered Generator) for New Ferry Terminal Equipment and Lighting.

[2] Concept 4 Requires Work Proposed in Concept 1 - Bulkhead Reconstruction. Therefore, Total Cost of Concept 4 if Concept 1 Bulkhead Reconstruction is Not Complete is Concept 4 Cost ($15.4 M) + Concept 1 Bulkhead Reconstruction ($10.3 M) = $25.7 M

***Table 3 – Service Plan Alternatives Comparison Table***

| Alternative | Timeline | Description | Benefits | Challenges | Capital Costs (Terminal) | Capital Costs (Vessel) | Annual O&M Costs | Transit Travel Time Savings for NYC in Minutes (Average [Range]) | Transit Travel Time Savings for Greater Metro Area in Minutes (Average [Range]) |
|---|---|---|---|---|---|---|---|---|---|
| **S1** | Short Term | Shuttle Bus Service from Orchard Beach to Fordham Street Pier | -Provides Dedicated Off-Street Parking Facility for Hart Island Visitors<br>-Reduces Parking Demand and Traffic Activity on City Island | -Coordination Required with Existing or Future Concessionaire Contract for Parking Lot Management.<br>-No Improvement for Transit Access | N/A | N/A | $50,680[1] | 0 | 0 |
| **S2** | Short Term | Shuttle Bus Service From Pelham Bay Park Subway Station to Orchard Beach and Fordham Street Pier | -Benefits of Alternative S1, as well as Reduces Transit Travel Time<br>-Improves Transit Access | -Coordination Required with Existing or Future Concessionaire Contract for Parking Lot Management. | N/A | N/A | $50,880[1] | -18 [-25 to -4] | -13 [-27 to 0] |
| **M1/L1** | Medium/ Long Term | Standalone Ferry Service Between Ferry Point Park & New Hart Island Ferry Terminal | -Improves Transit Access<br>-Increased Flexibility of Visitation Times for All Visitors<br>-Off-Street Parking Facilities Available<br>-No Changes Required to NYC Ferry Soundview Schedule | -Requires Transfer Between Ferries at Ferry Point Park<br>-Longer Travel Times for Visitors Travelling By Private Automobile | $19.6 - $29.0 M[2,3] | N/A | $557,185/$1,478,335 | -15 [-25 to 0] | -8 [-25 to +18][3] |
| **M2/L2** | Medium/ Long Term | New Hart Island Stop Added to the NYC Ferry Soundview Route During Select Days of the Week (Part Time Service). | -Improve Transit Access<br>-Increased Flexibility of Visitation Times for All Visitors<br>-Off-Street Parking Facilities Available<br>-No Ferry Transfers Required for Visitors Who Depart from Other Soundview Ferry Stops | -Would Require Special Scheduling for NYC Ferry Soundview Route.<br>-Longer Travel Times for Visitors Travelling By Private Automobile | $19.6 - $29.0 M[2,3] | $ 5.8 M | $576,465/$1,005,433 | -20 [-28 to 0] | -15 [-28 to +16][3] |

Notes

[1] Does Not Include Operating and Maintenance Costs Associated with NYC DOT Ferry Operating.

[2] Capital Cost Dependent on Hart Island Terminal Concept Selected.

[3] Transit Riders from Connecticut/Arriving Via the MNR New Haven Line Would See an Increase in Travel Time.

# II. INTRODUCTION

A package of local laws was passed by the Mayor and City Council in December 2019 to transfer Hart Island from the jurisdiction of the Department of Correction to NYC Parks by July 2021, and a transportation study be conducted to explore improving access to Hart Island by July 1st, 2022. Hart Island is an approximately 130-acre island operating as the city's active public cemetery and contains no permanent population. Due to its unique location east of City Island in the Bronx as shown on *Figure 1* and *Figure 2*, Hart Island is currently only accessible by boat from City Island, with visitation scheduled by appointment and ferry service to the island operated by the New York City Department of Transportation (DOT).

The study scope of work includes an existing conditions assessment of ferry infrastructure and services at City Island and Hart Island, as well as assessing available transportation alternatives and parking availability near the Fordham Street Pier and at the Orchard Beach parking lot. The study scope of work also includes development of conceptual alternatives to improve transportation access to Hart Island with short-, medium-, and long-term options. While NYC Parks is leading the study, a Study Advisory Group (SAG) was assembled consisting of city agencies including NYC Parks, DOT, NYC Economic Development Corporation (NYCEDC), NYC Human Resources Administration (HRA), NYC Office of the Chief Medical Examiner, and NYC Office of the Mayor, as well as other critical stakeholders to provide important expertise on the project and assist in developing the conceptual alternatives. Conceptual alternatives considered include repairs or upgrades to existing ferry terminal facilities at Hart Island and Fordham Street, considerations to serve NYC Ferry vessels at City Island and Hart Island, providing ferry services from departure locations with more transportation options, and landside improvements including shuttle bus services or improved public transit accessibility. Cost estimates and projections of changes in typical travel times were developed to aid in comparing benefits and challenges for each conceptual alternative. The report concludes with an overall comparison of each alternative, to provide guidance for future decisions for transportation access to Hart Island.

***Figure 1 – Project Location Map (NYC)***

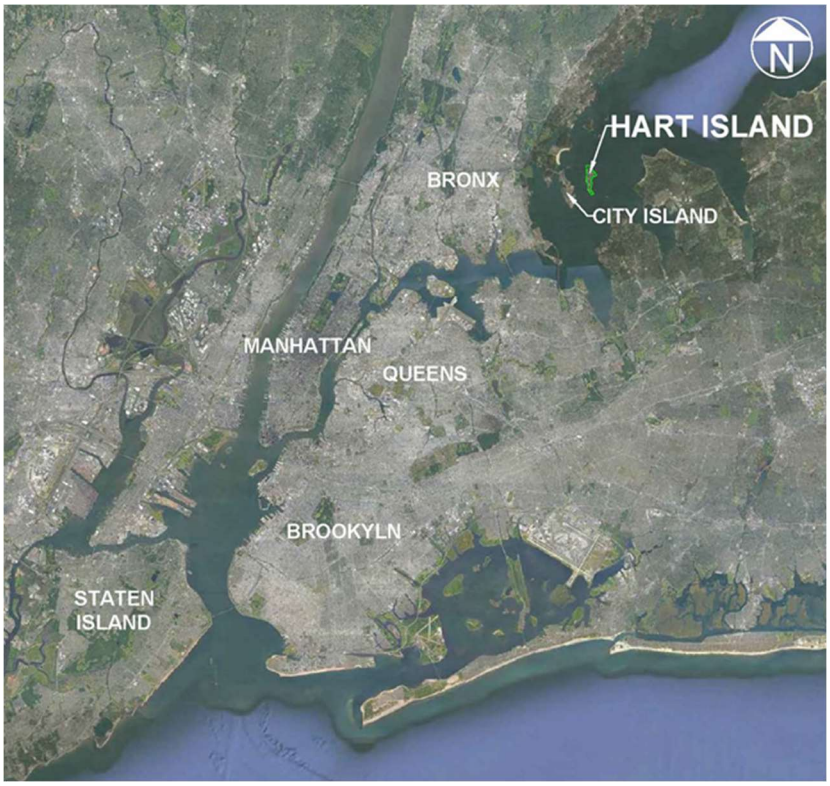



***Figure 2 – Project Location Map (Bronx)***

# III. OUTREACH SUMMARY

To inform the public and obtain stakeholder input on the transportation study and the conceptual alternatives, a robust outreach effort was conducted to encourage community involvement in the study. Public and stakeholder outreach included a Visitor Trip Origin and Stakeholder Survey conducted at the beginning of the study, as well as public meetings in January and March to present the scope of the study and obtain feedback on conceptual alternatives. Below is a summary of the outreach effort conducted for the study.

At the beginning of the study, a Visitor Trip Origin and Stakeholder Survey was conducted which collected responses from Hart Island visitors and identified stakeholders between December 11th, 2021, and January 26th, 2022. The purpose of the survey was to collect transportation data from past Hart Island visitors as well as obtain stakeholder preferences on future transportation access to Hart Island. The survey was distributed to Hart Island visitors as they boarded the ferry during the existing conditions data gathering phase of the study, for three visitation days on December 11th, 2021, January 8th, 2022, and January 23rd, 2022. In addition, the survey was also distributed via email to stakeholder groups with known ties to Hart Island and City Island, including local and regional elected officials, the local community board, and advocacy groups for Hart Island, City Island and Pelham Bay Park to capture potential past Hart Island visitors and stakeholders. In addition to the survey questions, participants were requested to provide their email address (optional) if they would like to be informed of future meetings and updates on the study. This aided in developing a stakeholder list to distribute information on progress of the project. There were a total of 279 respondents to the stakeholder survey, and 96 of those respondents were travelling to or had previously been to Hart Island.

As the study was to be completed in an expedited time frame of seven months, and the number of opportunities visitors could be surveyed during trips to Hart Island was limited (during December and January of 2022, trips only occurred twice per month). Therefore, the survey outreach needed to include past visitor responses to bolster the number of total survey responses. A challenge of identifying past visitors as well as stakeholders for Hart Island is that they are not necessarily bound by a geographical area, thus reaching out to Hart Island advocacy groups, such as the Hart Island Project, was important to the outreach effort. However, as the survey and stakeholder outreach included many City Island advocacy groups as well, a significant portion of survey responses were provided by Bronx residents compared to the other NYC boroughs and geographical locations.

An introductory public meeting was held on January 25th, 2022, where the project purpose, scope of work and initial findings of the Visitor Trip Origin and Stakeholder Survey were presented to the public, followed by two question and answer sessions and a live polling question session. Outreach for the introductory meeting was conducted primarily through email and electronic means as this was the most efficient method to reach stakeholders spread over a substantial geographical area. Meeting information was distributed to the stakeholder list, which was developed using information provided by the SAG, the study's community engagement team, and responses from the Visitor Trip Origin and Stakeholder Survey. The public meeting was presented in English and included live interpretation in Spanish. Over 120 participants attended the virtual meeting, including members of community organizations such as NYC Bronx Community Board 10, City Island Chamber of Commerce, City Island Rising, City Island Civic Association, and the Hart Island Project. City agencies NYC Parks, NYCEDC, DOT, HRA, and NYC City Council were also in attendance. The public meeting was held on Zoom Video Conferencing Software. Public comments received at this meeting were recorded and summarized in the Event 1 Summary document included in *Appendix A*.

A second public meeting to present the conceptual transportation alternatives was held on March 30th, 2022, with a similar outreach effort performed as the introductory public meeting. The meeting began with a presentation including a recap of existing conditions, development of the alternatives, and presenting of the Service Plan Alternatives, followed by two question and answer sessions and a live polling question session. The public meeting was presented in English and included live interpretation in Spanish. Over 50 participants attended the virtual meeting, including members of community organizations such as NYC Bronx Community Board 10, City Island Chamber of Commerce, City Island Rising, City Island Civic Association, New Yorkers of Parks and the Hart Island Project. City agencies NYC Parks, NYCEDC, DOT, and NYC City Council were also in attendance. The second public meeting was also held on Zoom Video Conferencing Software. Public comments received at this meeting were recorded and summarized in the Event 2 Summary document included in *Appendix A*.

# IV. BACKGROUND

Hart Island is an approximately 130-acre island located in the western end of Long Island Sound, approximately 0.65 miles northeast of City Island.

## A. Current Land Uses

Since 1869, Hart Island has been utilized as a public cemetery for the burial of the indigent or whose remains went unclaimed after their death. While the island has been the home for hospitals, jails, disciplinary barracks, and homeless shelters over the course of the island's history, Hart Island currently operates solely as a public cemetery. A total of 18 buildings currently exist on the island which are proposed to be demolished beginning in 2022.

## B. Existing Operations

Visitation to Hart Island is permitted through scheduled visits through NYC Parks. Historically, two types of visits were permitted, Gravesite visitation and public 'Gazebo' visitation. Gravesite visitation is provided for those who have a loved one buried on Hart Island and must have a relation to the loved one when requesting a visit. Ferries to Hart Island depart from Fordham Street Pier and Ferry Dock, located at the eastern end of Fordham Street on City Island. Ferry service is operated by NYCDOT ferries, with scheduled visits typically occurring at 9:00 AM and 12:00 PM on two weekend days per month, for a total of four visits per month. NYC Parks staff escort all visitors to their designated gravesites.

Previously, members of the public who do not have a loved one on the island were allowed to visit during a monthly "Gazebo" visit, which was also held by appointment only. Visitors on a gazebo visit would be escorted to the Gazebo area on Hart Island by city staff and would be allowed to stay within the gazebo area to see the island and take pictures. However, this practice has been suspended since April 2020.

Hart Island visitation data provided by NYC Parks is summarized in *Figure 3*, *Figure 4*, and *Figure 5* below. As shown in *Figure 3*, the number of Hart Island gravesite visitors ranged from 29 to 93 visitors per month in 2019 (before jurisdiction transfer to NYC Parks), with the greatest occurring in December (93) and the least occurring in February (29). The number of Gazebo visitors ranged from zero to 16 per month, with the greatest occurring in November (16) and the least occurring in January (0). The total number of visitors in 2019 (both gravesite and gazebo visits) was 720 visitors.

As shown in *Figure 4,* in 2020 Hart Island visitation saw a substantial number of visitors during the month of February 2020 (71 total visitors), however, by April 2020 all visitation to the Island was suspended to limit the spread of Covid-19. Gravesite visits resumed in May 2021 as shown in *Figure 5*, however, public 'Gazebo' visits remain suspended at the time of this report. Attendance for gravesite visits gradually increased in 2021, with the highest number of people (91) visiting in September 2021.

Burial operations continue to occur weekly, also departing from the Fordham Street Ferry Dock.

***Figure 3 – Total Hart Island Visitors by Month during 2019***

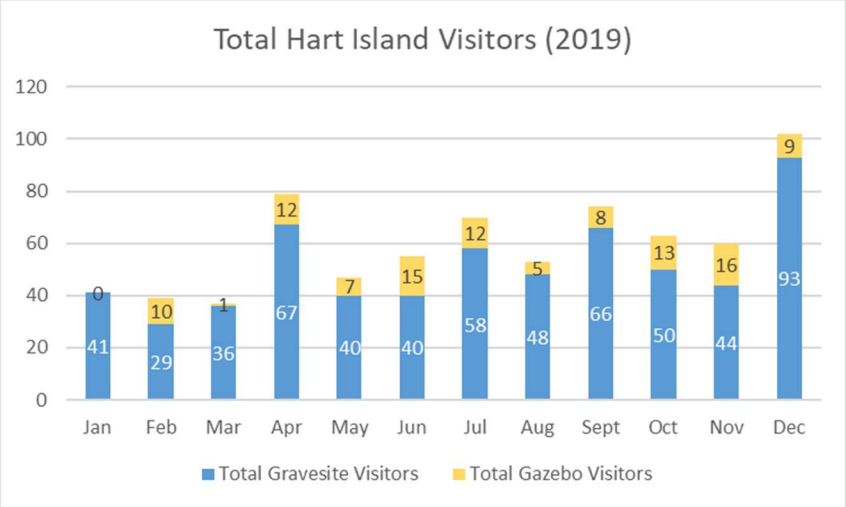



***Figure 4 – Total Hart Island Visitors by Month during 2020***

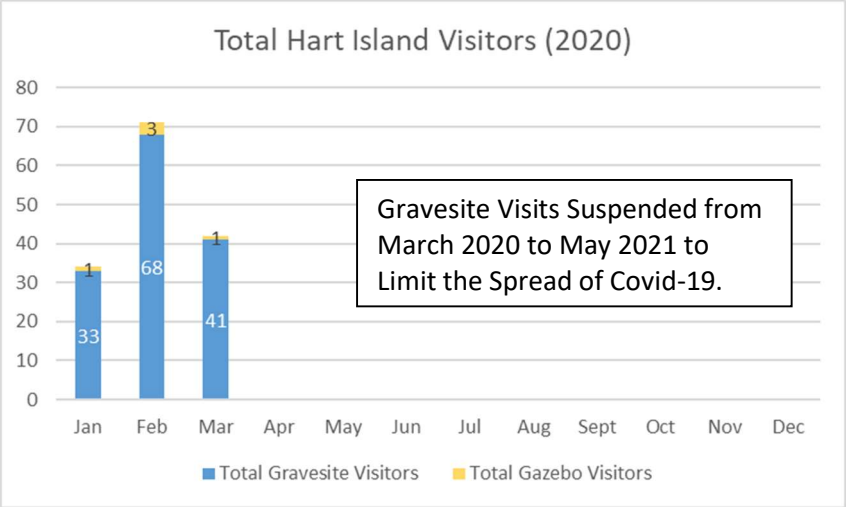
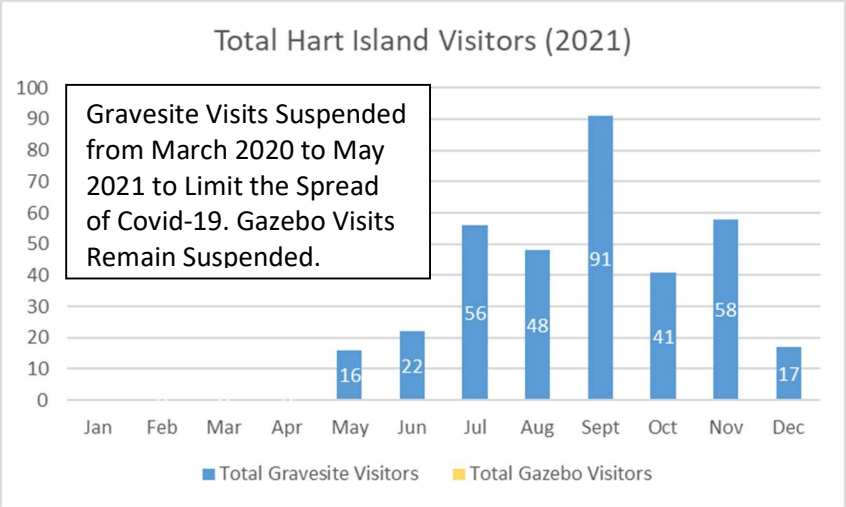



***Figure 5 – Total Hart Island Visitors by Month during 2021***



# V. CITY ISLAND TRANSPORTATION ASSESSMENT

The Hart Island Transportation Study is intended to examine not only the operations of the passenger ferry system to Hart Island but will also consider transportation alternatives available for visitors who travel to the Fordham Street Pier on City Island. The following sections document the existing transportation system conditions to reach Hart Island.

## A. Street Network and Traffic Conditions

The study area roadway network is shown on *Figure 6* below. City Island is primarily accessed by City Island Road and City Island Avenue. To reach City Island, all traffic must travel on Pelham Bridge Road or Shore Road, which connects to the greater roadway network. City Island Road is a two-way four lane roadway north of Park Drive but reduces down to two travel lanes and fire lane south of Park Drive into City Island. There are a few existing driveway access locations along City Island Road, but the roadway primarily travels through the wooded park land of Pelham Bay Park.

As City Island Road continues south over the City Island Bridge, the road changes names to City Island Avenue. City Island Avenue is the primary north-south roadway, as it is the longest continuous roadway on the island and terminates at the southern end of City Island. City Island Avenue has a one travel lane in each direction, with a fire lane provided for emergency access in the center of the roadway. Curbside parking is provided along each side of the roadway. Parking is generally unrestricted and non-metered where permissible, with the exception of bus stops and intermittent locations with no parking anytime or no standing anytime regulations. A mix of residential and commercial retail uses are present along the length of City Island Avenue. Both City Island Road and City Island Avenue are designated local truck routes per NYC DOT designation.

Based on historical traffic count data from the TIMS database collected between April 12$^{th}$, 2017, and April 28$^{th}$, 2017, and NYSDOT Seasonal Adjustment Factors for the month of April, the Annual Average Daily Traffic (AADT) volume for both directions on the City Island Bridge is 18,424 vehicles per day. *Figure 7* and *Figure 8* show the hourly traffic volumes for the average weekday and weekend in the northbound and southbound directions, respectively. As shown, weekend activity is generally higher than weekday traffic volumes, with weekend traffic volumes experiencing a sustained peak starting at 12:00 PM slowing tapering off at 8:00 PM. While there appears to be a small peak occurring at 7:00 AM on a weekday, the largest weekday peak appears to occur at 6:00 PM. Automatic Traffic Recorder (ATR) summary reports are included in *Appendix B*.

Fordham Street is an east-west two-way narrow local street intersecting City Island Avenue approximately 0.6 miles south from City Island Bridge. Fordham Street is approximately 0.4 miles long, terminating as a dead end at the western and eastern extents of City Island. Parking is generally unrestricted where permitted on both sides of the street.

The closest public parking facility to the Fordham Street Pier is located off of City Island at Orchard Beach in Pelham Bay Park. The Orchard Beach Parking Lot is approximately 2.3 miles, or an 8-minute drive from the Fordham Street Pier. The parking lot contains approximately 5,600 parking spaces.

***Figure 6 – City Island Area Roadway Network***

***Figure 7 – Total Average Hourly Traffic Volumes on City Island Bridge (Northbound)***

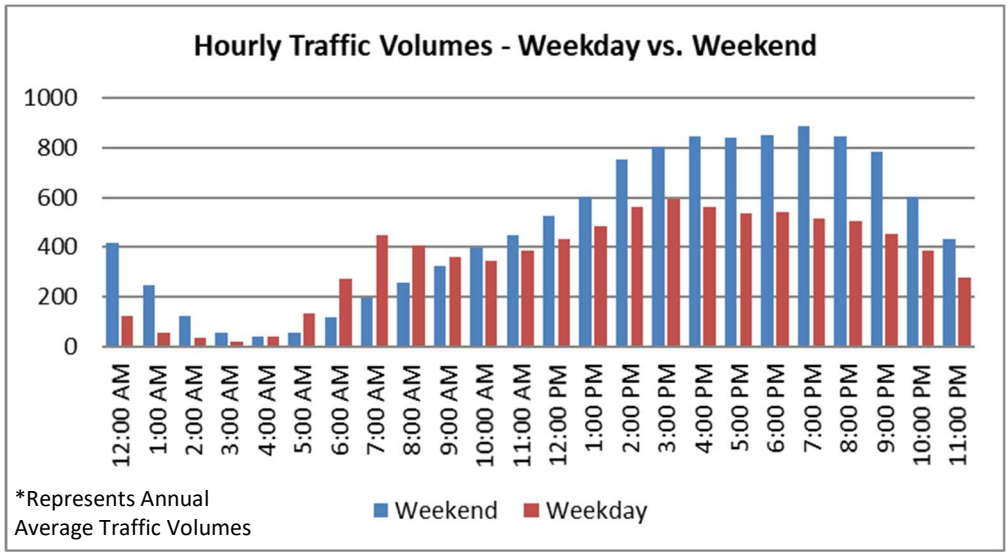
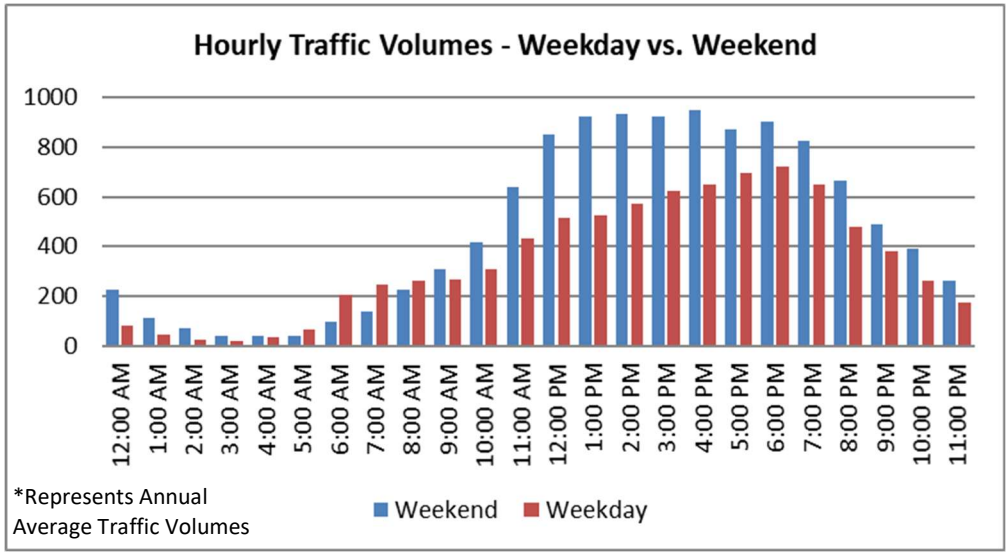



***Figure 8 – Total Average Hourly Traffic Volumes on City Island Bridge (Southbound)***




## B. Public Transit Services

*Buses*

There are two NYCT bus routes which serve City Island, the Bx29 and BxM8. The Bx29 bus operates between City Island and Bay Plaza, stopping at the Pelham Bay Park subway station in both directions. The Bx29 bus travels down City Island Avenue and stops in both directions at Fordham Street. The Bx29 bus generally operates between 4:30 AM and 1:00 AM on weekdays and Saturdays, and 5:30 AM to 1:00 AM on Sundays. Frequency of service is typically higher during the weekday AM and PM peak hours with average headways of 15 minutes, while during the off-peak weekday and weekend hours operating with 20-to-30-minute average headways.

The NYCT BxM8 express bus service typically operates between the Pelham Bay Park subway station and 23rd Street and Broadway in Manhattan. During the weekday rush hours, two trips in each direction are extended to City Island Avenue and Rochelle Street on City Island, including stops at the City Island Avenue and Fordham Street in both directions. Frequency of service is higher during the weekday AM and PM peak hours with average headways of 10 minutes.

As the conceptual alternatives may consider a new shuttle service from the Orchard Beach parking lot in Pelham Bay Park to the Fordham Street Pier, NYCT bus service to the Orchard Beach parking lot will also be discussed. The Bx12 local bus typically operates between the Pelham Bay Park subway station and Fordham Road/Sedgewick Avenue during daytime hours when the Bx12 select bus service is running (generally 6:00 AM to 10:00 PM). Only during summer months does the Bx12 local bus extend service to Orchard Beach. The Bx12 bus typically operates with 8–12-minute average headways during the daytime hours on weekdays and weekends but increases to 40 minutes during the overnight hours.

*Subway*

The closest NYCT subway station with connections to other multimodal facilities located in the study area is the NYCT Pelham Bay Park subway station served by the 6 train, located at Westchester Avenue and Bruckner Boulevard. During the weekday rush hours, trains to and from Pelham Bay Park have average headways of 5-8 minutes. Overnight average headways increase to 10-15 minutes, while Saturday and Sunday service typically has an average of 8–10-minute headways during the daytime hours. Several NYCT bus routes provide connections from and to the Pelham Bay Park Station, including the Bx12 and Bx28 described previously. In addition, the station features a pedestrian bridge crossing over Bruckner Boulevard and Bruckner Expressway (I-95) to reach the east sidewalk connected to Pelham Bay Park.

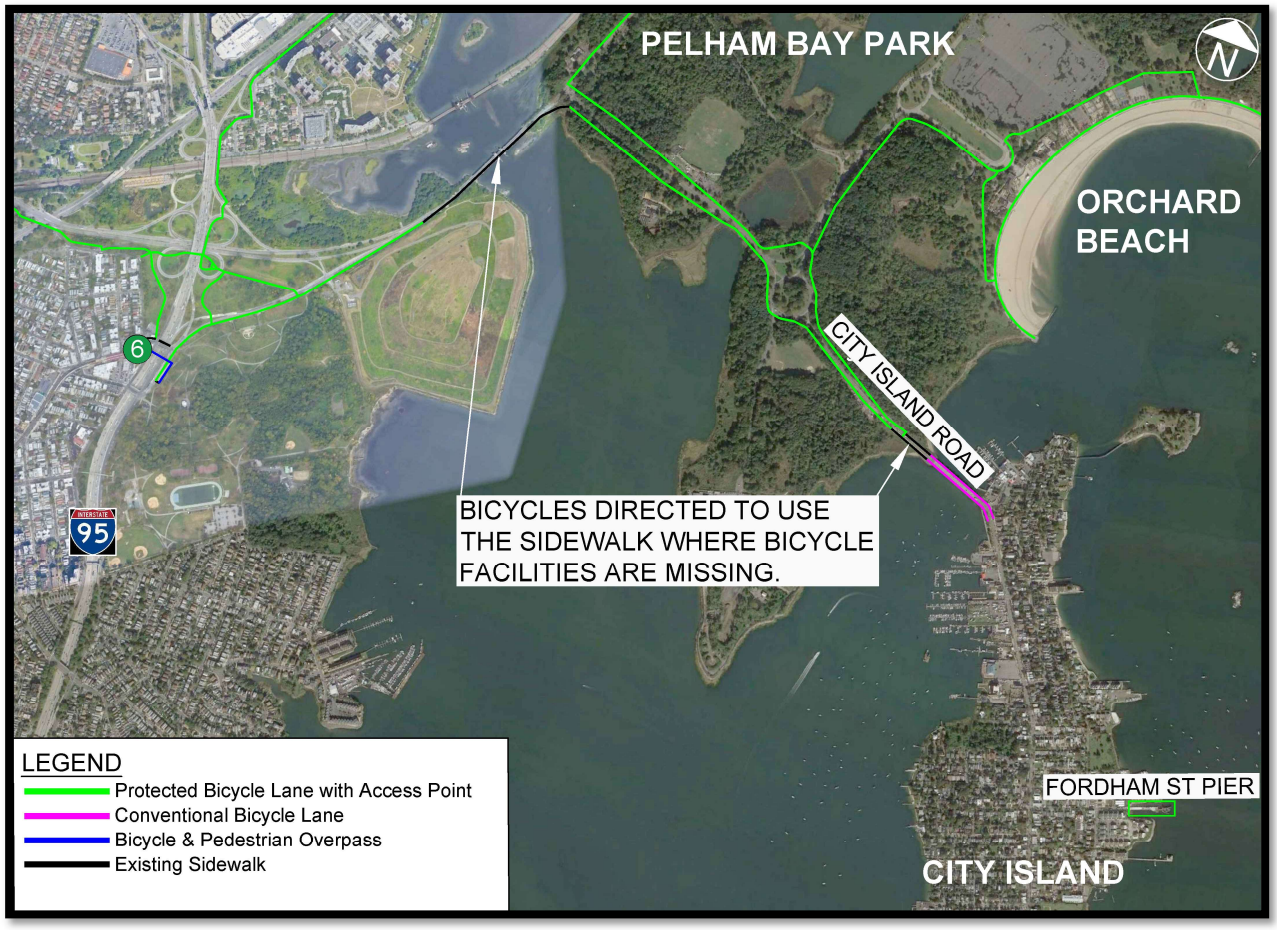
## C. Pedestrian and Bicycle Infrastructure

The majority of pedestrians travelling to and from the Fordham Street Pier will likely travel along a portion of Fordham Street east of City Island Avenue. *Figure 9* shows the general conditions of sidewalks along Fordham Street between City Island Avenue and the Fordham Street Pier. While the south sidewalk is generally continuous from City Island Avenue to Fordham Street Pier with only one narrow segment of sidewalk near Minniford Avenue (overgrown vegetation), the north sidewalk ends abruptly between King Street and Fordham Place and is not present east of this point to the Fordham Street Pier. The north sidewalk also includes two segments which overgrown landscaping have narrowed the width of the sidewalk. Crosswalks and pedestrian signal equipment are provided at the intersection of Fordham Street and City Island Avenue, which support bus riders and pedestrians crossing City Island Avenue. Sidewalks are provided along both sides of City Island Avenue for its entire length.

While there are no bicycle lanes located on City Island itself, Pelham Bay Park has a system of protected shared use paths that travel along both sides of City Island Road, the north side of Shore Road, and the south side of Pelham Bridge Road. The protected shared use path along Pelham Bridge Road extends west to connect to the Bronx street grid, including a connection to the NYCT Pelham Bay Park subway station. Note, there are no bicycle racks located at or near the Fordham Street Pier. A map showing bicycle facilities in City Island, Pelham Bay Park, and other areas of the Bronx near Pelham Bay Park Station are shown in *Figure 10* below.

***Figure 9 – Pedestrian Infrastructure Map***

***Figure 10 – Bicycle Infrastructure Map***




The Fordham Street Pier is located approximately 3.5 miles from the NYCT Pelham Bay Park subway station, too far of a distance for one to complete a trip to the Fordham Street Pier by walking alone. Bicycling is more likely, which is an approximately 19-minute bicycle ride from the subway station.

# VI. EXISTING CONDITION ANALYSIS AND INVESTIGATIONS

The following sections include existing condition analysis and investigations that would provide a basis of information to inform the development of conceptual alternatives discussed later in the report. A thorough search and review of available reports, plans, and data relevant to the proposed project was conducted, including review of documentation shared by NYC Parks and the SAG. A table summarizing the documents obtained as well as notes on the applicability to the study scope is included in *Appendix C*. Based on this review, it was determined that a data collection effort would be required including a parking utilization study on City Island and at Orchard Beach, a visitor origin survey, a bathymetric survey, as well as inspections of the existing ferry dock and shoreline infrastructure on City Island and Hart Island.

## A. Parking Utilization Study

The parking utilization studies were conducted for two study areas: (1) near the Fordham Street Pier on City Island and (2) the Orchard Beach parking lot in Pelham Bay Park to determine the existing parking availability at each location.

### 1. Fordham Street Pier on City Island

As no dedicated parking facilities are provided for Hart Island visitors travelling to Fordham Street Pier by car, a parking utilization study was performed to inventory existing parking availability on nearby streets and public off-street parking facilities in the area. The parking inventory study area generally encompasses a ¼ mile radius from the Fordham Street Pier, which represents the typical maximum walking distance for drivers (5–10-minute walk). Figure 6 shows the parking inventory study area in proximity to the Fordham Street Pier.

On-street parking regulations in the study area vary by roadway. While City Island Avenue, Fordham Street, and Schofield Street permit parking on both sides of the street in the study area, many streets in the area permit parking on only one side of the street as they permit two-way traffic on a narrow street (streets of approximately 30 ft wide or less). There is no parking permitted anytime along King Avenue in the study area. No public off-street parking facilities were identified within the study area. Additionally, no public off-street parking facilities were identified within the ¼ mile radius study area.

The on-street parking utilization study was conducted during typical peak parking periods: for a weekday midday and Saturday midday to capture the daytime peak period, and for a weekday overnight to capture the peak period for the primarily residential uses on City Island. On-street parking inventory was recorded for the weekday midday (11:00 AM – 1:00 PM), weekday overnight (6:00 PM – 8:00 PM), and Saturday midday (12:00 PM – 2:00 PM) peak periods on one mid-week day and one Saturday.

Due to restrictions in the study schedule (as this study is set to be completed by June 2022), parking facilities with ¼ mile of Fordham Street Pier were inventoried in December 2021. Data collection is typically avoided during the seasonal holiday period where there is a high percentage of destination retail as this can impact data collection, however, City Island primarily contains residential uses with an insignificant amount of destination retail use. Therefore, parking utilization within the study area is not anticipated to significantly fluctuate during the month of December compared to typical fall months such as October or November. To account for higher parking utilization on City Island during the summer months, a seasonal adjustment factors were developed in consultation with NYC DOT, based on a combination of Season Traffic Flow Factors for the Marine Parkway Bridge (a recreational facility with

***Figure 11 – City Island Parking Utilization Study Area (1/4-mile of Fordham Street Pier)***


similar characteristics as the City Island Bridge) and NYS DOT Seasonal Adjustment Factors for Traffic Count Processing (2017). These factors were applied to the parking utilization data collected in December to forecast parking utilization during the peak summer season. As such, the weekday parking utilization would be increased by a factor of 1.30, while a factor of 1.76 would be applied to the Saturday parking utilization.

The resulting summer parking utilization for each peak period is shown in *Table 4*. On-street parking facilities would result in 98, 93 and 100% utilized in the weekday midday, weekday overnight, and Saturday midday peak periods during the summer months, respectively. Approximately 10 and 29 parking spaces would be available during the weekday midday and weekday overnight peak periods, respectively. During the Saturday midday peak period, on-street parking is anticipated to be 100% utilized and would result in excess parking demand that could not be accommodated within the parking

utilization study area. Forecasted excess parking demand would need to find alternative locations to park outside of the study area, either on-street or in off-street parking facilities with available spaces.

***Table 4 – Existing On-Street Parking Utilization within ¼-mile of Fordham Street Pier***

| Peak Period | Existing No.of Parking Spaces | | | |
|---|---|---|---|---|
| | Occupied | Free | Excess Demand | Utilized % |
| Weekday Midday | 411 | 10 | - | 98% |
| Weekday Overnight | 388 | 29 | - | 93% |
| Saturday Midday | 407 | 0 | 69 | 100% |

*Note: Projected Typical Summer Parking Utilization Using Seasonal Adjustment Factors Developed in Consultation with NYC DOT.*

### 2. Orchard Beach Parking Lot

As a shuttle service from the Orchard Beach Parking Lot to the Fordham Street Pier will be considered in the proposed conceptual alternatives, a parking utilization study was proposed for the Orchard Beach Parking Lot as well. However, to capture the peak parking periods for seasonal recreational use such as the beach, a parking utilization study would normally be conducted during the summer months when parking utilization would be at its peak. While it would not be possible to conduct a parking utilization at the Orchard Beach Parking Lot during the summer months due to the project schedule, data including total daily vehicle entries into the Orchard Beach Parking lot for multiple days through the peak summer season in 2019 was provided by NYC Parks. The data was collected between June 8th, 2019, and September 1st, 2019, and recorded data for a total of 55 days.

The existing daily vehicle entry data is summarized in *Table 5* below. As shown, the maximum number of vehicles entering the parking lot in a single weekday, Saturday, or Sunday is significantly less than the total parking lot capacity of approximately 5,600 parking spaces. The maximum recorded total entering vehicles was observed to be 3,785 vehicles, which would result in a minimum of 1,815 parking spaces being available on the busiest day of the summer. It should be noted that this data represents the total number of entering vehicles into the Orchard Beach Parking lot over a course of a day and does not reflect the actual maximum parking utilization as it is unlikely all visitors would remain at the beach the entire day. Thus, the parking utilization study would provide a conservative estimation of the peak parking utilization at the Orchard Beach Parking Lot and conclude there is likely substantial available capacity during the peak beach season and throughout the remainder of the year.

***Table 5 – Existing Total Entering Vehicles at the Orchard Beach Parking Lot***

| Day | Lot Capacity | Average Spaces Utilized | *Average Percent Utilized* | Maximum Spaces Utilized | *Maximum Percent Utilized* | Minimum Spaces Available |
|---|---|---|---|---|---|---|
| Weekday | 5,600 | 465 | *8%* | 1,172 | *21%* | 4,428 |
| Saturday | | 1,502 | *27%* | 2,537 | *45%* | 3,063 |
| Sunday | | 1,963 | *35%* | 3,785 | *68%* | 1,815 |

*Source: Based on Total Entering Vehicle Data for the Orchard Beach Parking Lot (6/8/2019-9/1/2019).*

## B. Visitor Origin Study

To aid in developing future ferry services, a visitor survey focused on trip origin and mode choice was conducted for travel to Hart Island via the Fordham Street Pier and Ferry Dock. Past and current visitors

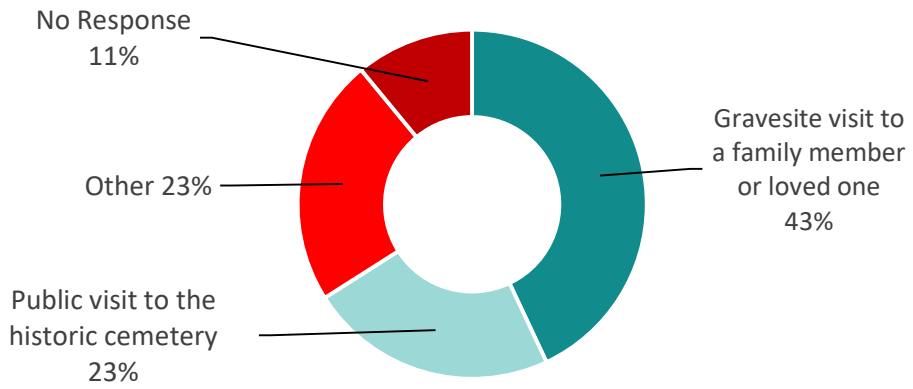
were surveyed for trip purpose, origin of trip by zip code, mode choice, vehicle occupancy, frequency of visitation, and time of year of visit. The survey was distributed to Hart Island visitors providing paper copies with links to online versions as they board the ferry at the Fordham Street Pier and Ferry Dock, and distributed to stakeholders by email, using a link to an online survey website to collect responses. As there were a limited number of visitations to Hart Island during the study period, past visitors were also surveyed to bolster the number of total survey responses. The paper version of the visitor survey can be found in *Appendix J*.

As stated previously in the "Outreach Summary", the study was to be completed in an expedited time frame of seven months, and the number of opportunities visitors could be surveyed during trips to Hart Island was limited (for three visitation days on December 11th, 2021, January 8th, 2022, and January 23rd, 2022). Therefore, the survey outreach also included past visitor responses to bolster the number of total survey responses. A challenge of identifying past visitors as well as stakeholders for Hart Island is that they are not necessarily bound by a geographical area, thus reaching out to Hart Island advocacy groups, such as the Hart Island Project, was important to the outreach effort. However, as the survey and stakeholder outreach included many City Island advocacy groups as well, a significant portion of survey responses were provided by Bronx residents compared to the other NYC boroughs and geographical locations.

The results of the survey are described in detail below, which contain results starting from December 11th, 2021, and ending January 26th, 2022. The total number of respondents who were travelling to or had previously been to Hart Island was 96. A summary memo for Visitor Trip Origin and Stakeholder Survey including results of all questions is provided in *Appendix E*.

To determine the number of gravesite visits versus public 'gazebo' visits, survey respondents were inquired on the purpose of the trip to Hart Island. As shown in *Figure 12*, the highest number of trips were gravesite visits to a family member or loved one (43%), followed by public 'Gazebo' visit (23%), and the least described as other (23%). 'Other' responses varied from work related trips and other recreational or other special events or visits made in years past. The remaining 11% of surveyed visitors did not provide a response to this question.

***Figure 12 – Trip Purpose***



To assist in identifying alternative departure points for Hart Island Ferry Access, zip codes of visitors were requested to determine the origin of visitors. As shown in *Figure* 13, the majority of trip origins were from the Bronx (58%), with many of those originating from the '10464' zip code which includes City Island. Trips from the remaining boroughs of Manhattan, Brooklyn, Queens, and Staten Island comprised 18% of the total trips. Other parts of New York state and other states in the northeast United States (US) comprised 19%, and the origins of other US states and international locations comprised the remaining 5%.

Origin of visitors was also broken down by trip purpose to show the origins of those who were making a gravesite visit, shown in *Figure 14*. The highest number of trip origins from a single NYC borough came from the Bronx at 28%, followed by 21% of trips originating from the other NYC boroughs combined, and 38% originating from other parts of New York state and other states in the northeast US. Other US states and international locations composed the remaining 13%.

Trip origins of public 'Gazebo' visit or other trip purpose is shown in *Figure 15*. The highest percentage of public or other type trips originated in the Bronx with 79%, followed by Manhattan and Brooklyn with 10% and 5%, respectively. It is notable that no public or other trips originated outside of New York state from the survey respondents.

The mode choice of Hart Island visitors was also surveyed, with results shown in *Figure 16*. The majority of visitors travelled by private automobile at 53%, followed by walk only at 29% and hired car (taxi, Uber, or Lyft) at 9%. The remaining survey responses by mode were limited to 4% or less, with very few choosing public transit as their primary mode to arrive to the Fordham Street Pier.

Mode choice by visitor type is provided in *Figure 17* and *Figure 18* below. *Figure 17* shows the mode choice for gravesite visitors, of which 80% traveled by private automobile, 18% travelling by hired car (taxi, Uber, or Lyft), and the remaining 2% walking. In *Figure 18*, mode choice is shown for public 'Gazebo' visit or other trip purposes. Of those surveyed, 48% walked, and 34% arrived in a private automobile, with the remaining modes accounting for 7% or less each.

It should be noted that the percentage of walk trips for public 'gazebo' and other type visits is significant for travel to a cemetery. This is primarily attributed to the high number of respondents of the survey that live in the zip code containing City Island, who live within walking distance of the Fordham Street Pier and have made trips to Hart Island. It is also important to note that the percentage of walk trips for gravesite visitors was dramatically less compared to all visitors, highlighting that only 2% of gravesite visitors live within walking distance of the Fordham Street Pier.

Lastly, visitors who drove by private automobile were asked to provide where they parked when arriving to the Fordham Street Pier. The majority of respondents parked on-street in the vicinity of the Fordham Street Pier, with only a single 'other' response recorded.

***Figure 13 – Trip Origin (All Visitors)***

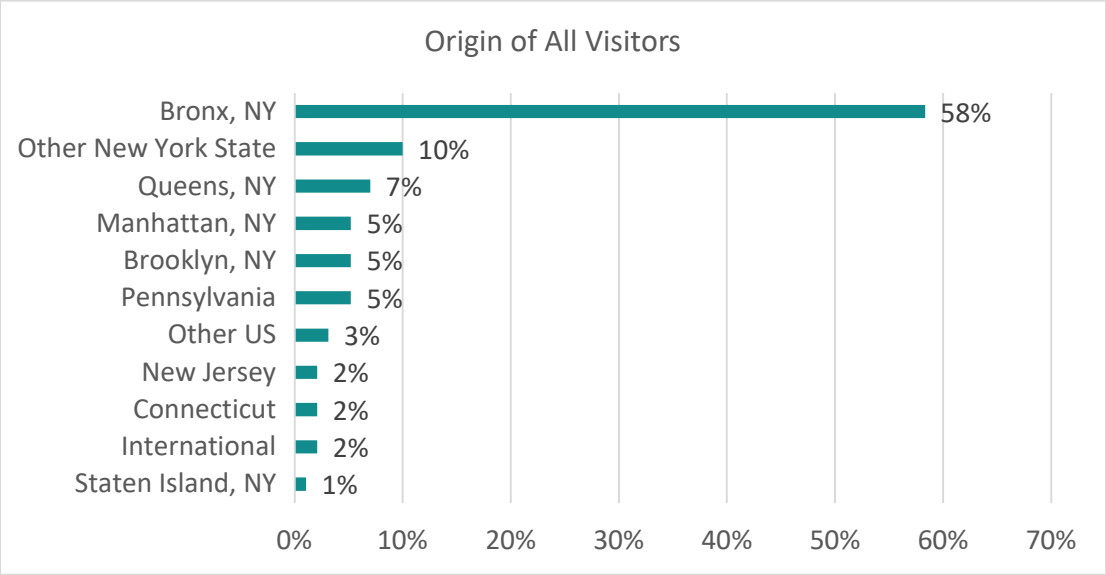



***Figure 14 – Trip Origin for Gravesite Visitors***

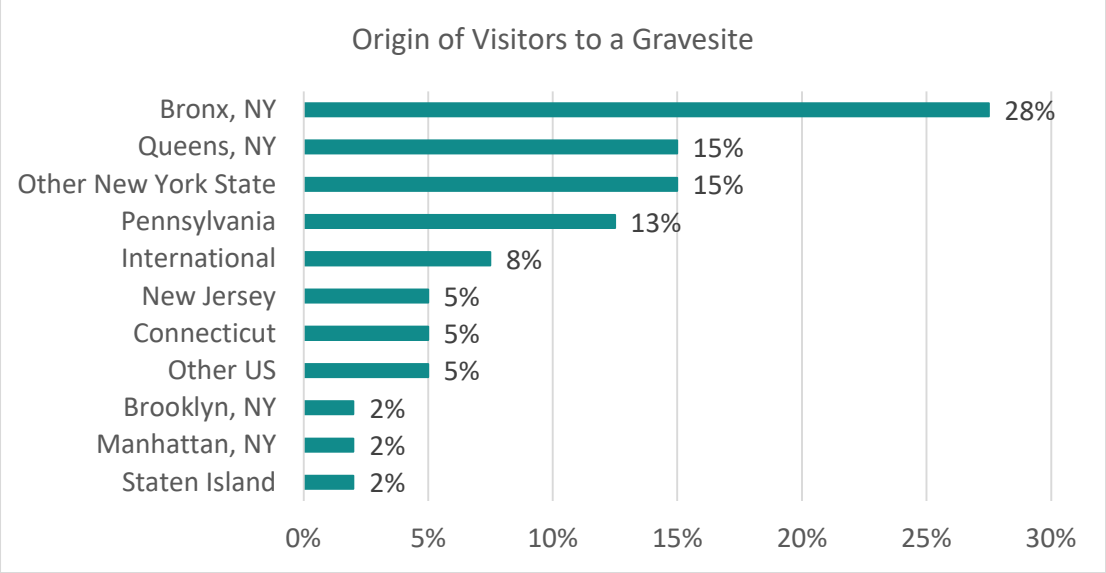



***Figure 15 – Trip Origin for Public 'Gazebo' and Other Purpose Visitors***

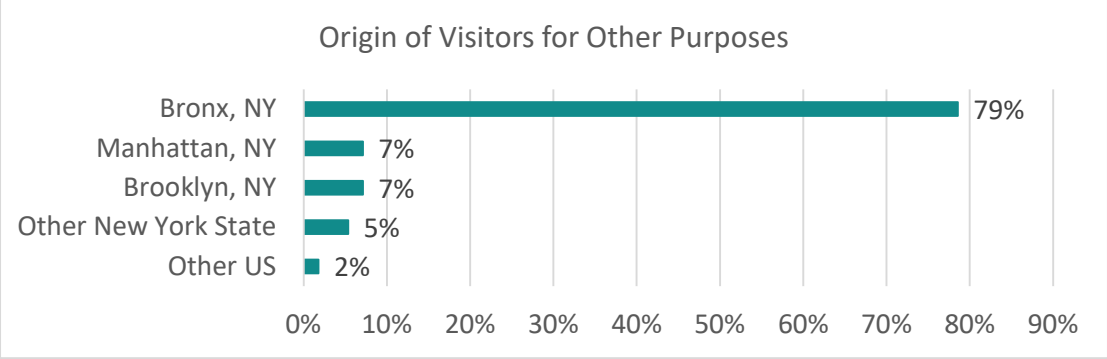


***Figure 16 – Mode Choice (All Visitors)***

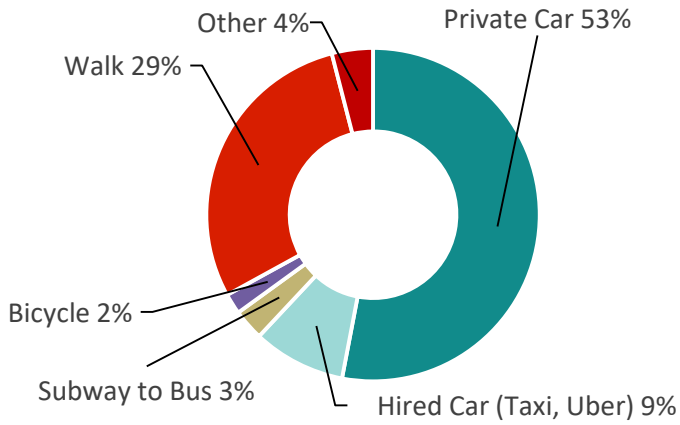



***Figure 17 – Mode Choice for Gravesite Visitors***

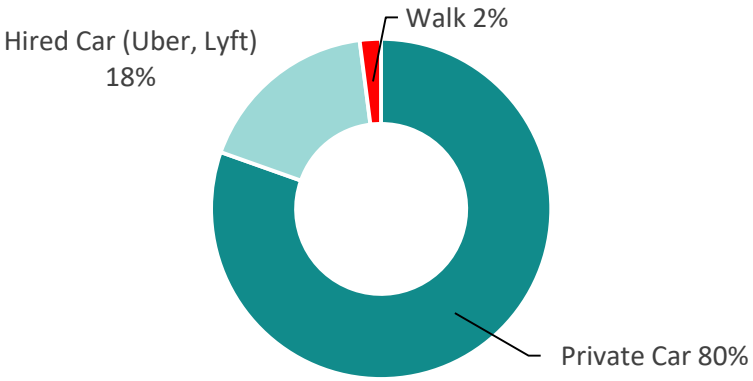
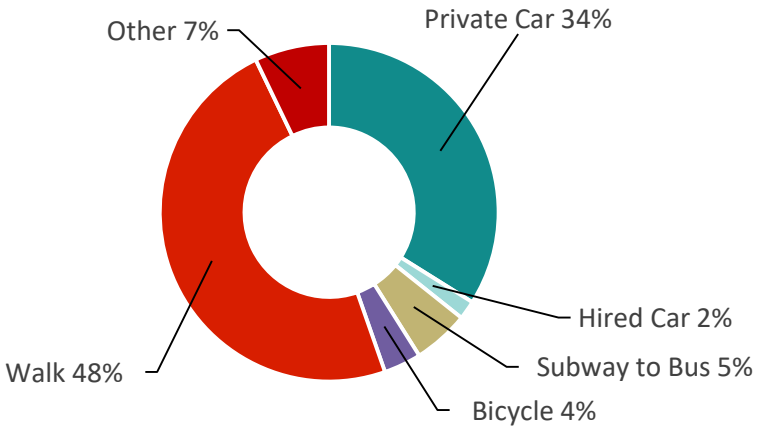



***Figure 18 – Mode Choice for Public 'Gazebo' and Other Purpose Visitors***



## C. Existing Ferry Infrastructure Conditions

To aid in developing future ferry service alternatives, the existing conditions of the Hart Island and City Island Ferry infrastructure were evaluated, as well as the water depths within the vicinity of each ferry dock. *Figure 19* through *Figure 22* show the locations of inspection and surveying work conducted at City Island and Hart Island Infrastructure. Infrastructure assessments on City Island included the Fordham Street Pier and Ferry Dock and adjacent shoreline. On Hart Island, infrastructure assessments included the Hart Island Ferry Dock and adjacent bulkhead/shoreline, as well as the Hart Island Concrete and Timber Dock (also known as the Coal Pier) and adjacent shoreline. Summaries of information included in the City Island & Hart Island Waterfront Facilities Rapid Level Inspection Report and Bathymetric Surveys prepared by Marine Solutions are provided in the following sections. Further details and structural and shoreline condition plans of each infrastructure assessment can be found in the complete City Island & Hart Island Waterfront Facilities Rapid Level Inspection Report included in *Appendix F.* The bathymetric surveys can be found in *Appendix G*.

***Figure 19 – Fordham Street Pier and Ferry Dock Inspection and Bathymetric Surveying Limits***


***Figure 20 – Hart Island Ferry Dock and Shoreline Inspection Limits***

***Figure 21 – Hart Island Concrete & Timber Dock and Shoreline Inspection Limits***


***Figure 22 – Hart Island Bathymetric Surveying Limits***

## 1. Structural Infrastructure Inspections

Inspections of the structural conditions of the existing transportation facilities at Hart Island and City Island was performed. Specifically for this subtask, inspections were carried out on the Hart Island Ferry Dock and adjacent bulkhead, Hart Island Concrete & Timber Dock (Coal Pier), and the Fordham Street Pier and Ferry Dock at City Island. The inspections were performed in accordance with a Rapid level assessment as defined by the NYCEDC WFMMS Inspection Guidelines Manual.

*Fordham Street Pier and Ferry Dock*

The Fordham Street Pier and Ferry Dock consist of a concrete pier structure and a timber ferry terminal structure, respectively. A photo of the Fordham Street Pier is shown in *Figure 23*. The Fordham Street Pier is approximately 330 ft long and 40 ft at its widest, consisting of 12 pile bents supporting concrete pile caps and a concrete deck. All piles are epoxy encased into the mudline and have active cathodic protection. The concrete deck exhibits isolated minor cracking up to 1/16 in wide on the top surface and hairline on the underside of the concrete deck. No significant signs of deterioration were observed at the Fordham Street Pier. The Fordham Street Pier was deemed to be in overall Good condition.

The Fordham Street Ferry Dock consists of a timber pile-supported approach platform, a steel vehicle-loading gangway, a timber and steel gantry system, two timber pile-supported towers, and two timber fender racks creating a slip for the car ferry. A photo of the Fordham Street Ferry Dock is shown in *Figure 24*. The two timber pile and bracing structures are referred to as the North and South Timber Gantry Towers and support the gantry system. The timber fender rack exhibited a number of issues, including section loss of the piles typically ranging from 30% to 60%, isolated broken piles, and significant deterioration at the tops of timber piles and ends of the timber wales at the fender racks. The timber fender racks were deemed to be in overall Poor condition. The timber approach platform, steel vehicle loading gangway, timber and steel gantry system, and two timber pile supported towers were deemed to be in overall Fair condition, primarily due to moderate deterioration of the timber piles due to marine borers.

*Hart Island Ferry Dock*

The Hart Island Ferry Dock consists of a timber pile-supported approach platform, a steel vehicle-loading gangway, a timber and steel gantry system, two (2) steel sheet pile cells, and two (2) timber fender racks creating a slip for the car ferry. A photo of the Hart Island Ferry Dock is shown in *Figure 25*. Timber pile and timber pile caps support the inshore landing platform. The two (2) steel sheet pile bulkhead cells are referred to as the North and South Steel Sheet Pile Gantry Cells and support the gantry system and a timber walking platform. The timber fender rack piles typically exhibit advanced to severe deterioration due to marine borers with isolated locations of broken piles. The timber fender rack was deemed to be in overall Poor condition. The timber approach platform, timber and steel vehicle-loading gangway, timber and steel gantry system, and steel sheet pile cells were deemed to be in Fair condition overall due to moderate deterioration of the timber piles due to marine borers and advanced to severe corrosion of the steel sheet pile cells.

***Figure 23 – Photo of Fordham Street Pier***


***Figure 24 – Photo of Fordham Street Ferry Dock***

***Figure 25 – Photo of Hart Island Ferry Dock***


*Hart Island Concrete & Timber Dock (Coal Pier)*

The Hart Island Concrete & Timber Dock is an approximately 8,000-sq.-ft loading dock comprised of timber batter and plumb piles with timber cross bracing supporting timber pile caps, a precast concrete deck, and a timber fender system. A photo of the Hart Island Concrete & Timber Dock is shown in *Figure 26*. The Hart Island Concrete & Timber Dock extends approximately 170 ft into the waterway and the larger main loading platform is approximately 120 ft long by 40 ft wide. The narrower landing access platform is 130 ft long and varies from 20 ft to 40 ft in width. There is a sloped concrete ramp approximately 15 ft long by 15 ft wide at the south end of the dock that is supported by a lower timber pile cap and extra timber piles. There are timber fender piles around the dock with steel cleats for mooring. A timber curb is present along the perimeter of the dock. A timber loading platform is in place at the north end of the main loading platform.

At the Hart Island Concrete & Timber Dock, the timber piles typically exhibited advanced to severe deterioration with signs of marine borers. The concrete deck typically exhibited moderate to advanced cracking and spalling with isolated locations of severe spalls. The concrete abutment exhibits severe undermining and moderate to advanced cracking and spalling. The Hart Island Concrete & Timber Dock was deemed to be in Poor condition overall due to deterioration of the timber piles supporting the timber and concrete platform.

***Figure 26 – Photo of Hart Island Concrete & Timber Dock (Coal Pier)***


## 2. Shoreline Infrastructure Inspections

Inspections of shoreline structures in the immediate vicinity of the ferry terminals were performed. The inspections were carried out in accordance with a Rapid level assessment as defined the New York City Economic Development Corporation (NYCEDC) WFMMS Inspection Guidelines Manual. The intent of the investigation was to assess the existing conditions of any shoreline infrastructure and provide information needed to determine the need for repairs. Condition assessment ratings are provided consistent with the NYCEDC WFMMS Inspection Guidelines Manual.

*Fordham Street Shoreline*

The inspection of the Fordham Street shoreline identified an existing masonry retaining wall with a concrete cap, a riprap revetment made of concrete and asphalt debris, and a natural sand shoreline. A photo of the portion of the Fordham Street shoreline adjacent to the Fordham Street Pier is shown on *Figure 27*. The masonry retaining wall exhibited widespread loss of the cementitious grout between adjacent stones, and the concrete cap exhibited minor cracking. The Fordham Street shoreline was deemed to be in overall Fair condition.

*Hart Island Ferry Dock Shoreline*

The inspection of the Hart Island Ferry Dock shoreline identified a combination of an existing timber bulkhead, riprap revetment, and stacked stone retaining wall. A photo of a portion of the Hart Island Ferry Dock shoreline is shown in *Figure 28*. The timber bulkhead exhibited deteriorating conditions including gaps in the bulkhead causing a loss of fill material behind the bulkhead, pile sheeting demonstrating moderate to advanced section loss, and piles themselves exhibiting advanced severe section loss with some piles broken entirely. The portion of the bulkhead north of the existing ferry dock

***Figure 27 – Photo of Fordham Street Shoreline***


***Figure 28 – Photo of Bulkhead at Hart Island Ferry Dock Shoreline***

was observed leaning outward towards the waterway. The Hart Island Ferry Dock shoreline was deemed to be in overall Poor condition.

*Hart Island Concrete and Timber Dock (Coal Pier) Shoreline*

The inspection of the Hart Island Concrete and Timber Dock shoreline is a combination of a rubble mound and natural shoreline with debris. A photo of a portion of the Hart Island Concrete and Timber Dock shoreline is shown in *Figure 29*. The shoreline north of the Hart Island Concrete and Timber Dock consists of a natural sand shoreline and rubble mound revetement with a gentle slope. The shoreline south of the coal pier consists of riprap that is poorly graded, has timber cutoff piles still present, and debris found throughout the shoreline. The Hart Island Concrete and Timber Dock (Coal Pier) shoreline was deemed to be in overall Fair condition.

***Figure 29 – Photo of Shoreline South of the Hart Island Concrete and Timber Dock***


## 3. Bathymetric Surveys

Multibeam bathymetric surveys were performed in the vicinity of the City Island and Hart Island ferry infrastructure to develop contour maps of the bottom topography at the terminals. The resultant contour map was utilized to assess the feasibility of operating different vessel types at and within the vicinity of the Hart Island and City Island ferry infrastructure with or without dredging.

Bathymetric surveys were conducted on December 13th, 2021. The surveys were carried out to at least 1,000 ft offshore from the face of each ferry landing/dock and at least 300 ft perpendicular in either direction. The survey was developed referencing the NAVD88 vertical datum and New York State Plan Coordinate System NAD83 horizontal datum. While the bathymetric surveys are provided in *Appendix G*,

a brief description of ground surface elevations in the vicinity of City Island and Hart Island Ferry infrastructure is provided below.

At the Fordham Street Ferry Dock, ground surface elevations between the timber fenders were recorded between -11 and -16 NAVD88. Extending eastward into City Island Harbor, ground surface elevations decrease over an approximately 200-300 feet from the timber fenders, reaching an elevation between -27 and -28 NAVD88. South of the Fordham Street Ferry Dock, conditions are similar with the exception of an isolated area located approximately 200 feet south of the ferry dock. This finger shaped zone approximately 30-40 feet wide and 120 feet long has ground surface elevations ranging between -16 and -20 NAVD88. North of the Fordham Street Ferry Dock, ground surface elevations are typically higher between the shore and 300 feet east, ranging from -10 to -20 NAVD88.

At the Hart Island Ferry Dock, the range of ground elevation between the timber fenders was recorded at -10 and -16 NAVD88. Extending westward into the City Island Harbor, ground elevations continue to decrease over approximately 200-300 feet from the Hart Island Ferry Dock, generally holding between -20 and -25 NAVD88. Approximately 200 feet south of the Hart Island Ferry Dock, there is an isolated area of lower ground elevation that ranges from -25 to -30 NAVD88.

In the vicinity of Hart Island Concrete & Timber Dock, the maximum ground elevation directly adjacent west portion of the dock is -11 NAVD88. The ground surface continues to decrease over a 100 feet length west of the dock to -20 NAVD88. Farther east and southeast of the Hart Island Concrete & Timber dock, ground surface elevation is generally between -20 and -23 NAVD88. However, northeast of the Hart Island Concrete & Timber Dock, ground surface elevations are relatively higher, generally ranging between -17 and -20 NAVD88.

# VII. CONCEPT DEVELOPMENT

The goal of this study is to present options to improve public access to Hart Island, serving the needs of those with loved ones on the island as well as general visitors. To achieve this goal, conceptual alternatives developed for this study were required to meet the following objectives, informed by the outreach performed for this study.

