

**A. INTRODUCTION**

Numerous alternatives have been developed and analyzed for a new Second Avenue Subway since the project was first conceived nearly 75 years ago. Although routes continued to evolve during those seven decades, three major plans were developed: a 1929 plan with an alignment under Second Avenue and Water Street, 1940s plans with a similar alignment to the 1929 plan but with additional connections to the Nassau Street Line and the Manhattan Bridge, and a 1968 plan (also along Second Avenue and Water Street), which was partially constructed in East Harlem and the Lower East Side in the late 1970s before construction was suspended because of New York City's fiscal situation at the time.

Most recently, MTA/NYCT undertook an extensive Major Investment Study (MIS) and Draft Environmental Impact Statement (DEIS), published in 1999, that analyzed a wide range of possible alternatives to ease transit problems on Manhattan's East Side. That study, known as the Manhattan East Side Transit Alternatives (MESA) Study, was undertaken in compliance with the National Environmental Policy Act (NEPA) and the MIS process established by the Intermodal Surface Transportation Efficiency Act (ISTEA), now the Transportation Efficiency Act for the 21st Century (TEA-21). For more information on the process and the extensive public outreach effort for the MESA Study, see Chapter 4, "Public Outreach and Review Process."

The MIS/DEIS evaluated a large number of possible alternatives, considering the project's goals and objectives, environmental impacts, cost and feasibility, and public input. Four alternatives were subject to detailed analysis: 1) a No Build Alternative, which included those improvements in the city's transportation system that were expected to be instituted by the future analysis year; 2) a Transportation Systems Management (TSM) Alternative—intended to meet the project's goals and objectives to the extent feasible at relatively low cost—which included improvements to station dwell times on the Lexington Avenue Line, introduction of bus priority lanes on First and Second Avenues between Houston and 96th Streets, and improvements to bus service on the Lower East Side; 3) Build Alternative 1, a new Second Avenue Subway from 125th Street at Lexington Avenue to 63rd Street, and continuing south to Lower Manhattan via the existing Broadway Line; and 4) Build Alternative 2, the same subway element as in Build Alternative 1, supplemented by new light rail transit service on the Lower East Side. Following the publication of the MIS/DEIS and an extensive public outreach effort to solicit comments and suggestions, the public voiced its strong support for a full-length Second Avenue Subway. The MTA Board determined that a full-length Second Avenue Subway from 125th Street to the Financial District in Lower Manhattan should be pursued and further analyzed. Because that full-length subway was not analyzed in detail in the MIS/DEIS, this Supplemental Draft Environmental Impact Statement (SDEIS) has been prepared to provide such analysis.

After selection of the full-length Second Avenue Subway for continued study, that preferred alternative was refined through an interactive process involving transportation planning, project

design, environmental analysis, and community outreach. Design refinements were made to the northern portion of the project, including changes to the design of the northern terminal station at 125th Street and modifications to the project alignment between 125th Street and 116th Street to reduce the number of easements required under private property and allow for a new 116th Street Station. Other studies were conducted that focused on alignment and station location considerations between 72nd and 42nd Streets to permit connections at 63rd Street to and from the existing 63rd Street Line, development of multiple alignment options between Houston and Canal Streets, and the Lower Manhattan alignment and southern terminal. As a result of these studies, a preferred alignment between 125th Street and Hanover Square using the Water Street route in Lower Manhattan has been selected.

A detailed discussion of the alternatives developed and analyzed during the MIS/DEIS process conducted for the MESA Study, as well as the studies conducted following selection of the full-length subway to refine the design, is provided in Appendix B to this SDEIS. This chapter describes the two alternatives analyzed in detail in this SDEIS: the No Build Alternative required for comparative analysis under NEPA and the Second Avenue Subway, or Build Alternative.

## **B. NO BUILD ALTERNATIVE**

The No Build Alternative consists of projects and initiatives to be undertaken or implemented before 2020, and assumes a Second Avenue Subway is not implemented. The No Build Alternative includes projects that have been approved and will be implemented by 2020 (this SDEIS's analysis year), as identified in the shorter-term MTA 2000-2004 Capital Program and as projected in the longer-term 2000-2019 20-Year Needs Assessment. As described below, these include initiatives to bring the system to a state-of-good-repair (e.g., purchase of new rail cars, track improvements, etc.), major capital improvements (e.g., station rehabilitation), and planned route changes as well as normal replacement and network expansion initiatives. These changes to be made to the transit system are the No Build Alternative, or the transit alternative that will be implemented whether or not the Second Avenue Subway proceeds. In addition, this SDEIS considers the effects of numerous other plans that will be completed by 2020 as part of its future background conditions (sometimes referred to as the "No Build" condition), such as the LIRR East Side Access Project and other public and private development initiatives. The existing conditions analyses in this SDEIS reflect conditions before the loss of the World Trade Center on September 11, 2001 in areas where quantitative analyses were required, as baseline conditions for analyses are intended to represent "normal" conditions, and post-September 11 conditions for areas such as traffic would not represent such conditions. Where possible, qualitative assessments, such as those conducted for social conditions, reflect current post-September 11 conditions. The No Build Alternative assumes that the former World Trade Center site and surrounding area will be fully redeveloped before 2020, and thus the No Build Alternative assumes a fully redeveloped Lower Manhattan. Transit initiatives that will occur in the No Build Alternative are described below.

## **SUBWAYS**

### *STATION REHABILITATION*

NYCT will continue its ongoing program to rehabilitate stations throughout the system. Approximately 64 stations are scheduled to be rehabilitated under construction contracts scheduled to commence during the 2002-2004 Capital Program; 26 of these are key stations to

be made accessible in compliance with the Americans with Disabilities Act (ADA) and in accordance with MTA's ADA Key Station Plan. More than 40 will be implemented on a line basis, in which groups of stations along a subway line segment are rehabilitated in coordination with other improvements, such as signal system and structural maintenance. Improvements at additional stations will include the installation or replacement of elevators and escalators, technology upgrades to MetroCard systems, and increased safety and security measures. NYCT's long-term ADA strategy is to complete accessibility reconfigurations at a total of 100 key stations to comply with ADA by 2020. Two-thirds of these stations will be upgraded by 2010.

As part of the station rehabilitation program, NYCT will create new transfers and intermodal facilities to improve customer convenience. New transfer connections will be constructed between the Broadway/Lafayette Station **B D F V** on the Sixth Avenue Line and the uptown Lexington Avenue Line **6** train at the Bleecker Street Station; and at the Jay Street and Lawrence Street Stations in Brooklyn between the **A C F** and **M N R** trains.

#### *MANHATTAN BRIDGE CONSTRUCTION*

In 2004, the New York City Department of Transportation (NYCDOT) will complete its two-decade reconstruction of the Manhattan Bridge, which is needed to correct structural stresses caused by the operation of subway service over the span. The bridge has four subway tracks, two on the north side and two on the south side. The tracks on the north side of the bridge connect the Brighton Beach and Fourth Avenue Lines in Brooklyn with the Sixth Avenue Line's express tracks in Manhattan. The tracks on the south side connect the Brighton Beach and Fourth Avenue Lines with the express tracks on the Broadway Line.

