

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, the Supplemental Draft Environmental Impact Statement (SDEIS), dated March 2003, was 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 was selected; that project was described and assessed in the project's SDEIS. Since then, a number of refinements to the proposed alignment have been made as a result of public comments on the SDEIS, further community outreach, and ongoing engineering studies. These refinements are described and assessed in this Final Environmental Impact Statement (FEIS).

In addition to engineering refinements, a plan has now been developed to allow the new Second Avenue Subway to be built and operated incrementally, thereby permitting portions of the project to operate prior to completion of the entire line. Given the project's 8 1/2-mile length, building and operating the new subway service in phases is the fastest way to provide many passengers with new subway service while also relieving some of the severe overcrowding on the Lexington Avenue Line. The following chapter, Chapter 3, "Description of Construction Methods and Activities," explains how these operable segments would be constructed, as well as which portions of the alignment area would be affected during the four construction phases.

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 FEIS. This chapter describes the two alternatives analyzed in detail in this FEIS: the No Build Alternative required for comparative analysis under NEPA and the Second Avenue Subway, or Build Alternative. In addition, this chapter and Appendix B also provide information on the refinements to both the alignment and the plans for necessary ancillary facilities that have been made since publication of the SDEIS as a result of ongoing engineering studies.

B. NO BUILD ALTERNATIVE

The No Build Alternative consists of projects and initiatives to be undertaken or implemented before 2025, the FEIS's analysis year, and assumes a Second Avenue Subway is not implemented. The analysis year for the FEIS has been changed to 2025, rather than the 2020 analysis year used in the SDEIS, to be consistent with the Section 5309 FTA New Starts Annual Update for 2005. (The annual update is required to support the application for federal funding for the project.) In addition, the 2025 analysis year allows MTA NYCT to maintain a 20-year planning horizon.

The No Build Alternative includes projects that have been approved and will be implemented by 2025, 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 continue 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 and service changes as well as normal replacement and network expansion initiatives (the proposed subway system service plan for the No Build Alternative is described in Chapter 5B,

“Subway and Commuter Rail”). 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 FEIS considers the effects of numerous other plans that will be completed by 2025 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 or baseline conditions analyses in this FEIS reflect conditions before the loss of the World Trade Center on September 11, 2001, in areas where quantitative analyses were required, because 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 World Trade Center site and surrounding area will be fully redeveloped well before 2025, 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 71 stations are scheduled to be rehabilitated under construction contracts scheduled to commence during the 2000-2004 Capital Program; 23 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 R** trains.

MANHATTAN BRIDGE CONSTRUCTION

In early 2004, the New York City Department of Transportation (NYCDOT) completed the portion of its two-decade reconstruction of the Manhattan Bridge that affects subway service, which was needed to correct structural deficiencies 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 required subway service diversions since the mid-1980s. The recently completed phase of work on the north-side tracks temporarily severed the connection between Brooklyn and the express tracks on the Sixth Avenue Line. In February 2004 the bridge returned to four-track operation and express service was restored on both the Broadway and Sixth Avenue Lines. Broadway Line express service (**N**) operates from Queens through Manhattan and via the Manhattan Bridge to Brooklyn. **Q** service also uses the Broadway Line's express tracks, providing service between 57th Street in Manhattan and the Brighton Line's local tracks in Brooklyn via the Manhattan Bridge. Broadway Line local service, which does not cross the Manhattan Bridge, is provided by **R** **W** trains. **R** trains continue their current routes between Forest Hills, Queens and Bay Ridge, Brooklyn. **W** trains operate between Astoria, Queens, and Whitehall Street in Lower Manhattan. **B** **D** service on the Sixth Avenue Line express tracks has been restored, allowing trains to operate between the Bronx and Brooklyn.

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.

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.

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 2025. 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 2025, 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 have been replaced, primarily with new cars featuring such communications technologies 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 2025.

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 2025. Also, aside from car replacement, NYCT is currently expanding its B Division fleet by approximately 362 more cars by 2025.

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 pending redevelopment of the site. In addition, plans are being developed for the redevelopment of the World Trade Center site and of the adjacent area in Lower Manhattan. For more information on projects planned for Lower Manhattan, see Chapter 6, "Social Conditions," and Appendix B. 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 60-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 following the MIS/DEIS process, 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:

- 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 generally be able to accommodate up to 30 trains per hour in each peak direction.
- 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.
- Enclosed transfer connections should be provided to existing stations and other public transit facilities wherever practicable—in other words, when they can be provided at a reasonable cost and when the expected benefits to passengers outweigh the expected adverse impacts.
- The system should be built so as not to preclude and where possible, accommodate 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, including the National Fire Protection Association (NFPA); all applicable codes; and with the ADA.
- All new facilities should respond to sustainable/green design criteria.

The planned 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 remain 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 a three-track terminal at its northern end and a two-track terminal at its southern end, 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 extensions 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.

Generally, 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 2-1). 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

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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 the SDEIS phase of project planning. 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 FEIS, environmental, economic, community, and engineering concerns were considered in developing the selected alternative.

SUMMARY OF PROJECT REFINEMENTS SINCE PUBLICATION OF THE SDEIS

Following is an overview of refinements to the project made as a result of ongoing engineering studies undertaken since publication of the SDEIS. These refinements are described in more detail below and in Appendix B.

