1 INTRODUCTION

This document is the Record of Decision (ROD) for the Hudson Tunnel Project (the Proposed Action or the Project) issued by the Federal Railroad Administration (FRA) and the Federal Transit Administration (FTA). FRA is the lead Federal agency to evaluate the Hudson Tunnel Project in accordance with the National Environmental Policy Act (NEPA) of 1969 (42 USC § 4321 et seq.). The Proposed Action is intended to preserve the current functionality of the Northeast Corridor's (NEC) Hudson River passenger rail crossing between New Jersey and New York and strengthen the resilience of the NEC. The Project would consist of construction of a new rail tunnel under the Hudson River, including railroad infrastructure in New Jersey and New York connecting the new rail tunnel to the existing NEC, and rehabilitation of the existing NEC tunnel beneath the Hudson River.

The New Jersey Transit Corporation (NJ TRANSIT) and the Port Authority of New York and New Jersey (PANYNJ) are joint lead agencies for the Final Environmental Impact Statement (FEIS). NJ TRANSIT was identified as a joint lead agency with the FRA in the Notice of Intent (NOI) to prepare the Hudson Tunnel Project Environmental Impact Statement (EIS). Following completion of the Draft Environmental Impact Statement (DEIS), in summer 2018, the PANYNJ notified FTA and FRA that it intended to serve as NEPA Project Sponsor for the Hudson Tunnel Project (the PANYNJ then became a joint lead agency for the FEIS).

Prior to becoming NEPA Project Sponsor, the PANYNJ was a Participating Agency for the EIS that provided support and assistance during development of the preliminary engineering and planning for the Hudson Tunnel Project's design. In addition, NJ TRANSIT, the PANYNJ, and the National Railroad Passenger Corporation (Amtrak) worked together as the Project Partners in developing the preliminary engineering and planning for the Project. In becoming a joint lead agency, the PANYNJ is relying on the efforts of FRA and NJ TRANSIT to date and concurs with the conclusions of the FEIS.

As the current Project Sponsor, the PANYNJ will be responsible for committing to mitigation measures through construction. The PANYNJ will remain the Project Sponsor until such time as the Gateway Development Commission (GDC) assumes the role of Project Sponsor. The PANYNJ and GDC anticipate that change will occur prior to the award of any Federal financial assistance for the Project.

GDC is a public authority and government-sponsored authority created when the States of New York and New Jersey enacted the Gateway Development Commission Act in each of the two states in July 2019. GDC is governed by a Board of Commissioners comprised of three Commissioners from the State of New York, three Commissioners from the State of New Jersey, and one Commissioner appointed by Amtrak. The GDC is empowered to facilitate and coordinate activities to effectuate the Gateway Program (described in the FEIS in Chapter 1, Section 1.2.2; the Hudson Tunnel Project is an independent element of the larger Gateway Program), including applying for and receiving Federal, state, and local funds.

Cooperating Agencies for the Project are as follows:

- FTA, given its technical expertise and current and potential future role in supporting the advancement of this Project through NEPA, final design, and construction. If FTA provides the majority of Federal funding for implementation of the Project, it will become the lead Federal agency responsible for ensuring environmental and other Project commitments identified in this ROD are met.
- The U.S. Army Corps of Engineers (USACE), because it will have a permitting action as part of Project implementation.

2 DECISION

FRA has determined, pursuant to the Council on Environmental Quality's (CEQ's) regulations implementing NEPA[1] and the FRA *Procedures for Considering Environmental Impacts*,[2] that the requirements of NEPA have been satisfied for the Project. This ROD memorializes FRA's review of the Preferred Alternative described in Section 3.4.2 of this ROD and in the FEIS and FRA's approval of that alternative as the Selected Alternative.

FRA selects the Preferred Alternative as the Selected Alternative for the Hudson Tunnel Project based on a thorough and careful consideration of the potential short-term and long-term benefits and impacts, mitigation of those impacts, and public and agency comments. FRA weighed and balanced the environmental effects associated with the single Build Alternative, the Preferred Alternative, with those associated with the No Action Alternative. Considering these factors, FRA determined that the adverse environmental impacts associated with the Preferred Alternative are less substantial than the impacts associated with the No Action Alternative. Although the No Action Alternative would have fewer near-term impacts to the physical environment, including historic, cultural, and natural resources, than the Preferred Alternative, the Preferred Alternative would have substantial beneficial impacts on transportation when compared to the No Action Alternative that outweigh the physical impacts of constructing the Preferred Alternative.

