

A. INTRODUCTION AND METHODOLOGY

This chapter discusses natural resources¹ (aquatic and terrestrial) along or near the proposed Second Avenue Subway alignment, including sites and resources that could be used temporarily during the subway's construction. Potential effects of construction are evaluated and mitigation is also discussed. Data were collected from field surveys, literature searches, review of published data and inquiries to federal and state agencies that regulate natural resources. Meetings have also been held with the U.S. Army Corps of Engineers (ACOE), the National Marine Fisheries Service (NMFS), and the New York State Department of Environmental Conservation (NYSDEC). For more detailed information, please also see Appendix L, Natural Resources.

**B. REFINEMENTS AFFECTING THE NATURAL RESOURCES
ASSESSMENT IDENTIFIED SINCE COMPLETION OF THE SDEIS**

As described in Chapter 2, "Project Alternatives," the expansion of the Coney Island Yard is no longer contemplated as a potential train storage option for the Second Avenue Subway project. Accordingly, all references to the Coney Island Creek and adjacent areas included in the SDEIS have been removed from this chapter. Similarly, references to the 129th Street barge site and staging area have also been removed, since this site, too, would no longer be used by the project. Accordingly, this chapter now focuses primarily on the proposed Pier 6 barge site.

C. REGULATIONS AND PERMITS

A number of federal and state agencies have jurisdiction over elements of the aquatic and terrestrial environment and are charged with protecting and regulating the use of natural resources. These include, but are not limited to, the U.S. Environmental Protection Agency (EPA), ACOE, the U.S. Fish and Wildlife Service (USFWS), NMFS, NYSDEC, the New York State Department of State (NYS DOS), and the United States Coast Guard (USCG).

The proposed project will comply with all applicable regulations and executive orders concerning protection of natural resources. Regulations pertaining to the natural resources analyses for the Second Avenue Subway include those covering discharges into surface water, floodplains, wetlands, groundwater, ecologically sensitive areas (including designated Essential Fish Habitat areas), and endangered species. In addition, permits for the construction of the proposed Pier 6 barge site would be obtained from the appropriate agencies after issuance of the Record of Decision.

¹ Plant and animal species and any area capable of providing habitat for plant and animal species or capable of functioning to support ecological systems and maintain the city's environmental balance (City Environmental Quality Review Manual, City of New York, 2001).

D. EXISTING CONDITIONS

The vast majority of the area that could be directly or indirectly affected by the Second Avenue Subway consists of paved property where natural resources would not be affected. Consequently, the text below concentrates on those sites where impacts to natural resources could potentially occur—chiefly, unpaved areas (parklands) and the Pier 6 site along the water's edge at the East River (see Figure 15-1).

GEOLOGICAL AND TERRESTRIAL CONDITIONS

The substrate underlying Manhattan consists of three prominent geologic formations: Manhattan Schist, Inwood Marble, and Fordham gneiss, all of which are highly folded, faulted, and metamorphosed rocks. From a natural resources perspective, the entire Second Avenue Subway corridor is located within disturbed, urban areas where either no vegetation or highly invasive species exist. Similarly, the parkland sites that could be affected by subway construction are largely paved spaces where vegetation is generally limited to perimeter trees and ornamental plants. The existing rail yards and maintenance facilities that are proposed for possible reconfiguration as part of the Second Avenue Subway project are industrial sites, where natural conditions have been disturbed and/or altered over many years. Terrestrial and avian wildlife along the corridor, in the parks, and at existing rail yards is generally limited to urban species tolerant of urban conditions.

The NYSDEC Natural Heritage Program Database has no record of endangered, threatened or special concern species at the project sites, though the endangered peregrine falcon and its nests have been observed near the Pier 6 site. NYSDEC has determined that the four protected plant species once found in Queens and Brooklyn are no longer found in these areas. Therefore, no further surveys for these species are required if NYCT were to use its existing 36th-38th Street Yard for train storage.

FLOODPLAINS AND WETLANDS

The following portions of the project are located in the 100-year floodplain: the proposed subway alignment and some storage tracks in East Harlem and Lower Manhattan, the potential staging and barge site at Pier 6 and the southern and eastern portions of the 207th Street Yard.