The bridge repair work has required subway service diversions since the mid-1980s. The current phase of work on the north-side tracks has temporarily severed the connection between Brooklyn and the express tracks on the Sixth Avenue Line. When the bridge returns to four-track operation in 2004, express service will be restored on both the Broadway and Sixth Avenue Lines. Although the exact service plan is under development and subject to public input, the following draft service plan is being assumed for the purposes of this SDEIS. Broadway Line express service (**N**) would operate from Queens through Manhattan and via the Manhattan Bridge to Brooklyn. **Q** service would also use the Broadway Line's express tracks, providing service between 57th Street in Manhattan and the Brighton Line's tracks in Brooklyn via the Manhattan Bridge. Broadway Line local service, which does not cross the Manhattan Bridge, would be provided by **R W** trains. **R** trains would continue their current routes between Forest Hills, Queens and Bay Ridge, Brooklyn. **W** trains would operate between Astoria, Queens and Whitehall Street in Lower Manhattan. **B D** service on the Sixth Avenue Line express tracks would be restored, allowing trains to operate between the Bronx and Brooklyn. NYCT expects to finalize the service plan for the restoration of full Manhattan Bridge service in 2003; the final plan may differ from the draft plan outlined in this document.

#### *COMMUNICATION-BASED TRAIN CONTROL*

NYCT is currently implementing a Communication-Based Train Control (CBTC) system on the Canarsie Line (**L**). This more advanced system of train control will be installed on all subway lines when their control systems require replacement.

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The CBTC system is more flexible than the signal system now in place, because it can continuously update train positions, distances, and travel speeds. This allows a system to recover more quickly from dwell-time-induced train delays, because a train can follow a “delayed” train more closely without having to come to a complete stop. The result is a more efficient operation that produces regular travel speed and allows for shorter headways. CBTC can help keep riders better informed of their commute time by providing up-to-the-minute travel conditions on electronic screens and public address systems.

NYCT plans to first implement CBTC on lines that do not merge with other lines, such as the Canarsie and Flushing Lines. Other lines that need their control systems replaced, such as the Culver, Crosstown, Queens Boulevard, Broadway, Brighton, and Fourth Avenue Lines, are expected to be converted to CBTC by 2020. The remainder of the system will be converted in the decades following. The Lexington Avenue Line (4 5 6) is not expected to be converted to CBTC before 2020, because its control systems do not require replacement until then. However, the delays on this line are not generally signal-related.

### *NEW-TECHNOLOGY CARS*

By the end of 2003, NYCT plans to retire its fleet of 40-year-old “Redbird” cars that currently operate on the A Division (1 2 3 4 5 6 7 9) routes. The 1,400 Redbird cars will be replaced with new cars featuring communications technologies such as automated announcements; variable message signage; lighted route maps showing station stops and the train’s progress on the route; wider doors to improve boarding and alighting; modern air conditioning and lighting systems; and advanced soundproofing and braking devices to reduce noise and recapture energy. With the new cars, the oldest A Division cars will be those acquired in the 1980s. Concurrent with the retirement of the Redbird fleet, NYCT will purchase up to 150 additional cars to expand the capacity of the A Division; another 50 cars are programmed for fleet expansion by 2020.

By the early 2010s, the current fleet of 1,572, 60-foot cars in the B Division (those trains designated with letters) will be retired and replaced with new cars, similar to those being purchased for the A Division. In addition, approximately 1,032 vehicles of the 75-foot, B Division fleet will be replaced by 2020. Also, aside from car replacement, NYCT is currently expanding its B Division fleet by approximately 362 more cars by 2020.

### *STATE-OF-GOOD-REPAIR, NORMAL REPLACEMENT, AND SYSTEM IMPROVEMENT*

In addition to the improvements and service changes described above, NYCT will continue to keep the system in a state-of-good-repair. The 2000-2004 Capital Program provides funding for the replacement of 40 miles of mainline track and 15 percent of all mainline switches. While approximately 80 percent of NYCT’s elevated and subway structures are in a state-of-good-repair, basic improvements are still necessary, including reconstruction of the Stillwell Avenue Terminal, which is underway; rehabilitation of the subway structures on the Eighth Avenue, Broadway, and Crosstown Lines; and reconfiguration of the Nassau Street Line and of the Atlantic Avenue interlocking of the Canarsie Line.

Plans for continued work on the system include power system upgrades at eight substations. Three underground emergency ventilation fan plants on the Sixth Avenue and Essex Street Lines in Manhattan will be rehabilitated. The fans at two sites, Houston and Elizabeth Streets, will be replaced by a single facility. Ventilation capacity will also be upgraded at a third fan plant at Stanton and Chrystie Streets.

Other system improvements include construction of a new Corona Maintenance Shop and reconstruction of the 207th Street Overhaul Shop; the procurement or rehabilitation of service vehicles; and the renovation of four transit police district offices.

The NYCT subway yard system is currently nearing capacity and, at numerous locations, has reached capacity. As a result, NYCT is currently planning several yard expansions and shop updates at various locations across the system to meet the storage and maintenance needs of both its current fleet and the additional trains now on order. Shop upgrades are planned at several locations, including Pitkin, 240th Street, and Livonia followed by the 207th Street Maintenance and Overhaul Shops and the Concourse Yard. These and other shop upgrades will result in reconfiguring older shops to meet current design standards, including increasing the spacing between shop tracks to improve efficiency and safety.

#### *RECONSTRUCTION IN LOWER MANHATTAN*

In Lower Manhattan, NYCT has repaired and reconstructed sections of the 19 Line beneath Greenwich Street, which were damaged on September 11, 2001. The Cortlandt Street 19 Station, however, remains closed and no timetable has yet been set for its reopening. In addition, plans are being developed for the redevelopment of the World Trade Center site and of the adjacent area in Lower Manhattan. These plans, which are in preliminary stages, could involve enhanced transfers between subways and PATH trains.

#### **BUSES**

NYCT will purchase more than a thousand new buses by 2004. This procurement includes 90-passenger, articulated buses; standard-sized, clean-fuel buses; and high-capacity express coaches. Combined with vehicles purchased in the late 1990s, these procurements will expand the capacity of the bus system by 40 percent since ridership began to increase in 1996.

Bus procurement will also continue after 2004. NYCT plans to implement articulated bus service on a number of high-traffic routes to replace the existing 60-passenger, standard buses. On other routes, NYCT will replace standard-sized diesel buses with new standard-sized clean-fuel buses.

NYCT will also continue to bring bus depots and maintenance centers to a state-of-good-repair. This may include the construction of new depots and the conversion of other facilities to allow for the repair and storage of clean-fuel vehicles. Within the study area, the 100th Street depot is currently being reconstructed. Among the new depots planned is an off-street bus parking facility at 126th Street on the west side of Second Avenue. NYCT is currently negotiating with City agencies for the transfer of land needed to construct this depot. A future reconstruction of the 126th Street depot on the east side of Second Avenue is also planned.

