THE INTER–BOROUGH EXPRESS

Planning & Environmental Linkages Study

January 2023

Executive Summary

The Interborough Express is advancing with the selection of Light Rail as its mode.

The MTA has selected Light Rail as the mode for the IBX. This report details the analysis and planning that show that Light Rail will provide the best service for riders at the best value.

BACKGROUND

The Corridor

Hidden in plain sight, a 14-mile-long freight rail corridor runs through Brooklyn and Queens. These tracks last provided passenger rail service in 1924. Today, the corridor is one of the few remaining freight rail links in New York City. This freight corridor is comprised of the Long Island Rail Road (LIRR) Bay Ridge Branch and the CSX Fremont Secondary.

This corridor provides opportunity to better connect some of Brooklyn's and Queens' most densely populated and diverse neighborhoods. The area surrounding the corridor is home to 900,000 people and 260,000 jobs.

The Interborough Express

The Interborough Express would take advantage of that opportunity. It would add passenger service to the corridor to better connect these neighborhoods to the MTA's existing transit network, including transfers to 17 subway lines and the Long Island Rail Road. It would also connect them to each other, serving growing demand for travel within and between the vibrant Brooklyn and Queens communities.

The IBX would serve a diverse study area with significant transportation needs:

- **7 in 10** People of color
- **1 in 2** Zero-car households
- **3 in 10** Households below 150% of poverty line
- **1 in 4** Residents with limited English fluency

THE STUDY

Announcement & Interim Report

Citing its potential to be a transformational addition to Brooklyn and Queens, Governor Kathy Hochul directed the MTA in January 2022 to initiate the environmental review process for the Interborough Express. Shortly thereafter, the MTA released an Interim Report summarizing the results of the MTA's previous efforts to evaluate potential passenger options for the corridor.

The Interim Report narrowed the project down to three potential modes:

- Light Rail Transit (LRT), which uses cars smaller in stature than subway cars and can operate both along dedicated tracks and on-street,
- Conventional Rail (CR), which would utilize FRA-compliant vehicles with configuration similar to a subway car, and
- Bus Rapid Transit (BRT), which would feature electric buses operating along a bus-only corridor with the flexibility to operate on-street if needed.

The Planning Study

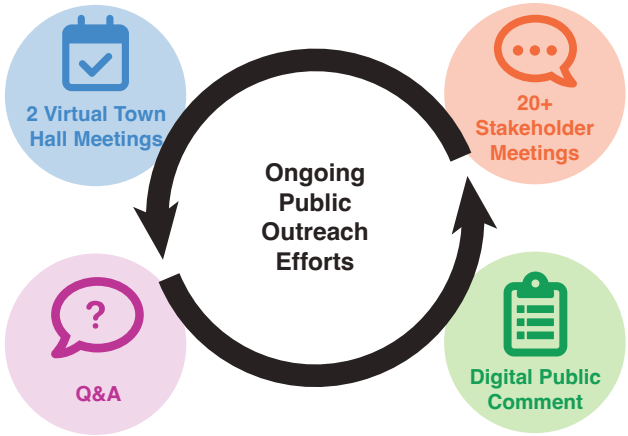
This report is the Planning and Environmental Linkages Study (the Planning Study). It represents the first formal step in the environmental review process. The Planning Study set out to select the **mode,** identify potential **station locations,** and advance **additional engineering, transit planning, and environmental evaluation.**

In this study, the MTA took a deeper dive into potential engineering, planning, and environmental issues, identifying constraints within the existing right-of-way and examining how each mode can adapt to them—and at what cost per rider. Putting these elements together, the relative costs, benefits, and therefore value of each mode could be assessed.

Public Engagement

To inform this work, public engagement was essential. More than 20 stakeholder meetings were held with partners throughout the corridor. Town hall meetings were held in May and September, 2022, and the MTA responded to a variety of questions and comments received live during these meetings. In addition, over 1000 comments were received over a six-month period through the project page.

This helped inform not just the mode selection but potential station locations as well. A station location map was also featured on the project website, and the public was invited to "drop a pin" in locations where stations should be considered.



THE RESULTS

Mode

After this extensive planning, analysis, and public engagement, Light Rail was chosen because it will provide the best service for riders at the best value.

Key factors considered include:

Capacity: Light Rail's quick acceleration and short dwell times make it the fastest of the three options. Combined with trains that can fit up to 360 people, Light Rail can fully meet demand. BRT, on the other hand, is unable to, due to passenger capacity limitations with the buses.

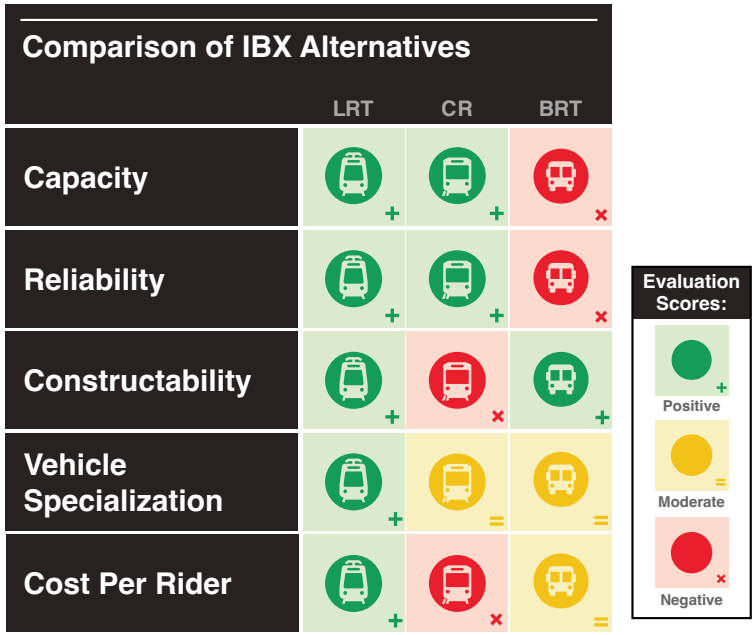
Reliability: Since it can operate in the cut through 96% of the corridor, Light Rail will provide reliable service. BRT risks being bogged down operationally as it turns around on crowded Jackson Heights streets.

Constructability: Light Rail's smaller, more flexible vehicles fit within the constraints of the existing corridor. The fact that it can run on the street allows it to avoid construction of a complex and costly tunnel at a key pinch point, as would be required by Conventional Rail.

Vehicle Specialization: Light Rail vehicles can be procured "off-the-shelf" without modification and can draw on a different pool of potential suppliers than traditional MTA rolling stock. Both Conventional Rail and BRT would require more extensive modifications.

Relative Cost: Thanks to its high ridership (115,000 projected weekday riders) and relatively low construction cost ($5.5B in 2027 $), Light Rail offers the best value, with a cost of $48,000 per daily rider. Conventional Rail had a much higher construction cost and bus rapid transit could not move as many riders.

Along with other technical considerations, and the fact that public input suggested strong support for a rail option, Light Rail was the clear choice as to advance for the Interborough Express.



Proposed LRT Alignment & Potential Stops

Station Locations

The study also identified potential station locations. Although stations may be added, removed, or modified as planning progresses, this preliminary list of stations would allow the IBX to connect to 17 subway lines, the Long Island Rail Road, and major bus corridors. Each station would be fully accessible. The station list also reflects a preliminary review at constructability and opportunities to support surrounding land use.

Additional Engineering, Planning, and Evaluation

Although the right-of-way already exists, this project is not so simple as laying down track and starting service. Substantial reconstruction will be necessary in order to make the Interborough Express possible while preserving vital freight connections.

Areas of focus along the corridor include over 45 overpass bridges, many of which will need to be reconstructed in order to accommodate the new service, as well as a 125-year-old tunnel that will require rehabilitation. Siting support facilities for vehicle maintenance and storage as well as power distribution, ancillary facilities, and prospective stations within or near this narrow right-of-way is also a significant challenge.

Additionally, the project is being designed to not prelude the Cross Harbor Freight Program rail tunnel project, which is undergoing its own environmental review at the Governor's direction.

PROJECT BENEFITS

Projected to transport a significant number of New Yorkers to their destinations, the Light Rail alternative would carry approximately 115,000 passengers each weekday. If built, the IBX would see higher daily ridership than nearly any new transit line built in the U.S. over the last two decades.

Travel time estimates for LRT would be 39 minutes to run from Jackson Heights to Bay Ridge. Dwell time for LRT—the length of time that a vehicle spends in a station to allow passengers to board and alight—is about 30 seconds.

This adds up to major time savings for riders, connecting neighborhoods with poor existing transit links to one another. The IBX would cut travel time significantly for many riders travelling within or between Brooklyn and Queens.

Along with its benefits for individual riders, the IBX would enhance entire neighborhoods and strengthen Brooklyn and Queens as a whole. By creating new connections to job centers like Brooklyn Army Terminal and Broadway Junction and educational insitutions like Brooklyn College, the IBX would open up new possibilities for New Yorkers all across the city.

NEXT STEPS

With the Planning Study completed, the MTA will seek to begin the environmental review process and preliminary engineering in early 2023.

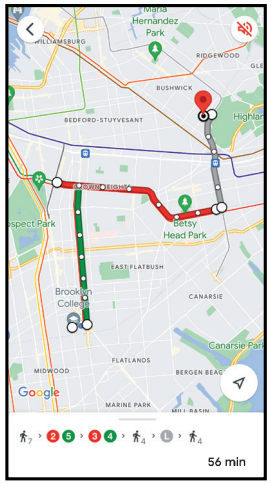
The IBX is one of nearly two dozen expansion projects being evaluated under the MTA's 20 Year Needs Assessment. Through this process, potential expansion projects will be assessed on a level playing field to determine which meet the MTA's strategic goals most effectively. If this project is determined to meet the MTA's strategic goals, construction funding will need to be identified before the project enters a future Capital Program. Public engagement will continue as the project progresses.

Today

Getting from home in East Bushwick to your class at Brooklyn College could take you an hour. You're routed with 2 transfers and one is out of system!

Wilson Avenue Station L

Flatbush Avenue - Brooklyn College 2 5



You could have a slightly faster route... but that requires transferring to an infrequent bus.

With the IBX

With a high-frequency transit line built along the IBX, you could have a one-seat ride from home to work, eliminating the time currently spent transferring between trains and reducing time spent waiting on the platform or in motion. That's:

30 *minutes saved per trip*

60 *minutes saved per day*

261 *hours saved per year*

That's a week and a half of travel time saved!

Introduction

INTRODUCTION

Hidden in plain sight, a 14-mile-long freight rail corridor runs through Brooklyn and Queens. These tracks last provided passenger rail service in 1924. Today, the corridor is one of the few remaining freight rail links in New York City.

This freight corridor is comprised of the Long Island Rail Road (LIRR) Bay Ridge Branch and the CSX Fremont Secondary (see map to the right). The combined right-of-way of these two lines presents an attractive opportunity to better connect some of Brooklyn's and Queens' most densely populated neighborhoods via a new transit link, dubbed the **Interborough Express (IBX)**.

In 2022, the MTA released the IBX Interim Report, which conceived of the line and three alternative transit modes. By using an existing right-of-way, the MTA could eliminate some of the costs and community disruption associated with constructing transit infrastructure. New York City has long contended with limited direct rapid transit links between the outer boroughs. A new rapid transit line along this alignment would connect up to 17 existing subway lines, providing a new rapid transit link between Queens and Brooklyn without going into Manhattan and provides a public transit station in underserved neighborhoods where none currently exist.