- Increase the quantity and quality of transportation alternatives to Hart Island
- Increase travel experience (comfort) for Hart Island visitors
- Reduce travel times for public transit riders
- Minimize the impact of traffic and on-street parking conditions on City Island

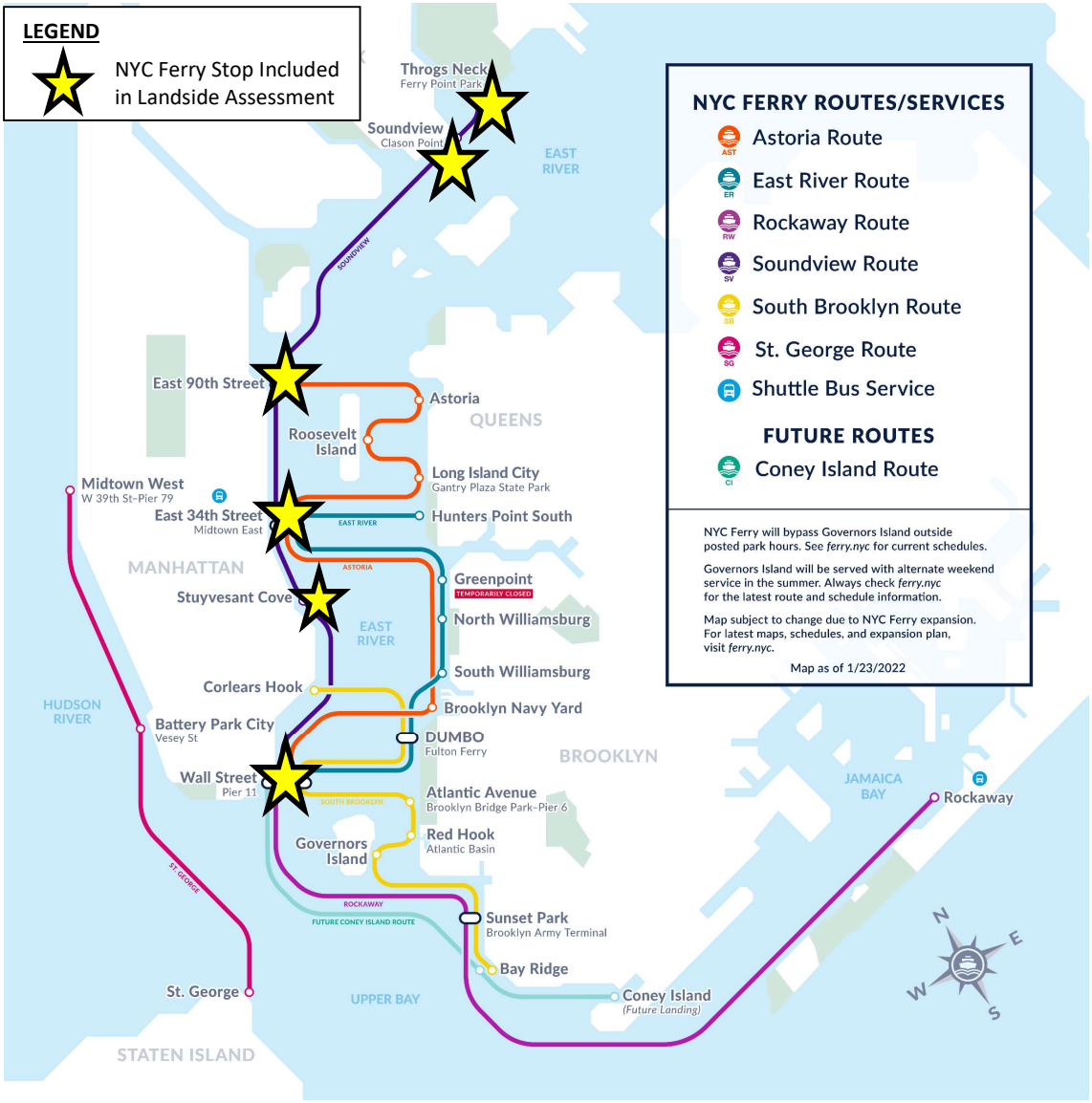
The findings from the Existing Conditions Report, NYC Parks and the SAG input, as well as input from the public meetings were utilized to develop conceptual alternatives to plan for future access to Hart Island. The general approach to developing the conceptual alternatives included evaluating alternative departure locations for a new ferry service to Hart Island in terms of transportation accessibility, assessing the impact of alternatives on visitor travel times service plans for ferry and shuttle bus operations, and considering the cost implications of each alternative. Further details on the conceptual alternative development are provided below.

## A. Landside Transportation Assessments

The transportation study includes landside transportation assessments to determine if a new ferry departure point and other existing NYC Ferry stops would provide access to transportation modes beyond the NYC Ferry Service itself. The NYC Ferry is a public transit service of ferry routes that provides New Yorkers an additional way to commute and connect to all five NYC boroughs and is operated by NYCEDC.

Locations of landside transportation assessments were selected based on NYC Ferry stops that are anticipated to be utilized by public transit riders to arrive to Hart Island. The NYC Ferry Soundview route extends into the Bronx and connects to other NYC Ferry routes that provide service to other NYC boroughs. The following NYC Ferry Soundview route ferry stops were included in the landside transportation assessments: Ferry Point Park, Soundview (Clason Point Park), E 90$^{th}$ Street, E 34$^{th}$ Street, Stuyvesant Cove, and Wall Street/Pier 11. These selected ferry stops are highlighted on the existing NYC Ferry Route Map shown on *Figure 30* below. The landside transportation assessment focused on public transit options available within walking distance (within1/2 mile), including subway, bus, commuter rail, and bike share facilities. The landside transportation assessments also considered available off-street parking facilities within walking distance of each NYC Ferry stop. Landside assessments for the NYC Ferry stop locations that are anticipated to be utilized by public transit riders to arrive to Hart Island are described in further detail below.

***Figure 30 – Existing NYC Ferry Route Map***



*Ferry Point Park*

The NYC Ferry terminal at Ferry Point Park is located off of the southwest section of the Throgs Neck peninsula in the Bronx. The Ferry Point Park terminal is served by the NYC Ferry Soundview route. Ferry Point Park is the newly opened northern terminus (opened 12/28/2021) and last existing stop on the NYC Ferry Soundview route, making this location the closest NYC Ferry stop to Hart Island. The NYC Ferry service at Ferry Point Park currently includes weekday headways between 40-60 minutes and weekend headways between 40-75 minutes (varies by season). There are no bus stops, subway stations, or Citi Bike stations located within walking distance to the ferry terminal at Ferry Point Park, however the NYC Ferry Soundview Route itself serves as a public transit connection to the Soundview (Clason Point Park) stop, and NYC Ferry stops in the Upper East Side and Lower Manhattan. In addition, this location is well connected to Hutchinson River Parkway and other Bronx interstates (I-678 and I-278) for private automobile access. A free public parking facility of approximately 300 parking spaces is provided at Ferry Point Park and located within a 10-minute walk from the ferry terminal. It should be noted that this parking lot may be highly utilized during the summer season based on observed typical park usage by NYC Parks, however, typical utilization of this new parking lot is not yet known since 2022 will be the first summer season both the parking lot and NYC Ferry stop are open. NYC Ferry operates a free electric shuttle bus that travels between the parking facility and the ferry terminal. *Figure 31* below shows a map of the Ferry Point Park NYC Ferry terminal, the electric shuttle route and the nearby parking facility.

***Figure 31 – Ferry Point Park NYC Ferry Terminal Map***

*Soundview (Clason Point Park)*

The Soundview NYC Ferry terminal is located at Clason Point Park at the southern end of Soundview Avenue in the Bronx. The Soundview terminal is served by the NYC Ferry Soundview route. This ferry terminal is a six-minute ferry ride from the Ferry Point Park NYC Ferry terminal. In addition, the ferry terminal is located within walking distance of two NYCT bus routes (Bx27 and Bx39), with the Bx27 bus stop located adjacent to the ferry terminal, and the Bx39 bus stop located approximately 1/4 mile from the ferry terminal. The two NYCT bus routes provide frequent weekend service, with the Bx27 bus route providing service with approximately 15-minute headways and the Bx39 bus route providing service with approximately 12-minute headways. There are no subway stations or Citi Bike stations located within walking distance of the Soundview ferry terminal. There are limited parking options available near this ferry terminal, with on-street parking located along Soundview Avenue utilized by nearby residents. *Figure 32* below shows a map of the Soundview NYC Ferry terminal and nearest bus stop locations.

***Figure 32 – Soundview NYC Ferry Terminal Map***

*East 90th Street*

The East 90th Street NYC Ferry terminal is located at East 90th Street and FDR Drive in Manhattan. The East 90th Street terminal is served by the NYC Ferry Soundview and Astoria routes. The ferry terminal is located within walking distance of three NYCT bus routes (M31, M86-SBS, and M15). The three NYCT bus routes provide frequent weekend service, with the M31 bus route providing service with approximately 12-minute headways, the B86-SBS bus route providing service with approximately 8-minute headways, and the M15 bus providing service with approximately 15-minute headways. In addition, the NYCT 86th Street Q Train subway station is located within 1/2 mile of the ferry terminal, and there are multiple Citi Bike Stations located within 1/4 mile of the ferry terminal. Off-street parking facilities are located within walking distance of the ferry terminal, with approximately six public parking garages located within 1/4 mile of the ferry terminal and approximately 12 public parking garages located between 1/4 mile and 1/2 mile of the ferry terminal. On-street parking is located on many streets near the ferry terminal, however, on-street parking is highly utilized in this area. *Figure 33* below shows a map of the East 90th Street NYC Ferry terminal, and nearest bus stop locations, subway station, and Citi Bike stations.

***Figure 33 – East 90th Street NYC Ferry Terminal Map***

*East 34th Street*

The East 34th Street NYC Ferry terminal is located at East 34th Street and FDR Drive in Manhattan. The East 34th Street terminal is served by the NYC Ferry Soundview, Astoria, and East River routes. In addition, the East 34th Street ferry terminal also serves other ferry services including SeaStreak, which provides a ferry service connection between Manhattan and Highlands, NJ. The ferry terminal is located within walking distance of multiple NYCT bus routes (M34-SBS, M15, and M15-SBS, MB5, BxM1, M101, M102, M103), with the M34-SBS bus stop located adjacent to the ferry terminal, the M15/M15-SBS bus stops located approximately 1/4 mile from the ferry terminal, and the MB5, MxM1, M101, M102, and M103 bus stops located within 1/2 mile from the ferry terminal. The M34-SBS bus route provides service with approximately 8-minute headways, the M15 bus route provides service with approximately 12-minute headways, the M15-SBS bus route provides service with approximately 9-minute headways. The M101, M102, and M103 provide frequent weekend service with approximately 10–15-minute headways. The BxM1 and MB5 bus routes provide less frequent service on the weekends, providing service with approximately 30-minute and 60-minute headways, respectively. In addition, the NYCT 33rd Street 6 Train subway station is located within 1/2 mile of the ferry terminal, and a Citi Bike station is located adjacent to the ferry terminal. There are limited parking options near this ferry terminal. *Figure 34* below shows a map of the East 34th Street NYC Ferry terminal, and nearest bus stop locations, subway station, and Citi Bike stations.

***Figure 34 – East 34th Street NYC Ferry Terminal Map***

*Stuyvesant Cove*

The Stuyvesant Cove NYC Ferry terminal is located at East 20th Street and FDR Drive in Manhattan. The Stuyvesant Cove terminal is served by the NYC Ferry Soundview route. The ferry terminal is located within walking distance of multiple NYCT bus routes (M9, M23-SBS, M14D-SBS, M14A-SBS, M15/M15-SBS) with the M9 and M23-SBS bus stops located adjacent to the ferry terminal, and the M14D-SBS, M14A-SBS, and M15/M15-SBS bus stops located within 1/2 mile from the ferry terminal. All NYCT bus routes provide frequent weekend service, with the M9 bus route providing service with approximately 15-minute headways, the M23-SBS bus route providing service with approximately 10-minute headways, the M14D-SBS bus route providing service with approximately 7-minute headways, the M14A-SBS bus route providing service with approximately 15-minute headways, the M15 bus route providing service with approximately 12-minute headways, and the M15-SBS bus route providing service with approximately 8-minute headways. In addition, the NYCT L Train subway station is located within 1/2 mile of the ferry terminal at 14th Street and 1st Avenue, and two Citi Bike stations are located adjacent to the ferry terminal. Off-street parking facilities are located within walking distance of the ferry terminal, with approximately five public parking garages located within 1/4 mile of the ferry terminal and approximately five public parking garages located between 1/4 mile and 1/2 mile of the ferry terminal. On-street parking is limited near the ferry terminal. *Figure 35* below shows a map of the Stuyvesant Cove NYC Ferry terminal, and nearest bus stop locations, subway station, and Citi Bike stations.

***Figure 35 – Stuyvesant Cove NYC Ferry Terminal Map***

*Wall Street/Pier 11*

The Wall Street NYC Ferry terminal is located at Pier 11 and South Street in Manhattan. The Wall Street terminal is served by the NYC Ferry Soundview, Astoria, East River, South Brooklyn, and Rockaway routes. The Wall Street terminal also serves NY Waterway, which is a separate privately owned ferry service that provides connections between Manhattan and New Jersey and operates during weekday commuter service hours. In addition, Whitehall ferry terminal serving the Staten Island Ferry (operated by NYC DOT) is located within walking distance approximately 1/2 mile away. Additionally, the Battery Maritime Building Slip 5 is located within walking distance approximately 1/4 mile away and serves the SeaStreak ferry which provides commuter service between New York and New Jersey. The Wall Street NYC Ferry terminal is within 1/4-mile walking distance of multiple NYCT bus routes. The NYCT bus routes include the East Harem route M15/M15-SBS, the Brooklyn Manhattan express service routes BM1, BM2, BM3, and MB4, and Queens express service routes QM7, QM8, QM11, and QM25. In addition, the M20 and M55 bus routes are located within 1/2 mile of the Wall Street NYC Ferry terminal. The M15 bus route provides service with approximately 28-minute headways and the M15-SBS bus route service provides services with approximately 8-minute headways. The Brooklyn Manhattan express service routes (BM1, BM2, BM3, and BM4) provide service on weekdays and Saturdays with approximately 60-minute headways on Saturdays, and the Queens express service routes (QM7, QM8, QM11, and QM25) provide frequent weekday service with approximately 14–20-minute headways, however they do not provide service on the weekends. The M20 bus route provides service with approximately 20-minute headways, and the M5 bus route provides service with approximately 15-minute headways. In addition, multiple subway lines have stations located within 1/2 mile of the ferry terminal, including the 2/3 Train located at Wall Street and Williams Street, the 1 Train located at Whitehall Street and South Street, the R/W Train located at Whitehall Street and South Street, the J/Z Train located at Wall Street and Broad Street, and the 4/5 Train located at Wall Street and Broadway. In addition, a Citi Bike station is located adjacent to the ferry terminal. Off-street parking facilities are located within walking distance of the ferry terminal, with approximately 11 parking garages located within 1/4 mile of the ferry terminal and approximately 18 parking garages located between 1/4 mile and 1/2 mile of the ferry terminal. There is limited on-street parking near the ferry terminal, and on-street parking is highly utilized in this area. *Figure 36* below shows a map of the Wall Street NYC Ferry terminal, and nearby bus stop locations, closest subway stations, and Citi Bike stations.

***Figure 36 – Wall Street/ Pier 11 NYC Ferry Terminal Map***


Based on the landside transportation assessment, NYC Ferry terminals located in Manhattan along the East River have a wealth of public transit connections available. However, the location of the Ferry Point Park NYC Ferry terminal is a compelling choice for a new ferry departure location to Hart Island as it is the closest existing NYC Ferry terminal to Hart Island, providing the shortest ferry travel time to Hart Island compared to other NYC Ferry terminals, and that the Ferry Point Park NYC Ferry terminal is served by the NYC Ferry Soundview route. A ferry service connection at Ferry Point Park to the NYC Ferry Soundview route would provide a connection to the other five NYC Ferry terminals along the Soundview route and the NYCT buses and subways in close proximity to these terminals. In addition, the East 34th Street ferry terminal and the Wall Street/Pier 11 ferry terminal along the NYC Ferry Soundview route connect to other NYC Ferry routes (Astoria, East River, Rockaway, South Brooklyn) that provide service to other NYC boroughs. Visitors arriving via private automobile can park at the public parking facility provided at Ferry Point Park, as well as at other off-street parking facilities located near NYC Ferry stops in Manhattan.

## C. Schedule Development

Although the proposed schedules for the service plan alternatives presented later in this report would be hypothetical as they are dependent on programmatic factors that will not be determined at the conclusion of this report, potential schedules were developed to determine service frequency for the cost estimates, highlight logistical issues, and inform the travel time comparisons for each alternative. The following section includes a discussion on what was considered in development of the ferry service

schedule for each alternative, including days and times preferred by stakeholders for ferry service, seasonal lighting conditions (sunrise/sunset in winter vs summer), schedules for other similar services (Governor's Island, IKEA Shuttle), and coordination with existing NYC Ferry schedules to reduce waiting or transfer time.

*Stakeholder Preferences*

As part of the Visitor Trip Origin survey conducted in the existing condition assessment, additional questions were directed towards visitors and non-visitor stakeholders on future ferry services. A summary of responses to the survey is provided in *Appendix E*. Two questions from the stakeholder survey which pertain to visitation and ferry service scheduling are discussed in detail below. Note, stakeholders were able to select more than one response per question.

As shown in *Figure 37,* stakeholders were asked what time of year they would be most likely to visit if ferry service was expanded to Hart Island. Nearly half of survey responses to this question indicated no preference (47%). A portion of the survey respondents that indicated no preference were for gravesite visits, where visitors with a family member or loved one buried on Hart Island would be more likely to visit year-round compared to public 'Gazebo' visitors. Survey responses to this question were followed closely by Spring with 42% and Summer with 40%. Fall or Autumn accounted for 31% of responses and Winter accounting for 10% of responses. Therefore, it would appear that stakeholders generally prefer the warmer months of the year and are least likely to visit during the winter season. Note, this is likely due to Hart Island's exposed location in the Long Island Sound and lack of facilities for shelter from the weather as there are no existing enclosed buildings for visitors on Hart Island, and the current DOT ferry to Hart Island is not enclosed.

Stakeholders were also asked what day of the week and time of day they would be most likely to visit if ferry service was expanded to Hart Island. As shown in *Figure 38*, nearly half of survey responses to this question indicated no preference (45%), followed by Saturday and Sunday midday/afternoon with 32% and 29%, respectively. Saturday morning and Sunday morning were favored by 25% and 23% of survey respondents, respectively, with the remaining responses of weekday morning, midday, and evening, as well as Saturday and Sunday evening receiving 12% or less each. While many respondents would not have a preference for visitation day of the week and time of day, those who do prefer the weekend midday/afternoon time period, followed by the weekend morning time period.

*Seasonal Lighting Conditions*

Another consideration in ferry schedule development is the times of sunrise and sunset throughout the year, as Hart Island currently does not have electrical service and it is yet to be decided if electrical lighting on Hart Island would be provided in the future. In 2021, the winter solstice (December 21) representing the least amount of day light of the year saw the sunrise at 7:17 AM and the sunset at 4:32 PM. In order to provide simplicity to the schedule that would work for lighting conditions year-round, it is recommended that all ferry services to Hart Island would be scheduled to arrive after 7:30 AM and depart before 4:30 PM.

***Figure 37 – Stakeholder Responses to Preferred Season for Visitation***

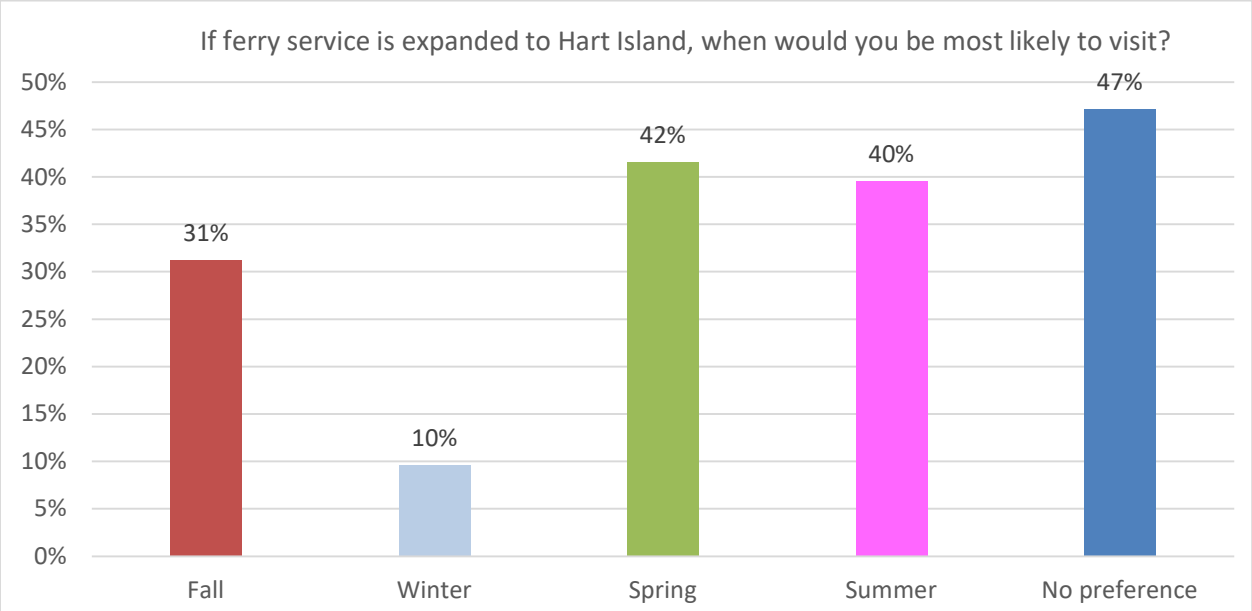
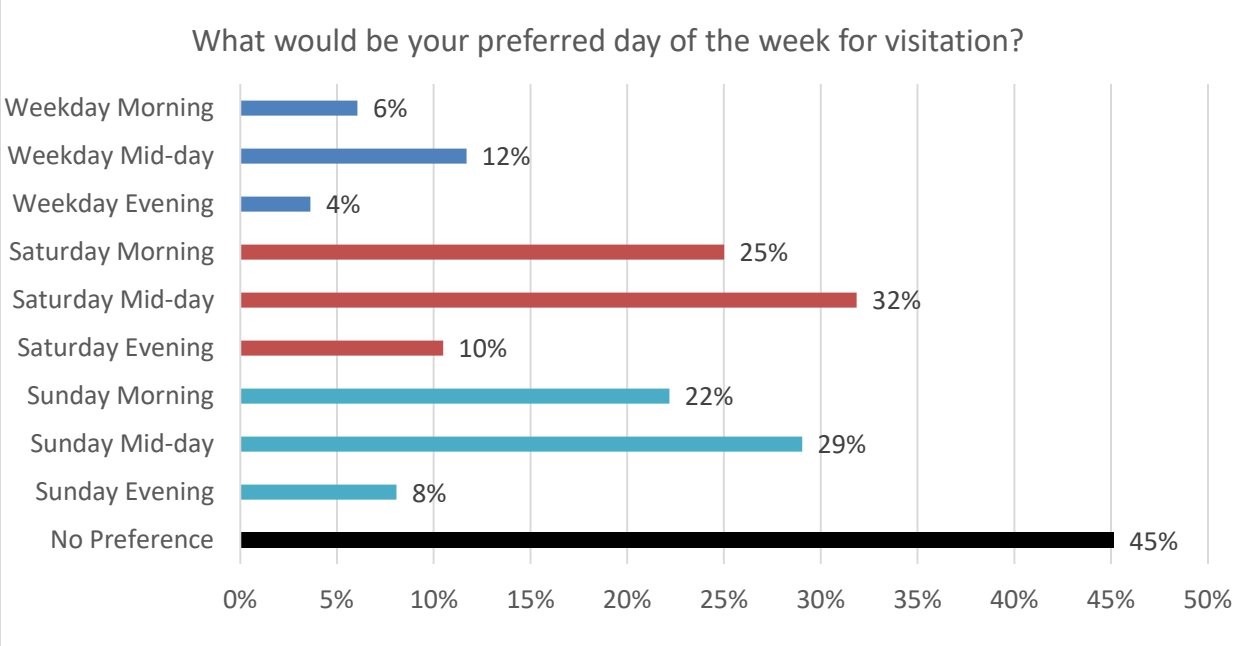



***Figure 38 – Stakeholder Responses to Preferred Day and Time for Visitation***




*Comparable Ferry Services*

Governor's Island shares a unique characteristic with Hart Island as both are locations only accessible by boat. While the uses on Governor's Island and Hart Island are quite different and the future ferry service to Hart Island would not necessarily need to be modelled after the Governor's Island Ferry, the following discussion on Governor's Island ferry services is provided to show the schedule progression of a comparable existing ferry service. The Governor's Island ferry service began in 2008, and originally operated only during summer months from the end of May to the beginning of September. In 2014, the

Governor's Island Ferry from the Battery Maritime Building in Lower Manhattan operated seven days a week, while service from Pier 6 in Brooklyn was provided Saturdays, Sundays, Memorial Day, and Labor Day. Additionally, the NYC Ferry East River route provided service on weekends as well.

Starting on November 1, 2021, Governor's Island is now open year-round. Governor's Island ferry service for 2022 from the Battery Maritime Building in Manhattan continues to provide daily service. Governor's Island is also served by the South Brooklyn NYC Ferry route which also provides daily service.

In conclusion, the following criteria was utilized to develop hypothetical schedules for future ferry service plans to Hart Island:

1. Proposed ferry service is assumed to be provided more frequently in Spring, Summer, and Fall Months compared to Winter Months.
2. Proposed weekend service may be prioritized over weekday service.
3. Proposed ferry services to Hart Island are assumed to operate for lighting conditions year-round.
4. Proposed ferry services should be coordinated with existing NYC Ferry services where possible to reduce transfer or waiting time.

Schedules for each alternative will be discussed in further detail in Chapter IX (Service Plan Alternatives).

## D. Travel Time Comparisons

As the Service Plan Alternatives provided later in this report include transportation improvements that would impact visitor travel times, a method of assessing the increase or decrease in total visitor travel time was developed to provide another metric for comparison for each Service Plan Alternative. The methodology utilized to determine visitor travel times for the existing condition and the Service Plan Alternatives, as well as the resulting typical travel times by mode for the existing condition is described in more detail below.

*Travel Time Calculation Methodology*

Total travel time for trips to Hart Island was calculated for existing trips and future proposed trip alternatives for comparison purposes, to assist in determining short-, medium-, and long-term options to improve Hart Island accessibility.

Travel times were calculated utilizing Google Maps, to determine shortest trip duration by private automobile (car) and public transit. Travel time was calculated from the trip origin to Hart Island itself including the ferry trip travelling to Hart Island, to provide a set comparison between existing and proposed travel times. Travel times include all transfer and waiting times between public transit modes, as well as walking time between public transit services without direct connections. Travel times were calculated for both a Saturday AM (9 AM) and Saturday midday (12 PM) arrival, as these two arrival times are currently offered for a Saturday visit to a gravesite on Hart Island. However, as the Saturday midday (12 PM) arrival time trips were typically longer in duration, the 12 PM arrival time was primarily used for this study to provide conservative estimates of travel time. Car and shuttle trip durations calculated utilizing Google Maps were based on typical summer Saturday travel times, and public transit trip duration was calculated based on typical Saturday travel times. Public transit trips for future medium- and long-term alternatives considered how the new ferry service connections would impact travel time.

To capture travel times for visitors arriving from various origins in NYC and the metropolitan area, trip origin points were selected for each NYC Borough and select counties in the Northeast (based on the origin survey). Counties outside of NYC were selected based on the general geographical location relative to the Hart Island. Westchester County was selected for travel to and from the north, Nassau County in New York and Fairfield County in Connecticut for travel to and from the east, and Bergen County in NJ for travel to and from the west. For each county, the center of population was identified and the zip code which included that location was utilized as the origin point. In addition, Bergen County in NJ and Fairfield County in CT are the most populous counties in their respective states. The trip origins selected for this study are the following: NYC Boroughs (Bronx, Manhattan, Brooklyn, Queens, Staten Island), Nassau County, NY, Westchester County, NY, Fairfield County, CT, and Bergen County, NJ. For each origin location, up to three routing options were included in the travel time comparison as there are multiple public transit route options with different number of transfers required per trip.

New ferry service travel times were estimated using distances measured using Google Maps and estimated ferry operating speeds utilized to determine travel time to potential new ferry terminals in the *2018/2019 NYC Ferry Expansion Feasibility Study*. The ferry operating speeds utilized in that study are listed below:

- Less than a 2-mile route: 18 knots or 20.7 mph
- More than a 2-mile route, but less than a 5-mile route: 22 knots or 25.3 mph
- Greater than a 5-mile route: 24 knots or 27.6 mph
- Maneuvering distance estimated at 0.25 miles at each end of segment with a speed of 7 knots or 8.1 mph.

In addition, a ferry dwell time (amount of time between a vessel's arrival to the terminal and the vessel's departure) of 3 minutes was assumed for this study, based on dwell times utilized in the *NYCEDC Citywide Ferry Study 2013*.

It should be noted that the MTA Penn Station Access Project is likely to provide additional public transit alternatives to travel to Hart Island in the future. The Penn Station Access Project would provide a new rail service from the Metro-North New Haven Line to Penn Station in Manhattan following Amtrak's Hell Gate Line on the Northeast Corridor through the eastern Bronx and western Queens. As part of this project, four new Metro-North stations are proposed at Hunts Point, Parkchester-Van Nest, Morris Park, and Co-op City. This new rail service could reduce public transit travel time for visitors travelling to Hart Island, as there are currently no commuter rail stations in Eastern Bronx. As anticipated schedules for this new commuter rail service were not available at the time of this study, public transit travel time utilizing this future route was not incorporated into the travel time calculations.

In addition, the MTA plans to implement the borough-wide Bronx Bus Network Redesign Final Plan in Summer 2022, focused on bringing customers faster, more reliable bus service in the Bronx. The Bronx Bus Network Redesign Plan was assessed for impacts to this study, and it was determined that the plan improvements will not significantly impact the public transit travel times calculated for this study. In addition, as anticipated schedules for this bus network redesign were not available at the time of this study, future changes to frequency of MTA Bronx buses were not incorporated into the travel time calculations.

*Existing Conditions Total Travel Time*

Under the existing conditions, all ferry trips to Hart Island depart from Fordham Street Pier on City Island. All visitors arriving by car were assumed to drive or ride directly to Fordham Street and be dropped off via taxi or rideshare or park on the street. Public transit riders would utilize the Bx29 bus on the last leg of their public transit trip, as it is the only public transit service available within walking distance of the Fordham Street Pier on a typical Saturday.

The Bx29 bus stop is located at City Island Avenue and Fordham Street, which is approximately a four-minute walk from the Fordham Street Pier. The passenger arrival time to Fordham Street Pier via public transit is based on the current Bx29 bus schedule, which has headways of 20 minutes for Saturday service to City Island. The ferry wait time is approximately 21 minutes, which is the amount of time between a public transit passenger's arrival at Fordham Street Pier and passenger loading onto the ferry. Lastly, the ferry travel time from City Island to Hart Island is approximately seven minutes, which includes three minutes of dwell time at City Island.

The existing conditions total travel time to Hart Island for visitors arriving by car or public transit for a typical Saturday trip is shown below on *Table 6*. Total travel time for visitors arriving by car were significantly less than travel times for visitors arriving by public transit from all origin locations. For trips originating in the NYC Boroughs, total travel time to Hart Island by car ranged from approximately 37 minutes to 87 minutes, and total travel time to Hart Island by public transit ranged from approximately 79 minutes to 151 minutes. For trips originating in the Bronx origin zip code, total travel time to Hart Island is approximately 37 minutes and 79 minutes by car and public transit, respectively.

Total travel time and travel routes will be discussed for each alternative respectively in Chapter IX (Service Plan Alternatives). Total travel time calculation summary tables can be found in *Appendix K*.

***Table 6 – Existing Conditions Total Travel Time for a Saturday***

| Origin (Center of Population Zip Code) | Car | Transit |
|---|---|---|
| | Existing Travel Time (Minutes) | Existing Travel Time[1] (Minutes) |
| Bronx (10460) | 37 | 79 |
| Manhattan (10021) | 57 | 96 |
| Brooklyn (11226) | 87 | 139 |
| Queens (11375) | 42 | 119 |
| Staten Island (10314) | 77 | 151 |
| Nassau County, NY (11550) | 57 | 175 |
| Westchester County, NY (10601) | 47 | 142 |
| Fairfield County, CT (06880) | 67 | 141 |
| Bergen County, NJ (07601) | 57 | 132 |

Notes:

[1]Minimum travel time was used for this comparison, for origin locations that have more than one typical transit route alternative to travel to Hart Island.

## E. Cost Estimation

Detailed cost estimations for the Terminal Concept Alternatives and the Service Plan Alternatives were developed to provide another metric for comparison of the alternatives. Cost estimations were performed by a certified cost estimator. Capital costs and operation and maintenance costs were developed independently, as well as the costs for the Terminal Concept Alternatives and Service Plan Alternatives. Detailed discussions of cost estimation of each alternative will be discussed in their respective sections, however, general assumptions and methodology will be discussed below. Detailed notes on assumptions and exclusions for capital costs can be found in *Appendix I*.

Capital Costs for each Terminal Concept Alternative were estimated based on the following:

- Terminal Concept Design Narrative and Figures including Estimated Quantities
- NYCEDC Cost Assumptions and NYC Terminal Drawings from other locations

Items included in Terminal Concept Alternative capital cost estimations:

- Bond & Insurance, General Contractors Overhead & Profit, and Contingencies and Mark-Ups
- Soft Costs (Soft costs include A/E Design Fee, Inspection Fee, Project Management, Loan Interest and Accounting).
- Allowance for Site Improvements Upland of Terminals (erosion control, excavation, pavements/sidewalks, curbs, site furnishings)
- Allowance for Electrical Power Source for Bow Loader Ramp, Ticketing Equipment, and Terminal Displays for New Terminals
- Lighting for New Terminals

The new NYC Ferry terminal proposed in Terminal Concept Alternatives 2, 3, and 4 require an electrical power source, which Hart Island does not currently have. While this is a substantial feasibility issue, the conceptual design of a power source to serve the terminals is outside the scope of this study. However, an allowance for a generator and power feeders on Hart Island to power the proposed terminal is included in the Terminal Concept Alternatives 2, 3, and 4 cost estimations.

In addition, annual operation and maintenance costs were estimated for each Service Plan Alternative. The annual operations and maintenance costs differed for each of the short-, medium, and long-term alternatives, and will be discussed in Chapter IX (Service Plan Alternatives). Detailed notes on assumptions and exclusions for operation and maintenance costs can be found in the Complete operations and maintenance cost estimates provided in *Appendix I*.

Items excluded in Service Plan Alternative Operation and Maintenance cost estimations:

- Annual revenue, annual subsidy amount, and farebox recovery

# VIII. FERRY TERMINAL CONCEPTUAL ALTERNATIVES

One of the key parts of the transportation study is to evaluate the functionality of the existing ferry infrastructure compatibility with potential future ferry services such as NYC Ferry, and if not, provide new terminals to accommodate NYC Ferry vessels. The following section provides a detailed discussion of Terminal Conceptual Alternatives developed to maintain existing or provide new infrastructure for future ferry services proposed later in this report. Structural and shoreline inspections as well as bathymetric surveys as included in the Existing Condition Report were conducted within the vicinity of the existing ferry terminal infrastructure to aid in assessing the feasibility of accommodating NYC Ferry vessels. Based on the infrastructure inspections, it was determined that no immediate measures are required to continue use of ferry infrastructure for burial and visitation operations. However, some rehabilitation measures are recommended at the existing facilities to maintain a 'Good State of Repair', which are discussed in further detail in Concept 1 below.

Based on the following factors, it was determined that a NYC Ferry passenger vessel would not be compatible with the existing Fordham Street Ferry Dock and Hart Island Ferry Dock infrastructure. NYC Ferry vessels typically approach and berth to a ferry terminal barge. The vessels are bow loading and actively thrust into a radial fender system during passenger loading and unloading on a floating ferry terminal barge. This type of berthing requiring a radial fender system and the ability of the structure to resist the force of a thrusting NYC Ferry vessel would not be compatible with the existing fixed timber infrastructure at Hart Island or Fordham Street, even after considering repairs and upgrades to the existing structural elements. Therefore, new terminals compatible with NYC Ferry vessels would be required to accommodate new ferry services to Hart Island and/or City Island. *Figure 39* below shows a photo of the existing Hart Island Ferry Terminal, and *Figure 40* below shows a NYC Ferry vessel docking at the NYC Ferry Soundview Ferry Terminal.

***Figure 39 – Photo of Existing Hart Island Ferry Dock***

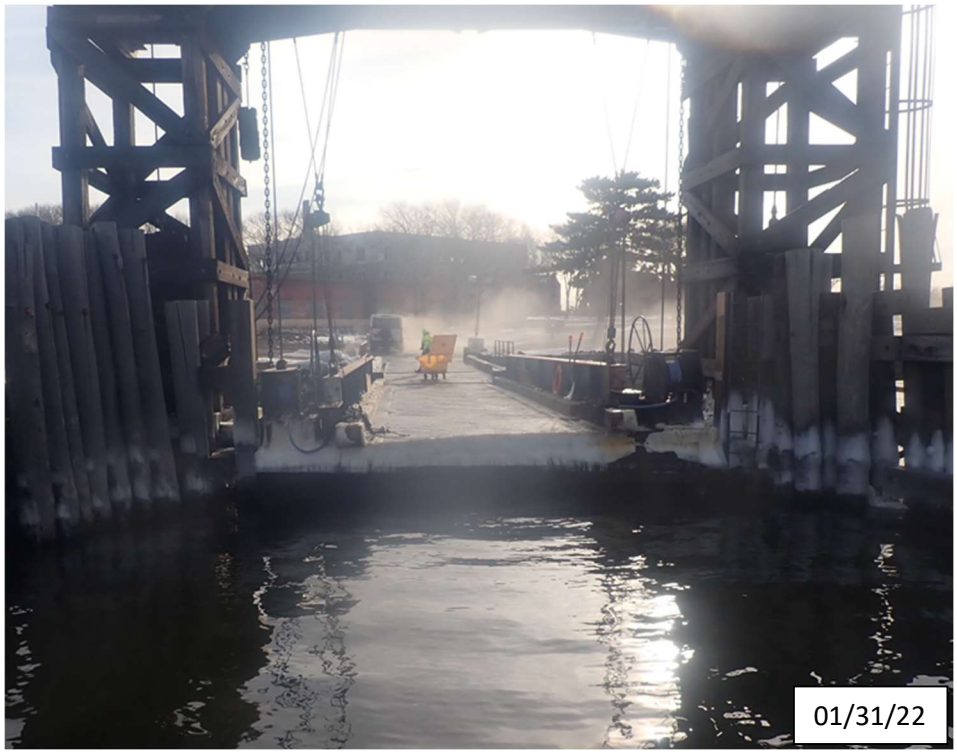
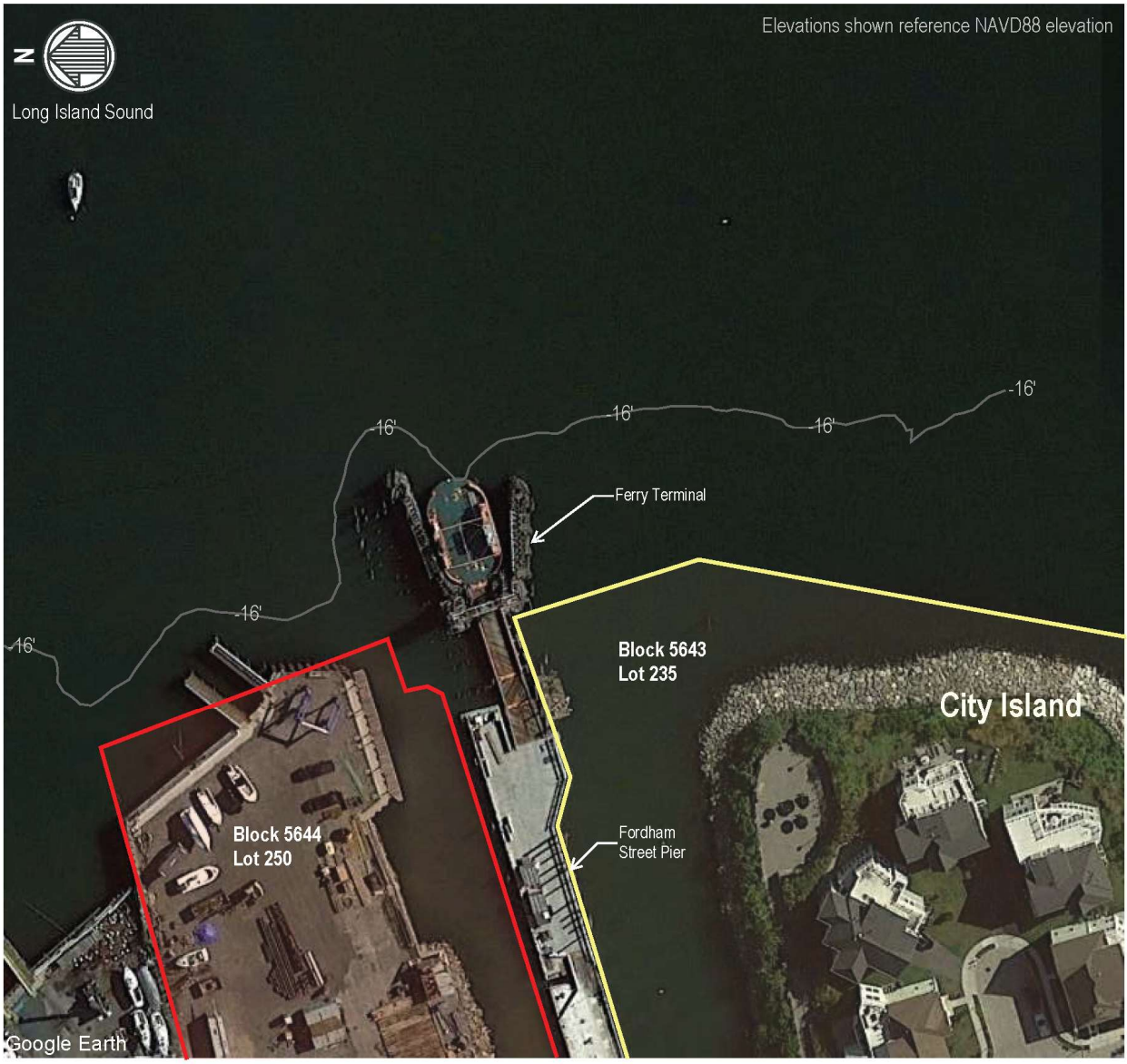


***Figure 40 – Photo of NYC Ferry Docking at NYC Ferry Soundview Terminal***


As it is not feasible to modify the Fordham Street Ferry Dock to accommodate NYC Ferry vessels, construction of a new walkway structure extending from the Fordham Street Pier and leading to a gangway providing access to a typical NYC Ferry Terminal barge was considered. However, after review of the NYC tax map, adjacent property lines to the existing Fordham Street Pier would not allow for such a structure without acquisition or easements. As shown on *Figure 41*, extension of a new walkway structure extending from the south face of Fordham Street Pier would require structural improvements within private property (Block 5643 Lot 236, outlined in yellow), and therefore, this option was not evaluated any further. While an extension of a new walkway structure extending from the northeast corner of the Fordham Street Pier could be constructed without structural improvements within the neighboring tax lot (Block 5644 Lot 250, outlined in Red), the new structure would likely block access to the slip located on the south shoreline of the boat yard property on Block 5644 Lot 250. Lastly, extension of the Fordham Street Pier offshore to construct a separate NYC DOT Ferry Terminal and NYC Ferry Terminal would require the demolition of the existing Fordham Street Ferry Dock and would disrupt current burial and visitor operations from Fordham Street Pier during construction. Additionally, further research would be required to determine the location of the pierhead lines in this area to assess the feasibility of this option. Therefore, alternatives to reconfigure the existing Fordham Street Ferry Dock to accommodate NYC Ferry vessels were not advanced as part of this study. Other locations on City Island could be considered for NYC Ferry service in the future through coordination with NYCEDC, however, this analysis falls outside of the scope of this study.

***Figure 41 – Existing Fordham Street Ferry Dock***




New terminals were considered for conceptual alternatives to bring passenger ferry vessels to Hart Island. The following design assumptions were made for the following alternatives:

- Service life of 25 years
- Sea Level Rise of 16 inches
- NYC Passenger Ferry Dimensions of 60 ft long by 36 ft beam by 6 ft 11 in draft
- Typical NYC Ferry terminal barge dimensions of 90 ft long by 35 ft wide
- Typical gang way of 80 ft long by 9 ft wide (Gangway minimum dimensions for ADA Compliance)
- Minimum water depth elevation of -16 NAVD88 (approximate elevation -11.79 MLLW)

Terminal Conceptual Alternative 1 was identified as a short-term alternative and focuses on maintaining Good State of Repair at existing facilities serving the NYC DOT Ferry. Terminal Conceptual Alternatives 2, 3, and 4 were identified as medium-term alternatives and propose to construct a new terminal to accommodate an NYC Ferry vessel at Hart Island. Terminal Conceptual Alternatives 2, 3, and 4 identified

locations where a gangway can be extended from the shoreline or existing structure to access a typical NYC Ferry barge to serve a new Hart Island ferry service. Terminal Conceptual Alternatives 2, 3 and 4 include an estimated number of proposed steel anchor piles and monopiles, however, specific number of monopiles would typically be determined during the detailed design phase, which is outside of the scope of this study. In addition, Terminal Conceptual Alternatives 2, 3, and 4 may require upland connection improvements based on future design to be selected on Hart Island, however, the extent of improvements is largely dependent on the future plan for Hart Island itself, and therefore, is outside of the scope of this study.

Terminal conceptual alternatives may require environmental determination and work permits to be attained, however, further analysis outside of the scope of this study is required to accurately determine which permits would be required. It is anticipated that coordination, approvals and/or permits would be required from the NYC Department of Small Business Services (SBS), New York State Department of Environmental Conservation (NYCDEC), and potentially in-water construction permits from the United States Army Corps of Engineers (USACE). The Terminal Conceptual Alternatives are described in further detail below, and further details on the proposed design and estimated quantities can be found on the Terminal Concept Design Narrative and Figures in *Appendix H*.

## A. Terminal Conceptual Alternative 1

Terminal Conceptual Alternative 1 is a short-term alternative which proposes rehabilitation of the existing facilities, including the following:

1. Rehabilitation of the Hart Island Ferry Dock/Terminal
2. Reconstruction of the Hart Island Ferry Dock/Terminal Shoreline (Bulkhead)
3. Rehabilitation of the Fordham Street Ferry Dock/Terminal

Terminal Conceptual Alternative 1 focuses on maintaining good state of repair at existing facilities supporting both existing burial and passenger ferry services. The existing Hart Island Ferry Dock/Terminal is shown on *Figure 42* below, showing the Hart Island Ferry Dock/Terminal to be rehabilitated (1), and the location of the Hart Island Ferry Dock/Terminal bulkhead to be reconstructed (2). The existing Fordham Street Ferry Dock on City Island is shown on *Figure 43* below, which is proposed to be rehabilitated under Terminal Conceptual Alternative 1. A list of detailed infrastructure improvements required under Terminal Conceptual Alternative 1, including estimated material quantities, are listed in detail below:

1. Rehabilitation of the Hart Island Ferry Dock/Terminal (Location **1** on *Figure 42* below)
   - Replacement of 32 severe rated timber piles at the fender rack. Assume replacement piles are 12-in. in diameter by 70-ft long.
   - Replacement of steel cable wraps securing groups of timber piles at the fender rack. Assume 500-LF of 1-in. diameter galvanized rope with associated connection hardware.
   - Replacement of the missing safety rail along the south edge of the fender rack. Assume 20-LF of handrail.
   - Replacement of fire damaged horizontal member supporting the south portion of the fender rack. Assume 10LF of 12x12 timber.
   - Repair of corroded steel sheet pile cells supporting the gantry towers via oversheeting and filling the annulus with concrete. Assume 100-LF of AS-500 flat steel sheet piles 35-ft long and 20-CUYD of concrete. Total of 25-CUYD of in-water fill.

- Note, inspection of the 35 timber piles supporting the ferry terminal access platform is recommended every 4-years to monitor deterioration.

2. Reconstruction of the Hart Island Ferry Dock/Terminal Bulkhead (Location **2** on *Figure 42* below)
   - Replacement of deteriorated timber bulkhead. Repair proposes driving new steel sheet piles directly inshore of the existing bulkhead, cutting sheets 12-in. above existing top of sheet, and installing timber fender system and concrete cap. A tie back system for the steel sheet pile wall would likely not be structurally required. Once the sheets are driven, removal of the old timber bulkhead and placement of new fill is required.

3. Rehabilitation of the Fordham Street Ferry Dock/Terminal (Location **3** on *Figure 43* below)
   - Replacement of 17 severe rated timber piles at the fender rack. Assume replacement piles are 12-in. in diameter by 70-ft long.
   - Replacement of steel cable wraps securing groups of timber piles at the fender rack. Assume 500-LF of 1-in. diameter galvanized rope with associated connection hardware.
   - Replacement of the broken horizontal member supporting the south gantry tower. Assume 12x12 timber replacement for 10-LF.
   - Note, inspection of the 42 timber piles supporting the ferry terminal access platform and 16 piles each supporting the gantry towers are recommended every 4-years to monitor deterioration.

Additional details and repair figures for Terminal Conceptual Alternative 1 can be found in the Terminal Concept Design Narrative and Figures in *Appendix H*.

***Figure 42 – Terminal Conceptual Alternative 1 – Existing Hart Island Ferry Dock/Terminal***

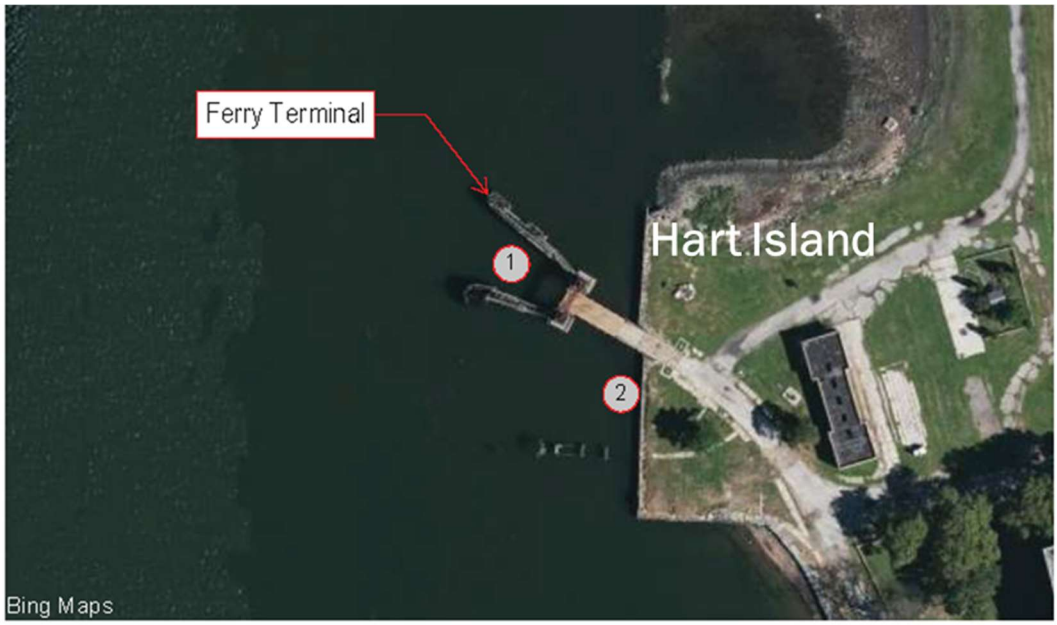
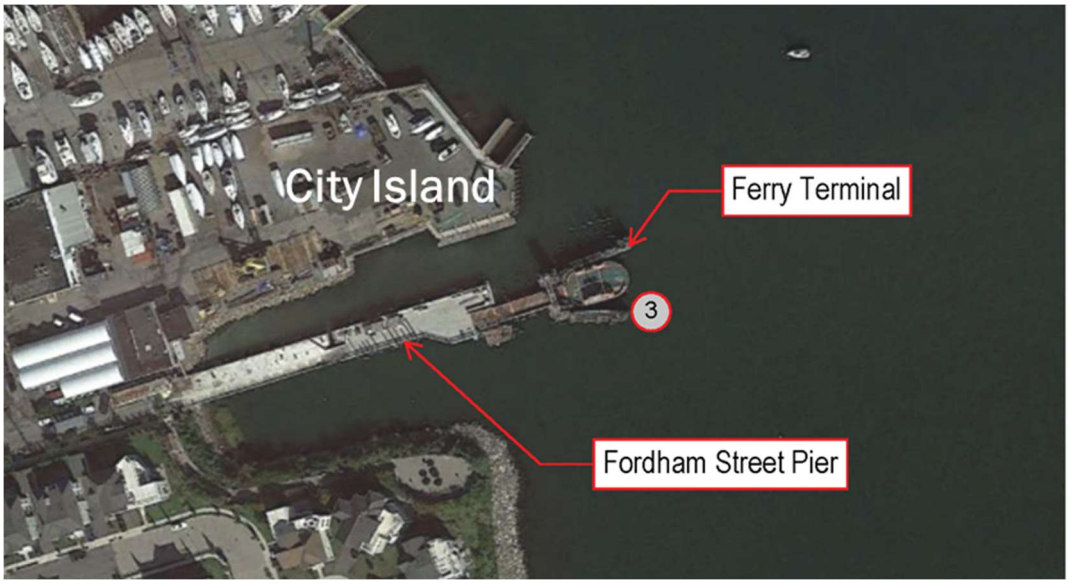


***Figure 43 – Terminal Conceptual Alternative 1 – Existing Fordham Street Ferry Dock/Terminal***




Based on a site visit and without as-built drawings, the existing bulkhead appears to be disconnected to the Hart Island Ferry Dock and does not extend along the inshore end of the ramp. If the existing timber bulkhead does not extend along the inshore end of the ramp, interruption to burial and visitor operations would be minimal. However, a new bulkhead was conservatively proposed around the inshore end of the ramp in the event the existing timber bulkhead extends along the inshore end of the ramp. In this case, the bulkhead reconstruction would likely interrupt burial and visitor at the Hart Island Ferry Dock. The extent of interruption to operations would be determined after conducting a design level inspection and developing a detailed design for the bulkhead.

*Costs*

As described previously, estimated capital costs for construction, design, and permitting fees were developed for Terminal Concept Alternative 1. Capital costs were based on the Terminal Concept Design Narrative and Figures as included in *Appendix H* and supplemented by drawings for similar NYC Ferry Terminal facilities provided by NYCEDC. As it is assumed that work included under Terminal Concept Alternative 1 would be conducted while the existing ferry service is operational, the cost estimate includes a lower work time efficiency rate to account for less usable construction time to pause construction and minimize disruptions to existing operations.

A complete breakdown of the capital costs for Terminal Concept Alternative 1 is provided in *Appendix I*. The total capital cost for Terminal Conceptual Alternative 1 is $16,823,768. The breakdown of costs among each infrastructure is provided below.

- Hart Island Ferry Dock/Terminal Rehabilitation: $ 4,855,938
- Hart Island Ferry Dock/Terminal Bulkhead Reconstruction: $10,352,769
- Fordham Street Ferry Dock/Terminal Rehabilitation: $ 1,615,061

## B. Terminal Conceptual Alternative 2

Terminal Conceptual Alternative 2 is the first medium to long term alternative, which proposes to rehabilitate the existing Hart Island Concrete and Timber Dock (Coal Pier) structure at Hart Island to facilitate access to a new NYC Ferry barge via a gangway. This concept includes the following infrastructure improvements:

1. New ferry terminal barge providing two vessel berths with pipe anchor piles and gangway
2. Rehabilitation of the Hart Island Coal Pier including:
    - Epoxy encasement of existing timber piles
    - Replace timber cross bracing
    - Repair concrete deck and concrete abutment connection to shoreline
3. Install Handrail on Hart Island Coal Pier (potentially removable)

The conceptual design for Terminal Conceptual Alternative 2 including proposed ferry terminal barge, gangway, and handrail installed on the existing Hart Island Coal Pier is shown on *Figure 44* below. The ferry terminal barge was positioned on the south side of the Coal Pier to avoid demolition of the existing timber walkway located at the northwest corner of the dock. A list of detailed infrastructure improvements required under Terminal Conceptual Alternative 2, including estimated material quantities, are listed in detail below:

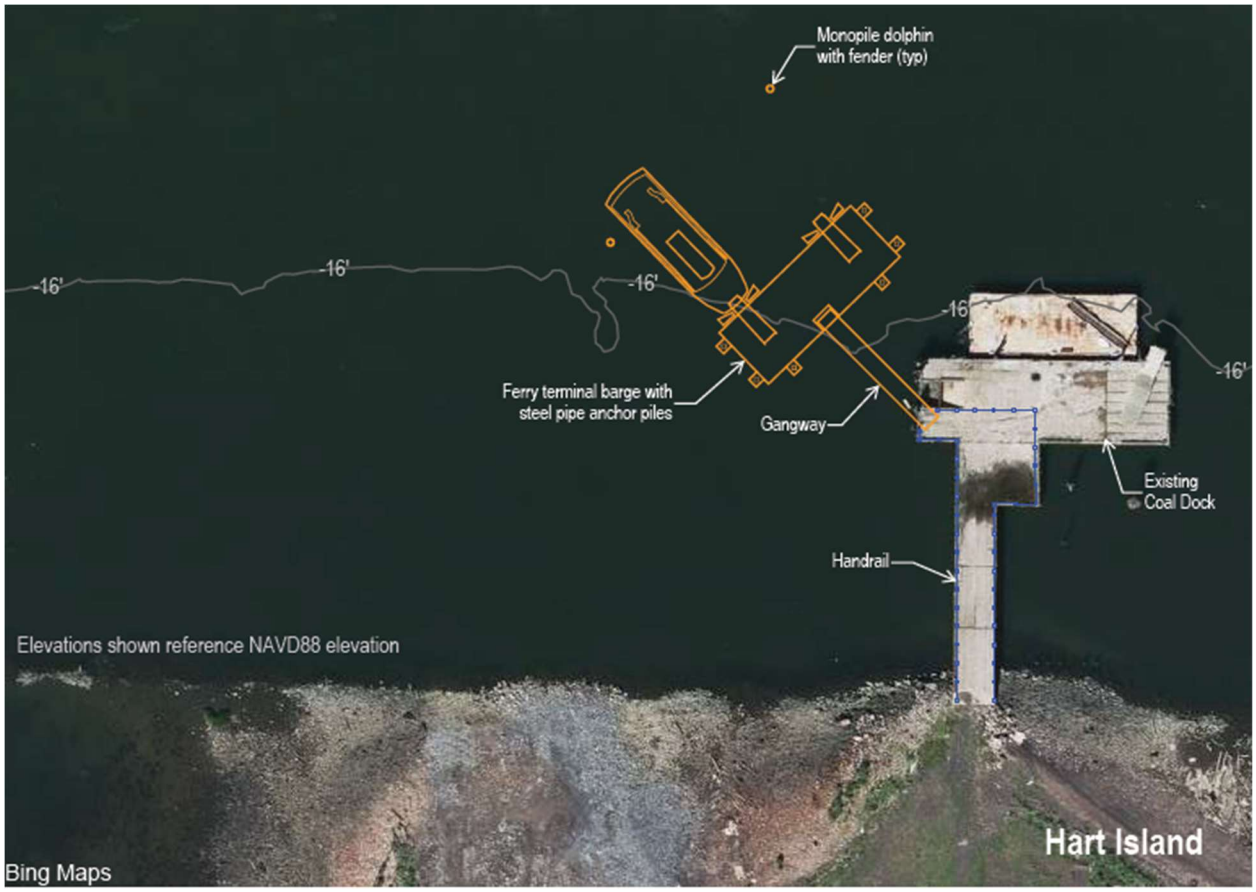
- One (1) typical NYC Ferry Terminal Barge with dual ramps, including six (6) steel pipe anchor piles. Assume piles are 24-in. in diameter and 85-ft long. Total of 14-CUYD of in-water fill.
- One (1) 80-ft long by 9-ft wide gangway.
- Two (2) monopile dolphins with donut fender. Assume steel pipe pile is 36-in. in diameter and 100-ft long. Total of 7-CUYD of in-water fill.
- Epoxy encasement of 142 existing timber piles at the Coal Pier; 15-in. in diameter by average height of 15-ft. Total of 35-CUYD of in-water fill.
- Replace 260-LF of timber cross bracing.
- Repair 1400-SF of deteriorated concrete deck.
- Repair concrete abutment connection to the shoreline.
- Install 400-LF of handrail.

Dredging would not be required for Terminal Conceptual Alternative 2. Additional details and repair figures for Terminal Conceptual Alternative 2 can be found in the Terminal Concept Design Narrative and Figures in *Appendix H*.

The rehabilitation of the Coal Pier allows for city agencies to continue to utilize the offshore, west face of the Coal Pier for material barge berthing options. The handrail installation included in Terminal Conceptual Alternative 2 has the option to be removable, in order to allow for multiple functions for the Coal Pier. For example, the Coal Pier can be used for construction activities as it has been utilized in the past when the proposed new Hart Island ferry is not in service.

In terms of disadvantages, it should be noted that the Coal Pier is further away from the existing Hart Island roadway compared to the Hart Island ferry terminal currently used for burial operations and gravesite visits, which may require additional upland improvements but is dependent on future plans for Hart Island. In addition, service life for rehabilitated structures may be shorter than construction of new structures. Lastly, a feasibility issue that is present amongst all new terminals proposed at Hart Island is

***Figure 44 – Terminal Conceptual Alternative 2 – Hart Island Coal Pier Rehabilitation***




the lack of an existing power source to supply power for terminal equipment and lighting. While detailed design of a power source and service for a new NYC Ferry terminal was outside the scope of this study, the following describes the generator and transformer utilized as temporary power source at Ferry Point Park, as an example of the type of electrical equipment that may be required to power a new NYC Ferry Terminal at Hart Island. An industrial towable generator running on diesel fuel capable of providing voltages of 120/208V to 277/480V as well as a 600 Amp portable power distribution panel were provided at Ferry Point Park. While a gas-powered generator is assumed to be installed for cost estimating purposes, it is recommended that the electrical power needs of the ferry terminal be considered with any future development planning for Hart Island. Future power needs may consider solar and wind sources for potential power for Hart Island.

*Costs*

As described previously, estimated capital costs for construction, design, and permitting fees were developed for Terminal Concept Alternative 2. Capital costs were based on the Terminal Concept Design Figures as included in *Appendix H* and supplemented by drawings for similar NYC Ferry Terminal facilities provided by NYCEDC. A complete breakdown of the capital costs for Terminal Concept Alternative 2 is provided in *Appendix I*. The total capital cost for Terminal Conceptual Alternative 2 is $19,607,855.