Project Refinements: Track Depth and Location

To minimize the amount of surface disruption that would occur from "cut-and-cover construction" (see Chapter 3, "Description of Construction Methods and Activities," for a definition) and to minimize the potential for impacts to existing in-ground utilities, the alignment has been adjusted to be deeper in certain locations. Such deepening is most notable at the 125th and 42nd Street Stations, in the area from 23rd Street to Houston Street, and at the Seaport Station.

In addition, the number of locations where a third track would be necessary has been reduced in order to avoid tunneling beneath buildings to the degree possible. Locations previously identified as having more than two tracks that have now been eliminated from such consideration include:

- Second Avenue between 129th and 120th Streets;
- Second Avenue between 42nd Street and 34th Street; and
- Water Street between Pine Street and approximately Coenties Slip.

Locations where a third or fourth track would still be required are identified later in this chapter under the section entitled, "Second Avenue Subway: Tunnel Alignment."

Project Refinements: Adjustment to the "Curve" at 125th Street and Second Avenue

In the vicinity of 125th Street and Second Avenue where the alignment needs to make a sharp curve, partly below private property, numerous engineering alignments were explored to minimize the number of properties that would be affected. These alternatives are described in Appendix B. NYCT has selected the alignment that would result in the fewest impacts to private and public properties. Unlike the alignment assessed in the SDEIS, this refined alignment would no longer affect the historic library on 125th Street, and it would only travel beneath a small corner of Triboro Plaza. This alignment is described in more detail below and shown in Figure 2-3.

Project Refinements: Selection of a Modified “Deep Chrystie Option” for the Alignment South of Houston Street

Three options for the area between Houston Street and Canal Street were analyzed in the SDEIS—the Shallow Chrystie, Deep Chrystie, and Forsyth Street Options (see Appendix B). 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 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 D. 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 originally considered for the area south of Houston Street would modify the existing Grand Street Station differently.

As a result of information gained through the analyses included in the SDEIS, the Shallow Chrystie Option is no longer under consideration, as it would have resulted in more significant adverse impacts during construction than the other two options. As is described throughout the SDEIS, the Shallow Chrystie Option would have: 1) resulted in more displacement of residential and commercial uses, 2) required more underpinning of adjacent properties, 3) caused more encroachment into and greater impacts to Sara D. Roosevelt Park, 4) generated more dust and noise because cut-and-cover construction would have been required along a longer segment of the proposed alignment, and 5) potentially affected possible burial remains at five former cemeteries. Although no longer under consideration, the Shallow Chrystie Option was nevertheless discussed throughout the SDEIS for comparative purposes.

Since completing the SDEIS, a decision has also been made to eliminate the Forsyth Street Option from further consideration. As described in more detail in Chapter 5B, “Subways and Commuter Rail,” the existing Grand Street Station beneath Chrystie Street on the **B D** service requires reconstruction in any case in order to accommodate the high volume of transfers that would occur once the Second Avenue Subway Line commences operation. This would mean creating significant construction disturbance along Chrystie Street under any circumstance. With the Forsyth Street Option, the area of construction disturbance would be larger than with the Deep Chrystie Option because it would be necessary to disturb portions of Forsyth Street as well as Chrystie Street. In addition, with the Deep Chrystie Option, the projected transfer volumes between the new Second Avenue Subway service and the existing **B D** service would be nearly double the amount that would occur with the Forsyth Street Option. For these reasons, the Forsyth Street Option has now been eliminated.

For reference, Appendix B provides a summary table comparing the environmental benefits, impacts, and mitigation measures for the Shallow Chrystie, Deep Chrystie, and Forsyth Street Options. Additionally, Appendix B also discusses the numerous options considered in this area before these three options were selected for further study in the SDEIS.

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Following publication of the SDEIS, ongoing engineering work resulted in some modifications to the remaining option, the Deep Chrystie Option. The alignment of this option was shifted slightly in several locations to avoid the need to remove numerous steel piles located in the project route. Thus, only the modified Deep Chrystie Option is reviewed throughout this FEIS. A description of the construction activities required for this option is provided in Chapter 3. In the SDEIS, Second Avenue Subway trains using the Deep Chrystie Option would have traveled south beneath Chrystie Street to the Chatham Square Station, and would be beneath rather than beside the existing B D lines. In the modified Deep Chrystie Option, the alignment would run east of Chrystie Street under a portion of Sara D. Roosevelt Park between East Houston Street and Delancey Street, to avoid a large number of steel piles and other obstructions associated with existing subway tunnels in this area. Avoiding these obstructions would allow the project to use a TBM to construct much of the alignment in this area and, in so doing, reduce the amount of surface disruption. (Since there is no way to completely avoid these existing piles, some piles would still need to be removed. Until the area where the piles are located is excavated, the project will not be able to determine the exact depth and location of these piles. For more information on construction in this area, see Chapter 3.) The refined alignment is discussed below in the description of the project under “Second Avenue Subway: Tunnel Alignment.”

The effects of shifting the alignment beneath a larger portion of Sara D. Roosevelt Park are comparable to those that would have occurred with the Forsyth Street Option assessed in the SDEIS, except that the current Deep Chrystie Option would not create construction impacts on Forsyth Street itself because the alignment would shift west back to Chrystie Street before the Grand Street Station. Near the Manhattan Bridge approach area, further engineering studies have revealed the presence of dozens of sheetpile structures in this area associated with the Second Avenue Subway structure built near the Manhattan Bridge approach in the 1970s. In some cases, these steel structures reach a depth of approximately 150 feet. To maximize the possibility of avoiding them, it would again be necessary to shift the alignment somewhat from that described in the SDEIS. In this case, the alignment would shift to the west, under the Bowery, so that it would now pass beneath five properties at the corner of Canal Street.