This Planning and Environmental Linkages Study (Planning Study) further evaluates three alternative transit modes identified in the *IBX Feasibility Study*. A wide range of factors, including engineering, transit planning, the environment, and public input were assessed to identify the most promising alternative to advance to the next phase of evaluation and design.

This Planning Study further explores options for building a new transit line between Queens and Brooklyn along an existing freight corridor.

Overview map of the existing freight rail corridor, subway connections, and the primary study area. Note that while most of the IBX corridor runs along the Bay Ridge Branch, a portion includes the Fremont Secondary.

BACKGROUND

The IBX Interim Report published in January 2022 outlined the project's needs, goals, and objectives; this report refines some of those original recommendations to meet the requirements for the National Environmental Policy Act (NEPA) assessment to come:

> *The purpose of the IBX is to provide fast, direct, and reliable transit service connecting Brooklyn and Queens using the existing Bay Ridge Branch and Fremont Secondary freight corridors between the Brooklyn Army Terminal and Roosevelt Avenue in Jackson Heights.*

The needs from the Interim Report were refined to align them with guidance from the Federal Transit Administration (FTA), focusing them on the subject of transportation. Non-transportation-related needs were moved to the project's goals and objectives.

A. **Need for efficient, direct, and reliable transit service connecting Brooklyn and Queens –** This need will identify deficiencies in the existing travel between the two boroughs, including travel time, routing, and delays due to roadway congestion;

B. **Need for connections to existing transit that serves Brooklyn and Queens –** This need will identify the existing deficiencies in making connections between existing subway and transit systems along the IBX corridor; and,

C. **Need for easier access and connections to and among communities and job centers in the corridor that are currently underserved by subway or transit services –** This need will identify existing and foreseeable problems in making connections along the corridor between communities, job centers, and targeted growth areas in the two boroughs.

Subsequently, MTA refined the five project goals. There is a wide variety of options for implementing transit along the Bay Ridge Branch and Fremont Secondary freight corridors. Defining clear goals helped MTA evaluate and narrow down the alternatives to the best one.

The FTA's Standard Operating Procedures (SOPs) for Managing the Environmental Review Process, No. 4, provides guidance on preparing a purpose and need statement within a NEPA context. FTA's SOPs provide the following key guidance:

- A purpose and need is typically developed during planning and is refined during NEPA.
- In making refinements, "a project's purpose and need should exhibit continuity from planning, through each project development phase, to project approval."
- During NEPA, the statements in a purpose and need should be transportation focused, i.e.:
  - The purpose is what MTA intends to accomplish with the project; and
  - The needs are the transportation problems that the project would address.

Goals and Objectives

MTA refined the IBX goals and objectives during the Planning Study, retaining the original themes from the Interim Report.

1. **Support the economic health and development of local communities –** promote transit-oriented development, opportunities for public-private investment, and potential enhancements to neighborhood land use.
2. **Maximize the use of the existing right of way for new transit services –** avoid the use of adjacent roadways (either at-grade or above-grade) or other public or private spaces.
3. **Accommodate transit and freight systems within the existing freight railroad corridors –** operate both rail freight and potential transit service within the same corridor while minimizing the need for additional right of way and potential right of way-related impacts.
4. **Avoid or minimize environmental issues –** efficiently utilizing the existing infrastructure and maximizing our assets.
5. **Provide cost-effective transit service improvements –** compare construction risks and capital cost relative to other alternatives under consideration.

1876: Line opens as part of the New York and Manhattan Beach Railway.

1906-15: Line placed in trenches and viaducts to eliminate grade crossings.

1918: New York Connecting Rail completed, linking the Bay Ridge Branch to the mainland via Hell Gate Bridge.

1924: Passenger service ends due to declining tourist traffic to Manhattan Beach. Line devoted to freight.

1996: The Regional Plan Association (RPA) first proposes a new circumferential passenger transit service along the Bay Ridge Branch.

1997: New York & Atlantic Railway takes over freight operations along the line. (Today the railroad operates a single daily round-trip freight train with plans for a second).

2000: First feasibility study for Cross-Harbor Rail Tunnel connecting Bay Ridge Branch to New Jersey.

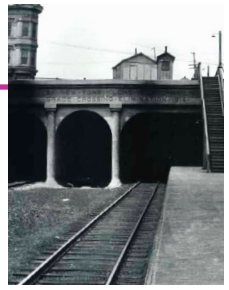
2008: Port Authority takes over operations of car float ferrying trains from the Bay Ridge Branch to New Jersey. (Traffic on the car float service has grown five-fold since 2008).

2014: Initial Environmental Impact Statement for Cross-Harbor Freight Program projects 21 additional freight trains a day on the Bay Ridge Branch.

2017: The RPA's Fourth Regional Plan envisions the Bay Ridge Branch as part of its flagship Triboro RX subway line.

2020: MTA initiates the *IBX Feasibility Study*.

2022: MTA advances the feasibility study to the PEL phase.



Kouwenhoven Station (now East New York Station), c. 1905.

New York & Atlantic Railway train at Atlantic Avenue crossing, 2000.

Triboro RX Proposal, RPA Fourth Regional Plan.

CORRIDOR BACKGROUND

History

The Bay Ridge Branch opened in 1876 as part of the New York, Bay Ridge, and Jamaica Railroad. The line extended from Bay Ridge to the crossing of the Brooklyn, Bath, and Coney Island Railroad near New Utrecht. From 1877 to 1883 a series of expansions extended the Bay Ridge tracks to the current terminus at Fresh Pond Junction and a connection to the LIRR Montauk Line. The line started out primarily as a passenger railroad, but declining ridership forced the end of passenger service in 1924. The entire branch was electrified starting in 1927 for the operation of freight trains. Electric operation of freight trains ended in 1968 with the switch to diesel-powered locomotives. The branch currently serves clients in Brooklyn, Queens, and Nassau and Suffolk Counties by connection with the Montauk Line.

Today, the corridor is divided into two parts. The northern portion in Queens, known as the Fremont Secondary, is owned by CSX and is used by freight trains traveling from Long Island to the Bronx and New England. The southern portion of the corridor, the Bay Ridge Branch, is owned by LIRR and operated by New York & Atlantic Railway, serving several freight customers, Brooklyn port facilities, and a car float to New Jersey. The corridor sees about one round-trip train per day.

Previous and Ongoing Studies

Previous studies have looked at restoring passenger service on the Bay Ridge Branch and Fremont Secondary. The Regional Plan Association's Third and Fourth Regional Plans proposed using the corridor as part of a new passenger rail line linking Brooklyn, Queens, and the Bronx, dubbed the Triboro RX.[1] With Metro-North Penn Station Access entering construction in the Bronx, one geography included in the Triboro RX plan is already being implemented.

The Bay Ridge Branch is also a critical piece of the Port Authority of New York and New Jersey's (PANYNJ's) Cross-Harbor Freight Program, which envisions a freight rail tunnel linking the Bay Ridge Branch to Jersey City, New Jersey. The tunnel would save freight trains from making an up-to-280-mile detour to cross the Hudson River near Albany, and would result in a reduction of cross-harbor truck traffic. The project is in a Tier II Environmental Impact Study as of 2022,[2] which currently projects freight traffic on the Bay Ridge Branch of over 21 trains per day.

1 **"The Fourth Regional Plan."** Regional Plan Association, 2017.

2 **"Cross Harbor Freight Program."** Port Authority of New York and New Jersey.

STUDY AREA CHARACTERISTICS

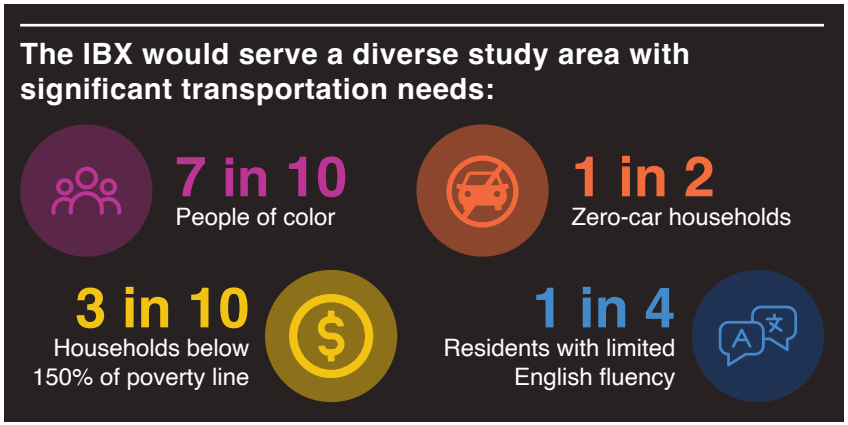
Context

Running from Bay Ridge in Brooklyn to Jackson Heights in Queens, the IBX Corridor would wind its way through some of New York City's most diverse neighborhoods. In such dense, walkable neighborhoods, transit is the norm.

The IBX Corridor is significant for two reasons: its potential to access areas currently served by existing subway routes, and its potential to connect areas in Brooklyn and Queens that lack direct rapid transit connections to each other and to transit connections in Long Island.

The IBX Corridor intersects with 17 of the city's subway lines, which provide access to Manhattan and other parts of New York City. The northern terminal is planned to be adjacent to the Jackson Heights–Roosevelt Avenue/74th Street station, which is among the busiest subway stations in Queens.[3] It is also within walking distance of the Woodside LIRR station, which provides connections to points east on Long Island and to Penn Station. The corridor also intersects the East New York LIRR station. The IBX Corridor would bring much needed transit service to residents of underserved areas such as East Flatbush, Maspeth, and neighborhoods served by only one subway line, such as Middle Village and Canarsie.

With the exception of the G Crosstown subway line, New York City lacks high-frequency transit that connects the outer boroughs. This often results in difficult and circuitous trips from one outer borough to another. While the B82–Select Bus Service runs roughly parallel to the southern part of the IBX, it does not follow the corridor north of Canarsie. For example, a Bushwick resident working in Midwood would have to either transfer subways in Manhattan or take three different trains to stay within Brooklyn. The IBX would provide a one-seat ride for this trip.