## C. Terminal Conceptual Alternative 3

Terminal Conceptual Alternative 3 is the second medium to long term alternative, which proposes to replace the existing Coal Pier structure at Hart Island in-kind to facilitate access to a new NYC Ferry barge via a gangway. This concept includes the following infrastructure improvements:

1. New ferry terminal barge with pipe anchor piles and gangway
2. Demolition of existing Coal Pier and replace in-kind, including:
    - Steel pipe piles
    - 3' x 2' concrete pile caps
    - 10-inch-thick concrete deck (approximately 8,000 SF)

The conceptual design for Alternative 3 is shown on *Figure 45* below. Note, it is proposed to construct the new ferry terminal barge and gangway either to the north (shown in pink) or the south (shown in orange) of the existing Coal Pier, and not both. Alternative 3 includes the option for installation of a new floating dock and gangway for recreational vessels, which the concept design for this structure was based on a similar existing floating dock at the Fordham Street Pier. This type of dock is intended to accommodate types of recreational vessels such as kayaks, paddle boards/boats, jet skis, and small to medium sized boats less than 25-ft in length. This would provide an alternative access for smaller vessels compared to the larger facilities utilized by NYC Ferry and NYCDOT vessels. A list of infrastructure improvements required under Terminal Conceptual Alternative 3, including estimated material quantities, are listed in detail below:

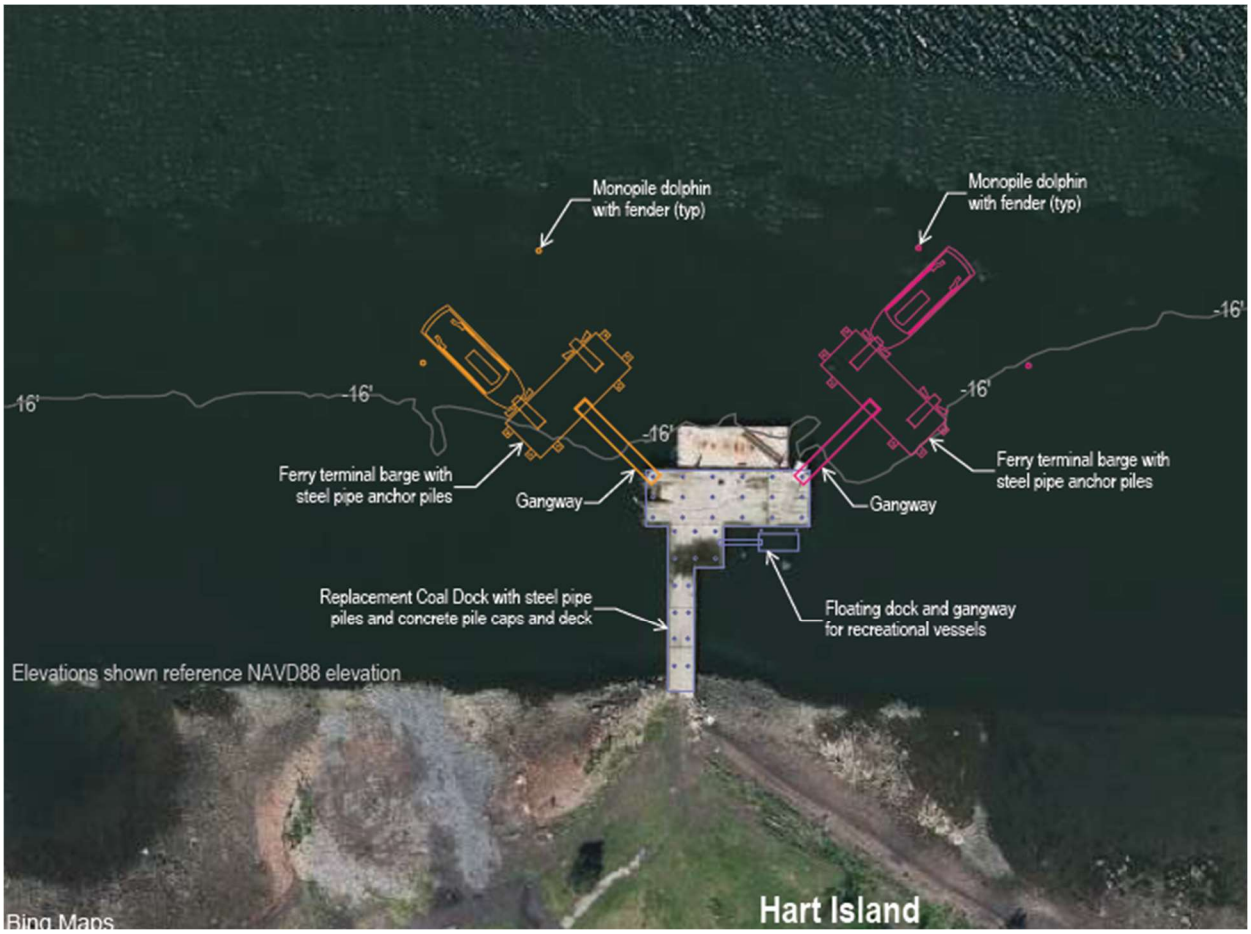
- Demolish existing Coal Pier and replace in-kind; thirty-two (32) 18-in. diameter by 100-ft long steel pipe piles, 400-LF of 3-ft wide by 2-ft high concrete pile caps, 8,000-SF of 10-in. thick concrete deck planks, 560-LF of handrail, and 13 12-in. diameter by 50-ft long timber fender piles. Reduction of in-water fill of 47-CUYD.
- One (1) typical NYC Ferry Terminal Barge with dual ramps, including six (6) steel pipe anchor piles. Assume piles are 24-in. in diameter and 85-ft long. Total of 14-CUYD of in-water fill.
- One (1) 80-ft long by 9-ft wide gangway.
- Two (2) monopile dolphins with donut fender. Assume steel pipe pile is 36-in. in diameter and 100-ft long. Total of 7-CUYD of in-water fill.
- Recreational floating dock; 28-ft long by 12-ft wide timber dock, two (2) 12-in. diameter by 70-ft long timber anchor piles, and 30-ft long by 4-ft wide gangway. Total of 1-CUYD of in-water fill.

Dredging would not be required for Terminal Conceptual Alternative 3. Additional details and repair figures for Terminal Conceptual Alternative 3 can be found in the Terminal Concept Design Narrative and Figures in *Appendix H*.

The reconstruction of the Coal Pier allows for city agencies to continue to utilize the Coal Pier for material barge berthing options. The footprint of the new ferry dock is proposed to match the existing footprint of the existing Coal Pier to not preclude future use of the Coal Pier for construction or materials movement while the new Hart Island ferry is not in service, and to not lose any existing overwater coverage for the pier.

In terms of disadvantages, similar to Terminal Concept 2, the Coal Pier is further away from the existing Hart Island roadway compared to the Hart Island ferry terminal currently used for burial operations and gravesite visits, which may require additional upland improvements dependent on future plans for Hart

***Figure 45 – Terminal Conceptual Alternative 3 – Hart Island Coal Pier Reconstruction***




Island. In addition, this concept has the highest cost due to the reconstruction of the pier, discussed further in the Cost Estimation *Section IV.E.* of this report. Lastly, a feasibility issue that is present amongst all new terminals proposed at Hart Island is the lack of an existing power source to supply power for terminal equipment and lighting. Generator and transformer equipment utilized at Ferry Point Park that could potentially be utilized to serve a new NYC Ferry Terminal at Hart Island is described in the Chapter VII, Section B (Terminal Conceptual Alternative 2). While a gas-powered generator is assumed to be installed for cost estimating purposes, it is recommended that the electrical power needs of the ferry terminal be considered with any future development planning for Hart Island.

*Costs*

As described previously, estimated capital costs for construction, design, and permitting fees were developed for Terminal Concept Alternative 3. Capital costs were based on the Terminal Concept Design Narrative and Figures as included in *Appendix H* and supplemented by drawings for similar NYC Ferry Terminal facilities provided by NYCEDC. A complete breakdown of the capital costs for Terminal Concept Alternative 3 is provided in *Appendix I*. The total capital cost for Terminal Conceptual Alternative 3 is $22,286,315.

## D. Terminal Conceptual Alternative 4

Terminal Conceptual Alternative 4 is the third medium to long term alternative, which proposes to install a new gangway and typical NYC Ferry terminal barge south of the existing Hart Island Ferry Terminal. This concept includes the following infrastructure improvements:

1. New ferry terminal from Hart Island ferry terminal bulkhead
    - New ferry terminal barge with steel pipe anchor piles and gangway
    - Reconstruct Hart Island Ferry Terminal Shoreline (Bulkhead) (included in Terminal Concept 1)

Alternative 4 requires the replacement of the Hart Island ferry terminal bulkhead (included in Terminal Concept 1) and is contingent upon this infrastructure improvement to operate. The conceptual design for Alternative 4 is shown on *Figure 46* below. A list of infrastructure improvements required under Terminal Conceptual Alternative 4, including estimated material quantities, are listed in detail below:

- Removal of derelict timber structure; 12 piles and four (4) horizontal cap members.
- One (1) typical NYC Ferry Terminal Barge with dual ramps, including six (6) steel pipe anchor piles. Assume piles are 24-in. in diameter and 85-ft long. Total of 14-CUYD of in-water fill.
- One (1) 80-ft long by 9-ft wide gangway.
- Two (2) monopile dolphins with donut fender. Assume steel pipe pile is 36-in. in diameter and
- 100-ft long. Total of 7-CUYD of in-water fill.
- One (1) hinge connection to concrete cap of the proposed steel sheet pile replacement bulkhead.
- Note, the replacement bulkhead as detailed in Concept 1, including steel sheet piles and concrete cap, would require specific design to accommodate the gangway connection.

Dredging would not be required for Terminal Conceptual Alternative 4. Additional details and repair figures for Terminal Conceptual Alternative 4 can be found in Terminal Concept Design Narrative and Figures in *Appendix H*.

As discussed in Terminal Conceptual Alternative 1, the existing bulkhead appears to be disconnected to the Hart Island Ferry Dock and does not extend along the inshore end of the ramp. If this is the case, interruption to burial and visitor operations would be minimal. However, a new bulkhead was conservatively proposed around the inshore end of the ramp in the event the existing timber bulkhead is located there. In this case, the bulkhead reconstruction would likely interrupt burial and visitor at the Hart Island Ferry Dock. The extent of interruption to operations would be determined after conducting a design level inspection and developing a detailed design for the bulkhead. The duration of interruption to existing operations is unknown at the conceptual design phase, however, the duration of interruption will be determined during the detailed design phase in the future. The ferry terminal location in Terminal Conceptual Alternative 4 is closer to the existing Hart Island roadway compared to the location of the Hart Island Coal Pier, likely requiring fewer upland improvements, but this is ultimately dependent on future plans on Hart Island. In addition, Alternative 4 does not include infrastructure improvements at the Coal Pier so no impact to existing operations at the Coal Pier are anticipated, however, the Coal Pier would remain in a state of disrepair. Lastly, a feasibility issue that is present amongst all new terminals proposed at Hart Island is the lack of an existing power source to supply power for terminal equipment and lighting. Generator and transformer equipment utilized at Ferry Point Park that could potentially be utilized to serve a new NYC Ferry Terminal at Hart Island is described in

the Chapter VII, Section B (Terminal Conceptual Alternative 2). While a gas-powered generator is assumed to be installed for cost estimating purposes, it is recommended that the electrical power needs of the ferry terminal be considered with any future development planning for Hart Island.

*Costs*

As described previously, estimated capital costs for construction, design, and permitting fees were developed for Terminal Concept Alternative 4. Capital costs were based on the Terminal Concept Design Narrative and Figures as included in *Appendix H* and supplemented by drawings for similar NYC Ferry Terminal facilities provided by NYCEDC. A complete breakdown of the capital costs for Terminal Concept Alternative 4 is provided in *Appendix I*. The capital cost for the new Terminal and gangway is estimated at $15,352,475, however, as the Hart Island Ferry Dock bulkhead reconstruction would be required ($10,352,769), the total capital cost of Terminal Conceptual Alternative 4 is estimated at $25,705,244.

***Figure 46 – Terminal Conceptual Alternative 4 – New NYC Ferry Terminal at Hart Island***

In summary, Terminal Conceptual Alternative 1 focuses on maintaining a good state of repair at existing facilities to continue operating the existing NYC DOT ferry service. Terminal Conceptual Alternatives 2, 3, and 4 propose to construct a new ferry terminal to accommodate an NYC Ferry vessel at Hart Island. Terminal Conceptual Alternative 2 proposes to rehabilitate the Coal Pier at Hart Island and construct a gangway and NYC Ferry Terminal. Terminal Conceptual Alternative 3 proposes to completely reconstruct the Coal Pier, providing increased longevity, while also constructing a new gangway and NYC Ferry Terminal. Terminal Conceptual Alternative 4 proposes to construct a gangway and NYC Ferry Terminal from a newly reconstructed bulkhead just south of the Hart Island Ferry Dock. While Terminal Conceptual Alternatives 2, 3, and 4 each have their respective benefits and challenges, a new NYC Ferry Terminal at Hart Island will require an electrical power source, highlighting a potential feasibility issue and consideration for future plans on Hart Island.

A summary comparison table of the four Terminal Conceptual Alternatives (1-4) is provided in *Table 2* included in the executive summary of the report.

# IX. SERVICE PLAN ALTERNATIVES

The conceptual transportation planning options for short-, medium-, and long-term alternatives for future access to Hart Island developed for this study are discussed below. The Service Plan Alternatives developed include two short-term (S1 and S2), two medium term (M1 and M2), and two long term (L1 and L2) alternatives. Service Plan Alternatives S1 and S2 focus on providing a shuttle bus service to the Fordham Street Pier, to both serve visitors travelling by automobile and public transit. Service Plan Alternatives M1 and M2 are focused on providing a new ferry service to Hart Island. Service Plan Alternatives L1 and L2 are similar proposals to the Service Plan Alternatives M1 and M2, however, would suggest increasing levels of service dependent upon future usage. Note that the purpose of this study is to present possible alternatives to improve transportation access to Hart Island, however, other alternatives outside of the scope of this study may be considered as a future vision for Hart Island is developed.

## A. Service Plan Alternative S1 – Shuttle Bus Service from Orchard Beach

*Description of Alternative*

Service Plan Alternative S1 is a short-term alternative that proposes to implement a shuttle bus service from Orchard Beach Parking Lot to Fordham Street Pier, as an alternative connection to the Hart Island Ferry departure location for visitors arriving by car. The proposed shuttle bus service route and shuttle service stops are shown on *Figure 47* below. Service Plan Alternative S1 would maintain the existing NYC DOT ferry service to Hart Island and includes one shuttle bus operating in coordination with the existing Hart Island ferry service schedule. Under Service Plan Alternative S1, visitors travelling by car would have the option to drive to the Orchard Beach Parking Lot, where parking would be available. Drivers would be directed via signage to an area of the parking lot near a passenger waiting area for boarding the proposed shuttle bus. The proposed passenger waiting and boarding area, in addition to proposed temporary signage and traffic cones at Orchard Beach Parking Lot are shown on *Figure 48* below. As shown on *Figure 48*, it is proposed to temporarily remove a small amount of existing parking spaces at the Orchard Beach Parking Lot that are located within the shuttle bus service route, pick-up area, and passenger waiting and boarding area, which would have a negligible impact on the total parking lot capacity. While a demarcation of the shuttle bus passenger waiting area is proposed using temporary measures, permanent improvements for a shuttle bus pick-up area could be considered if Short-term Alternative S1 was considered for permanent implementation.

***Figure 47 – Service Plan Alternative S1 Shuttle Bus Service***

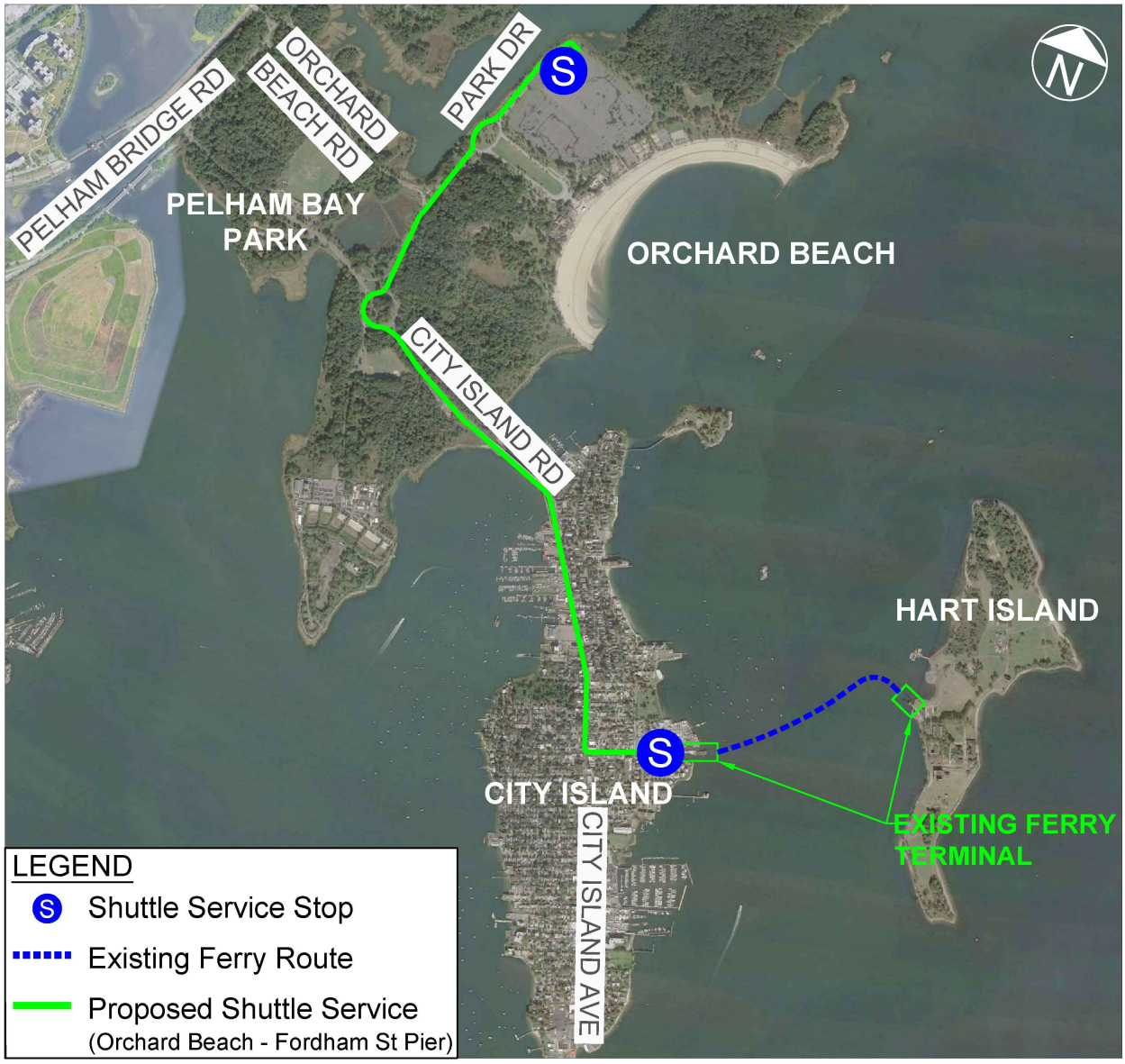
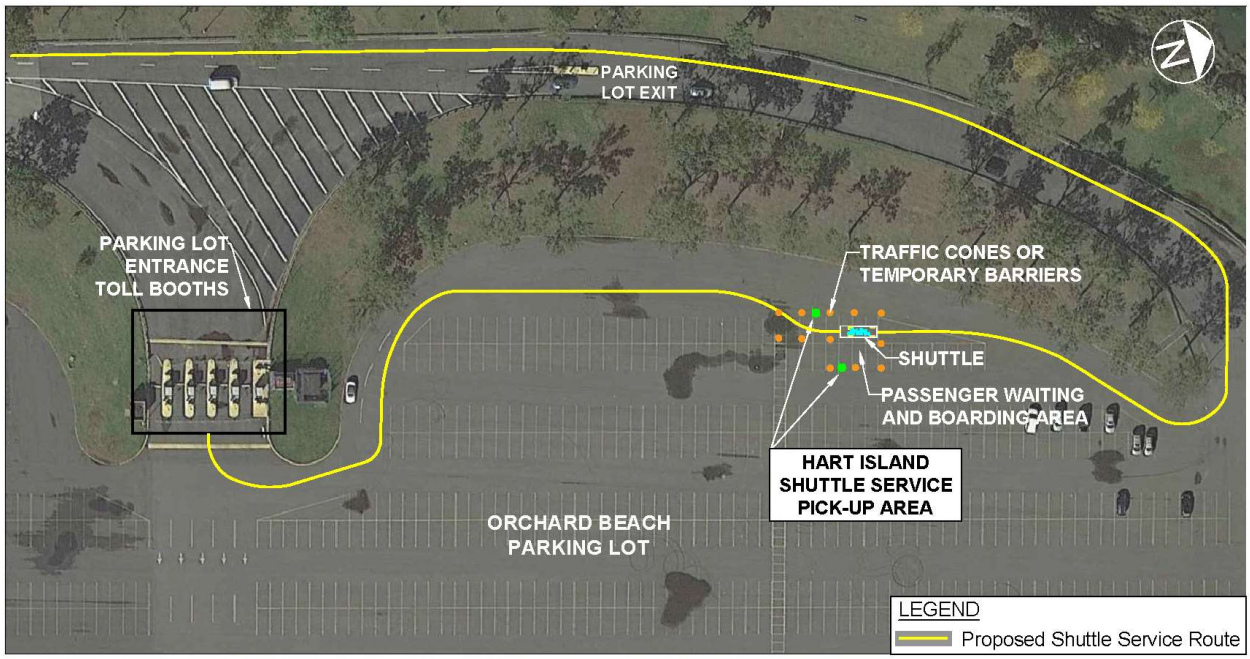


***Figure 48 – Service Plan Alternative S1 Shuttle Bus Service at Orchard Beach Parking Lot***




*Schedule*

As stated previously, potential schedules for the shuttle bus service were developed to calculate the operating and maintenance costs as well as inform travel time calculations associated with each service plan alternative. The existing Hart Island ferry service for gravesite visits currently operates on two weekend days per month, with two trips per day typically occurring at 9:00 AM and 12:00 PM. In Service Plan Alternative S1, it was assumed that ferry service would be provided three weekend days per month, with two trips per day. Further details on the schedule for Service Plan Alternative S1 is included in *Appendix J*.

As mentioned previously, the shuttle bus service proposed to be implemented under Service Plan Alternative S1 would be intended to be coordinated with the existing Hart Island Ferry Service schedule. Thus, only one shuttle bus is required to drop-off visitors departing for and returning back from Hart Island for both the 9:00 AM and 12:00 PM trips. A possible shuttle service schedule can be found in the Service Plan Alternative Summary in *Appendix J.*

*Travel Time Savings/Changes*

Total travel time was calculated for Service Plan Alternative S1, to determine the effect on travel times compared to the existing condition. Total travel time under Service Plan Alternative S1 includes the travel time to drive to Orchard Beach Parking Lot, shuttle wait time, shuttle travel time from Orchard Beach Parking Lot to Fordham Street Pier, and ferry travel time from City Island to Hart Island. The shuttle travel time from Orchard Beach Parking Lot to Fordham Street Pier is approximately 14 minutes, which includes one minute of dwell time for passenger loading at Orchard Beach Parking Lot and one minute of dwell time for passenger unloading at Fordham Street Pier.

Service Plan Alternative S1 provides a dedicated location for visitors to park at Orchard Beach Parking Lot, however, longer travel times are experienced for visitors arriving by car, compared to the existing conditions. As shown on *Table 7* below, total travel times are likely to increase by approximately 14 minutes for all trip origins considered.

***Table 7 – Service Plan Alternative S1 Total Travel Time Comparison for a Saturday***

| Origin (Center of Population Zip Code) | Car | | |
|---|---|---|---|
| | Existing Travel Time (Minutes) | Future Alternative S1 Travel Time (Minutes) | Difference in Travel Time (Minutes) |
| Bronx (10460) | 37 | 51 | +14 |
| Manhattan (10021) | 57 | 71 | +14 |
| Brooklyn (11226) | 87 | 101 | +14 |
| Queens (11375) | 42 | 56 | +14 |
| Staten Island (10314) | 77 | 91 | +14 |
| Nassau County, NY (11550) | 57 | 71 | +14 |
| Westchester County, NY (10601) | 47 | 61 | +14 |
| Fairfield County, CT (06880) | 67 | 81 | +14 |
| Bergen County, NJ (07601) | 57 | 71 | +14 |
| **Difference in Travel Time:** | **Range** | | **+14 - +14** |
| | **Average** | | **+14** |
| **Difference in Travel Time: (NYC Only)** | **Range** | | **+14 - +14** |
| | **Average** | | **+14** |

*Costs*

The cost estimate for Service Plan Alternative S1 includes annual operations and maintenance costs for the shuttle bus service. The annual operations and maintenance costs associated with Service Plan Alternative S1 is estimated to be $50,680 per year.

While the shuttle bus service was assumed to be a third-party operator for the purposes of cost estimation to obtain rates and fees for this service, a similar shuttle bus service could be operated by a city agency. In addition, the operations and maintenance costs do not include incremental costs associated with NYC DOT Ferry operating an additional day per month, as limited operation and maintenance cost information was provided for the existing NYC DOT ferry.

Complete cost estimates with detailed breakdowns are provided in *Appendix I*.

*Advantages/Disadvantages*

As mentioned previously, on-street parking by Fordham Street Pier on City Island is limited and was forecasted to be near or at capacity during the typical peak parking periods during the summer months. Service Plan Alternative S1 provides visitors arriving by car a dedicated location to park at Orchard Beach Parking Lot, reducing parking demand generated by Hart Island visitors at Fordham Street Pier, and reducing traffic activity on City Island.

In terms of disadvantages, Service Plan Alternative S1 does not include improvements that would incentivize visitors to use public transit rather than private automobile to reach the Fordham Street Pier. In addition, it is worth noting that the Orchard Beach Parking Lot currently has a parking fee of $8-$10 per vehicle during the summer season (with free parking outside of the summer season), however, the parking lot is a NYC Parks concession and waiving fees for Hart Island visitors might be possible.

## B. Service Plan Alternative S2 – Shuttle Bus Service from Pelham Bay Park Station

*Description of Alternative*

Service Plan Alternative S2 is a short-term alternative that proposes to implement a shuttle bus service from Pelham Bay Park 6 Train Station to the Orchard Beach Parking Lot and Fordham Street Pier, as an alternative connection to the Hart Island Ferry departure location for visitors arriving by car or public transit. The proposed shuttle bus service route and shuttle service stops are shown on *Figure 49* below. Service Plan Alternative S2 is an extension of the shuttle bus service proposed under Service Plan Alternative S1, and similarly would maintain the existing NYC DOT ferry service to Hart Island and would include one shuttle bus operating in coordination with the existing Hart Island ferry service schedule. Under Service Plan Alternative S2, visitors arriving by public transit would have the option to travel to Pelham Bay Park Station and transfer to the shuttle service or travel directly to Fordham Street Pier via the existing trip route, whichever trip is shorter in duration. The shuttle pick-up and drop-off location at Pelham Bay Park Station is proposed in a location that would not disrupt other NYCT bus stops in the area but would still be relatively close to the pedestrian bridge crossing Bruckner Boulevard and the Bruckner Expressway (I-95). The existing Pelham Bay Park 6 Train Station and nearby bus stop locations, as well as the proposed shuttle bus stop location are shown on *Figure 50* below. A photo of the curbside space along eastside of Charles J Crimi Road where the shuttle bus stop location is proposed to be located is shown on *Figure 51*.

***Figure 49 – Service Plan Alternative S2 Shuttle Bus Service***

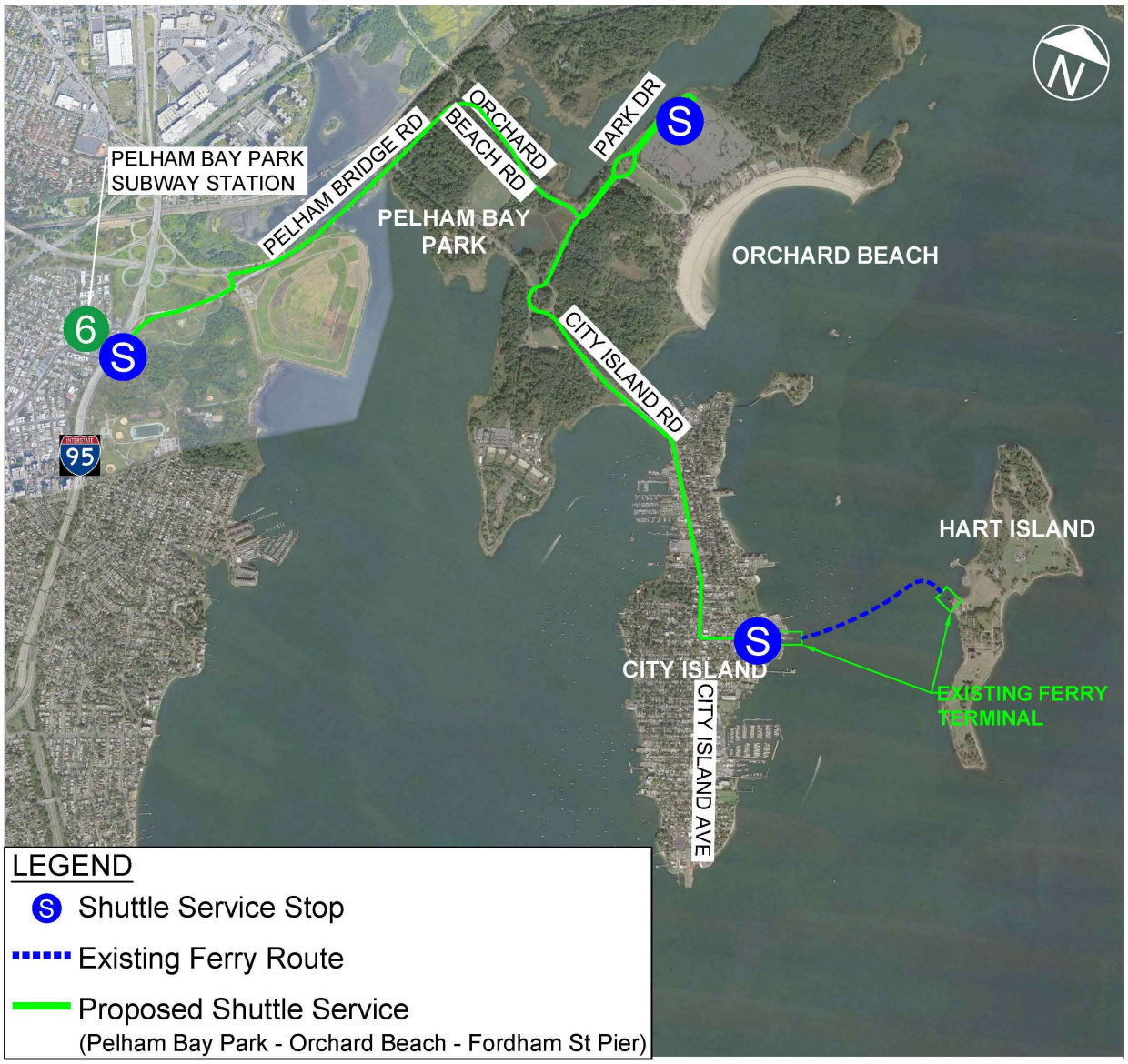


***Figure 50 – Service Plan Alternative S2 Shuttle Bus Stop at Pelham Bay Park Station***

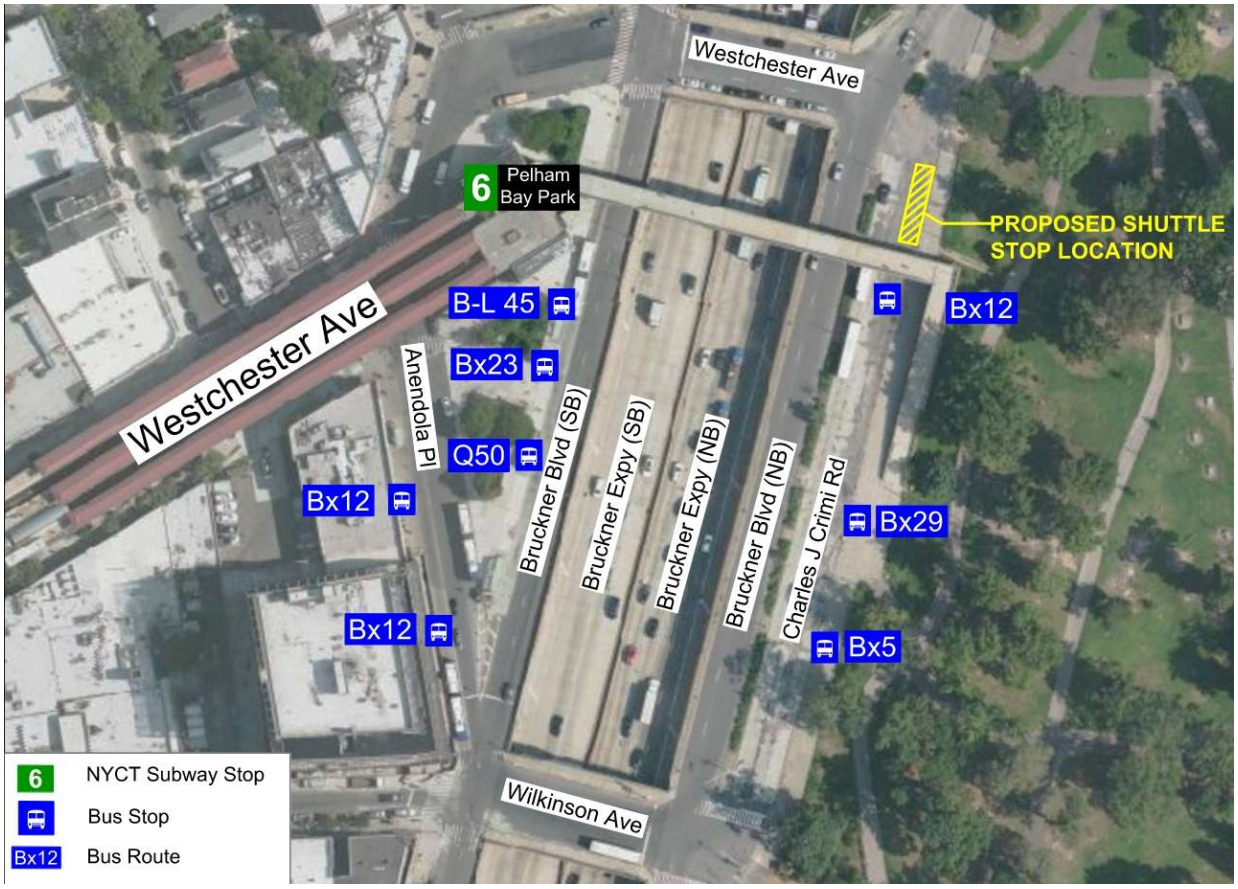



***Figure 51 – Photo of Curbside Space for Shuttle Bus Stop at Pelham Bay Park Station***

*Schedule*

As stated previously, potential schedules for the shuttle bus service were developed to calculate the operating and maintenance costs as well as inform travel time calculations associated with each service plan alternative. The existing Hart Island ferry service for gravesite visits currently operates on two weekend days per month, with two trips per day typically occurring at 9:00 AM and 12:00 PM on two weekend days per month. In Service Plan Alternative S2, it was assumed that ferry service would be provided three weekend days per month, with two trips per day. Further details on the schedule for Service Plan Alternative S1 is included in *Appendix J*.

As mentioned previously, the shuttle bus service proposed to be implemented under Service Plan Alternative S2 would be intended to be coordinated with the existing Hart Island Ferry Service schedule. The travel time between the Pelham Bay Park 6 Train Station and the Fordham Street Pier (with a stop at Orchard Beach Parking Lot) is approximately 24 minutes (5.4 miles) at a worst case during the summer months, and therefore, a single shuttle bus could drop-off visitors departing for and returning back from Hart Island for both the 9:00 AM and 12:00 PM trips. A possible shuttle service schedule can be found in the Service Plan Alternatives Summaries in *Appendix J.*

*Travel Time Savings/Changes*

Total travel time was calculated for Service Plan Alternative S2, to determine the effect on travel times compared to the existing condition. Total travel time under Service Plan Alternative S2 includes public transit travel time to Pelham Bay Park Station, shuttle wait time, shuttle travel time from Pelham Bay Park Station to Fordham Street Pier (with a stop at Orchard Beach Parking Lot), and ferry travel time from City Island to Hart Island. Shuttle wait time represents the amount of time between a passenger's arrival time at Pelham Bay Park Station and passenger loading onto the shuttle and ranged from 3 to 19 minutes depending on the time passengers arrived at Pelham Bay Park Station. The shuttle travel time from Pelham Bay Park Station to Fordham Street Pier is approximately 24 minutes, which includes one minute of dwell time at Pelham Bay Park Station, one minute of dwell time for passenger loading at Orchard Beach Parking Lot, and one minute of dwell time for passenger unloading at Fordham Street Pier.

Travel times by car are estimated to be the same for Service Plan Alternatives 1 and 2, with an increase of total travel time by approximately 14 minutes. However, public transit trips from all trip origins under Service Plan Alternative S2 would likely decrease in travel time when compared to the existing conditions, with the exception of public transit trips originating from Nassau County, Connecticut, and New Jersey, as shown on *Table* 8 below. Public transit trips from these three origin locations would continue to use the existing trip route and travel directly to Fordham Street Pier to board the ferry to Hart Island, as denoted in the right most column on *Table 8*. For trips originating in the NYC Boroughs, visitors arriving by public transit are likely to experience an average decrease in travel time of approximately 18 minutes compared to the existing conditions. In addition, for trips originating in the Bronx origin zip code, visitors arriving by public transit are likely to experience a decrease in travel time of approximately 21 minutes compared to existing conditions. This significant reduction in travel time for trips originating in the Bronx origin zip code is due to the reduced passenger wait times between public transit transfers with the implementation of the shuttle service from Pelham Bay Park Station to Fordham Street Pier.

***Table 8 – Service Plan Alternative S2 Total Travel Time Comparison for a Saturday***

| Origin (Center of Population Zip Code) | Transit | | | |
|---|---|---|---|---|
| | Existing Travel Time[1] (Minutes) | Future Alternative S2 Travel Time[1] (Minutes) | Difference in Travel Time (Minutes) | Shuttle Service Utilized for Fastest Route? (Y/N) |
| Bronx (10460) | 79 | 58 | -21 | Y |
| Manhattan (10021) | 96 | 71 | -25 | Y |
| Brooklyn (11226) | 139 | 118 | -21 | Y |
| Queens (11375) | 119 | 98 | -21 | Y |
| Staten Island (10314) | 151 | 147 | -4 | Y |
| Nassau County, NY (11550) | 175 | 175 | 0 | N |
| Westchester County, NY (10601) | 142 | 115 | -27 | Y |
| Fairfield County, CT (06880) | 141 | 141 | 0 | N |
| Bergen County, NJ (07601) | 132 | 132 | 0 | N |
| **Difference in Travel Time:** | **Range** | | **-27 - 0** | |
| | **Average** | | **-13** | |
| **Difference in Travel Time: (NYC Only)** | **Range** | | **-25 - -4** | |
| | **Average** | | **-18** | |

Notes:

[1]Minimum travel time was used for this comparison, for origin locations that have more than one typical transit route alternative to travel to Hart Island.

*Costs*

The proposed shuttle bus service is assumed to be provided by a third-party operator which charges an hourly rate for the service, and the hours of operation of the shuttle bus for both the alternatives would be the same. Although the proposed shuttle bus route in Service Plan Alternative S2 would travel a greater distance and make additional stops compared to Service Plan Alternative S1, the operating and maintenance costs would be similar. The operating and maintenance cost for Service Plan Alternative S2 is estimated at $50,880 per year.

*Advantages/Disadvantages*

Service Plan Alternative S2 would serve visitors arriving by car and public transit, as the shuttle bus stop at Pelham Bay Park Subway Station would provide an alternative to visitors arriving by public transit and the shuttle bus stop at the Orchard Beach Parking Lot would provide an alternative to visitors arriving by car. The existing MTA bus schedule is not coordinated with the existing ferry service to Hart Island, which incurs a dramatic increase in passenger waiting time from when the existing MTA bus arrives at Fordham Street Pier to when the existing ferry departs to Hart Island. The proposed shuttle bus service would be coordinated with the ferry service to Hart Island and eliminate the passenger waiting time, dramatically reducing public transit travel times from Pelham Bay Park and incentivizing visitors to travel via public transit. Similar to Service Plan Alternative S1, Service Plan Alternative S2 provides visitors arriving by car a dedicated location to park at the Orchard Beach Parking Lot, reducing parking demand generated by Hart Island visitors at Fordham Street Pier, and reducing traffic activity on City Island.

In terms of disadvantages, the Orchard Beach Parking Lot currently has a parking fee of $8-$10 per vehicle during the summer season (with free parking outside of the summer season), however, the parking lot is a NYC Parks concession and waiving fees for Hart Island visitors might be possible.

## C. Service Plan Alternative M1 – Stand-Alone Hart Island Ferry

*Description of Alternative*

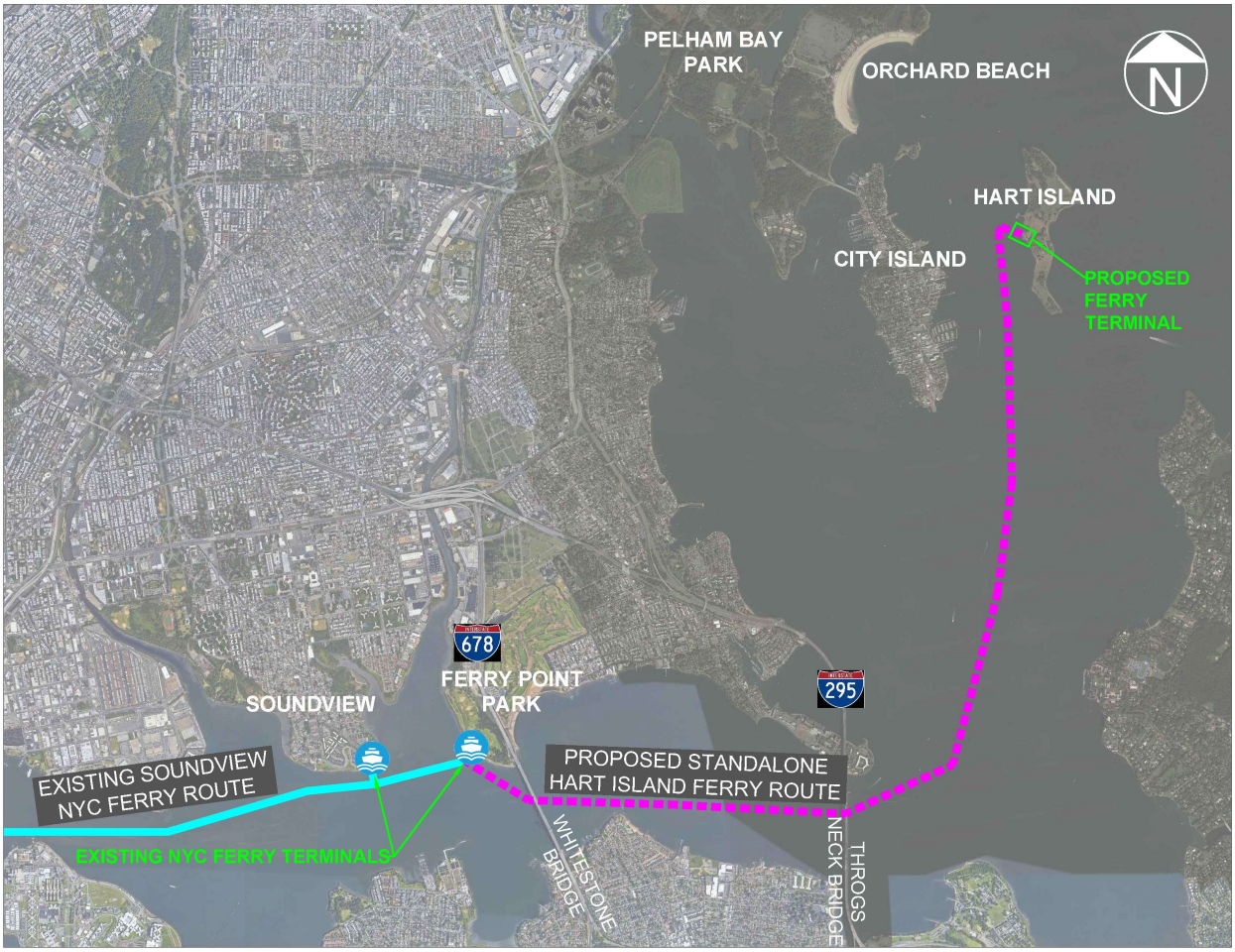
Service Plan Alternative M1 is a medium-term alternative that proposes to implement a new stand-alone ferry service from the existing Ferry Point Park NYC Ferry terminal to a new ferry terminal on Hart Island, providing a connection to the existing NYC Ferry Soundview route. The proposed stand-alone ferry service route is shown on *Figure 52* below. As shown, the new standalone service would serve as an extension of the Soundview route, however, a transfer between the existing NYC Ferry service to Ferry Point Park and the new standalone Hart Island Ferry would be required at Ferry Point Park. On Hart Island, a new terminal proposed in Terminal Conceptual Alternatives 2, 3 or 4 discussed earlier in this report would be required to serve the standalone ferry service. While Service Plan Alternative M1 does not include service to City Island, the improvements proposed would not preclude the existing ferry service from City Island from serving Hart Island.

Under Service Plan Alternative M1, visitors arriving by car could either park at the public parking lot at Ferry Point Park or park at off-street parking garages located near the NYC Ferry Soundview stops in Manhattan and use the Soundview ferry service to reach Ferry Point Park. There is potential for the Ferry Point Park Parking Lot to be highly utilized during the summer months. Visitors arriving by public transit would take a train, subway, bus and/or ferry to one of the existing ferry terminals along the NYC Ferry Soundview route (Soundview, East 90$^{th}$ Street, East 34$^{th}$ Street, Stuyvesant Cove, Wall Street/Pier 11), take the NYC Ferry to Ferry Point Park, and transfer to the stand-alone ferry service to Hart Island. As mentioned previously, the East 34$^{th}$ Street and Wall Street/Pier 11 ferry terminals provide a connection to other NYC ferry routes (Astoria, East River, Rockaway, South Brooklyn) that provide service to other NYC boroughs.

*Schedule*

As stated previously, potential schedules for the ferry service were developed to calculate the operating and maintenance costs as well as inform travel time calculations associated with each service plan alternative. The new service is proposed to be coordinated with the current NYC Ferry Soundview schedule. As the Ferry Point Park Ferry terminal has two ferry docking ports, the stand-alone ferry is proposed to arrive before and depart after the NYC Ferry at Ferry Point Park to minimize ferry wait times while passengers transfer from the Soundview ferry to the standalone Hart Island ferry. For cost estimating purposes, the new stand-alone ferry service is proposed to run from 9 AM to 4:30 PM on two weekend days per month, alternative Saturday and Sunday, with limited service (once per month) provided during the colder months of the year, January through March. A possible ferry service schedule can be found in the Service Plan Alternatives Summaries in *Appendix J.*

***Figure 52 – Service Plan Alternative M1 Stand-Alone Hart Island Ferry***




*Travel Time Savings/Changes*

Total travel time was calculated for Service Plan Alternative M1, to determine the effect on travel times compared to the existing condition. For visitors arriving by car, travel times were calculated based on the following assumptions:

- It was assumed that all car trips would travel to and park at the parking lot at Ferry Point Park.
- Total travel time includes the approximate 10-minute walk from the Ferry Point Park Parking Lot to the Ferry Point Park ferry terminal.
- Total travel time includes the stand-alone ferry travel time from Ferry Point Park to Hart Island of approximately 17 minutes.

For visitors arriving by public transit, travel times were calculated based on the following assumptions:

- Total travel time includes five minutes to transfer from the NYC Soundview Ferry to the stand-alone Hart Island ferry at the Ferry Point Park terminal. All public transit riders would utilize the NYC Ferry Soundview service to reach the Ferry Point Park terminal.
- Total Travel Time includes the stand-alone ferry travel time from Ferry Point Park to Hart Island of approximately 17 minutes.

As shown on *Table 9* below, visitors arriving by car are anticipated to experience an increase in travel time under Service Plan Alternative M1 when compared to the existing conditions. For trips originating in the NYC Boroughs, visitors arriving by car are anticipated to experience an increase in travel time of approximately 8 minutes. For trips originating in the Bronx origin zip code, visitors arriving by car are anticipated to experience an increase in travel time of approximately 6 minutes. For visitors arriving by public transit, all travel times are anticipated to be reduced under Service Plan Alternative M1 when compared to existing conditions, with the exception of the trips originating from Staten Island and Connecticut. For trips originating in the NYC Boroughs, visitors arriving by public transit are anticipated to experience a decrease in travel time of approximately 15 minutes compared the existing conditions. For trips originating in the Bronx origin zip code, visitors arriving by public transit are anticipated experience a decrease in travel time of approximately 10 minutes compared to existing conditions.

***Table 9 – Service Plan Alternative M1 Total Travel Time Comparison for a Saturday***

| Origin (Center of Population Zip Code) | Car | | | Transit | | |
|---|---|---|---|---|---|---|
| | Existing Travel Time (Minutes) | Future Alternative M1/L1 Travel Time (Minutes) | Difference in Travel Time (Minutes) | Existing Travel Time[1] (Minutes) | Future Alternative M1/L1 Travel Time[1] (Minutes) | Difference in Travel Time (Minutes) |
| Bronx (10460) | 37 | 43 | +6 | 79 | 69 | -10 |
| Manhattan (10021) | 57 | 62 | +5 | 96 | 71 | -25 |
| Brooklyn (11226) | 87 | 97 | +10 | 139 | 114 | -25 |
| Queens (11375) | 42 | 51 | +9 | 119 | 106 | -13 |
| Staten Island (10314) | 77 | 87 | +10 | 151 | 151 | 0 |
| Nassau County, NY (11550) | 57 | 67 | +10 | 175 | 174 | -1 |
| Westchester County, NY (10601) | 47 | 67 | +20 | 142 | 135 | -7 |
| Fairfield County, CT (06880) | 67 | 82 | +15 | 141 | 159 | +18 |
| Bergen County, NJ (07601) | 57 | 62 | +5 | 132 | 123 | -9 |
| **Difference in Travel Time:** | | **Range** | **+5 - +20** | | **Range** | **-25 - +18** |
| | | **Average** | **+10** | | **Average** | **-8** |
| **Difference in Travel Time: (NYC Only)** | | **Range** | **+5 - +10** | | **Range** | **-25 - 0** |
| | | **Average** | **+8** | | **Average** | **-15** |

Notes:

[1]Minimum travel time was used for this comparison, for origin locations that have more than one typical transit route alternative to travel to Hart Island.

*Costs*

The cost estimate for Service Plan Alternative M1 includes capital costs for new terminals and annual operations and maintenance costs for the new ferry operations. The capital costs would be dependent on the Hart Island Terminal Conceptual Alternative selected. As discussed previously, capital costs for Terminal Conceptual Alternative 2, Terminal Conceptual Alternative 3, and Terminal Conceptual Alternative 4 were estimated at $19.6M, $28.9M, and $25.7M, respectively.

For cost estimating purposes, a third-party operator was assumed to charter a vessel for the standalone ferry service. However, third-party operation is not required for Service Plan Alternative M1, and a standalone ferry service could be provided by a city agency.

The annual operations and maintenance costs for Service Plan Alternative M1 include the following:

- Vessel Moorage – based on a $285/ft per year for a 61 ft vessel at Liberty Harbor Marina
- Office and Administration
- Vessel Lease (Third-Party Operator) - based on lease cost of $1,500/hr provided by NYCEDC for a third-party ferry charter

- Terminal Operations and Maintenance Costs

The annual operations and maintenance costs associated with Service Plan Alternative M1 is $557,185 per year. Complete cost estimates with detailed breakdowns are provided in *Appendix I*.

*Advantages/Disadvantages*

Under Service Plan Alternative M1, public transit access is improved as the new connection at the Ferry Point Park NYC Ferry terminal greatly expands the number of public transit connections to NYCT buses, subways, and other NYC Ferry routes from other NYC Ferry terminals on the Soundview route. Service Plan Alternative M1 does not require any changes to be made to the NYC Ferry Soundview schedule. In addition, visitors arriving by public transit experience significant reduction in travel times when compared to existing conditions. Furthermore, Service Plan Alternative M1 provides visitors arriving by car several off-street parking options, including the Ferry Point Park Parking Lot and public off-street parking lots at E 90$^{th}$ Street, E 34$^{th}$ Street, and Wall Street/Pier 11. By providing an alternative ferry departure location to Hart Island, parking demand and traffic activity generated by Hart Island visitors at Fordham Street Pier would be reduced.

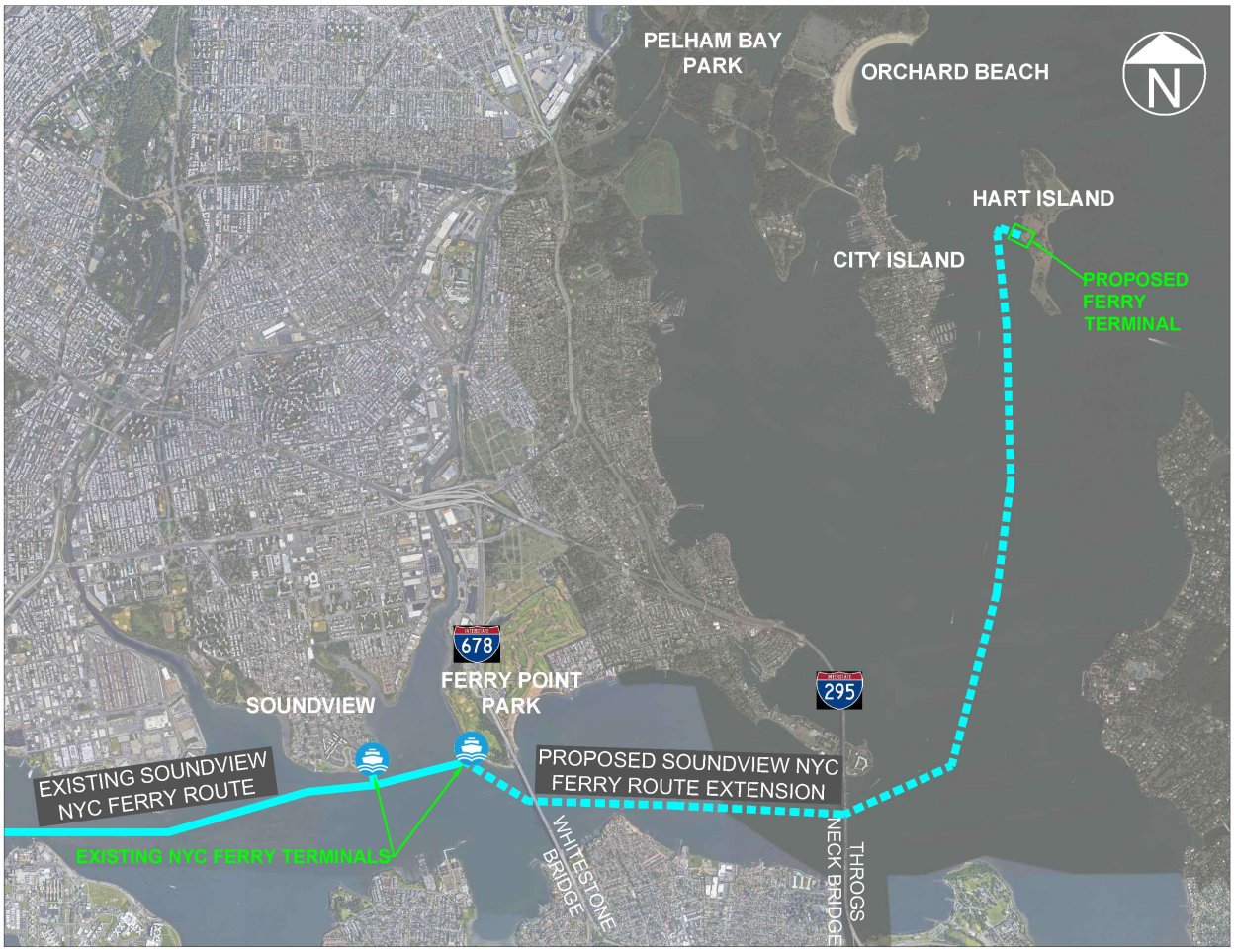
In terms of disadvantages, Service Plan Alternative M1 requires a transfer at Ferry Point Park, and visitors arriving by car may experience an increase in travel time compared to existing conditions. Note, Service Plan Alternative M1 may trigger a need for a City Environmental Quality Review (CEQR) to be conducted as the proposal would shift trips from the Fordham Street Pier to new locations along the NYC Ferry Soundview route. From a transportation perspective, a travel demand forecast based on the future use of Hart Island would be required to determine the magnitude and route of new trips to Hart Island. Additionally, parking utilization studies would likely be required at parking lots and/or garages and on-street near NYC Ferry Soundview terminals which were forecasted to experience a significant increase in private automobile trips. However, the determination of the extent of environmental review and supplementary transportation studies required for Service Plan Alternative M1 is outside the scope of this study.

## D. Service Plan Alternative M2 –NYC Ferry Service Extension to Hart Island

*Description of Alternative*

Service Plan Alternative M2 is a medium-term alternative that proposes to extend the NYC Ferry Soundview route from Ferry Point Park to a new ferry terminal on Hart Island. The proposed extension of the NYC Ferry Soundview route is shown on *Figure 53* below. Note, the existing NYC Ferry Soundview route starts at the Wall Street/ Pier 11 terminal in Manhattan and ends at the Ferry Point Park terminal in the Bronx. The extended service would require an additional NYC Ferry vessel to operate on days Hart Island service is provided, in order to maintain existing headways of the NYC Ferry Soundview service. On Hart Island, a new terminal as envisioned in Terminal Concept Alternatives 2, 3 or 4 discussed earlier in this report would be required to serve the NYC Ferry service. While Service Plan Alternative M2 does not include service to City Island, the improvements proposed would not preclude ferry service from also stopping at City Island in addition to Hart Island with necessary infrastructure improvements.

***Figure 53 – Service Plan Alternative M2 NYC Ferry Service Extension to Hart Island***




Under Service Plan Alternative M2, visitors arriving by car could either park at the public parking lot at Ferry Point Park or park at off-street parking garages located near the NYC Ferry Soundview stops in Manhattan and use the Soundview ferry service extension to reach Hart Island. Visitors arriving by public transit would take a train, subway, bus and/or ferry to one of the existing ferry terminals along the NYC Ferry Soundview route (Soundview, East 90th Street, East 34th Street, Stuyvesant Cove, Wall Street/Pier 11), and take a single ferry ride to Hart Island. As mentioned previously, the East 34th Street and Wall Street/Pier 11 ferry terminals provide a connection to other NYC Ferry routes (Astoria, East River, Rockaway, South Brooklyn) that provide service to other NYC boroughs.

*Schedule*

As stated previously, potential schedules for the ferry service were developed to calculate the operating and maintenance costs as well as inform travel time calculations associated with each service plan alternative. The new service is proposed to be coordinated with the current NYC Ferry Soundview schedule. For cost estimating purposes, the NYC Ferry Soundview service extension is proposed to run between 9 AM and 4:15 PM on two weekend days per month, alternating Saturday and Sunday, with limited service (once a month) provided during the colder months of the year, January through March. The monthly frequency of service was based on existing service and the stakeholder survey data

collected. A possible ferry service schedule can be found in the Service Plan Alternatives Summaries in *Appendix J.*

*Travel Time Savings/Changes*

Total travel time was calculated for Service Plan Alternative M2, to determine the effect on travel times compared to the existing condition. For visitors arriving by car, travel times were calculated based on the following assumptions:

- It was assumed that all car trips would travel to and park at the parking lot at Ferry Point Park.
- Total travel time includes the approximate 10-minute walk from The Ferry Point Park Parking Lot to the Ferry Point Park ferry terminal.
- Total travel time includes the NYC Ferry travel time from Ferry Point Park to Hart Island of approximately 17 minutes.

For visitors arriving by public transit, travel times were calculated based on the following assumptions:

- Total travel time includes public transit travel time to an existing ferry terminal along the NYC Ferry Soundview route.
- Total travel time includes ferry wait time (amount of time between a passenger's arrival at the NYC ferry terminal and ferry departure), which was calculated based on existing public transit schedules and the proposed NYC Ferry Soundview schedule for a Saturday.
- Total travel time includes the NYC Ferry travel time from origin NYC Ferry terminal along the Soundview route to Hart Island.

As shown on *Table 10* below, visitors arriving by car are anticipated to experience an increase in travel time under Service Plan Alternative M2 when compared to the existing conditions. For trips originating in the NYC Boroughs, visitors arriving by car are anticipated to experience an increase in travel time of approximately 8 minutes. For trips originating in the Bronx origin zip code, visitors arriving by car are anticipated to experience an increase in travel time of approximately 10 minutes. For visitors arriving by public transit, all travel times are anticipated to be reduced under Service Plan Alternative M2 when compared to existing conditions, with the exception of the trips originating from Staten Island and Connecticut. For trips originating in the NYC Boroughs, visitors arriving by public transit are anticipated to experience a reduction in travel time of approximately 20 minutes compared the existing conditions. For trips originating in the Bronx origin zip code, visitors arriving by public transit are anticipated to experience a reduction in travel time of approximately 23 minutes compared to existing conditions.

***Table 10 – Service Plan Alternative M2 Total Travel Time Comparison for a Saturday***

| Origin (Center of Population Zip Code) | Car | | | Transit | | |
|---|---|---|---|---|---|---|
| | Existing Travel Time (Minutes) | Future Alternative M2/L2 Travel Time (Minutes) | Difference in Travel Time (Minutes) | Existing Travel Time[1] (Minutes) | Future Alternative M2/L2 Travel Time[1] (Minutes) | Difference in Travel Time (Minutes) |
| Bronx (10460) | 37 | 43 | +6 | 79 | 56 | -23 |
| Manhattan (10021) | 57 | 62 | +5 | 96 | 68 | -28 |
| Brooklyn (11226) | 87 | 97 | +10 | 139 | 115 | -24 |
| Queens (11375) | 42 | 51 | +9 | 119 | 96 | -23 |
| Staten Island (10314) | 77 | 87 | +10 | 151 | 151 | 0 |
| Nassau County, NY (11550) | 57 | 67 | +10 | 175 | 159 | -16 |
| Westchester County, NY (10601) | 47 | 67 | +20 | 142 | 120 | -22 |
| Fairfield County, CT (06880) | 67 | 82 | +15 | 141 | 157 | +16 |
| Bergen County, NJ (07601) | 57 | 62 | +5 | 132 | 117 | -15 |
| **Difference in Travel Time:** | | **Range** | **+5 - +20** | | **Range** | **-28 - +16** |
| | | **Average** | **+10** | | **Average** | **-15** |
| **Difference in Travel Time: (NYC Only)** | | **Range** | **+5 - +10** | | **Range** | **-28 - 0** |
| | | **Average** | **+8** | | **Average** | **-20** |

Notes:

[1]Minimum travel time was used for this comparison, for origin locations that have more than one tyical transit route alternative to travel to Hart Island.

*Costs*

The cost estimate for Service Plan Alternative M2 includes capital costs for new terminals, capital cost for a new vessel, and annual operations and maintenance costs for the new ferry operations. The capital costs would be dependent on the Hart Island Terminal Conceptual Alternative selected. As discussed previously, capital costs for Terminal Conceptual Alternative 2, Terminal Conceptual Alternative 3, and Terminal Conceptual Alternative 4 were estimated at $19.6M, $28.9M, and $25.7M, respectively. As an additional vessel would be required to extend the Soundview ferry route to Hart Island and maintain existing headways, the capital cost for an additional NYC Ferry vessel was estimated at $5.8M.

The annual operations and maintenance costs for Service Plan Alternative M2 include the following:

- Labor
- Fuel and Lubricants
- Vessel Maintenance and Repair
- Vessel Moorage – based on Vessel Holding Fee provided by NYCEDC
- Insurance – 20% of operating costs
- Office and Administration
- Terminal Operations and Maintenance Costs

The annual operations and maintenance costs associated with Service Plan Alternative M2 is $576,465. Complete cost estimates with detailed breakdowns are provided in *Appendix I*.

*Advantages/Disadvantages*

Similar to Service Plan Alternative M1, public transit access is improved as the extension of the NYC Ferry Soundview route greatly expands the number of public transit connections to NYCT buses, subways, and other NYC Ferry routes from other NYC Ferry terminals on the Soundview route. In addition, visitors arriving by public transit experience significant reduction in travel times when compared to existing conditions. Furthermore, Service Plan Alternative M2 provides visitors arriving by car several off-street parking options, including the Ferry Point Park Parking Lot and public off-street

parking lots at E 90th Street, E 34th Street, and Wall Street/Pier 11. By providing alternative ferry departure locations to Hart Island, parking demand and traffic activity generated by Hart Island visitors at Fordham Street Pier would be reduced. In addition, a ferry transfer at Ferry Point Park ferry terminal is not required under Service Plan Alternative M2, as the NYC Ferry Soundview Ferry service is extended to Hart Island.

In terms of disadvantages, Service Plan Alternative M2 requires an additional NYC Ferry vessel to operate on days Hart Island service is provided to maintain existing headways of the NYC Ferry Soundview service. In addition, Service Plan Alternative M2 requires modifications to the NYC Ferry Soundview weekend schedule during days where the ferry route is extended to Hart Island. Note, Service Plan Alternative M2 may trigger a need for a City Environmental Quality Review (CEQR) to be conducted as the proposal would shift trips from the Fordham Street Pier to new locations along the NYC Ferry Soundview route. From a transportation perspective, a travel demand forecast based on the future use of Hart Island would be required to determine the magnitude and route of new trips to Hart Island. Additionally, parking utilization studies would likely be required at parking lots and/or garages and on-street near NYC Ferry Soundview terminals which were forecasted to experience a significant increase in private automobile trips. However, the determination of the extent of environmental review and supplementary transportation studies required for Service Plan Alternative M2 is outside the scope of this study.

## E. Service Plan Alternative L1 – Standalone Hart Island Ferry

*Description of Alternative*

Service Plan Alternative L1 is a long-term alternative that proposes similar improvements as Service Plan Alternative M1, however, proposes to increase levels of service dependent upon future usage. Service Plan Alternative L1 proposes to implement a new stand-alone ferry service from the existing Ferry Point Park NYC Ferry terminal to a new ferry terminal on Hart Island, providing a connection to the existing NYC Ferry Soundview route.

*Schedule*

As stated previously, potential schedules for the ferry service were developed to calculate the operating and maintenance costs as well as inform travel time calculations associated with each service plan alternative. The new service is proposed to be coordinated with the current NYC Ferry Soundview schedule. As the Ferry Point Park Ferry terminal has two ferry docking ports, the stand-alone ferry is proposed to arrive before and depart after the NYC Ferry at Ferry Point Park to minimize ferry wait times while passengers transfer from the Soundview ferry to the standalone Hart Island ferry. For cost estimating purposes, the new stand-alone ferry service is proposed to run from 9 AM to 4:30 PM on two days per week, one weekday and one weekend day. During the colder months of the year (January through March), the proposed the new stand-alone ferry service will provide limited service and only run twice per month. The monthly frequency of service was based on existing service and the stakeholder survey data collected. A possible ferry service schedule can be found in the Service Plan Alternatives Summaries in *Appendix J.*

*Travel Time Savings/Changes*

Total travel times for trips under Service Plan Alternative L1 are expected to be similar to the travel times experienced under Service Plan Alternative M1, for a typical Saturday.