South of the Chatham Square Station, the alignment would continue beneath a ramp constructed during the 1960s that provides access to the Brooklyn Bridge. This ramp is supported by four pile caps, each of which is supported by numerous piles, so another small alignment shift would again be necessary. By moving the tunnels somewhat to the east beneath private property, the project can avoid two of these pile caps and still not affect any buildings. The remaining two pile caps would need to be relocated and the piles removed in advance of tunnel construction. The construction methods to be used in this area are described in Chapter 3.

Overall, with the refinements described above, the alignment south of Houston Street would allow the use of tunnel boring technology rather than cut-and-cover construction, reducing the impacts to existing subway service and the surrounding community.

Project Refinements: Station Design, Entrances, Ventilation Facilities, and Air Temperature Management

Substantial architectural work on station design, including the location and number of proposed entrances, has also occurred since publication of the SDEIS. This information is presented in more detail in the “Stations” section below (including Table 2-1) and in Chapter 8, “Displacement and Relocation.” In addition, the location of several stations has shifted slightly in several instances as described in Table 2-1. There are several reasons for these adjustments, including to

minimize impacts to historic properties (as is the case at the 14th Street Station), to provide transfer connections to other lines most efficiently, or to avoid various underground obstructions.

As described in the SDEIS, approximately three to eight properties would need to be wholly or partially acquired at each station area to accommodate subway entrances, and venting and cooling equipment. Many of these locations have now been identified and are presented in Chapter 8. The text below summarizes the engineering and operational requirements with respect to locating such facilities.

Project Refinements: Storage Yards

Since completing the SDEIS, NYCT and its project engineers have also conducted additional studies of potential storage yards. These studies have considered such factors as operational needs and cost, construction cost, amount of construction disturbance, and environmental impacts during both construction and operation. As a result of these efforts, a number of changes have been made to the original plans for train storage. The proposed facilities are described in more detail later in this chapter. The changes made include:

- Eliminating the proposed expansion to the Coney Island Yard onto an adjacent property owned by Keyspan. Even though this option offers the least expensive initial capital cost alternative, the annual operational costs would be significantly greater than those for the other options because of the distance required to bring trains to and from Brooklyn. In addition, this yard option would adversely affect an existing wetland. Operationally, this option would also pose substantially greater risks to providing dependable service on the Second Avenue Subway Line, again because of the need for trains to travel considerable distances through Brooklyn before reaching the new Second Avenue Line.
- 125th Street Tail Tracks. The number of underground storage tracks that would be constructed west of the 125th Street terminal has been reduced from three tracks to two tracks. These tracks would be located entirely beneath the 125th Street streetbed, so the impacts to private property would be reduced. These tracks would now extend to approximately 525 feet west of Fifth Avenue, rather than ending at Fifth Avenue. To minimize surface disruption, the tracks would be constructed using a Tunnel Boring Machine (TBM) instead of the cut-and-cover construction envisioned in the SDEIS (for more information on construction, see Chapter 3). Four trains could be accommodated at this location.
- 129th Street Storage Tracks. While a new underground storage yard is still under consideration beneath Second Avenue north of 125th Street to 129th Street, current plans call for it to be narrowed significantly, so that it would remain entirely beneath Second Avenue. Importantly, with this refinement, Crack is Wack Playground would no longer be directly affected by construction activities, and impacts to traffic and private properties north of 125th Street would also be reduced by the reduction in the amount of cut-and-cover construction. This option would provide for the storage of four trains on two tracks, instead of the nine tracks initially proposed in the SDEIS. It is possible that this yard would not be required at all if the other options described in this section are selected.
- New Midline Storage Tracks between approximately 21st and 9th Streets. The various storage yards studies have demonstrated that storing trains on or adjacent to the Second Avenue Line is desirable both in terms of service reliability and lower operational costs. Moreover, as noted by many of the commenters at the public hearings on the SDEIS,

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provision of more than two tracks where possible would accommodate trains that break down or otherwise need to go out of service. Accordingly, the project's engineers have sought to identify locations where such tracks could be constructed with the fewest environmental impacts. Examination of the alignment in the vicinity of 23rd to 9th Streets has demonstrated that the rock profile (depth) in this area is sufficient to allow two additional underground tracks to be constructed adjacent to the east and west sides of the main alignment to provide for storage of up to eight trains. These tracks could be constructed with TBMs and would not require any surface disturbances. (Facilities required for egress and ventilation would be incorporated into those needed for the 23rd and 14th Street Stations.) Therefore, they would result in storage of more trains with fewer construction impacts than the current configuration of the 129th Street storage tracks.

- Hanover Tail Tracks. For the same reason described above—building storage tracks immediately adjacent to the Second Avenue Subway Line is operationally less costly and provides for more dependable service—NYCT has explored creating “tail tracks” south of the new Hanover Square Station. Up to four trains could be stored on such underground tracks. Based on current conceptual designs, a vent structure would likely need to be located at a traffic island located on Water Street at Whitehall Street near an existing city park (Peter Minuit Plaza).