FRA also finds that the Preferred Alternative satisfies the Project's purpose and need. Specifically, the Preferred Alternative would preserve the current functionality of Amtrak's NEC service and NJ TRANSIT's commuter rail service between New Jersey and Penn Station New York (PSNY) by repairing the deteriorating North River Tunnel, which currently carries the NEC beneath the Hudson River. It would also strengthen the NEC's resiliency to support reliable service by providing redundant capability under the Hudson River for Amtrak and NJ TRANSIT NEC trains between New Jersey and the existing PSNY. These improvements would occur while maintaining uninterrupted intercity and commuter rail service.

FRA has also completed its Section 4(f) Determination in accordance with Section 4(f) of the U.S. Department of Transportation Act of 1966 (provided in Section 6.2).[3] FRA's decision is consistent

---

1 The EIS was prepared in accordance with CEQ's regulations implementing NEPA (40 CFR Parts 1500-1508) from 1978, as amended in 1986 and 2005. CEQ comprehensively updated its NEPA implementing regulations effective September 14, 2020; the revised regulations apply to any NEPA process begun after that date. For NEPA reviews initiated prior to September 14, 2020, the lead agency may continue to apply the prior regulations. FRA initiated the NEPA process for the Hudson Tunnel Project in 2016 with publication of a Notice of Intent (NOI) in the Federal Register, and is applying the CEQ regulations that were in effect at the time of that NOI.

2 64 FR 28545 (1999).

3 49 USC § 303.

with its obligation under Section 4(f) to protect land in publicly owned parks, recreational areas, wildlife and waterfowl refuges, or historic sites on public or private land.

FTA has determined, pursuant to 23 USC § 139(n), 23 CFR Part 771, and 40 CFR Parts 1500–1508, that the requirements of NEPA have been satisfied for the Project. After consultation with FRA, NJ TRANSIT, and the PANYNJ and review of the FEIS and NEPA documentation associated with the Project, FTA is issuing this ROD jointly with FRA, in accordance with the requirements of CEQ (40 CFR 1505.2) and FTA environmental statute (23 USC § 139(n)(2)). FTA is adopting the Hudson Tunnel Project EIS pursuant to 23 USC § 139(c)(5) and stating its intent to evaluate a future application for funding from the Project Sponsor for the Project. This EIS fulfills the requirements of NEPA and applicable regulations that apply to FTA.

3 BASIS OF DECISION

The documents FRA and FTA considered in making this decision include the July 2017 DEIS; the FEIS; the Final Section 4(f) Evaluation (FEIS Chapter 24); the Section 106 Programmatic Agreement (PA) (FEIS Appendix 9); agency, organization, and public comments received on the DEIS (FEIS Chapter 28); as well as technical memoranda, correspondence, and other supporting documents.[4]

This ROD provides background on the Project's development; describes the alternatives FRA considered in the EIS; discusses the public opportunity for comment on the DEIS; explains the basis for FRA's decision; identifies the Environmentally Preferable Alternative; documents compliance with applicable Federal environmental laws, regulations, and executive orders; and sets forth the commitments, required as part of the decision, to provide mitigation to minimize harm. The DEIS (published in July 2017), the FEIS, and this ROD are part of the environmental record for the Project. The brief descriptions of components of the environmental record included in this ROD provide a summary of the basis for the decision that the environmental record fully substantiates.

In accordance with 23 USC § 139(n), and 23 CFR § 771.124, FRA and FTA are issuing a single document that consists of the combined FEIS and ROD as it has been determined that circumstances, such as substantial changes to the proposed action or significant new information, do not preclude issuance of such a combined document.

3.1 PLANNING PROCESS

3.1.1 NORTH RIVER TUNNEL

The existing NEC rail tunnel beneath the Hudson River, the North River Tunnel, is used by Amtrak for intercity passenger rail service and by NJ TRANSIT for commuter rail service. The NEC is the most heavily used passenger rail line in the U.S., both in terms of ridership and service frequency. The NEC extends from Washington, D.C., in the south to Boston, Massachusetts, in the north, serving the densely populated Northeast region, including PSNY. Amtrak's NEC service and NJ TRANSIT's commuter rail service provide connections between the major cities of the Mid-Atlantic and Northeast states and commuter access for thousands of people who work in the region and therefore are vital to the regional economy.