*Costs*

The cost estimate for Service Plan Alternative L1 includes capital costs for new terminals and annual operations and maintenance costs for the new ferry operations. The capital costs would be dependent on the Hart Island Terminal Conceptual Alternative selected. As discussed previously, capital costs for Terminal Conceptual Alternative 2, Terminal Conceptual Alternative 3, and Terminal Conceptual Alternative 4 were estimated at $19.6M, $28.9M, and $25.7M, respectively.

For cost estimating purposes, a third-party operator was assumed to charter a vessel for the stand-alone ferry service. However, third-party operation is not required for this alternative and a standalone ferry service could be provided by a city agency.

The annual operations and maintenance costs for this alternative include the following:

- Vessel Moorage – based on a $285/ft per year for a 61 ft vessel at Liberty Harbor Marina
- Office and Administration
- Vessel Lease (Third-Party Operator) - based on lease cost of $1,500/hr provided by NYCEDC for a third-party ferry charter
- Terminal Operations and Maintenance Costs

The annual operations and maintenance costs associated with Medium-term Alternative M1 is $1.5M per year. Complete cost estimates with detailed breakdowns are provided in *Appendix I*.

*Advantages/Disadvantages*

Service Plan Alternative L1 would have similar advantages and disadvantages as discussed under Service Plan Alternative M1. Similarly, Service Plan Alternative L1 does not require any changes to be made to the existing NYC Ferry Soundview schedule. Note, Service Plan Alternative L1 may trigger a need for a City Environmental Quality Review (CEQR) to be conducted as the proposal would shift trips from the Fordham Street Pier to new locations along the NYC Ferry Soundview route. From a transportation perspective, a travel demand forecast based on the future use of Hart Island would be required to determine the magnitude and route of new trips to Hart Island. Additionally, parking utilization studies would likely be required at parking lots and/or garages and on-street near NYC Ferry Soundview terminals which were forecasted to experience a significant increase in private automobile trips. However, the determination of the extent of environmental review and supplementary transportation studies required for Service Plan Alternative L1 is outside the scope of this study.

## F. Service Plan Alternative L2 –NYC Ferry Service Extension to Hart Island

*Description of Alternative*

Service Plan Alternative L2 is a long-term alternative that proposes similar improvements as Service Plan Alternative M2, however, suggests increasing levels of service dependent upon future usage. Service

Plan Alternative L2 proposes to extend the NYC Ferry Soundview route from Ferry Point Park to a new ferry terminal on Hart Island.

*Schedule*

As stated previously, potential schedules for the ferry service were developed to calculate the operating and maintenance costs as well as inform travel time calculations associated with each service plan alternative. The new service is proposed to be coordinated with the current NYC Ferry Soundview schedule. For cost estimating purposes, the NYC Ferry Soundview service extension is proposed to run from 9 AM to 4:15 PM on two days per week, one weekday and one weekend day. During the colder months of the year (January through March), the proposed NYC Ferry Soundview service extension will provide limited service and only run twice per month. The monthly frequency of service was based on existing service and the stakeholder survey data collected. A possible ferry service schedule can be found in the Service Plan Alternatives Summaries in *Appendix J.*

*Travel Time Savings/Changes*

Total travel times for trips under Service Plan Alternative L2 are expected to be similar to the travel times experienced under Service Plan Alternative M2, for a typical Saturday.

*Costs*

The cost estimate for Service Plan Alternative L2 includes capital costs for new terminals, capital cost for a new vessel, and annual operations and maintenance costs for the new ferry operations. The capital costs would be dependent on the Hart Island Terminal Conceptual Alternative selected. As discussed previously, capital costs for Terminal Conceptual Alternative 2, Terminal Conceptual Alternative 3, and Terminal Conceptual Alternative 4 were estimated at $19.6M, $28.9M, and $25.7M, respectively. As an additional vessel would be required to extend the Soundview ferry route to Hart Island and maintain existing headways, the capital cost for an additional NYC Ferry vessel was estimated at $5.8M.

The annual operations and maintenance costs for Service Plan Alternative L2 include the following:

- Labor
- Fuel and Lubricants
- Vessel Maintenance and Repair
- Vessel Moorage – based on Vessel Holding Fee provided by NYCEDC
- Insurance – 20% of operating costs
- Office and Administration
- Terminal Operations and Maintenance Costs

The annual operations and maintenance costs associated with Service Plan Alternative L2 is $1.0M. Complete cost estimates with detailed breakdowns are provided in *Appendix I*.

*Advantages/Disadvantages*

Service Plan Alternative L2 would have similar advantages and disadvantages as discussed under Service Plan Alternative M2. Similarly, Service Plan Alternative L2 would require an additional NYC Ferry vessel to operate on days Hart Island service is provided to maintain existing headways of the NYC Ferry Soundview service. In addition, Service Plan Alternative M2 would require modifications to the NYC

Ferry Soundview weekday and weekend schedule during days where the ferry route is extended to Hart Island. Note, Service Plan Alternative L2 may trigger a need for a City Environmental Quality Review (CEQR) to be conducted as the proposal would shift trips from the Fordham Street Pier to new locations along the NYC Ferry Soundview route. From a transportation perspective, a travel demand forecast based on the future use of Hart Island would be required to determine the magnitude and route of new trips to Hart Island. Additionally, parking utilization studies would likely be required at parking lots and/or garages and on-street near NYC Ferry Soundview terminals which were forecasted to experience a significant increase in private automobile trips. However, the determination of the extent of environmental review and supplementary transportation studies required for Service Plan Alternative L2 is outside the scope of this study.

# X. CONCLUSIONS

This report concludes the Hart Island Transportation Study. In summary, this report provides analyses and investigations to define existing conditions, including an assessment of landside transportation alternatives to reach the Fordham Street Pier on City Island, a discussion on parking utilization studies conducted on City Island and the Orchard Beach Parking Lot in Pelham Bay Park, a discussion on the results of the visitor origin survey, and a summary of the inspection and surveying work conducted for ferry infrastructure and sea-bed topology. In addition, this report provides an assessment of existing and potential new ferry departure points in terms of landside transportation accessibility, an assessment of ferry terminal concept designs including infrastructure improvements at existing terminals and construction of new terminals at existing facilities. A community and stakeholder outreach effort was performed including a Visitor Trip Origin and Stakeholder survey and two public meetings to obtain public input on the conceptual alternatives and address questions and concerns on the study.

Four Terminal Conceptual Alternatives and six Service Plan Alternatives were developed to provide short-, medium-, and long-term solutions to provide improved transportation access to Hart Island. A summary table of the Terminal Conceptual Alternatives including timeline, description, benefits and challenges, and cost estimations is shown in *Table 2* included in the Executive Summary of this report. While Terminal Conceptual Alternatives 2, 3, and 4 each have their respective benefits and challenges, a new NYC Ferry Terminal at Hart Island will require an electrical power source, highlighting a potential feasibility issue and consideration for future plans on Hart Island.

In addition, this report provides an evaluation of service plan alternatives for ferry and shuttle bus operations under the future proposed service plan alternatives including travel time comparisons and cost implications. A summary table of the Service Plan Alternatives including timeline, description, benefits and challenges, cost estimations, and travel time comparisons is shown in *Table 3*, included in the Executive Summary of this report.

Service Plans Alternatives S1 and S2 (shuttle bus) would provide a substantial benefit by providing parking for Hart Island visitors that would not impact City Island on-street parking for a relatively low annual operating and maintenance costs. Service Plan Alternative S2 has further advantages by serving public transit riders in addition to drivers, reduces typical public transit travel times to Hart Island, and has a similar total annual operating and maintenance cost compared to Service Plan Alternative S1.

Service Plan Alternatives M1/L1 & M2/L2 would require considerable capital investment with the construction of a new NYC Ferry compatible terminal at Hart Island, however, these alternatives would

significantly increase the number of public transit alternatives to reach Hart Island by providing a connection to the NYC Ferry Soundview Route. Public transit travel times are anticipated to be reduced compared to the existing condition as well. The Stand-Alone Ferry (Service Plan Alternative M1) and Soundview Route Extension to Hart Island (Service Plan Alternative M2) are estimated to have relatively similar annual operating and maintenance costs, and similar benefits of average travel time reductions for public transit riders. However, Soundview Route Extension (Service Plan Alternative M2/L2) is anticipated to be more cost effective from an annual operating and maintenance cost perspective as service is increased in Long Term Alternative L2, this alternative requires a larger upfront cost to purchase an additional NYC Ferry Vessel to operate along the NYC Ferry Soundview route.

The intention of this report is to be used by NYC agencies for the planning and implementation of potential future transportation improvement projects to increase accessibility to Hart Island. While a specific alternative is not recommended, this report provides a detailed evaluation of potential alternatives to inform future planning decisions for Hart Island.

# Hart Island Transportation Study - Appendices

A. Public Event Summary Documents
B. City Island Bridge ATR Summaries
C. Existing Document Review Summary
D. Visitor Survey (Blank)
E. Survey Results Summary Memo
F. City Island & Hart Island Waterfront Facilities Rapid Level Inspection Report
G. City Island & Hart Island Bathymetric Surveys
H. Terminal Concept Design Narrative and Figures
I. Capital and Operation and Maintenance Detailed Cost Estimates
J. Service Plan Alternatives Summaries
K. Total Travel Time Calculation Tables

# Appendix A

# Public Event Summary Documents

NYC Parks


# HART ISLAND TRANSPORTATION STUDY

PROJECT INTRODUCTION, KICK-OFF, JANUARY 25, 2022
MEETING SUMMARY

## AGENDA

- Project Introduction
- Existing Conditions and Initial Findings
- Questions & Answers
- Understanding Stakeholder Preferences
- Next Steps

## PARTICIPANTS

120+

- **Hart Island Visitors, City Island Residents, Others**
- **City Agencies:** NYC Parks, NYCEDC, NYC DOT, NYC City Council
- **Community Organizations:** CB10, City Island Chambers of Commerce, City Island Rising, City Island Civic Association, Hart Island Project

## OVERVIEW

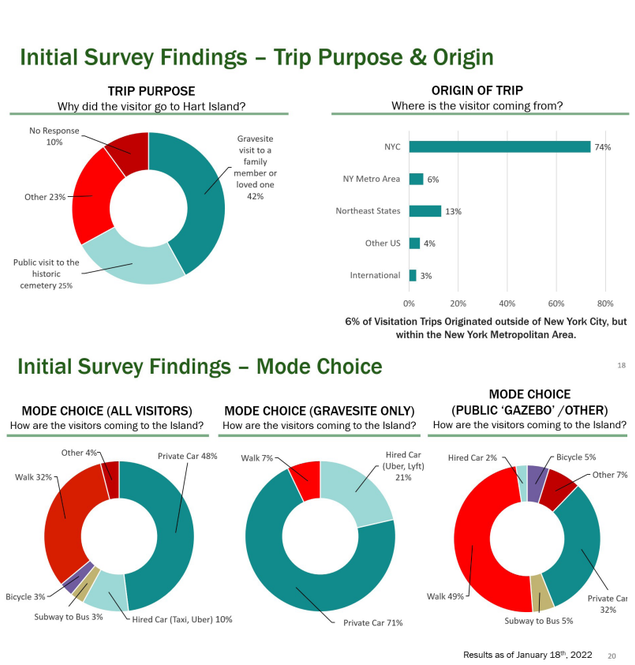
Hart Island holds a special significance for thousands of New Yorkers, serving as the city's active public cemetery. The jurisdiction of Hart Island was recently transferred from the NYC Department of Correction to the NYC Department of Parks and Recreation (NYC Parks). Transportation to Hart Island is limited as the island is currently only accessible by scheduled visits on a ferry from City Island in the Bronx. **A transportation study is being conducted to explore expanding access to Hart Island while preserving its function as a public cemetery.**

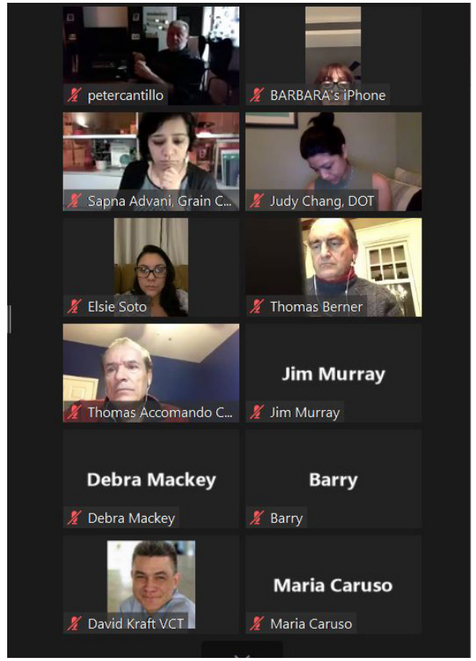
## ENGAGEMENT GOALS

- Introduce the Project and Project Team
- Describe Existing Conditions
- Present Initial Findings of the Survey
- Obtain Public Input

## ENGAGEMENT FORMAT

- Virtual Meeting (Zoom)
- English mode with live interpretation in Spanish




*Screenshot from virtual zoom meeting, presenting initial stakeholder survey findings*

## PROJECT CONTENT AND PARTICIPANT FEEDBACK

Mitchel Loring from NYC Parks kicked off the evening with opening remarks and a brief overview of Hart Island, the scope of the transportation study, and an introduction to the project team. He was joined by the NYC Parks Bronx Borough Commissioner, Iris Rodriguez-Rosa who acknowledged the platform for the community to exchange an open dialogue, share their opinions and give their feedback.

Justin Iwinski, from NV5, began the presentation by sharing the goals of the meeting, followed by a brief project introduction, description of the existing conditions at Hart Island and the purpose of the transportation study. Emphasis was laid on the purpose of the study, which is to study transportation access to Hart Island, assess the conditions of the existing land-side and water-side infrastructure and develop scalable conceptual alternatives for improving transportation access.

The presentation also shared the findings of the initial stakeholder survey conducted in December 2021 and January 2022. The survey findings shared in the presentation were based on 183 responses received as of January 18th 2022. The survey remained open through January 26, 2022.

> *"This particular survey study is simply about transportation. That transportation should in fact make it easier for people who have loved ones on the island be able to visit them with the greatest of ease. That has always been our concern."*
>
> *- Stakeholder Survey Respondent*

In addition to summarizing the statistical data gathered by the survey, the presentation highlighted key stakeholder comments. Some of these include: *"having improved access", "maintaining existing serenity", "the need for public access to be respectful of the cemetery", "to consider locations with increased transit accessibility", "expand beyond reservation only system and to minimize or reduce automobile trips and parking demand".*

## STAKEHOLDER COMMENTS, SUGGESTIONS AND PREFERENCES

In general, the participants responded positively to the presentation and the interactive activities. They understood the scope, and the role of stakeholder input to inform the transportation study. Throughout the event, stakeholders were encouraged to ask questions, and share their needs, concerns, priorities and past experiences.

The engagement event included a live poll component that gave stakeholders an opportunity to share their preferences on topics related to transportation and access to the island, including primary motivation to visit the island, different modes of public transportation, barriers or challenges they may have faced in their experience, and some alternative route options. The poll results were shared live on screen for stakeholders to see responses in real time.

### In summary, top community concerns and priorities included:

**Improved Access**

**Alternate Departure Points**
*Consider locations with increased transit accessibility*

**Freedom of Movement within the Island**
*Public access should be respectful of cemetery context*

**Increased Visiting Times**
*Expand visitation beyond reservation only system*

**Restoration to a Woodland Cemetery**
*Maintain existing serenity*

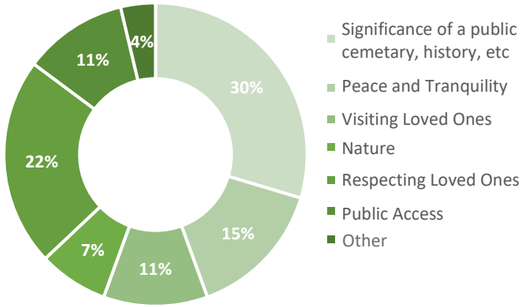
**Traffic and Parking**
*Alternatives should consider City Island residents' quality of life; Minimize or reduce automobile trips and parking demand*

Other stakeholder feedback includes:

> Strategize and implement alternative transportation routes to eliminate concerns regarding traffic, parking, and lack of accessibility. Examples suggested below:
>
> - Build a ferry dock at Orchard beach
> - Use Ferry Point Park ferry service for Hart Island
> - Propose a shuttle service from the train station to Hart Island
> - Consider SUNY Maritime
> - Have inclusive drop off services to individual gravesites on the island
>
> - Recognize the impact on the community members of City Island as part of the study. Learn from past responses from City Islanders at past city council meetings
> - Prioritize family members of those who have their loved ones buried on the island
> - Show respect to the buried at the island and maintain its sanctity as a cemetery
> - Figure out the economic development potential of City Island as well as within the framework of City Island as a special purpose district

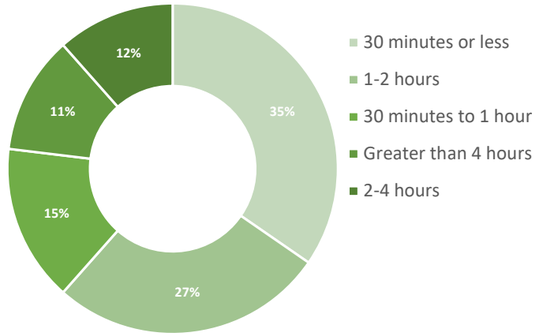
The visuals below depict responses to some of the questions asked during the interactive polls.

*Most valued thing about Hart Island*



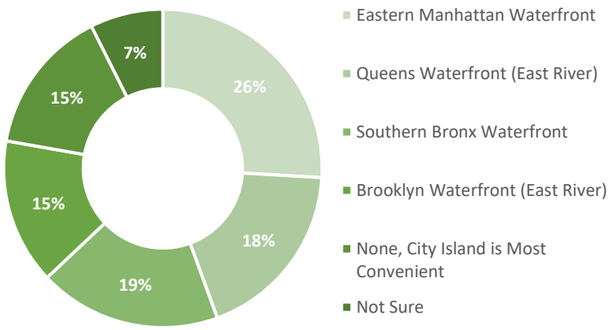

*Majority (20% - 30%) of the participants value the historic significance of the public cemetery and the serenity that it offers*

*Time Taken to get to Hart Island Ferry Terminal*

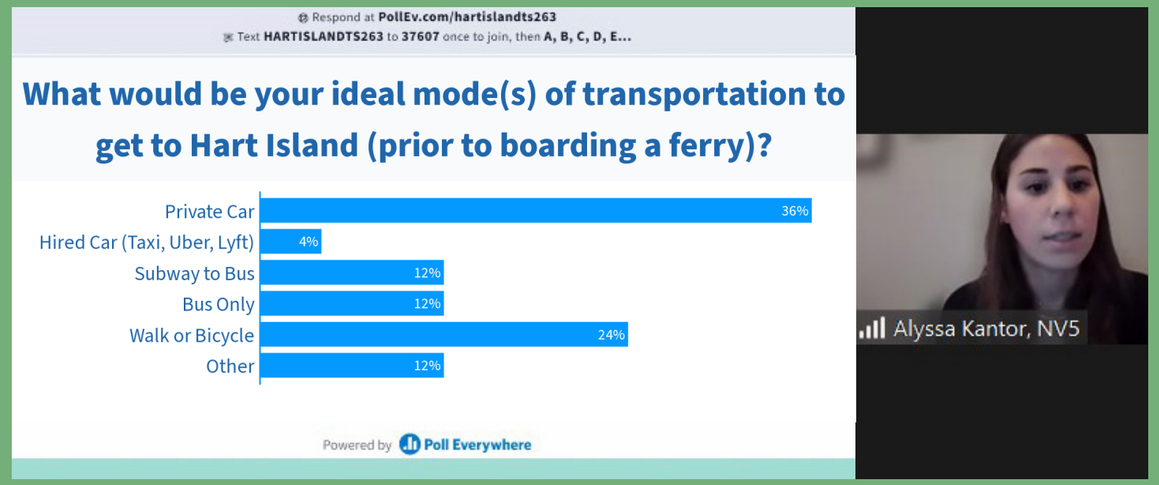



*Majority (35%) of the participants expressed that it takes them 30 minutes or less to get to the ferry terminal. This indicates they travel using a private mode of transport.*

*The most convenient waterfront ferry landing to likely begin the trip*




*Majority (26%) of the participants expressed that the Eastern Manhattan Waterfront would be the most convenient waterfront ferry landing to begin their trip.*


*Screenshot from virtual zoom meeting, presenting the poll responses as viewed live*

## CONCLUSION AND NEXT STEPS

Valuable stakeholder feedback was gathered at the event through robust participation in the polls and the engaging question and answer sessions. The evening's activities were concluded by closing remarks from Justin Iwinski. He shared the next steps of the study and informed participants of a follow up public community meeting in March. Reminders were shared on the approaching deadline of the online survey. Stakeholders were thanked for their enthusiastic participation and were invited to communicate with the project team through the project email address: hartislandstudy@nv5.com

NYC Parks

# HART ISLAND TRANSPORTATION STUDY

## PUBLIC MEETING #2
## CONCEPTUAL ALTERNATIVES

## WEDNESDAY, MARCH 30, 2022
## MEETING SUMMARY

### STUDY DESCRIPTION

NYC Department of Parks and Recreation (NYC Parks) is exploring plans for improving transportation access to Hart Island while preserving its function as a public cemetery.

### MEETING CONTENT

- Recap of Existing Conditions
- Development of Alternatives
- Service Plan Alternatives- Short-Term and Long-Term Solutions
- Public Input

### PARTICIPANTS

**50+**

- **Hart Island Visitors, City Island Residents, Others**
- **City Agencies:**
  NYC Parks, NYCEDC,
  NYC City Council, NYCDOT Ferry Division, HRA
- **Community Organizations:**
  CB10, The Hart Island Project, City Island Chamber of Commerce, City Island Rising, City Island Civic Association, New Yorkers for Parks

## ATTENDANCE OVERVIEW

The meeting was conducted virtually on Zoom, in English. Live interpretation was provided in Spanish however no attendees opted to participate in the Spanish language. The meeting included several polls to gauge the level of project awareness and background amongst the attendees. A little more than half the attendees (54%) participated in the polls.

- 39% of attendees participated in the project survey, conducted from December 2021-January 2022
- 45% of attendees attended the first public meeting held in January 2022

## PROJECT CONTENT

Mitchel Loring from NYC Parks kicked off the evening with opening remarks and a brief overview of Hart Island, the scope of the meeting, and an introduction to the project team. He was joined by the first Deputy Commissioner of the NYC Department of Parks, Ms. Iris Rodriguez-Rosa who acknowledged the platform for the community to exchange an open dialogue, share their opinions and give their feedback on the conceptual alternatives.

Justin Iwinski, from NV5 began the presentation with a brief project recap, as listed below, each of which informed the development of the conceptual service plan alternatives.

- Purpose of the transportation study
- Learnings from the first public meeting held in January
- Learnings from the project survey conducted from December 2021-January 2022



The existing conditions assessment that led to the concept development was shared, including:

- Existing Ferry Terminals (NYC ferry Soundview route, transportation connections)
- Ferry Point Park (Newly opened terminus, weekday shuttle service schedules)
- Soundview (Location, parking options)
- East River Manhattan (Bus and ferry connections, off-street parking facilities)
- Fordham Street Ferry Dock (Key issues with upgrades)

The conceptual Service Plan Alternatives included:

Short-Term Solutions: ***Shuttle Bus Service to serve Hart Island Visitors***

- Shuttle Bus Alternative ***S1: Orchard Beach to Fordham St***
- Shuttle Bus Alternative ***S2: Pelham Bay Park Station to Orchard Beach to Fordham St***

Long-Term Solutions: ***New Passenger Ferry service to Hart Island***

- Hart Island Ferry Service ***L1: Standalone Ferry Service***
- Hart Island Ferry Service ***L2: Integration with NYC Ferry Soundview Route***

To clearly understand each of the above alternatives, each service plan alternative included:

- Background and origination of the alternative
- Performance in different seasons
- Route details with a detailed travel time
- Pros and cons analysis

## STAKEHOLDER COMMENTS, FEEDBACK AND SUGGESTIONS

In general, the participants responded positively to the presentation, and were appreciative of the various alternatives conceptualized. They understood the scope, and the role of stakeholder input to further expand on the four conceptual service alternatives.

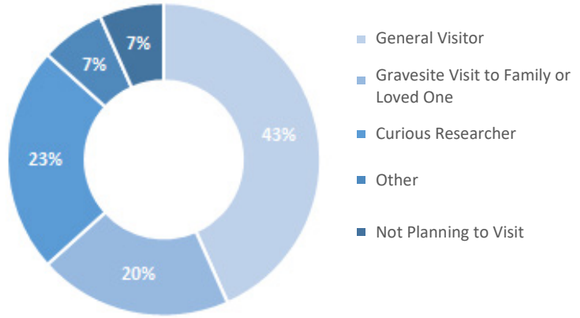
The engagement program included a series of polls to gather stakeholder preferences and two interactive Q&A sessions. NV5, Parks and several other city agency members were in attendance to answer questions. The interactive sessions gave attendees the opportunity to share their preferences and feedback on the overall study and more specifically, the four conceptual alternatives.

### Top community suggestions, comments and concerns include

- Consider an alternative ferry terminal or ferry stop at Orchard Beach to connect to Hart Island. *(For the ease of those traveling from Westchester or the Bronx and even those traveling on the 6th train. In this case it would be ideal for travelers to park their car at this parking lot and then board the ferry)*
- Recognize the needs of elderly visitors on alternatives implemented in the future
- Further advance the study on ferry landing alternatives for residents of City Island
- Consider and propose increased MTA connections to City Island, as it remains the active ferry departure point to Hart Island
- Further advance the alternative that extends the Soundview Ferry *(Connect and aid visitors traveling from Lower Manhattan)*
- Prioritize family members of those who have their loved ones buried on the island
- Explore other long-term alternatives that do not heavily rely on parking *(This would help cater to the majority of the population that visit Hart Island to respect their loved ones and do not own a personal vehicle)*

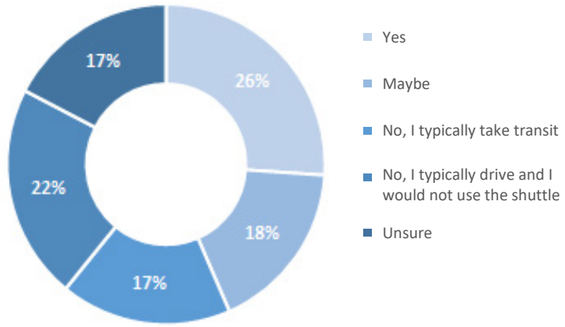
The visuals below depict responses to some of the questions asked during the interactive polls.

*Primary motivation to visit Hart Island*



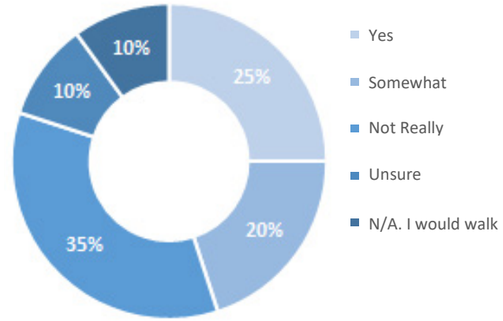

*43% of the participants expressed that they would primarily visit Hart Island as a general visitor. The second motivation (23%) to visit the Island would be a Gravesite visit to family or loved one followed by visits made as a curious researcher (20%).*

*S1: Shuttle Bus service from Orchard Beach to Fordham St*



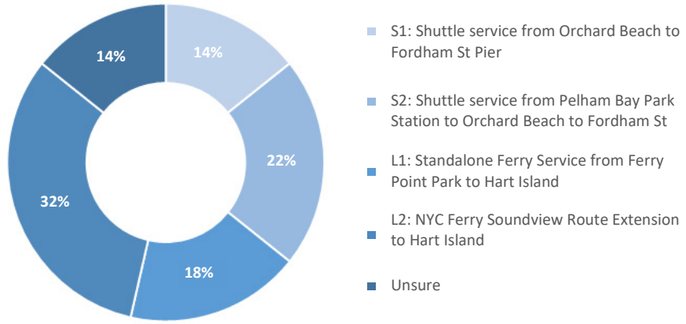

*26% of the participants would use the shuttle bus service from Orchard Beach Parking Lot to Fordham St. Pier on City Island, closely followed by 22% of those that would typically drive and not use the shuttle bus.*

*Addition of a new ferry service from Ferry Point Park to make the trip easier to Hart Island*




*35% of the participants expressed that the addition of a new ferry service from Ferry Point Park would not affect their trip. Closely followed by 20%-25% of those who might benefit from the new ferry service. And, 10% mentioned that they were unsure and would rather prefer walking.*

*Most preferred alternative*




*32% of the participants preferred the L2 alternative which was the extension of NYC Ferry Soundview route to Hart Island. Closely followed by S2, (a shuttle service from Pelham Bay Park Station to Orchard Beach to Fordham St) as the second most preferred alternative (22%).*

## CONCLUSION & NEXT STEPS

Valuable stakeholder feedback was gathered at the event through robust participation in the polls and the engaging question and answer sessions. The evening's activities were concluded by closing remarks from Justin Iwinski. Attendees were reminded that the service alternatives presented that evening were conceptual ideas, and would be forwarded along as a report to the Study Advisory Group (SAG) for review. The report will analyze and take into consideration the stakeholder input gathered throughout the study.

Next steps of the study were shared:

- Conceptual alternatives report provided by NV5 to SAG for review- expected early April
- Final report and presentation by NV5 to the SAG- expected May
- Public final report- June (TBD)

Attendees were thanked for their enthusiastic participation and were invited to communicate with the project team through the project email address: hartislandstudy@nv5.com

# Appendix B

# City Island Bridge ATR Summary Tables

## ATR Count Summary

| | | | | | |
|---|---|---|---|---|---|
| **Project Name:** | Hart Island | | | | |
| **ATR Station/ Site ID:** | A | | | | |
| **Location (Location1):** | City Island Bridge | | | | |
| **From (Location2):** | 0 | | | | |
| **To (Location3):** | 0 | | | | |
| **Borough/ County:** | Bronx | | | | |
| **Direction:** | EB (SB) | | | | |
| **Start Day of Week:** | Wednesday | **Start Date:** | 4/12/17 | **End Date:** | 4/28/17 |
| | | **Start Time:** | 9:15 AM | **End Time:** | 7:45 AM |

**Average Volumes from ATR Count**

| One Hour Interval From - To | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday | 3-Day Average (Tues - Thur) (AWT) | Weekend Average | 7-Day Average (ADT) |
|---|---|---|---|---|---|---|---|---|---|---|
| 12:00 AM - 1:00 AM | 77 | 74 | 64 | 83 | 93 | 202 | 202 | 73 | 202 | 113 |
| 1:00 AM - 2:00 AM | 39 | 43 | 39 | 38 | 44 | 91 | 108 | 40 | 99 | 57 |
| 2:00 AM - 3:00 AM | 23 | 21 | 20 | 27 | 28 | 50 | 70 | 22 | 60 | 34 |
| 3:00 AM - 4:00 AM | 13 | 16 | 16 | 19 | 23 | 36 | 32 | 17 | 34 | 22 |
| 4:00 AM - 5:00 AM | 33 | 24 | 31 | 30 | 36 | 35 | 35 | 28 | 35 | 32 |
| 5:00 AM - 6:00 AM | 59 | 65 | 55 | 66 | 66 | 40 | 26 | 62 | 33 | 54 |
| 6:00 AM - 7:00 AM | 196 | 201 | 179 | 202 | 190 | 103 | 63 | 194 | 83 | 162 |
| 7:00 AM - 8:00 AM | 246 | 208 | 252 | 239 | 241 | 141 | 102 | 233 | 121 | 204 |
| 8:00 AM - 9:00 AM | 231 | 260 | 251 | 260 | 248 | 222 | 180 | 257 | 201 | 236 |
| 9:00 AM - 10:00 AM | 281 | 252 | 238 | 267 | 242 | 297 | 247 | 253 | 272 | 261 |
| 10:00 AM - 11:00 AM | 284 | 297 | 285 | 292 | 324 | 356 | 385 | 291 | 370 | 317 |
| 11:00 AM - 12:00 PM | 398 | 399 | 392 | 400 | 482 | 498 | 632 | 397 | 565 | 457 |
| 12:00 PM - 1:00 PM | 477 | 460 | 434 | 504 | 586 | 652 | 855 | 466 | 753 | 567 |
| 1:00 PM - 2:00 PM | 491 | 480 | 453 | 482 | 622 | 715 | 922 | 471 | 818 | 595 |
| 2:00 PM - 3:00 PM | 484 | 504 | 474 | 560 | 722 | 693 | 968 | 512 | 831 | 629 |
| 3:00 PM - 4:00 PM | 563 | 546 | 553 | 611 | 725 | 715 | 924 | 570 | 819 | 662 |
| 4:00 PM - 5:00 PM | 593 | 553 | 557 | 625 | 780 | 804 | 880 | 578 | 842 | 684 |
| 5:00 PM - 6:00 PM | 641 | 578 | 619 | 685 | 818 | 758 | 788 | 627 | 773 | 698 |
| 6:00 PM - 7:00 PM | 609 | 594 | 677 | 700 | 881 | 798 | 803 | 657 | 800 | 723 |
| 7:00 PM - 8:00 PM | 540 | 515 | 607 | 635 | 819 | 716 | 746 | 586 | 731 | 654 |
| 8:00 PM - 9:00 PM | 407 | 343 | 419 | 454 | 681 | 622 | 556 | 405 | 589 | 497 |
| 9:00 PM - 10:00 PM | 301 | 277 | 309 | 358 | 567 | 511 | 360 | 315 | 436 | 383 |
| 10:00 PM - 11:00 PM | 181 | 193 | 208 | 261 | 402 | 438 | 259 | 220 | 348 | 277 |
| 11:00 PM - 12:00 AM | 108 | 112 | 143 | 164 | 295 | 302 | 159 | 139 | 230 | 183 |
| **24 Hour Total** | **7271** | **7010** | **7271** | **7960** | **9910** | **9789** | **10297** | **7414** | **10043** | **8501** |

| PERIOD | SYSTEM PEAK HOUR | VOLUME |
|---|---|---|
| Weekday AM | 7:45 AM - 8:45 AM | 274 |
| Weekday MD | 12:00 PM - 1:00 PM | 466 |
| Weekday PM | 4:30 PM - 5:30 PM | 607 |
| Saturday MD | 12:15 PM - 1:15 PM | 664 |

## ATR Count Summary

| | | | | | |
|---|---|---|---|---|---|
| **Project Name:** | Hart Island | | | | |
| **ATR Station/ Site ID:** | A | | | | |
| **Location (Location1):** | City Island Bridge | | | | |
| **From (Location2):** | 0 | | | | |
| **To (Location3):** | 0 | | | | |
| **Borough/ County:** | Bronx | | | | |
| **Direction:** | WB (NB) | | | | |
| **Start Day of Week:** | Wednesday | **Start Date:** | 4/12/17 | **End Date:** | 4/25/17 |
| | | **Start Time:** | 9:45 AM | **End Time:** | 10:30 AM |

**Average Volumes from ATR Count**

| One Hour Interval From - To | Monday | Tuesday | Wednesday | Thursday | Friday | Saturday | Sunday | 3-Day Average (Tues - Thur) (AWT) | Weekend Average | 7-Day Average (ADT) |
|---|---|---|---|---|---|---|---|---|---|---|
| 12:00 AM - 1:00 AM | 155 | 102 | 89 | 101 | 128 | 340 | 403 | 97 | 371 | 188 |
| 1:00 AM - 2:00 AM | 56 | 48 | 44 | 53 | 60 | 221 | 213 | 48 | 217 | 99 |
| 2:00 AM - 3:00 AM | 38 | 29 | 23 | 39 | 45 | 91 | 128 | 30 | 109 | 56 |
| 3:00 AM - 4:00 AM | 24 | 19 | 12 | 24 | 18 | 47 | 53 | 18 | 50 | 28 |
| 4:00 AM - 5:00 AM | 43 | 42 | 36 | 37 | 32 | 36 | 33 | 38 | 35 | 37 |
| 5:00 AM - 6:00 AM | 119 | 130 | 123 | 135 | 124 | 63 | 36 | 129 | 49 | 104 |
| 6:00 AM - 7:00 AM | 254 | 267 | 305 | 250 | 225 | 121 | 84 | 274 | 103 | 215 |
| 7:00 AM - 8:00 AM | 426 | 440 | 495 | 424 | 367 | 199 | 142 | 453 | 170 | 356 |
| 8:00 AM - 9:00 AM | 394 | 332 | 406 | 417 | 397 | 267 | 184 | 385 | 225 | 342 |
| 9:00 AM - 10:00 AM | 341 | 325 | 349 | 346 | 354 | 328 | 242 | 340 | 285 | 326 |
| 10:00 AM - 11:00 AM | 322 | 314 | 341 | 326 | 339 | 393 | 312 | 327 | 353 | 335 |
| 11:00 AM - 12:00 PM | 345 | 395 | 345 | 355 | 400 | 384 | 409 | 365 | 396 | 376 |
| 12:00 PM - 1:00 PM | 405 | 442 | 374 | 400 | 446 | 455 | 479 | 405 | 467 | 428 |
| 1:00 PM - 2:00 PM | 457 | 499 | 410 | 454 | 502 | 491 | 581 | 454 | 536 | 485 |
| 2:00 PM - 3:00 PM | 494 | 608 | 479 | 519 | 593 | 598 | 740 | 535 | 669 | 576 |
| 3:00 PM - 4:00 PM | 513 | 577 | 497 | 571 | 670 | 640 | 784 | 548 | 712 | 607 |
| 4:00 PM - 5:00 PM | 508 | 569 | 487 | 516 | 620 | 668 | 833 | 524 | 750 | 600 |
| 5:00 PM - 6:00 PM | 460 | 522 | 460 | 514 | 615 | 710 | 784 | 499 | 747 | 581 |
| 6:00 PM - 7:00 PM | 458 | 474 | 449 | 552 | 660 | 653 | 856 | 492 | 754 | 586 |
| 7:00 PM - 8:00 PM | 430 | 517 | 446 | 448 | 630 | 631 | 941 | 470 | 786 | 577 |
| 8:00 PM - 9:00 PM | 396 | 455 | 440 | 462 | 661 | 670 | 832 | 452 | 751 | 559 |
| 9:00 PM - 10:00 PM | 315 | 358 | 437 | 425 | 639 | 635 | 759 | 406 | 697 | 510 |
| 10:00 PM - 11:00 PM | 239 | 299 | 334 | 374 | 603 | 586 | 488 | 336 | 537 | 417 |
| 11:00 PM - 12:00 AM | 158 | 194 | 221 | 262 | 497 | 514 | 255 | 226 | 384 | 300 |
| **24 Hour Total** | **7344** | **7953** | **7597** | **7997** | **9619** | **9736** | **10565** | **7849** | **10150** | **8687** |

| PERIOD | SYSTEM PEAK HOUR | VOLUME |
|---|---|---|
| Weekday AM | 7:45 AM - 8:45 AM | 432 |
| Weekday MD | 12:00 PM - 1:00 PM | 405 |
| Weekday PM | 4:30 PM - 5:30 PM | 514 |
| Saturday MD | 12:15 PM - 1:15 PM | 467 |

# Appendix C

# Existing Document Review Summary

| | # | Name/Title | Prepared For | Prepared By | Date | Document Type | NV5 Team Review Notes |
|---|---|---|---|---|---|---|---|
| *Documents Provided in RFP* | 1 | Hart Island Shoreline Restoration | NYC DOC | Greenman-Pederson (GPI) and McLauren Eng Group | 9/25/2018 | Construction Plans | Issued for Construction Documents detailing shoreline restoration of three (3) separate locations along Hart Island following damage sustained by Hurricane Sandy. Work was completed in 2021, per the Parks RFP. Scope of work was generally outside of Transportation Study Area, though, some elevations are provided just south of the existing Loading Dock Ferry Rack, which may be useful depending on final location of a recontructed terminal alternative. |
| | 2 | Phase IA - Documentary Study and Archaeological Assessment for the Hart Island, Bronx (Bronx County), New York – Shoreline Stabilization Project | NYC DOC, NYS Parks, NYC Landmarks, FEMA | Chrysalis Archaeological Consultants / GPI | Sept 2017 | Report | Archaeological study related to the shoreline restoration project (see Document 1). Purpose was to assess impacts of the proposed rehabilitation activity to potentially significant cultural resources found on the island. Provides location of all roads, buildings, equipment, and burial grounds on the island. Generally unrelated to the Transportation Study Area, though, there are obvious areas to avoid on the island for any proposed infrastructure. |
| | 3 | Reconstruction of City Island Pier (Construction Sequencing) | NYCDOT Ferry Division | Reconstruction of City Island Pier | N/A | Conceptual Plans | Document outlining two (2) separate alternates for replacement of the City Island Pier in the Bronx. Based on Google Earth, work (Alternate 1 phasing) appears completed in 2020. Only simple figures and not the full drawing set. The end of the (new) City Island Pier leads to an existing timber transfer bridge supported by a floating pontoon and may have a potential use in short term ferry service. |
| | 4 | Routine Inspection | NYC EDC, NYC DOC | Maser Consulting | June 2017 | Report | Routine Level inspection of Hart Island waterfront structures including the Timber & Concrete Dock (Coal Dock) and shoreline in the general Transportation Study Area. The Hart Island Loading Dock Ferry Rack was not included in the inspection. In addition, this report did not cover the City Island Pier.<br>With a condition rating of Poor in 2017, an updated inspection of the Timber and Concrete Dock and Shoreline is due, thus, the information provided is considered outdated though can be used for preliminary planning purposes. |
| | 5 | Hart Island Shoreline Damage Report Hurricane Sandy | NYC DOC | McLauren Eng Group | 5/22/2013 | Report | Damage report for Hart Island shoreline and seawalls (only) following Hurricane Sandy. Outdated. See Document 4 for new(er) information. |
| | 6 | Waterfront Facilities Maintenance Management System - Inspection Guidelines Manual | NYC EDC | ch2m | May 2016 | Manual/Guidelines | Waterfront inspection guidelines from the New York Economic Development Corporation (NYCEDC). Standards for inspection of waterfront facilities in New York City, including Hart Island. These guidelines were considered in developing the work plan for site investigations for the project. |
| | 7 | DOT Traffic Counts | N/A | NYC DOT - TIMS | Downloaded on 2/25/2020 | Raw Traffic Data | Traffic data from the NYC DOT TIMS database including Turning movement (TMC) and automated traffic recorder (ATR) counts at various locations on City Island, Pelham Bay, and beyond. Data collected along City Island Avenue will be utilized to determine typical traffic peak hours on City Island. |

| | # | Name/Title | Prepared For | Prepared By | Date | Document Type | NV5 Team Review Notes |
|---|---|---|---|---|---|---|---|
| *Obtained with Internet Based Research* | 8 | 2018/2019 NYC Ferry Expansion Feasibility Study | Mayors Office/City Hall | NYC EDC | 1/18/2018 | Report | Study performed by the NYCEDC analyzing the feasibility of expanding the NYC Ferry system. Document covers Hart Island Ferry Service (via Fordham Street in the Bronx) on page 68. NYCEDC recognized the fact that the existing infrastructure at the end of Fordham Street may be able to support passenger-only ferry services, though, additional assessment is required. It is assumed that the gantry would have to be removed for passenger-only ferry services. Per the study, NYC Ferry planning uses a minimum of 12 feet water depth when evaluating sites. |
| | 9 | Comprehensive Citywide Ferry Study | NYC EDC | Steer Davies Gleave | 2013 | Report | Ferry study to expand the Ferry services beyond the East River Ferry, serving as a planning framework to assess future ferry service opportunities. While this study has a larger scope, it is outdated compared to study provided in #8 from 2018. |
| | 10 | City Island Transportation Study | - | NYC DOT | 2011 | Report | Intersection improvement traffic study prepared by NYC DOT identifying roadway improvements for key intersections on City Island. As the study was completed in 2011, the data is too old to be utilized to support any work on the project. |
| *Provided By Parks (11/22)* | 11 | Orchard Beach Parking Lot Visitor Data (2019) | NYC Parks | - | 2019 | Data | Recorded total number of vehicles entering parking lot for dozens of days throughout the 2019 summer season. This data could be utilized to conservatively estimate peak season utilization and determine if additional parking capacity is available. |
| | 12 | Hart Island Visitor Data Summarized by Month | - | NYC Parks/DOC | 2019-2021 | Data | Record of total number of Hart Island visitors by month from January 2019 to present day. Includes number of "gazebo" visits during 2019 as well. Data useful in determining pre-covid ridership on the existing service. |

# Appendix D

# Visitor Survey (Blank)

NYC Parks

# HART ISLAND
## TRANSPORTATION STUDY

### STAKEHOLDER SURVEY

NYC Parks is exploring plans for improving transportation access to Hart Island – an active cemetery with historical significance located in the Bronx, New York City. Get involved: please take a few minutes to fill out this brief survey to help us understand how best to improve access to Hart Island. Your input is key to the process!

1 Have you ever visited Hart Island before? If "No" please skip to question 7.
- ❑ Yes
- ❑ No

2 What was the purpose of your trip to Hart Island?
- ❑ Gravesite visit to a family member or loved one
- ❑ Public visit to the historic cemetery
- ❑ Other: _____

3 What zip code do you live in? (If international, list country).
_____

4 What mode of transportation did you primarily use to get to the City Island Ferry Terminal?
- ❑ Private Car
- ❑ Hired Car (Uber, Lyft)
- ❑ Bus Only
- ❑ Subway to Bus
- ❑ Bicycle
- ❑ Walk
- ❑ Other: _____

4a If Private Car or Hired Car was selected for Q.4, how many people travelled in the car (including the driver)?
- ❑ One
- ❑ Two
- ❑ Three
- ❑ Four or more

4b If "Private Car" was selected for Q. 4, where did you park?
- ❑ Near Fordham Street Pier (City Island Ferry Terminal)
- ❑ Other: _____

5 How frequently do you visit Hart Island?
- ❑ Once a year
- ❑ Every 3-4 months
- ❑ Once a month
- ❑ Other: _____

6 What time of year do you typically visit? (Select all that apply).
- ❑ Fall
- ❑ Winter
- ❑ Spring
- ❑ Summer

7 Would you be more likely to visit Hart Island if ferry service was increased or more convenient?
- ❑ Strongly Agree
- ❑ Agree
- ❑ Neutral
- ❑ Disagree
- ❑ Strongly Disagree

8 Would you be more likely to visit Hart Island if it was open to the public more often?
- ❑ Strongly Agree
- ❑ Agree
- ❑ Neutral
- ❑ Disagree
- ❑ Strongly Disagree

9 If ferry service is expanded to Hart Island, when would you be most likely to visit? (Select all that apply).
- ❑ Fall
- ❑ Winter
- ❑ Spring
- ❑ Summer
- ❑ No preference

10 What would be your preferred day of the week for visitation? (Select all that apply).
- ❑ Weekday Morning
- ❑ Sunday Morning
- ❑ Weekday Mid-day
- ❑ Sunday Mid-day
- ❑ Weekday Evening
- ❑ Sunday Evening
- ❑ Saturday Morning
- ❑ No Preference
- ❑ Saturday Mid-day
- ❑ Saturday Evening

11 For updates and information on other opportunities to provide your input, please enter your email below.
*(Your information will not be shared with third parties)*
_____

Is there anything else that you would like to share?

Scan the QR code above for an online version of the survey. If preferable, please mail this survey by January 13 to: NV5 – Attn: Hart Island Study, 32 Old Slip, Suite 401, New York, NY, 10005. For further information, please email: hartislandstudy@nv5.com

# Appendix E

# Survey Results Summary Memorandum

# MEMORANDUM

| | | | |
|---|---|---|---|
| **To:** | Mitchel Loring, Parks | **Date:** | February 4, 2022 |
| **From:** | Justin Iwinski, NV5 (Justin.Iwinski@NV5.com) | | |
| **Project:** | X370-122M – Hart Island Transportation Study | | |
| **Subject:** | Survey Summary Memo [Draft] | | |

This memorandum presents a summary of all stakeholder survey data collected for the Hart Island Transportation Study. To aid in developing future ferry services, a transportation and public input survey was conducted for travel to Hart Island. A survey questionnaire was developed to obtain trip purpose, origin of trip, mode choice, time of day for visitation, their current and desired visitation day, and their current and desired time of year to visit for current and past Hart Island visitors. In addition, the survey also included questions regarding preferences for future access to Hart Island, which includes responses from both past and current visitors as well as the general public. Paper versions of the survey were distributed directly to Hart Island visitors which included an option to complete the survey on paper or online. In addition, the project stakeholder list was contacted by email with links to the online version of the survey to collect responses. Stakeholders were asked to share the survey with their constituents to increase the reach of the survey.

While the survey was live online, stakeholders were asked to provide not more than one response to the survey. However, when the data set was reviewed, there were dozens of responses made by the same stakeholder, identified by comparing duplicate email addresses and IP addresses within the data set. Duplicate responses were removed from the data set, with the most recent, or second response removed from the data set.

The results of the survey are provided in tables below, which contain results starting from December 11th, 2021 and ending January 26th, 2022. There were a total of 279 respondents to the stakeholder survey, and 96 of those respondents were travelling to or had previously been to Hart Island.

Tables 1 through 8 summarize the results of the survey for current and past visitors.

**Table 1 – Question 2 "What was the purpose of your trip to Hart Island?" Responses**

| Trip Purpose | Responses | Percent |
|---|---|---|
| Public visit to a historic cemetery | 22 | 23% |
| Visiting a Gravesite | 41 | 43% |
| Other | 22 | 23% |
| No Response | 11 | 11% |
| Total | 96 | 100% |

**Table 2 – Question 3 "What zipcode do you live in?" Responses**

| Location | All Visitors | | Gravesite Visitors | | Public Gazebo/Other | |
|---|---|---|---|---|---|---|
| | Responses | Percent | Responses | Percent | Responses | Percent |
| Bronx, NY | 56 | 58% | 11 | 28% | 44 | 79% |
| Manhattan, NY | 5 | 5% | 1 | 3% | 4 | 7% |
| Brooklyn, NY | 5 | 5% | 1 | 3% | 4 | 7% |
| Staten Island, NY | 1 | 1% | 1 | 3% | - | - |
| Queens, NY | 6 | 6% | 6 | 7% | - | - |
| Other New York State | 9 | 9% | 6 | 15% | 3 | 5% |
| New Jersey | 2 | 2% | 2 | 5% | - | - |
| Pennsylvania | 5 | 5% | 5 | 13% | - | - |
| Connecticut | 2 | 2% | 2 | 5% | - | - |
| Other US | 3 | 3% | 2 | 5% | 1 | 2% |
| International | 2 | 2% | 2 | 5% | - | - |
| Total | 96 | 100% | 40 | 100% | 56 | 100% |

**Table 3 – Question 4 "What mode of transportation did you primarily use to get to the City Island Ferry Terminal?" Responses**

| Mode Choice | All Visitors | | Gravesite Visitors | | Public Gazebo/Other | |
|---|---|---|---|---|---|---|
| | Responses | Percent | Responses | Percent | Responses | Percent |
| Private Car | 51 | 53% | 32 | 80% | 19 | 34% |
| Hired Car (Uber, Lyft) | 8 | 8% | 7 | 18% | 1 | 2% |
| Subway to Bus | 3 | 3% | - | - | 3 | 5% |
| Bicycle | 2 | 2% | - | - | 2 | 4% |
| Walk | 28 | 29% | 1 | 3% | 27 | 48% |
| Other | 4 | 4% | - | - | 4 | 7% |
| Total | 69 | 100% | 40 | 100% | 56 | 100% |

**Table 4 – Question 4a Vehicle Occupancy Results for Private Car**

| Persons Per Vehicle | Responses |
|---|---|
| One | 16 |
| Two | 19 |
| Three | 9 |
| Four or more | 11 |
| Total | 63 |
| Vehicle Occupancy | 2.27 |

**Table 5 – Question 4a Vehicle Occupancy Results for Hired Car (Excludes Driver)**

| Passengers Per Vehicle | Response |
|---|---|
| One | 6 |
| Two | 1 |
| Three | 1 |
| Total | 8 |
| Vehicle Occupancy | 1.38 |

**Table 6 – Question 5 "How Frequently do you visit Hart Island?" Responses**

| Frequency | Responses | Percent |
|---|---|---|
| Only Once or Twice, Long Ago, or Very Rarely | 43 | 54% |
| Every Few Years | 7 | 9% |
| Every Year | 18 | 23% |
| Every Few Months | 7 | 9% |
| Every Month or More | 5 | 6% |
| Total | 80 | 100% |

Notes:

(1) Many respondents provided unique answers, therefore, responses were summarized based on the above categories.
(2) 16 respondents did not provide a response to this question.

**Table 7 – Question 6 "What Type of Year Do You Typically Visit?" Responses**

| Season | Selections | Percent |
|---|---|---|
| Winter | 16 | 17% |
| Spring | 39 | 41% |
| Summer | 34 | 35% |
| Fall | 32 | 33% |

Notes:

(1) Respondents were allowed to select multiple choices. Percentages are based on the total respondents, not the total number of selections.
(2) 18 respondents did not provide a response to this question.

The remaining Tables 8 through 11 summarize the results of the survey for both current and past visitors as well as other stakeholders as well as the general public.

**Table 8 – Question 7 "Would you be more likely to visit Hart Island if ferry service was increased or more convenient?" Responses**

| Preference | Responses | Percent |
|---|---|---|
| Strongly Agree | 115 | 43% |
| Agree | 40 | 15% |
| Neutral | 23 | 9% |
| Disagree | 13 | 5% |
| Strongly Disagree | 79 | 29% |
| Total | 270 | 100% |

Notes:

(1) 8 respondents did not provide a response to this question.

**Table 9 – Question 8 "Would you be more likely to visit Hart Island if it was open to the public more often?" Responses**

| Preference | Responses | Percent |
|---|---|---|
| Strongly Agree | 115 | 43% |
| Agree | 36 | 13% |
| Neutral | 23 | 9% |
| Disagree | 11 | 4% |
| Strongly Disagree | 84 | 31% |
| Total | 269 | 100% |

Notes:

(1) 9 respondents did not provide a response to this question.

**Table 10 – Question 9 "If ferry service is expanded to Hart Island, when would you be most likely to visit?" Responses**

| Season | Selections | Percent |
|---|---|---|
| Winter | 24 | 10% |
| Spring | 104 | 42% |
| Summer | 99 | 40% |
| Fall | 78 | 31% |
| No Preference | 118 | 47% |

Notes:

(1) Respondents were allowed to select multiple choices. Percentages are based on the total respondents, not the total number of selections.

(2) 24 respondents did not provide a response to this question.

**Table 11 – Question 10 "What would be your preferred day of the week for visitation?" Responses**

| Day/Time | Selections | Percent |
|---|---|---|
| Weekday Morning | 15 | 6% |
| Weekday Mid-day | 29 | 12% |
| Weekday Evening | 9 | 4% |
| Saturday Morning | 62 | 25% |
| Saturday Mid-day | 79 | 32% |
| Saturday Evening | 26 | 10% |
| Sunday Morning | 55 | 22% |
| Sunday Mid-day | 72 | 29% |
| Sunday Evening | 20 | 8% |
| No Preference | 112 | 45% |

Notes:

(1) Respondents were allowed to select multiple choices. Percentages are based on the total respondents, not the total number of selections.

(2) 30 respondents did not provide a response to this question.

# Appendix F

# City Island & Hart Island Waterfront Facilities Rapid Level Inspection Report

**WATERFRONT FACILITIES MAINTENANCE SYSTEM**

# CITY ISLAND & HART ISLAND WATERFRONT FACILITIES BRONX, NEW YORK

## RAPID-LEVEL INSPECTION

**JANUARY 2022**

*DRAFT*

City of New York
Parks & Recreation

NV5 Delivering Solutions Improving Lives

MARINE SOLUTIONS

**NV5 FOR NEW YORK CITY**
**DEPARTMENT OF PARKS AND RECREATION**

# WATERFRONT FACILITIES MAINTENANCE MANAGEMENT SYSTEM

# *CITY ISLAND & HART ISLAND WATERFRONT FACILITIES BRONX, NEW YORK*

# *RAPID LEVEL INSPECTION*

## *JANUARY 2022*

***Submitted By:***

**Marine Infrastructure Engineering Solutions P.C.**
**708 3rd Avenue, 5th Floor**
**New York, NY 10017**
**www.MSImarinesolutions.com**

January 20, 2022

NV5
32 Old Slip
Suite 401
New York, NY 10005
P: (646) 300-7163
F: (212) 633-1205

Attentions: Justin Iwinski

Reference: Hart Island Transportation Study Project #X3709-122M

Subject: Rapid-Level Inspection of City Island & Hart Island Ferry Facilities, Bronx, New York

Dear Mr. Inwiski,

At the request of NV5 Global, Inc. (NV5) for the New York City Department of Parks and Recreations (NYCDPR), Marine Infrastructure Engineering Solutions (Marine Solutions) performed inspection services of the City Island and Hart Island Ferry Facilities. The inspection was initiated to support the NYCDPR Hart Island Transportation Study, Project #X370-122M. The purpose of this inspection is to determine the condition of the ferry terminals and develop contour maps of the bottom topography at City Island and Hart Island. The survey of the sites will be submitted under a separate cover. The Rapid-Level Inspection was conducted in accordance with the New York City Economic Development (NYCEDC) Waterfront Facilities Maintenance Management System (WFMMS) Inspection Guidelines Manual (WFMMS Inspection Guidelines Manual) released in 2016.

If you have any questions, or need further assistance, please contact me at (908) 319-9498.

Sincerely,

Marine Solutions

Jeremy Pope

Vice President

# 1.0 SUMMARY OF FINDINGS

The City Island and Hart Island ferry facilities and pier structures are in overall **Fair** to **Poor** condition. During Hurricane Sandy on October 29, 2012, City Island and Hart Island experienced inundation levels up to eight (8) ft high leading to erosion and damage of the shoreline infrastructure and nearshore structures. The Hart Island Ferry Dock Shoreline, Hart Island Coal Pier Shoreline, and Hart Island Coal Pier were previously inspected by Maser Consulting, P.A. (Maser) in June 2017. The results of that inspection are provided in the Hart Island Routine Inspection Report June 2017, hereby referred to as the '2017 Routine Inspection Report'.

The Fordham Steet Shoreline is in **Fair** condition overall due to widespread loss of the cementious grout between the stone blocks of the masonry retaining wall.

The Hart Island Ferry Dock Shoreline structure is in **Poor** condition overall due to gaps in the timber bulkhead with observed fill loss. Typically, the timber soldier piles exhibit advanced to severe deterioration with signs of marine borers. The timber wales are typically rated advanced to severe due to splitting and section loss due to marine borers.

The Hart Island Coal Pier Shoreline is in **Fair** condition overall. The shoreline consists of poorly graded riprap, sandy shoreline, a derelict pile field, and debris.

The Fordham Street Pier is in **Good** condition overall with no significant defects observed. The Fordham Street Pier is a newly constructed pier.

The Fordham Street Ferry Dock is in **Fair** to **Poor** condition. The timber fender rack is in **Poor** condition overall due to deterioration of the timber piles comprising the fender racks. The timber fender rack piles typically exhibit advanced to severe deterioration due to marine borers with isolated of broken piles. The timber approach platform, timber and steel vehicle-loading gangway, timber and steel gantry system, and two (2) timber pile-supported towers are in **Fair** condition overall due to moderate deterioration of the timber piles due to marine borers.

The Hart Island Ferry Dock is in **Fair** to **Poor** condition. The timber fender rack is in **Poor** condition overall due to deterioration of the timber piles comprising the fender racks. The timber fender rack piles typically exhibit advanced to severe deterioration due to marine borers with isolated of broken piles. The timber approach platform, timber and steel vehicle-loading gangway, timber and steel gantry system, and steel sheet pile cells are in **Fair** condition overall due to moderate deterioration of the timber piles due to marine borers and advanced to severe corrosion of the steel sheet pile cells.

The Hart Island Coal Pier is in **Poor** condition overall due to deterioration of the timber piles supporting the timber and concrete platform. Typically, the timber piles exhibit advanced to severe deterioration with signs of marine borers. The concrete deck typically exhibits moderate to advanced cracking and spalling with isolated locations of severe spalls. The concrete abutment exhibits severe undermining and moderate to advanced cracking and spalling.

## 2.0 DESCRIPTION OF SITE

City Island and Hart Island are two islands in the Pelham Islands group located at the west end of the Long Island Sound, south of Pelham Bay, and east of Eastchester Bay (Photo 2-1 and 2-2). There are seven (7) systems between City Island and Hart Island within the scope of this inspection which include the Fordham Street Shoreline, Hart Island Ferry Dock Shoreline, Hart Island Coal Pier Shoreline, Fordham Street Pier, Fordham Street Ferry Dock, Hart Island Ferry Dock, and Hart Island Coal Pier.

City Island and Hart Island are considered a part of the Bronx, New York. City Island is 1.5-mile-long by 0.5-mile-wide island with a population of over 4,000 residents. Hart Island is a 1 mile long by 0.33-mile-wide island serving as a "Potter's Field" for the City of New York since 1869 and access to the island is restricted. Hart Island is the country's largest publicly funded cemetery and serves as a burial ground for over one million individuals. The waterway separating the two islands is known as City Island Harbor. The shorelines at the ferry facilities and the loading dock are intended to create a stable shoreline to support the nearshore structures (Photo 2-3 through 2-5).

Ferry facilities are located on both City Island and Hart Island. The Fordham Street Pier and Ferry Dock are located on City Island and Hart Island Ferry Dock is located on Hart Island (Photo 2-6 and 2-7). The ferry terminals are operated by New York City Department of Transportation (NYCDOT) on behalf of the City of New York. The ferry facilities are designed to support the car ferry services a route between City Island and Hart Island. The Hart Island Coal Pier is a timber loading dock (Photo 2-8).

The Fordham Street Shoreline is a riprap revetment shoreline with stone sizes ranging from 12 to 24 in. in diameter. The Fordham Street Pier terminates at a stacked masonry retaining wall, which is 40-ft-long by 3-ft-wide and forms an access landing to the island. The Fordham Street Pier and Ferry Dock is comprised of a concrete pier structure and a timber ferry terminal structure. The pier is approximately 330 ft long and 40 ft at its widest, consisting of 12 pile bents supporting concrete pile caps and a concrete deck. The piles have round fiberglass epoxy jackets encasing the piles into the mudline and active cathodic protection at each pile. There are several office trailers on the deck of the pier to support the ferry operations and Hart Island operations. Access to the pier is restricted by a gate at the west end of the pier. According to record information provided, the concrete pier structure was constructed in 2020.

The Fordham Street Ferry Dock consists of a timber pile-supported approach platform, a steel vehicle-loading gangway, a timber and steel gantry system, two (2) timber pile-supported towers, and two (2) timber fender racks creating a slip for the car ferry. The two (2) timber pile and bracing

structures are referred to as the North and South Timber Gantry Towers and support the gantry system. The steel vehicle-loading gangway spans approximately 60 ft between the gantry system and the inshore timber platform and has a timber decking. The timber fender racks are 65 ft to 80 ft long and constructed with multiple closely spaced rows of 12 in. diameter timber piles as well as vertical timber planks secured together with timber wales, steel hardware, and steel cable wraps. A steel gangway attached to the Fordham Street Concrete Pier leads to a floating dock approximately 26 ft long by 15 ft wide held in place by guide piles.

The Hart Island Ferry Dock Shoreline is a combination of a timber bulkhead, riprap revetment, and stacked stone retaining wall. The timber sheet pile bulkhead consists of 4 in. by 12 in. timber planks with 10 to 12 in. diameter soldier piles spaced approximately 10 ft and 6.5 ft on center at the north and south sections, respectfully. There are two (2) levels of 6 to 12 in. by 12 in. timber wales at the top and at the mudline of the timber bulkhead structure. Stone fill is present behind the timber bulkhead and riprap is placed offshore of the timber bulkhead structure. The stacked stone retaining wall is made of 6 to 24 in. diameter stone and terminates before the section of timber bulkhead south of the ferry access platform. The riprap revetment consists of stones 6 in. to 12 in. in diameter and is integrated at the north end of the timber bulkhead.

The Hart Island Ferry Dock consist of a timber pile-supported approach platform, a steel vehicle-loading gangway, a timber and steel gantry system, two (2) steel sheet pile cells, and two (2) timber fender racks creating a slip for the car ferry. Timber pile and timber pile caps support the inshore landing platform. The two (2) steel sheet pile bulkhead cells are referred to as the North and South Steel Sheet Pile Gantry Cells and support the gantry system and a timber walking platform. The vehicle-loading gangway spans approximately 50 ft between the steel gantry system and the inshore landing platform and has a timber decking. The timber fender racks are 80 ft to 100 ft long and constructed with multiple closely spaced rows of 12 in. diameter timber piles as well as vertical timber planks secured together with timber wales, steel hardware, and steel cable wraps.