Population in the study area, defined as a ½ mile buffer around the corridor. **(US Census, 2019)**

Socioeconomic Conditions

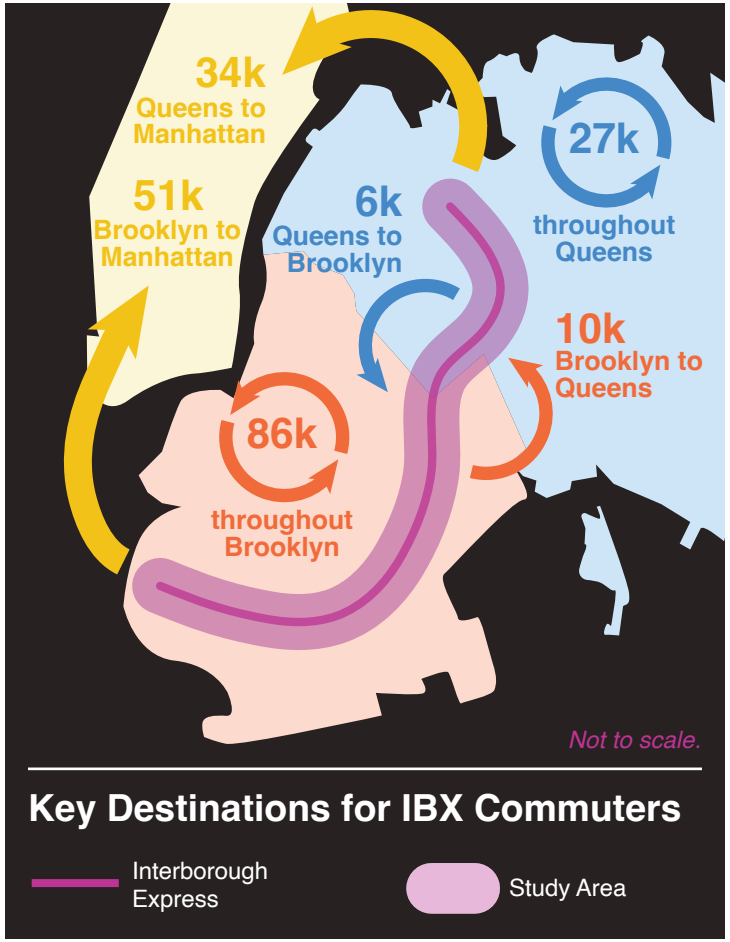
In keeping with the needs and goals of the project, the IBX would bring new transit connections to historically underserved communities. Of the census tracts that fall in the IBX study area, 65% of them are classified as "Environmental Justice Areas," and a further 21% are classified as "Potential Environmental Justice Areas."[4]

On the whole, almost three-quarters of the population served by the IBX are people of color and one in four people has limited fluency in English. A third of households are below 150% of the poverty line. Providing additional reliable, high-frequency transit options for households in the study corridor, half of which do not own a car, would increase mobility and access to economic opportunities for them.

The IBX Corridor intersects with 17 of the city's subway lines and links dozens of neighborhoods within Brooklyn and Queens that lack high-frequency transit connections.

3 As of 2019. "**Facts and Figures: Annual Subway Ridership 2014–2019.**" Metropolitan Transportation Authority. 2020.

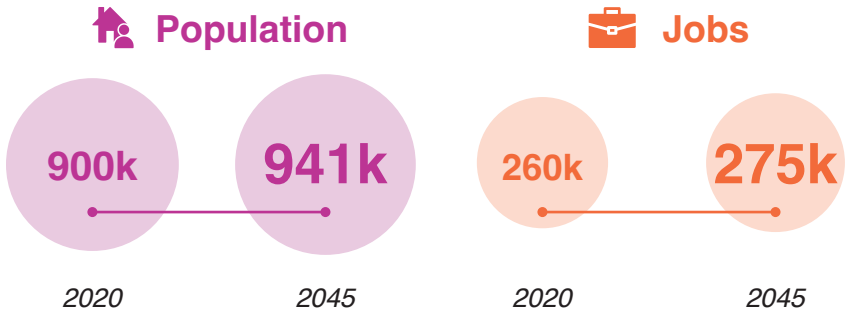
4 **New York City Local Law 64 (2017)** defines "Environmental Justice Area" as a census tract with at least 23.59% of the population below the poverty line, or with at least 51.1% of the population belonging to a minority community. Tracts that straddle the threshold for either variable are identified as "Potential Environmental Justice Areas."



Above: Travel flows between the study area and Manhattan, Brooklyn, and Queens. **Below:** Q52 Select Bus showing high capacity articulated bus vehicle.

Jobs and Population

The area adjacent to the IBX corridor is expected to add tens of thousands of new residents and jobs over the next 25 years.[5] Since 2008, the outer boroughs accounted for 48 percent of the City's total job growth, while Manhattan's share of private sector employment has declined from 64 percent in 1990 to 59 percent in 2018.[6] Improved transit infrastructure will help these neighborhoods better absorb and accommodate new residents and jobs.



Travel Patterns

The existing rail transit network in the study area is focused on linking Brooklyn and Queens to Manhattan, but the majority of commute trips today are currently contained within Brooklyn and Queens. Approximately 86,000 commute trips from the study area remain within Brooklyn, and approximately 27,000 remain within Queens. Another 16,000 trips occur between the two boroughs, for a total of approximately 129,000 trips. This is higher than the 85,000 trips that cross the East River to Manhattan.[7]

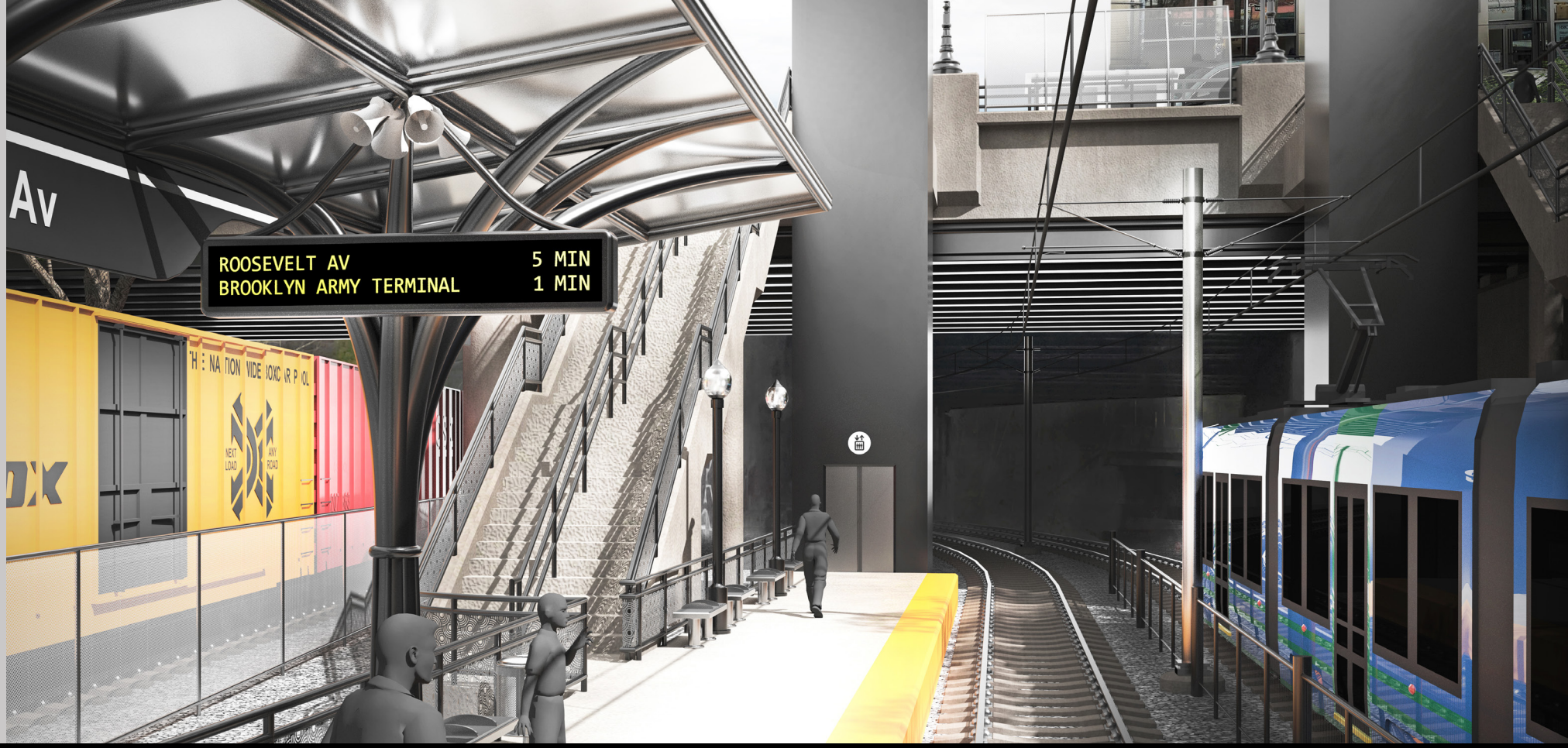
Poor transit links between Brooklyn and Queens result in increased car usage. Approximately half of the commutes between Brooklyn and Queens in the study area occur by car, compared to fewer than 15 percent of commutes between the study area and Manhattan. The IBX could help reduce car commutes while redirecting these trips from overburdened Manhattan-bound subway lines.

5 NYMTC (Feb 2016), **2010-2050 Total Population/Employment 2050 County Level Forecast Data.**

6 Between 2009 and 2018. **"New York City Employment Trends."** Office of the New York State Comptroller. April 2019

7 Bureau of Transportation Statistics. **Census Transportation Planning Package, 2012-16.**


IBX
Roosevelt Av
IBX
Roosevelt Av
IBX



Alternatives Analysis

OVERVIEW OF ALTERNATIVES

The Planning Study evaluated three alternatives that were identified for further investigation in the Interim Report: Light Rail Transit, Conventional Rail, and Bus Rapid Transit.

These three alternatives underwent engineering, transit planning, and environmental evaluation, allowing MTA to consider additional measures not previously assessed in the Interim Report. The alternatives would traverse the 14-mile IBX corridor from the Brooklyn Army Terminal in Bay Ridge, Brooklyn, to a terminal at Roosevelt Avenue in Jackson Heights, Queens. It is envisioned that all three alternatives would be electrically powered and would operate on their own dedicated alignment primarily within the existing freight rail corridor.

Alternatives

a. Light Rail Transit (LRT)

Light Rail uses tram-like trains that would operate both in their own dedicated right of way and on streets. The LRT alternative envisions a two-track service that is alongside but physically separated from the freight rail line, similar to CR and consistent with FRA requirements. Most of the line would run side-by-side with the freight tracks, with a short segment of the LRT alternative potentially operating on existing streets.

b. Conventional Rail (CR)

Conventional Rail would have two dedicated passenger rail tracks running largely alongside the existing freight rail line. CR would use Federal Railroad Administration (FRA)-compliant electrical multiple units (EMUs). The rail cars would be configured similarly to subway cars that allow for faster boarding, alighting and greater standing room while operating at high frequencies.

c. Bus Rapid Transit (BRT)

Bus Rapid Transit describes bus service that mimics LRT by operating in its own dedicated right of way alongside but separated from the freight rail line. As with the LRT alternative, a short segment of the line would potentially operate on existing streets.

	LRT	CR	BRT
Length (route miles)	14	14	14
Potential Station Count	19	19	19
Train Consists/Buses Required	24	22	26
Peak Frequency (minutes)	5	5	5
Daily Ridership Estimate (2045) (thousands)	115	120	76
% of Line Operating in the Freight Rail Corridor	94%	100%	94%
Estimated Runtime (minutes)	39	45	41
Cost Per New Daily Rider (thousands)	$48	$70	$53
Annual Operating and Maintenance Costs (2027 Dollars) (millions)	$83.2	$79.6	$60.8
Construction Costs* (2027 Dollars) (billions)	$5.54	$8.44	$4.03

*The base construction cost includes the cost of constructing the project and maintaining existing freight capacity. It does not include the cost of rolling stock nor additional costs to fully upgrade freight capacity to provide for two tracks between Bay Ridge and Fresh Pond Yard.