SECOND AVENUE SUBWAY: SUBWAY 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 or fourth track would allow trains to reverse direction, move in or out of service under certain operating conditions, or be stored along the alignment. The locations where more than two tracks are planned are as follows (see Figures 2-4 and 2-5):

- 125th Street from just west of Park Avenue to just east of Third Avenue (to accommodate a three-track terminal—needed to handle the planned 30 trains per hour—at the 125th Street Station);
- Second Avenue at approximately 121st Street (to allow for a future extension to the Bronx or the 129th Street underground storage tracks);
- Second Avenue in the vicinity of the 72nd Street Station. This would accommodate a three-track station and the transition to the existing Broadway Line, which would allow for a smooth merge between the two services (Second Avenue and Broadway) and permit turning back some Broadway services under special operating conditions, such as the closure of the Manhattan Bridge tracks, which result in additional trains on the Broadway Line;
- Second Avenue between approximately 62nd Street and 56th Street (to allow access for Second Avenue Subway trains onto the 63rd Street Line); and
- Second Avenue between 21st Street and approximately 9th Street (to accommodate underground train storage tracks).

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), 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 over 100 feet below the street. (Figure 3-19 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, which permit trains to pull into the station at sufficient speeds to allow the operation of 30 trains per hour, and allow for train storage during off-peak hours, would be located underground to the west of the new 125th Street Station to approximately 525 feet west of Fifth Avenue, instead of at Fifth Avenue as described in the SDEIS. Moving east along 125th Street, the new subway would transition to Second Avenue via a curve between 125th and 121st Streets. This curve would pass deep beneath 10 low-rise residential buildings generally on the southwest corner of Second Avenue and 125th Street. As described above, this is fewer than any of the other alignment options considered for this area. Once on Second Avenue, the alignment would pass well beneath Triboro Plaza, a public park, avoiding above-ground disturbance to this resource, unlike the project assessed in the SDEIS. To avoid additional property impacts, it would swerve east between approximately 124th Street and approximately 122nd Street. In this area, the alignment would be beneath a portion of the Robert Wagner Houses property, a public housing complex owned by the New York City Housing Authority (NYCHA). The tracks would not pass beneath any of the buildings on this site. This “swerve” is needed in order to allow trains to safely negotiate the transition from 125th Street to Second Avenue at the desired operating speed. It also reduces construction impacts to private property from the curve analyzed in the SDEIS.

Once at 122nd Street, 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. However, as described above, exceptions would be made in several locations—most notably, the area between approximately 21st and 9th Streets where the new storage tunnels would be built.

Houston Street to Hanover Square

South of Houston Street, the alignment would curve east to pass under a portion of Sara D. Roosevelt Park between East Houston Street and Delancey Street. At Delancey Street, the tunnel would return to Chrystie Street, where it would run beneath the existing **B D** subway lines in a new lower level at the existing Grand Street Station (see Figure 2-6).

Continuing south, the alignment would curve slightly to the west, passing beneath five private properties near Canal Street (as described above, this curve is necessary to avoid sheetpile structures near the existing Second Avenue Subway structure that was constructed in the 1970s in this area). The route would continue beneath the Bowery to the Chatham Square Station. The existing Second Avenue Subway tunnel segment built in the 1970s would be used for ancillary facilities as discussed later in this chapter.

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South of the Chatham Square Station, the alignment would continue south under St. James Place, following that street below the Brooklyn Bridge and its ramps. From the Brooklyn Bridge, the tunnel would follow Pearl Street and then Water Street to a terminus near Hanover Square.

The alignment south of Houston Street would range in depth from approximately 80 feet at the Houston Street Station to over 100 feet at the Hanover Square Station. This is somewhat deeper than the alignment described in the SDEIS. At the Grand Street Station, passengers would transfer between the Second Avenue Subway and existing **B** **D** service by stairs, escalators, or elevators.

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 and on lines serving Queens to prevent service disruptions on multiple lines due to malfunctioning trains, though no additional service beyond that addressed in this FEIS 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 substantially 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 West Side of Manhattan, 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 at approximately 121st Street as part of the curve from Second Avenue to 125th Street. (This bellmouth, which has shifted four blocks south from the location identified in the SDEIS to minimize property impacts in this vicinity, would not be needed if the 129th Street Storage tracks were to be constructed, since the storage tracks themselves would function as a portion of the extension to the Bronx.) An extension of Second Avenue Subway service west along 125th Street would also be feasible in the future. In the

south, by constructing the Hanover Square Station south of Wall Street at approximately 110 feet below street level, the elevation would be deep enough to allow for the potential extension of Second Avenue Subway service to Brooklyn, and is approximately 15 feet deeper than the station depth identified in the SDEIS.

SECOND AVENUE SUBWAY: 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.

Stations would range from approximately 800 to 1,400 feet long to accommodate the station platform itself, which would typically be approximately 615 feet (2½ city blocks) long, and a variety of ancillary spaces, such as ventilation ducts and power substations. In the project assessed in the SDEIS, the maximum length of a station box was approximately 1,000 feet long. The decision to lengthen some station boxes was made during the ongoing engineering process as a means of accommodating some of the required ancillary facilities in certain circumstances.

The northernmost station on both the Second Avenue and Broadway services would be on 125th Street generally 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 intermodal transfer connection to Metro-North's Harlem-125th Street Station (see Figure 2-7 for an illustration of this complex station). The entrances on Lexington Avenue would be combined with the existing 125th Street Lexington Avenue entrances for the 4 5 6 trains.

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.