### **C. SECOND AVENUE SUBWAY**

#### **DESIGN REFINEMENT CRITERIA**

As described in Appendix B (“Development of Alternatives”), after selection of the full-length Second Avenue Subway alternative for continued study, that alternative was further refined through an interactive transportation planning, project design, environmental analysis, and community outreach process. As part of the alternatives refinement process and in response to project objectives (see Chapter 1, “Project Purpose and Need”), criteria were developed to guide the design effort, as follows:

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- The system should deliver fast, reliable service to provide an attractive alternative to the Lexington Avenue Line and relieve overcrowding on that line.
- All new facilities including tracks and termini must be able to accommodate up to 30 trains per hour in each peak direction, the maximum number of trains that could be operated on the Second Avenue Line.
- The already built segments of the Second Avenue Subway should be used if practicable. These are located on Second Avenue between 120th and 110th Streets, on Second Avenue between 105th and 99th Streets, and on the Bowery between Canal and Pell Streets.
- The Second Avenue Subway should use the existing “bellmouths” constructed as part of the 63rd Street Tunnel to provide a West Side service and to facilitate future connections between the 63rd Street Line and the Second Avenue Line.
- Free transfer connections should be provided to existing stations and other public transit facilities wherever practicable.
- The system should be built so as not to preclude future connections or extensions to other boroughs in New York City.
- The system should be designed to provide flexibility in its construction methods and contracting process.
- The system should be designed to achieve a balance between ease of construction and passenger convenience in terms of both tunnel depth (a very deep tunnel might be easier to construct, but passenger access time to and from the street would increase), and a balance between speed of operation and passenger convenience in terms of station spacing (having fewer stations allows faster service for those already on the train, but also means pedestrians may need to walk farther to reach a station entrance).
- The system should be designed to minimize environmental and community impacts to the extent practicable and should be reasonably responsive to community concerns. This goal affects construction techniques selected as well as the basic design of the system in terms of station placement and alignment.
- The system must comply with passenger safety requirements and with the Americans with Disabilities Act (ADA), the National Fire Protection Act (NFPA), and all applicable codes.
- All new facilities should respond to sustainable/green design criteria.

The Second Avenue Subway meets these criteria, as described below.

In addition, the subway design will comply with the Environmental Management System (EMS) established by MTA/NYCT, which establishes protocols to achieve energy efficiency, enhanced indoor environmental quality, conservation of materials and resources, and water conservation and site management. The EMS conforms with the ISO 14001 Standard, an internationally recognized system that provides a disciplined framework under which NYCT can demonstrate control over key issues related to raw materials consumption, energy usage, emissions, wastes, products, transport, distribution and services. The EMS requires not only a continuing compliance with relevant legislation but also that NYCT remains committed to achieving improvements in these key issues. A key aspect of this system involves the adoption of Design for the Environment Guidelines for use during the project’s design phase. The purpose of these guidelines is to establish a process for the creation of an environmentally responsible subway

system that is appreciably ahead of current standards and practices when compared with similar transportation systems.

## **DESCRIPTION OF THE SECOND AVENUE SUBWAY**

### *OVERVIEW*

The Second Avenue Subway would be a new rail line extending approximately 8.5 miles along the length of Manhattan's East Side from 125th Street to Hanover Square (see Figures 2-1 and 2-2). This new subway line would have 16 new stations, serving communities in Harlem, the Upper East Side, East Midtown, Gramercy Park/Union Square, the East Village/Lower East Side/Chinatown, and Lower Manhattan. The Second Avenue Subway would have a two-track design with three-track termini at both its north and south ends, and it would provide transfers to existing Metro-North commuter rail service and to NYCT subway lines and bus services. The subway would also connect to the 63rd Street Line, thereby providing direct access to the Broadway Line and the ability to transfer to the Sixth Avenue Line. The layout provides for possible future extension to the Bronx from the northern end and to Brooklyn from the southern end. A connection from the 63rd Street Line to Queens would also be constructed as part of the project for non-passenger trains.

Facilities for the Second Avenue Subway are being developed to accommodate up to 30 trains per hour during peak periods. The system would provide B Division service, with trains consisting of ten 60-foot cars or eight 75-foot cars.

The Second Avenue Subway would create two subway services in the same tunnels (see Figure 2-2). The first would be a Second Avenue route operating between 125th Street in East Harlem and Hanover Square in Lower Manhattan. The second service would operate along Second Avenue from 125th Street to 65th Street, where it would join the existing 63rd Street Line to stop at the existing Lexington Avenue/63rd Street Station before joining the existing Broadway Line at the 57th Street/Seventh Avenue Station. Once on the Broadway Line, it would serve express stations along Seventh Avenue and Broadway before crossing the Manhattan Bridge to Brooklyn. Passengers traveling to stations on the Broadway Line in Lower Manhattan could transfer at the Union Square or Canal Street Station for local service to destinations south of Canal Street.

As described in Appendix B, a Water Street alignment in Lower Manhattan was selected over a Nassau Street alignment as a result of additional environmental and operational review and public input during the planning phase that occurred as part of this SDEIS. Accordingly, the project description below incorporates the Water Street alignment as part of the Second Avenue Subway project. The new subway's routes, tunnels, stations, ancillary facilities, signals, rolling stock, and maintenance and storage facilities are summarized below as well. As discussed throughout this SDEIS, environmental, economic, community and engineering concerns were considered in developing the selected alternative.

### *TUNNEL ALIGNMENT*

The Second Avenue Subway would provide new subway service beneath the full-length of Second Avenue and along the existing Broadway Line south of 63rd Street in Manhattan. At most points along the alignment, the Second Avenue Subway would include two tracks: one northbound and one southbound. However, in certain locations, a third track would allow trains

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to reverse direction or move in or out of service under certain operating conditions. The locations where more than two tracks are contemplated are as follows (see Figures 2-3 and 2-4):

- 125th Street from Fifth Avenue to midway between Lexington and Third Avenues;
- Second Avenue between 129th and 120th Streets;
- Second Avenue in the vicinity of the 72nd Street Station;
- Second Avenue between 61st Street and approximately 56th Street;
- Second Avenue between 42nd Street and 34th Street; and
- Water Street between Pine Street and approximately Coenties Slip.

Generally, most of the Second Avenue Subway would be deeper than most existing subway lines in New York City. Several factors contribute to the system's depth. First and foremost, a deeper alignment was selected to minimize the need to excavate using cut-and-cover along the entire 8.5-mile route during construction (see Chapter 3, "Description of Construction Methods and Activities"), and thereby reduce environmental impacts. In addition, the Second Avenue tunnel must be placed so that it would safely pass over or under other existing utilities, as well as subway, train, and vehicular tunnels. The location and quality of bedrock in which the tunnel would be constructed also affected the alignment decisions. As a result, the depth of the Second Avenue Subway platforms would range from approximately 40 feet to some 85 feet below the street. (Figure 3-12 in Chapter 3 depicts the location of the alignment, stations, and tunnel in relation to street level, bedrock, and other tunnel structures.)