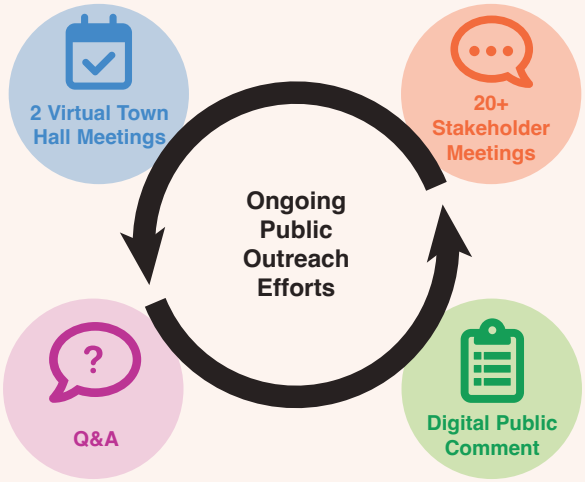
a. Light Rail Trainst (LRT)


b. Conventional Rail (CR)

c. Bus Rapid Transit (BRT)

Public Engagement

Outreach was an important element of the Planning Study. The MTA conducted outreach to agency partners, advocates, and the public during the PEL Study. More than 20 meetings with stakeholders were conducted, including meetings with elected officials, business groups, and civic organizations. These meetings were an opportunity to share priorities, feedback, and comments. The MTA hosted virtual town hall meetings during the Planning Study in May 2022 and September 2022. The public was invited to ask questions during these virtual meetings, with many answered live during the broadcast or in a chat feature with subject matter experts. A project website (https://new.mta.info/project/interborough-express) was also created and includes a public comment feature, as well as an interactive "station location" map, in which the public can provide feedback regarding station preference. The MTA also met regularly with its the Technical Advisory Committee, consisting of key agency partners and external stakeholders, throughout the Study.



MEASURES USED TO EVALUATE THE ALTERNATIVES

MTA identified measures to evaluate and compare the three alternatives from the perspectives of the purpose and need, goals and objectives, engineering, transit planning, and public input. While all measures listed are important for comparing the benefits and challenges of the alternatives, several measures are considered to be major differentiators among the alternatives in the Planning Study. These measures are shown below.

MTA refined the project's purpose and need statement, taking into consideration the engineering, traffic, and environmental measures evaluated during the Planning Study. Because the Planning Study serves as a point of transition between the 2021 Feasibility Study and the future, federal environmental review process, the MTA also refined the purpose and need in accordance with federal requirements.

Does the alternative meet the project purpose and need?

Project Purpose:

Provide fast, direct, and reliable transit service connecting Brooklyn and Queens using the existing Bay Ridge Branch and Fremont Secondary freight corridors between Brooklyn Army Terminal and Roosevelt Avenue in Jackson Heights.

Project Need:

- **Need for efficient, direct, and reliable transit service connecting Brooklyn and Queens –** Can the alternative provide reliable passenger service? Is there potential for transfers between stations at Roosevelt Avenue (ease of transfer)?
- **Need to connect to existing transit systems that serve Brooklyn and Queens –** Would the alternative connect to existing subway and bus lines in the corridor?
- **Need to improve access and connections to and among communities and job centers in the corridor that are currently underserved by subway or transit services –** Would the alternative improve access and connections to and among communities and job centers in the corridor?

Goals and Objectives

A list of project goals and objectives was originally reported in the 2021 Interim Report and Alternatives Analysis. MTA refined the project's goals and objectives during the Planning Study for the same reasons as for the refined purpose and need. These refinements retain the original themes of the purpose and need, and the goals and objectives, and are consistent with the original themes.

- **Support the economic health and development of local communities –** Does the alternative have the potential to conflict with proposed development plans?
- **Maximize the use of the existing right of way for new transit services –** Can new transit service operate in the existing freight railroad corridor? Would additional right of way be needed to provide required separation from freight operations?
- **Accommodate transit and freight systems within the existing freight railroad corridors –** Can new transit service and existing freight railroad service be accommodated in the existing freight railroad corridor? Would intrusion (crossing) of freight rail operations be required to operate transit service? Would the alternative require relocation of freight tracks or other infrastructure?
- **Avoid or minimize environmental issues –** Would parks, recreation areas, and open space properties need to be acquired for additional right of way? How many historic architectural resources would be directly impacted within existing right of way or within additional right of way? How many potential archaeological sites may be directly impacted? Could the project cause a visual change? How much of the right of way would be in adopted flood hazard areas? Is there potential for operational noise impacts to residences?
- **Provide cost-effective transit service improvements (based on preliminary cost estimates) –** What would be the capital cost for the alternative? What would be the operations and maintenance (O&M) costs for the alternative? What would be the annualized capital cost per rider? What would be the annualized O&M costs per rider?

Engineering Factors

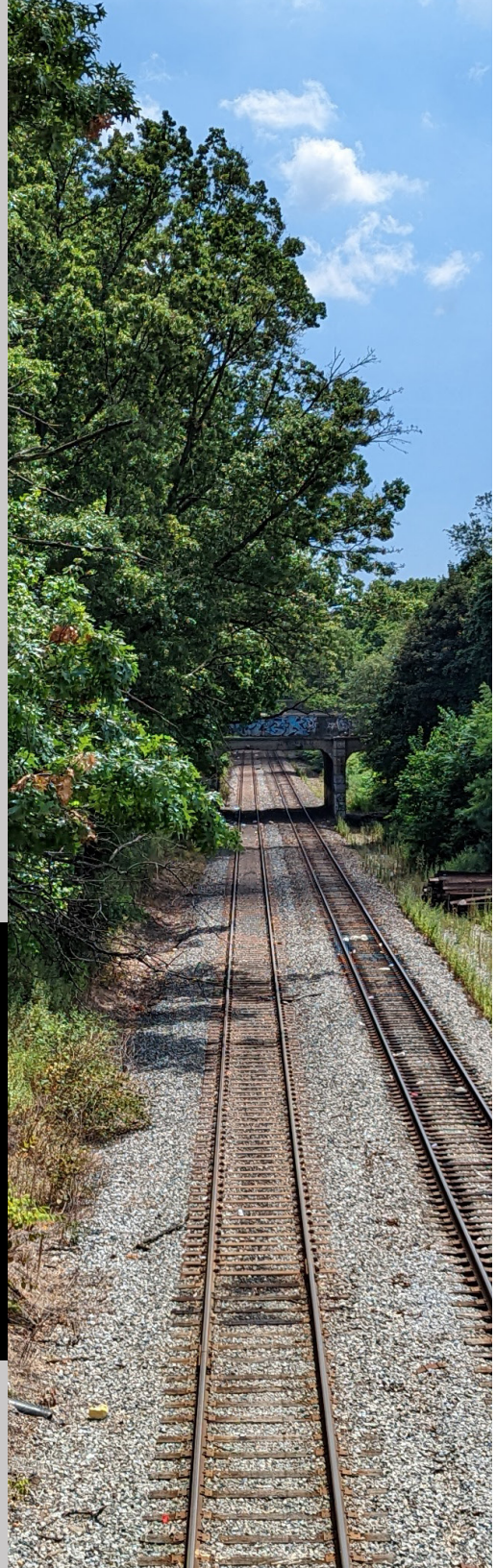
- **Tunnel requirements –** Can the vehicle for each alternative operate in the existing tunnels and under what conditions can operation occur? Does the alternative avoid construction of a new tunnel under All Faiths Cemetery?
- **Street operations in Queens –** Does the alternative require operations on Metropolitan Avenue, 69th Street, and Roosevelt Avenue? What is the potential for the alternative to disrupt roadway operations on Roosevelt Avenue?
- **Terminal location –** Is the alternative constrained in its ability to provide an efficient terminal station at Roosevelt Avenue?

Transit Planning

- **Ridership –** Can the alternative meet 2045 ridership demand? Is the vehicle operating headway sufficient to meet the projected ridership demand?
- **Operational complexity and risk –** Does the alternative require special operations in tunnels (i.e., mechanical guidance and signalized crossings)? Is there a risk to the operating schedule because of tunnel operating complexity?

While the Planning Study evaluated the three alternatives based on the factors and measures listed above, the following factors were identified as key differentiators. These five factors provided distinction between the three alternatives from an operating, cost and construction perspective and guided the selection of the Preferred Alternative.

- **Meets Demand**
- **Reliable Service**
- **Construction Risk**
- **Vehicle Specialization**
- **Relative Cost**



ENGINEERING CONSTRAINTS AND DESIGN REFINEMENTS

Since the release of the Interim Report, the MTA has continued to refine the design of the three alternatives to address constraints along the corridor. The following section describes the key constraints and the design changes that were made to each alternative in order to mitigate them.

Street-Level Transit Intersections

The BRT and LRT alternatives were initially designed to be elevated above the freight tracks in Brooklyn to maintain separation from freight operations and enable convenient street-grade transfers. Running at street level would create 24 new transit intersections. During the PEL Study it was determined that the new intersections may cause unnecessary delays and disruptions by bringing transit operations into contact with street-level vehicular and pedestrian traffic.

Design Refinement:

BRT and LRT have been redesigned to operate in the freight rail cut at the same grade as the freight tracks, similar to the CR alternative, which eliminates the 24 proposed transit intersections originally proposed in Brooklyn. Unlike CR, however, BRT and LRT would still exit the IBX corridor at Metropolitan Avenue and travel on-street around All Faiths Cemetery, as envisioned in the Interim Report.

All Faiths Cemetery Tunnel - Metropolitan Avenue to Juniper Boulevard South

The existing freight rail corridor travels underneath Metropolitan Avenue and All Faiths Cemetery via an existing tunnel. LRT and BRT have the capability to leave the cut of the freight rail corridor and travel along the street for approximately two-thirds of a mile along Metropolitan Avenue, 69 Street, and 69 Place before returning to the corridor after Juniper Boulevard South. However, operation in the street may affect streetscape conditions, which will be studied in future project phases. Due to the presence of the third rail, CR cannot exit onto the street, but the tunnel is too narrow to accommodate new tracks.

Design Refinement:

CR would operate in a newly constructed tunnel that runs parallel to the existing freight tunnel. The tunnel must be designed and constructed to be deep enough to avoid any surface or subsurface disturbance to the cemetery and its structures.

Connection at Roosevelt Avenue to Broadway

The Roosevelt Avenue terminus of the IBX poses design challenges for LRT and BRT as both modes were designed to run on-street to the transit hub at Jackson Heights–Roosevelt Avenue. Weekday traffic simulations conducted during the PEL Study found that LRT operations on Roosevelt Avenue could be prone to delay and disruption and would deteriorate traffic operations to unsatisfactory levels in peak periods. BRT could also face similar reliability and traffic congestion issues because of street operations. Even with bus lanes, it is anticipated that scheduled service could not be reliably maintained during peak morning and evening commuting periods.

Design Refinement:

As LRT trains can operate in both directions without the need of a turning loop, the alignment of the LRT alternative was redesigned to terminate in the cut of the freight rail corridor at Roosevelt Avenue, similar to the CR alternative.

Unlike CR and LRT, BRT must exit the freight rail cut at Roosevelt Avenue, as originally planned, because there is insufficient space for a bus to turn around in the cut without interrupting freight operations. It must contend with the challenges of running on the street to arrive at the Jackson Heights-Roosevelt Avenue station.

Conceptual rendering of an LRT terminal at Roosevelt Avenue.

The East New York Tunnel, constructed over 100 years ago, would be rehabilitated for IBX service.

East New York Tunnel

The passageways of the East New York Tunnel are 14 feet wide, which creates constraints for equipment selection and operations. Standard LIRR rolling stock is too wide to fit within the tunnel while including enough space for emergency egress. Articulated BRT buses cannot meet fire protection and emergency evacuation requirements under standard operations in such a narrow tunnel.