Under New York State Tidal Wetlands Land Use Regulations (6NYCRR Part 661), NYSDEC is responsible for designating wetlands within New York State. NYSDEC follows a process in designating wetlands, wherein a checklist of criteria characterizing wetlands is used and the area is assessed for the presence of these qualities. While the portion of the East River near Pier 6 was designated as littoral zone (areas shallower than 6 feet at mean low water (MLW) that are not intertidal, and are considered tidal wetlands) under NYSDEC's tidal wetland mapping system, this area was dredged to depths greater than 6 feet at MLW in 2001, so there is likely no littoral zone remaining at this location. Additionally, a continuous functional bulkhead runs along the entire potential construction site, limiting the potential for tidal marsh plants or submerged aquatic vegetation (SAV). Therefore, it is unlikely that Pier 6 meets the criteria for designation as a wetland. However, should sedimentation cause the site to fill in, the site may meet the criteria of a tidal wetland in the future, and the Second Avenue Subway would have the potential to affect this potential resource.

GROUNDWATER AND SURFACE WATER

Groundwater along the project alignment in Manhattan is typically found at approximately 10 to 60 feet below grade. Manhattan's groundwater is not used for potable supply, and non-potable use is limited.

The East River (where Pier 6 is located) is a tidal strait connecting New York Harbor with the western end of Long Island Sound. The lower East River primarily has a hard, rock bottom consisting of gravel, cobble, rocks, and boulders covered with a shallow layer of sediment. Sediment samples collected at the Pier 6 site were primarily silt and clay with some sand. In 2001, fecal coliform concentrations for the lower East River complied with specified best-use classifications for fishing for each month, with periodic increases following rainstorms. The Inner Harbor also shows the least year-to-year chlorophyll *a* variation and lowest summertime average; although, trends have shown a slight increase in chlorophyll *a* concentration in the 1990's. The river has a best use classification of Class I. The area surrounding the project site at Pier 6 on the East River was dredged under emergency conditions in Fall 2001, and approximately 60,000 cubic yards of sediment were removed. The cement bulkhead at the Pier 6 site is generally in good condition. Current velocity is very rapid and can reach 5 knots. Concentrations of heavy metals and methylene chloride have been measured in East River sediments. Results of sampling at Pier 6 indicate that sediment concentrations of contaminants exceed NYSDEC guidance levels (TAGM #4046) for some SVOCs and heavy metals.

AQUATIC BIOTA

The hydrodynamic and estuarine characters of the East River coupled with the heavy industrial discharges that have occurred in this location make the river a harsh environment; therefore, many of the species using it are tolerant of highly variable conditions. Continued water quality improvements in this water will result in improved aquatic habitat.

Phytoplankton are the dominant primary producer in the East River and New York Harbor, to which it is connected. Diatoms (fresh and marine water algae) are generally the dominant group of phytoplankton. Residence times of phytoplankton species within New York Harbor are short and individuals move quickly through the system. While submerged aquatic vegetation (SAV) is not typically found in these water bodies, macroalgae do occur on hard surfaces and sandy or muddy bottoms. Copepods (crustaceans) are the dominant group of zooplankton found in the NY Harbor Estuary system. Over 180 benthic taxa have been identified in the NY Harbor Estuary and over 100 taxa have been identified in the East River, most of which were crustaceans or polychaetes. Macroinvertebrates collected in July 2002 at Pier 6 included pollution tolerant and pollution sensitive organisms. Dominant macroinvertebrates were polychaetes (segmented worms) in the *Capitellidae* and *Spionidae* families.

A mixture of habitats in the East River support marine, estuarine, anadromous, and catadromous fish. Despite the relatively low value of the East River as residential fish habitat, it serves as a major migratory route for certain species from the Hudson River to the Long Island Sound. Winter flounder, scup, bluefish, Atlantic silverside, striped killifish, common killifish, striped bass, tomcod, members of the herring family, and American eel are among the species seasonally present in the East River. Essential Fish Habitat has been identified for 15 species at the Pier 6 site in the East River (although in most of the East River, EFH is designated for 17 species). The EFH assessment prepared for use of Pier 6 location by the Second Avenue Subway is attached as part of Appendix L and provides a more detailed discussion of EFH. Protected species within the New York Harbor Estuary (leatherback, loggerhead, Kemp's ridley, and green

turtles) are not likely to occur within the project sites except as occasional seasonal transient individuals.