**Table 2-1
New or Expanded Subway Stations**

Station	Location	Type	Transfer Routes ¹	Preliminary Entrance Locations ²	Approximate Station Depth ³
SECOND AVENUE LINE					
125 St	125th St/Park to east of Lexington Av	3 track	4 5 6 Metro-North	125th St/Park Av at Metro-North Station; expanded or existing Lexington Av entrances	100 ft
116 St	Second Avenue/north of 118th to north of 115th St	2 track		Northeast corner of Second Ave/116th St and southeast corner of 118th St	40 ft
106 St	Second Avenue/108th to 105th St	2 track		Second Av/southeast corner of 108th St and northeast corner of 106th St	40 ft
96 St	Second Av/96th to south of 94th St	2 track		Second Av/southwest corner of 96th St and northeast and southwest corners of 94th St	40-45 ft
86 St	Second Av/87th to south of 82nd St	2 track		Second Av/northeast and southeast corners of 86th St and eastern side of Second Av between 83rd and 84th Sts	85 ft
72 St	Second Av/72nd to 69th St	3 track	Bway/ Second Av Lines	Second Av/northeast and northwest corners of 72nd St; and northeast corner of 69th St	85 ft
55 St	Second Av/56th to 52nd St	2 track	E V	Second Av/southeast and southwest corners of 55th St; eastern side between 53rd and 52nd Sts; and southwest corner of 53rd St	50-60 ft
42 St	Second Av/north of 44th to south of 41st St	2 track	7	Second Av/ northeast and southwest corners of 44th St; northwest corner of 42nd St; and southeast corner of 41st St	90-100 ft
34 St	Second Av/35th to 31st St	2 track		Second Av/southwest corner of 34th St; and midblock between 34th/33rd Sts on east side of Second Av	50 ft
23 St	Second Av/north of 26th to 22nd St	2 track		Second Av/southeast corner of 26th St and Second Av/northwest corner of 23rd St and Second Av/midblock between 23rd and 22nd Sts on east	95-100 ft
14 St	Second Av/15th to 11th St	2 track	L	Second Av/northwest and southeast corners of 14th St and Second Av/northeast corner of 12th St	105 ft
Houston St	North of 3rd St to Second Avenue/Houston St	2 track	F V	Second Av/northeast corner of 3rd St; and northwest and southwest (existing) sides of Houston St at Second Av	80 ft
Grand St	Chrystie St/Delancey St to Hester St	2 track	B D	North and south sides of Grand St between Forsyth and Chrystie Sts	70 ft
Chatham Sq	Chatham Square/Pell to Madison St.	2 track		Chatham Square—midblock on west side of the Bowery between Mott and Doyer and east side of Bowery at East Broadway	65 ft
Seaport	Pearl St/Dover St to Fulton St	2 track		Water St/northeast and northwest corners of Fulton St	80 ft
Hanover Sq	Water St/north of Pine St to Coenties Slip	2 track		Wall St/northwest and northeast corners of Water St; Water St/southeast corner of Old Slip; and Water St/southwest corner of Coenties Slip	110 ft
63RD STREET LINE					
Lexington Av	63rd Street/Lexington to Third Av	4 track ⁴	F	Existing: Lexington Av/ 63rd St.; New: Third Av/63rd St. (northwest, southeast, and possible northeast corners)	105/135 ft
Notes:					
¹ Transfer routes are under evaluation.					
² Preliminary entrance locations have shifted since the SDEIS as a result of ongoing engineering studies, and are still subject to change in both number and location. More information on the specific properties currently contemplated as entrances is provided in Chapter 8.					
³ Depth is shown to base of rails and is subject to change.					
⁴ All four tracks exist today; only two are in passenger service.					

Continuing on Second Avenue south of 63rd Street, stations would be located at 55th Street,¹ 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). A free transfer to the existing **B****D** service would be provided at the Grand Street Station.

Aside from the transfers discussed above at 125th Street and Grand Street, enclosed transfers are likely at the following locations:

- To the **L** service at 14th Street (Third Avenue Station); and
- To the **F****V** service at Houston Street (Lower East Side-Second Avenue Station).

Other enclosed transfers still under consideration include transfers to the **E****V** service at 53rd Street (Lexington Avenue-53rd Street Station), and to the **4****5****6****7** and **S** services at 42nd Street (42nd Street-Grand Central Station). In both of these cases, the construction costs and disruption to existing subway lines would be considerably greater than with the other possible transfers.

In all cases, 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 (where the project would add new entrances at the station's east end at Third Avenue), 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 also 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 (**N****R****Q****W**), 42nd Street-Times Square (**1****2****3****9****A****C****E****S****7****N****R****Q****W**), 34th Street-Herald Square (**B****D****F****V****N****R****Q****W** and PATH), 14th Street-Union Square (**4****5****6****N****R****Q****W****L**), and Canal Street (**J****M****Z****6****N****R****Q****W**).

Station Design

Detailed designs for stations along the Second Avenue Subway will continue to be developed during Preliminary Engineering and Final Design. However, the basic concepts for each station have been developed and are shown in the conceptual drawings provided in Figure 2-8. 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, and stations will also be designed to meet NFPA industry guidelines. Entrances to the new Second Avenue Subway stations would consist of a combination of elevators, escalators, and stairs, with every station served by at least one elevator. In addition, each entrance would be covered; this could consist of locating the entrance in the interior of a building or beneath a canopy. The features of the new stations would vary,

¹ In the SDEIS, the 55th Street Station was referred to as the 57th Street Station because an entrance was planned at 57th Street, but further studies have determined that this would not be practicable.

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 and 72nd Street would have two platforms, because they would have three tracks rather than two. Now that the Hanover Square Station would have only two tracks, this station would only have one platform, as opposed to the two platforms considered throughout the SDEIS.