Design Refinement:

The CR alternative would require the procurement of narrower cars that are modified to meet FRA requirements. PATH cars, operated by the Port Authority of New York and New Jersey, are an example of such vehicles.

Each passageway of the East New York Tunnel is only wide enough to accommodate one emergency egress safety walk for BRT. In order to provide the safety walk on the side of a standard bus with right-side passenger doors and comply with fire life safety and emergency egress requirements, the BRT alignment would purposely be directed to a left-hand operation through the tunnels. Buses would switch to the opposite lane at a signalized intersection before entering and after exiting the tunnel to provide passenger access to emergency evacuation routes. In addition, buses would be modified with a mechanical guidance system to help steer it through the tunnel.

Operating Alongside Freight Trains

As the IBX alignment runs along an active freight corridor, measures must be taken to ensure adherence to FRA requirements for safe side-by-side operation of freight and transit.

Design Refinement:

The IBX has been designed to ensure a minimum acceptable distance between transit and freight rails. In addition, a fencing system would be installed between freight and transit operations with a vehicle intrusion detection system to detect incidents that could affect either operation.

Interactions with Port Authority's Cross Harbor Freight Program (CHFP)

The Port Authority is planning to use the Bay Ridge Branch as the Brooklyn portal for its proposed new freight rail tunnel underneath New York Harbor connecting New Jersey to Brooklyn. The limited right of way of the Bay Ridge Branch must be able to accommodate the infrastructure requirements of both the IBX and CHFP.

Design Refinement:

During the development of the Planning Study, MTA and Port Authority staff and consultants met on a regular basis to coordinate on project design. Alignments have been modified to ensure that neither project precludes the other from construction and operation. Such coordination will continue throughout the planning and design phases of the respective projects.

Maintenance and Storage Facilities

The Planning Study identified the need for new storage and maintenance facilities for all three alternatives. Existing MTA facilities for storage and maintenance of BRT and CR would not be sufficient for a new IBX fleet, and facilities do not currently exist for the maintenance and storage of LRT equipment.

Design Refinement:

The Brooklyn terminus of the alignment for all three alternatives has been shifted further west to include a station at the Brooklyn Army Terminal. A facility is proposed for maintenance and storage of any of the three alternatives near the terminal station. Potential locations could be an elevated facility adjacent to the 65th Street Rail Yard or the area currently occupied by the parking lot for the Brooklyn Army Terminal. The existing parking could be relocated to a deck constructed over the proposed facility.

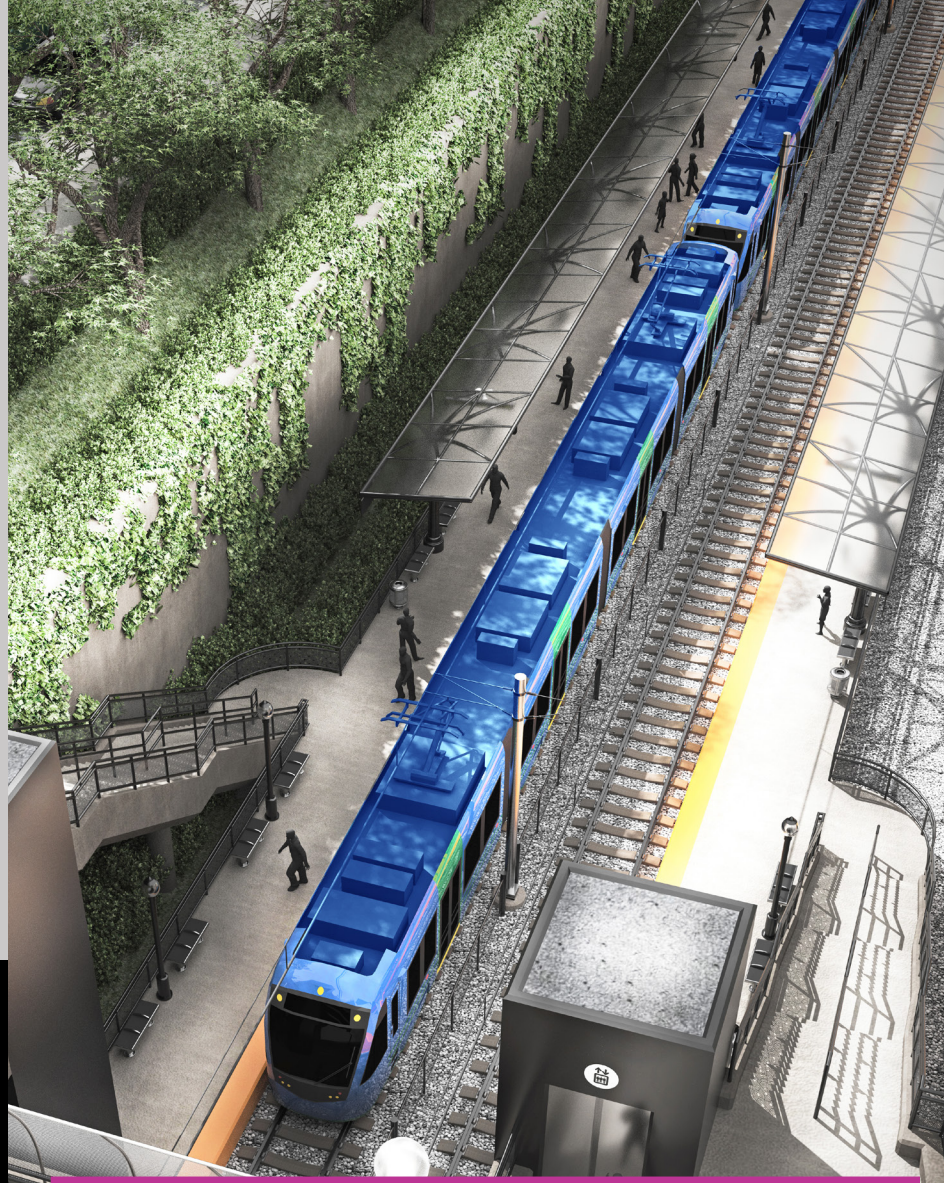
Forecasted Ridership Demand versus Alternatives' Passenger Capacity

Ridership forecasts completed in August 2022 found that BRT would have insufficient capacity to handle projected peak period demand. Unlike LRT and CR which can lengthen trains to meet demand, BRT is limited to a 60-foot bus length.

Design Refinement:

Based on modeling, even if the frequency of BRT buses was adjusted from every five to every 2.5 minutes, it still would not meet peak demand. (In any event, such a high frequency could not be achieved for BRT, given the constraints near the Roosevelt Avenue terminus.).

Frequency and vehicle size help increase capacity to meet demand and prevent crowding.



Estimated Runtime (minutes)	**39**
Daily Ridership Estimate (2045) (thousands)	**115**
Cost Per New Daily Rider (thousands)	**$48**
Construction Costs* (2027 Dollars) (billions)	**$5.54**

*The base construction cost includes the cost of constructing the project and maintaining existing freight capacity. It does not include the cost of rolling stock nor additional costs to fully upgrade freight capacity to provide for two tracks between Bay Ridge and Fresh Pond Yard.

LIGHT RAIL TRANSIT

LRT would operate in the existing freight rail corridor, except for a short street-running portion around All Faiths Cemetery in Queens. In the existing freight corridor, LRT would require two dedicated tracks alongside the freight rail lines. Because LRT is not FRA-compliant, the tracks would have to be physically separated from the freight tracks for safety reasons, as well as the installation of an intrusion detection system. LRT service would operate at five-minute peak headways.

Challenges

LRT would require operation of a new class of vehicle that is not used in other MTA services. The new class of vehicle would require new specialized maintenance and storage facilities to operate and maintain the vehicles and system. This facility could potentially be constructed at the Brooklyn Army Terminal. New operational arrangements would also be required.

Benefits

LRT would meet the project purpose and need. It would carry a similar number of riders as CR and over 50% more than BRT. The operating headway and per-train capacity of LRT is sufficient to achieve forecasted 2045 ridership demand, and because of that capability, LRT can provide reliable passenger service.

LRT can accommodate a terminal station in the cut at Roosevelt Avenue with a free in-system transfer. Because LRT would operate in the cut, it would not disrupt roadway operations on Roosevelt Avenue.

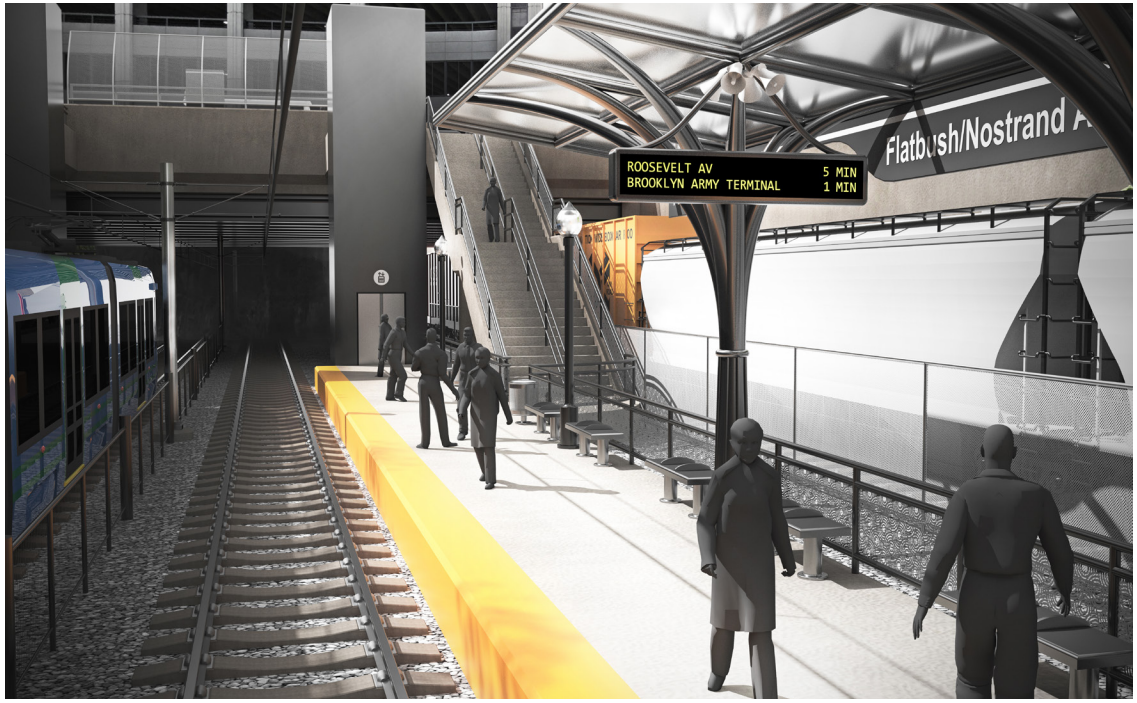
LRT can be operated in existing tunnels with no special operations and no new tunnel under All Faiths Cemetery would be required.

LRT service could be expanded in the future. LRT avoids or minimizes environmental issues to a greater extent than the other alternatives.

The capital cost for LRT would be lower than the capital cost for CR and higher than the capital cost for BRT. However, because of the ridership capacity of LRT, the annualized capital cost per rider would be the lowest among the three alternatives. The O&M cost for LRT would be similar to that for CR and higher than the O&M cost for BRT.