The Hart Island Coal Pier Shoreline is a combination of a rubble mound and natural shoreline with debris. There is a derelict pile field on the north side of the Coal Pier. The Hart Island Coal Pier terminates at an approximately 8-ft-long by 20-ft-wide concrete abutment forming an access landing to the island. The Hart Island Coal Pier is an approximately 8,000-sq.-ft loading dock comprised of 12 in. diameter timber batter and plumb piles with timber cross bracing supporting timber pile caps, a precast concrete deck, and a timber fender system. The Coal Pier extends approximately 170 ft into the waterway and the larger main loading platform is approximately 120 ft long by 40 ft wide. The narrower landing access platform is 130 ft long and varies from 20 ft to

40 ft in width. The timber pile caps are orientated east to west and the timber cross bracing support every other bent row in the main loading platform. The timber pile caps are orientated north to south along the landing access platform. The spacing of the timber piles varies from beneath the main and landing access platforms. The precast concrete deck panels are 12 in. thick and span from 10 ft to 15 ft atop the timber pile caps. There is a sloped concrete ramp approximately 15 ft long by 15 ft wide at the south end of the dock that is supported by a lower timber pile cap and extra timber piles. There are timber fender piles around the dock with steel cleats for mooring. A timber curb lines the Hart Island Coal Pier. A timber loading platform is in place at the north end of the main loading platform.

A Site Plan and Facility Plans for City Island and Hart Island are presented in Figures 2-1, 2-2, and 2-3, respectively.

Photo 2-1. General view of City Island, looking west.

Photo 2-2. General view of Hart Island, looking east.

Photo 2-3. Typical view of the Fordham Street Pier Shoreline at City Island, looking west.

Photo 2-4. Typical view of the Hart Island Ferry Dock Shoreline, looking east.


Photo 2-5. General view of the Hart Island Coal Pier Shoreline, looking east.

Photo 2-6. General view of the Fordham Street Pier at City Island, looking west.

Photo 2-7. General view of the Fordham Street Ferry Dock at City Island, looking west.


Photo 2-8. General view of the Hart Island Ferry Dock, looking east.

Photo 2-9. General view of the Hart Island Coal Pier, looking east.


NEW YORK CITY
DEPARTMENT OF PARKS AND RECREATION
HART ISLAND TRANSPORTATION STUDY
BRONX, NEW YORK

0 1500 3000 6000 FT
SCALE: 1"= 3000'

JANUARY 2022
FIGURE 2-1
SITE PLAN

MARINE SOLUTIONS

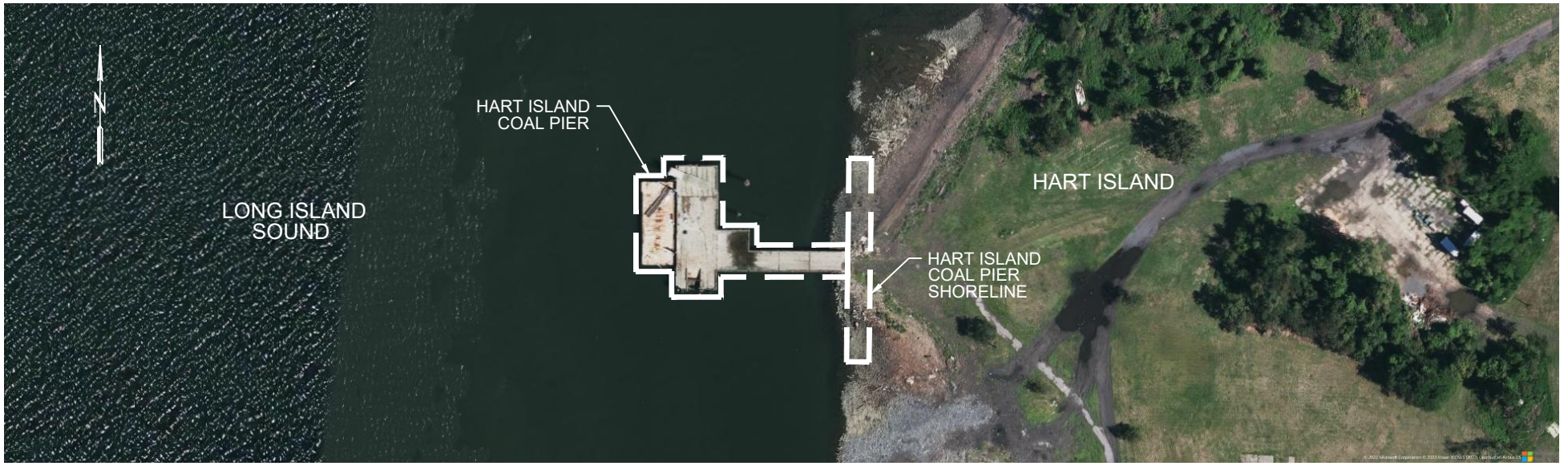

**CITY ISLAND FACILITY PLAN**
SCALE: 1" = 100'

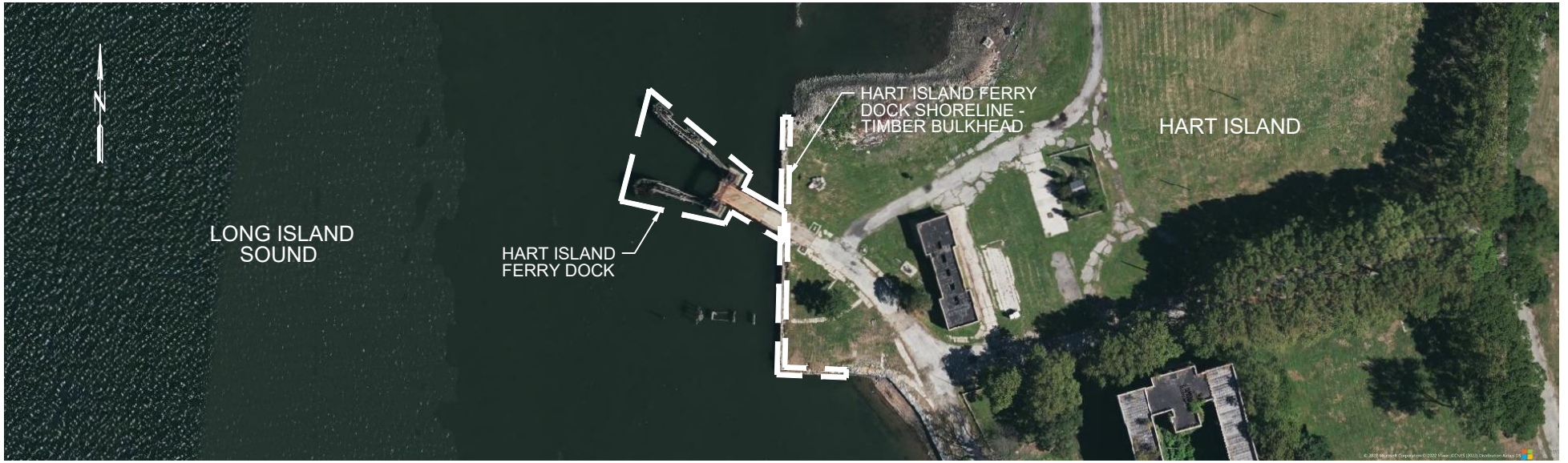
0 50 100 200 FT
SCALE: 1"= 100'

NEW YORK CITY
DEPARTMENT OF PARKS AND RECREATION
HART ISLAND TRANSPORTATION STUDY
BRONX, NEW YORK

JANUARY 2022
FIGURE 2-2
CITY ISLAND FACILITY PLAN

MARINE SOLUTIONS




**HART ISLAND FACILITY PLAN**

SCALE: 1" = 150'

0 75 150 300 FT

SCALE: 1"= 150'

MARINE SOLUTIONS

NEW YORK CITY
DEPARTMENT OF PARKS AND RECREATION
HART ISLAND TRANSPORTATION STUDY
BRONX, NEW YORK

JANUARY 2022

FIGURE 2-3
HART ISLAND FACILITY PLAN

# 3.0 OBSERVED CONDITIONS AND RATINGS

## 3.1 SHORELINE INFRASTRUCTURE INSPECTION

Rapid-level inspection of the City Island and Hart Island shoreline infrastructure was performed. The inspection assessed the existing infrastructure connected to the shoreline. The City Island shoreline infrastructure is in overall **Fair** condition due to widespread cementious grout loss. The Hart Island shoreline infrastructure is in overall **Fair** to **Poor** condition due to deterioration of the timber bulkhead and settlement upland of the timber bulkhead.

### (A) FORDHAM STREET SHORELINE

The Fordham Street Shoreline is in overall **Fair** condition. The shoreline consists of a masonry retaining wall with a concrete cap, a riprap revetment made of concrete and asphalt debris, and a natural sand shoreline. The masonry retaining wall exhibits widespread loss of the cementious grout between adjacent stones up to 42-in. deep (Photo 3.1-1). The concrete cap exhibits minor hairline cracking.

### (B) HART ISLAND FERRY DOCK SHORELINE

The Hart Island Ferry Dock Shoreline is in overall **Poor** condition due to gaps in the timber bulkhead leading to fill loss and signs of erosion. The end and corner connections exhibit large gaps up to 8 in. wide and over 12 in. deep allowing fill loss to occur (Photo 3.1-2). There are subsidence areas upland of the timber bulkhead up to 6 ft wide and up to 6.5 ft deep with newer fills using varying diameter stone, concrete, and masonry brick debris (Photo 3.1-3). Large areas of subsidence and voids remain despite newer repair fills. There are isolated gaps up to 3.5 in. wide and over 12 in. deep in the timber sheet piles (Photo 3.1-4). The timber pile sheeting typically exhibits moderate section loss due to marine borers with isolated locations of advanced section loss. The tops of the timber soldier piles typically exhibit advanced severe section loss with isolated locations of broken piles (Photo 3.1-5). The horizontal timber wales exhibit moderate to severe section loss due to splitting and marine borers with isolated locations of missing or deflected timbers (Photo 3.1-6 through 3.1-7). The timber bulkhead from 2+18 to 3+10 is leaning outward towards the waterway, indicating signs of movement of the structure.

(C) HART ISLAND COAL PIER SHORELINE

The Hart Island Coal Pier Shoreline is in overall **Fair** condition. The shoreline north of the coal pier consists of a natural sand shoreline and rubble mound revetement with stone size typically ranging from 2 to 18 in. diameter up to a maximum of 36 in. diameter with a gentle slope. The shoreline south of the coal pier consists of riprap that is poorly graded, has timber cutoff piles still present, and debris is found throughout the shoreline (Photo 3.1-8).

The conditions of the Fordham Street Pier Shoreline and Hart Island Ferry Dock Shoreline infrastructure are provided in Figure 3.1-1 through Figure 3.1-2. The conditions of the Hart Island Coal Pier Shoreline infrastructure are provided in Figure 3.2-4.

Photo 3.1-1. Masonry bulkhead at the Fordham Street Shoreline with widespread grout loss up to 3.5 ft deep, looking west.

Photo 3.1-2. Timber bulkhead at the Hart Island Ferry Dock Shoreline with gaps up to 8 in. wide and over 12 in. deep with exposed fill within, looking east.

Photo 3.1-3. Subsidence areas behind timber bulkhead at the Hart Island Ferry Dock Shoreline with varying stages of repair fills due to active fill loss, looking west.

Photo 3.1-4. Timber bulkhead at the Hart Island Ferry Dock Shoreline with gaps between the sheets up to 3.5 in. wide and over 12 in., looking east.

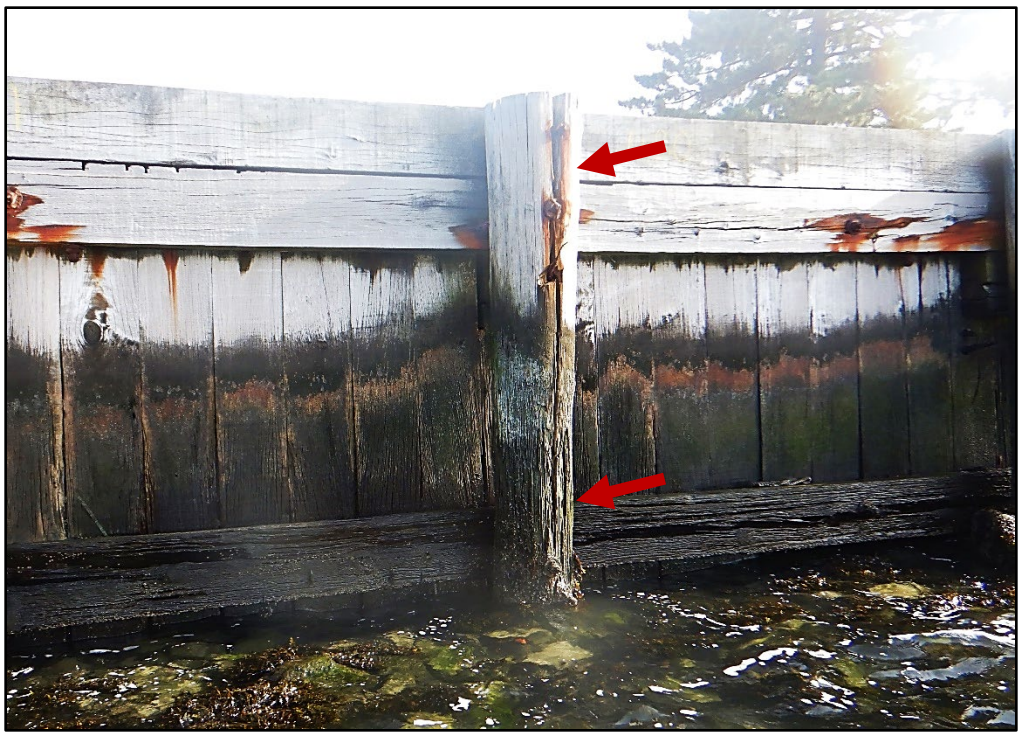


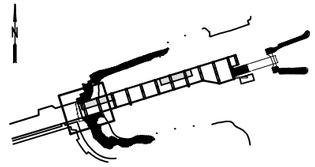
Photo 3.1-5. Timber soldier piles at the Hart Island Ferry Dock Shoreline exhibiting advanced splitting and deterioration due to marine borers, looking east.

Photo 3.1-6. Low-water timber wale at the Hart Island Ferry Dock Shoreline exhibiting severe splitting and deterioration due to marine borers, looking east.

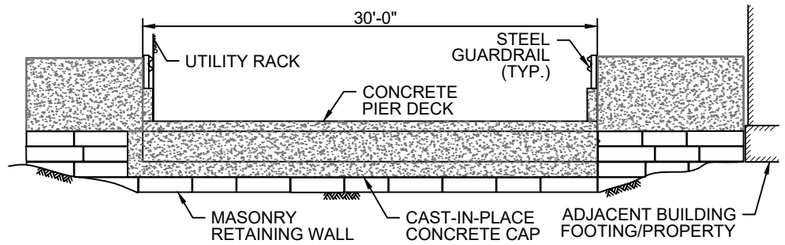
Photo 3.1-7. Missing top horizontal timber sheet at the end section of timber bulkhead at the Hart Island Ferry Dock Shoreline with signs of active fill loss, looking north.


Photo 3.1-8. Poorly graded riprap stone and timber cutoff piles at the Hart Island Coal Pier Shoreline, looking north.


**FORDHAM STREET SHORELINE CONDITION PLAN**
SCALE: 1" = 10'



**KEY MAP**
SCALE: 1" = 300'




**BULKHEAD ELEVATION**
SCALE: 1" = 10'

LONG ISLAND SOUND
FLOOD
EBB

**LEGEND**

- MASONRY CONCRETE ABUTMENT RATED MODERATE
- RIPRAP REVETMENT

0 5 10 20 FT
SCALE: 1"= 10'

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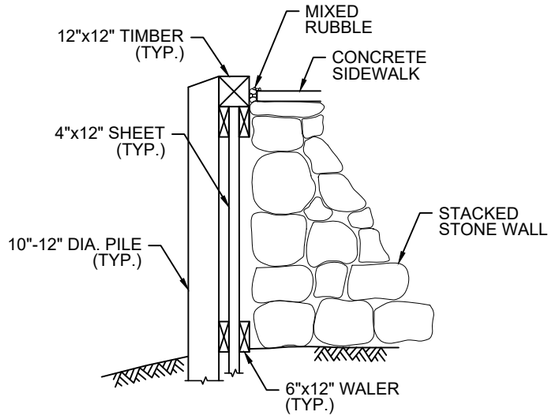
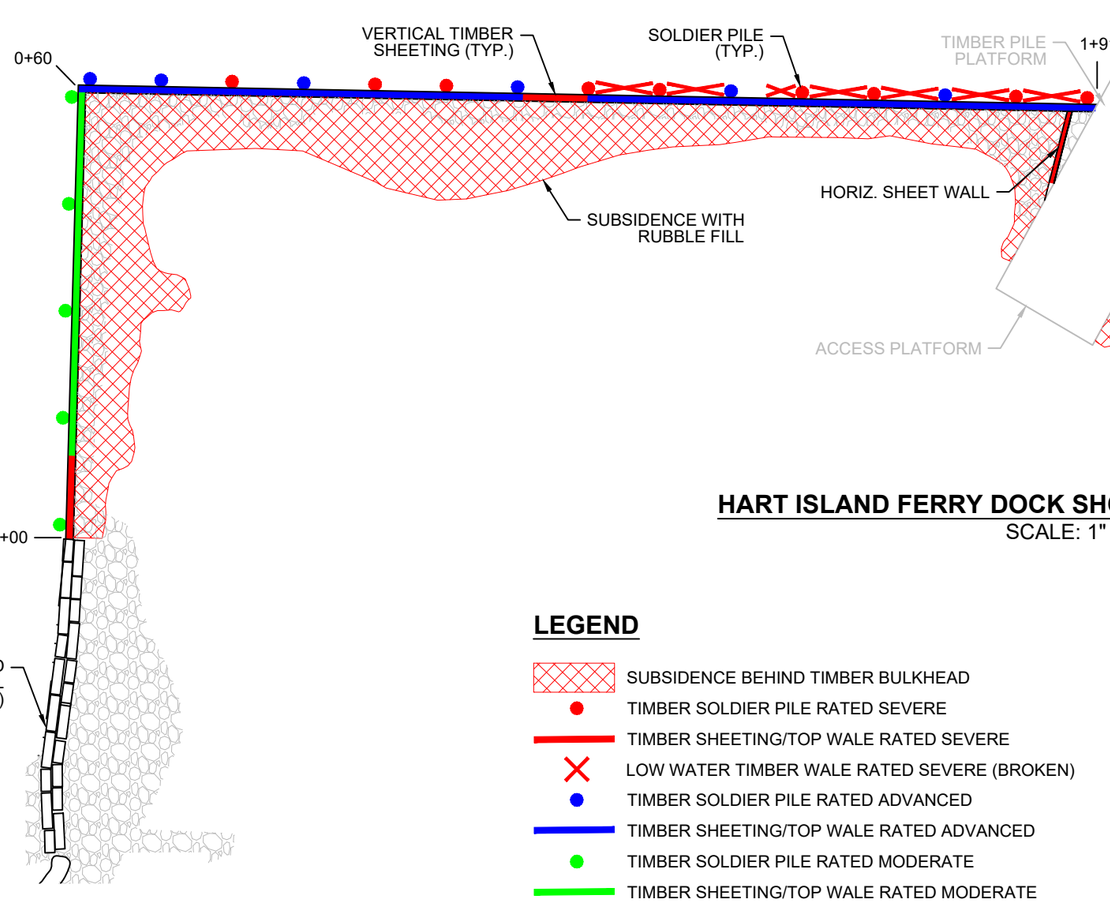
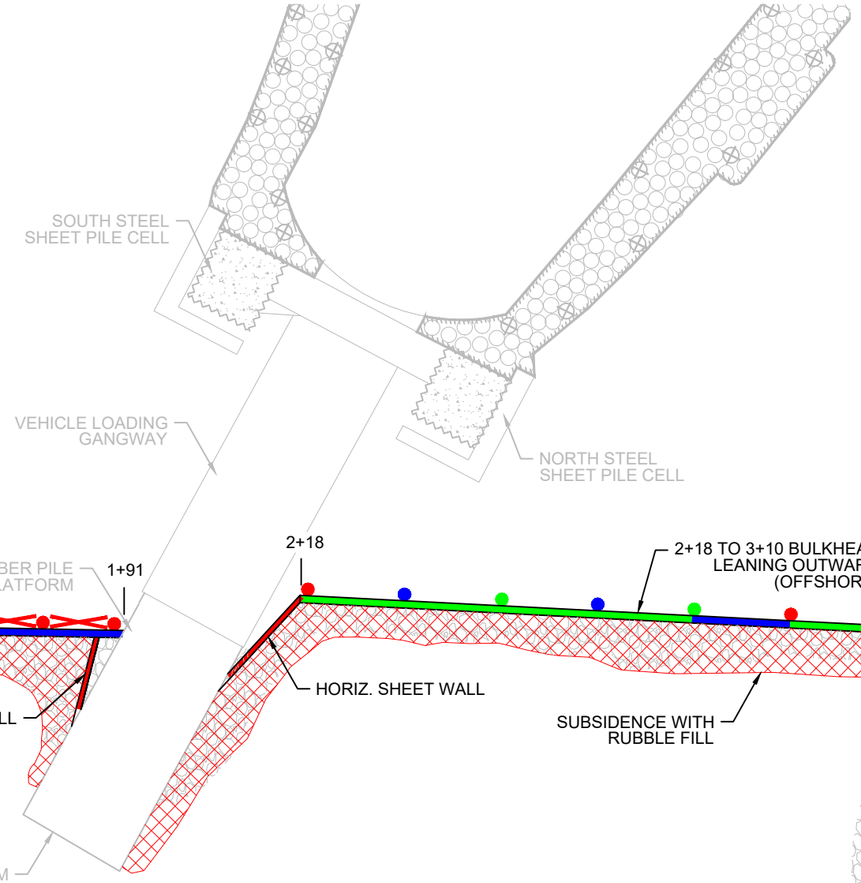
FIGURE 3.1–1
FORDHAM STREET SHORELINE
CONDITION PLAN

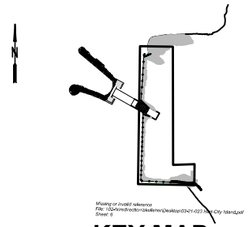
MARINE SOLUTIONS




**TYPICAL SECTION**
SCALE: 1" = 5'




**KEY MAP**
SCALE: 1" = 300'

**HART ISLAND FERRY DOCK SHORELINE CONDITION PLAN**
SCALE: 1" = 20'

## LEGEND

- SUBSIDENCE BEHIND TIMBER BULKHEAD
- TIMBER SOLDIER PILE RATED SEVERE
- TIMBER SHEETING/TOP WALE RATED SEVERE
- LOW WATER TIMBER WALE RATED SEVERE (BROKEN)
- TIMBER SOLDIER PILE RATED ADVANCED
- TIMBER SHEETING/TOP WALE RATED ADVANCED
- TIMBER SOLDIER PILE RATED MODERATE
- TIMBER SHEETING/TOP WALE RATED MODERATE
- STONE / CONCRETE FILL

0 10 20 40 FT
SCALE: 1"= 20'

0 2.5 5 10 FT
SCALE: 1"= 5'

MARINE SOLUTIONS

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JANUARY 2022
FIGURE 3.1–2
HART ISLAND FERRY DOCK SHORELINE CONDITION PLAN

## 3.2 STRUCTURAL INSPECTION

Rapid-level inspections of the transportation facilities associated with City Island and Hart Island piers and ferry facilities were performed. The inspection assessed any existing infrastructure for the possibility of retrofitting to allow for use by vessels compatible with the existing citywide ferry system. The City Island structures are in overall **Good** to **Poor** condition due to moderate to advanced deterioration of the timber elements from marine borers with isolated locations of broken piles. The Hart Island structures are in **Fair** to **Poor** condition due to moderate to severe deterioration of the timber elements from marine borers with isolated locations of broken piles, advanced to severe corrosion of the steel sheet pile cells, advanced to severe cracking and spalling of the concrete, and undermining of the concrete abutment.

### (A) FORDHAM STREET PIER

The Fordham Street Pier is in **Good** condition overall. The Fordham Street Pier is a newly constructed concrete pier (Photo 3.2-1). All piles are epoxy encased into the mudline and have active cathodic protection. The piles material type was not confirmed during this inspection due to the encasements extending into the mudline and no record information indicating the pile type. However, due to the presence of what is assumed to be cathodic protection, the material of the piles is most likely steel. The concrete deck exhibits isolated minor cracking up to 1/16 in. wide on the top surface and hairline on the underside of the concrete deck (Photo 3.2-2). No significant signs of deterioration were observed at the Fordham Street Pier.

### (B) FORDHAM STREET FERRY DOCK

The Fordham Street Ferry Dock is in **Fair** to **Poor** condition overall. The two (2) timber fender racks are in **Poor** condition. The timber piles comprising the timber fender rack exhibit section loss typically ranging from 30 to 60 percent within the tidal zone due to marine borers and splitting (Photo 3.2-3). There are isolated broken piles at the timber fender racks (Photos 3.2-4). Typically, the tops of the timer piles and the ends of the timber wales at the fender racks exhibit splits and significant deterioration from hollowing and decaying of the timber (Photo 3.2-5). Isolated locations of loose and broken steel hardware and steel wire cables securing the timber fender racks are observed (Photo 3.2-6). The timber approach platform, timber and steel vehicle-loading gangway, timber and steel gantry system, and two (2) timber pile-supported towers are in **Fair** condition. The timber piles supporting the timber approach platform and the north and south timber gantry towers exhibit section loss typically ranging from 10 to 25 percent within the tidal zone due to marine borers and isolated locations of splits. The timber gantry towers exhibit broken horizontal posts beneath the steel gantry weights due to impact (Photo 3.2-7). The timber cross

bracing at the ferry dock and the north and south timber gantry towers exhibits moderate section loss due to marine borers. The timber piles caps supporting the ferry docks and the timber girders supporting the steel vehicle-loading gangway vehicle-loading gangway exhibit moderate section loss. The steel beams supporting the gantry gangway exhibit minor surface corrosion. Typically, all steel connection hardware in the tidal and atmospheric zone typically exhibit moderate corrosion and isolated missing or loose connections were observed. The safety ladders exhibit moderate corrosion and impact damage (Photo 3.2-8).

(C) HART ISLAND FERRY DOCK

The Hart Island Ferry Dock is in **Fair** to **Poor** condition overall. The two (2) timber fender racks are in **Poor** condition. The timber piles comprising the timber fender rack exhibit section loss typically ranging from 40 to 60 percent within the tidal zone due to marine borers and splitting. There are isolated broken timber piles at the timber fender racks (Photos 3.2-9). Typically, the tops of the timer piles and the ends of the timber wales at the fender racks exhibit splits and significant deterioration from hollowing and decaying of the timber (Photo 3.2-10). One (1) location of damaged timber from fire was observed at the south timber fender rack (Photo 3.2-11). Isolated locations of loose and broken steel hardware and steel wire cables securing the timber fender racks were observed (Photo 3.2-12). The timber approach platform, timber and steel vehicle-loading gangway, timber and steel gantry system, and two (2) steel sheet pile cells are in **Fair** condition. The timber piles, pile caps, and cross bracing at the timber approach platform exhibit moderate to advanced section loss due to marine borers and deterioration. The steel beams supporting the vehicle-loading gangway exhibit minor surface corrosion. The timber girders supporting the vehicle-loading gangway exhibit minor to moderate section loss. The steel sheet piles of the north and south steel cells exhibit bands of section loss up to 52 percent due to corrosion at the mudline and within the tidal/atmospheric zone (Photo 3.2-13). No holes in the steel sheet pile cells were observed. Typically, all steel connection hardware in the tidal and atmospheric zone typically exhibit moderate corrosion and isolated missing or loose connections were observed. The safety ladders exhibit moderate corrosion and impact damage. The south fender rack system is missing a safety railing (Photo 3.2-14).

(D) HART ISLAND COAL PIER

The Hart Island Ferry Pier is in **Poor** condition overall. The timber plumb and batter piles typically exhibit advanced section loss with isolated locations of severe deterioration due to marine borers and shell peeling and isolated locations of split piles (Photos 3.2-15 through 3.2-17). The steel connection hardware within the tidal zone exhibits advanced corrosion. The timber cross bracing

supporting the timber piles at the main pier typically exhibits advanced to severe section loss of the timber and are detached at the lower ends (Photo 3.2-18). The underside of the precast concrete deck exhibits minor cracking up to 1/16 in wide with efflorescence, moderate pop-out spalling and delamination up to 2 in. deep, and isolated severe spalling up to 3 in. deep with exposed corroded steel reinforcement (Photo 3.2-19). The top of the concrete deck has cracking up to 1/8 in. wide with isolated moderate spalls up to 2 in. deep. The concrete ramp exhibits advanced to severe spalling up to 12 in. deep with exposed corroded steel reinforcement with up to 100 percent section loss at the end 8 ft of the ramp along the vertical and horizontal face of the concrete ramp (Photo 3.2-20 through 3.1-21). The concrete abutment exhibits settlement up to 3 in., undermining up to 3 ft deep, hairline cracking with efflorescence, spalling up to 3 in. deep with exposed corroded reinforcement (Photo 3.2-22). There are two (2) locations of missing sections of timber curb for 17 ft total on the east and north faces of the main loading platform (Photo 3.2-23). There is one (1) location of a broken steel cleat atop the timber curb on the south side of the landing access platform and one (1) missing cleat atop the timber curb on the north side of the landing access platform (Photo 3.2-24).

A summary of the observed conditions of the Hart Island Coal Pier is provided in Tables 3.2-1. Ultrasonic thickness measurements for the steel sheet pile cells at the Hart Island Ferry Dock are provided in Table 3.2-2. The conditions of the City Island and Hart Island pier and ferry structures are provided in Figure 3.2-1 through Figure 3.2-3.

**TABLE 3.2-1**
**SUMMARY OF THE HART ISLAND COAL PIER ELEMENT CONDITIONS**

| Component | Total Number Inspected | Damage Grade | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Minor | | Moderate | | Advanced | | Severe | |
| | | No. | % | No. | % | No. | % | No. | % |
| Timber Plumb Piles | 132 EA | 1 | 0.7 | 38 | 28.6% | 87 | 65.4% | 7 | 5.3% |
| Timber Batter Piles | 10 EA | 0 | 0.0% | 3 | 30.0% | 6 | 60.0% | 1 | 10.0% |
| Timber Pile Caps | 740 LF | 0 | 0.0% | 740 | 100.0% | 0 | 0.0% | 0 | 0.0% |
| Timber Cross Bracing | 260 LF | 0 | 0.0% | 64 | 24.6% | 0 | 0.0% | 196 | 75.4% |
| Concrete Deck and Ramp | 8,000 SF | 2,784 | 34.8% | 3,824 | 47.8% | 1,280 | 16.0% | 112 | 1.4% |
| Concrete Abutment | 160 SF | 0 | 0.0% | 76 | 47.5% | 0 | 0.0% | 84 | 52.5% |

**TABLE 3.2-2**
**HART ISLAND FERRY DOCK STEEL SHEET PILE CELL**
**ULTRASONIC THICKNESS MEASUREMENTS**

| Location | Face | Elevation/ Zone | Nominal Thickness (in.) | Average Ultrasonic Thickness Measurement (in.) | | | Maximum Section Loss (%) |
|---|---|---|---|---|---|---|---|
| | | | | Outside Flange | Web | Inside Flange | |
| North Cell | North | Atmospheric | 0.375 | 0.328 | 0.305 | 0.350 | 18.7% |
| North Cell | East | Mudline | 0.375 | 0.225 | 0.330 | 0.350 | 40.0% |
| North Cell | West | Mudline | 0.375 | 0.192 | 0.190 | 0.360 | 52.0% |
| South Cell | South | Atmospheric | 0.375 | 0.365 | 0.227 | 0.335 | 41.3% |
| South Cell | South | Mudline | 0.375 | 0.348 | 0.325 | 0.355 | 13.3% |
| South Cell | North | Mudline | 0.375 | 0.333 | 0.340 | 0.340 | 12.0% |

Photo 3.2-1. Newly constructed Fordham Street Pier with epoxy encased piles, concrete pile caps, a concrete deck with steel safety ladders, street lights, and a safety guard rail, looking southeast.

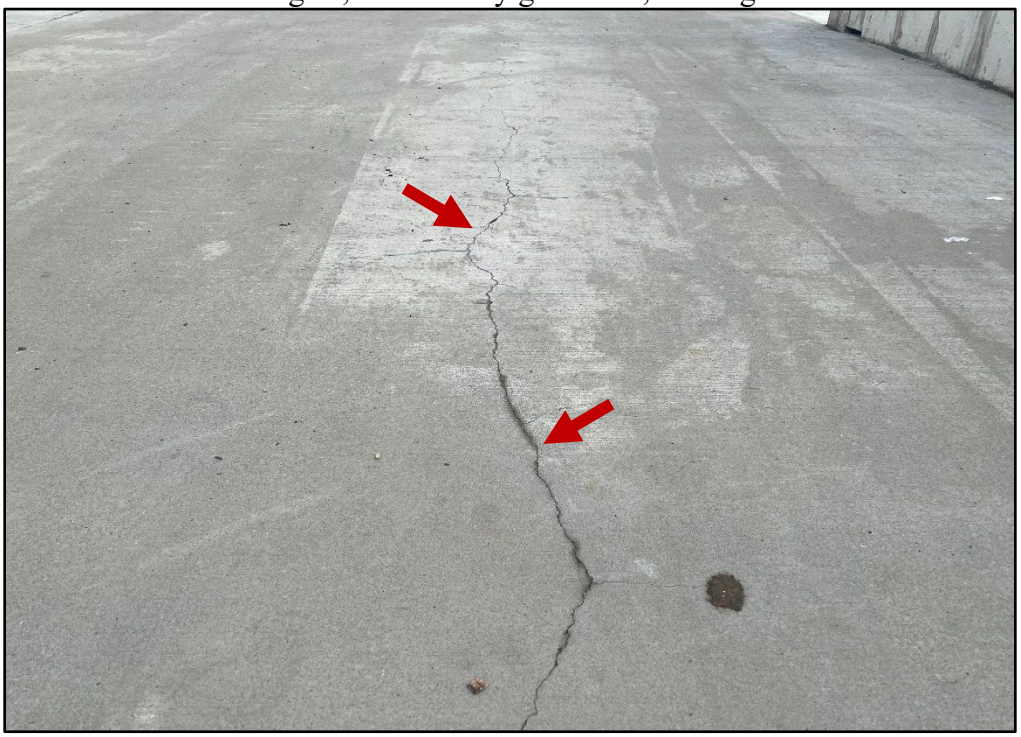


Photo 3.2-2. Minor cracking up to 1/16 in. wide on the concrete deck of the newly constructed Fordham Street Pier, looking west.

Photo 3.2-3. Timber pile making up the north timber fender rack at City Island with 30 percent section loss, looking northwest.

Photo 3.2-4. Broken timber piles comprising the south timber fender rack at City Island, looking south.

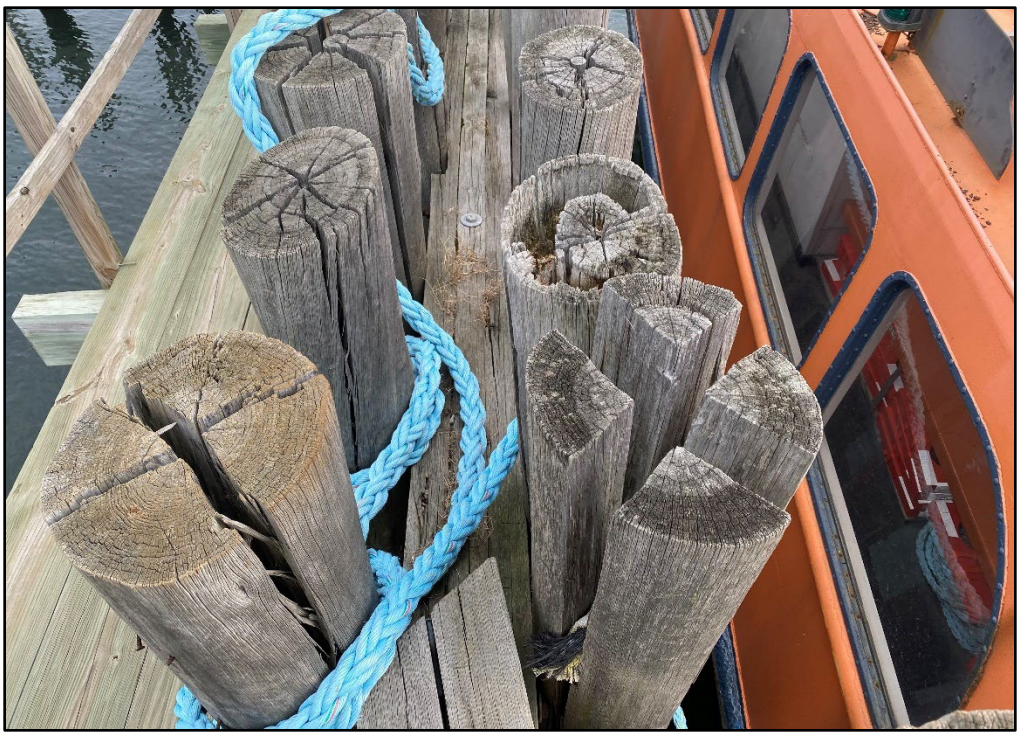


Photo 3.2-5. Tops of the timber piles making up the south timber fender rack at City Island with splitting and hollowing due to rotting, looking east.


Photo 3.2-6. Loose, missing, and broken steel connection hardware and steel cable wraps with surface corrosion securing the north timber fender rack at City Island, looking east.

Photo 3.2-7. Broken horizontal posts beneath the steel gantry weights due to impact at the south timber gantry tower at City Island, looking southeast.

Photo 3.2-8. Safety ladder with impact damage and moderate corrosion at the south timber gantry tower at City Island, looking west.

Photo 3.2-9. Broken timber piles making up the south timber fender rack at Hart Island, looking south.

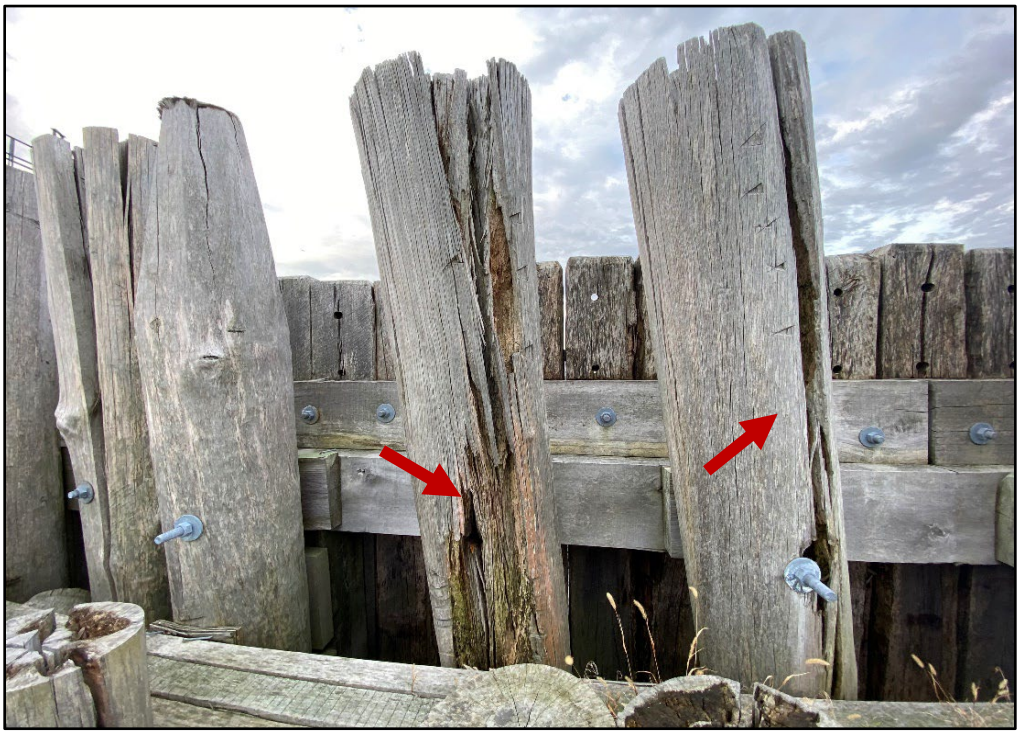


Photo 3.2-10. Tops of the timber piles making up the north timber fender rack at Hart Island with splitting and hollowing due to rotting, looking south.

Photo 3.2-11. Horizontal timber posts securing the south timber fender rack at Hart Island exhibiting fire damage, looking north.

Photo 3.2-12. Loose steel cable wraps and steel connection hardware securing the south timber fender rack at Hart Island, looking north.

Photo 3.2-13. South steel sheet pile cell supporting the gantry at Hart Island with advanced section loss due to corrosion, looking north.

Photo 3.2-14. Missing safety railing at the top of the south timber fender rack at Hart Island, looking west.


Photo 3.2-15. Timber piles at Bent 1 supporting the Coal Pier with peeling, abrasion, and section loss due to marine borers, looking west.

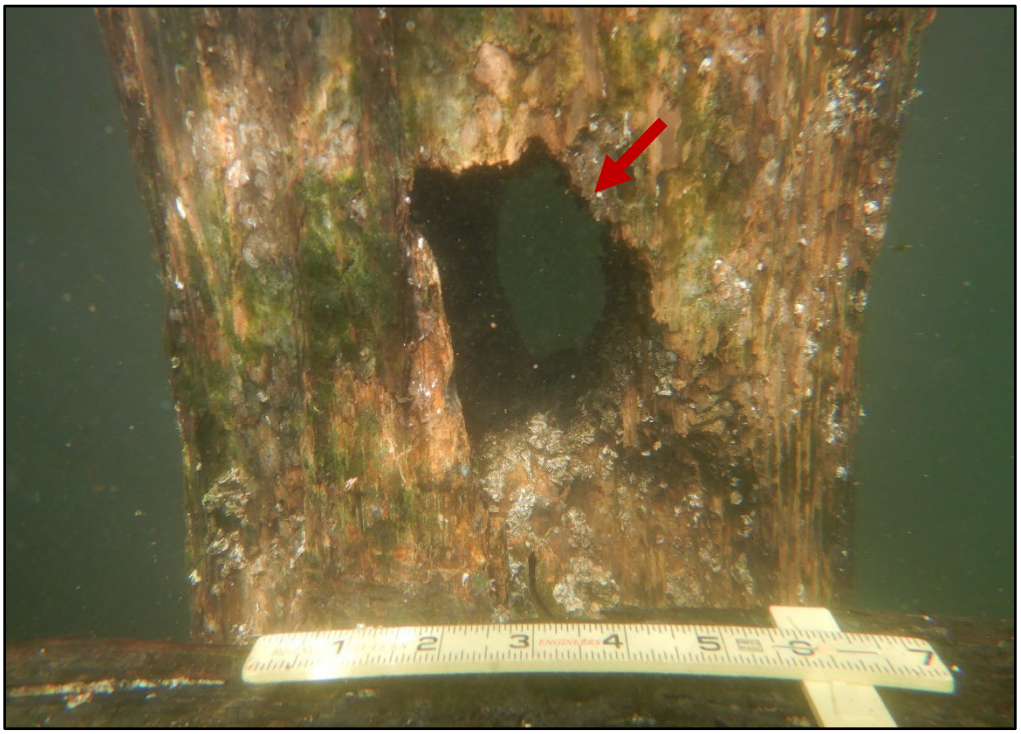


Photo 3.2-16. Timber Pile 9-F supporting the Coal Pier with section loss at a hollowed-out hole due to marine borers, looking north.

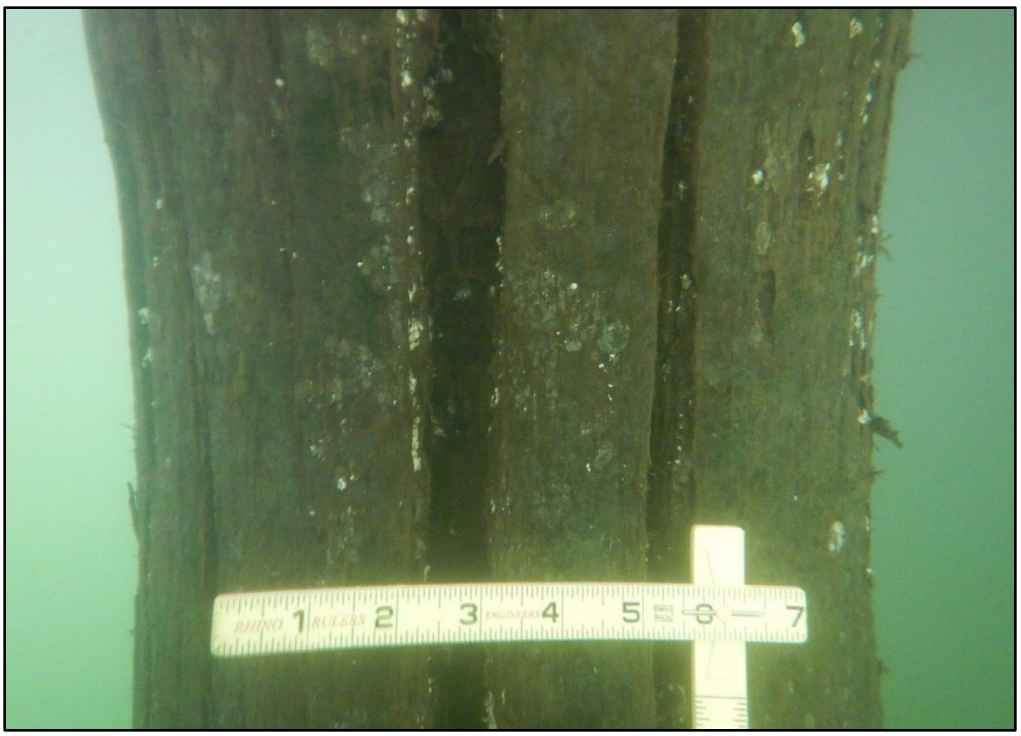


Photo 3.2-17. Timber Pile supporting the Coal Pier with up to 40 percent section loss and hollowing due to marine borers, looking east.

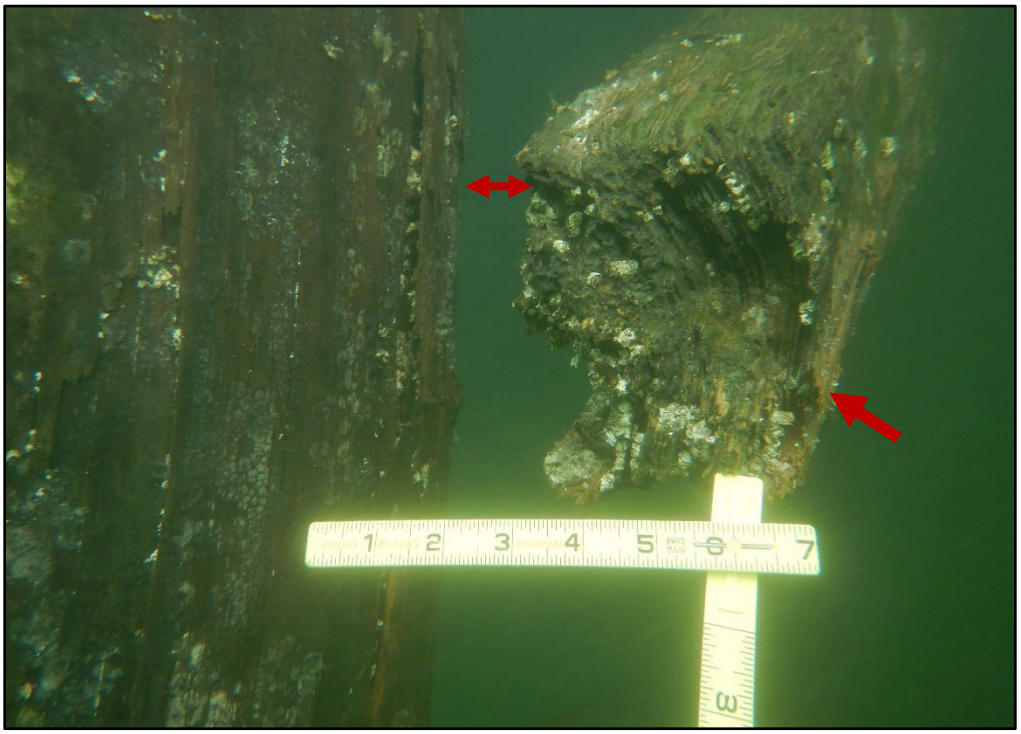


Photo 3.2-18. Detached lower timber pile bracing at the Coal Pier exhibiting section loss up to 40 percent and missing steel connection hardware, looking east.


Photo 3.2-19. Severe spall in the precast concrete deck with exposed corroded steel reinforcement up to 100 percent east of Pile 1-A' at the Coal Pier, looking west.

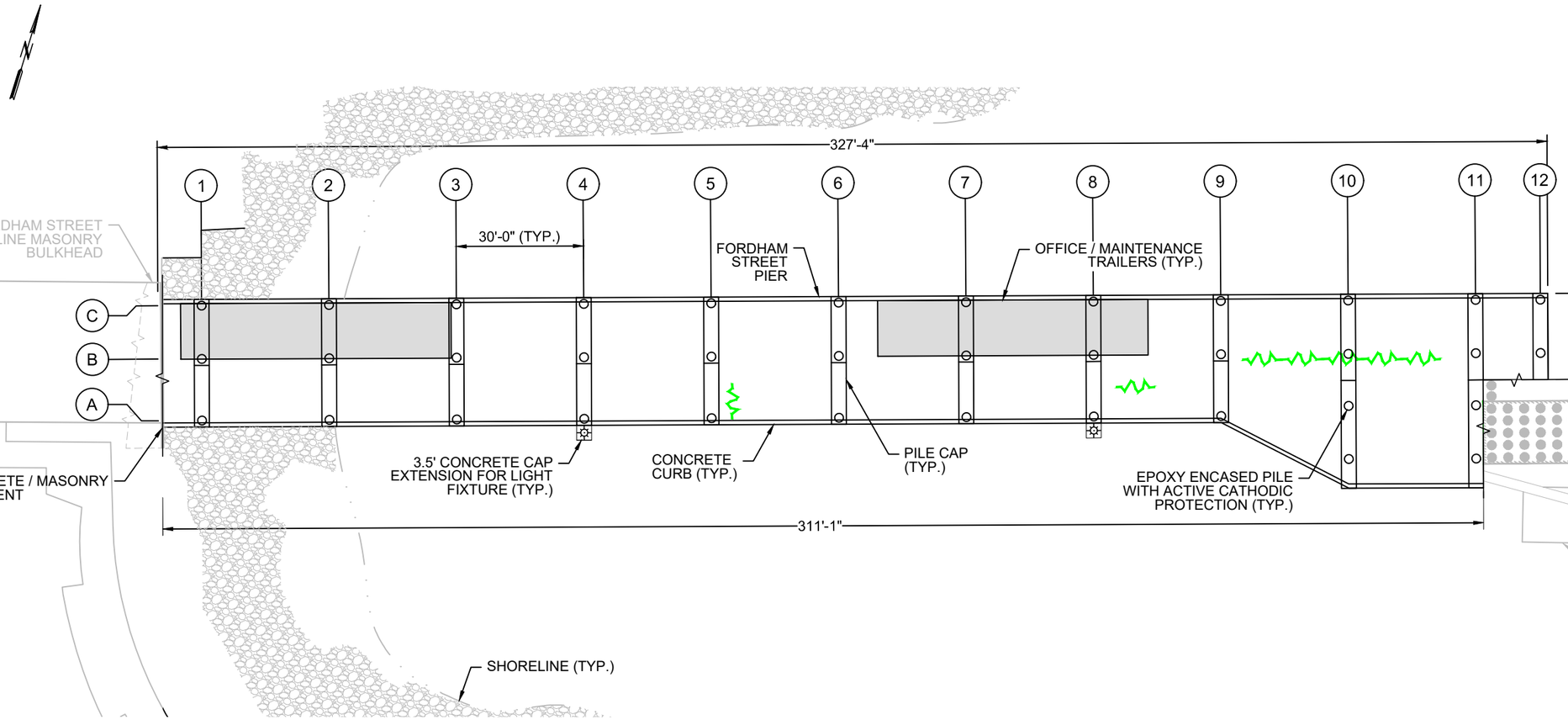

Photo 3.2-20. Severe spall 6 ft long by 3 ft high by 3 in. deep in the concrete ramp wall at the Coal Pier with exposed corroded steel reinforcement up to 30 percent, looking east.


Photo 3.2-21. Severe spall 4 ft long by 2.5 ft high by 10 in. deep in the concrete ramp wall at the Coal Pier with exposed corroded steel reinforcement up to 100 percent, looking east.


Photo 3.2-22. Undermining more than 3 ft deep beneath the concrete abutment supporting the Coal Pier, looking south.

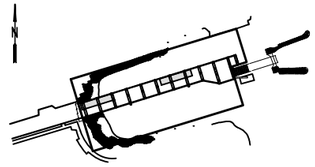

Photo 3.2-23. Missing section of curb up to 15 ft atop the south section of the main loading platform of the Coal Pier, looking north.


Photo 3.2-24. Broken and loose steel cleat atop the timber curb at the north side of the landing access platform of the Coal Pier, looking south.




## FORDHAM STREET CONDITION PLAN

SCALE: 1" = 30'

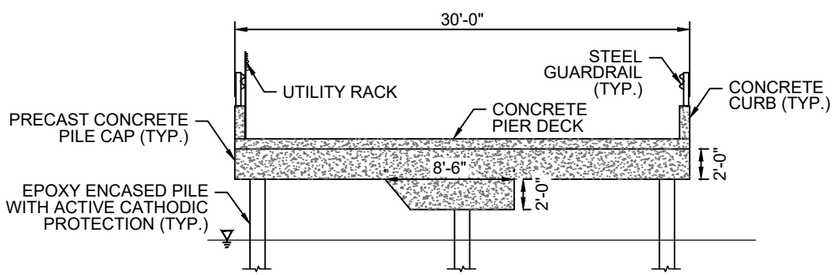


## KEY MAP

SCALE: 1" = 300'

### LEGEND

CRACK IN THE CONCRETE DECK RATED MODERATE




## TYPICAL BENT SECTION

SCALE: 1" = 10'

0 15 30 60 FT
SCALE: 1"= 30'

0 5 10 20 FT
SCALE: 1"= 10'

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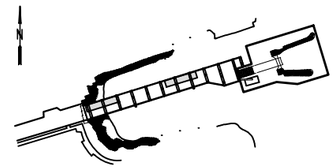
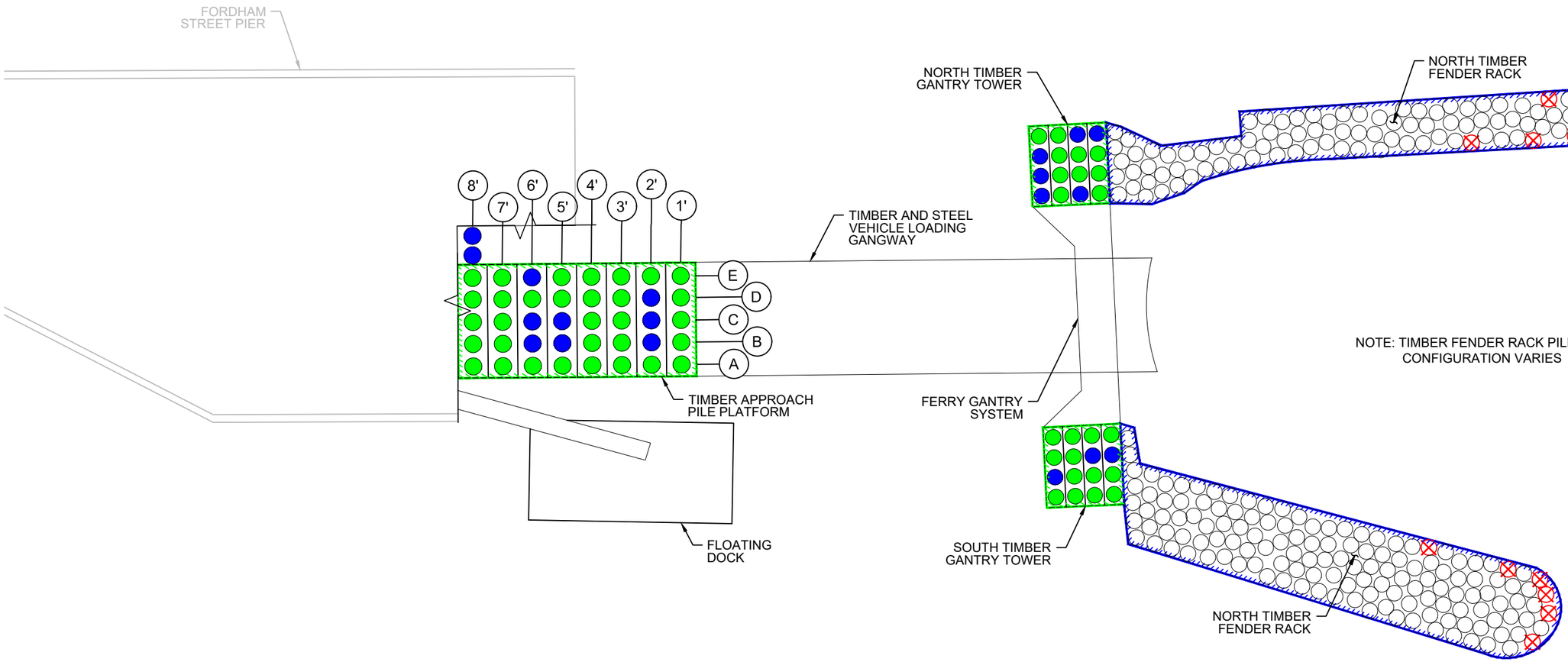
FIGURE 3.2–1
FORDHAM STREET
CONDITION PLAN

MARINE SOLUTIONS



**KEY MAP**
SCALE: 1" = 300'




**FORDHAM STREET FERRY DOCK CONDITION PLAN**
SCALE: 1" = 15'

**LEGEND**

- TIMBER FENDER RACK RATED SEVERE
- TIMBER PILE RATED ADVANCED
- TIMBER FENDER RACK RATED ADVANCED
- TIMBER PILE RATED MODERATE
- TIMBER PILE CAPS RATED MODERATE

MARINE SOLUTIONS

0 7.5 15 30 FT
SCALE: 1"= 15'

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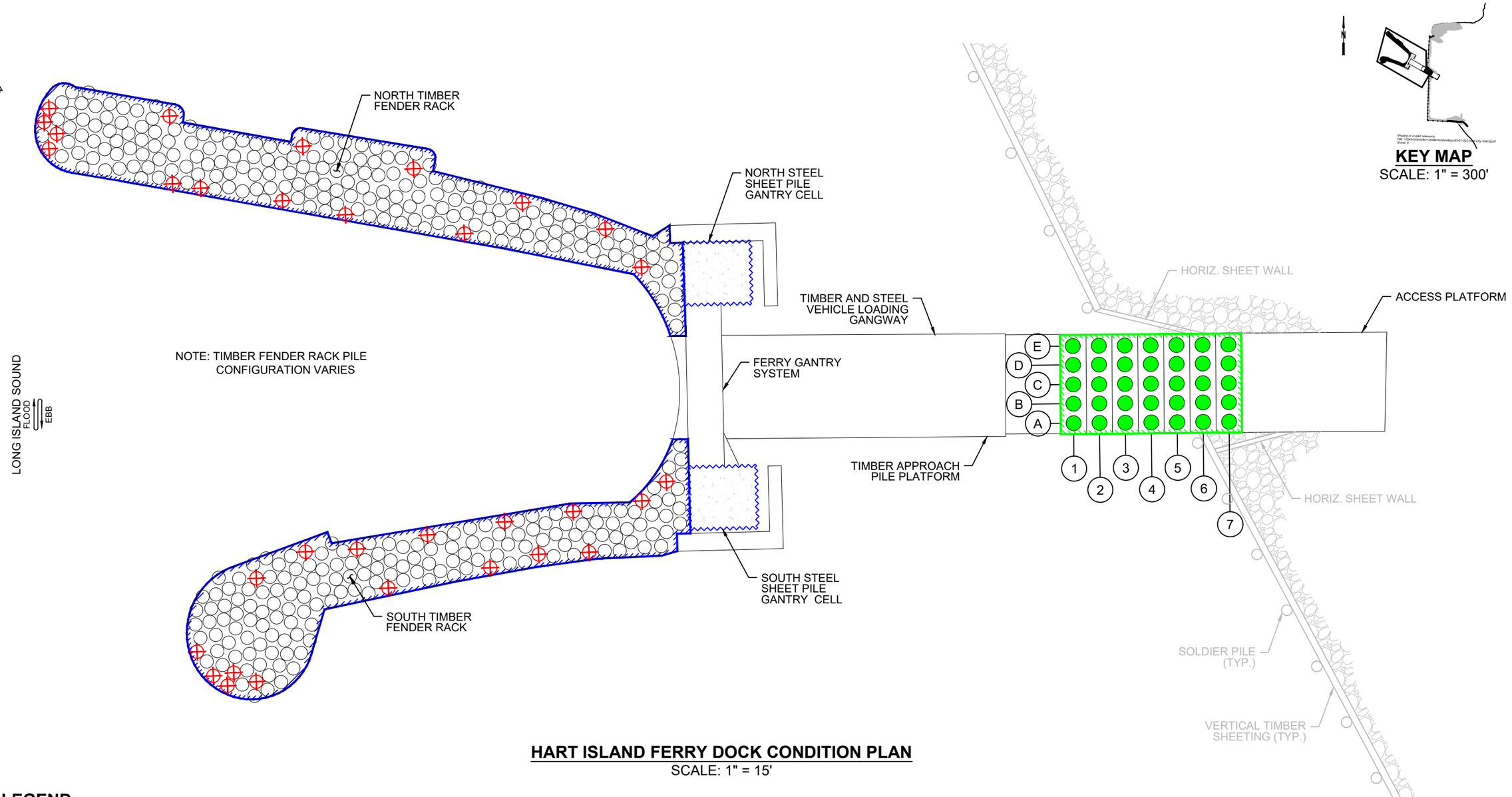
FIGURE 3.2–2
FORDHAM STREET FERRY DOCK
CONDITION PLAN







**KEY MAP**
SCALE: 1" = 300'

## HART ISLAND FERRY DOCK CONDITION PLAN
SCALE: 1" = 15'

### LEGEND

- TIMBER FENDER RACK RATED SEVERE
- TIMBER FENDER RACK RATED ADVANCED
- STEEL SHEET PILE CELL RATED ADVANCED
- TIMBER PILE RATED MODERATE
- TIMBER PILE CAPS RATED MODERATE

MARINE SOLUTIONS

0 7.5 15 30 FT
SCALE: 1"= 15'

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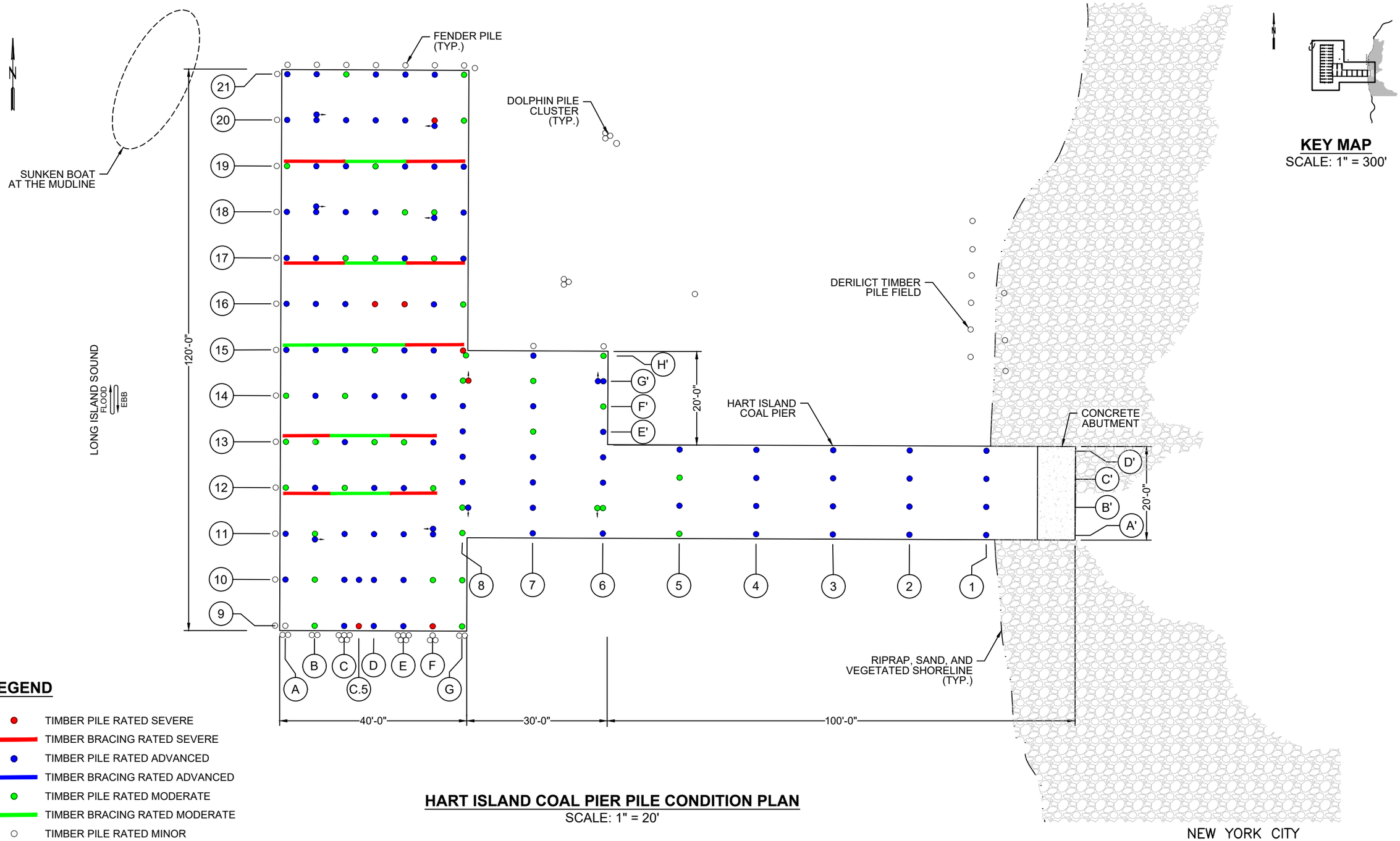
FIGURE 3.2–3
HART ISLAND FERRY DOCK
CONDITION PLAN




**KEY MAP**
SCALE: 1" = 300'

**LEGEND**

- TIMBER PILE RATED SEVERE
- TIMBER BRACING RATED SEVERE
- TIMBER PILE RATED ADVANCED
- TIMBER BRACING RATED ADVANCED
- TIMBER PILE RATED MODERATE
- TIMBER BRACING RATED MODERATE
- TIMBER PILE RATED MINOR

**HART ISLAND COAL PIER PILE CONDITION PLAN**
SCALE: 1" = 20'

0 10 20 40 FT
SCALE: 1"= 20'

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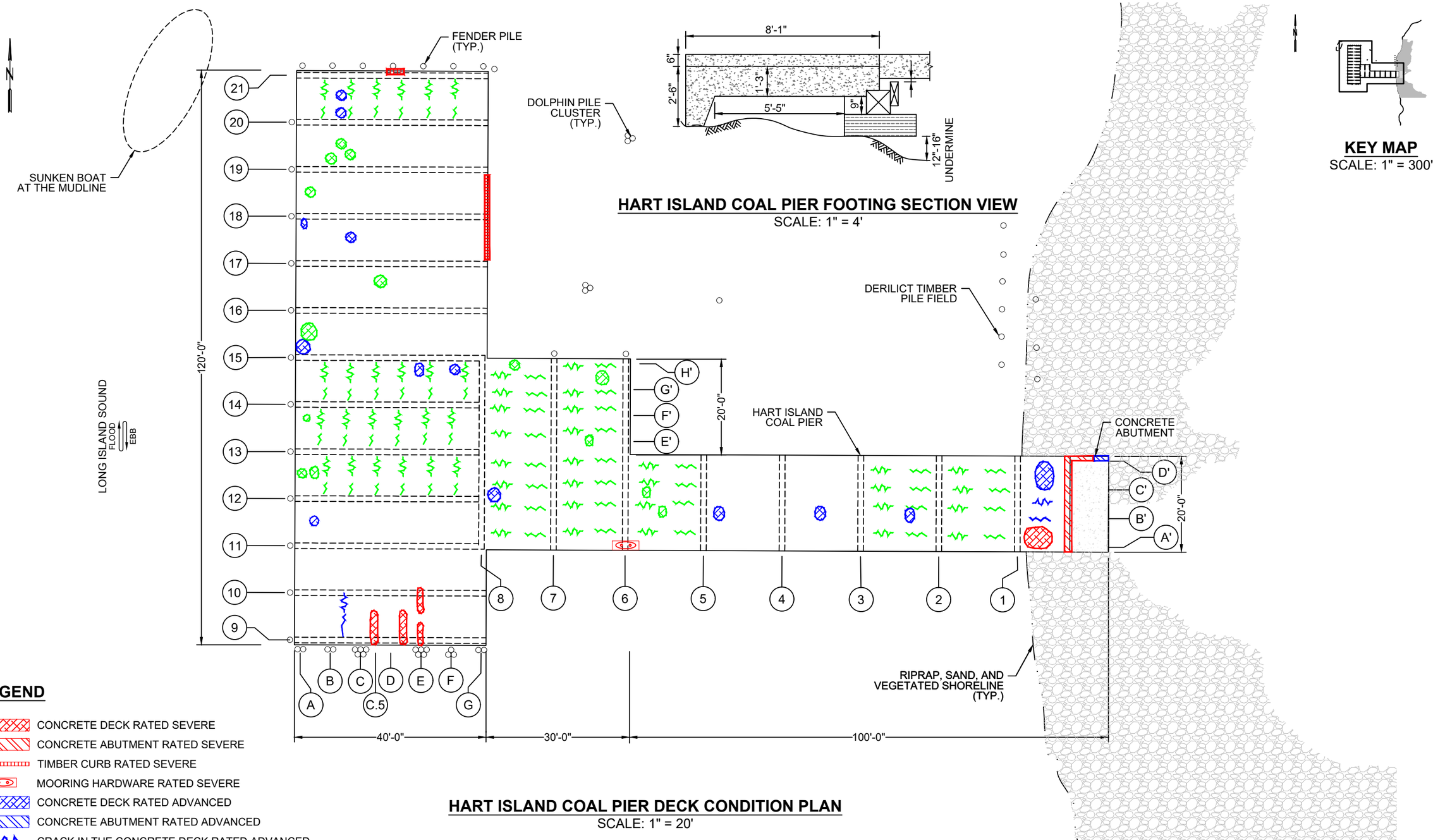
FIGURE 3.2-4
HART ISLAND COAL PIER PILE
CONDITION PLAN

MARINE SOLUTIONS




## HART ISLAND COAL PIER FOOTING SECTION VIEW

SCALE: 1" = 4'



## KEY MAP

SCALE: 1" = 300'

## HART ISLAND COAL PIER DECK CONDITION PLAN

SCALE: 1" = 20'

### LEGEND

- CONCRETE DECK RATED SEVERE
- CONCRETE ABUTMENT RATED SEVERE
- TIMBER CURB RATED SEVERE
- MOORING HARDWARE RATED SEVERE
- CONCRETE DECK RATED ADVANCED
- CONCRETE ABUTMENT RATED ADVANCED
- CRACK IN THE CONCRETE DECK RATED ADVANCED
- CONCRETE DECK RATED MODERATE
- CRACK IN THE CONCRETE DECK RATED MODERATE

MARINE SOLUTIONS

0 2 4 8 FT
SCALE: 1"= 4'

0 10 20 40 FT
SCALE: 1"= 20'

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FIGURE 3.2–5
HART ISLAND COAL PIER DECK CONDITION PLAN

# 4.0 COMPARISON WITH PREVIOUS INSPECTION RESULTS

There is no record of inspection conducted at the City Island ferry facilities. The previous inspection of Hart Island was performed by Maser Consulting, P.C. in June of 2017 under a Routine-Level basis, per the NYCEDC WFMMS manual. The scope of the 2017 Routine Inspection included a Level I general examinations of all structural components and a Level II detailed inspection of 10 percent of the components at the Hart Island Ferry Dock Shoreline, Hart Island Coal Pier Shoreline, and Hart Island Coal Pier.