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. The 125th Street Station in particular would be large, with upper, lower, and ancillary mezzanine levels required to connect to the Lexington Avenue 4 5 6 service and Metro-North's Harlem-125th Street Station. As shown in Table 2-1, most stations would have street entrances at two or more distinct intersections—one on the major cross street for which the station is named, and others located 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.)

The specific locations of station entrances are currently under consideration. As described in Chapter 4, since completing the SDEIS, NYCT has been meeting with the various Community Boards located along the alignment to discuss the possible entrance locations at each station. Entrance locations are influenced by a number of factors, including:

- Anticipated passenger demand—for each planned entrance location, using results of the ridership model (discussed in Chapter 5A, “Ridership Modeling”), NYCT has identified the percentage of riders that would arrive at each corner of the intersection, and has tried to locate entrances in locations where the ridership demand would be highest;
- Locations of bus transfers—in cases where crosstown or other bus stops would be located near the station, NYCT has sought to locate station entrances to provide for easiest transfers between the bus line and the new subway line;
- Geographic distribution—to expand the geographic reach of many stations, particularly those with the highest anticipated passenger demand, where practicable NYCT has sought to site entrances at each end of the station to minimize the distance that passengers coming from each end of those stations would have to walk; and
- Minimizing the extent of environmental impacts including displacement—given the density of the Second Avenue Subway alignment, at every station it will be necessary to construct entrances and associated ancillary facilities (described below) in some locations within existing occupied buildings. Sensitive uses, such as hospitals, schools, and religious institutions line the alignment, as do parks, historic structures, and residences. As described in Chapter 8, NYCT and its engineers have sought to minimize the extent of such disruption by locating entrances with these considerations in mind.

Several options are under consideration for the stations’ street entrance configurations. Depending on the station, entrances would typically be located within buildings or in a plaza (see Figure 2-9). To conform with ADA regulations, building codes, and NFPA safety guidance, all stations would be accessible by escalators, elevators, and stairs. Escalators and elevators require more space than stairs, and also require that station entrances be covered for weather protection. For these reasons, the new subway system’s entrances would larger than the entrance stairs to NYCT’s existing, older subway lines, and would not fit within the city sidewalks without causing substantial obstruction.

Therefore, most stations would have either an off-street entrance (see Figure 2-9), or open air entrances in wide plaza areas of the sidewalk (see Figure 2-9). Access to the new subway would be provided via stairs, elevators, or escalators located within existing buildings or within the building line in new structures.

In certain locations where space and traffic levels permit, entrances could include locations where the sidewalk is widened into the parking lane (called a sidewalk “bump out”). Bump outs would create enough sidewalk space to allow entrances that would be wide enough to accommodate escalators and stairs needed to access the new stations. Bump outs would be located so as not to affect bus lanes. Bump outs would typically be no greater in width than one parking lane (about 8 feet) and might include an escalator, elevator, or stairs. Sidewalk entrances are not proposed unless they can be accommodated in a plaza or bump out setting, or already exist as part of an existing subway station into which the new Second Avenue Subway would connect.

All stations would comply with ADA regulations. Each station would have an elevator 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 tactile 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.

Easements and Property Acquisitions for Stations

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);
- 1040 Second Avenue (southwest corner of Second Avenue and 55th Street, Block 1328, Lot 21);
- 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).

NYCT is endeavoring to use its existing easements to the degree possible; however, in certain cases, the easements may not be in the desired locations or of an appropriate size. Final decisions about which easements to use will be made during continuing engineering.

Generally, three to eight easements or property acquisitions (but up to 11 properties at a few locations) would likely be needed at every station for entrances and other station facilities. In some cases, this will necessitate acquisition of private property. In some cases, only a partial acquisition of property would be required. In all cases, if property acquisition is required, compensation would be provided. See Chapter 8 (“Displacement and Relocation”) for more information on potential property impacts and compensation requirements. A preliminary list of the specific properties (and their current uses) that are currently identified as potential entrances or ancillary facilities is also provided in Chapter 8. As described in that chapter, all of these locations are preliminary and subject to change as engineering progresses. If they were to change, additional and/or different properties within the same vicinity would be required with similar environmental impacts as those identified throughout this FEIS.

Subsurface easements will also be needed at some stations and at various places along the alignment where construction would occur beneath existing buildings—for example, at the 125th Street curve, the 63rd Street connectors, and the proposed midline storage tracks. In those cases, these easements would only be needed temporarily during construction. In other cases, subsurface easements would be permanent. Chapter 8 provides more information on subsurface easements of both types.

SECOND AVENUE SUBWAY: ANCILLARY FACILITIES

In addition to tracks and stations, the new subway line would also require 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 above street-level and within a given distance of the alignment. When possible, the project would share the use of existing transit facilities, such as NYCT’s Subway Control Center.

Ventilation, Station Cooling, and Emergency Exits

As part of the engineering work for the project, studies are underway as to how to provide ventilation, climate control, and emergency egress for the new stations and tunnels of the Second Avenue Subway. Where practicable, these three functions would be housed in shared structures. As a result of ongoing engineering studies, substantially more information on these functions is provided below than was included in the SDEIS.

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All stations would have ventilation systems to refresh air in the station, train area (both under the platform and over the tracks), and tunnel. The ventilation systems would require areas above street level above the station for intake and exhaust.