### *125th Street to Houston Street*

Starting in the north, the Second Avenue Subway would begin at a new station on 125th Street between Park and Lexington Avenues, where transfer connections would be provided to the existing Lexington Avenue Line (4 5 6) and to the Metro-North station at 125th Street. (Other connections are discussed below under "Stations.") Tail tracks, allowing trains to pull into the station at sufficient speeds to allow the operation of 30 trains per hour and to allow trains to move out of service, would be located underground to the west of the new 125th Street Station to approximately Fifth Avenue. (These tail tracks would also provide limited train storage.) Moving east along 125th Street, the new subway would transition to Second Avenue via a curve between 125th and 123rd Streets; this curve would pass deep beneath some low-rise residential buildings as well as Triboro Plaza. Once on Second Avenue, the alignment would continue south to 63rd Street, where trains would either continue south to Lower Manhattan via the paths described below, or onto the 63rd Street Line and then the Broadway Line. In most cases, the new tunnels would be beneath the existing street or avenue right-of-way, and would not pass directly beneath structures.

### *Houston Street to Hanover Square*

Three options for the area between Houston Street and Canal Street were analyzed in this SDEIS (see Figures 2-5, 2-6, and 2-7).<sup>1</sup> This area was a focus of study because of the construction difficulties inherent in this area. While a short connection between the new Second Avenue Subway and the existing Grand Street B D service would create great benefits for passengers, there are two existing subway lines in this area that require special consideration during

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<sup>1</sup> As detailed below, because the analyses showed that one option—referred to herein as the "Shallow Chrystie Option"—would result in more significant adverse impacts than the other two options (the Deep Chrystie and Forsyth Street Options), this option is no longer under consideration by NYCT.



construction of the Second Avenue Subway to avoid creating excessive service disruptions for existing passengers. Further, construction in this area poses a number of environmental concerns, such as impacts to Sara Delano Roosevelt Park, and possible impacts to archaeological resources. Impacts to private properties and businesses that are part of several important commercial districts—the restaurant equipment district, the Bowery lighting district, and Chinatown—are also a consideration in this area.

An important part of the Second Avenue Subway involves connecting the existing **B D** service at Grand Street to the new Second Avenue Subway service via some type of transfer. Because of the narrowness of the existing Grand Street Station platforms, the existing station would have to be reconstructed in order to serve the larger volume of passengers that would use the station once the Second Avenue Subway service is operational. Each of the three options considered for the area south of Houston Street would modify the existing Grand Street Station differently, as shown on Figures 2-5 through 2-7.

As a result of information gained through the analyses included in this SDEIS, the Shallow Chrystie Option is no longer under consideration, as it would result in more significant adverse impacts during construction than the other two options. As is described throughout this SDEIS, the Shallow Chrystie Option would: 1) result in more displacement of residential and commercial uses, 2) require more underpinning of adjacent properties, 3) cause more encroachment into and greater impacts to Sara D. Roosevelt Park, 4) generate more dust and noise because cut-and-cover construction would be required along a longer segment of the proposed alignment, and 5) could affect potential burial remains at five former cemeteries. Although no longer under consideration, the Shallow Chrystie Option is nevertheless discussed throughout the SDEIS for comparative purposes. Thus, the three alignment options for the area between Houston and Canal Streets are reviewed throughout this document.

The extent of adverse impacts (as well as cost, service, and engineering issues) will be considered in determining which of the two remaining options being considered—the Deep Chrystie and Forsyth Street Options—should be carried forward. As described throughout this SDEIS, the various options would have markedly different effects during construction and different benefits once complete. A discussion of the numerous options considered in this area before these three were selected for further study is provided in Appendix B. The construction activities required for the three options are described in Chapter 3.

With the first option, the Shallow Chrystie Option, which is no longer under consideration, the new subway would continue south of Houston Street under Chrystie Street to the Chatham Square Station. The tunnel would be immediately on either side of the existing **B D** tunnel under Chrystie Street, and therefore shallow—25 feet deep at the Houston Street Station and Grand Street Station, and 40 feet deep at the Chatham Square Station. This would create the shortest, most convenient passenger transfer between the two subway services, with a cross-platform transfer. South of the Grand Street Station, the new subway would continue to Chatham Square using the small tunnel segment already constructed near the Manhattan Bridge. The Shallow Chrystie Option is the alignment originally contemplated in the 1970s for the Second Avenue Subway. However, as described in Chapter 3, this option would require cut-and-cover construction that would result in significant impacts during construction on Sara D. Roosevelt Park, existing businesses, possible archaeological resources, and subway service at Grand Street.

The second option, the Deep Chrystie Option, which is still under consideration, would also continue south beneath Chrystie Street to the Chatham Square Station, but would be beneath rather than beside the existing **B D** lines. Near the Manhattan Bridge, this deep option would

travel below the existing tunnel segment built in the 1970s, which would instead be used for ancillary facilities (discussed later in this chapter). This option's deep alignment would allow the use of tunnel boring technology rather than cut-and-cover construction, to reduce the impacts to existing subway service and the surrounding community from those in the Shallow Chrystie Option. As a result, the Deep Chrystie Option would range in depth from approximately 75 feet at the Houston Street Station to 65 feet at the Grand Street and Chatham Square Stations. At the Grand Street Station, passengers would transfer between the Second Avenue Subway and existing **B** **D** service by stairs, escalators, or elevators.

The third option, the Forsyth Street Option, is also still under consideration. This option would also be mined using tunnel boring technology to reduce construction impacts. From the Houston Street Station, this option would curve toward the east beneath Sara D. Roosevelt Park; from approximately Rivington to Hester Street, it would be beneath Forsyth Street, one block east of the existing **B** **D** lines under Chrystie Street. A 200-foot-long transfer passageway between the **B** **D** and the Second Avenue Subway would be provided. Near Canal Street, the alignment would curve back toward Chrystie Street again, traveling beneath the existing tunnel segment, which would be used for ancillary facilities. This option would have tunnels and stations at approximately the same depth as the Deep Chrystie Option—75 feet deep at the Houston Street Station and 65 feet deep at Grand Street and Chatham Square Stations.

### *Connection to Broadway Line*

In addition to the new tunnels along Second Avenue, the Second Avenue Subway would also provide for a connection to the 63rd Street Line. As discussed, this connection would be accomplished by making use of the existing bellmouths constructed during the 1970s as part of the existing 63rd Street Line. Southbound Second Avenue Subway trains would access the Broadway Line through a switch connecting to a track curve starting at approximately 65th Street that turns westward to join the 63rd Street Line at the Lexington Avenue/63rd Street Station. Trains would stop at that station at a currently unused track and a currently unused platform. Trains would use the 63rd Street Line to travel beneath Central Park via an existing track connection to the express tracks of the Broadway Line, which has the capacity to accommodate these trains. Second Avenue service would then continue down the express tracks of the Broadway Line, making express stops to Canal Street and then continuing to Brooklyn via the Manhattan Bridge.