## 4.1 SHORELINE INFRASTRUCTURE INSPECTION

Comparisons of the shoreline inspection findings and updates on the previously recommended actions at the shoreline from the 2017 Routine Inspection Report were made.

### (A) FORDHAM STREET SHORELINE

There is no record of inspection conducted at Fordham Street Shoreline. As such, this inspection will serve as a baseline for future investigations, allowing for development of condition comparisons, deterioration rates, and service life estimates.

### (B) HART ISLAND FERRY DOCK SHORELINE

The Hart Island Ferry Dock Shoreline was inspected under the 2017 Routine Inspection Report, wherein the structure is referred to as the 'Loading Bulkhead'. The Hart Island Ferry Dock Shoreline was previously reported in **Poor** condition due severely deteriorated timber soldier piles, severe corrosion of the steel connection hardware, advanced deterioration of the timber sheeting at the mudline due to marine borers and deterioration of the timber wales with splitting. The observed conditions at the Hart Island Ferry Dock Shoreline are either the same or have progressed since the 2017 Routine Inspection Report and the structure remains in **Poor** condition.

### (C) HART ISLAND COAL PIER SHORELINE

There is no record of inspection conducted at Hart Island Coal Pier Shoreline. As such, this inspection will serve as a baseline for future investigations, allowing for development of condition comparisons, deterioration rates, and service life estimates.

## 4.2 STRUCTURAL INSPECTION

Comparisons of the waterfront structures inspection findings and updates on the previously recommended actions at the structures from the 2017 Routine Inspection Report were made.

(A) FORDHAM STREET PIER

There is no record of inspection conducted at Fordham Street Pier. As such, this inspection will serve as a baseline for future investigations, allowing for development of condition comparisons, deterioration rates, and service life estimates.

(B) FORDHAM STREET FERRY DOCK

There is no record of inspection conducted at Fordham Street Ferry Dock. As such, this inspection will serve as a baseline for future investigations, allowing for development of condition comparisons, deterioration rates, and service life estimates.

(C) HART ISLAND FERRY DOCK

There is no record of inspection conducted at Hart Island Ferry Dock. As such, this inspection will serve as a baseline for future investigations, allowing for development of condition comparisons, deterioration rates, and service life estimates.

(D) HART ISLAND COAL PIER

The Hart Island Coal Pier was inspected under the 2017 Routine Inspection Report, wherein the structure is referred to as the 'Timber & Concrete Dock'. The Hart Island Coal Pier was previously reported in **Poor** condition due to significant deterioration of the timber piles, spalling and cracking of the concrete deck structure, and undermining, spalling, and cracking of the concrete abutment. There were several priority actions and routine actions recommended by the previous report. No priority or routine recommended actions have been completed. One (1) timber plumb pile rated severe due to a split was repaired with a steel band wrap at the top. The observed conditions at the Coal Pier are either the same or have progressed since the 2017 Routine Inspection Report and the structure remains in **Poor** condition. Table 4.1-1 provides a summary of the 2017 Routine Inspection Report recommendations and their status as of the date of this report.

**TABLE 4.1-1**
**SUMMARY OF PREVIOUS RECOMMENDED ACTIONS FOR THE HART ISLAND COAL PIER**

| Component Condition | Previously Recommended Action 2017 | Recommended Action Type | Current 2021 Status |
|---|---|---|---|
| Concrete Abutment **Poor** | Backfilling of the undermined concrete abutment | Priority | Incomplete |
| Timber Piles **Poor** | Scrape and pile-wrap all weight bearing piles to protect from further section loss due to marine borers and water abrasion | Priority | Incomplete |
| | Scrape and pile-wrap all moderately damaged piles | Routine | Incomplete |
| Precast Concrete Deck **Fair** | Patch spalls at underside of concrete deck | Routine | Incomplete |

# APPENDIX A

# FIELD NOTES

MARINE SOLUTIONS

# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Shoreline | 0 | | Note | General view of the shoreline north of the Coal Pier looking north. | | 12/16/2021 |
| Hart Island Coal Pier | Shoreline | 0 | | Note | General view of the shoreline south of the Coal Pier looking south. | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | D' | Severe | Undermining of footing 48" horizontal penetration and 16" to 18" high. Abutment footing is 26" wide. | 4.6 | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | A'-D' | Severe | Chamfer spalling 4" H x 6" D with exposed rebar with advanced corrosion full length of footing. | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | D' | Severe | Horizontal cracking with mechanical spall 2' L x 4" H x 6" D with de-bonded rebar due to settlement. | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | A' | Note | No signs of settlement on the top deck of the Coal Pier. | 3.0 | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | D' | Advanced | Crack 1/8" to 1/4" wide with exposed corroded rebar on the north face of the concrete abutment with the end near the settlement. | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | D' | Severe | North face of the abutment undermined 24' L x 6" H x 12" deep. | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | D' | Severe | Undermined full length of the west end of the abutment footing full length 1,5' H x 3' D. | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | D' | Severe | Gap due to settlement of the approach up to 3" at the north end and 0" at the south end of the abutment. | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | D' | Advanced | Seal angles cast in deck with moderate corrosion and impact damage. | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | | Note | Approach is concrete rubble and fill and is uneven. | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Abutment | 0 | A'-D' | Advanced | Spall full length along the bottom edge intermittent 3" H x 4". | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Deck | 1 | | Advanced | Multiple cracks in top approach up to 1/8" W. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 1 | A' | Advanced | Checking throughout 1/4" to 1/2" wide x 1" to 1.5" deep x 18" long. Moderate to advanced shell cracking within the tidal zone. Eye bolt at top of pile from pile cap, mild steel, with through bolt connecting to top of pile. Hardware heavily corroded (advanced). Through bolts from cap to deck also advanced corrosion. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 1 | B' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 1 | C' | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/16/2021, 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 1 | D' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 0-1 | - | Advanced | Multiple cracks hairline to 1/2" wide extending east toward the abutment with closed corrosion spall 3'W x 10'L. | | 12/16/2021 |

MARINE SOLUTIONS

# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Underdeck | 0.7 | A' | Severe | Underdeck Span 1: Open corrosion spall in underdeck 2.5' W x 2.5' L x 3" D with exposed corroded rebar. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 1-2 | - | Moderate | Multiple hairline cracking 1' to 3' long with efflorescence with isolated rust staining. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Curb | 1 | A'-D' | Note | Typical view of the timber curb 12" x 12" around the full perimeter of the pier. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 2 | D' | Advanced | Typical checking and shell cracking within the tidal zone. Pile is notched east side 1' above mudline, 2"D. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 2 | C' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 2 | B' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 2 | A' | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 2-3 | B' | Moderate | Multiple hairline cracking 1' to 3' long with efflorescence with isolated rust staining. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 2.4 | B' | Advanced | Closed spall 1.5' L x 1' W x 1.5" D in line with 'B" piles. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 3 | A' | Advanced | Typical checking with Shell cracking 1/4" to 1" D with section loss up to 30%. | 12.2 | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 3 | B' | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 3 | C' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 3 | D' | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 40%. | 11.7 | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 3.5 | B' | Advanced | Spall 2' L x 1' W x 2" D with exposed rebar minor section loss in line with 'B" piles. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 4 | A' | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 4 | B' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 4 | C' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 4 | D' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 4.7 | B' | Advanced | Closed spall 2' L x 1' W. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 5 | A' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 5 | B' | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |

MARINE SOLUTIONS

# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Timber Pile - Plumb | 5 | C' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 5 | D' | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 6 | A' | Advanced | Typical checking and shell cracking with section loss up to 35%. | 14.0 | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 6 | B' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 6 | C' | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 40%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Batter | 6 | B' | Moderate | Batter on west side of pile, battered to south. Typical checking and shell cracking within the tidal zone with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Mooring Hardware | 6 | A' | Severe | Broken cleat | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 5-6 | - | Moderate | Multiple hairline cracking 1' to 3' long with efflorescence with isolated rust staining. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 5.5 | B' | Moderate | Closed spall 2' L x 6" W. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 5.7 | C' | Moderate | Closed spall 2' L x 6" W. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 6 | D' | Advanced | Typical checking and shell cracking with section loss up to 30%. | 13.4 | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 6-7 | - | Moderate | Multiple hairline cracking 1' to 3' long with efflorescence with isolated rust staining. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 6-7 | - | Moderate | Open spall at core hole, 1' diameter x 1.5" D. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 6.5 | - | Moderate | Spall 8" L x 3" W x 1" D with rust staining. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 6 | E' | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 6 | F' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 6 | G' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Batter | 6 | G' | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 6 | H' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 6 | H' | Severe | Heavy checking and shell cracking with decay up to 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 7 | H' | Severe | Heavy checking and shell cracking with decay up to 50% section loss. | | 12/17/2021 |

MARINE SOLUTIONS

# New York City Department of Parks and Recreation (NV5)
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# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Timber Pile - Plumb | 7 | H' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 7 | G' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 7 | F' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 7 | E' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 7 | D' | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 7 | C' | Advanced | Typical checking and shell cracking with section loss up to 40%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 7 | B' | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 40%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 7 | A' | Advanced | Typical checking and shell cracking with section loss up to 40%. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 7-8 | - | Moderate | Multiple hairline cracking 1' to 3' long with efflorescence with isolated rust staining. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 7.8 | B'.5 | Advanced | Open corrosion spall 3' L x 3' W x 3" D with exposed rebar minor to moderate section loss, heavy rust scale. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 7.5 | H' | Moderate | Close spall 4' L x 12" W. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 8 | A' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 8 | B' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Batter | 8 | B' | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 8 | C' | Advanced | Typical checking and shell cracking with section loss up to 40%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 8 | D' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 8 | E' | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 8 | F' | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 40%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 8 | G' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Batter | 8 | G' | Severe | Typical checking and shell cracking within the tidal zone with section loss up to 30%. Check 23"W x 3'L x 5"D just above MLW with teredo > 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 8 | H' | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20%. | | 12/17/2021 |

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# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Timber Fender Pile | 9 | A | Severe | West side. Top 8' to 10' of pile missing, non-bearing to pier. | | 12/17/2021 |
| Hart Island Coal Pier | Mooring Hardware | 9.5 | A | Note | Typical cleat along the west face of the Coal Pier 3.6' L x Base 2.5' L x 12" W x 12" H | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 9 | A | Minor | Repaired pile, previous severe with a split. Minor section loss less than 10%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | A | Moderate | South Side - North Pile, Typical checking and shell cracking within the tidal zone. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | A | Moderate | South Side - South Pile, Typical checking and shell cracking within the tidal zone. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 9 | B | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | B | Severe | South Side - North Pile, Typical checking and shell cracking within the tidal zone. Heavy abrasion at and above tidal zone, 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | B | Severe | South Side - South Pile, Typical checking and shell cracking within the tidal zone. Heavy abrasion at and above tidal zone, 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Concrete Ramp | 9 | B.5 | Advanced | Crack 10' L x 1/8" W. on the top of the concrete ramp wall | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 9 | C | Advanced | South Side - South Pile, Typical checking and shell cracking within the tidal zone. Advanced corrosion to hardware at horizontal bracing to concrete loading ramp. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | C | Severe | Inboard East Pile, 50% section loss at and beneath lower tidal zone due to limnoria. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | C | Severe | Inboard Center Pile, 80% section loss at and beneath lower tidal zone due to limnoria. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | C | Moderate | Inboard West Pile, Typical checking and shell cracking within the tidal zone. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | C | Moderate | Outboard East Pile, Typical checking and shell cracking within the tidal zone. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | C | Moderate | Outboard West Pile, Typical checking and shell cracking within the tidal zone. | | 12/17/2021 |
| Hart Island Coal Pier | Concrete Ramp | 9 | C.5 | Severe | South face of bottom ramp, corrosion spall 8' L x 18" W x 12" D with exposed severely corroded rebar. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 9 | C.5 | Severe | Heavy hollowing of pile interior beneath braces to ramp, 70% section loss in top 2'. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 9 | D.5 | Advanced | Typical checking and shell cracking within the tidal zone. Freeze thaw chamfering at cold joints between bottom slab and vertical walls. | | 12/17/2021 |
| Hart Island Coal Pier | Concrete Ramp | 9 | D.5 | Severe | South face of bottom ramp, corrosion spall 8' L x 18" W x 12" D with exposed severely corroded rebar. Freeze thaw chamfering at cold joints between bottom slab and vertical walls. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 9 | E | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | E | Advanced | Inboard East Pile, 30% section loss at and beneath lower tidal zone due to limnoria. | | 12/17/2021 |

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# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Timber Fender Pile | 9 | E | Severe | Inboard Center Pile, 50% section loss at and beneath lower tidal zone due to limnoria. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | E | Severe | Inboard West Pile, 100% section loss beneath bracing. Typical checking and shell cracking within the tidal zone. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | E | Moderate | Outboard East Pile, 30% section loss at and beneath lower tidal zone due to limnoria. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | E | Moderate | Outboard West Pile, 30% section loss at and beneath lower tidal zone due to limnoria. | | 12/17/2021 |
| Hart Island Coal Pier | Concrete Ramp | 9 | E.5 | Severe | Outboard south face of ramp wall, corrosion spall 4' L x 2.5' H x full width with exposed severely corroded rebar completely through the wall where vertical face of ramp meets slab. Freeze thaw chamfering at cold joints between bottom slab and vertical walls. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 9 | F | Severe | Typical checking and shell cracking within the tidal zone. Severe hollowing creating a 3" W x 5" H x full depth hole within the pile. Section loss greater than 60%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | F | Severe | Inboard pile, 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | F | Severe | Outboard East pile, 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | F | Severe | Outboard West pile, 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | G | Severe | West Pile, Pile is non-bearing to pier, 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 9 | G | Severe | South Pile, Pile is non-bearing to pier, 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 9 | G | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 10 | G | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 10 | F | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 10 | E | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Concrete Ramp | 10 | E.5 | Severe | Top of ramp wall, corrosion spall 6' L x 2' H x 3" D with exposed severely corroded rebar. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 10 | D | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 10 | C | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 10 | B | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 10 | A | Advanced | Checking full depth in the tidal zone. Typical checking and shell cracking within the tidal zone with section loss up to 40%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 10 | A | Advanced | Checking full depth in the tidal zone. | | 12/17/2021 |

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# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Underdeck | 9-10 | - | Minor | Minor rust staining on underdeck, no visible cracking. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 10-11 | - | Minor | Minor rust staining on underdeck, no visible cracking. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 11 | A | Advanced | Checking full depth in the tidal zone with section loss 30% at the top. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 11 | A | Advanced | Checking full depth in the tidal zone. Typical checking and shell cracking within the tidal zone with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 11 | B | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Batter | 11 | B | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 11 | C | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 11 | D | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 11 | E | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 11 | F | Advanced | Typical checking with shell cracking within the tidal zone, section loss up to 40%. (G pile is part of Bent 8, typical for Bents 11-14) | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Batter | 11 | F | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 11-12 | - | Advanced | Multiple hairline to 1/2" cracking 1' to 3' long with efflorescence with isolated rust staining. Open corrosion spall 6" L x 6" W x 0.5" D. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 12 | F | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 12 | E | Advanced | Typical checking and shell cracking within the tidal zone with limnoria and 40% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 12 | D | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 12 | C | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 12 | B | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 12.5 | B | Moderate | Closed spall 2.5' L x 1' W. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 12.5 | A.2 | Moderate | Spall 8" L x 8" W x 2.5" D with exposed corroded rebar. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 12 | A | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Bracing | 12 | A-F | Severe | Bracing on south side, top at D pile with bottoms at 'A' and 'F' piles. Detached at the lower connection at A and C. | | 12/17/2021 |

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# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Timber Fender Pile | 12 | A | Severe | South pile, Heavy limnoria 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 12 | A | Moderate | North pile, Moderate limnoria 20% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 12-13 | - | Moderate | Multiple hairline to 1/2" cracking 1' to 3' long with efflorescence with isolated rust staining. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 12-13 | A | Moderate | Typical checking and shell cracking within the tidal zone. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 12-13 | A | Moderate | Typical checking and shell cracking within the tidal zone. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 12-13 | A | Advanced | Outboard pile,40% section loss abrasion. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Bracing | 13 | A-F | Severe | Bracing on north side, top at D pile with bottoms at 'A' and 'F' piles, limnoria trace. Detached at the lower connections. Failed connections at A and C piles, heavy limnoria. Missing bracing from F-G. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 13 | A | Moderate | Typical checking and shell cracking within the tidal zone, traces of limnoria with section loss up to 20% | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 13.7 | A.9 | Moderate | Spall 2" L x 2" W x 2" D with no exposed rebar at a drainage hole. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 13 | B | Moderate | Typical checking and shell cracking within the tidal zone, traces of limnoria with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 13 | C | Advanced | Typical checking and shell cracking within the tidal zone, traces of limnoria. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 13 | D | Moderate | Typical checking and shell cracking within the tidal zone, traces of limnoria with section loss up to 20% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 13 | E | Moderate | Typical checking and shell cracking within the tidal zone with limnoria and 20% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 13 | F | Advanced | Typical checking and shell cracking within the tidal zone, traces of limnoria. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 14 | F | Severe | Typical checking and shell cracking within the tidal zone with limnoria and 55% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 14 | E | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 14 | D | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 14 | C | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 14 | B | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 14 | A | Moderate | Typical checking and shell cracking with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 14 | A | Severe | Evidence of teredo, pile is missing top 8' and not bearing to pier. | | 12/17/2021 |

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# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Underdeck | 13-14 | - | Moderate | Multiple hairline cracks, 2' L. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 14-15 | - | Moderate | Multiple small spalls with exposed rebar from insufficient cover during casting. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 14.7 | E | Advanced | Spall 2' L x 6" W x 1" D with exposed heavily corroded rebar on south side of 15-E and 15-F. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 14.7 | F.2 | Advanced | Closed spall 1.5' L x 1.5' W x 2" D spalls with exposed heavily corroded rebar on south side of 15-F. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 15 | A | Severe | Evidence of teredo, pile is missing top 8' and not bearing to pier. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 15 | A | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 15 | A | Advanced | Spall 3' L x 3' W x 3" D with exposed corroded rebar. | | 12/16/2021 |
| Hart Island Coal Pier | Concrete Deck | 15 | A.5 | Moderate | Spall in top of deck 4' L x 3' W x 2" D. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 15 | B | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 15 | C | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 15 | D | Moderate | Typical checking and shell cracking with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 15 | E | Advanced | Multiple gouges at the top of the pile 3" L x 1" W in upper tidal zone. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Bracing | 15 | A-G | Advanced | Evidence of limnoria and teredo. Connection to G pile has failed. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 15 | F | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 15 | G | Severe | Typical checking and shell cracking within the tidal zone with limnoria and 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 16 | G | Moderate | Typical checking and shell cracking with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 16 | F | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 16 | E | Severe | Typical checking and shell cracking within the tidal zone with limnoria and 50% section loss. Open bolt hole with hollowing. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 16 | D | Severe | Typical checking and shell cracking within the tidal zone with limnoria and 60% section loss. Open bolt hole with hollowing. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 16 | C | Advanced | Typical checking and shell cracking within the tidal zone with limnoria and 40% section loss. Open bolt hole with hollowing. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 16 | B | Advanced | Opposing checks 1/2"W x 3'L, N-S. | | 12/17/2021 |

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# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Timber Pile - Plumb | 16 | A | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 15-16 | - | Moderate | Closed spall 1' diameter with multiple hairline cracks. Open spall 6" diameter x 1"D. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 16-17 | - | Moderate | Open spall at thru-bolt 8"L x 6"W x 1"D. Minor cracking. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Bracing | 17 | A-G | Severe | Bracing on south side, top at D pile with bottoms at A piles. Evidence of limnoria in upper tidal zone with 30% section loss. Detached at the lower connections. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 17 | A | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 17 | B | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 17 | C | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 17 | D | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 17 | E | Advanced | Typical checking and shell cracking within the tidal zone with limnoria and 30% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 17 | F | Moderate | Typical checking and shell cracking with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 17 | G | Advanced | Typical checking and shell cracking within the tidal zone with limnoria and 40% section loss. Opposing checks 1.5"W x 3'L, N-S | | 12/17/2021 |
| Hart Island Coal Pier | Timber Curb | 17-19 | G | Severe | Missing timber curb for 15 feet. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 18 | G | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 18 | F | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Batter | 18 | F | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 18 | E | Moderate | Typical checking and shell cracking with section loss up to 15%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 18 | D | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 18 | C | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Batter | 18 | B | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 40%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 18 | B | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 18.5 | A.5 | Moderate | Spall 8" L x 8" W x 3" D with no exposed rebar. | | 12/16/2021 |

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# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Timber Pile - Plumb | 18 | A | Advanced | Opposing checks 1/2" wide N-S at top 3.5' of pile. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 17-18 | - | Advanced | Open corrosion spalls with exposed rebar 1' L x 3.5" W x 1" D at C and E piles, south side of cap at bent 18. Open corrosion spall 6" diameter x 1" D with exposed rebar. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 18-19 | - | Advanced | Multiple hairline to 1/16" wide cracks, multiple closed spalls 8" diameter, two holes in deck at C pile 2" W x 4" L full depth of deck. Core hole on N. side of Bent 18 with spall 1' L x 8" W x 1.5" D. No exposed rebar at these holes. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 18-19 | A | Advanced | Outboard pile: 40% section loss due to abrasion with trace limnoria | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 18-19 | A | Advanced | Outboard pile: 40% section loss due to abrasion with trace limnoria | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 18-19 | A | Advanced | Outboard pile: 40% section loss due to abrasion with trace limnoria | | 12/17/2021 |
| Hart Island Coal Pier | Concrete Deck | 19-21 | A-E | Note | Timber loading ramp | | 12/16/2021 |
| Hart Island Coal Pier | Timber Bracing | 19 | A-G | Severe | Bracing on south side of bent. Teredo and limnoria. 100% section loss at top of bracing East side, top bolt is disconnected due to rot. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 19 | A | Moderate | Typical checking and shell cracking with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 19 | B | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 19.2 | B.2 | Moderate | Spall 8" L x 8" W x 3" D at drainage hole with no exposed rebar. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 19.5 | B.5 | Moderate | Spall 8" L x 8" W x 3" D with rust staining and no exposed rebar. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 19.3 | B.8 | Moderate | Spall 8" L x 8" W x 3" D with rust staining and no exposed rebar. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 19 | C | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 19 | D | Moderate | Typical checking and shell cracking within the tidal zone with section loss up to 15% | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 19 | E | Advanced | Typical checking and shell cracking within the tidal zone with limnoria and 35% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 19 | F | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 19 | G | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 19 | G | Advanced | Typical checking and shell cracking within the tidal zone with limnoria and 40% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 20 | G | Moderate | Typical checking and shell cracking with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Batter | 20 | F | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 30%. | | 12/17/2021 |

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# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Timber Pile - Plumb | 20 | F | Severe | Typical checking and shell cracking 1.5-2" D within the tidal zone with limnoria and 55% section loss from hollowing. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 20 | E | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 20 | D | Advanced | Typical checking and shell cracking within the tidal zone. Gouge at top of pile 1' L x 1" W. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 20 | C | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 20 | B | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Batter | 20 | B | Advanced | Typical checking and shell cracking within the tidal zone with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 20 | A | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 20 | A | Severe | South Pile. 60% section loss due to abrasion. Evidence of limnoria. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 20 | A | Advanced | North pile. Gouge in upper tidal zone 2' H x 1' W x 4" D with 40% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Underdeck | 20-21 | - | Moderate | Multiple rust stains throughout, no visible cracking. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 20.2 | B.2 | Advanced | Spall 12" L x 8" W x 3" D with exposed corroded rebar with rust staining. | | 12/16/2021 |
| Hart Island Coal Pier | Underdeck | 20.6 | B.2 | Advanced | Spall 12" L x 8" W x 3" D with exposed corroded rebar with rust staining. | | 12/16/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 21 | A | Severe | Limnoria with 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 21 | A | Advanced | Typical checking and shell cracking with section loss up to 35%. | 17.5 | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 21 | B | Moderate | Typical checking and shell cracking with section loss up to 20%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 21 | B | Severe | Limnoria and Teredo with 80% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 21 | C | Moderate | Typical checking and shell cracking with section loss up to 15%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 21 | C | Severe | Limnoria and Teredo with 60% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 21 | D | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 21 | D | Advanced | Limnoria and Teredo with 40% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Curb | 21 | D | Severe | Missing timber curb up to 2' long. | | 12/16/2021 |

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# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Coal Pier

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Coal Pier | Timber Pile - Plumb | 21 | E | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 21 | E | Severe | Limnoria and Teredo with 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 21 | F | Advanced | Typical checking and shell cracking with section loss up to 30%. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 21 | F | Severe | Limnoria and Teredo with 60% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 21 | G | Moderate | Typical checking and shell cracking with section loss up to 20%. | 15.0 | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 21 | G | Severe | North pile broken, 3' stub at mudline | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 21 | G | Advanced | East Pile Limnoria and Teredo with 40% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 19-20 | SE | Severe | Typical checking and shell cracking within the tidal zone. Evidence of Teredo. Hollowing estimated at 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 19-20 | NE | Severe | Typical checking and shell cracking within the tidal zone. Evidence of Teredo. Hollowing estimated at 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 19-20 | E | Severe | Typical checking and shell cracking within the tidal zone. Evidence of Teredo. Hollowing estimated at 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 16-17 | SE | Severe | Typical checking and shell cracking within the tidal zone. Evidence of Teredo. Hollowing estimated at 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 16-17 | NE | Severe | Typical checking and shell cracking within the tidal zone. Evidence of Teredo. Hollowing estimated at 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Fender Pile | 16-17 | E | Severe | Typical checking and shell cracking within the tidal zone. Evidence of Teredo. Hollowing estimated at 50% section loss. | | 12/17/2021 |
| Hart Island Coal Pier | Timber Pile - Plumb | 20-21 | Outboard | Advanced | Typical checking and shell cracking with section loss up to 35%. | | 12/17/2021 |

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# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Ferry Dock Shore

| Structure | Element | Station | Offset | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Ferry Dock Shoreline | Dry-Stacked Stone Wall | 0+00 to 0+90 | 0 | Advanced | Area of subsidence behind wall 4' W on average. Timber sheeting stops at the riprap/stone mudline. Exposed height of timber bulkhead measured as the top timber wale to the mudline increases from 8.3' (0+00) to 11.9' (0+60). | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Dry-Stacked Stone Wall | 0+00 to 0+09 | 0 | | No timber bulkhead in place outboard of stacked stone wall. The gaps between the timber sheeting are 1" to 2" W. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 0+00 to 0+60 | | | Timber sheeting stops at the riprap/stone mudline. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 0+09 to 0+60 | | | Timber soldier piles are in moderate condition. The top timber wale is severe condition due to splitting and rot. | | |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 0+09 | | | Start of timber sheeting. Areas of subsidence up to 8' W at the southwest corner of the bulkhead. Mixed rubble fill 12" to 3' in diameter (estimated). Depth of subsidence estimated from 1' to 5' deep. | 9.2 | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 0+09 to 0+60 | | | 1-2" W gaps typical. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 0+60 to 3+10 | | | Timber sheeting are embedded into sand/rock mudline. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 0+85 | | | 3" W gaps with fill observed behind timber sheeting. | 10.1 | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 0+60 to 1+91 | | | Subsidence of backside of bulkhead 1' to 2' D x 2' to 4' W. Sand backfill inshore of bulkhead. Exposed height of timber bulkhead measured as the top timber wale to the mudline decreases from 12.5' (0+60) to 7.9' (1+91). | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 1+91 to 2+18 | | | Access platform to ferry landing is pile supported with no visible backwall. Possible riprap slope to u/deck flanked by retaining walls consisting of 4" W x 12" H horizontal timbers braced by bulkhead piles to the west and meeting the rock wall to the east. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 0+60 to 1+91 | | | 3" +/- gap in sheeting to underside of upper wale visible large 3' L x 3' W x 1' thick stone appears to be stacked along backside of the wall. No fines are visible. Smaller 4" to 6" diameter stone visible in gap at base of the sheeting with large voids present behind the wall with up to 3' deep +/- horizontal penetration. Typical 0" to 1/2" gaps between the sheeting with horizontal penetration up to 3' deep +/-. Ice pick penetrations 1/8" to 1/4" on timber sheets and 1/4" deep on timber soldier piles with moderate shell peeling, rot, and E-W splitting at the top thru-bolt connections. The steel hardware is moderate due to surface corrosion.<br><u>General Conditions:</u><br>The condition of the timber sheeting is moderate with signs of teredo.<br>The condition of the timber soldier piles is advanced to severe with moderate to advanced section loss, splitting, rot, and teredo.<br>The condition of the timber wales is advanced to severe with moderate to advanced section loss, splitting, rot, and teredo.<br>The steel hardware is moderate due to surface corrosion. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 1+25 | | Severe | 7" wide gap between vertical timber sheeting with 3' penetration and large stone observed in gap. | ~8.0 | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 1+36 to 1+91 | | Severe | The low water wale has advanced to severe section loss with full length splitting at the hardware connections. | | 12/16/2021 |

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# Rapid-Level Inspection
# Hart Island Ferry Dock Shore

| Structure | Element | Station | Offset | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 2+18 to 3+10 | | | Typical construction and conditions. The vertical sheeting continues into the mudline. Subsidence zone upland of the bulkhead 4' to 6' W x 2' to 4' D with rubble fill. The top of the bracing piles is advance to severe due to rot in the top 1' to 2'.<br>General Conditions:<br>The condition of the timber sheeting is moderate with signs of teredo.<br>The condition of the timber soldier piles is advanced to severe with moderate to advanced section loss, splitting, rot, and teredo.<br>The condition of the timber wales is advanced to severe with moderate to advanced section loss, splitting, rot, and teredo.<br>The steel hardware is moderate due to surface corrosion. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 3+10 | | Severe | Horizontal 4" W x 12" H plank retaining wall angles to the northeast. Retaining rubble fill is present behind retaining wall and shows signs of settling. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 2+64 to 3+10 | | Severe | Bulkhead is leaning outward +/- 6"W x 12" H. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 2+70 | | | 3rd timber pile from the north end is broken 5' +/- below the top of the wall. Break occurs at the upper wale hardware. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 2+18 to 3+10 | | | The timber sheeting extends into the mudline. Exposed height of timber bulkhead measured as the top timber wale to the mudline increases from 9.7' (2+18) to 11.8' (3+10). | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 3+10 | | | Retaining wall and horizontal sheeting in typical condition is integrated into the north end of the bulkhead. | 11.8 | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 2+18 to 3+10 | | | General Conditions:<br>The condition of the timber sheeting is moderate with signs of teredo and rot.<br>The condition of the timber soldier piles is moderate to advanced with checking, splitting of the upper 2' to 5', rot, and teredo.<br>The condition of the timber wales is advanced to severe with moderate to advanced section loss, splitting, rot, and teredo.<br>The steel hardware is moderate due to surface corrosion. | | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 2+18 | | | Return wall meets side of access landing. | 9.7 | 12/16/2021 |
| Hart Island Ferry Dock Shoreline | Timber Sheet Pile Bulkhead | 1+70 | | | Top of the bulkhead to the water surface is 5.0' at 09:15 AM on 12/16/2021 | | 12/16/2021 9:15:00 AM |

MARINE SOLUTIONS

# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Fordham Street Ferry Dock

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Fordham Street Pier | Timber Landing Platform | 1 | A | Moderate | 10-15% section loss with limnoria and teredo. This is the typical condition for timber piles. | | 12/20/2021 |
| Fordham Street Pier | Timber Landing Platform | 2 | D | Advanced | Split at the top 5' North/South direction 1.5" W. Pile has 10-15% section loss with limnoria and teredo. | | 12/20/2021 |
| Fordham Street Pier | Timber Landing Platform | 2 | C | Advanced | Split at the top 2' East/West direction 1" W. Pile has 10-15% section loss with limnoria and teredo. | | 12/20/2021 |
| Fordham Street Pier | Timber Landing Platform | 2 | B | Advanced | Split at the top 1.5' North/South direction 1" W. Pile has 20% section loss with limnoria and teredo. | | 12/20/2021 |
| Fordham Street Pier | Timber Landing Platform | 5 | B | Advanced | Split at the top 2.5' East/West direction 1" W. Pile has 15-20% section loss with limnoria and teredo. | | 12/20/2021 |
| Fordham Street Pier | Timber Landing Platform | 5 | C | Advanced | Split at the top 2' East/West direction 3/4" W. Pile has 15-20% section loss with limnoria and teredo. | | 12/20/2021 |
| Fordham Street Pier | Timber Landing Platform | 6 | E | Advanced | Split at the top 3' North/South and East/West direction 1.5" W with fishplate repair with 75% section loss on timber plates and advanced corrosion of connection hardware. Pile has 15-20% section loss with limnoria and teredo. | | 12/20/2021 |
| Fordham Street Pier | Timber Landing Platform | 6 | C | Advanced | Split at the top 1' East/West direction 1/2" W. Pile has 15-20% section loss with limnoria and teredo. | | 12/20/2021 |
| Fordham Street Pier | Timber Landing Platform | 6 | B | Advanced | Split at the top 1' North/South direction 1" W. Pile has 40% section loss with limnoria and teredo near split. | | 12/20/2021 |
| Fordham Street Pier | Timber Landing Platform | 8 | F | Advanced | Split at the top 2.5' North/South direction 2" W. Pile has 15% section loss with limnoria and teredo. | | 12/20/2021 |
| Fordham Street Pier | Timber Landing Platform | 8 | G | Advanced | Split at the top 3' East/West direction 1.5" W. Pile has 15% section loss with limnoria and teredo. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - South Tower | 1 | C | Advanced | Advanced pile with 30% section loss at the mudline. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - South Tower | 1 | D | Moderate | Split at the top of the pile 1" W with moderate connection hardware. The timber framing (bracing and pile caps) have 5% section loss. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - South Tower | 2 | C | Advanced | Split at the top 2.5' East/West direction 1" W. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - South Tower | 2 | D | Moderate | Split at the top 3' North/South and East/West direction 1/4" W. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - South Tower | 2-3 | | Moderate | Piles typically exhibit 15% section loss with limnoria and teredo. Only 3 piles in these rows. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - South Tower | 4 | B | Advanced | Split at the top 4' North/South and East/West direction 1" W. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - South Tower | 4 | E | Moderate | Piles typically exhibit 15% section loss with limnoria and teredo. There are 6 piles in this row. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - North Tower | 1 | D | Advanced | Split at the top 3.5' East/West direction 1" W. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - North Tower | 2 | D | Advanced | Split at the top 2.5' North/South direction 1/2" W. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - North Tower | 2 | A | Advanced | Split at the top 2' North/South direction 1" W. | | 12/20/2021 |

MARINE SOLUTIONS

# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Fordham Street Ferry Dock

| Structure | Element | Row | Pile | Damage Grade | Comments | Exposed Height (ft) | Date |
|---|---|---|---|---|---|---|---|
| Fordham Street Pier | Timber Platform - North Tower | 3 | B | Moderate | Posted pile with typical conditions. 10-15% section loss with limnoria and teredo. The connection hardware exhibits moderate corrosion. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - North Tower | 4 | A | Advanced | 30$ section loss with limnoria and teredo at the mudline. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - North Tower | 4 | B | Advanced | Split at the top 2.5' East/West direction 1" W. | | 12/20/2021 |
| Fordham Street Pier | Timber Platform - North Tower | 4 | C | Advanced | Split at the top 3' East/West direction 1.5" W. | | 12/20/2021 |
| Fordham Street Pier | North Timber Fender Rack | | | Severe | 2 severe piles 20 west of end of rack at the mudline. | | 12/20/2021 |
| Fordham Street Pier | North Timber Fender Rack | | | Severe | 1 broken pile on north side of the North Timber Fender Rack. | | 12/20/2021 |
| Fordham Street Pier | North Timber Fender Rack | | | Severe | Several broken piles at the east end cluster of the North Timber Fender Rack. | | 12/20/2021 |
| Fordham Street Pier | North Timber Fender Rack | | | Severe | 4 piles on the south side of the North Timber Fender Rack | | 12/20/2021 |
| Fordham Street Pier | South Timber Fender Rack | | | Severe | 1 broken pile on north side of the South Timber Fender Rack. | | 12/20/2021 |
| Fordham Street Pier | South Timber Fender Rack | | | Severe | Several broken piles at the east end of the cluster of the South Timber Fender Rack. | | 12/20/2021 |

MARINE SOLUTIONS

# New York City Department of Parks and Recreation (NV5)
# 03-21-023 Hart Island Transportation Study Field Notes
# Rapid-Level Inspection
# Hart Island Ferry Dock Steel

| Structure | Element | Elevation/ Zone | Exposed Height (ft) | Damage Grade | Face | Ultrasonic Thickness Measurements (in.) | | | | | | | | | Nominal Thickness (in.) | Maximum Section Loss (%) | Date Time |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Outer Flange | | | Web | | | Inner Flange | | | | | |
| Hart Island Ferry Dock | Steel Sheet Pile - North Cell | Atmospheric | 10.0 | Moderate | North | 0.325 | 0.330 | 0.330 | 0.305 | 0.305 | 0.305 | 0.350 | 0.350 | 0.350 | 0.375 | 18.7% | 12/17/2021 8:15:00 AM |
| Hart Island Ferry Dock | Steel Sheet Pile - North Cell | Mudline | 8.0 | Advanced | East | 0.225 | 0.225 | 0.225 | 0.330 | 0.330 | 0.330 | 0.350 | 0.350 | 0.350 | 0.375 | 40.0% | 12/17/2021 8:45:00 AM |
| Hart Island Ferry Dock | Steel Sheet Pile - North Cell | Mudline | 10.0 | Severe | West | 0.210 | 0.180 | 0.185 | 0.185 | 0.190 | 0.195 | 0.365 | 0.355 | 0.360 | 0.375 | 52.0% | 12/17/2021 8:50:00 AM |
| Hart Island Ferry Dock | Steel Sheet Pile - South Cell | Atmospheric | 10.0 | Advanced | South | 0.365 | 0.365 | 0.365 | 0.235 | 0.225 | 0.220 | 0.335 | 0.330 | 0.340 | 0.375 | 41.3% | 12/17/2021 8:50:00 AM |
| Hart Island Ferry Dock | Steel Sheet Pile - South Cell | Mudline | 10.0 | Minor | South | 0.350 | 0.345 | 0.350 | 0.325 | 0.325 | 0.325 | 0.355 | 0.355 | 0.355 | 0.375 | 13.3% | 12/17/2021 8:00:00 AM |
| Hart Island Ferry Dock | Steel Sheet Pile - South Cell | Mudline | 11.0 | Minor | North | 0.330 | 0.335 | 0.335 | 0.335 | 0.340 | 0.345 | 0.340 | 0.340 | 0.340 | 0.375 | 12.0% | 12/17/2021 8:55:00 AM |

# APPENDIX B

# REFERENCES

## B. References


Chrysalis Archaeological Consultants, Inc. *Phase IA - Documentary Study and Archaeological Assessment for the Hart Island, Bronx (Bronx County), New York – Shoreline Stabilization Project*. Greenman-Pedersen, Inc. City of New York Department of Corrections. September 2017.

Green-Pedersen, Inc. & McLaren Engineering. *Hart Island Shoreline Stabilization Bronx, New York PIN#: 072201826CPD*. The City of New York Department of Correction. Division of Capital Policy and Development Engineering Unit. September 25, 2018.

Halcrow Engineering. *Ferry Division Reconstruction of City Island Pier*. New York City Department of Transportation. 2019.

Maser Consulting, P.A. for New York City Economic Development Corporation. *Hart Island Bronx, New York Routine Inspection*. Waterfront Facilities Maintenance Management System. Inspection Guidelines Manual. June 2017.

M.G. McLaren, P.C. for New York City Economic Development Corporation. *Hart Island Shoreline Damage Report Hurricane Sandy*. May 22, 2013.

New York City Economic Development Corporation. *2018-2019 NYC Ferry Expansion Feasibility Study*. January 11, 2018.

New York City Economic Development Corporation. Waterfront Facilities Maintenance Management System. Inspection Guidelines Manual. May 2016.

# Appendix G

# City Island & Hart Island Bathymetric Surveys

## GENERAL NOTES

1. THE INFORMATION PRESENTED ON THIS DRAWING REPRESENTS THE MEASUREMENTS AND SOUNDINGS TAKEN BY MARINE SOLUTIONS, INC. ON DECEMBER 13, 2021.
2. ECHOSOUNDER - R2SONIC 2022 MULTIBEAM OPERATING AT 400KHZ.
3. POSITIONING AND MOTION - APPLANIX POS MV WAVEMASTER WITH IARTK POSITIONING.
4. SOUND VELOCITY SENSORS - AML MICRO SOUND VELOCITY PROBE ATTACHED TO THE SONAR BRACKET AND AN AML SOUND VELOCITY PROFILER.
5. VERTICAL COMPENSATION FOR CHANGING WATER LEVELS IS PROVIDED USING PPK SOLUTION PROVIDED BY CORRECTIONS FROM THE CORS NETWORK.
6. HORIZONTAL DATUM: STATE PLANE NEW YORK LONG ISLAND NAD83 2011 U.S. SURVEY FEET.
7. VERTICAL DATUM: NAVD88 U.S. SURVEY FEET.
8. SURVEY PERFORMED IN ACCORDANCE WITH INTERNATIONAL HYDROGRAPHIC ORGANIZATION (IHO) ORDER 1A.
9. AERIAL PHOTO: BING.

LONG ISLAND SOUND
EBB
FLOOD

HART ISLAND REFER TO FIGURE NO. 3

CITY ISLAND REFER TO FIGURE NO. 2

N

ELEVATION LEGEND CITY ISLAND (NAVD88 FEET)

-9.0
-12.0
-15.0
-18.0
-21.0
-24.0
-27.0

ELEVATION LEGEND HART ISLAND (NAVD88 FEET)

-12.0
-15.0
-18.0
-21.0
-24.0
-27.0
-30.0



**OVERVIEW**
SCALE: 1" = 400'

NOAA STATION: KINGS POINT, NY 8516945

4.21' NAVD88

0.0' MLLW

MARINE SOLUTIONS

0 200 400 800 FT
SCALE: 1"= 400'

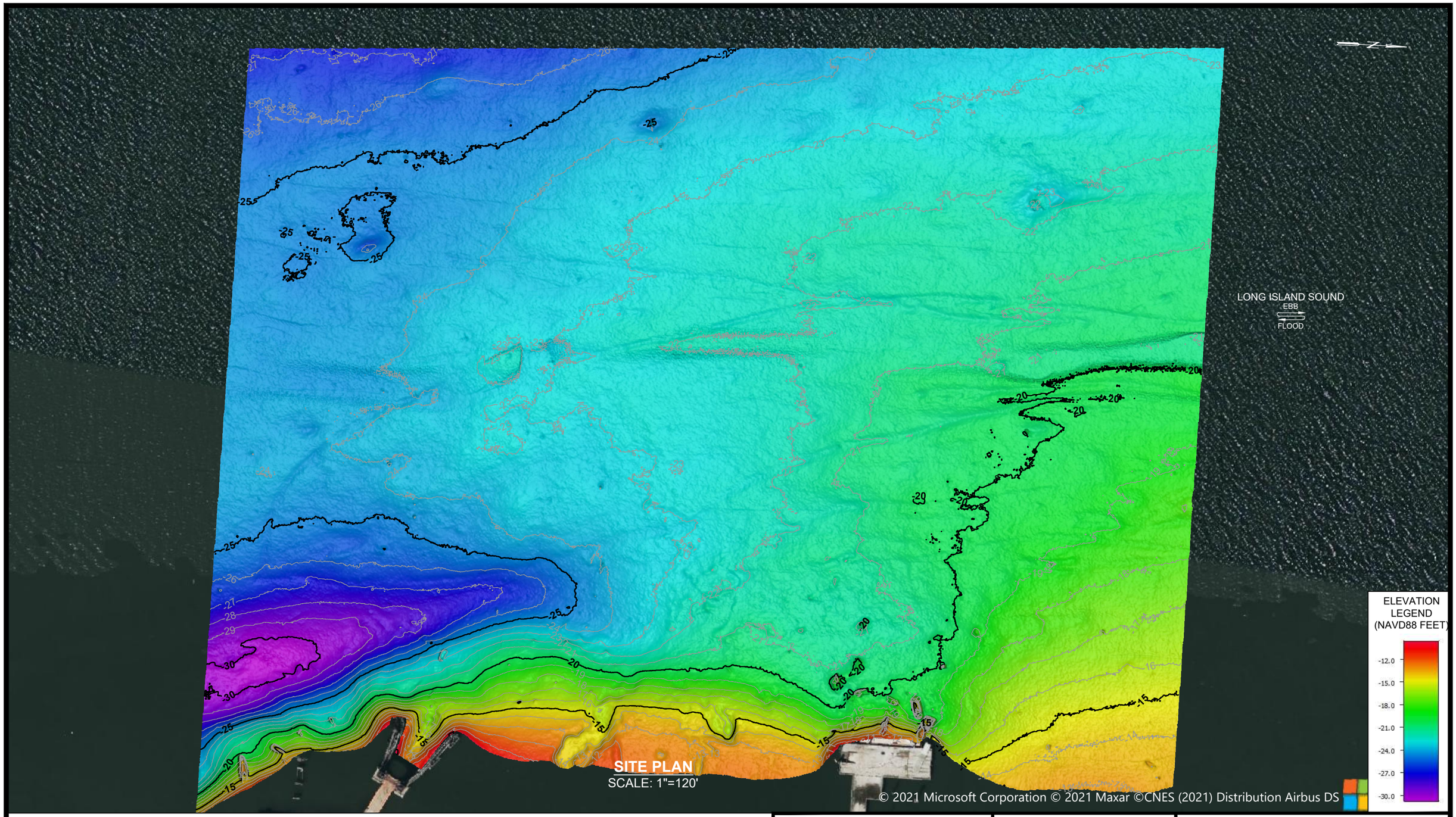
NV5 Delivering Solutions Improving Lives

| | |
|---|---|
| DATE: DECEMBER 13, 2021 | DRN BY: BEK |
| MSI JOB: 03-21-023 | CKD BY: JFG |
| FILENAME: 03-21-023_SURV-HART.DWG | |

HART ISLAND TRANSPORTATION STUDY
HYDROGRAPHIC SURVEY

OVERVIEW

FIG. NO.
1 OF 3




## GENERAL NOTES

1. HORIZONTAL DATUM: STATE PLANE NEW YORK LONG ISLAND NAD83 2011 U.S. SURVEY FEET.
2. VERTICAL DATUM: NAVD88 U.S. SURVEY FEET.
3. AERIAL PHOTO: BING.

## LEGEND

5 MAJOR CONTOURS

1 MINOR CONTOURS

MARINE SOLUTIONS

0 60 120 240 FT

SCALE: 1"= 120'

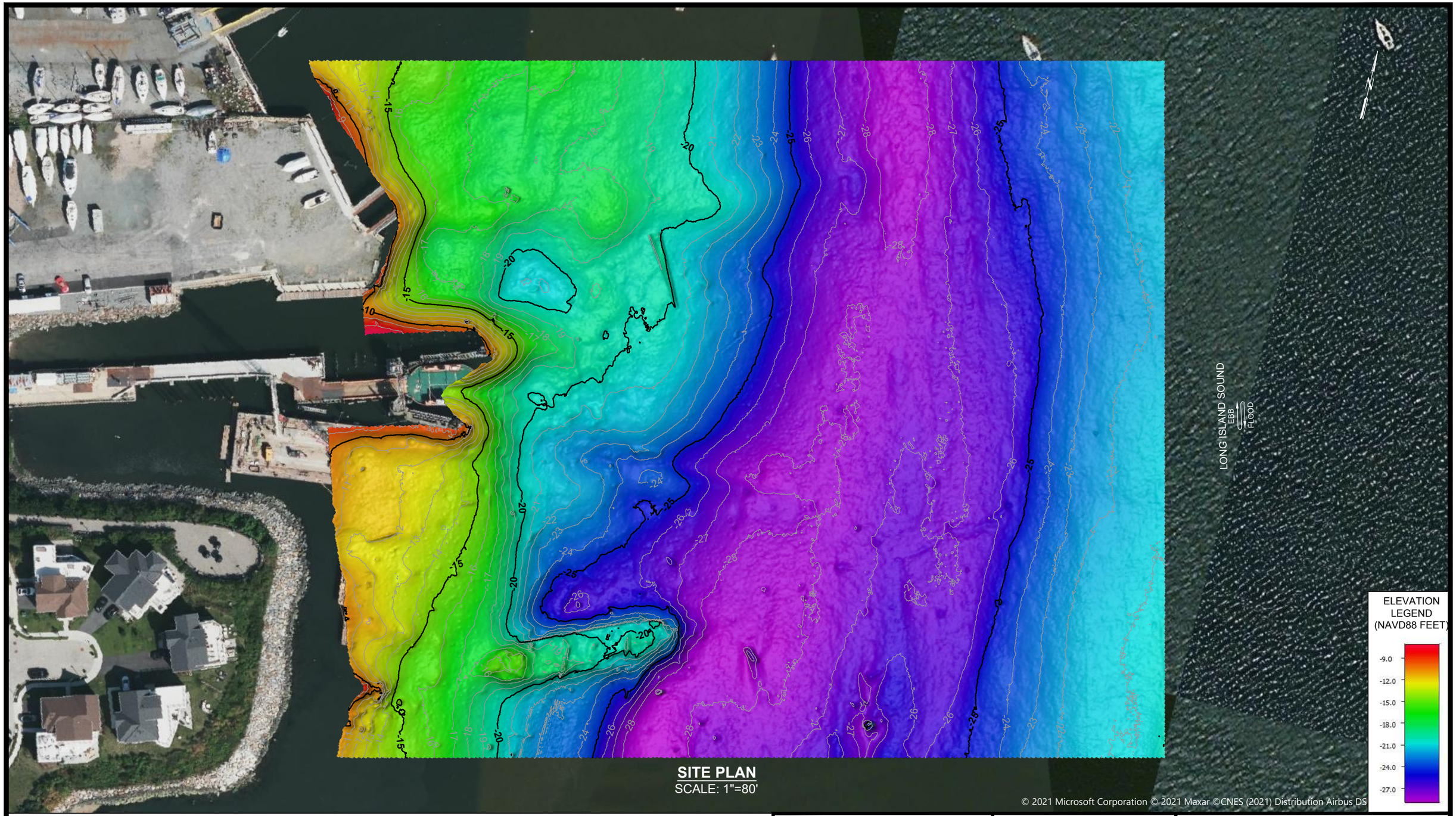
NV5 Delivering Solutions Improving Lives

HART ISLAND TRANSPORTATION STUDY
HYDROGRAPHIC SURVEY

| | |
|---|---|
| DATE: DECEMBER 13, 2021 | DRN BY: BEK |
| MSI JOB: 03-21-023 | CKD BY: JFG |
| FILENAME: 03-21-023_SURV-HART.DWG | |

HART ISLAND SITE PLAN

FIG. NO. 2 OF 3




**SITE PLAN**
SCALE: 1"=80'

## GENERAL NOTES

1. HORIZONTAL DATUM: STATE PLANE NEW YORK LONG ISLAND NAD83 2011 U.S. SURVEY FEET.
2. VERTICAL DATUM: NAVD88 U.S. SURVEY FEET.
3. AERIAL PHOTO: BING.

## LEGEND

5 MAJOR CONTOURS
1 MINOR CONTOURS

MARINE SOLUTIONS

0 40 80 160 FT
SCALE: 1"= 80'

NV5 Delivering Solutions Improving Lives

HART ISLAND TRANSPORTATION STUDY
BATHYMETRIC SURVEY

| | |
|---|---|
| DATE: DECEMBER 13, 2021 | DRN BY: BEK |
| MSI JOB: 03-21-023 | CKD BY: JWP |
| FILENAME: 03-21-023_SURV-CITY.DWG | |

CITY ISLAND SITE PLAN

FIG. NO.
3 of 3

# Appendix H

# Terminal Conceptual Design Narrative and Figures

m&n engineering, p.c.

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16 February 2022

NV5
32 Old Slip
Suite 401
New York, NY 10005

Attention: Justin Iwinski (NV5)

Cc: Stephen Frech (M&N)

Reference: Project #X370-122M – Hart Island Transportation Study

**Subject: Concept Alternatives**

Dear Mr. Iwinski,

Pursuant to Task 3.2 of the reference project for the City of New York Parks and Recreation (Parks), M&N Engineering P.C. (M&N) has developed concept alternatives for improvements to the waterfront infrastructure at Hart Island and City Island, located in the Long Island Sound within the borough of Bronx, New York, NY. The following alternatives, appended to this memorandum in 17x11 landscape format, include a figure and narrative describing and quantifying the proposed improvements or new structures for each concept.

Concept 1: Hart Island & City Island, State of Good Repair

Concept 2: Hart Island, Retrofit Coal Dock and Install Gangway to NYC Ferry Terminal Barge

Concept 3: Hart Island, Replace Coal Dock In-Kind and Install Gangway to NYC Ferry Terminal Barge

Concept 4: Hart Island, New Gangway Leading to NYC Ferry Terminal Barge

Concept 5: City Island, Further Study Required

The concepts shall be classified under the predetermined short-, mid-, and long-term planning options by NV5. Specifically, as requested by Parks for the mid- and long-term options, M&N determined that a typical New York City (NYC) passenger vessel is not compatible with the existing Hart Island or City Island ferry terminals. Therefore, a concept utilizing the existing ferry terminal infrastructure for berthing of a NYC passenger vessel was not developed. The most significant factor leading to this determination was the way in which a NYC passenger vessel approaches and berths to a ferry terminal barge. The NYC vessels are bow loading and are powered into a radial fender system during pedestrian loading and unloading. The transient nature of the berthing involves the vessel actively trusting into the terminal which includes a specific fender system mounted on the floating portion of the terminal. This style of berthing, even after considering repairs to existing structural elements, is not compatible with the fixed, aging timber infrastructure at Hart Island or City Island. Also, alterations to the

offshore end of the gantry tower supported ramp would likely be required for berthing of a NYC passenger vessel. Any alterations of this magnitude could disrupt existing ferry service run by the Department of Transportation. In addition, M&N could not find another example within the citywide ferry system where vessels berth at a non-typical floating terminal barge.

**Design Assumptions**

M&N developed the five (5) concept alternatives presented herein per the following design assumptions.

- Service life of 25 years.
- Sea level rise of 16-inches.
- NYC passenger ferry dimensions of 60-ft long by 36-ft beam by 6-ft 11-in. draft.
- Typical NYC ferry terminal barge dimensions of 90-ft long by 35-ft wide.
- Gangway minimum dimensions for ADA compliance. Study used a typical gangway of 80-ft long by 9-ft wide.
- Minimum water depth elevation of -16' NAVD88.

M&N greatly appreciates the opportunity to support NV5 on this project. If you have any questions or require any additional information, please do not hesitate to contact me by cell phone, (973) 525-6575, at your convenience.

Sincerely,

M&N Engineering P.C.

David Melnyczuk, PE
Project Engineer

# CONCEPT 1: HART ISLAND & CITY ISLAND, STATE OF GOOD REPAIR (1 OF 5)


*This concept focuses on bringing the existing structural components of the Hart Island and City Island Ferry Terminals, including the Hart Island Ferry Terminal shoreline bulkhead, to a state of good repair in order to facilitate continued and uninterrupted ferry service run by the New York City (NYC) Department of Transportation (DOT). Repairs to the Hart Island Coal Dock and adjacent shoreline were not considered as those structures are unrelated to the ferry service run by the NYC DOT. Repairs to the Fordham Street Pier were not considered as the structure is a newly constructed concrete pier.*

**1**

1a) Replacement of 32 severe rated timber piles at the fender rack. Assume replacement piles are 12-in. in diameter by 70-ft long.

1b) Replacement of steel cable wraps securing groups of timber piles at the fender rack. Assume 500-LF of 1-in. diameter galvanized rope with associated connection hardware.

1c) Replacement of the missing safety rail along the south edge of the fender rack. Assume 20-LF of handrail.

1d) Replacement of fire damaged horizontal member supporting the south portion of the fender rack. Assume 10LF of 12x12 timber.

1e) Repair of corroded steel sheet pile cells supporting the gantry towers via oversheeting and filling the annulus with concrete. Assume 100-LF of AS-500 flat steel sheet piles 35-ft long and 20-CUYD of concrete. Total of 25-CUYD of in-water fill.

Note: the timber piles supporting the ferry terminal access platform, 35 total, are all rated moderate due to marine borer damage. Repairs are not recommended, however, monitoring these piles on a 4-year interval for further deterioration is necessary.

See Page 3 for additional details and repair figure.

**2**

2a) Replacement of deteriorated timber bulkhead. Repair proposes driving new steel sheet piles directly inshore of the existing bulkhead, cutting sheets 12-in. above existing top of sheet, and installing timber fender system and concrete cap. A tie back system for the steel sheet pile wall will likely not be structurally required. Once the sheets are driven, removal of the old timber bulkhead and placement of new fill is required.

See Page 4 for additional details and repair figure.

## CONCEPT 1: HART ISLAND & CITY ISLAND, STATE OF GOOD REPAIR (2 OF 5)


3

3a) Replacement of 17 severe rated timber piles at the fender rack. Assume replacement piles are 12-in. in diameter by 70-ft long.

3b) Replacement of steel cable wraps securing groups of timber piles at the fender rack. Assume 500-LF of 1-in. diameter galvanized rope with associated connection hardware.

3c) Replacement of the broken horizontal member supporting the south gantry tower. Assume 12x12 timber replacement for 10-LF.