NYCT has adopted a project-wide policy to require all vent structures to be located at least 10 feet above ground level. Among the reasons for this decision are: compliance with current state codes requires intakes and exhausts away from street level and prohibits venting onto sidewalks; removal of sidewalk vent gratings (see Figure 2-10), which affect the pedestrian capacity of the sidewalks; minimization of security risks for the stations; and alleviation of problems associated with floodwater at flood-prone locations. Moreover, because of the depth of the new tunnels and stations, in many locations sidewalk grates alone would not be effective in venting the new subway system. As a result, new off-street, above-ground ventilation structures would be created at each of the Second Avenue Subway's new stations. This would require acquisition of private property. As described above, typically eight easements or property acquisitions would likely be needed at every station to accommodate the various entrances, vent structures, and other ancillary facilities.

There are a number of dimensional and siting requirements for ancillary facilities. For example, the station vent facilities must be located close to each end of each station to efficiently connect to the ancillary vent rooms located there and to be effective in providing ventilation for both the tunnels and stations. Two different shafts must be placed at each end of the station for station ventilation (one for intake and the other to exhaust), and two separate shafts must also be provided at each end of the station to provide emergency ventilation for the two subway tunnels. These requirements were used in developing preliminary plans for ancillary structures at each of the new stations along the alignment. At each station, designs must be customized to account for existing buildings along the alignment, the specific station design proposed at that location, tunnel depth, geological conditions, and constructability.

At each station, new above-ground structures are proposed to house the tunnel and station ventilation functions, including fresh air intake, exhaust, emergency smoke exhaust, and relief of air pressure build-up caused by the movement of trains (the "piston" effect). Most ventilation structures would also provide emergency egress from the station below. In some locations, cooling equipment can also be housed within the same building, with a cooling tower on the roof. In other locations, the ventilation structure can be combined not only with cooling equipment, but also with a new entrance with escalators, and elevator, and emergency stairs to the station below.

The new ventilation structures would typically be approximately the same size as a typical rowhouse—25 feet wide, 75 feet deep, and four to five stories high, although some may be wider. Ventilation structures that also incorporate station entrances would have to be wider (approximately 40 feet wide) and would typically be located on a corner lot. In some cases, depending on the types of properties within a given station area, it may be possible to construct buildings in a way that would allow retail or similar uses to occur on the ground floor with the various subway uses above.

Ventilation facilities and emergency egress stairs are being planned for locations off the sidewalk in neighborhood buildings or plazas that can be integrated into the community character (see Figure 2-10 for examples of such existing ancillary buildings in New York City). They would be designed to blend into the urban fabric; for example, they could be designed to appear like a neighborhood row house in height, scale, materials, and colors (see Figure 2-11). In some locations, the existing building facade may be preserved while the interior of the building

is reconstructed to serve its intended use. Exhaust gratings and louvers would primarily be through the roof to minimize the amount of surface area needed at street level, while fresh air intake will occur through louvers located toward the rear yard. This location for the intake louvers is expected to improve air quality within each station (because the rear yards are farther removed from vehicular traffic than at the street frontage) while also eliminating visibility from the street and providing for greater security than sidewalk vents.

To provide venting to serve the connection to the Broadway Line, improvements would have to be made to the existing 63rd Street MTA vent tower located approximately 100 feet east of Second Avenue on the southeast corner of East 63rd Street. Constructed in 1988, this existing building provides emergency ventilation for the eastbound and westbound tracks routed under 63rd Street. Current project plans call for the Second Avenue Subway tunnels to be routed above the existing subway tunnels running between the Lexington Avenue and Roosevelt Island Stations on the **F** service.

The location of the existing NYCT fan plant within the existing 63rd Street vent tower is ideally suited to service the new Second Avenue Subway line, as well as the existing **F** service, in an emergency situation. The large capacity of the existing fan plant (600,000 cubic feet per minute) would be used to pressurize various tunnels and help direct air flow and minimize the fan capacity required in the new 72nd and 55th Street Stations in the event of emergencies. To provide satisfactory operation for all operating scenarios, two new ventilation shafts would be created within a mined tunnel structure and routed underground from the existing MTA vent tower to connect to the midpoint of the proposed northbound and southbound Second Avenue Subway tunnels between the 72nd Street and 55th Street Stations.

An emergency egress corridor would also be incorporated into the mined tunnel structure to allow passengers to be evacuated from the Second Avenue Subway tunnels in an emergency. A common egress corridor would be routed over the northbound Second Avenue Subway tunnel to the 63rd Street MTA vent tower, where it would connect into the existing emergency stairs. A refuge area for disabled passengers would be created between the two Second Avenue Subway tunnels.

All stations would have an air-tempering system, designed to lower station temperatures on hot days. Current plans call for cooling towers to be located on the roofs of buildings; these would be hidden from view by privacy screens. The exhausts and intakes would be designed to have state-of-the-art noise attenuation devices and are planned to be located at least 10 feet away from any neighboring building windows or entrances both to meet code requirements and to minimize any potential adverse impacts to the neighborhood from noise. To provide for such station air tempering, a cooling tower or air-cooled condenser and screen having a footprint of approximately 16 feet by 14 feet would need to be located at each end of the station. Each unit would also require a piped connection to and from the station plant room (total two pipes), which is currently estimated to be approximately 18 inches external diameter for each pipe. The project's intent is to combine ventilation requirements with other station functions, where practicable, to minimize the need for acquisition of property.

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 within the station area. Each new substation would be fed with dual Con Edison service and would contain electrical equipment, fire detection and alarm

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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. Where possible, the low points would be located midway between stations. (This allows trains to take advantage of gravity to gain speed when leaving stations and slow down when entering.) 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.