### *Connection to Queens*

As described previously, the Second Avenue Subway alternative would connect to the 63rd Street Tunnel east of Second Avenue via a switch to a curved tunnel at approximately 61st Street and Second Avenue. In the near term, this connection would be used for non-passenger service, diversions and reroutes due to disruptions. The connection between the Second Avenue Subway and the 63rd Street Tunnel would provide flexibility in operations on the Second Avenue Subway to prevent service disruptions on multiple lines due to malfunctioning trains, though no additional service beyond that addressed in this EIS would be provided. Any future service changes pertaining to this connection would be assessed as part of NYCT's standard service review procedures. If the capacity of the Queens subway network is increased in the future, or if existing service is reconfigured, this connection, along with the available track capacity on the planned Second Avenue Line south of 63rd Street, would enable additional subway service between Queens, Midtown, and the Financial District to be provided.

*Future Connections to the Bronx and Brooklyn*

Both the northern and southern portions of the alignment would be designed so as not to preclude future connections to the Bronx and Brooklyn. In the north, a bellmouth would be constructed along Second Avenue north of 125th Street as part of the proposed underground storage yard (discussed below) in this area. In the south, by constructing the Hanover Square Station south of Wall Street at approximately 85 feet below street level, the elevation would be deep enough to allow for the potential extension of Second Avenue Subway service to Brooklyn.

*STATIONS**Locations and Connections to Existing Transit Facilities*

As shown in Table 2-1 and on Figures 2-1 and 2-2, 16 new stations would serve the Second Avenue Subway Line. Most stations would be spaced approximately 10 blocks apart, providing a balance between speed of operation and passenger convenience. While final decisions about the locations of station entrances have not yet been made, preliminary station entrance intersections have been identified. The typical Second Avenue Subway station would be constructed at or near major crosstown streets, with entrances located on or near the corners of the major intersections for which the station is named. In addition, at many stations, entrances are expected at one or more other street intersections. Based on the existing subway system in Manhattan, it is probable that most entrances would be located on or near the corners, although subways in New York City occasionally provide mid-block station entrances.

Each station would be between 800 to approximately 1,000 feet long to accommodate the station platform itself, which would be approximately 615 feet (two and a half blocks) long, and a variety of ancillary spaces, such as ventilation plants and power substations.

The northernmost station on both the Second Avenue and Broadway services would be on 125th Street between Park and Lexington Avenues; this three-track terminal station would provide a free transfer to the **4 5 6** trains. This station would also provide an easy transfer connection to Metro-North's Harlem-125th Street Station (see Figure 2-8).

As shown on Table 2-1, south of 125th Street, the next station would be at 116th Street and Second Avenue. Continuing south along Second Avenue, stations would be located at 106th Street, 96th Street, 86th Street, and 72nd Street. The 72nd Street Station would be designed to permit some trains to and from the Broadway Line to terminate on a third track without having to merge with through, Second Avenue Line trains. From 72nd Street, trains would either continue south on Second Avenue or head west onto the Broadway Line.

Continuing on Second Avenue south of 63rd Street, stations would be located at 57th Street, 42nd Street, 34th Street, 23rd Street, 14th Street, Houston Street, Grand Street, Chatham Square, Seaport (just north of Fulton Street), and Hanover Square (just south of Wall Street). Enclosed transfers at the following locations are being evaluated as detailed design continues:

- To the **4 5 6** service and Metro-North at 125th Street;
- To the **E V** service at 53rd Street (Lexington Avenue-53rd Street Station);
- To the **7** service at 42nd Street (42nd Street-Grand Central Station);
- To the **L** service at 14th Street (Third Avenue Station);
- To the **F V** service at Houston Street (Lower East Side-Second Avenue Station); and
- To the **B D** service at Grand Street (Grand Street Station).

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Table 2-1  
New or Expanded Subway Stations

Station	Location	Type	Transfer Routes <sup>1</sup>	Preliminary Entrance Locations <sup>2</sup>	Approximate Station Depth <sup>3</sup>
<b>SECOND AVENUE LINE (SHALLOW CHRYSTIE<sup>4</sup>, DEEP CHRYSTIE, AND FORSYTH STREET OPTIONS)</b>					
125 St	125th St/Madison to Lexington Av	3 track	4 5 6 Metro-North	125th St/Park and Lexington Avs	90-100 ft
116 St	Second Avenue/119th to 115th St	2 track		Second Ave/116th St	40 ft
106 St	Second Avenue/108th to 105th St	2 track		Second Av/106th St	40 ft
96 St	Second Av/98th to 94th St	2 track		Second Av/ 96th St Second Av/94th St	40 ft
86 St	Second Av/87th to 83rd St	2 track		Second Av/86th St Second Av/83rd St	75 ft
72 St	Second Av/73rd to 69th St	3 track	Bway/Second Av Lines	Second Av/72nd St Second Av/69th St	85 ft
57 St	Second Av/57th to 52nd St	2 track	E V	Second Av/57th to 56th St; Second Av/54th/53rd St	50 ft
42 St	Second Av/45th to 41st St	2 track	7	Second Av/ 44th St Second Av/42nd to 41st St	80 ft
34 St	Second Av/36th to 32nd St	2 track		Second Av/34th St	50 ft
23 St	Second Av/26th to 23rd St	2 track		Second Av/26th St Second Av/23rd St	80 ft
14 St	Second Av/15th to 12th St	2 track	L	Second Av/14th St Second Av/12th St	80 ft
<b>SECOND AVENUE SUBWAY SHALLOW CHRYSTIE OPTION (no longer under consideration)</b>					
Houston St	4th St to Second Avenue/Houston St	2 track	F V	Second Av/3rd St Houston St/Chrystie St	25 ft
Grand St	Chrystie St/Delancey to Hester St (expand existing station)	4 track <sup>5</sup>	B D	Grand St/Chrystie St	30 ft
Chatham Sq	Chatham Square/Pell to Madison St	2 track (2 new)		Chatham Square	40 ft
<b>SECOND AVENUE SUBWAY DEEP CHRYSTIE AND FORSYTH STREET OPTIONS</b>					
Houston St	4th St to Second Avenue/Houston St	2 track	F V	Second Av/3rd St Houston St/Chrystie St	75 ft
Grand St	Forsyth St/Delancey St to south of Grand St	2 track	B D	Grand St/Chrystie or Forsyth St	65 ft
Chatham Sq	Chatham Square/Pell to Madison St	2 track		Chatham Square	65 ft
<b>LOWER MANHATTAN STATIONS (SHALLOW CHRYSTIE<sup>4</sup>, DEEP CHRYSTIE, AND FORSYTH STREET OPTIONS)</b>					
Seaport	Water St/Peck Slip to Fulton St	2 track		Fulton St/Water St Peck Slip/Pearl St	75 ft
Hanover Sq	Water St/Wall St to Coenties Slip	3 track		Wall St/ Water St; Hanover Square/55 Water St	110 ft
<b>63RD STREET LINE</b>					
Lexington Av	63rd Street/Lexington to Third Av	4 track <sup>6</sup>	F	Existing: Lexington Av/ 63rd St.; New: Third Av/63rd St.	105/135 ft
<b>Notes:</b>					
<sup>1</sup> Transfer routes are under evaluation.					
<sup>2</sup> Preliminary entrance locations subject to change in both number and location.					
<sup>3</sup> Subject to change.					
<sup>4</sup> The Shallow Chrystie Option is no longer under consideration.					
<sup>5</sup> Two existing tracks and two new tracks to accommodate Second Avenue Subway Service.					
<sup>6</sup> All four tracks exist today; only two are in passenger service.					