E. FUTURE CONDITIONS COMMON TO ALL ALTERNATIVES

No projects that would affect existing natural resources conditions before 2025¹ are proposed along the Second Avenue Subway alignment. However, it is possible that construction could occur adjacent to the Pier 6 waterfront site before 2025. The Mayor's office has announced plans to develop the East River waterfront, including in the vicinity of Pier 6, for a combination of housing, cultural uses, and open space. In addition, the ongoing water quality improvements that are underway throughout the harbor should continue to result in some enhancement for aquatic resources habitat at the East River. This includes a projected citywide reduction in combined sewer overflow (CSO) discharges.

F. CONSTRUCTION IMPACTS OF THE PROJECT ALTERNATIVES

The following discussion considers the potential impacts to natural resources that could occur from construction of the project alternatives.

NO BUILD ALTERNATIVE

Under the No Build Alternative, continued water quality improvements within the project areas should improve aquatic habitat and utilization by aquatic organisms.

SECOND AVENUE SUBWAY

Given the large number of trucks that would be required to remove and bring in material from shaft sites each day (see Chapter 3, "Description of Construction Methods and Activities"), removing spoils from Manhattan by barge was considered as a means of minimizing disruption to the communities at the shaft sites and of reducing the amount of regional construction activity. Chapter 3 describes construction activities that would occur at the proposed barge site at Pier 6 during Phase 4 of the subway's construction.² The proposed barge operation would be temporary but could last throughout the projected 7-year project construction period for this phase (a reduction from the 10 years described in the SDEIS for use of Pier 6). Therefore, the following impact analysis conservatively treats it as a permanent operation.

GEOLOGICAL AND TERRESTRIAL CONDITIONS

Although the amount of bedrock and soil that would be removed during the tunneling processes during all construction phases would be substantial, the underlying geology of Manhattan would not be altered and no adverse impacts would occur.

Given the disturbed, urban environments within which the terrestrial project sites reside, no significant adverse impacts to vegetation and wildlife habitats would occur along the Manhattan alignment. The plants and animals found in these locations are limited and would likely be

¹ As described in Chapter 2, the FEIS analysis year was changed to 2025 from 2020, which was assessed in the SDEIS, in order to be consistent with the Section 5309 New Starts Annual Update for 2005.

² Since publication of the SDEIS, a 4-stage phasing plan has been developed that would permit the subway to be constructed and operated incrementally. See Chapter 3 for more information.

tolerant of any increased disturbance created by the project. Adverse impacts to some wildlife due to loss of habitat would not adversely impact populations of these species within the New York City region. While construction of the project would result in the removal of mature trees in parks and the streets, this would not create a significant adverse impact on natural resources because the number of trees that would be removed represents a small fraction of New York City's urban forest. In addition, as described in Chapter 7, "Public Open Space," the trees removed from parks would be replaced in coordination with the New York City Department of Parks and Recreation. Construction activity would not occur in any state-listed endangered peregrine falcon nesting locations. Moreover, in May 2002, NYSDEC further determined that construction of the Second Avenue Subway, including above-ground activity at the shaft sites and spoils removal areas, would not adversely affect peregrine falcons because they are accustomed to the intensive street level activity that already occurs throughout this area.

FLOODPLAINS AND WETLANDS

Changes to the existing ground levels within the Second Avenue Subway alignment during all construction phases would be limited and would not result in increased flooding. New York State requires that projects demonstrate why they need to be located in the 100-year floodplain. The Second Avenue Subway could not be constructed outside the 100-year floodplain in East Harlem and Lower Manhattan and still meet the project's goals of providing service along the Second Avenue corridor and relieving congestion on the existing Lexington Avenue Line. The 207th Street Yard already exists, and new tracks would be constructed within the confines of the existing yard during Phase 2, and thus would not create any floodplain impacts.