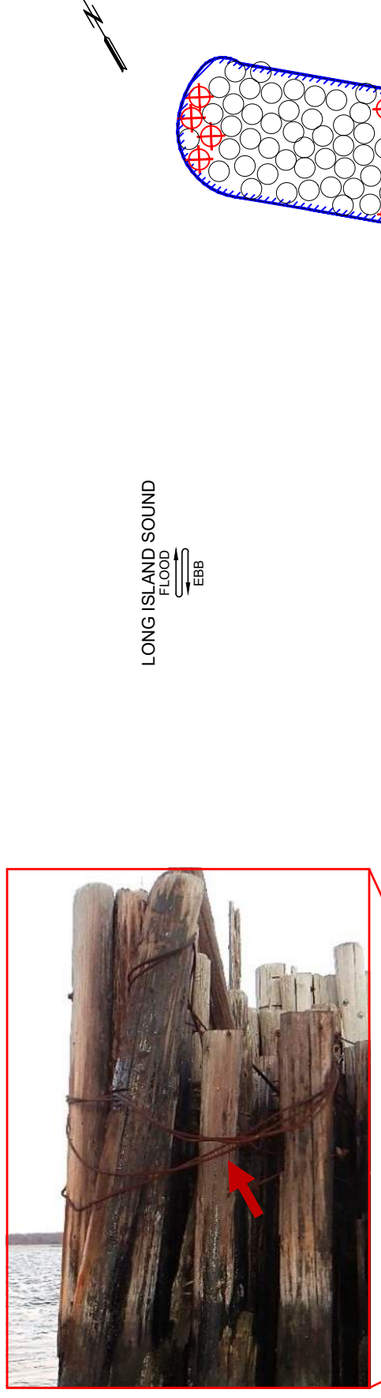
Note: the timber piles supporting the ferry terminal access platform, 42 total, and piles supporting the two (2) gantry towers, 16 each, are rated moderate to advanced due to marine borer damage. Repairs are not recommended, however, monitoring these piles on a 4-year interval for further deterioration is necessary.

See Page 5 for additional details and repair figure.

# CONCEPT 1: HART ISLAND & CITY ISLAND, STATE OF GOOD REPAIR (3 OF 5)

1a) Replacement of 32 severe rated timber piles (typical red pile w/ cross) at the fender rack, including any associated connection hardware.

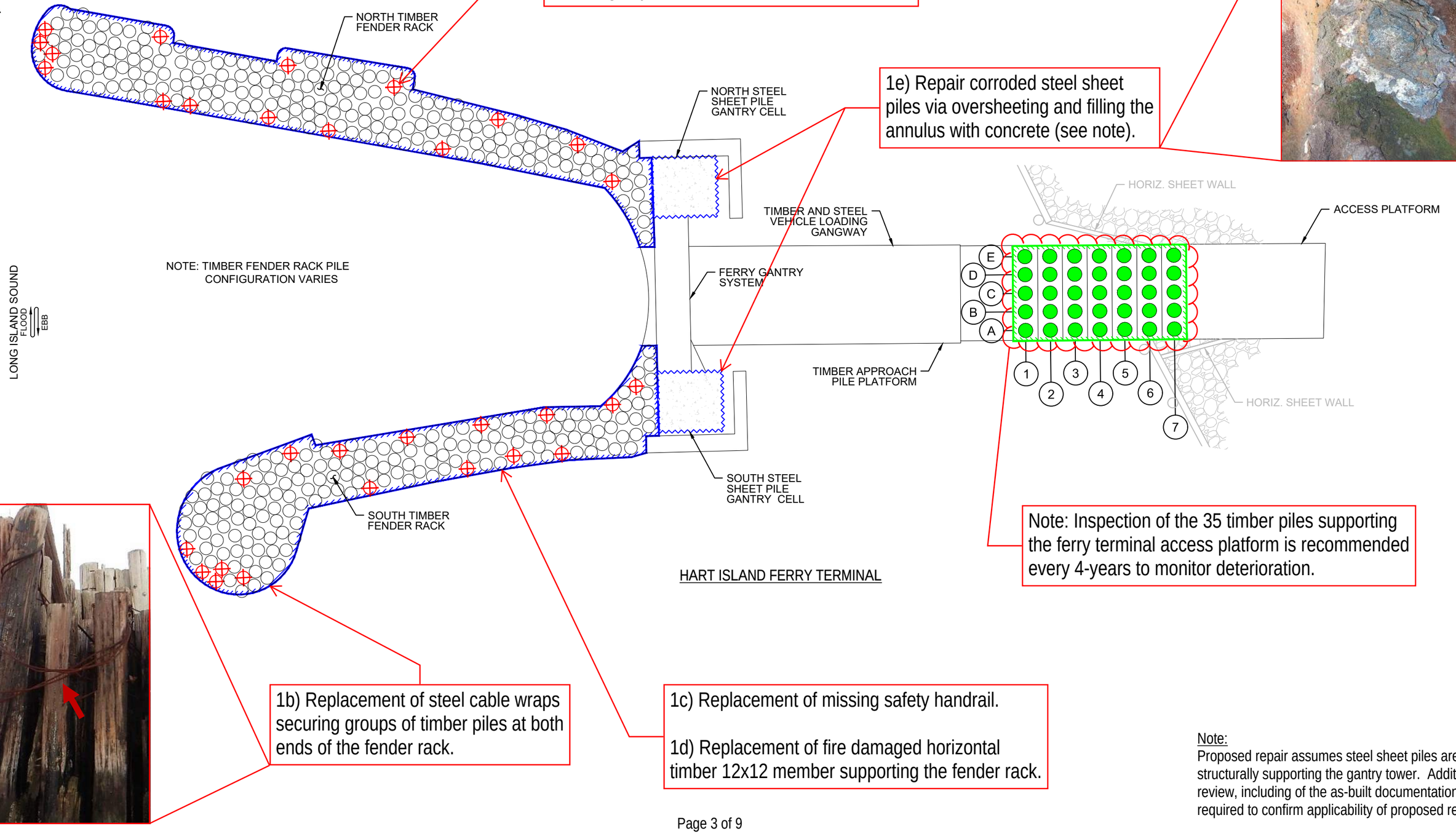
1e) Repair corroded steel sheet piles via oversheeting and filling the annulus with concrete (see note).



1b) Replacement of steel cable wraps securing groups of timber piles at both ends of the fender rack.

1c) Replacement of missing safety handrail.

1d) Replacement of fire damaged horizontal timber 12x12 member supporting the fender rack.

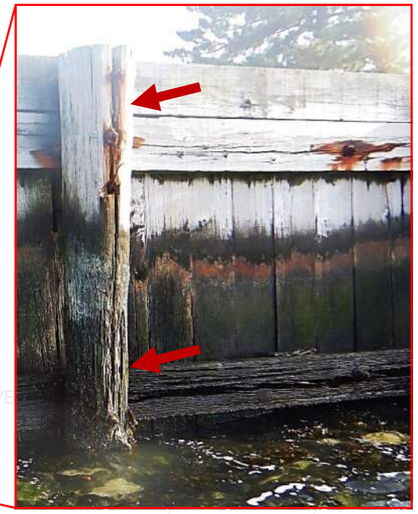



HART ISLAND FERRY TERMINAL

Note: Inspection of the 35 timber piles supporting the ferry terminal access platform is recommended every 4-years to monitor deterioration.

Note:
Proposed repair assumes steel sheet piles are structurally supporting the gantry tower. Additional review, including of the as-built documentation, is required to confirm applicability of proposed repair.

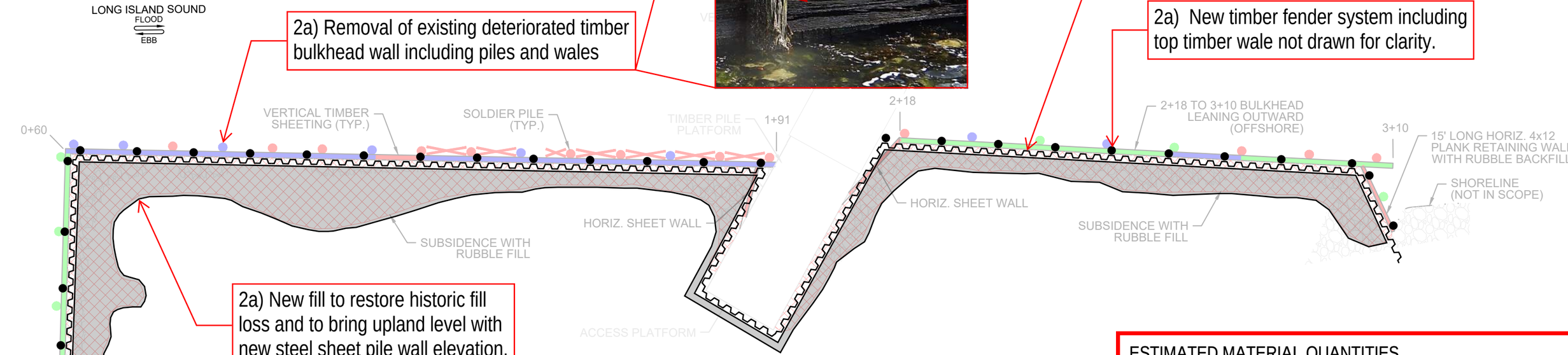
# CONCEPT 1: HART ISLAND & CITY ISLAND, STATE OF GOOD REPAIR (4 OF 5)



2a) Removal of existing deteriorated timber bulkhead wall including piles and wales

2a) New steel sheet pile wall directly inshore of existing bulkhead including return walls at each end. Concrete cap not drawn for clarity.

2a) New timber fender system including top timber wale not drawn for clarity.




2a) New fill to restore historic fill loss and to bring upland level with new steel sheet pile wall elevation.

HART ISLAND FERRY TERMINAL SHORELINE BULKHEAD

ESTIMATED MATERIAL QUANTITIES

Demolition:
- 29 timber piles,10-in. to 12-in. in diameter
- 350-LF of 4x12 timber sheets
- 700-LF of 12x12 timber wales

Proposed Bulkhead (see Note 1):
- 450-LF of PZ 27 steel sheet piles, 45-ft long (see Note 2)
- 310-LF of 2-ft wide by 1.5-ft high concrete cap
- 30 timber piles, 12-in. in diameter by 70-ft long
- 310-LF of 12x12 timber wale
- 123-CUYD of fill for upland area

Note:
1) Proposed bulkhead is assumed to be net-zero in-water fill.
2) Steel sheet pile size for estimating purposes only.

# CONCEPT 1: HART ISLAND & CITY ISLAND, STATE OF GOOD REPAIR (5 OF 5)

Note: Inspection of the 42 timber piles supporting the ferry terminal access platform and 16 piles each supporting the gantry towers are recommended every 4-years to monitor deterioration.

3b) Replacement of steel cable wraps securing groups of timber piles at both ends of the fender rack.

NORTH TIMBER GANTRY TOWER

NORTH TIMBER FENDER RACK

8' 7' 6' 5' 4' 3' 2' 1'

E D C B A

TIMBER AND STEEL VEHICLE LOADING GANGWAY

TIMBER APPROACH PILE PLATFORM

FERRY GANTRY SYSTEM

FLOATING DOCK

SOUTH TIMBER GANTRY TOWER

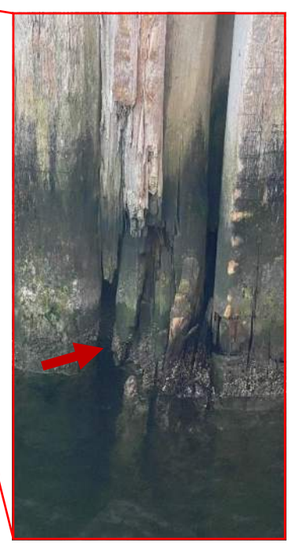
NOTE: TIMBER FENDER RACK PILE CONFIGURATION VARIES

3a) Replacement of 17 severe rated timber piles (typical red pile w/ cross) at the fender rack, including any associated connection hardware.

NORTH TIMBER FENDER RACK

LONG ISLAND SOUND
FLOOD
EBB

3c) Replacement of broken horizontal timber 12x12 member supporting the gantry tower.



CITY ISLAND FERRY TERMINAL

# CONCEPT 2: HART ISLAND, RETROFIT COAL DOCK AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE


*This concept proposes rehabilitating the existing Coal Dock structure at Hart Island to facilitate access to a typical NYC ferry terminal barge via a gangway. The ferry terminal barge was positioned on the south side of the Coal Dock to avoid demolition of the existing timber walkway located at the northwest corner of the dock. In addition, this option allows for NYC DOT or Parks to continue to utilize the offshore, west face of the Coal Dock for material barge berthing operations.*

The following list highlights the proposed improvements or new infrastructure, including estimated material quantities, for Concept 2.

1 - One (1) typical NYC Ferry Terminal Barge with dual ramps, including six (6) steel pipe anchor piles. Assume piles are 24-in. in diameter and 85-ft long. Total of 14-CUYD of in-water fill.

- One (1) 80-ft long by 9-ft wide gangway.

1 - Two (2) monopile dolphins with donut fender. Assume steel pipe pile is 36-in. in diameter and 100-ft long. Total of 7-CUYD of in-water fill.

- Epoxy encasement of 142 existing timber piles at the Coal Dock; 15-in. in diameter by average height of 15-ft. Total of 35-CUYD of in-water fill.
- Replace 260-LF of timber cross bracing.
- Repair 1400-SF of deteriorated concrete deck.
- Repair concrete abutment connection to the shoreline.
- Install 400-LF of handrail.

Note(s):

1) M&N concept development scope of work covers up to the end of the Coal Dock structure. Upland area may require improvement prior to serving the general public.

2) Electrical for lighting equipment on the Coal Dock, gangway, and terminal barge was not proposed as passenger trips were assumed to occur during the day time.

# CONCEPT 3: HART ISLAND, REPLACE COAL DOCK IN-KIND AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE


*This concept proposes replacing the existing Coal Dock structure at Hart Island in-kind to facilitate access to a typical NYC ferry terminal barge via a gangway. Two (2) options are shown for location of the terminal. Both options, north and south, are identical in terms of constructibility and do not require dredging to facilitate NYC Ferry access. This concept also includes a floating dock for temporary berthing for recreational vessels, to match a similar dock at the Fordham Street Pier.*

The following list highlights the proposed improvements or new infrastructure, including estimated material quantities, for Concept 3.

- Demolish existing Coal Dock and replace in-kind; thirty-two (32) 18-in. diameter by 100-ft long steel pipe piles, 400-LF of 3-ft wide by 2-ft high concrete pile caps, 8,000-SF of 10-in. thick concrete deck planks, 560-LF of handrail, and 13 12-in. diameter by 50-ft long timber fender piles. Reduction of in-water fill of 47-CUYD.
- 1 One (1) typical NYC Ferry Terminal Barge with dual ramps, including six (6) steel pipe anchor piles. Assume piles are 24-in. in diameter and 85-ft long. Total of 14-CUYD of in-water fill.
- One (1) 80-ft long by 9-ft wide gangway.
- 1 Two (2) monopile dolphins with donut fender. Assume steel pipe pile is 36-in. in diameter and 100-ft long. Total of 7-CUYD of in-water fill.
- Recreational floating dock; 28-ft long by 12-ft wide timber dock, two (2) 12-in. diameter by 70-ft long timber anchor piles, and 30-ft long by 4-ft wide gangway. Total of 1-CUYD of in-water fill.

Note(s):

1) M&N concept development scope of work covers up to the end of the Coal Dock structure. Upland area may require improvement prior to serving the general public.

2) Electrical for lighting equipment on the Coal Dock, gangway, and terminal barge was not proposed as passenger trips were assumed to occur during the day time.

3) Removal of existing timber piles in the pile field adjacent to the proposed recreational floating dock was not considered.

4) Further study is required to confirm proposed gangway for the recreational dock is ADA compliant.

# CONCEPT 4: HART ISLAND, NEW GANGWAY LEADING TO NYC FERRY TERMINAL




*This concept proposes installing a new gangway and typical NYC ferry terminal barge south of the Hart Island Ferry Terminal, in line with three (3) rows of abandoned timber piles and caps. This concept is predicated on replacement of the the Ferry Terminal Shoreline Bulkhead as detailed on Page 4 of the concept alternatives package. Operations at the existing Hart Island waterfront infrastructure, including the Ferry Terminal and Coal Dock, are not disrupted by this concept.*

The following list highlights the proposed improvements or new infrastructure, including estimated material quantities, for Concept 4.

- Removal of derelict timber structure; 12 piles and four (4) horizontal cap members.
- 1 One (1) typical NYC Ferry Terminal Barge with dual ramps, including six (6) steel pipe anchor piles. Assume piles are 24-in. in diameter and 85-ft long. Total of 14-CUYD of in-water fill.
- One (1) 80-ft long by 9-ft wide gangway.
- 1 Two (2) monopile dolphins with donut fender. Assume steel pipe pile is 36-in. in diameter and 100-ft long. Total of 7-CUYD of in-water fill.
- One (1) hinge connection to concrete cap of the proposed steel sheet pile replacement bulkhead.

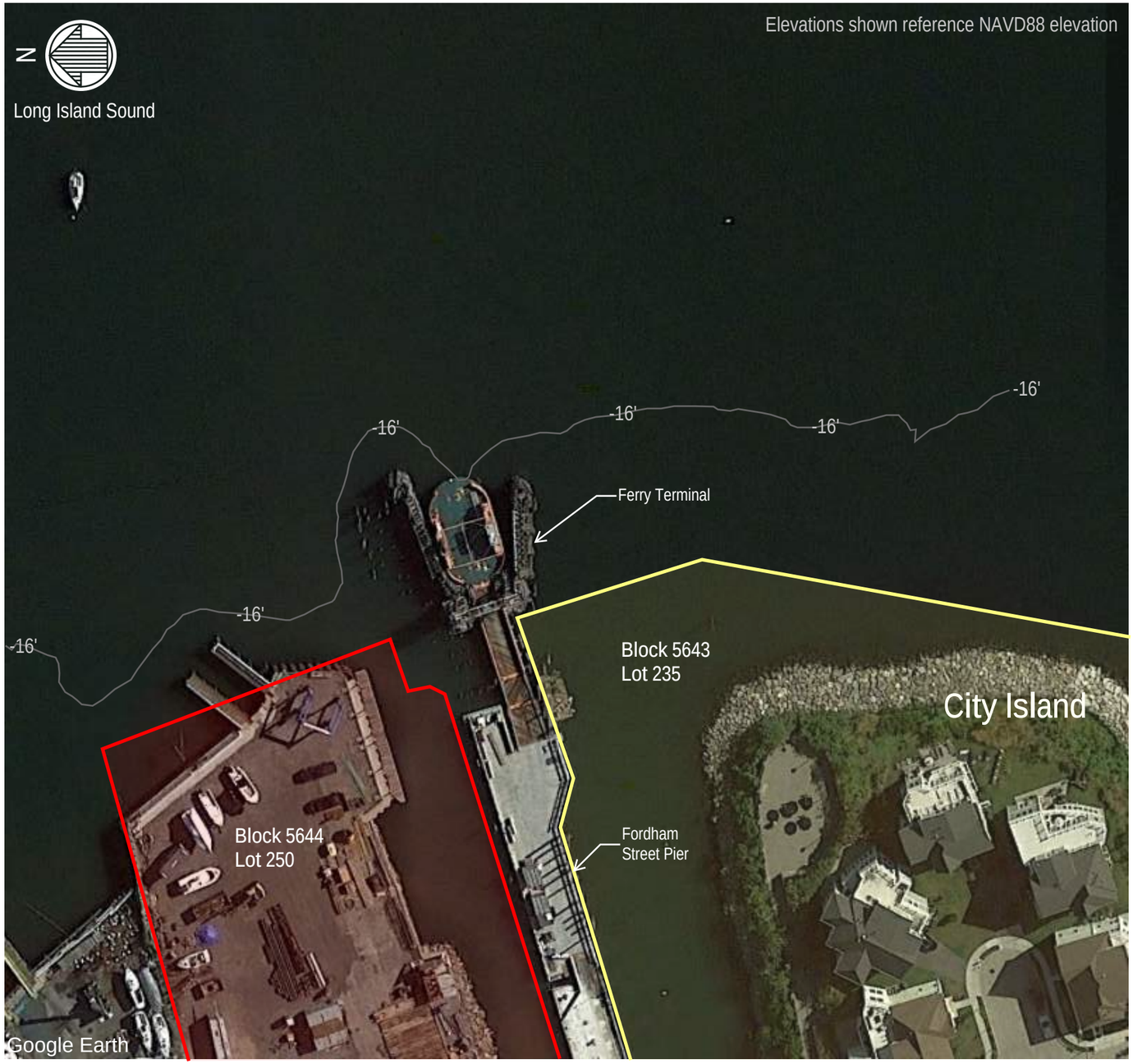
Note(s):

1) M&N concept development scope of work covers up to the end of the gangway connection to the bulkhead. Upland area may require improvement prior to serving the general public.

2) Electrical for lighting equipment on the gangway and terminal barge was not proposed as passenger trips were assumed to occur during the day time.

3) The replacement bulkhead as detailed in Concept 1, including steel sheet piles and concrete cap, will require specific design to accommodate the gangway connection.

# CONCEPT 5: CITY ISLAND, FURTHER STUDY REQUIRED




*This concept intended to propose a new walkway structure extending from the newly constructed Fordham Street Pier, leading to a gangway providing access to a typical NYC Ferry Terminal Barge. After review of the NYC tax map, adjacent property lines would not allow for such a structure. To accommodate existing DOT service, and an NYC passenger ferry, extensive demolition and construction of separate terminals would be required.*

The following three (3) concepts were analyzed and ultimately not presented nor quantified for the purposes of this Study for the reasons listed below.

1) Install a new walkway structure extending from the south face of the Fordham Street Pier, leading to a gangway providing access to a NYC Ferry Terminal Barge:

- This concept would entail constructing a permanent pile supported walkway within the privately owned Block 5643 Lot 235 highlighted in yellow. M&N anticipates this would likely be a nonstarter and abandoned further development of the concept alternative.

2) Install a new walkway structure extending from the west face of the Fordham Street Pier, leading to a gangway providing access to a NYC Ferry Terminal Barge:

- There is sufficient room to construct a pile supported walkway, extending from the west face of the Fordham Street Pier, and located between the existing Ferry Terminal and the privately owned Block 5644 Lot 250 highlighted in red. However, construction of the offshore NYC Ferry Terminal Barge would likely block access to the south shoreline of the boat yard property, which M&N anticipates would be fought with resistance from the owner, and thus, abandoned further development of the concept.

3) Demolish existing Ferry Terminal and extend Fordham Street Pier offshore terminating at a "T-shape" for installation of two (2) separate terminals:

- The cost of this alternative would likely be a barrier to implementation. In addition, the pier extension would have to protrude far beyond the end of the tax lots to not interfere with adjacent property access (see no. 2 reasoning above). The US and NYC pierhead lines do not appear to be defined in this area, thus, additional research would be required on their interaction with any proposed construction.

# Appendix I

# Capital and Operation and Maintenance Detailed Cost Estimates

**TOSCANO CLEMENTS TAYLOR**
**COST CONSULTANTS**
**150 WEST 30TH STREET, 7TH FLOOR**
**NEW YORK, NY 10001**

# STUDY ESTIMATE

# HART ISLAND TRANSPORTATION STUDY
# NEW YORK

## NEW YORK CITY DEPARTMENT OF PARKS AND RECREATION

**April 5, 2022**

TOSCANO CLEMENTS TAYLOR
Cost Consultants
WBE/DBE

# STUDY ESTIMATE
# HART ISLAND TRANSPORTATION STUDY

**4/5/2022**

## BASIS OF ESTIMATE

### Project Description

The scope of work under Task 3.2 of Hart Island Transportation Study for NYC Parks, TCT has developed conceptual alternatives estimates for improvements to the waterfront infrastructure at Hart Island and City Island, located in the Long Island Sound within the borough of Bronx, New York, NY.

Alternatives:

| | |
|---|---|
| Concept 1 | Hart Island & City Island, State of Good Repair |
| Concept 2 | Hart Island, Retrofit Coal Dock and Install Gangway to NYC Ferry Terminal Barge |
| Concept 3 | Hart Island, Replace Coal Dock In-Kind and Install Gangway to NYC Ferry Terminal Barge |
| Concept 4 | Hart Island, New Gangway Leading to NYC Ferry Terminal Barge |

### Basis

This estimates are based on the documents provided by NV5 along with direction from the design team. Actual measurements of different items of work were done wherever possible.

### Construction Schedule and Escalation

All subcontract prices are reflective of current prices. Escalation rate of 4% per annum is included on the summary to mid-point of construction based on the following schedule.

| | |
|---|---|
| Concept 1 | 2025 Q3, duration 1.5 years |
| Concept 2 | 2026 Q3, duration 2.5 years |
| Concept 3 | 2026 Q3, duration 2.5 years |
| Concept 4 | 2026 Q3, duration 2.5 years |

### Unit Costs and Sources of Pricing

The work is anticipated to be carried during normal business hours and unit costs are not adjusted to factor in any shift premiums for evening and night time work. Subcontractor's overhead and profit is included in each line item unit cost. The General Contractor's costs are shown separately on the summary. The pricing data from TCT's database was used, it was updated to reflect the current market conditions in NY area.

### Contingencies

The following percentage adjustments have been incorporated:

| | |
|---|---|
| General Requirements | 10.0% |
| Mobilization | 5.0% |
| Bond and Insurance | 3.0% |
| GC Overhead & Profit | 20.0% |
| Design Contingency | 20.0% |
| Construction Contingency | 10.0% |
| Market Condition Adjustment | 10.0% |
| Escalation (at 4% per Annum), Concept 1 | 17.02% |
| Escalation (at 4% per Annum), Concept 2 | 23.02% |
| Escalation (at 4% per Annum), Concept 3 | 23.02% |
| Escalation (at 4% per Annum), Concept 4 | 23.02% |
| Soft Costs | 30.0% |

# BASIS OF ESTIMATE

## Qualifications / Clarifications

Labor costs are included at local prevailing wage rates.
All unit prices include installation.
The estimate assumes all long-lead items can be pre-purchased to meet schedule requirements.
No provision for underground gas and vapor mitigation system.

## Items Excluded from the Base Estimate

Abatement of hazardous materials.
Working in contaminated soil.
Loose furnishings, fixtures and equipment (FF&E).
Relocation of utilities.
Traffic signaling.
Land Acquisition.
Sales Tax.
Relocation Costs.
Exterior improvements, site and building structures demolition unless noted in the body of estimate.
Permanent dewatering.
Special seismic requirements.
Vibration monitoring.
Terminal/Station operation and maintenance costs.

## Statement of Probable Cost

TCT has no control over the cost of labor and materials, the general contractor's or any subcontractor's method of determining prices, or competitive bidding and market conditions. The opinion of probable cost of construction is made on the basis of experience, qualifications and best judgment of consultants familiar with the construction industry. TCT, however, does not guarantee that the bids or actual construction costs will not vary from this or subsequent cost estimates.

TOSCANO CLEMENTS TAYLOR
Cost Consultants
WBE/DBE

**STUDY ESTIMATE**

**HART ISLAND TRANSPORTATION STUDY**

**NEW YORK**

**4/5/2022**

## SUMMARY - TERMINAL INFRASTRUCTURE CONCEPTS

| ITEM #. | DESCRIPTION | | AMOUNT |
|---|---|---|---|
| 1 | CONCEPT 1: HART ISLAND & CITY ISLAND, STATE OF GOOD REPAIR | $ | 16,823,768 |
| 2 | CONCEPT 2: HART ISLAND, RETROFIT COAL DOCK AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE | $ | 19,607,855 |
| 3 | CONCEPT 3: HART ISLAND, REPLACE COAL DOCK IN-KIND AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE | $ | 28,972,210 |
| 4 | CONCEPT 4: HART ISLAND, NEW GANGWAY LEADING TO NYC FERRY TERMINAL | $ | 25,705,244 |
| 5 | CONCEPT 5: CITY ISLAND, FURTHER STUDY REQUIRED | $ | - |

TOSCANO CLEMENTS TAYLOR
Cost Consultants WBE/DBE

**STUDY ESTIMATE**
**HART ISLAND TRANSPORTATION STUDY**
**NEW YORK**

**4/5/2022**

## SUMMARY - CONCPET 1: HART ISLAND & CITY ISLAND, STATE OF GOOD REPAIR

| ITEM #. | DESCRIPTION | | CONCEPT 1: FERRY TERMINAL, HART ISLAND | CONCEPT 1: BULKHEAD RECONSTRUCTION | CONCEPT 1: FERRY TERMINAL, CITY ISLAND | CONCEPT 1 TOTAL |
|---|---|---|---|---|---|---|
| 1 | General Requirements | | $ 675,480 | $ 1,216,363 | $ 242,380 | $ 2,134,223 |
| 1a | Replacement of 32 severe rated timber piles at the fender rack | | $ 478,200 | | | $ 478,200 |
| 1b | Replacement of steel cable wraps securing groups of timber piles at the fender rack | | $ 30,000 | | | $ 30,000 |
| 1c | Replacement of the missing safety rail along the south edge of the fender rack | | $ 15,000 | | | $ 15,000 |
| 1d | Replacement of fire damaged horizontal member supporting the south portion of the fender rack | | $ 5,000 | | | $ 5,000 |
| 1e | Repair of corroded steel sheet pile cells supporting the gantry towers | | $ 475,000 | | | $ 475,000 |
| 2a | Replacement of deteriorated timber bulkhead | | | $ 2,475,750 | | $ 2,475,750 |
| 3a | Replacement of 17 severe rated timber piles at the fender rack | | | | $ 264,200 | $ 264,200 |
| 3b | Replacement of steel cable wraps securing groups of timber piles at the fender rack | | | | $ 30,000 | $ 30,000 |
| 3c | Replacement of the broken horizontal member supporting the south gantry tower | | | | $ 5,000 | $ 5,000 |
| 4 | Upland / Sitework | | $ 100,000 | $ 100,000 | $ 50,000 | $ 250,000 |
| | **TRADE COST - SUB TOTAL** | | **$ 1,778,680** | **$ 3,792,113** | **$ 591,580** | **$ 6,162,373** |
| | **ADMINISTRATION** | | | | | |
| | Bond & Insurance (On Trade Cost) | 3% | $ 53,360 | $ 113,763 | $ 17,747 | $ 184,871 |
| | General Contractors Overhead & Profit (On Trade Cost + Bonds + Insurance) | 20% | $ 366,408 | $ 781,175 | $ 121,865 | $ 1,269,449 |
| | **ADMIN. COST - SUB TOTAL** | | **$ 419,768** | **$ 894,939** | **$ 139,613** | **$ 1,454,320** |
| | **CONTINGENCIES AND MARKUPS** | | | | | |
| | Design Contingency (On Trade Cost + Administration Cost) | 20% | $ 439,690 | $ 937,410 | $ 146,239 | $ 1,523,338 |
| | Construction Contingency (On Trade Cost + Administration Cost + Design Contingency) | 10% | $ 263,814 | $ 562,446 | $ 87,743 | $ 914,003 |
| | Market Condition Adjustment (On Trade Cost + Administration Cost + Design Contingency + Construction Contingency) | 10% | $ 290,195 | $ 618,691 | $ 96,517 | $ 1,005,403 |
| | Escalation to mid-point of Construction (on Trade Cost + Admin. Cost + Design Contingency + Construction Contingency+ Market Condition) | 17.02% | $ 543,190 | $ 1,158,070 | $ 180,662 | $ 1,881,922 |
| | **CONTINGENCIES AND MARKUPS - SUB TOTAL** | | **$ 1,536,888** | **$ 3,276,617** | **$ 511,161** | **$ 5,324,667** |
| | **TOTAL ESTIMATED CONSTRUCTION COST** | | **$ 3,735,337** | **$ 7,963,669** | **$ 1,242,354** | **$ 12,941,360** |
| | **OWNER CONTINGENCIES / SOFT COSTS** | | | | | |
| | Soft Costs (A/E Design Fee, Inspection Fee, Project Management, Loan Interest and Accounting etc.) | 30% | $ 1,120,601 | $ 2,389,101 | $ 372,706 | $ 3,882,408 |
| | **OWNER CONTINGENCIES / SOFT COSTS - SUB TOTAL** | | **$ 1,120,601** | **$ 2,389,101** | **$ 372,706** | **$ 3,882,408** |
| | **TOTAL PROJECT COST** | | **$ 4,855,938** | **$ 10,352,769** | **$ 1,615,061** | **$ 16,823,768** |

**HART ISLAND TRANSPORTATION STUDY**
**NEW YORK**

**STUDY ESTIMATE**

TOSCANO CLEMENTS TAYLOR
Cost Consultants
WBE/DBE

**ESTIMATE DETAILS - CONCEPT 1: HART ISLAND & CITY ISLAND, STAGE OF GOOD REPAIR**
**FERRY TERMINAL AT HART ISLAND**

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| 1 | **General Requirements** | | | | |
| | General requirements, allow 10% | 1 | LS | $110,320.00 | $110,320 |
| | Mobilization, allow 5% | 1 | LS | $55,160.00 | $55,160 |
| | Barge (assume 1 incl. rental, crew, fuel etc.) | 1 | LS | $180,000.00 | $180,000 |
| | Crane rental, assume 6 months | 1 | LS | $300,000.00 | $300,000 |
| | Turbidity curtain, allow 500 LF | 1 | LS | $30,000.00 | $30,000 |
| | Inspection of timber piles every 4-years | | | | Excluded |
| | **Sub Total: General Requirements** | | | | **$675,480** |
| 1a | **Replacement of 32 severe rated timber piles at the fender rack** | | | | |
| | Remove severe rated timber piles | 32 | EA | $2,100.00 | $67,200 |
| | New timber piles, 12" dia. 70' long | 32 | EA | $10,150.00 | $324,800 |
| | Boot for pile tip | 32 | EA | $350.00 | $11,200 |
| | Rock socket/drilling in rock | | | | Excluded |
| | Test pile program, allow | 1 | LS | $75,000.00 | $75,000 |
| | **Sub Total: Replacement of 32 severe rated timber piles at the fender rack** | | | | **$478,200** |
| 1b | **Replacement of steel cable wraps securing groups of timber piles at the fender rack** | | | | |
| | Remove steel cable wraps, replace with 1" dia. Galvanized rope incl. connection hardware | 500 | LF | $60.00 | $30,000 |
| | **Sub Total: Replacement of steel cable wraps securing groups of timber piles at** | | | | **$30,000** |
| 1c | **Replacement of the missing safety rail along the south edge of the fender rack** | | | | |
| | New handrail incl. required support connections | 20 | LF | $750.00 | $15,000 |
| | **Sub Total: Replacement of the missing safety rail along the south edge of the** | | | | **$15,000** |
| 1d | **Replacement of fire damaged horizontal member supporting the south portion of the fender rack** | | | | |

## ESTIMATE DETAILS - CONCEPT 1: HART ISLAND & CITY ISLAND, STAGE OF GOOD REPAIR
## FERRY TERMINAL AT HART ISLAND

**4/5/2022**

| ITEM #. | | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|---|
| | | Remove existing fire damaged member and replace with new 10 LF12x12 timber | 1 | EA | $5,000.00 | $5,000 |
| | | | | | | |
| | | **Sub Total: Replacement of fire damaged horizontal member supporting the south** | | | | **$5,000** |
| | | | | | | |
| **1e** | | **Repair of corroded steel sheet pile cells supporting the gantry towers** | | | | |
| | | | | | | |
| | | New sheet piles, 100 LF 35 ft long | 3,500 | SF | $100.00 | $350,000 |
| | | Misc. anchors/toe seal allowance | 1 | LS | $100,000.00 | $100,000 |
| | | Fill void space between new and existing sheet pile with tremie concrete | 20 | CY | $1,250.00 | $25,000 |
| | | | | | | |
| | | **Sub Total: Repair of corroded steel sheet pile cells supporting the gantry towers** | | | | **$475,000** |
| | | | | | | |
| **4** | | **Upland / Sitework** | | | | |
| | | | | | | |
| | | Minimal exterior improvements (for erosion control measures, excavation, base courses, pavements, curbs, site furnishings). Utilities including electrical service and site lighting are excluded. | 1 | LS | $100,000.00 | $100,000 |
| | | | | | | |
| | | **Sub Total: Upland / Sitework** | | | | **$100,000** |
| | | | | | | |
| | | **SUBTOTAL: CONCEPT 1: FERRY TERMINAL, HART ISLAND** | | | | **$1,778,680** |

**HART ISLAND TRANSPORTATION STUDY**
**NEW YORK**

**STUDY ESTIMATE**

TOSCANO CLEMENTS TAYLOR
Cost Consultants
WBE/DBE

## ESTIMATE DETAILS - CONCEPT 1: HART ISLAND & CITY ISLAND, STAGE OF GOOD REPAIR
## HART ISLAND BULKHEAD RECONSTRUCTION

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| | | | | | |
| **1** | **General Requirements** | | | | |
| | | | | | |
| | General requirements, allow 10% | 1 | LS | $257,575.00 | $257,575 |
| | Mobilization, allow 5% | 1 | LS | $128,787.50 | $128,788 |
| | Barge (assume 1 incl. rental, crew, fuel etc.) | 1 | LS | $300,000.00 | $300,000 |
| | Crane rental, assume 10 months | 1 | LS | $500,000.00 | $500,000 |
| | Turbidity curtain, allow 500 LF | 1 | LS | $30,000.00 | $30,000 |
| | | | | | |
| | **Sub Total: General Requirements** | | | | **$1,216,363** |
| | | | | | |
| **2a** | **Replacement of deteriorated timber bulkhead** | | | | |
| | | | | | |
| | Demolition | | | | |
| | Timber piles, 10-12" dia. | 29 | EA | $2,100.00 | $60,900 |
| | Timber sheets and wales, 4x12 | 1 | LS | $150,000.00 | $150,000 |
| | | | | | |
| | New Work | | | | |
| | Steel sheet piles, 450' long 45' deep | 20,250 | SF | $85.00 | $1,721,250 |
| | Concrete cap 2'x1.5', reinforced | 310 | LF | $350.00 | $108,500 |
| | Timber piles, 12" dia. 70' long | 30 | EA | $10,150.00 | $304,500 |
| | Timber wale, 12x12 | 310 | LF | $100.00 | $31,000 |
| | Fill in upland area | 123 | CY | $200.00 | $24,600 |
| | | | | | |
| | Rock socket/drilling in rock | | | | Excluded |
| | | | | | |
| | Test pile program, allow | 1 | LS | $75,000.00 | $75,000 |
| | | | | | |
| | **Sub Total: Replacement of deteriorated timber bulkhead** | | | | **$2,475,750** |
| | | | | | |
| **4** | **Upland / Sitework** | | | | |
| | | | | | |
| | Minimal exterior improvements (for erosion control measures, excavation, base courses, pavements, curbs, site furnishings). Utilities including electrical service and site lighting are excluded. | 1 | LS | $100,000.00 | $100,000 |
| | | | | | |
| | **Sub Total: Upland / Sitework** | | | | **$100,000** |
| | | | | | |
| | **SUBTOTAL: CONCEPT 1: COAL DOCK** | | | | **$3,792,113** |

**ESTIMATE DETAILS - CONCEPT 1: HART ISLAND & CITY ISLAND, STAGE OF GOOD REPAIR**
**FERRY TERMINAL AT CITY ISLAND**

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| | | | | | |
| **1** | **General Requirements** | | | | |
| | | | | | |
| | General requirements, allow 10% | 1 | LS | $34,920.00 | $34,920 |
| | Mobilization, allow 5% | 1 | LS | $17,460.00 | $17,460 |
| | Barge (assume 1 incl. rental, crew, fuel etc.) | 1 | LS | $60,000.00 | $60,000 |
| | Crane rental, assume 3 months | 1 | LS | $100,000.00 | $100,000 |
| | Turbidity curtain, allow 500 LF | 1 | LS | $30,000.00 | $30,000 |
| | Inspection of timber piles every 4-years | | | | Excluded |
| | | | | | |
| | **Sub Total: General Requirements** | | | | **$242,380** |
| | | | | | |
| **3a** | **Replacement of 17 severe rated timber piles at the fender rack** | | | | |
| | | | | | |
| | Remove severe rated timber piles | 17 | EA | $2,100.00 | $35,700 |
| | New timber piles, 12" dia. 70' long | 17 | EA | $10,150.00 | $172,550 |
| | Boot for pile tip | 17 | EA | $350.00 | $5,950 |
| | | | | | |
| | Rock socket/drilling in rock | | | | Excluded |
| | | | | | |
| | Test pile program, allow | 1 | LS | $50,000.00 | $50,000 |
| | | | | | |
| | **Sub Total: Replacement of 17 severe rated timber piles at the fender rack** | | | | **$264,200** |
| | | | | | |
| **3b** | **Replacement of steel cable wraps securing groups of timber piles at the fender rack** | | | | |
| | | | | | |
| | Remove steel cable wraps, replace with 1" dia. Galvanized rope incl. connection hardware | 500 | LF | $60.00 | $30,000 |
| | | | | | |
| | **Sub Total: Replacement of steel cable wraps securing groups of timber piles at** | | | | **$30,000** |
| | | | | | |
| **3c** | **Replacement of the broken horizontal member supporting the south gantry tower** | | | | |
| | | | | | |
| | Remove existing damaged member and replace with new 10 LF12x12 timber | 1 | EA | $5,000.00 | $5,000 |
| | | | | | |
| | **Sub Total: Replacement of the broken horizontal member supporting the south** | | | | **$5,000** |
| | | | | | |

## ESTIMATE DETAILS - CONCEPT 1: HART ISLAND & CITY ISLAND, STAGE OF GOOD REPAIR
## FERRY TERMINAL AT CITY ISLAND

**4/5/2022**

| ITEM #. | | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|---|
| **4** | **Upland / Sitework** | | | | | |
| | | | | | | |
| | | Minimal exterior improvements (for erosion control measures, excavation, base courses, pavements, curbs, site furnishings). Utilities including electrical service and site lighting are excluded. | 1 | LS | $50,000.00 | $50,000 |
| | | | | | | |
| | | **Sub Total: Upland / Sitework** | | | | **$50,000** |
| | | | | | | |
| | | **SUBTOTAL: CONCEPT 1: FERRY TERMINAL, CITY ISLAND** | | | | **$591,580** |

TOSCANO CLEMENTS TAYLOR
Cost Consultants
WBE/DBE

# STUDY ESTIMATE
# HART ISLAND TRANSPORTATION STUDY
# NEW YORK

4/5/2022

## SUMMARY - TOTAL (CONCEPTS 2, 3 AND 4)

| ITEM #. | DESCRIPTION | | CONCEPT 2 AMOUNT | CONCEPT 3 AMOUNT | CONCEPT 4 AMOUNT [1] |
|---|---|---|---|---|---|
| 1 | General Requirements | | $ 1,778,068 | $ 2,181,016 | $ 1,584,675 |
| 2 | Removal of Existing Structures | | $ 50,000 | $ 450,500 | $ 100,000 |
| 3 | Test Pile Program | | $ 100,000 | $ 200,000 | $ 100,000 |
| 4 | Barge / Floating Docks | | $ 1,761,500 | $ 1,836,500 | $ 1,761,500 |
| 5 | Anchor Piles | | $ 349,500 | $ 369,800 | $ 349,500 |
| 6 | Gangways | | $ 112,500 | $ 316,000 | $ 112,500 |
| 7 | Monopile and Donut Fender | | $ 316,000 | $ 316,000 | $ 316,000 |
| 8 | Retrofit Coal Dock | | $ 1,349,285 | | |
| 9 | New Coal Dock | | | $ 3,309,806 | |
| 10 | Electrical | | $ 815,000 | $ 815,000 | $ 815,000 |
| 11 | Mechanical, Plumbing, and Fire Protection Systems | | Excluded | Excluded | Excluded |
| 12 | Sitework | | $ 200,000 | $ 300,000 | $ 210,000 |
| | **TRADE COST - SUB TOTAL** | | **$ 6,831,853** | **$ 10,094,621** | **$ 5,349,175** |
| | **ADMINISTRATION** | | | | |
| | Bond & Insurance (On Trade Cost) | 3% | $ 204,956 | $ 302,839 | $ 160,475 |
| | General Contractors Overhead & Profit (On Trade Cost + Bonds + Insurance) | 20% | $ 1,407,362 | $ 2,079,492 | $ 1,101,930 |
| | **ADMIN. COST - SUB TOTAL** | | **$ 1,612,317** | **$ 2,382,331** | **$ 1,262,405** |
| | **CONTINGENCIES AND MARKUPS** | | | | |
| | Design Contingency (On Trade Cost + Administration Cost) | 20% | $ 1,688,834 | $ 2,495,390 | $ 1,322,316 |
| | Construction Contingency (On Trade Cost + Administration Cost + Design Contingency) | 10% | $ 1,013,300 | $ 1,497,234 | $ 793,390 |
| | Market Condition Adjustment (On Trade Cost + Administration Cost + Design Contingency + Construction Contingency) | 10% | $ 1,114,630 | $ 1,646,958 | $ 872,729 |
| | Escalation to mid-point of Construction (on Trade Cost + Admin. Cost + Design Contingency + Construction Contingency+ Market Condition) | 23.02% | $ 2,822,031 | $ 4,169,781 | $ 2,209,581 |
| | **CONTINGENCIES AND MARKUPS - SUB TOTAL** | | **$ 6,638,795** | **$ 9,809,363** | **$ 5,198,016** |
| | **TOTAL ESTIMATED CONSTRUCTION COST** | | **$ 15,082,965** | **$ 22,286,315** | **$ 11,809,596** |
| | **OWNER CONTINGENCIES / SOFT COSTS** | | | | |
| | Soft Costs (A/E Design Fee, Inspection Fee, Project Management, Loan Interest and Accounting etc.) | 30% | $ 4,524,890 | $ 6,685,895 | $ 3,542,879 |
| | **OWNER CONTINGENCIES / SOFT COSTS - SUB TOTAL** | | **$ 4,524,890** | **$ 6,685,895** | **$ 3,542,879** |
| | **TOTAL PROJECT COST** | | **$ 19,607,855** | **$ 28,972,210** | **$ 15,352,475** |

1 Concept 4 requires work proposed in Concept 1 - Bulkhead Reconstruction. Therefore, total cost of Concept 4 if short term work in not completed is $ 25,705,244, or an additional $10,352,769.

**HART ISLAND TRANSPORTATION STUDY**
**NEW YORK**

**STUDY ESTIMATE**

TOSCANO CLEMENTS TAYLOR
Cost Consultants
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## ESTIMATE DETAILS - CONCEPT 2: HART ISLAND, RETROFIT COAL DOCK AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| | | | | | |
| **1** | **General Requirements** | | | | |
| | | | | | |
| | General requirements, allow 10% | 1 | LS | $505,378.50 | $505,379 |
| | Mobilization, allow 5% | 1 | LS | $252,689.25 | $252,689 |
| | Barge (assume 1 incl. rental, crew, fuel etc.) | 1 | LS | $360,000.00 | $360,000 |
| | Crane rental, assume 12 months | 1 | LS | $600,000.00 | $600,000 |
| | Turbidity curtain, allow 1000 LF | 1 | LS | $60,000.00 | $60,000 |
| | | | | | |
| | **Sub Total: General Requirements** | | | | **$1,778,068** |
| | | | | | |
| **2** | **Removal of Existing Structures** | | | | |
| | | | | | |
| | Selective Demolition, Shore Protection | | | | |
| | Misc. demolition, shore protection/mooring structures, breakwaters, bulkheads, carking away of debris | 1 | LS | $50,000.00 | $50,000 |
| | | | | | |
| | **Sub Total: Removal of Existing Structures** | | | | **$50,000** |
| | | | | | |
| **3** | **Test Pile Program** | | | | |
| | | | | | |
| | Test pile program, allow | 1 | LS | $100,000.00 | $100,000 |
| | | | | | |
| | **Sub Total: Test Pile Program** | | | | **$100,000** |
| | | | | | |
| **4** | **Barge / Floating Docks** | | | | |
| | | | | | |
| | NYC Passenger Ferry Terminal Barge | | | | |
| | Barge | | | | |
| | Barge, 35'x90' | 1 | EA | $1,000,000.00 | $1,000,000 |
| | Setup and installation | 1 | LS | $150,000.00 | $150,000 |
| | | | | | |
| | Fendering/Cleats | | | | |
| | Vessel fendering 10' high, ramps, corner fenders and support anchors | 1 | LS | $250,000.00 | $250,000 |
| | Mooring cleat and bits | | | | w/ Barge |
| | | | | | |
| | Misc. Metals | | | | |
| | Canopy incl. framing and supports, allow | 1,530 | SF | $125.00 | $191,250 |
| | Safety ladder (ships ladder) | 1 | EA | $5,000.00 | $5,000 |
| | Passenger containment railing | 125 | LF | $250.00 | $31,250 |
| | Onboarding gates, double | 2 | PR | $5,000.00 | $10,000 |
| | Gate, single | 2 | EA | $3,000.00 | $6,000 |
| | | | | | |
| | Equipment and Furnishings | | | | |
| | Ticket vending machine, allow | 2 | EA | $50,000.00 | $100,000 |
| | Display monitors, allow | 1 | LS | $10,000.00 | $10,000 |

**ESTIMATE DETAILS - CONCEPT 2: HART ISLAND, RETROFIT COAL DOCK AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE**

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| | Bench with back and armrest | 4 | RA | $2,000.00 | $8,000 |
| | | | | | |
| | **Sub Total: Barge / Floating Docks** | | | | **$1,761,500** |
| | | | | | |
| **5** | **Anchor Piles** | | | | |
| | | | | | |
| | 24" dia. Anchor pile, 85' long | 6 | EA | $55,250.00 | $331,500 |
| | Cathodic protection, allow | 6 | EA | $3,000.00 | $18,000 |
| | Rock socket/drilling in rock | | | | Excluded |
| | | | | | |
| | **Sub Total: Anchor Piles** | | | | **$349,500** |
| | | | | | |
| **6** | **Gangways** | | | | |
| | | | | | |
| | Gangway - 9'x80' | 1 | EA | $112,500.00 | $112,500 |
| | | | | | |
| | **Sub Total: Gangways** | | | | **$112,500** |
| | | | | | |
| **7** | **Monopile and Donut Fender** | | | | |
| | | | | | |
| | 36" dia. Monopile, 100' long | 2 | EA | $120,000.00 | $240,000 |
| | Cathodic Protection | 2 | EA | $3,000.00 | $6,000 |
| | | | | | |
| | Rock Socket/Drilling in rock | | | | Not required |
| | | | | | |
| | Donut fender | 2 | EA | $35,000.00 | $70,000 |
| | | | | | |
| | **Sub Total: Monopile and Donut Fender** | | | | **$316,000** |
| | | | | | |
| **8** | **Retrofit Coal Dock** | | | | |
| | | | | | |
| | Epoxy encasement of 15" dia. 142 existing timber piles at the Coal Dock | | | | |
| | Cleaning of piles, pressure washing | 142 | EA | $550.00 | $78,100 |
| | Pile wrap | 2,130 | VLF | $112.50 | $239,625 |
| | Epoxy fill/grout | 2,130 | VLF | $225.00 | $479,250 |
| | | | | | |
| | Replace timber cross bracing, 260 ft | 260 | LF | $200.00 | $52,000 |
| | | | | | |
| | Repair deteriorated concrete deck | 1,400 | SF | | |
| | Sound the concrete surface to located delaminated areas | 1,400 | SF | $0.75 | $1,050 |
| | Remove concrete in repair areas of expose reinforcing bars | 1,400 | SF | $13.50 | $18,900 |
| | Mark the perimeter of each repair area, sawcut perimeter | 1,400 | SF | $7.50 | $10,500 |
| | Remove concrete below corroded rebar (assume 25%) | 350 | SF | $75.00 | $26,250 |

**ESTIMATE DETAILS - CONCEPT 2: HART ISLAND, RETROFIT COAL DOCK AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE**

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| | Build wood forms for concrete placement and remove after concrete placement (10%) | 140 | SFCA | $12.00 | $1,680 |
| | Place repair material | 1,400 | SF | $23.75 | $33,250 |
| | Screed, float of repair material, trowel finish | 1,400 | SF | $5.25 | $7,350 |
| | Curing with sprayed membrane compound | 1,400 | SF | $0.95 | $1,330 |
| | | | | | |
| | Repair concrete abutment connection to the shoreline, allowance | 1 | LS | $100,000.00 | $100,000 |
| | | | | | |
| | Handrail at Coal Dock incl. required support connections | 400 | LF | $750.00 | $300,000 |
| | | | | | |
| | **Sub Total: Retrofit Coal Dock** | | | | **$1,349,285** |
| | | | | | |
| **10** | **Electrical** | | | | |
| | | | | | |
| | Lighting (emergency light fixtures at barge, gangway lights, conduits & wires) | 1 | LS | $110,000.00 | $110,000 |
| | Power (Generator 200 LF away, power panel, safety switches, connectors) | 1 | LS | $115,000.00 | $115,000 |
| | Power feeders (allow 300 LF of feeders for electrical service) | 1 | LS | $290,000.00 | $290,000 |
| | Misc. Conditions (groundings, lightning protections, data conduits, co-ordination with utility company, temp. power and lighting, testing & commissioning, as-built drawings) | 1 | LS | $300,000.00 | $300,000 |
| | | | | | |
| | **Sub Total: Electrical** | | | | **$815,000** |
| | | | | | |
| **11** | **Mechanical, Plumbing, and Fire Protection Systems** | | | | |
| | | | | | |
| | Vessel Fuel System - fuel tanks and pump, fuel dike enclosure, piping, controls, gauging and monitoring | | | | Excluded |
| | Potable Water System - domestic water tanks, pumps and piping | | | | Excluded |
| | Waste Pumpout / Sewage System - sewage and vacuum pumps, piping, deck hydrant and hoses | | | | Excluded |
| | | | | | |
| | **Sub Total: Mechanical, Plumbing, and Fire Protection Systems** | | | | **$0** |
| | | | | | |
| **12** | **Sitework** | | | | |
| | | | | | |
| | Dredging to facilitate ferry access | | | | Excluded |

## ESTIMATE DETAILS - CONCEPT 2: HART ISLAND, RETROFIT COAL DOCK AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE

**4/5/2022**

| ITEM #. | | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|---|
| | | Minimal exterior improvements (for erosion control measures, excavation, base courses, pavements, curbs, site furnishings). Utilities including electrical service and site lighting are excluded. | 1 | LS | $200,000.00 | $200,000 |
| | | | | | | |
| | | **Sub Total: Sitework** | | | | **$200,000** |
| | | | | | | |
| | | **SUBTOTAL: CONCEPT 2** | | | | **$6,831,853** |

**HART ISLAND TRANSPORTATION STUDY**
**NEW YORK**

**STUDY ESTIMATE**

TOSCANO CLEMENTS TAYLOR
Cost Consultants
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**ESTIMATE DETAILS - CONCEPT 3: HART ISLAND, REPLACE COAL DOCK IN-KIND AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE**

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| | | | | | |
| **1** | **General Requirements** | | | | |
| | | | | | |
| | General requirements, allow 10% | 1 | LS | $774,010.56 | $774,011 |
| | Mobilization, allow 5% | 1 | LS | $387,005.28 | $387,005 |
| | Barge (assume 1 incl. rental, crew, fuel etc.) | 1 | LS | $360,000.00 | $360,000 |
| | Crane rental, assume 12 months | 1 | LS | $600,000.00 | $600,000 |
| | Turbidity curtain, allow 1000 LF | 1 | LS | $60,000.00 | $60,000 |
| | | | | | |
| | **Sub Total: General Requirements** | | | | **$2,181,016** |
| | | | | | |
| **2** | **Removal of Existing Structures** | | | | |
| | | | | | |
| | Selective Demolition, Shore Protection | | | | |
| | Coal dock | | | | |
| | Concrete deck | 8,000 | SF | $15.00 | $120,000 |
| | Steel pipe piles, 100' long | 32 | EA | $3,750.00 | $120,000 |
| | Pile caps, 3'x2' | 400 | LF | $175.00 | $70,000 |
| | Handrail | 560 | LF | $37.50 | $21,000 |
| | Timber fender piles, 50' long | 13 | EA | $1,500.00 | $19,500 |
| | Existing timber piles in the adjacent pile field | | | | Excluded |
| | Misc. demolition, shore protection/mooring structures, breakwaters, bulkheads, carking away of debris | 1 | LS | $100,000.00 | $100,000 |
| | | | | | |
| | **Sub Total: Removal of Existing Structures** | | | | **$450,500** |
| | | | | | |
| **3** | **Test Pile Program** | | | | |
| | | | | | |
| | Test pile program, allow | 1 | LS | $200,000.00 | $200,000 |
| | | | | | |
| | **Sub Total: Test Pile Program** | | | | **$200,000** |
| | | | | | |
| **4** | **Barge / Floating Docks** | | | | |
| | | | | | |
| | NYC Passenger Ferry Terminal Barge | | | | |
| | Barge, 35'x90' | 1 | EA | $1,000,000.00 | $1,000,000 |
| | Setup and installation | 1 | LS | $150,000.00 | $150,000 |
| | | | | | |
| | Fendering/Cleats | | | | |
| | Vessel fendering 10' high, ramp, corner fenders and support anchors | 1 | LS | $250,000.00 | $250,000 |
| | Mooring cleat and bits | | | | w/ Barge |
| | | | | | |
| | Misc. Metals | | | | |
| | Canopy incl. framing and supports, allow | 1,530 | SF | $125.00 | $191,250 |
| | Safety ladder (ships ladder) | 1 | EA | $5,000.00 | $5,000 |
| | Passenger containment railing | 125 | LF | $250.00 | $31,250 |

## ESTIMATE DETAILS - CONCEPT 3: HART ISLAND, REPLACE COAL DOCK IN-KIND AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| | Onboarding gates, double | 2 | PR | $5,000.00 | $10,000 |
| | Gate, single | 2 | EA | $3,000.00 | $6,000 |
| | | | | | |
| | Equipment and Furnishings | | | | |
| | Ticket vending machine, allow | 2 | EA | $50,000.00 | $100,000 |
| | Display monitors, allow | 1 | LS | $10,000.00 | $10,000 |
| | Bench with back and armrest | 4 | RA | $2,000.00 | $8,000 |
| | | | | | |
| | Recreational Floating Dock | | | | |
| | Timber floating dock, 12'x28' | 1 | LS | $75,000.00 | $75,000 |
| | Mooring cleat and bits | | | | w/ Floating Dock |
| | | | | | |
| | **Sub Total: Barge / Floating Docks** | | | | **$1,836,500** |
| | | | | | |
| **5** | **Anchor Piles** | | | | |
| | | | | | |
| | NYC Passenger Ferry Terminal Barge | | | | |
| | 24" dia. Anchor pile, 85' long | 6 | EA | $55,250.00 | $331,500 |
| | Cathodic protection, allow | 6 | EA | $3,000.00 | $18,000 |
| | | | | | |
| | Recreational Floating Dock | | | | |
| | 12" dia. timber anchor pile, 70' long | 2 | EA | $10,150.00 | $20,300 |
| | | | | | |
| | Rock socket/drilling in rock | | | | Excluded |
| | | | | | |
| | **Sub Total: Anchor Piles** | | | | **$369,800** |
| | | | | | |
| **6** | **Gangways** | | | | |
| | | | | | |
| | NYC Passenger Ferry Terminal Barge | | | | |
| | Gangway - 9'x80' | 1 | EA | $112,500.00 | $112,500 |
| | | | | | |
| | Recreational Floating Dock | | | | |
| | Gangway - 4'x30' | 1 | EA | $30,000.00 | $30,000 |
| | | | | | |
| | **Sub Total: Gangways** | | | | **$142,500** |
| | | | | | |
| **7** | **Monopile and Donut Fender** | | | | |
| | | | | | |
| | 36" dia. Monopile, 100' long | 2 | EA | $120,000.00 | $240,000 |
| | Cathodic Protection | 2 | EA | $3,000.00 | $6,000 |
| | | | | | |
| | Rock Socket/Drilling in rock | | | | Not required |
| | | | | | |
| | Donut fender | 2 | EA | $35,000.00 | $70,000 |
| | | | | | |
| | **Sub Total: Monopile and Donut Fender** | | | | **$316,000** |
| | | | | | |

**ESTIMATE DETAILS - CONCEPT 3: HART ISLAND, REPLACE COAL DOCK IN-KIND AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE**

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| **9** | **New Coal Dock** | | | | |
| | | | | | |
| | Coal Dock | | | | |
| | Concrete deck, 10" thick | 247 | CY | $2,250.00 | $555,556 |
| | Steel pipe piles 18" dia., 100' long | 32 | EA | $57,500.00 | $1,840,000 |
| | Pile caps, 3'x2' | 400 | LF | $750.00 | $300,000 |
| | Timber fender piles 12" dia., 50' long | 13 | EA | $7,250.00 | $94,250 |
| | Handrail at Coal Dock incl. required support connections | 560 | LF | $750.00 | $420,000 |
| | | | | | |
| | Repair concrete abutment connection to the shoreline, allow | 1 | LS | $100,000.00 | $100,000 |
| | | | | | |
| | **Sub Total: New Coal Dock** | | | | **$3,309,806** |
| | | | | | |
| **10** | **Electrical** | | | | |
| | | | | | |
| | Lighting (emergency light fixtures at barge, gangway lights, conduits & wires) | 1 | LS | $110,000.00 | $110,000 |
| | Power (Generator 200 LF away, power panel, safety switches, connectors) | 1 | LS | $115,000.00 | $115,000 |
| | Power feeders (allow 300 LF of feeders for electrical service) | 1 | LS | $290,000.00 | $290,000 |
| | Misc. Conditions (groundings, lightning protections, data conduits, co-ordination with utility company, temp. power and lighting, testing & commissioning, as-built drawings) | 1 | LS | $300,000.00 | $300,000 |
| | | | | | |
| | **Sub Total: Electrical** | | | | **$815,000** |
| | | | | | |
| **11** | **Mechanical, Plumbing, and Fire Protection Systems** | | | | |
| | | | | | |
| | Vessel Fuel System - fuel tanks and pump, fuel dike enclosure, piping, controls, gauging and monitoring | | | | Excluded |
| | Potable Water System - domestic water tanks, pumps and piping | | | | Excluded |
| | Waste Pumpout / Sewage System - sewage and vacuum pumps, piping, deck hydrant and hoses | | | | Excluded |
| | | | | | |
| | **Sub Total: Mechanical, Plumbing, and Fire Protection Systems** | | | | **$0** |
| | | | | | |
| **12** | **Sitework** | | | | |
| | | | | | |
| | Dredging to facilitate ferry access | | | | Excluded |

## ESTIMATE DETAILS - CONCEPT 3: HART ISLAND, REPLACE COAL DOCK IN-KIND AND INSTALL GANGWAY TO NYC FERRY TERMINAL BARGE

**4/5/2022**

| ITEM #. | | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|---|
| | | Minimal exterior improvements (for erosion control measures, excavation, base courses, pavements, curbs, site furnishings). Utilities including electrical service and site lighting are excluded. | 1 | LS | $300,000.00 | $300,000 |
| | | | | | | |
| | | **Sub Total: Sitework** | | | | **$300,000** |
| | | | | | | |
| | | **SUBTOTAL: CONCEPT 3** | | | | **$9,921,121** |

## ESTIMATE DETAILS - CONCEPT 4: HART ISLAND, NEW GANGWAY LEADING TO NYC FERRY TERMINAL

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| | | | | | |
| **1** | **General Requirements** | | | | |
| | | | | | |
| | Concept 4 | | | | |
| | General requirements, allow 10% | 1 | LS | $376,450.00 | $376,450 |
| | Mobilization, allow 5% | 1 | LS | $188,225.00 | $188,225 |
| | Barge (assume 1 incl. rental, crew, fuel etc.) | 1 | LS | $360,000.00 | $360,000 |
| | Crane rental, assume 12 months | 1 | LS | $600,000.00 | $600,000 |
| | Turbidity curtain, allow 1000 LF | 1 | LS | $60,000.00 | $60,000 |
| | | | | | |
| | **Sub Total: General Requirements** | | | | **$1,584,675** |
| | | | | | |
| **2** | **Removal of Existing Structures** | | | | |
| | | | | | |
| | Selective Demolition, Shore Protection | | | | |
| | Misc. demolition, removal of timber structure, shore protection/mooring structures, breakwaters, bulkheads, carking away of debris | 1 | LS | $100,000.00 | $100,000 |
| | | | | | |
| | **Sub Total: Removal of Existing Structures** | | | | **$100,000** |
| | | | | | |
| **3** | **Test Pile Program** | | | | |
| | | | | | |
| | Test pile program, allow | 1 | LS | $100,000.00 | $100,000 |
| | | | | | |
| | **Sub Total: Test Pile Program** | | | | **$100,000** |
| | | | | | |
| **4** | **Barge / Floating Docks** | | | | |
| | | | | | |
| | NYC Passenger Ferry Terminal Barge | | | | |
| | Barge | | | | |
| | Barge, 35'x90' | 1 | EA | $1,000,000.00 | $1,000,000 |
| | Setup and installation | 1 | LS | $150,000.00 | $150,000 |
| | | | | | |
| | Fendering/Cleats | | | | |
| | Vessel fendering 10' high, ramp, corner fenders and support anchors | 1 | LS | $250,000.00 | $250,000 |
| | Mooring cleat and bits | | | | w/ Barge |
| | | | | | |
| | Misc. Metals | | | | |
| | Canopy incl. framing and supports, allow | 1,530 | SF | $125.00 | $191,250 |
| | Safety ladder (ships ladder) | 1 | EA | $5,000.00 | $5,000 |
| | Passenger containment railing | 125 | LF | $250.00 | $31,250 |
| | Onboarding gates, double | 2 | PR | $5,000.00 | $10,000 |
| | Gate, single | 2 | EA | $3,000.00 | $6,000 |
| | | | | | |
| | Equipment and Furnishings | | | | |

**ESTIMATE DETAILS - CONCEPT 4: HART ISLAND, NEW GANGWAY LEADING TO NYC FERRY TERMINAL**

**4/5/2022**

| ITEM #. | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|
| | Ticket vending machine, allow | 2 | EA | $50,000.00 | $100,000 |
| | Display monitors, allow | 1 | LS | $10,000.00 | $10,000 |
| | Bench with back and armrest | 4 | RA | $2,000.00 | $8,000 |
| | | | | | |
| | **Sub Total: Barge / Floating Docks** | | | | **$1,761,500** |
| | | | | | |
| **5** | **Anchor Piles** | | | | |
| | | | | | |
| | 24" dia. Anchor pile, 85' long | 6 | EA | $55,250.00 | $331,500 |
| | Cathodic protection, allow | 6 | EA | $3,000.00 | $18,000 |
| | Rock socket/drilling in rock | | | | Excluded |
| | | | | | |
| | **Sub Total: Anchor Piles** | | | | **$349,500** |
| | | | | | |
| **6** | **Gangways** | | | | |
| | | | | | |
| | Gangway - 9'x80' | 1 | EA | $112,500.00 | $112,500 |
| | | | | | |
| | **Sub Total: Gangways** | | | | **$112,500** |
| | | | | | |
| **7** | **Monopile and Donut Fender** | | | | |
| | | | | | |
| | 36" dia. Monopile, 100' long | 2 | EA | $120,000.00 | $240,000 |
| | Cathodic Protection | 2 | EA | $3,000.00 | $6,000 |
| | | | | | |
| | Rock Socket/Drilling in rock | | | | Not required |
| | | | | | |
| | Donut fender | 2 | EA | $35,000.00 | $70,000 |
| | | | | | |
| | **Sub Total: Monopile and Donut Fender** | | | | **$316,000** |
| | | | | | |
| **10** | **Electrical** | | | | |
| | | | | | |
| | Lighting (emergency light fixtures at barge, gangway lights, conduits & wires) | 1 | LS | $110,000.00 | $110,000 |
| | Power (Generator 200 LF away, power panel, safety switches, connectors) | 1 | LS | $115,000.00 | $115,000 |
| | Power feeders (allow 300 LF of feeders for electrical service) | 1 | LS | $290,000.00 | $290,000 |
| | Misc. Conditions (groundings, lightning protections, data conduits, co-ordination with utility company, temp. power and lighting, testing & commissioning, as-built drawings) | 1 | LS | $300,000.00 | $300,000 |
| | | | | | |
| | **Sub Total: Electrical** | | | | **$815,000** |
| | | | | | |
| **11** | **Mechanical, Plumbing, and Fire Protection Systems** | | | | |
| | | | | | |

**ESTIMATE DETAILS - CONCEPT 4: HART ISLAND, NEW GANGWAY LEADING TO NYC FERRY TERMINAL**

**4/5/2022**

| ITEM #. | | DESCRIPTION | QUANTITY | UNIT | UNIT PRICE | TOTAL AMOUNT |
|---|---|---|---|---|---|---|
| | | Vessel Fuel System - fuel tanks and pump, fuel dike enclosure, piping, controls, gauging and monitoring | | | | Excluded |
| | | Potable Water System - domestic water tanks, pumps and piping | | | | Excluded |
| | | Waste Pumpout / Sewage System - sewage and vacuum pumps, piping, deck hydrant and hoses | | | | Excluded |
| | | | | | | |
| | | **Sub Total: Mechanical, Plumbing, and Fire Protection Systems** | | | | **$0** |
| | | | | | | |
| **12** | **Sitework** | | | | | |
| | | | | | | |
| | | Dredging to facilitate ferry access | | | | Excluded |
| | | Hinge connection to concrete cap of the proposed steel sheet pile replacement bulkhead undertaken in Concept 1, allow | 1 | LS | $10,000.00 | $10,000 |
| | | Minimal exterior improvements (for erosion control measures, excavation, base courses, pavements, curbs, site furnishings). Utilities including electrical service and site lighting are excluded. | 1 | LS | $200,000.00 | $200,000 |
| | | | | | | |
| | | **Sub Total: Sitework** | | | | **$210,000** |
| | | | | | | |
| | | **SUBTOTAL: CONCEPT 4** | | | | **$5,349,175** |

## NYCDPR Hart Island Transportation Study

### Projected Annual Operating Costs for Alternatives S1, S2, M1, M2, L1 and L2

**SUMMARY**

**4/25/2022**

| | ALT S1<br>3rd Party Operator | ALT S2<br>3rd Party Operator | ALT M1<br>3rd Party Operator | ALT M2<br>NYC Ferry | ALT L1<br>3rd Party Operator | ALT L2<br>NYC Ferry |
|---|---|---|---|---|---|---|
| **Annual Hours of Operations** | 288 | 288 | 168 | 168 | 702 | 683 |
| **Labor** | NA | NA | NA | 19,051 | NA | 77,396 |
| **Fuel and Lubricants** | NA | NA | NA | 78,330 | NA | 337,740 |
| **Vessel Maintenance & Repair** | NA | NA | NA | $ 100,000 | NA | $ 100,000 |
| **Other Cost** | NA | NA | $ 267,385 | $ 349,476 | $ 267,385 | $ 413,027 |
| **Office and Administration** | $ 7,480 | $ 7,680 | $ 37,800 | $ 29,607 | $ 157,950 | $ 77,270 |
| **Shuttle Bus Lease (3rd Party Operator)** | $ 43,200 | $ 43,200 | NA | NA | NA | NA |
| **Vessel Lease (3rd Party Operator)** | NA | NA | $ 252,000 | NA | $ 1,053,000 | NA |
| **Total Annual Operating and Maintenance** | **$ 50,680** | **$ 50,880** | **$ 557,185** | **$ 576,465** | **$ 1,478,335** | **$ 1,005,433** |
| **Capital Costs (one time costs for Terminal Improvements)** | Plug-in number based on selected Infrastructure Cost Option | | | | | |
| **Capital Costs (one time costs for new Vessels)** | NA | NA | NA | $ 5,800,000 | NA | $ 5,800,000 |

1 Ferry Labor costs assume a 3-person crew. Direct costs for crew is assumed to be $40/$22 per hour as per local Glassdoor and Indeed advertised wages. Employee benefit costs are assumed to be additional 35% of wages.