SECOND AVENUE SUBWAY: 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.)

SECOND AVENUE SUBWAY: 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 28 trains per hour in the peak hour in the peak direction, would require the operation of approximately 33 new B Division train sets, including spares. The number of trains that would be used on the Second Avenue Subway line has increased since the SDEIS was published.

SECOND AVENUE SUBWAY: SERVICE PLAN SUMMARY

The Second Avenue Subway would operate 24 hours per day, seven days per week. Upon completion of the entire alignment, new service would run between 125th Street in East Harlem and Hanover Square in Lower Manhattan, via Second Avenue. New service would also run between 125th Street and the Brooklyn via the Broadway Line (with transfers to Lower Manhattan via the Broadway Line local service). By 2025, subways would run at about 2-minute intervals during peak hours north of 63rd Street and at about 4½-minute intervals on the Broadway and Second Avenue Lines south of 63rd Street. More information on frequency, connections to the rest of the subway system, and ridership is provided in Chapter 5B of this FEIS.

Overall, it is anticipated that the total construction duration for the 8½-mile subway project will be approximately 16 years. As explained above, rather than wait for completion of the entire project before beginning any passenger service, the project has been planned to allow it to be sequenced in a manner that would permit portions of the new subway line to become operational before the entire line is complete. Please see Chapter 3 for information on how and when the various lengths of the alignment would be constructed, and for background information on the other alternatives considered for building the alignment in phases before the option described below was selected.

SECOND AVENUE SUBWAY: 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 25 10-car trains¹. This is an increase of three from the project described in the SDEIS. 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, B Division train storage facilities are being considered at several locations (see Figure 2-12 and Figures 2-13 through 2-16). Since a few trains could also be stored on existing tracks at night, 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). Two underground storage tracks would be constructed west of the 125th Street Terminal, beyond the station platforms and extending to approximately 525 feet west of Fifth Avenue (see Figure 2-13). (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 capacity².) These tracks could provide storage for up to four trains. No additional vent structures would be needed beyond those required for the 125th Street Station. Additionally, one train each could be stored on the line at the 125 Street and 72nd Street Stations.
- 129th Street Storage Tracks. Underground storage tracks are under consideration beneath Second Avenue north of 125th Street to 129th Street, which would provide for the storage of up to four trains on two tracks overnight (see Figure 2-13). The proposed storage tracks would be designed and constructed to allow for a future extension to the Bronx. A ventilation/emergency egress structure measuring approximately 70 feet by 25 feet and a minimum of 10 feet high would also need to be constructed in an easement near 127th

¹ Of the 33 trains needed for the Second Avenue Subway, five would operate overnight between 125th Street and Hanover Square and one would be in the overhaul shop. Two would be stored on the Broadway Line north of 57th Street during late night periods under some conditions. This leaves 25 trains that would have to be stored overnight.

² The Hanover Square Station would be designed to be able to turn back 26 trains per hour instead of 30 trains per hour. This is because less capacity is needed on the alignment south of 63rd Street, where some of the Second Avenue Subway trains would divert to the Broadway Line.

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Street. It is possible that this yard would not be required at all if the other storage track options described in this section are selected.

- 21st to 9th Street Midline Storage Tracks. As described above, a total of eight trains could be stored between 21st and 9th Streets on two tracks (see Figure 2-14). The tracks would be located deep below ground on both the east and west sides of the alignment, beneath private property. A vent facility for the storage tracks would be provided as part of a larger 23rd Street Station ventilation facility at the south end of the station. Besides the need to enlarge this vent facility, no other surface disturbances would occur except those needed to build the 23rd and 14th Street Stations.
- 36th-38th Street Yard. A portion of the existing 36th-38th Street Yard could be renovated to provide a new above-ground storage area (see Figure 2-15). The new storage area would be confined to the far end of the yard, east of Ninth Avenue. It would allow for up to eight (instead of the nine identified in the SDEIS) Second Avenue Subway trains to be stored on six new tracks constructed within the existing yard's boundaries.

As noted above, since issuing the SDEIS, ongoing engineering studies have resulted in a recommendation that two tail tracks be constructed south of the Hanover Square Station to provide for storage of up to four trains. A portion of these tracks would be constructed to allow for a possible future expansion of the Second Avenue Subway into Brooklyn. The tracks would be deep below ground at a depth of approximately 110 feet along Water Street south to a traffic island located near Peter Minuit Plaza (see Figure 2-16). While the tracks themselves would involve only minimal surface disturbance (see Chapter 3 for a description of the construction method), in order for them to operate, a vent shaft would need to be provided. Any such vent structure would need to contain a 180-square-foot vertical ventilation shaft extending a minimum 10 feet above grade, as well as an exit from an emergency/service stair. The structure would be located in an existing traffic island at the intersection of Water Street and Whitehall Street. The vent structure would be set back from the intersection and be constructed so as not to interfere with pedestrian crosswalks or vehicular traffic. It could potentially be designed as a sculptural element that could enhance the traffic island public space. Any such structure would be subject to the review and approval of the New York City Department of Transportation.

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 NYCT's existing 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 shops in northern Manhattan or the Bronx. This would require adding maintenance 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 FEIS, 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 continuing 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; some of this fleet is being maintained in Coney Island since full Manhattan Bridge service was restored (see Figure 2-17). Shifting the inspection and maintenance of approximately 30 **B** trains (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 (see Figure 2-18), 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: 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 \$13.3 billion in 2004 dollars, or \$16.8 billion in year-of-expenditure dollars. *