A variance from NYSDEC would be needed to operate spoils removal facilities at Pier 6 during Phase 4. The project would likely meet the two criteria for issuance of a variance: that avoiding the wetlands would be unreasonably burdensome, and that there would be no significant impacts from the activities in the wetlands, as it is unlikely that any tidal wetlands exist at Pier 6. (As described above, the area is currently bordered by a hard bulkhead wall, does not currently support wetland plant communities, and is likely to be entirely, or almost entirely, located in waters that are substantially greater than 6 feet at MLW). Use of the barging site would thus have environmental benefits and would not substantially affect wetlands. In this way, the Second Avenue Subway project would comply with Executive Order No. 11990, which concerns the protection of wetlands, and with all other appropriate regulations.

GROUNDWATER AND SURFACE WATER

Groundwater

Groundwater resources in Manhattan are not used as potable water, and would not be adversely affected by construction of the new subway tunnels or stations. Moreover, the tunnel and station designs are being developed with the objective of protecting adjacent structures from changes in groundwater flow and elevation. During construction, design requirements would limit the amount of dewatering allowed as one aspect of such protection measures. Groundwater levels would be continuously monitored relative to pre-construction conditions to minimize changes in water levels.

At this time, geotechnical data are being collected and potential subsurface structural and drainage treatments are being assessed at the conceptual level. Depending on the volume to be removed, groundwater removed via dewatering during construction would be pumped to the city's sewer system or to a nearby water body under a State Pollutant Discharge Elimination

System (SPDES) permit. As described in Chapter 14, “Contaminated Materials,” if the groundwater contains contaminants and if these are present in levels that exceed the sewer use limitations set by the New York City Department of Environmental Protection (NYCDEP), the water would be treated using readily available technologies and retested prior to its disposal.

Construction work proposed at the various above-ground yard and maintenance sites would also not adversely affect groundwater. At each site, the work proposed would involve surface grading and trackwork, neither of which would result in impacts to groundwater.

Surface Water

The potential operation of barges during construction at Pier 6 in Phase 4 is not likely to create significant adverse impacts on the aquatic biota using the East River waterway. The construction activities would not introduce a new use to the location. Temporary water quality impacts would occur during installation of the barge equipment, from possible dredging and from a limited amount of pile driving, but the effects would be limited to temporary increases of suspended sediment. At Pier 6, the amount of dredged material would be small, approximately 3,500 cubic yards. The dredged material would most likely be disposed at an approved upland site, minimizing water quality effects associated with disposal. All applicable state and federal permit requirements associated with dredging operations also would need to be met before any dredging could be undertaken, and mitigation measures would be identified in consultation with the regulatory agencies. Sediment contaminants detected at Pier 6, such as SVOCs and PCBs, are tightly bound to sediments and have little potential to dissolve in the water column. Metals detected at Pier 6 are likely to be dispersed by the rapid current velocities of the East River. Therefore, any potential water quality effects would be short in duration and would be expected to return to a level consistent with the waterway’s intended use shortly after construction activities stop.

As described above under “Existing Conditions,” the area surrounding Pier 6 was dredged in fall 2001 so that it could be used for barging activities related to removal of materials from the World Trade Center site. The barging facilities used for that recovery effort have since been removed. Since sampling at Pier 6 conducted for the Second Avenue Subway revealed that sediment concentrations of contaminants exceeded NYSDEC guidance levels for some SVOCs and heavy metals, it is also likely that such contamination would also have existed prior to the dredging activities conducted to accommodate the World Trade Center operations. If the Pier 6 site is used for barging activities for construction of the Second Avenue Subway, any dredging required to accommodate the subway’s barges would occur at least several years after the activities required for the World Trade Center. Therefore, any sediment suspended during the 2001 dredging effort will have settled prior to any dredging required for the Second Avenue Subway’s construction, and thus there would be no potential for cumulative impacts from the two dredging projects at this site. Any resuspension of sediment caused by dredging and barging operations for the Second Avenue Subway project would be temporary and localized, as sediment would be expected to resettle within months after being disturbed.