Light Rail Transit Alternative Evaluation

1	Meets project purpose and need	+
2	Meets forecasted 2045 ridership demand	+
3	Provide reliable passenger service	+
4	Capital cost estimate	+
5	Avoids construction of new tunnel under All Faiths Cemetery	+
6	Ability to provide terminal station at Roosevelt Avenue	+
7	Potential to disrupt roadway operations on Roosevelt Avenue	+
8	Ability to expand service in future	+
9	Standard operation of equipment in tunnels	+
10	Avoids or minimizes environmental issues	+



Evaluation Scores:

+	=	×
Positive	Moderate	Negative

Estimated Runtime (minutes)	**45**
Daily Ridership Estimate (2045) (thousands)	**120**
Cost Per New Daily Rider (thousands)	**$70**
Construction Costs* (2027 Dollars) (billions)	**$8.44**

*The base construction cost includes the cost of constructing the project and maintaining existing freight capacity. It does not include the cost of rolling stock nor additional costs to fully upgrade freight capacity to provide for two tracks between Bay Ridge and Fresh Pond Yard.

CONVENTIONAL RAIL

CR service would operate exclusively in the existing freight rail corridor at five-minute peak headways. The CR alignment would operate on dedicated tracks parallel to the existing freight service. This alternative does not include any street running operations. Due to capacity constraints at existing MTA facilities, a new storage and maintenance facility would be required, potentially at the Brooklyn Army Terminal.

This mode would provide a terminal station in the existing freight cut at Roosevelt Avenue, with a free transfer to transit connections at Roosevelt Avenue and Broadway. Because CR would operate in the existing freight cut, it would not disrupt roadway operations on Roosevelt Avenue.

Challenges

CR is the only alternative that would require a new tunnel under All Faiths Cemetery. The existing tunnel under All Faiths Cemetery could not be utilized for CR because four track operations cannot be accommodated in the tunnel. As a result, the capital cost for CR would be higher than the capital cost for LRT and BRT, and would add significant risk and complexity to the project. The additional capital cost results in a substantially higher annualized capital cost per rider for CR compared to LRT and BRT. The O&M cost for CR would be similar to that for LRT and roughly double the O&M cost for BRT.

Furthermore, CR would require specialized, FRA-compliant heavy rail rolling stock. This poses a significant challenge, especially given the other demands on the limited pool of rolling stock manufacturers in the United States.

Benefits

CR would meet the project's purpose and need. It would have similar ridership to LRT, which is substantially better than BRT ridership. The operating headway of CR is also sufficient to achieve forecasted 2045 ridership demand, and because of that capability, CR can provide reliable passenger service.

CR service could be expanded in the future. It requires no special operations in tunnels and does not require any on-street operations. CR avoids or minimizes environmental issues to a greater extent than BRT.

Conventional Rail Alternative Evaluation

1	Meets project purpose and need	+
2	Meets forecasted 2045 ridership demand	+
3	Provide reliable passenger service	+
4	Capital cost estimate	×
5	Avoids construction of new tunnel under All Faiths Cemetery	×
6	Ability to provide terminal station at Roosevelt Avenue	+
7	Potential to disrupt roadway operations on Roosevelt Avenue	+
8	Ability to expand service in future	+
9	Standard operation of equipment in tunnels	+
10	Avoids or minimizes environmental issues	=

Evaluation Scores:

+ Positive
= Moderate
× Negative

Estimated Runtime (minutes)	**41**
Daily Ridership Estimate (2045) (thousands)	**76**
Cost Per New Daily Rider (thousands)	**$53**
Construction Costs* (2027 Dollars) (billions)	**$4.03**

*The base construction cost includes the cost of constructing the project and maintaining existing freight capacity. It does not include the cost of rolling stock nor additional costs to fully upgrade freight capacity to provide for two tracks between Bay Ridge and Fresh Pond Yard.

BUS RAPID TRANSIT

BRT would operate in dedicated bus-only lanes primarily within the existing freight rail corridor. In addition, it would operate in-street along Roosevelt Avenue, 75th Street, and Broadway at its terminus in Queens. Additionally, BRT would operate in-street from Metropolitan Avenue to Juniper Boulevard South, similar to LRT. The lanes in the existing freight corridor would be alongside but separate from the existing freight rail lines for safety reasons. BRT vehicles are smaller than subway cars and able to operate on the street in addition to the freight rail corridor. Service would operate at 5-minute peak headways.

Challenges

BRT would not meet all the elements of the project purpose and need because it cannot achieve the forecasted 2045 ridership demand. The passenger capacity on BRT is approximately 65% of LRT or CR. MTA analyzed the potential for operating up to 2.5 minute peak headways; however, it still fell substantially short of the forecasted 2045 ridership demand for the project. As a result of these findings, BRT would not provide reliable transit service and it cannot be expanded in the future.

Unlike CR and LRT, BRT must exit the freight rail cut and operate on-street at the Roosevelt Avenue terminus in Queens because there is not enough space for a bus to turn around in the cut without interrupting freight operations.

Operating BRT in the existing East New York Tunnel would require special equipment and operations (i.e., a mechanical guidance system and signalized crossings). However, BRT would not require a new tunnel under All Faiths Cemetery. BRT would terminate curbside on Broadway at Roosevelt Avenue; however, BRT operations in-street would experience roadway congestion and service reliability issues.

Although BRT is similar to other bus services that MTA currently operates, due to capacity constraints, a new maintenance facility would be required to service BRT vehicles.

Benefits

The capital cost for BRT would be the lowest among the alternatives. However, because of the ridership capacity constraints of BRT, the annualized capital cost per rider would be higher than LRT, but lower than CR. The O&M cost for BRT would be lower than the O&M cost for LRT and CR.

BRT alignment along Roosevelt Avenue and Broadway.

Evaluation Scores:

+	=	×
Positive	Moderate	Negative

Bus Rapid Transit Alternative Evaluation

1	Meets project purpose and need	=
2	Meets forecasted 2045 ridership demand	×
3	Provide reliable passenger service	×
4	Capital cost estimate	+
5	Avoids construction of new tunnel under All Faiths Cemetery	+
6	Ability to provide terminal station at Roosevelt Avenue	=
7	Potential to disrupt roadway operations on Roosevelt Avenue	×
8	Ability to expand service in future	×
9	Standard operation of equipment in tunnels	=
10	Avoids or minimizes environmental issues	×

SELECTION OF THE PREFERRED ALTERNATIVE

After considering the results of the Planning Study and feedback from the MTA's robust public outreach efforts, the LRT alternative has been determined to best meet the goals and objectives of the project.

This decision was based on specific differentiating measures that were identified in relation to: the purpose and need of providing reliable service that meets forecasted demand; the goal of developing cost-effective transit service improvements; the relative construction risk; and operational and fleet requirements of the alternative. The table on page 27 summarizes the evaluation of the three alternatives.

Meets Demand

During the Planning Study, ridership demand along the IBX corridor was forecasted out to 2045. At five-minute headways, LRT and CR are expected to meet projected ridership estimates. BRT does not meet the projected demand, even when the frequency of service was increased to 2.5-minute headways.

Reliable Service

Service is considered reliable when it meets operational frequencies, stays on schedule, and avoids delays. Traffic analyses conducted during the PEL Study indicated that BRT would experience delays on the street-running segment of its alignment along Roosevelt Avenue. Furthermore, non-standard operations at East New York Tunnel, which requires signalized intersections for left-hand running through the tunnel, may further delay BRT service. The LRT and CR alignments do not have street-running segments along Roosevelt Avenue and have standard operating patterns through East New York Tunnel, and are thus able to provide reliable transit service.

Construction Risk

The project's degree of construction risk is related to the complexity of construction. LRT and BRT have similar construction requirements, which primarily include the reconstruction of active freight track. In addition to this, CR requires construction of a new tunnel under All Faiths Cemetery because the existing freight tunnel is not wide enough to accommodate IBX tracks. These components increase the construction complexity and risk of CR compared with LRT and BRT.

Vehicle Specialization

The width of the passageways of the East New York Tunnel creates constraints for the vehicles that each alternative could use for IBX operations. CR would require a new class of specialized vehicle not in use by other MTA services. This would necessitate a complex procurement process. Furthermore, it would add to the demand on a limited pool of rolling stock manufacturers in the United States.

LRT requires operation of a standard LRT vehicle that would not require modification, although it would be a new class of vehicle that is not used in other MTA services. The vehicles would require new operating and maintenance arrangements and separate maintenance facilities.

For BRT, a standard low-floor, 60-foot articulated bus would need to be modified to install a mechanical guidance system. Precedents of this kind of modification exist in other transit systems in the US and abroad.

Relative Cost

The overall capital cost for each alternative was estimated and compared. CR is expected to be the most expensive alternative, driven in part by the cost of the new tunnel under All Faiths Cemetery. This tunnel is not required for LRT or BRT. LRT has a lower capital cost than CR, but it is more costly than BRT because it requires substations, overhead catenary power supply and the installation of rail.

Comparison of IBX Alternatives

	LRT	CR	BRT
Capacity	+	+	×
Reliability	+	+	×
Constructability	+	×	+
Vehicle Specialization	+	=	=
Cost Per Rider	+	×	=

Evaluation Scores:

+	=	×
Positive	Moderate	Negative

The Preferred Alternative

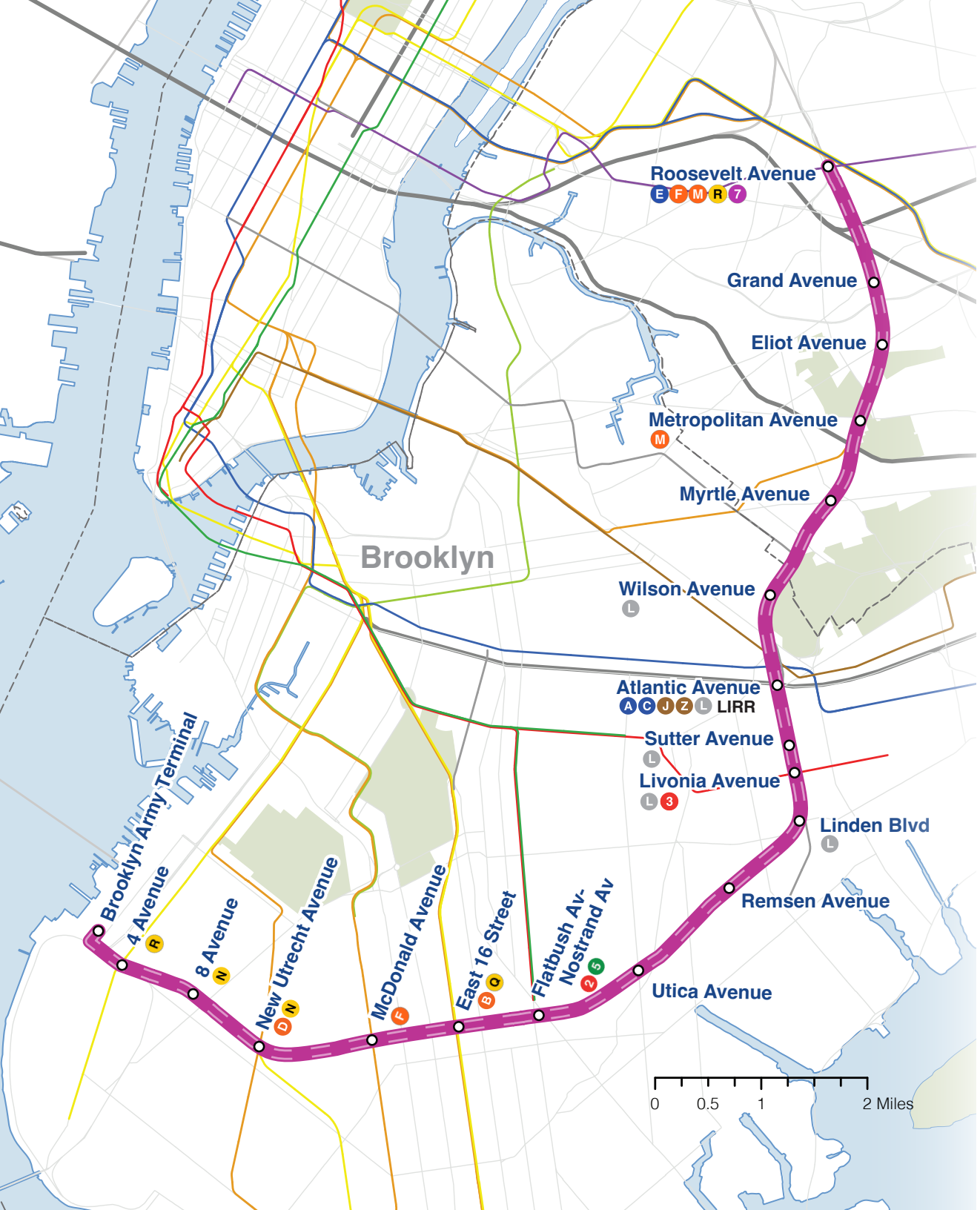
After considering the benefits and challenges of LRT, CR, and BRT, the LRT alternative has been selected for further study in the environmental review phase.