Depending on the construction cost and feasibility, as well as the more detailed modeling studies under way, it is possible that not all of these transfers would be constructed as part of the Second Avenue Subway.

On the 63rd Street and Broadway Lines, stops would include Lexington Avenue/63rd Street on the 63rd Street Line, and 57th Street, 42nd Street-Times Square, 34th Street-Herald Square, 14th Street-Union Square, and Canal Street on the Broadway Line. After Canal Street, the line would continue to Brooklyn via the Manhattan Bridge. Passengers who want to access stations south of Canal Street would be able to transfer to the Broadway Line local service, which stops at 49th Street, 28th Street, 23rd Street, 8th Street-NYU, Prince Street, City Hall, Cortlandt Street, Rector Street, and Whitehall Street before continuing into Brooklyn.

On the 63rd Street and Broadway Lines, transfers would be available at the existing stations at Lexington Avenue/63rd Street (F), 57th Street (NRQW), 42nd Street-Times Square (1239ACES7NRQW), 34th Street-Herald Square (BDFVNRQW and PATH), 14th Street-Union Square (456NRQQL), and Canal Street (JMZ6NRQW).

*Station Design*

Detailed designs for stations along the Second Avenue Subway will be developed during Preliminary Engineering and Final Design. However, the basic concepts for each station have been developed. These will continue to be refined prior to publication of the Final Environmental Impact Statement (FEIS). Prototypical stations for the new route would have a mezzanine above the tracks and platforms, where passengers could access either the uptown or downtown trains. Fare collection would typically occur at mezzanines. ADA new construction accessibility requirements will be integrated into the station design. Elevators and stairs and/or escalators would provide access between the street and platforms. The features of the new stations would vary, depending on the volumes of passengers expected at the station and the number of tracks. Most of the new stations would have one central island platform. The stations at 125th Street, Hanover Square, and 72nd Street would have two platforms, because they would have three tracks rather than two.

The terminal stations at 125th Street and Hanover Square would be larger than intermediate stations, as they would contain additional support facilities such as crew quarters, dispatchers offices, cleaners, and other departmental offices. Many stations would have street entrances at two distinct intersections—one on the major cross street for which the station is named, and another two or three blocks north or south of the main entrance. These stations would typically have an upper mezzanine at each entrance, each with its own customer service area adjacent to the fare control area. Other stations would have one entrance at the crosstown street for which the station is named.

All new Second Avenue Subway stations would also be constructed under the MTA’s “Arts for Transit” (AFT) program. In 1982, legislation was adopted mandating that all new construction projects allocate funds for public art. Since 1985, this program has been administered by AFT, which oversees public art installations for MTA. Under its mission, AFT applies to new or rehabilitated stations and to new or rehabilitated aboveground facilities that are accessible to the public and/or highly visible by the public. MTA allows the AFT budget for public art to be 1 percent of the project’s capital cost up to \$20 million, and an additional 0.5 percent of monies spent over \$20 million. For the Second Avenue Subway, the AFT budget would likely be based

on the total cost of station construction and rehabilitation, including costs associated with the construction or refurbishment of transfer facilities.

In addition to its administrative role for the public art program, AFT serves as the “aesthetic-eye” for station construction or rehabilitation projects. In their role as the aesthetic-eye, AFT staff provides design consultation, including architectural selection, design review, and design support. For the Second Avenue Subway, AFT would provide input to the selection of architectural firms; the design of stations, including materials selection, entrance design, and station organization; historic preservation of existing facilities; and the selection of public art installations. Sustainable design principles within an integrated framework would be used throughout the planning and design of the station. All sustainable design opportunities including energy efficiency, natural day lighting, natural ventilation, and material conservation would be explored and recorded.

### *Station Access*

Depending on the station, access from the street might be to the center part of the platform, to the ends, or to the center and one end of the platform. Stations with entrances at the ends of the platforms would provide easy access to a larger neighborhood because people with destinations between stations would walk shorter distances to reach the entrance. However, these stations typically cost more than stations with one central entrance. Optimally, the system should have a mix of all types of stations, to best distribute passengers among the subway cars. (Most people typically enter the train either close to the entrance at their boarding station or close to the exit at their destination station, so a mix of many types of stations would spread passengers throughout the trains.)

Several options are under consideration for the stations’ street entrance configurations and mezzanines. Depending on the station, entrances could be located within buildings or in the sidewalk (see Figure 2-9). Sidewalk entrances could include locations where the sidewalk is widened into the parking lane (called a sidewalk “bump out”), to create a larger and more visible entrance location. Sidewalk entrances are the most common entrance in the existing NYCT subway system, and some sidewalk entrances could be constructed at every station both for normal passenger access and to permit passengers to exit the stations under emergency conditions. Sidewalk bump outs create a larger and more visible entrance location. In this case, the sidewalk area would be extended into the parking lane on the eastern side of Second Avenue at certain main entrance intersections at major crosstown streets. By locating such bump outs on the east side of Second Avenue, no bus lanes would be affected. Bump outs would typically be no greater in width than one parking lane (about 8 feet) and might include an escalator, elevator, or stairs. Other bump out configurations are still being studied.

While sidewalk entrances provide the shortest travel paths to the fare control area, they can constrain pedestrian movements. Consequently, the project is also evaluating plans that provide access via stairs, elevators, or escalators located within existing buildings or within the building line in new structures. Another option, where possible, is open air entrances in plaza areas of the sidewalk.