2 Hours of operation updated based on each alternative Service plan

3 Expense cost for food, beverage, concession items are excluded.

4 Shuttle cost based on local charter bus - $150/hr. for 8 hr. day. No discount applied for contractual monthly/yearly service.

5 Vessel Lease cost based on $1500/hr. for 3rd party ferry charter provided by EDC.

6 Excludes Annual Revenue, Annual Subsidy Amount and Farebox Recovery.

7 NYC EDC provided annual vessel operating and maintenance costs; however, this cost may vary depending on annual ferry operations.

8 S1 & S2 signage/wayfinding costs are assumed to be annual for these temporary measures.

## NYCDPR Hart Island Transportation Study

**Service Plan**

**Name: Alternative S1**

**Type: Short Term - Shuttle Bus Alt 1**

**4/25/2022**

### Annual Operation and Maintenance Costs

| Annual Operations - Labor | Hours / Day | Days / Month | Months/Year | Total (Labor Hours) |
|---|---|---|---|---|
| Weekday | 8 | - | 12 | - |
| Weekend | 8 | 3 | 12 | 288 |
| | | | | 288 |

| Shuttle bus | Position | Hourly Rate | # Per Vehicle | Hours / Year | Annual Cost |
|---|---|---|---|---|---|
| | | | | | $ - |
| **A. Total Annual Crew Cost** | | | | | **$ -** |

| Fuel and Lubricants | Consumption Miles / Gal | Fuel Price / Gal. | Trip Distance | Trips | Annual Cost |
|---|---|---|---|---|---|
| Diesel | 10 | $ 4.00 | 2.4 | 48 | N/A |
| **B. Total Annual Fuel Cost** | | | | | **$ -** |

| Vehicle Maintenance & Repair | Annual Cost |
|---|---|
| Annual Bus Maintenance | N/A |
| **C. Total Annual Maintenance Cost** | **$ -** |

| Other Cost | Annual Cost |
|---|---|
| Orchard Beach Lot Temporary Signage & Wayfinding | 1000 |
| Storage | N/A |
| Insurance | N/A |
| **D. Total Other Cost** | **$ 1,000** |

| Office and Administration | Annual Cost |
|---|---|
| Administration/Management | $ 6,480 |
| **E. Total Other Cost** | **$ 7,480** |

| **Total Operation and Maintenance Cost (A + B + C + D)** | **$ 8,480** |
|---|---|

**Excludes:**

Capital Costs
Revenue
Start-up expenses
NYC DOT additional operating costs for additional weekend day of Ferry Service per month

## NYCDPR Hart Island Transportation Study

**Service Plan**

**Name: Alternative S2**

**Type: Short Term - Shuttle Bus Alt 2**

**4/25/2022**

### Annual Operation and Maintenance Costs

| Annual Operations - Labor | Hours / Day | Days / Month | Months/Year | Total (Labor Hours) |
|---|---|---|---|---|
| Weekday | 8 | - | 12 | - |
| Weekend | 8 | 3 | 12 | **288** |
| | | | | **288** |

| Shuttle bus | Position | Hourly Rate | # Per Vehicle | Hours / Year | Annual Cost |
|---|---|---|---|---|---|
| **A. Total Annual Crew Cost** | | | | | $ - |

| Fuel and Lubricants | Consumption Miles / Gal | Fuel Price / Gal. | Trip Distance | Trips | Annual Cost |
|---|---|---|---|---|---|
| Diesel | 10 | $ 4.00 | 5.4 | 48 | N/A |
| **B. Total Annual Fuel Cost** | | | | | $ - |

| Vehicle Maintenance & Repair | Annual Cost |
|---|---|
| Annual Bus Maintenance | N/A |
| **C. Total Annual Maintenance Cost** | $ - |

| Other Cost | Annual Cost |
|---|---|
| Orchard Beach Lot Temporary Signage & Wayfinding | 1000 |
| Pelham Bay Stop Temporary Signage & Wayfinding | 200 |
| Storage | N/A |
| Insurance | N/A |
| **D. Total Other Cost** | **$ 1,200** |

| Office and Administration | Annual Cost |
|---|---|
| Administration/Management | $ 6,480 |
| **E. Total Other Cost** | **$ 7,680** |

| **Total Operation and Maintenance Cost (A + B + C + D)** | **$ 8,880** |
|---|---|

**Excludes:**

Capital Costs
Revenue
Start-up expenses
NYC DOT additional operating costs for additional weekend day of Ferry Service per month

## NYCDPR Hart Island Transportation Study

**Service Plan**

**Name: Alternative M1**

**Type: Medium Term - Stand Alone Ferry Service without City Island Stop**

**4/25/2022**

### Annual Operation and Maintenance Costs

| Annual Operations - Labor | Hours / Day | Days / Month | Months/Year | Total (Labor Hours) |
|---|---|---|---|---|
| Weekday | 8 | - | 12 | - |
| Weekend | 8 | 1.75 | 12 | **168** |
| | | | | **168** |

| Onboard Deck and Engine Crew (150 Passenger Vessel) | Position | Hourly Rate | # Per Boat | Hours / Year | Annual Cost |
|---|---|---|---|---|---|
| | | | | | N/A |
| **A. Total Annual Crew Cost** | | | | | **$ -** |

| Fuel and Lubricants | Consumption Gallons / Hour | Fuel Price / Gal. | Trip Time (Hours) | Operating Hours / Year | Annual Cost |
|---|---|---|---|---|---|
| Ultra-low sulfur diesel | 120 | $ 5.00 | 0.33 | - | N/A |
| **B. Total Annual Fuel Cost** | | | | | **$ -** |

| Vessel Maintenance & Repair | Annual Cost |
|---|---|
| Machinery, Hull, Terminals | N/A |
| **C. Total Annual Maintenance Cost** | **$ -** |

| Other Cost | Annual Cost |
|---|---|
| Moorage | $ 17,385 |
| Terminal O & M cost | $ 250,000 |
| Insurance | N/A |
| **D. Total Other Cost** | **$ 267,385** |

| Office and Administration | Annual Cost |
|---|---|
| Administration/Management | $ 37,800 |
| **E. Total Other Cost** | **$ 37,800** |

| **Total Operation and Maintenance Cost (A + B + C + D)** | **$ 305,185** |
|---|---|

Notes:
Moorage based on 61 ft boat, $285/ft per year at Liberty Harbor Marina
Trips based on net increase Service Plan Summaries from Hart Island Transportation Study
Days/month is a weighted average based on 2 weekend days April - Dec and 1 weekend day Jan - March

**Excludes:**
Capital Costs
Revenue
Start-up expenses

## NYCDPR Hart Island Transportation Study

**Service Plan**

**Name: Alternative M2**

**Type: Medium Term - NYC Ferry Soundview Route Extension without City Island Stop**

**4/25/2022**

### Annual Operation and Maintenance Costs

| Annual Operations - Labor | Hours / Day | Days / Month | Months/Year | Total (Labor Hours) |
|---|---|---|---|---|
| Weekday | 8 | - | 12 | - |
| Weekend | 8 | 1.75 | 12 | **168** |
| | | | | **168** |

| Onboard Deck and Engine Crew (150 Passenger Vessel) | Position | Hourly Rate | # Per Boat | Hours / Year | Annual Cost |
|---|---|---|---|---|---|
| | Captain | $ 54.00 | 1 | 168 | $ 9,072 |
| | Deckhand / Mate | $ 29.70 | 2 | 168 | $ 9,979 |
| **A. Total Annual Crew Cost** | | | | | **$ 19,051** |

| Fuel and Lubricants | Consumption Gallons / Hour | Fuel Price / Gal. | Trip Time (Hours) | Operating Hours / Year | Annual Cost |
|---|---|---|---|---|---|
| Ultra-low sulfur diesel | 120 | $ 5.00 | 0.33 | 131 | $ 78,330 |
| **B. Total Annual Fuel Cost** | | | | | **$ 78,330** |

| Vessel Maintenance & Repair | Annual Cost |
|---|---|
| Machinery, Hull, Terminals | $ 100,000 |
| **C. Total Annual Maintenance Cost** | **$ 100,000** |

| Other Cost | Annual Cost |
|---|---|
| Moorage | $ 80,000 |
| Terminal O & M cost | $ 250,000 |
| Insurance (20% of operating costs) | $ 19,476 |
| **D. Total Other Cost** | **$ 349,476** |

| Office and Administration | Annual Cost |
|---|---|
| Administration/Management | $ 29,607 |
| **E. Total Other Cost** | **$ 29,607** |

| **Total Operation and Maintenance Cost (A + B + C + D)** | **$ 576,465** |
|---|---|

Notes:
Labor considered for 150 passenger vessel
Fuel consumption based on 120 gallons/hour for full load during travel.
Moorage based on Vessel Holding Fee provided by EDC.
Trips based on net increase Service Plan Summaries from Hart Island Transportation Study
Days/month is a weighted average based on 2 weekend days April - Dec and 1 weekend day Jan - March

**Excludes:**
Capital Costs
Revenue
Start-up expenses

## NYCDPR Hart Island Transportation Study

**Service Plan**

**Name: Alternative L1**

**Type: Long Term - Stand Alone Ferry Service without City Island Stop**

**4/25/2022**

### Annual Operation and Maintenance Costs

| Annual Operations - Labor | Add'l Trips/Day | Hours / Day | Days / Month | Months/Year | Total (Labor Hours) |
|---|---|---|---|---|---|
| Weekday | 16 | 9.0 | 3.25 | 12 | **351** |
| Weekend | 12 | 9.0 | 3.25 | 12 | **351** |
| | | | | | **702** |

| Onboard Deck and Engine Crew (150 Passenger Vessel) | Position | Hourly Rate | # Per Boat | Hours / Year | Annual Cost |
|---|---|---|---|---|---|
| | | | | | N/A |
| | | | | | $ - |
| **A. Total Annual Crew Cost** | | | | | **$ -** |

| Fuel and Lubricants | Consumption Gallons / Hour | Fuel Price / Gal. | Trip Time (Hours) | Operating Hours / Year | Annual Cost |
|---|---|---|---|---|---|
| Ultra-low sulfur diesel | 120 | $ 5.00 | 0.33 | | N/A |
| **B. Total Annual Fuel Cost** | | | | | **$ -** |

| Vessel Maintenance & Repair | Annual Cost |
|---|---|
| Machinery, Hull, Terminals | N/A |
| **C. Total Annual Maintenance Cost** | **$ -** |

| Other Cost | Annual Cost |
|---|---|
| Moorage | $ 17,385 |
| Terminal O & M cost | $ 250,000 |
| Insurance | N/A |
| **D. Total Other Cost** | **$ 267,385** |

| Office and Administration | Annual Cost |
|---|---|
| Administration/Management | $ 157,950 |
| **E. Total Other Cost** | **$ 157,950** |

| **Total Operation and Maintenance Cost (A + B + C + D)** | **$ 425,335** |
|---|---|

Notes:
Moorage fee based on 61 ft boat, $285/ft per year at Liberty Harbor Marina
Trips based on net increase Service Plan Summaries from Hart Island Transportation Study
Days/month is a weighted average based on 4 weekdays/weekend days April - Dec and 1 weekday/weekend day Jan - March

**Excludes:**
Capital Costs
Revenue
Start-up expenses

## NYCDPR Hart Island Transportation Study

**Service Plan**

**Name: Alternative L2**

**Type: Long Term - NYC Ferry Soundview Route Extension without City Island Stop**

**4/25/2022**

### Annual Operation and Maintenance Costs

| Annual Operations - Labor | Add'l Trips/Day | Hours / Day | Days / Month | Months/Year | Total (Labor Hours) |
|---|---|---|---|---|---|
| Weekday | 20 | 9.5 | 3.25 | 12 | **371** |
| Weekend | 14 | 8.0 | 3.25 | 12 | **312** |
| **Total Hours** | | | | | **683** |

| Onboard Deck and Engine Crew (150 Passenger Vessel) | Position | Hourly Rate | # Per Boat | Hours / Year | Annual Cost |
|---|---|---|---|---|---|
| | Captain | $ 54.00 | 1 | 683 | $ 36,855 |
| | Deckhand / Mate | $ 29.70 | 2 | 683 | $ 40,541 |
| **A. Total Annual Crew Cost** | | | | | **$ 77,396** |

| Fuel and Lubricants | Consumption Gallons / Hour | Fuel Price / Gal. | Trip Time (Hours) | Operating Hours / Year | Annual Cost |
|---|---|---|---|---|---|
| Ultra-low sulfur diesel | 120 | $ 5.00 | 0.33 | 563 | $ 337,740 |
| **B. Total Annual Fuel Cost** | | | | | **$ 337,740** |

| Vessel Maintenance & Repair | Annual Cost |
|---|---|
| Machinery, Hull, Terminals | $ 100,000 |
| **C. Total Annual Maintenance Cost** | **$ 100,000** |

| Other Cost | Annual Cost |
|---|---|
| Moorage | $ 80,000 |
| Terminal O & M cost | $ 250,000 |
| Insurance (20% of operating costs) | $ 83,027 |
| **D. Total Other Cost** | **$ 413,027** |

| Office and Administration | Annual Cost |
|---|---|
| Administration/Management | $ 77,270 |
| **E. Total Other Cost** | **$ 77,270** |

| **Total Operation and Maintenance Cost (A + B + C + D)** | **$ 1,005,433** |
|---|---|

Notes:
Labor considered for 150 passenger vessel
Fuel consumption based on 120 gallons/hour for full load during travel.
Moorage based on Vessel Holding Fee provided by EDC.
Trips based on net increase Service Plan Summaries from Hart Island Transportation Study
Days/month is a weighted average based on 4 weekdays/weekend days April - Dec and 1 weekday/weekend day Jan - March
Weekday operations include 2 new runs at 46.5 minutes for new service (not extension) between Hart Island and Wall Street/Pier 11.

**Excludes:**
Capital Costs
Revenue
Start-up expenses

# Appendix J

# Service Plan Alternatives Summaries

**Service Plan** Hart Island Transportation Study

Name: Alternative S1 Date: 4/8/2022

Type: Short Term - Shuttle Bus Alt 1 Revision: -

Description: Shuttle Bus Service Between Orchard Beach and Fordham Street Pier to serve visitors using private automobile.
Ferry Schedule for Gravesite Visits Remains Same as Existing. Add additional visitation day on a Saturday for Public 'Gazebo' Visit.

Improvements: 1) Implement Shuttle Bus Service (Hire Third Party Shuttle Operator) Coordinated with Existing Hart Island Ferry Service.
2) Reinitiate Public 'Gazebo' Visits by Appointment Only by Adding an Additional Weekend Day for Ferry Service to Hart Island (Using Existing NYC DOT Service).

## Ferry Services

Ferry Terminal (Start): Fordham Street Pier (Existing) Ferry Vessel Type: Passenger/Vehicle Ferry (Cosgrove)

Ferry Terminal (End): Hart Island Ferry Dock (Existing) Ferry Vessel Capacity: 140 passengers

Ferry Operator: NYC DOT (Existing) No. of Operating Vessels: 1

Seasonal/Weekly Operations:

| Day of Week | Monthly Frequency | Trips Per Day |
|---|---|---|
| Saturday | 2 | 2 |
| Sunday | 1 | 2 |

Ferry Service Notes:
1) By Appointment/reservation only

## Shuttle Services

Shuttle Bus: Capacity - 30-40 passengers

Shuttle Operations: 4 Trips per Day of HI Ferry Service Trip Duration: 14 minutes

Operating Hours: 8:30 AM - 2:30 PM Trip Distance: 2.4 miles

Shuttle Schedule:

| | Fordham St Bound | | Orchard Beach Bound | |
|---|---|---|---|---|
| | Orchard Beach | Fordham St Pier | Fordham St Pier | Orchard Beach |
| 9 AM Ferry | 8:46 AM | 9:00 AM | 11:10 AM | 11:24 AM |
| 12 PM Ferry | 11:46 AM | 12:00 PM | 2:10 PM | 2:24 PM |

**Service Plan** Hart Island Transportation Study

Name: Alternative S2 Date: 4/8/2022

Type: Short Term - Shuttle Bus Alt 2 Revision: -

Description: Shuttle Bus Service Between Pelham Bay Park 6 Train Station, Orchard Beach and Fordham Street Pier to serve visitors using private automobile and subway/bus.

Improvements: Ferry Schedule for Gravesite Visits Remains Same as Existing. Add additional visitation day on a Saturday for Public 'Gazebo' Visit.
1) Implement Shuttle Bus Service (Hire Third Party Shuttle Operator) Coordinated with Existing Hart Island Ferry Service.
2) Reinitiate Public 'Gazebo' Visits by Appointment Only by Adding an Additional Weekend Day for Ferry Service to Hart Island (Using Existing NYC DOT Service).

## Ferry Services

Ferry Terminal (Start): Fordham Street Pier (Existing) Ferry Vessel Type: Passenger/Vehicle Ferry (Cosgrove)

Ferry Terminal (End): Hart Island Ferry Dock (Existing) Ferry Vessel Capacity: 140 passengers

Ferry Operator: NYC DOT (Existing) No. of Operating Vessels: 1

Seasonal/Weekly Operations:

| Day of Week | Monthly Frequency | Trips Per Day |
|---|---|---|
| Saturday | 2 | 2 |
| Sunday | 1 | 2 |

Ferry Service Notes:
1) By Appointment/reservation only

## Shuttle Services

Shuttle Bus: Capacity - 30-40 passengers

Shuttle Operations: 4 Trips per Day of HI Ferry Service Trip Duration: 24 minutes

Operating Hours: 8:30 AM - 2:45 PM Trip Distance: 5.4 miles

Shuttle Schedule:

| | Fordham St Bound | | | Orchard Beach Bound | | |
|---|---|---|---|---|---|---|
| | PBP 6 Train | Orchard Beach | Fordham St Pier | Fordham St Pier | Orchard Beach | PBP 6 Train |
| 9 AM Ferry | 8:36 AM | 8:46 AM | 9:00 AM | 11:10 AM | 11:24 AM | 11:34 AM |
| 12 PM Ferry | 11:36 AM | 11:46 AM | 12:00 PM | 2:10 PM | 2:24 PM | 2:34 PM |

**Service Plan** Hart Island Transportation Study

Name: Alternative M1 Date: 4/8/2022

Type: Medium Term - Stand Alone Ferry Service without City Island Stop Revision: -

Description: Stand Alone Ferry Service (Third Party Operator) to provide service from Ferry Point Park to Hart Island.
Ferry Service Proposed to Run From 9AM to 4:30PM on two weekend days per month, alternating Saturday and Sunday, with limited service (once per month) provided in January through March.

Improvements: 1) Construct New NYC Ferry Terminal at Hart Island.
2) Implement Ferry Service through Third Party Operator to operate between existing NYC Ferry Terminal at Ferry Point Park and New NYC Ferry Terminal at Hart Island.

## Ferry Service

Ferry Terminal (Start): NYC Ferry Ferry Point Park Stop Ferry Vessel Type:

Ferry Terminal (End): NYC Ferry Hart Island Stop (**Proposed**) Ferry Vessel Capacity: 100-150 passengers

Ferry Operator: Third Party Operator No. of Operating Vessels: 1

Seasonal/Weekly Operations:

| Day of Week | Monthly Frequency of Service: April Thru December | Monthly Frequency of Service: January Thru March | Trips to/From Hart Island per Day |
|---|---|---|---|
| Saturday | 1 | 1 | 12 |
| Sunday | 1 | | 12 |
| Total | 2 | 1 | - |

**Total Days of Ferry Operation Annually:** **21**

Ferry Service Notes:
1) Public Service Open to All. Monthly Frequency Based on Existing Service and Stakeholder Survey Data.
2) Winter Service (January Thru March) Proposed to Operate once per month, alternating between Saturday and Sunday.

## Ferry Schedule

Weekend Ferry Schedule:

(Year Round)

| **NYC Ferry** | **HI Ferry - HI Bound** | | **HI Ferry - Ferry Point Park Bound** | |
|---|---|---|---|---|
| FPP | FPP | HI | HI | FPP |
| 9:00 AM | 9:03 AM | 9:20 AM | 9:52 AM | 10:09 AM |
| 10:15 AM | 10:18 AM | 10:35 AM | 11:07 AM | 11:24 AM |
| 11:30 AM | 11:33 AM | 11:50 AM | 12:22 PM | 12:39 PM |
| 12:45 PM | 12:48 PM | 1:05 PM | 1:37 PM | 1:54 PM |
| 2:00 PM | 2:03 PM | 2:20 PM | 2:52 PM | 3:09 PM |
| 3:15 PM | 3:18 PM | 3:35 PM | 4:07 PM | 4:24 PM |
| 4:30 PM | - | - | - | - |

Ferry Schedule Notes:
1) Hart Island Ferry Provides Service Coordinated with NYC Ferry Soundview Schedule to minimize transfer/waiting time between NYC Ferry and Stand Alone Service.
2) Hart Island Ferry Remains at Hart Island Terminal for 32 minutes. Hart Island Ferry Arrives to Ferry Point Park Before and Departs after NYC Ferry SV Service to Minimize Transfer Waiting Time.

**Service Plan** Hart Island Transportation Study

Name: Alternative M2 Date: 4/8/2022

Type: Medium Term - NYC Ferry Soundview Route Extension without City Island Stop Revision: -

Description: A New Hart Island Stop is Integrated into NYC Ferry Soundview Route to provide service from Ferry Point Park to Hart Island.
Revised Weekend Schedule Proposed to Provide Hart Island Access From 9:30AM to 4:15PM on two weekend days per month, alternating Saturday and Sunday.

Improvements: 1) Construct NYC Ferry Terminal at Hart Island.
2) Modify Weekend NYC Ferry Soundview Schedule During Days of Hart Island Service to Extend to Hart Island, Add One Additional Operating Vessel to Soundview Ferry Route to Maintain Existing Headways (Ferry Frequency).

## Ferry Service

Ferry Terminal (Start): Wall Street/Pier 11

Ferry Terminal (End): NYC Ferry Hart Island Stop (**Proposed**)

Ferry Operator: NYC Ferry

Ferry Vessel Type: 150 Passenger River

Ferry Vessel Capacity: 150

No. of Operating Vessels: 3 (1 Additional)

Seasonal/Weekly Operations:

| Day of Week | Monthly Frequency of Service: April Thru December | Monthly Frequency of Service: January Thru March | Trips to/From Hart Island per Day |
|---|---|---|---|
| Saturday | 1 | 1 | 14 |
| Sunday | 1 | | 14 |
| Total | 2 | 1 | - |

**Total Days of Ferry Operation Annually:** **21**

Ferry Service Notes:
1) Public Service Open to All. Monthly Frequency Based on Existing Service and Stakeholder Survey Data.
2) Winter Service (January Thru March) Proposed to Operate once per month, alternating between Saturday or Sunday.

## Ferry Schedule

Weekend Ferry Schedule: **See Attached Sheet Alternate M2 Schedule**

**Service Plan** Hart Island Transportation Study

Name: Alternative L1 Date: 4/8/2022

Type: Long Term - Stand Alone Ferry Service without City Island Stop Revision: -

Description: Stand Alone Ferry Service (Third Party Operator) to provide service from Ferry Point Park to Hart Island.
Ferry Service Proposed to Run From 9AM to 4:30PM on one weekday and one weekend day per week, alternating weekdays and weekend days. During Winter months from January through March, service would be limited to two trips per month.

Improvements: 1) Construct NYC Ferry Terminal at Hart Island.
2) Implement Ferry Service through Third Party Operator to operate between existing NYC Ferry Terminal at Ferry Point Park and New NYC Ferry Terminal at Hart Island.

## Ferry Service

Ferry Terminal (Start): NYC Ferry Ferry Point Park Stop Ferry Vessel Type:

Ferry Terminal (End): NYC Ferry Hart Island Stop (**Proposed**) Ferry Vessel Capacity: Est. 100-150 passengers

Ferry Operator: Third Party Operator No. of Operating Vessels: 1

Seasonal/Weekly Operations:

| Day of Week | Monthly Frequency of Service: April Thru December | Monthly Frequency of Service: January Thru March | Trips to/From Hart Island per Day |
|---|---|---|---|
| Weekday | 4 | 1 | 16 |
| Saturday | 2 | 1 | 12 |
| Sunday | 2 | | 12 |
| Total | 8 | 2 | - |

**Total Days of Ferry Operation Annually:** **78**

Ferry Service Notes:
1) Public Service Open to All. Monthly Frequency Based on Existing Service and Stakeholder Survey Data.
2) Winter Service (January Thru March) Proposed to Operate once per month, alternating between Saturday or Sunday.

**Service Plan** Hart Island Transportation Study

Name: Alternative L1 Date: 4/8/2022

## Ferry Schedule

### Weekday

Weekday Ferry Schedule:

(Year Round)

| NYC Ferry | HI Ferry - HI Bound | | HI Ferry - Ferry Point Park Bound | |
|---|---|---|---|---|
| FPP | FPP | HI | HI | FPP |
| 9:08 AM | 9:10 AM | 9:27 AM | 9:29 AM | 9:46 AM |
| 9:48 AM | 9:50 AM | 10:07 AM | 10:09 AM | 10:26 AM |
| 10:28 AM | 10:30 AM | 10:47 AM | 11:08 AM | 11:25 AM |
| 11:28 AM | 11:30 AM | 11:47 AM | 12:08 PM | 12:25 PM |
| 12:28 PM | 12:30 PM | 12:47 PM | 1:08 PM | 1:25 PM |
| 1:28 PM | 1:30 PM | 1:47 PM | 2:08 PM | 2:25 PM |
| 2:28 PM | 2:30 PM | 2:47 PM | 3:08 PM | 3:25 PM |
| 3:28 PM | 3:30 PM | 3:47 PM | 4:08 PM | 4:25 PM |
| 4:28 PM | | | | |

Ferry Schedule Notes:

1) Hart Island Ferry Provides Service Coordinated with NYC Ferry Soundview Schedule to minimize transfer/waiting time between NYC Ferry and Stand Alone Service.

2) First two round trips of the Hart Island Ferry have two minutes dwell time at each Terminal. During the Third round trip, the Hart Island Ferry Remains at Hart Island Terminal for 21 minutes and continues this pattern for remainder of service. Hart Island Ferry Arrives to Ferry Point Park Before and Departs after NYC Ferry SV Service to Minimize Transfer Waiting Time.

### Weekend

Weekend Ferry Schedule:

(Year Round)

| NYC Ferry | HI Ferry - HI Bound | | HI Ferry - Ferry Point Park Bound | |
|---|---|---|---|---|
| FPP | FPP | HI | HI | FPP |
| 9:00 AM | 9:03 AM | 9:20 AM | 9:55 AM | 10:12 AM |
| 10:15 AM | 10:18 AM | 10:35 AM | 11:10 AM | 11:27 AM |
| 11:30 AM | 11:33 AM | 11:50 AM | 12:25 PM | 12:42 PM |
| 12:45 PM | 12:48 PM | 1:05 PM | 1:40 PM | 1:57 PM |
| 2:00 PM | 2:03 PM | 2:20 PM | 2:55 PM | 3:12 PM |
| 3:15 PM | 3:18 PM | 3:35 PM | 4:10 PM | 4:27 PM |
| 4:30 PM | - | - | - | - |

Ferry Schedule Notes:

1) Hart Island Ferry Provides Service Coordinated with NYC Ferry Soundview Schedule to minimize transfer/waiting time between NYC Ferry and Stand Alone Service.

2) Hart Island Ferry Remains at Hart Island Terminal for 35 minutes. Hart Island Ferry Arrives to Ferry Point Park Before and Departs after NYC Ferry SV Service to Minimize Transfer Waiting Time.

**Service Plan** Hart Island Transportation Study

Name: Alternative L2 Date: 4/8/2022

Type: Long Term - NYC Ferry Soundview Route Extension without City Island Stop Revision: -

Description: A New Hart Island Stop is Integrated into NYC Ferry Soundview Route to provide service from Ferry Point Park to Hart Island.
Revised Weekday and Weekend Schedule Proposed to Provide Hart Island Access From 9:30AM to 4:15PM on one weekday and one weekend day per week, alternating a weekday and Saturday and Sunday for a weekend day.

Improvements: 1) Construct NYC Ferry Terminal at Hart Island.
2) Modify Weekday and Weekend NYC Ferry Soundview Schedule During Days of Hart Island Service to Extend to Hart Island, Add One Additional Operating Vessel to Soundview Ferry Route on weekday and weekend to Maintain Existing Headways (Ferry Frequency).

## Ferry Service

Ferry Terminal (Start): Wall Street/Pier 11

Ferry Terminal (End): NYC Ferry Hart Island Stop (**Proposed**)

Ferry Operator: NYC Ferry

Ferry Vessel Type: 150 Passenger River

Ferry Vessel Capacity: 150

No. of Operating Vessels (Weekday): 4 (1 Additional)

No. of Operating Vessels (Weekend): 3 (1 Additional)

Seasonal/Weekly Operations:

| Day of Week | Monthly Frequency of Service: April Thru December | Monthly Frequency of Service: January Thru March | Trips to/From Hart Island per Day |
|---|---|---|---|
| Weekday | 4 | 1 | 20 |
| Saturday | 2 | 1 | 14 |
| Sunday | 2 | | 14 |
| Total | 8 | 2 | - |

**Total Days of Ferry Operation Annually:** **78**

Ferry Service Notes:
1) Public Service Open to All. Monthly Frequency Based on Increasing Service from Medium Term Alternative.
2) Winter Service (January Thru March) Proposed to Operate Twice per month, including one weekday and alternating between Saturday or Sunday.

## Ferry Schedule

Weekday Ferry Schedule: **See Attached Sheet**
Weekend Ferry Schedule: **See Attached Sheet**

Proposed Modified NYC Ferry Schedule for Alternative M2 and L2 - Weekends

**NYC Ferry Soundview Weekend Schedule - Ferry Point Park/Hart Island Bound**

| Wall St/Pier 11 | Stuyvesant Cove | E 34th St | E 90th St | Soundview | Ferry Point Park | Hart Island |
|---|---|---|---|---|---|---|
| 6:39 AM | 6:50 AM | 7:00 AM | 7:13 AM | 7:31 AM | 7:37 AM | - |
| 8:12 AM | 8:23 AM | 8:33 AM | 8:46 AM | 9:04 AM | 9:10 AM | 9:27 AM |
| 9:16 AM | 9:27 AM | 9:37 AM | 9:50 AM | 10:08 AM | 10:14 AM | 10:31 AM |
| 10:20 AM | 10:31 AM | 10:41 AM | 10:54 AM | 11:12 AM | 11:18 AM | 11:35 AM |
| 11:23 AM | 11:34 AM | 11:44 AM | 11:57 AM | 12:15 PM | 12:21 PM | 12:38 PM |
| 12:27 PM | 12:38 PM | 12:48 PM | 1:01 PM | 1:19 PM | 1:25 PM | 1:42 PM |
| 1:31 PM | 1:42 PM | 1:52 PM | 2:05 PM | 2:23 PM | 2:29 PM | 2:46 PM |
| 2:34 PM | 2:45 PM | 2:55 PM | 3:08 PM | 3:26 PM | 3:32 PM | 3:49 PM |
| 3:38 PM | 3:49 PM | 3:59 PM | 4:12 PM | 4:30 PM | 4:36 PM | - |
| 4:42 PM | 4:53 PM | 5:03 PM | 5:16 PM | 5:34 PM | 5:40 PM | - |
| 5:45 PM | 5:56 PM | 6:06 PM | 6:19 PM | 6:37 PM | 6:43 PM | - |
| 7:03 PM | 7:14 PM | 7:24 PM | 7:37 PM | 7:55 PM | 8:01 PM | - |
| 8:22 PM | 8:33 PM | 8:43 PM | 8:56 PM | 9:14 PM | 9:20 PM | - |
| 9:40 PM | 9:51 PM | 10:01 PM | 10:14 PM | 10:32 PM | 10:38 PM | - |

**NYC Ferry Soundview Weekend Schedule - Wall Street Bound**

| Hart Island | Ferry Point Park | Soundview | E 90th St | E 34th St | Stuyvesant Cove | Wall St/Pier 11 |
|---|---|---|---|---|---|---|
| - | 6:35 AM | 6:42 AM | 7:00 AM | 7:14 AM | 7:22 AM | 7:33 AM |
| - | 7:39 AM | 7:46 AM | 8:04 AM | 8:18 AM | 8:26 AM | 8:37 AM |
| - | 8:43 AM | 8:50 AM | 9:08 AM | 9:22 AM | 9:30 AM | 9:41 AM |
| 9:29 AM | 9:46 AM | 9:53 AM | 10:11 AM | 10:25 AM | 10:33 AM | 10:44 AM |
| 10:33 AM | 10:50 AM | 10:57 AM | 11:15 AM | 11:29 AM | 11:37 AM | 11:48 AM |
| 11:37 AM | 11:54 AM | 12:01 PM | 12:19 PM | 12:33 PM | 12:41 PM | 12:52 PM |
| 12:40 PM | 12:57 PM | 1:04 PM | 1:22 PM | 1:36 PM | 1:44 PM | 1:55 PM |
| 1:44 PM | 2:01 PM | 2:08 PM | 2:26 PM | 2:40 PM | 2:48 PM | 2:59 PM |
| 2:48 PM | 3:05 PM | 3:12 PM | 3:30 PM | 3:44 PM | 3:52 PM | 4:03 PM |
| 3:51 PM | 4:08 PM | 4:15 PM | 4:33 PM | 4:47 PM | 4:55 PM | 5:06 PM |
| - | 5:26 PM | 5:33 PM | 5:51 PM | 6:05 PM | 6:13 PM | 6:24 PM |
| - | 6:45 PM | 6:52 PM | 7:10 PM | 7:24 PM | 7:32 PM | 7:43 PM |
| - | 8:03 PM | 8:10 PM | 8:28 PM | 8:42 PM | 8:50 PM | 9:01 PM |
| - | 9:22 PM | 9:29 PM | 9:47 PM | 10:01 PM | 10:09 PM | 10:20 PM |

Notes:

1) Assumed Travel Times between existing stops to match existing.

2) Dwell Time at each stop assumed to be two minutes based on existing arrival and departure time at Ferry Point Park.

3) Vessel Route Dwell Time at Wall St/Pier 11 Assumed to be 39 minutes based on existing arrival and departure time at Wall St/Pier 11.

Key:

| |
|---|
| Ferry Vessel 1 |
| Ferry Vessel 2 |
| Ferry Vessel 3 |

| | Existing Runs | Proposed Runs | | Difference | |
|---|---|---|---|---|---|
| Vessel | Pier 11 - FPP | Pier 11 - FPP | Pier 11 - HI | Pier 11 - FPP | Pier 11 - HI |
| Ferry Vessel 1 | 13 | 7 | 4 | -6 | 4 |
| Ferry Vessel 2 | 13 | 5 | 6 | -8 | 6 |
| Ferry Vessel 3 | 0 | 2 | 4 | 2 | 4 |
| Total | 26 | 14 | 14 | -12 | 14 |

Proposed Modified NYC Ferry Schedule for Alternative L2 - Weekdays

**NYC Ferry Soundview Weekday Schedule - Ferry Point Park/Hart Island Bound**

| Wall St/Pier 11 | Stuyvesant Cove | E 34th St | E 90th St | Soundview | Ferry Point Park | Hart Island |
|---|---|---|---|---|---|---|
| **5:28 AM** | 5:39 AM | 5:49 AM | 6:02 AM | 6:20 AM | 6:26 AM | - |
| 6:08 AM | 6:19 AM | 6:29 AM | 6:42 AM | 7:00 AM | 7:06 AM | - |
| 6:48 AM | 6:59 AM | 7:09 AM | 7:22 AM | 7:40 AM | 7:46 AM | - |
| 7:28 AM | 7:39 AM | 7:49 AM | 8:02 AM | 8:20 AM | 8:26 AM | 8:43 AM |
| 8:08 AM | 8:19 AM | 8:29 AM | 8:42 AM | 9:00 AM | 9:06 AM | 9:23 AM |
| 8:48 AM | 8:59 AM | 9:09 AM | 9:22 AM | 9:40 AM | 9:46 AM | 10:03 AM |
| 9:28 AM | 9:39 AM | 9:49 AM | 10:02 AM | 10:20 AM | 10:26 AM | 10:43 AM |
| 10:28 AM | 10:39 AM | 10:49 AM | 11:02 AM | 11:20 AM | 11:26 AM | 11:43 AM |
| 11:28 AM | 11:39 AM | 11:49 AM | 12:02 PM | 12:20 PM | 12:26 PM | 12:43 PM |
| 12:28 PM | 12:39 PM | 12:49 PM | 1:02 PM | 1:20 PM | 1:26 PM | 1:43 PM |
| 1:28 PM | 1:39 PM | 1:49 PM | 2:02 PM | 2:20 PM | 2:26 PM | 2:43 PM |
| 2:28 PM | 2:39 PM | 2:49 PM | 3:02 PM | 3:20 PM | 3:26 PM | 3:43 PM |
| 3:28 PM | 3:39 PM | 3:49 PM | 4:02 PM | 4:20 PM | 4:26 PM | 4:43 PM |
| 4:08 PM | 4:19 PM | 4:29 PM | 4:42 PM | 5:00 PM | 5:06 PM | - |
| **4:48 PM** | 4:59 PM | 5:09 PM | 5:22 PM | 5:40 PM | 5:46 PM | - |
| 5:28 PM | 5:39 PM | 5:49 PM | 6:02 PM | 6:20 PM | 6:26 PM | - |
| 6:08 PM | 6:19 PM | 6:29 PM | 6:42 PM | 7:00 PM | 7:06 PM | - |
| 6:48 PM | 6:59 PM | 7:09 PM | 7:22 PM | 7:40 PM | 7:46 PM | - |
| 7:28 PM | 7:39 PM | 7:49 PM | 8:02 PM | 8:20 PM | 8:26 PM | - |
| 8:28 PM | 8:39 PM | 8:49 PM | 9:02 PM | 9:20 PM | 9:26 PM | - |

**NYC Ferry Soundview Weekday Schedule - Wall Street Bound**

| Hart Island | Ferry Point Park | Soundview | E 90th St | E 34th St | Stuyvesant Cove | Wall St/Pier 11 |
|---|---|---|---|---|---|---|
| - | **5:08 AM** | 5:15 AM | 5:33 AM | 5:47 AM | 5:55 AM | 6:06 AM |
| - | **5:48 AM** | 5:55 AM | 6:13 AM | 6:27 AM | 6:35 AM | 6:46 AM |
| - | 6:28 AM | 6:35 AM | 6:53 AM | 7:07 AM | 7:15 AM | 7:26 AM |
| - | 7:08 AM | 7:15 AM | 7:33 AM | 7:47 AM | 7:55 AM | 8:06 AM |
| - | 7:48 AM | 7:55 AM | 8:13 AM | 8:27 AM | 8:35 AM | 8:46 AM |
| - | **8:28 AM** | 8:35 AM | 8:53 AM | 9:07 AM | 9:15 AM | 9:26 AM |
| 8:45 AM | 9:02 AM | 9:09 AM | 9:27 AM | 9:41 AM | 9:49 AM | 10:00 AM |
| 9:25 AM | 9:42 AM | 9:49 AM | 10:07 AM | 10:21 AM | 10:29 AM | 10:40 AM |
| 10:05 AM | 10:22 AM | 10:29 AM | 10:47 AM | 11:01 AM | 11:09 AM | 11:20 AM |
| 10:45 AM | 11:02 AM | 11:09 AM | 11:27 AM | 11:41 AM | 11:49 AM | 12:00 PM |
| 11:45 AM | 12:02 PM | 12:09 PM | 12:27 PM | 12:41 PM | 12:49 PM | 1:00 PM |
| 12:45 PM | 1:02 PM | 1:09 PM | 1:27 PM | 1:41 PM | 1:49 PM | 2:00 PM |
| 1:45 PM | 2:02 PM | 2:09 PM | 2:27 PM | 2:41 PM | 2:49 PM | 3:00 PM |
| 2:45 PM | 3:02 PM | 3:09 PM | 3:27 PM | 3:41 PM | 3:49 PM | 4:00 PM |
| 3:45 PM | 4:02 PM | 4:09 PM | 4:27 PM | 4:41 PM | 4:49 PM | 5:00 PM |
| 4:45 PM | 5:02 PM | 5:09 PM | 5:27 PM | 5:41 PM | 5:49 PM | 6:00 PM |
| - | 5:48 PM | 5:55 PM | 6:13 PM | 6:27 PM | 6:35 PM | 6:46 PM |
| - | 6:28 PM | 6:35 PM | 6:53 PM | 7:07 PM | 7:15 PM | 7:26 PM |
| - | 7:08 PM | 7:15 PM | 7:33 PM | 7:47 PM | 7:55 PM | 8:06 PM |
| - | 7:48 PM | 7:55 PM | 8:13 PM | 8:27 PM | 8:35 PM | 8:46 PM |
| - | 8:28 PM | 8:35 PM | 8:53 PM | 9:07 PM | 9:15 PM | 9:26 PM |

Notes:

1) Assumed Travel Times between existing stops to match existing.

2) Dwell Time at each stop assumed to be two minutes based on existing arrival and departure time at Ferry Point Park.

3) Vessel Route Dwell Time at Wall St/Pier 11 Varies to Maintain Existing Headways.

Key:

- Ferry Vessel 1
- Ferry Vessel 2
- Ferry Vessel 3
- Ferry Vessel 4

| | Existing Runs | Proposed Runs | | Difference | |
|---|---|---|---|---|---|
| Vessel | Pier 11 - FPP | Pier 11 - FPP | Pier 11 - HI | Pier 11 - FPP | Pier 11 - HI |
| Ferry Vessel 1 | 11 | 3 | 6 | -8 | 6 |
| Ferry Vessel 2 | 15 | 7 | 2 | -8 | 2 |
| Ferry Vessel 3 | 13 | 7 | 6 | -6 | 6 |
| Ferry Vessel 4 | 0 | 4 | 6 | 4 | 6 |
| Total | 39 | 21 | 20 | -18 | 20 |

# Appendix K

# Total Travel Time Calculation Tables

**Existing Condition**

Total Travel Time to Hart Island

| Origin (Zip Code) | Destination Location/ Address | Car | | | Transit | | | | | Transit Route |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Drive (Minutes) | Ferry[1] (Minutes) | Total (Minutes) | Transit Route Alternative | Subway/Bus[2] (Minutes) | Ferry Wait Time[3] (Minutes) | Ferry[1] (Minutes) | Total (Minutes) | |
| Bronx (10460) | Fordham St Dock/ 225 Fordham St Bronx, NY | 30 | 7 | 37 | - | 51 | 21 | 7 | 79 | 5 Train / 2 Train > Bx12 SBS > Bx29 |
| Manhattan (10021) | | 50 | | 57 | - | 68 | 21 | 7 | 96 | 6 Train > Bx29 |
| Brooklyn (11226) | | 80 | 7 | 87 | A | 111 | 21 | 7 | 139 | 2 Train > 4 Train > 6 Train > Bx29 |
| | | | | | B | 111 | 21 | 7 | 139 | 2 Train > 4 Train > BxM8 > Bx29 |
| Queens (11375) | | 35 | 7 | 42 | A | 91 | 21 | 7 | 119 | R Train > 7 Train > Q50 > Bx29 |
| | | | | | B | 97 | 21 | 7 | 125 | F Train > 6 Train > Bx29 |
| Staten Island (10314) | | 70 | 7 | 77 | - | 123 | 21 | 7 | 151 | SIM4C / SIM33C > 4 Train > 6 Train > Bx29 |
| Nassau County (11550) | | 50 | 7 | 57 | A | 147 | 21 | 7 | 175 | LIRR (Woodside) > 7 Train > 6 Train > Bx29 |
| | | | | | B | 151 | 21 | 7 | 179 | LIRR (Jamaica) > Q44-SBS > Q50 > Bx29 |
| Westchester County (10601) | | 40 | 7 | 47 | A | 114 | 21 | 7 | 142 | MNR Harlem (125 St) > 6 Train > Bx29 |
| | | | | | B | 114 | 21 | 7 | 142 | MNR Harlem (Williams Bridge) > Bx28 > Bx29 |
| Connecticut (06880) | | 60 | 7 | 67 | A | 113 | 21 | 7 | 141 | MNR New Haven (New Rochelle) > 0045 > Bx29 |
| | | | | | B | 137 | 21 | 7 | 165 | MNR New Haven (125 St) > BxM27 > Bx29 |
| New Jersey (07601) | | 50 | 7 | 57 | A | 104 | 21 | 7 | 132 | NJ Transit Bus 182 > Bx3 > Bx12 > Bx29 |
| | | | | | B | 123 | 21 | 7 | 151 | NJ Transit Bus 76 > NJ Transit Bus 164 > 7 Train > 6 Train > Bx29 |

leave @ 12pm

Notes:

[1]Ferry travel time includes 3 minutes of dwell time at origin (City Island) location. (Source: NYC EDC Citywide Ferry Study 2013)

[2]Walk travel time from City Island bus stop to Fordham St Dock included in Subway/Bus travel time for transit trips.

[3]Ferry Wait Time represents the amount of time between a passenger's arrival at Fordham St Dock and passenger loading onto the ferry.

[4]Car travel time based on typical summer Saturday travel times. Transit travel time based on typical Saturday travel times in February 2022. Travel times calculated for both a 9AM and 12PM Saturday ferry departure from City Island to Hart Island, and the 12PM Saturday ferry departure typically provided more conservative travel times (shown in table).

**Short Term Alternative S1 - Shuttle Bus Service (Orchard Beach - Fordham St)**

Total Travel Time to Hart Island

| Origin (Zip Code) | Car | | Shuttle | | | Ferry[2] (Minutes) | Total (Minutes) |
|---|---|---|---|---|---|---|---|
| | Drive (Minutes) | Destination Location/ Address | Shuttle Wait Time[3] (Minutes) | Shuttle[1] (Minutes) | Destination Location/ Address | | |
| Bronx (10460) | 25 | Orchard Beach Parking Lot, Bronx, NY | 5 | 14 | Fordham St Pier/ 225 Fordham St, Bronx, NY | 7 | 51 |
| Manhattan (10021) | 45 | | 5 | 14 | | 7 | 71 |
| Brooklyn (11226) | 75 | | 5 | 14 | | 7 | 101 |
| Queens (11375) | 30 | | 5 | 14 | | 7 | 56 |
| Staten Island (10314) | 65 | | 5 | 14 | | 7 | 91 |
| Nassau County (11550) | 45 | | 5 | 14 | | 7 | 71 |
| estchester County (1060 | 35 | | 5 | 14 | | 7 | 61 |
| Connecticut (06880) | 55 | | 5 | 14 | | 7 | 81 |
| New Jersey (07601) | 45 | | 5 | 14 | | 7 | 71 |
| | | | | leave @ 11:45am | | leave @ 12pm | |

Notes:

[1]Shuttle travel time includes 1 minute of dwell time at origin (Orchard Beach Parking Lot) and destination (Fordham St Dock, City Island) location.

[2]Ferry travel time includes 3 minutes of dwell time at the City Island ferry terminal. (Source: NYC EDC Citywide Ferry Study 2013)

[3]Shuttle Wait Time represents the amount of time between a passenger's arrival at Orchard Beach Parking Lot and passenger loading onto the shuttle.

[4]Car and shuttle travel time based on typical summer Saturday travel times. Travel times calculated for both a 9AM and 12PM Saturday ferry departure from City Island to Hart Island, and the 12PM Saturday ferry departure typically provided more conservative travel times (shown in table).

**Short Term Alternative S2 - Shuttle Bus Service (Pelham Bay Park Station - Orchard Beach - Fordham St)**

Total Travel Time to Hart Island

| Origin (Zip Code) | Transit | | | Shuttle (Pelham Bay Park > Orchard Beach > Fordham St Pier) | | | Ferry | | Total (Minutes) | Transit Route |
|---|---|---|---|---|---|---|---|---|---|---|
| | Transit Route Alternatives | Subway/ Bus (Minutes) | Destination Location/ Address | Shuttle Wait Time[3] (Minutes) | Shuttle[1] (Minutes) | Destination Location/ Address | Ferry Wait Time[4] (Minutes) | Ferry[2] (Minutes) | | |
| Bronx (10460) | A | 29 | Pelham Bay Park Subway Station, Bronx, NY | 13 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 73 | 2 Train > Bx12 |
| | B | 24 | Pelham Bay Park Subway Station, Bronx, NY | 3 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 58 | Q44-SBS > 6 Train |
| Manhattan (10021) | - | 37 | Pelham Bay Park Subway Station, Bronx, NY | 3 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 71 | 6 Train |
| Brooklyn (11226) | A | 84 | Pelham Bay Park Subway Station, Bronx, NY | 3 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 118 | 2 Train > 4 Train > 6 Train |
| | B | 111 | Fordham St Pier, Bronx, NY | - | - | - | 21 | 7 | 139 | 2 Train > 4 Train > 6 Train > Bx29 |
| Queens (11375) | A | 64 | Pelham Bay Park Subway Station, Bronx, NY | 3 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 98 | F Train > 6 Train |
| | B | 69 | Pelham Bay Park Subway Station, Bronx, NY | 3 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 103 | R Train > 6 Train |
| Staten Island (10314) | - | 113 | Pelham Bay Park Subway Station, Bronx, NY | 3 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 147 | S62 > SIM33C > 4 Train > 6 Train |
| Nassau County (11550) | A | 150 | Pelham Bay Park Subway Station, Bronx, NY | 3 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 184 | n40/41 > LIRR Hempstead > Q Train > 6 Train |
| | B | 147 | Fordham St Pier, Bronx, NY | - | - | - | 21 | 7 | 175 | LIRR (Woodside) > 7 Train > 6 Train > Bx29 |
| Westchester County (10601) | A | 69 | Pelham Bay Park Subway Station, Bronx, NY | 15 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 115 | MNR Harlem > Bx12-SBS |
| | B | 70 | Pelham Bay Park Subway Station, Bronx, NY | 19 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 120 | MNR Harlem > 6 Train |
| Connecticut (06880) | A | 113 | Pelham Bay Park Subway Station, Bronx, NY | 11 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 155 | MNR New Haven > 6 Train |
| | B | 113 | Fordham St Pier, Bronx, NY | - | - | - | 21 | 7 | 141 | MNR New Haven (New Rochelle) > 0045 > Bx29 |
| New Jersey (07601) | A | 100 | Pelham Bay Park Subway Station, Bronx, NY | 3 | 24 | Fordham St Pier, Bronx, NY | - | 7 | 134 | NJ Transit Bus 165 > 7 Train > 6 Train |
| | B | 104 | Fordham St Pier, Bronx, NY | - | - | - | 21 | 7 | 132 | NJ Transit Bus 182 > Bx3 > Bx12 > Bx29 |

leave @ 11:30am leave @ 12pm

Notes:

[1]Shuttle travel time includes 1 minute of dwell time at origin (Pelham Bay Park), at shuttle stop (Orchard Beach Parking Lot) and destination (Fordham St Dock, City Island) location.

[2]Ferry travel time includes 3 minutes of dwell time at the City Island ferry terminal. (Source: NYC EDC Citywide Ferry Study 2013)

[3]Shuttle Wait Time represents the amount of time between a passenger's arrival at Pelham Bay Park Station and passenger loading onto the shuttle.

[4]Ferry Wait Time represents the amount of time between a passenger's arrival at Fordham St Dock and passenger loading onto the ferry.

[5]Shuttle travel time based on typical summer Saturday travel times. Travel times calculated for both a 9AM and 12PM Saturday ferry departure from City Island to Hart Island, and the 12PM Saturday ferry departure typically provided more conservative travel times (shown in table).

**Mid Term Alternative M1 / Long Term Alternative L1 - Standalone Hart Island Ferry Without City Island Stop**

Total Travel Time to Hart Island

| Origin (Zip Code) | Destination Location/ Address | Car | | | | Transit | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Drive (Minutes) | Walk (Minutes) | Ferry (Minutes) | Total (Minutes) | Transit Route Alternatives | Subway/Bus/Ferry (Minutes) | Ferry Wait Time[1,2] (Minutes) | Ferry (Minutes) | Total (Minutes) | Transit Route | Origin Ferry Landing Location for Transit Trips |
| Bronx (10460) | NYC Ferry, Ferry Point Park, Bronx, NY | 16 | 10 | 17 | 43 | A | 71 | 5 | 17 | 93 | 5 Train > M86-SBS > NYC Ferry SV | 90th St |
| | | | | | | B | 47 | 5 | 17 | 69 | Q44-SBS > Bx39 > NYC Ferry SV | Soundview |
| Manhattan (10021) | | 35 | 10 | 17 | 62 | - | 49 | 5 | 17 | 71 | M31 > NYC Ferry SV | 90th St |
| Brooklyn (11226) | | 70 | 10 | 17 | 97 | A | 92 | 5 | 17 | 114 | 2 Train > 4 Train > M86-SBS > NYC Ferry SV | 90th St |
| | | | | | | B | 100 | 5 | 17 | 122 | 2 Train > NYC Ferry SV | 11th St Pier |
| Queens (11375) | | 24 | 10 | 17 | 51 | A | 84 | 5 | 17 | 106 | E Train > 6 Train > M86-SBS > NYC Ferry SV | 90th St |
| | | | | | | B | 84 | 5 | 17 | 106 | E Train > NYC Ferry Astoria > NYC Ferry SV | Roosevelt Island (Transfer @ E 34th St Pier) |
| Staten Island (10314) | | 60 | 10 | 17 | 87 | A | 129 | 5 | 17 | 151 | S62 > SIM4C > 4 Train > M86-SBS > NYC Ferry SV | 90th St |
| | | | | | | B | 159 | 5 | 17 | 181 | S62 > SI Ferry > NYC Ferry SV | St. George (Staten Island) (Transfer to NYC Ferry @ 11th St Pier) |
| Nassau County (11550) | | 40 | 10 | 17 | 67 | - | 152 | 5 | 17 | 174 | n35 > LIRR Babylon > M34-SBS > NYC Ferry SV | 34th St |
| Westchester County (10601) | | 40 | 10 | 17 | 67 | A | 113 | 5 | 17 | 135 | MNR Harlem > M42 > NYC Ferry SV | 34th St |
| | | | | | | B | 113 | 5 | 17 | 135 | MNR Harlem > 4 Train > M86-SBS > NYC Ferry SV | 90th St |
| Connecticut[4] (06880) | | 55 | 10 | 17 | 82 | - | 137 | 5 | 17 | 159 | MNR New Haven > M42 > NYC Ferry SV | 34th St |
| New Jersey (07601) | | 35 | 10 | 17 | 62 | - | 101 | 5 | 17 | 123 | NJ Transit Bus 165 > M42 > NYC Ferry SV | 34th St |

Notes:

[1]Ferry dwell time at origin (Ferry Point Park) location included in the Ferry Wait Time for transit trips.

[2]Ferry Wait Time represents the amount of time between a passenger's arrival at Ferry Point Park Pier and ferry departure time.

[3]Car travel time based on typical summer Saturday travel times. Transit travel time based on typical Saturday travel times in February 2022. Travel times calculated for an 11:50AM ferry arrival time at Hart Island.

[4]Travel times calculated for a 1:05PM ferry arrival time at Hart Island. (This alternative arrival time allows for minimum transit travel time and ferry wait time for passengers boarding the NYC Ferry at E 34th St ferry terminal.)

**Mid Term Alternative M2 / Long Term Alternative L1 - NYC Ferry Operation Without City Island Stop**

Total Travel Time to Hart Island

| Origin (Zip Code) | Car | | | | | Transit | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Destination Location/ Address | Drive (Minutes) | Walk (Minutes) | Ferry (Minutes) | Total (Minutes) | Transit Route Alternatives | Subway/Bus/Ferry (Minutes) | Ferry Wait Time[1,2] (Minutes) | Ferry (Minutes) | Total (Minutes) | Transit Route | Origin Ferry Landing Location for Transit Trips |
| Bronx (10460) | NYC Ferry, Ferry Point Park, Bronx, NY | 16 | 10 | 17 | 43 | A | 47 | 10 | 41 | 98 | 5 Train > M86-SBS > NYC Ferry SV | 90th St |
| | | | | | | B | 30 | 3 | 23 | 56 | Q44-SBS > Bx39 > NYC Ferry SV | Soundview |
| Manhattan (10021) | | 35 | 10 | 17 | 62 | - | 12 | 15 | 41 | 68 | M31 > NYC Ferry SV | 90th St |
| Brooklyn (11226) | | 70 | 10 | 17 | 97 | A | 64 | 10 | 41 | 115 | 2 Train > 4 Train > M86-SBS > NYC Ferry SV | 90th St |
| | | | | | | B | 30 | 10 | 75 | 115 | 2 Train > NYC Ferry SV | 11th St Pier |
| Queens (11375) | | 24 | 10 | 17 | 51 | A | 40 | 15 | 41 | 96 | F Train > Q Train > NYC Ferry SV | 90th St |
| | | | | | | B | 38 | 41 | 41 | 120 | F Train > NYC Ferry Astoria > NYC Ferry SV | Roosevelt Island (Transfer @ E 34th St) |
| Staten Island (10314) | | 60 | 10 | 17 | 87 | A | 92 | 18 | 41 | 151 | S62 > SIM4C > 4 Train > M86-SBS > NYC Ferry SV | 90th St |
| | | | | | | B | 73 | 22 | 75 | 170 | S62 > SI Ferry > NYC Ferry SV | St. George (Staten Island) (Transfer to NYC Ferry @ 11th St Pier) |
| Nassau County (11550) | | 40 | 10 | 17 | 67 | - | 96 | 9 | 54 | 159 | n35 > LIRR Babylon > M34-SBS > NYC Ferry SV | 34th St |
| Westchester County (10601) | | 40 | 10 | 17 | 67 | A | 81 | 14 | 54 | 149 | MNR Harlem > M42 > NYC Ferry SV | 34th St |
| | | | | | | B | 69 | 10 | 41 | 120 | MNR Harlem > 4 Train > M86-SBS > NYC Ferry SV | 90th St |
| Connecticut[4] (06880) | | 55 | 10 | 17 | 82 | - | 99 | 4 | 54 | 157 | MNR New Haven > M42 > NYC Ferry SV | 34th St |
| New Jersey (07601) | | 35 | 10 | 17 | 62 | - | 59 | 4 | 54 | 117 | NJ Transit Bus 163 > NJ Transit Bus 164 > M34-SBS > NYC Ferry SV | 34th St |

Notes:

[1]Ferry dwell time at origin location included in the Ferry Wait Time for transit trips.

[2]Ferry Wait Time represents the amount of time between a passenger's arrival at Ferry Point Park Pier or Fordham St Dock and ferry departure time.

[3]Car travel time based on typical summer Saturday travel times. Transit travel time based on typical Saturday travel times in February 2022. Travel times calculated for an 11:35AM ferry arrival time at Hart Island.

[4]Travel times calculated for a 12:38PM ferry arrival time at Hart Island. (This alternative arrival time allows for minimum ferry wait time for passengers boarding the NYC Ferry at E 34th St ferry terminal.)