The barging equipment at Pier 6 would be removed shortly after subway construction activities in this location is completed, unless another public agency (for example, with jurisdiction over in-water activities) were to ask that it remain in place for another public use. The barge site would be restored to its current condition.

At all locations near surface waters, the project would use specific techniques and safeguards to protect water quality in the event of materials, oil, or fuel spills from construction equipment or

barges, and best management practices would be used to control runoff and stormwater. A storm water pollution prevention plan (SPPP) will also be developed for Pier 6. However, during spoils conveyance, particulates and other fine matter may be released into the air, with some eventual settlement into the waterway that is not expected to cause significant adverse impacts to water quality. In addition, the wakes from tugs used to pull the barges could result in increased turbidity that would not cause significant long-term impacts to the waterway.

AQUATIC BIOTA

Construction and operation of the barge facility is not expected to result in any long-term adverse impacts to phytoplankton, SAV, or macroalgae present in the East River. Construction of the barge facility would result in temporary and localized increases in suspended sediment that may affect light penetration in the water column. This may result in temporary impairment to photosynthesis and primary production in the project area. Shading from the barge site structures (approximately 30,000 square feet in the East River) could also result in a temporary decrease in primary production. However, residence time under a fixed barge by phytoplankton would likely be short, and therefore the duration of decreased production would be very short and would not result in significant decreases in primary productivity within the Harbor Estuary. Shading may also decrease zooplankton's ability to locate prey but is not expected to adversely affect zooplankton populations because of their short residence time in the shaded areas. Furthermore, the presence of pollution-tolerant and pollution-sensitive macroinvertebrates at Pier 6 suggests that the concentration of SVOCs and metals detected in sediments at this site are not having a major effect on the macroinvertebrates. Therefore, the resuspension and redeposition of these contaminants should not significantly adversely affect macroinvertebrates. Benthic recolonization would be expected to occur relatively quickly, starting within weeks and taking approximately 1 to 2 years to complete. Dredging would result in a temporary loss of benthic invertebrates from these areas. However, these species would again be expected to quickly recolonize the new sediment and pile substrate.

Turbidity and disturbance of substrate habitat and the water column could have a temporary adverse impact on the habitat for certain fish species dependent on sight for feeding and sensitive to light levels. However, these species have adapted to estuarine conditions and can avoid highly turbid conditions that are temporary in nature. Construction activities would not substantially alter the existing fish habitat at the in-water construction site, so adverse impacts would not be expected. Nevertheless, as part of the permitting process, coordination with NMFS and other agencies would occur to determine the most appropriate seasons and timeframes for in-water construction. The construction activities would not result in any adverse impacts to protected turtle species. Sea turtles are not expected to occur in the project area except as occasional seasonal transient individuals. They do not reside in the project areas and are unlikely to pass through the East River when they leave Long Island Sound in the winter.

The dredged material would most likely be disposed of at an approved upland site, minimizing potential effects to aquatic biota associated with disposal.

EROSION, STORMWATER MANAGEMENT, AND DEWATERING

A SPDES permit from NYSDEC would be secured and storm water management plans implemented during construction to minimize the potential for on-site erosion, sedimentation, and stormwater pollution. The stormwater management program would contain appropriate requirements for erosion and sedimentation controls to be used during construction. With these

measures in place, erosion and stormwater pollution would be minimized and adverse impacts to water bodies near the construction sites would be avoided. Approval from NYCDEP would also be secured in order to discharge water from the required dewatering activities into the sewer system. With use of proper pre-treatment measures, no impacts to the East River would occur.

G. PERMANENT IMPACTS OF THE PROJECT ALTERNATIVES

NO BUILD ALTERNATIVE

Under the No Build Alternative, continued water quality improvements within the project areas should improve aquatic habitat and utilization by aquatic organisms.

SECOND AVENUE SUBWAY

The operations of the Second Avenue Subway would have no significant impacts on geology, groundwater, terrestrial vegetation and wildlife, floodplains, water quality, primary producers or zooplankton, fish, or endangered, threatened, or special concern species.