LRT is best positioned to meet the metrics set forth as part of this study. As a mode, it would meet project's stated purpose and need as well as reliably accommodate 2045 ridership targets. It would also accommodate a terminal station in Queens at Roosevelt Avenue without disrupting roadway operations, have the ability to expand service in the future, require no special operations in tunnels, and avoid or minimize environmental issues when compared to the other two modes.

While CR would also meet the project purpose and need, it would require a new tunnel under All Faiths Cemetery. The need for this new tunnel would add construction and maintenance complexity to the project, and substantially increase the capital cost without providing significantly greater benefit to the public. The procurement of specialized, FRA-compliant heavy rail rolling stock also poses a significant challenge.

BRT does not meet the project purpose and need, cannot meet ridership demand, and would require special equipment and operations in the East New York Tunnel.

After considering these and other planning and environmental conditions, LRT outperforms CR and BRT as potential transit modes.



Proposed LRT Alignment & Potential Stops

One of the project's primary objectives is to accommodate new IBX stations in areas that would maximize connections to other transit modes along the right-of-way. This can be accomplished in areas near existing subway stations and major arterial roadways within the study area. Stations were also considered in areas with supportive underlying land uses, as well as existing or planned developments within the corridor. Additionally, we incorporated public feedback received via the "station location mapper" tool featured on the project homepage to inform our station location program.

Although stations may be added, removed, or modified as planning progresses, this preliminary list of stations would allow the IBX to connect to 17 subway lines and the Long Island Rail Road and major bus corridors. Each station would be fully accessible.

The IBX will also require a new maintenance and yard facility. In collaboration with the City of New York and EDC, the MTA is working to site the yard, along with a station, in the vicinity of Brooklyn Army Terminal and the existing 65th Street Yard.

Cost

Cost

One of the Interborough Express' key advantages is the fact that it is located within an existing rail right-of-way. Assembling a new right-of-way through dense neighborhoods would be prohibitively expensive, involving expensive property acquisition, lengthy legal processes, and much more expensive construction methods like tunneling.

But while the existing corridor helps, constructing the project will not be simple—far from it. Beyond laying new track, constructing stations, and purchasing rolling stock, much more work will be needed to get the IBX ready for passenger service.

This includes reconstructing nearly the entire corridor to make space for passenger service, including:

- Reconstructing up to 45 bridges, widening at least 10 miles of embankment and viaduct to make space for additional tracks
- Renovating the nearly 150-year-old East New York tunnel to meet modern operational and safety requirements
- Relocating portions of the Buckeye pipeline

In addition to making space, investment is also needed to create the back-of-house infrastructure needed to operate the service, including:

- Traction power substations and distribution systems to power the trains
- Communications and signal systems to support operations
- A new maintenance facility to store and service the rolling stock

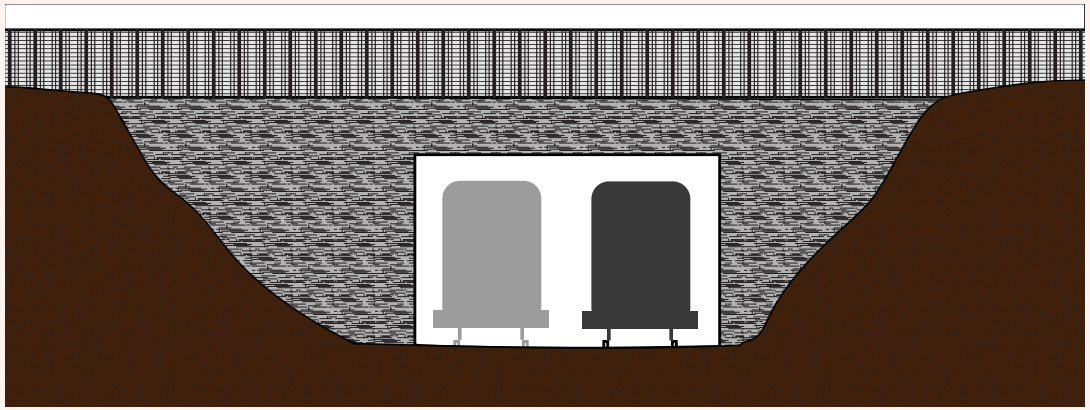
This adds up to a major megaproject. It's a project the modern MTA is well-positioned to deliver, but with complexities and challenges to work through nevertheless.

IBX Route conditions under 5th Avenue & Interstate 278/Gowanus Expressway

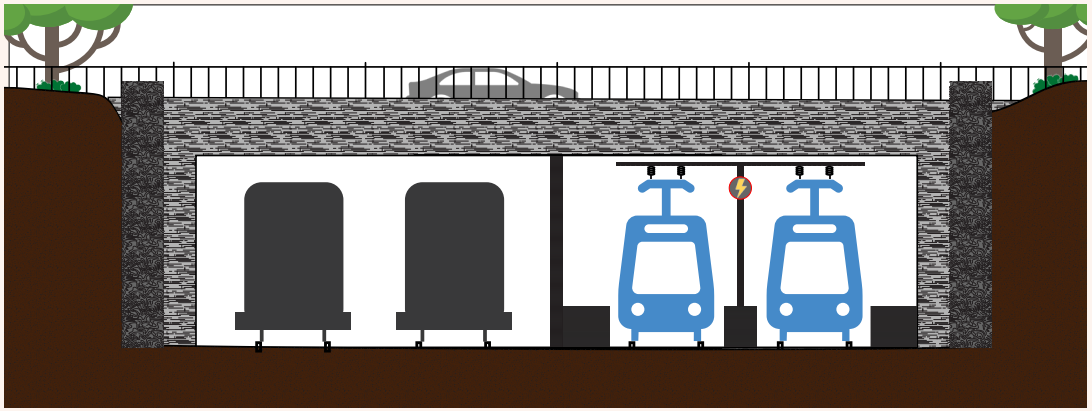
SPOTLIGHT: BRIDGE RECONSTRUCTION

The need to widen existing bridge underpasses helps illustrate the challenge. The corridor has space for only two tracks along most of its length (and for the last several decades, only one track has been in regular use.) The primary challenge of the IBX project will be to make enough space for the addition of tracks for passenger service—meaning that three or even four tracks will need to pass under a bridge, depending on the needs of the freight service.

Current Configuration



4-Track Configuration



Reconstructing these bridges is a major driver of complexity and cost, especially at interconnected locations like New Utrecht Avenue which feature not just street bridges but elevated transit structures as well.

Fortunately, MTA Construction & Development has experience dealing with exactly this sort of challenge. The LIRR Third Track project was opened for revenue service in 2022 on time and under budget. It included 7 similar bridge reconstruction projects, primarily to eliminate grade crossings or ensure proper clearance.

Innovative construction techniques like these, combined with strong project management, helped MTA C&D deliver the Third Track project on time and under-budget, saving $100M over the course of the project.

Cost Estimates

To help us plan for the project, this Planning Study also included a cost estimate. This was an important exercise, both to help us understand the relative cost of the modes considered and to plan for our preferred alternative.

The cost estimate includes the cost of building the physical infrastructure and systems to operate the new service. It does not include the cost procure rolling stock. It also does not include any additional costs to fully upgrade freight capacity to provide for two tracks between Bay Ridge and Fresh Pond Yard; the current estimate maintains the existing freight capacity.

The estimates included in this report are in 2027 dollars, adjusting for inflation out to a possible mid-point of construction. It is impossible at this stage to predict the pace of inflation or the timing of construction with perfect accuracy; the assumptions made in this document include 3.5% average inflation and a construction midpoint aligned with the middle of the next MTA Capital Plan, which will run from 2025 to 2029. This is consistent with the assumptions that will be made for all projects under consideration as part of the MTA's Comparative Evaluation process.

The cost estimate also includes contingency. At this preliminary stage of the project, it is prudent to include significant contingency in the estimate to account for potential site conditions and engineering challenges that may be discovered as the project develops further.

RESULTS

Cost Table - Light Rail Only

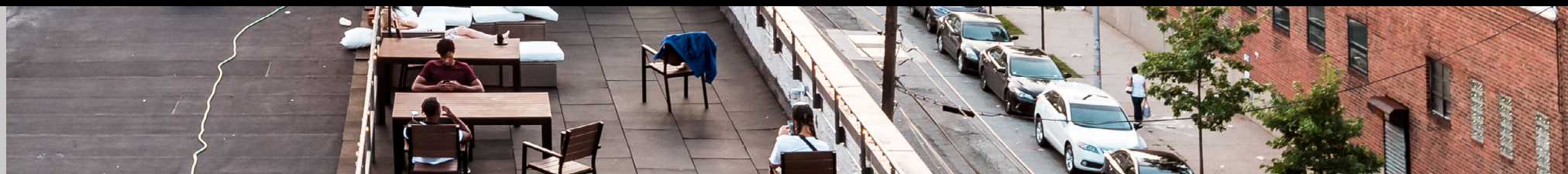
CATEGORY	COST 2027 $ (Billions)
Construction Costs	$5.54

Cost per Rider - $48,600

The cost estimate reflects the extent and complexity of the work required to deliver the project, the need to consider inflation for a future build year, and the need to include contingency given the preliminary stage of project development. With those factors taken into account, the cost estimate for LRT is $5.54 billion in construction costs.