New York City zoning encourages off-sidewalk station access in parts of Manhattan through special districts and specifically for the Second Avenue Subway through a Special Transit Land Use District. Consequently, in many locations along the Second Avenue Subway route, buildings constructed since the District was created in the 1970s have been required under the New York City Zoning Resolution, if the Department of City Planning and NYCT so determine,

to make room for such entryways (this is described in more detail in Chapter 6, “Social and Economic Conditions”). Such transit easements have already been acquired at the following locations along the alignment in anticipation of station construction, and more could be acquired on a case-by-case basis:

- 2357 Second Avenue and 246-248 East 121st Street (Block 1785 Lots 29, 30, 31, and 129);
- 237 East 95th Street (Block 1541 Lot 21);
- 240 East 86th Street (Block 1531 Lots 24, 28, 29, and 30);
- 306 East 72nd Street (not available until 2022);
- 1110 Second Avenue (northeast corner of Second Avenue and 58th Street, Block 1446 Lot 149);
- 300 East 54th Street (Block 1346 Lot 49);
- 885 Third Avenue near 54th Street (Block 1327 Lot 1);
- 246 East 54th Street (southwest corner of Second Avenue and 54th Street, Block 1327 Lot 28);
- 994-1002 Second Avenue at 53rd Street (Block 1345 Lots 4, 48, 49, 51, 52, 150);
- 244 East 53rd Street (Block 1326 Lot 30);
- Northeast corner of Second Avenue and 45th Street (Block 1338 Lot 1);
- 828 Second Avenue (Nigerian Embassy) near East 44th Street (Block 1337 Lot 1);
- 214-248 East 34th Street (Block 914 Lots 37, 45, and 53);
- 300 East 34th Street (Block 939 Lot 1);
- 240 East 27th Street (northwest corner of Second Avenue and 27th Street, Block 907 Lot 25);
- 225 East 23rd Street (Public School No. 47, School for the Deaf, Block 904 Lot 24);
- 392-398 East 23rd Street (Block 928 Lots 54, 55, 56, and 57);
- 1-4 Chatham Square (Block 162 Lot 1).

Between three and eight easements or property acquisitions would likely be needed at every station for entrances and other station facilities, possibly necessitating acquisition of private property (See Chapter 8, “Displacement and Relocation,” for more information on potential property impacts.)

All stations would comply with ADA regulations. Each station would have at least two elevators: one providing convenient access between the fare control area and the street, and another one between the fare control area and the platform(s). All station areas would meet ADA standards for elevations and grades for wheelchair access. In addition, required safety provisions would be implemented, including ADA compliant “truncated dome” warning strips at platform edges and adequate-size corridors and doorways. Public address systems would incorporate both visual and audio communications to be fully compliant with requirements for hearing and visually impaired passengers or employees. ADA-compliant design would also be incorporated into any employee and tenant spaces within the station complex.

Newly constructed transfer points between the Second Avenue Subway and existing train lines would also be ADA-accessible, unless technically infeasible, as defined by ADA. The construction of ADA-compliant elements within existing facilities is governed by the U.S. Department of Transportation (USDOT) regulations for accessible stations and by the U.S. Architectural and Transportation Barriers Board’s “ADA Accessibility Guidelines for Buildings and Facilities” (ADAAG). Street-to-platform paths of travel in the existing stations where transfers will be created will be made ADA-accessible to the extent possible within the

“disproportionate cost” cap, as defined by USDOT regulations (20 percent of certain construction costs). Consequently, depending on the cost of certain project elements, it may only be possible to make newly constructed areas ADA-compliant at certain stations where the Second Avenue Subway would connect to existing subway routes.

### *ANCILLARY FACILITIES*

In addition to tracks and stations, the new subway line would also require other ancillary facilities, such as ventilation facilities, substations, pump rooms, maintenance rooms, and fan plants. Typically, these would be within the envelope of new stations, but certain facilities would have to be located away from the stations. When possible, the project would share the use of existing transit facilities, such as NYCT’s Control Center.

#### *Power Substations and Other Electrical Requirements*

New power substations, measuring approximately 50 feet by 100 feet, would be constructed to meet the power requirements of the new subway. These substations would be located at stations, and would typically be underground. Each new substation would be fed with dual Con Edison service and would contain a station battery and charger, fire detection and alarm system, intrusion detector system, and remote terminal unit that would communicate with NYCT’s Power Control Center. Traction power to trains would be provided via the conventional third rail. Each traction power substation would be constructed within the station limits. The number and location of these substations will be determined as the engineering design continues.

#### *Drainage*

Pump plants would generally be provided at all low points along new tunnel sections, and would be accessible from the track and from equipment hatches in the sidewalk.

Where possible, the low points along the alignment would be located next to proposed subway stations to minimize the number of surface disruptions. At some locations where the tunnel alignment would make it impossible to provide the low point adjacent to the station, there would be access hatches located midway between stations at these locations.

#### *Ventilation Facilities and Air Temperature Management*

As part of the engineering work for the project, studies are under way as to how to provide climate control and ventilation for the new stations and tunnels of the Second Avenue Subway. There are several types of ventilation systems required at each station: under-platform exhaust, over-track exhaust, tunnel ventilation, and station ventilation. Each of these would require a certain area above ground for intake and exhaust. If underground systems and sidewalk gratings are used, the grating area would be approximately 4,500 square feet at each station. Assuming a typical 3.5-foot-wide sidewalk grate, this would result in over 1,280 linear feet of sidewalk with grating at each station. Options to minimize the amount of sidewalk space taken over by ventilation gratings include using adjacent properties to provide vertical, louvered intake and exhaust for the subway ventilation. Using louvers would reduce the area to approximately 2,800 square feet at each station, but would require acquiring space in adjacent buildings for ventilation. Potentially, space acquired to provide station access could also be used to accommodate ventilation facilities. At each station, up to two above-ground ventilation structures might be constructed.



The use of climate control is also being studied at the new stations of the Second Avenue Subway. Climate control could be achieved in several ways: with above-ground cooling towers, with below-ground cooling towers, or with the use of one or more central cooling plants. With above-ground cooling towers located at each station, additional property would have to be acquired. With below-ground cooling towers, additional station construction would be required to accommodate the additional machinery. With one or more central cooling plants, chilled water would be pumped to each station and then used to cool the station. These chilled water pipes would run within the proposed tunnels. The central cooling plants would require acquisition of parcels of land that could be away from the proposed subway alignment.

#### *SIGNALS*

The Second Avenue Subway would employ a state-of-the-art CBTC signal system, an improvement over the traditional signal system. (See section B, “No Build Alternative,” in this chapter for more detail.)

#### *ROLLING STOCK*

The rolling stock for the Second Avenue Subway would be similar to the standard equipment used on New York City Transit’s B Division lines. The new line would be designed to accommodate 60- and 75-foot-long cars, with full train sets that are 600 feet in length. These trains would have a total capacity of approximately 1,400 to 1,450 passengers. The trains would be powered from a 600-volt third rail. The proposed Second Avenue service plan, which calls for 24 trains per hour in the peak hour in the peak direction, would require the operation of approximately 28 new B Division train sets, including spares.

#### *SERVICE PLAN SUMMARY*

The Second Avenue Subway would operate 24 hours per day, seven days per week. It would run at 2.5-minute intervals during peak hours north of 63rd Street and at 5-minute intervals on the Broadway and Second Avenue Lines south of 63rd Street.