The presence of new tunnels and stations in the soils and bedrock of Manhattan would not adversely affect geological conditions there. Design of the new subway is being developed with the objective of protecting adjacent structures from changes in groundwater flow or elevation. As a result, it is not anticipated that permanent changes (e.g., raised or lowered levels) in the groundwater level would result from construction of the subway structures. At this time, geotechnical data are being collected and potential subsurface structural and drainage treatments are being assessed at the conceptual level. No new outfalls to surface waters are proposed as part of the project.

The new tunnels and stations would be constructed to be resistant to water infiltration. The tunnels would have concrete tunnel liners with voids between the liner and the rock/soil sealed by injecting cement grout, under pressure. This is designed to create an effective barrier against the seepage of water into the tunnel. Some groundwater would nevertheless enter the tunnels, and would be drained to sumps (low points) used to collect water and then pump it to the sewer system. The project would not add significant amounts of groundwater to the city's sewer system, and would not increase the flows from the city's combined sewer outfalls to nearby water bodies substantially.

Operation of the Second Avenue Subway also would not have any significant impacts on vegetation or wildlife along the Manhattan alignment. The urban environment in which the existing vegetation and wildlife currently exist would not be altered, and species that inhabit the area today are likely to continue to do so in the future.

The Second Avenue Subway alignment and some storage tracks pass through several locations that are within the 100-year floodplain in Manhattan. No habitable structures would be located within the floodplain, and the project would not result in any increase in flooding in those areas.

Operation of the Second Avenue Subway also would have no impact on any rare, threatened, or endangered species because no in-water activities would occur once the project is operational.

As described earlier, the project could affect surface water quality during construction, including the removal of construction facilities.

With completion of the Second Avenue Subway, construction activities within the water would cease, and surface water characteristics at the East River, are likely to return to existing conditions.

Benthic organisms disturbed by removal of barge facilities would quickly recolonize. Overall, no long-term adverse impacts would result. Therefore, with operation of the subway, impacts to the water quality within the aquatic environs of the East River would be minimal.

Operation of the Second Avenue Subway is not expected to result in any long-term adverse impacts to phytoplankton, SAV, or macroalgae present in the East River. By removing crane barges, minimal substrate inhabited by benthic invertebrates would be lost. No long-term impacts on primary producers and zooplankton would occur. The activities associated with the operation of the Second Avenue Subway would not be expected to result in long-term impacts to the benthic invertebrate community, which would quickly recolonize post construction. No significant adverse impacts to the fish community would be anticipated.

By attracting new residential and commercial investment within New York City and providing incentives for retention of such existing uses, the Second Avenue Subway would also reduce impacts to natural resources in the surrounding region by fostering compact development and discouraging construction on undeveloped land, thereby reducing urban sprawl. This conclusion is supported by a 1998 comprehensive study undertaken by the Transit Cooperative Research Program (an FTA-sponsored endeavor) entitled *Costs of Sprawl—Revisited*, which reviewed approximately 500 other studies considering urban sprawl and found general agreement that sprawl is strongly linked to a loss of fragile environmental lands.

H. SUMMARY OF SIGNIFICANT ADVERSE IMPACTS AND MITIGATION MEASURES

- No significant adverse impacts on natural resources would occur during any construction phase. Impacts including impairment of photosynthesis and primary production; hampering zooplankton's ability to locate prey; loss of benthic organisms; and impacts to habitat of fish species that are light sensitive or reliant on sight for feeding would be localized and of a short duration, and would not be significant.
- MTA/NYCT will work with regulatory agencies in developing the Second Avenue Subway project in order to minimize disturbances to natural resources. All project commitments and conditions would be organized into a document known as the Construction Environmental Protection Program (CEPP). NYCT will incorporate relevant portions of the CEPP into all construction contracts, and contractors will be obligated to follow these provisions.
- The project would use specific techniques and safeguards to protect water quality in the event of materials, oil, or fuel spills from construction equipment or barges, and best management practices would be used to control runoff and stormwater at all locations near surface waters. A storm water pollution prevention plan (SPPP) will also be developed for Pier 6.
- Any additional necessary project commitments or measures to minimize disturbances to natural resources would be determined as part of permitting requirements established by the federal and state agencies. *