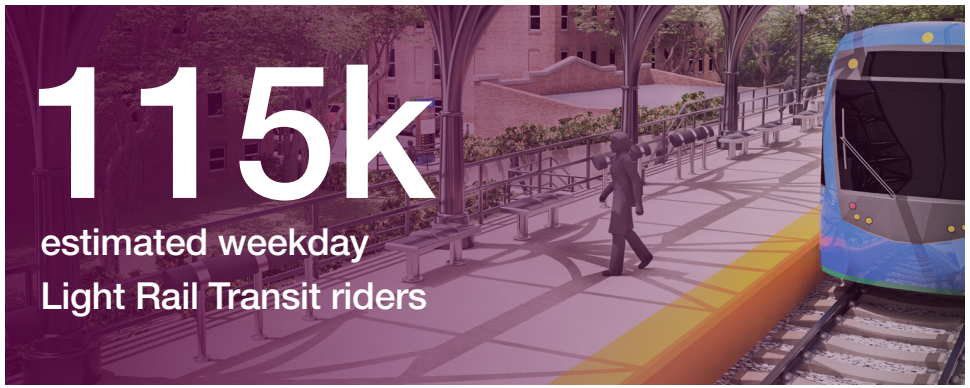
Given the wide range of neighborhoods and riders who would benefit from the project along the 14 mile corridor, these costs represent a great value. In fact, its cost per rider of $48,600 (in 2027 dollars) compares favorably to other recent projects under consideration across the country.

Project Benefits



SIGNIFICANT RIDERSHIP DEMAND

Projected to transport a significant number of New Yorkers to their destinations, the Light Rail alternative would carry approximately 115,000 passengers each weekday. If built, the IBX would see higher daily ridership than nearly any new transit line built in the U.S. over the last two decades.



Estimated Weekday Ridership for the LRT alternative

Among the three project modes analyzed, LRT would result in the greatest reduction of vehicle miles traveled (VMT), which means less emissions from private and for-hire vehicles and greater carbon savings in the communities served by the project.

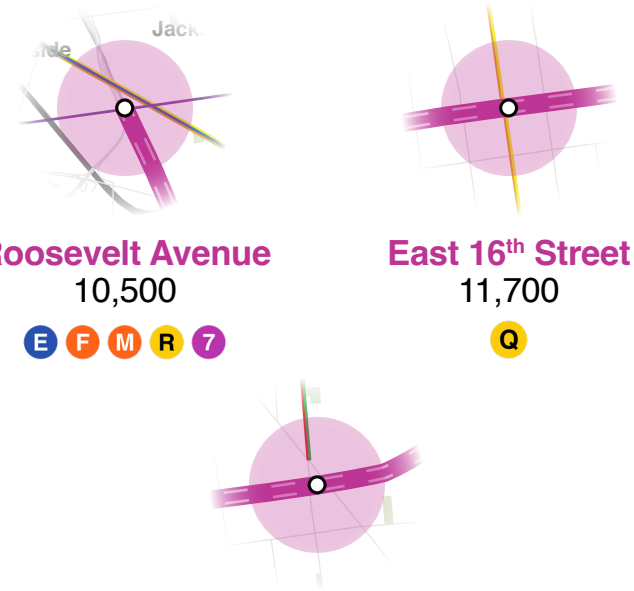
Some Prospective Transfer Stations with Highest Projected IBX Ridership

LRT ridership estimates project that the following prospective stations would have the highest weekday ridership:

- **Roosevelt Avenue** connecting to: E F M R 7
- **East 16th Street** connecting to: Q
- **Flatbush Avenue** connecting to: 2 5

All of these prospective transfer stations would be busy transit hubs, allowing IBX riders to connect to the subway, bus, and Long Island Rail Road.

Some Prospective Transfer Stations with Highest Projected IBX Ridership



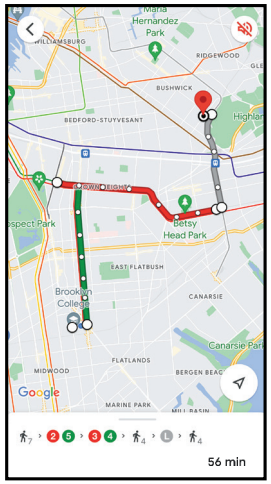
Approximately 115,000 passengers would use the new transit service each weekday, which would potentially save riders hundreds of hours of travel time a year by avoiding transfers or long routings. The project would also benefit new and existing residents in the neighborhoods adjacent to the corridor, a significant share of whom are people of color and/or low-income. The project would also draw additional activity to developing commercial hubs.

Today

Getting from home in East Bushwick to your class at Brooklyn College could take you an hour. You're routed with 2 transfers and one is out of system!

Wilson Avenue Station (L)

Flatbush Avenue - Brooklyn College (2 5)



You could have a slightly faster route... but that requires transferring to an infrequent bus.

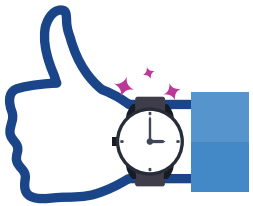
With the IBX

With a high-frequency transit line built along the IBX, you could have a one-seat ride from home to work, eliminating the time currently spent transferring between trains and reducing time spent waiting on the platform or in motion. That's:

30 *minutes saved per trip*

60 *minutes saved per day*

261 *hours saved per year*



That's a week and a half of travel time saved!

39 minutes

Roosevelt Avenue – Brooklyn Army Terminal

LRT End-to-End Runtime

REDUCED TRAVEL TIME

Travel time estimates for LRT would be 39 minutes to run from Jackson Heights to Bay Ridge. Dwell time for LRT—the length of time that a vehicle spends in a station to allow passengers to board and alight—is about 30 seconds.

One of the most significant benefits of the IBX is that it would connect neighborhoods with poor existing transit links to each other. For example, today a resident of Midwood commuting to Broadway Junction has to take the Q to Atlantic Avenue-Barclays Center and then transfer to the LIRR, or take the Q to the Franklin Avenue Shuttle S in order to connect to the A—either way, a trip of at least 40 minutes. The IBX could cut travel time in half—on a one-seat ride.

Among the three project modes analyzed, LRT would result in the greatest reduction of vehicle miles traveled (VMT), which means less emissions from private and for-hire vehicles and greater carbon savings in the communities served by the project.

COMMUNITY DEVELOPMENT

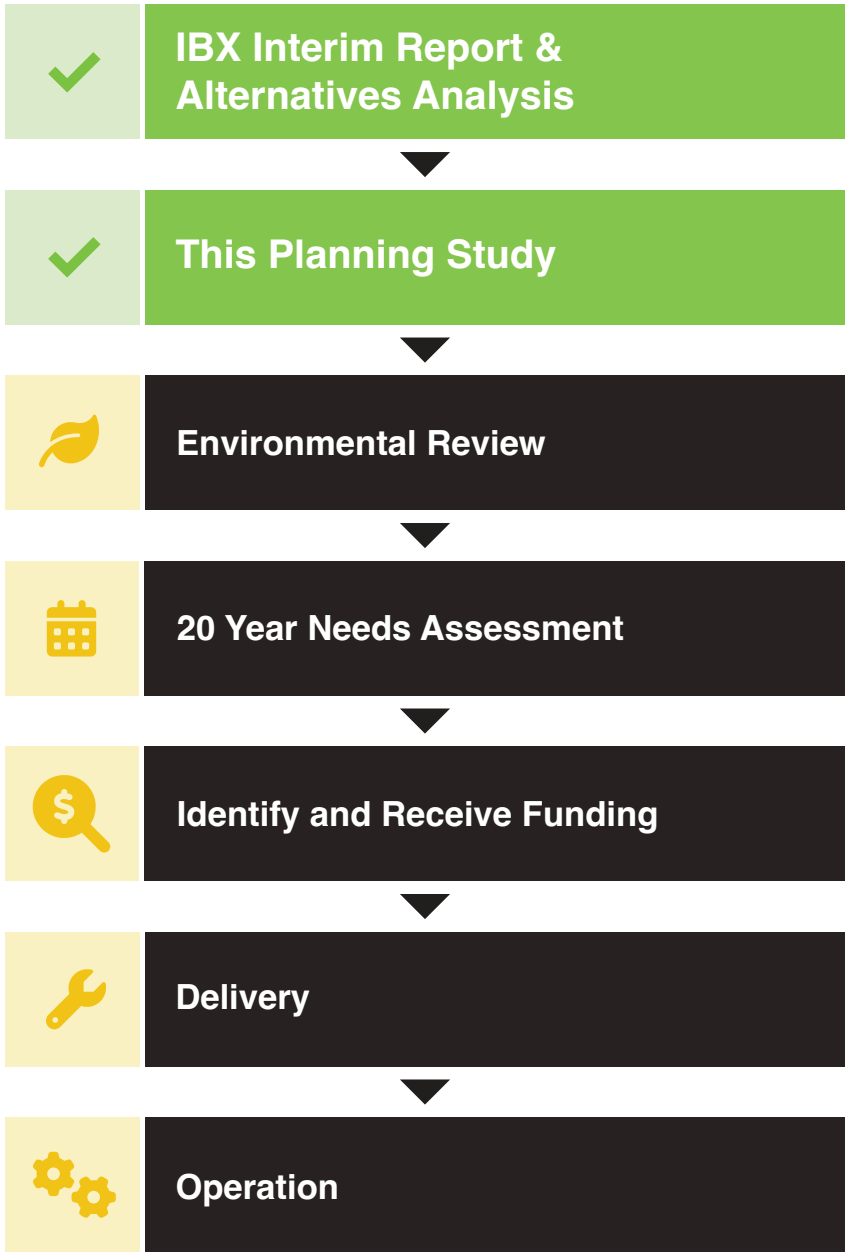
New York is a city of neighborhoods and the IBX would connect many of these communities more effectively, improving access to jobs, housing, education, and recreation. This in turn would improve the chance for the success of current and future plans to strengthen these existing communities. These plans include:

- The **East New York Neighborhood Plan** encourages major commercial development and economic investment, complementing the industrial and manufacturing uses within the East New York Industrial Business Zone.
- New York State's **Vital Brooklyn Initiative** has invested $664 million in healthcare facilities in central Brooklyn, such as Brookdale, many of which are proximate to the IBX.
- New York City's **Sunset Park Vision Plan** involves significant commercial development near what would be the southern terminus of the IBX.
- Brooklyn College's **Facilities Master Plan** calls for significant development on its campus, which is adjacent to the IBX.

MTA will collaborate with New York City and its planning and development agencies to proactively consider such economic development, healthcare, and housing opportunities in parallel with our transportation planning.

Top: Brooklyn Army Terminal, at the southern terminus of the IBX, is a major maritime and industrial hub. **Middle:** Map snapshot of the East New York Industrial Business Zone. **Above**: Retail corridor in Jackson Heights, Queens.

Next Steps for IBX



NEXT STEPS

The IBX Project has the potential to be a transformative force that will improve the lives of tens of thousands of New Yorkers. It also represents a rare opportunity to take advantage of an existing right of way to build a major new transit line.

The completion of this Planning Study moves the project closer to its realization. With the identification of Light Rail Transit as the preferred mode, the next steps will be environmental review, followed potentially by funding, design, and construction. Concurrently, the MTA's planning process involves preparation of a Twenty-Year Needs Assessment for potential project inclusion in future capital programs. This assessment includes a comparative evaluation of costs, benefits, and other metrics to determine which projects best meet the MTA's strategic goals. Projects with the greatest benefit will be prioritized and may be included in the Twenty-Year Needs Assessment and future Capital Programs.

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THE INTER–BOROUGH EXPRESS

Planning & Environmental Linkages Study

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