#### *STORAGE AND MAINTENANCE FACILITIES*

The Second Avenue Subway would add new trains to the NYCT subway fleet. These trains must be stored during the off-peak periods (and particularly at night) and inspected at regular intervals, and maintained, repaired, and overhauled periodically. Thus, NYCT’s existing storage facilities would need to be improved or expanded to accommodate the new subway line. Absent the Second Avenue Subway, such activities would not be required. Consequently, four areas are under consideration for possible use as new storage tracks for the Second Avenue Subway. In addition, expansion of the maintenance facilities at two existing NYCT storage and maintenance yards is being considered, as discussed below. A range of facilities is being evaluated to identify the best storage and maintenance options; the project would not require the use of all of these facilities now under consideration.

### *Storage Yards*

The storage system for the new Second Avenue Subway would need to accommodate and service approximately 22 10-car trains<sup>1</sup>. Specific designs for the configuration of the train storage to support the Second Avenue Subway are being developed by the project's engineering team. At present, new B Division train storage facilities are being considered at four locations (see Figure 2-10 and Figures 2-11 through 2-15). All of these facilities would not be required; a combination of storage yards would be selected to handle the project's storage needs, based on cost, constructability, effects on subway system operations, and environmental impacts. The four locations are as follows:

- Terminal Stations (125th Street Yard, 125th Street Station, and Hanover Square Station). Three underground storage tracks would be constructed west of the 125th Street Terminal, beyond the station platforms and extending to approximately Fifth Avenue (see Figure 2-11). (Approximately 300 feet of these tracks would be needed in any event, so that trains could enter the terminal at speeds that would allow for the operation of 30 trains per hour—the line's design capacity.) Additionally, one train each could be stored on the line at the 125th Street and Hanover Square Stations.
- 129th Street Yard. A new underground storage yard is under consideration beneath Second Avenue north of 125th Street to 129th Street, which would provide for the storage of up to 9 trains overnight depending on the size of the yard (see Figure 2-11). The proposed new yard design would allow for a future extension to the Bronx although some storage capacity would be lost if this option were developed.
- Coney Island Yard. A new above-ground storage yard could be located just to the south of the existing Coney Island Yard complex on a site currently owned by KeySpan (see Figure 2-12). Access to the site would be from the west, just beyond the existing Stillwell Terminal. Trains would diverge from the mainline on the south side of the Coney Island Creek and then cross this creek over a new single-track bridge to access the new storage yard. A new bridge adjacent to the existing four-track bridge structure would be required to limit disruptions to existing operations during construction and to provide a lead track that could be used for relay moves between the new yard and the main line Coney Island complex without disrupting existing operations. A new storage yard in this location would accommodate up to 18 trains. However, most trains stored at this location would have to deadhead (i.e., travel without passengers) to 125th Street.
- 36th-38th Street Yard. As an alternative to a new Coney Island complex, a portion of the existing 36th-38th Street Yard could be renovated to provide a new above-ground storage area (see Figure 2-13). The new storage area would be confined to the far end of the yard, east of Ninth Avenue. It would allow for up to nine Second Avenue Subway trains to be stored on six new tracks constructed within the existing yard's boundaries. In addition, storage tracks could be created in the western portion of the yard, south of the existing loop tracks or within the existing yard, but this would affect current uses of this area. As with the Coney Island site, most trains would deadhead from Brooklyn to 125th Street.

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<sup>1</sup> Of the 28 trains needed for the Second Avenue Subway, 5 would operate overnight and 1 would be in the overhaul shop, leaving 22 that would have to be stored overnight.

### *Maintenance Facilities*

Regular maintenance and inspection of subway cars is undertaken within NYCT maintenance shops. Three new maintenance and inspection tracks would need to be added to the system to meet routine maintenance requirements for the Second Avenue Subway fleet (see Appendix B for more information on the studies done on this topic). Typically the most advantageous location for such maintenance facilities is at one end of the line where the trains are stored. However, because the northern terminal proposed for the Second Avenue Line would be entirely underground north of 125th Street, there is no practical potential to create maintenance facilities there. Similarly, there is no appropriate vacant land available for such purpose in Lower Manhattan at the southern end of the alignment.

Consequently, NYCT sought to identify locations accessible to the Second Avenue Subway trains where the trains could be maintained. The most efficient solution would be to use an existing NYCT maintenance facility that has capacity adequate for the Second Avenue Subway trains, rather than to construct a new maintenance facility. The study conducted identified NYCT's existing Coney Island Yard complex as a suitable location to perform maintenance of the Second Avenue Subway trains. This yard is located at the southern terminus of the new subway's Broadway Line route, in Brooklyn. However, there is currently no spare maintenance capacity at Coney Island Yard. The study then considered methods to make space available at Coney Island Yard for maintenance of the Second Avenue Subway trains. By shifting some trains now served at Coney Island Yard to other NYCT maintenance facilities, that space can be created at Coney Island.

Trains maintained at Coney Island Yard are generally at the southern terminus of their route. Maintenance can also occur efficiently at the northern terminus of a train route. The maintenance evaluation concluded that some trains currently served at Coney Island Yard could instead be served at existing NYCT maintenance yards in northern Manhattan or the Bronx. This would require adding capacity to the north at either the 207th Street Yard or the Concourse Yard. The potential impacts of shifting service to both of these locations were evaluated in this SDEIS, but only one of those maintenance yards will ultimately be selected for this use. Selection of the site for an expanded maintenance shop, and a design for the expansion, will be developed during the Preliminary Engineering process.

The Concourse Yard in the Bronx and 207th Street Yard in northern Manhattan are at or near the end of the **B** Line, which is slated to have its fleet maintained in Coney Island once full Manhattan Bridge service is restored (see Figures 2-14 and 2-15). Shifting the inspection and maintenance of approximately 30 **B** tracks (300 cars) from Coney Island, would free capacity at Coney Island for Second Avenue trains. This would require expansion of the facilities within the existing Concourse Yard or 207th Street Yard.

At Concourse Yard, some tracks would be reconfigured and a new maintenance shop would be created to replace (and double in size) the existing facility. This new facility would be created in the eastern portion of the yard at Concourse Yard in an area now occupied by storage tracks. This shop is scheduled for reconstruction as part of the 2010-2014 Capital Program.

At 207th Street Yard, changes would be made to an existing maintenance shop, to expand its capacity. The 207th Street maintenance shop is a six-track shop that serves 215 cars of the **A** line. This shop is scheduled for reconstruction starting in 2007, and the adjacent overhaul shop is scheduled to be rehabilitated starting in 2003.

## Second Avenue Subway SDEIS

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### *PRELIMINARY PROJECT COSTS*

The estimated cost to construct the full-length Second Avenue Subway and all of its ancillary facilities, including, among other things, tunnels, stations, yards, rolling stock (subway cars), signals, and property acquisitions, is \$12.6 billion in 2002 dollars, or \$16.8 billion in year-of-expenditure dollars. \*