Amtrak, the nationwide intercity passenger rail operator, operates over the entire NEC, providing regional service, long-distance service, and high-speed Acela Express service. Amtrak owns the

[4] Publicly available study documents, including the DEIS, FEIS, and PA, and meeting materials are available online at https://railroads.dot.gov/environment/environmental-reviews/hudson-tunnel-project-new-jersey-and-new-york or http://www.hudsontunnelproject.com.

majority of the NEC, including the portion in New Jersey and the North River Tunnel. NJ TRANSIT operates an extensive commuter rail network in New Jersey that extends to Philadelphia, Pennsylvania; Orange and Rockland Counties in New York; and New York City. In New Jersey, NJ TRANSIT owns much of the commuter rail network that converges on the NEC. NJ TRANSIT's rail lines all include direct or connecting service to PSNY.

In its 2017 Fiscal Year, Amtrak carried approximately 20,900 weekday passenger trips (one-way ride) each day on more than 100 trains between New York and New Jersey, not counting passengers who traveled through the North River Tunnel and PSNY but did not get off or on at PSNY. In its 2017 Fiscal Year, NJ TRANSIT carried approximately 189,000 weekday trips each day on approximately 350 trains between New York and New Jersey. Overall, the North River Tunnel operates at capacity during peak periods to meet current demands.

3.1.2 PLANS TO INCREASE RAIL SERVICE CAPACITY ON THE NEC

FRA, Amtrak, NJ TRANSIT, the PANYNJ, and others have been planning for long-term improvements to rail service on the NEC between Newark, New Jersey and New York City through several planning initiatives, including FRA's NEC FUTURE program and the Gateway Program.

3.1.2.1 NEC FUTURE Program

In 2012, FRA launched NEC FUTURE to consider the role of rail passenger service in the context of current and future transportation demands and to evaluate the appropriate level of capacity improvements to make across the NEC. The intent of the NEC FUTURE program is to help develop a long-term vision and investment program for the NEC. Through NEC FUTURE, FRA evaluated overall capacity improvements and environmental consequences associated with improved NEC rail services, including trans-Hudson service. FRA released the NEC FUTURE Tier 1 Final EIS in December 2016. The Preferred Alternative evaluated in the Tier 1 Final EIS consisted of an investment program that grows the role of rail by identifying numerous upgrades and state-of-good-repair investments along the length of the NEC.

FRA's July 2017 Tier 1 ROD for the NEC FUTURE program documents FRA's formal selection of an investment program for the NEC, referred to as the Selected Alternative. The Selected Alternative is a refinement of the Preferred Alternative identified in the Tier 1 Final EIS and represents a vision for the NEC that will serve as a framework to help prioritize, facilitate, and expedite investment in the NEC for the next several decades. It is a corridor-wide commitment to the NEC to bring it to a state of good repair and provide additional capacity and service enhancements to address passenger rail needs for the future. To achieve this vision, the Selected Alternative includes the following four components:

- *Improve Rail Service:* Corridor-wide service and performance objectives for frequency, travel time, design speed, and passenger convenience.
- *Modernize NEC Infrastructure:* Corridor-wide repair, replacement, and rehabilitation of the existing NEC to bring the corridor into a state of good repair and increase reliability.
- *Expand Rail Capacity:* Additional infrastructure between Washington, D.C., and New Haven, Connecticut, and between Providence, Rhode Island, and Boston, Massachusetts, as needed to achieve the service and performance objectives, including investments that add capacity, increase speeds, and eliminate chokepoints.
- *Study New Haven to Providence Capacity:* Planning study in Connecticut and Rhode Island to identify additional on- and off-corridor infrastructure as needed to achieve the service and performance objectives.

The NEC FUTURE Selected Alternative is consistent with the Hudson Tunnel Project and includes new Hudson River tunnel investments similar to this Proposed Action.

3.1.2.2 Gateway Program

The Gateway Program is a comprehensive program of phased strategic rail infrastructure improvements to preserve and improve current services and create new capacity on the NEC. The objective of the Gateway Program is twofold: (1) to update and modernize existing infrastructure and repairs to infrastructure elements that are damaged due to age or events such as Superstorm Sandy, and (2) to increase track, tunnel, bridge, and station capacity, eventually creating four mainline tracks between Newark and PSNY to allow the doubling of passenger trains in this section of the NEC. The individual projects that make up the Gateway Program will advance through planning, environmental review, funding, and construction separately; some of these projects are approved for construction while others are in the planning stages.

3.1.3 HUDSON TUNNEL PROJECT'S RELATIONSHIP TO FUTURE PROPOSED CAPACITY ENHANCEMENT PROJECTS

With the Preferred Alternative, there would be four tracks on the NEC between the interlocking east of Secaucus Junction Station and PSNY, where today there are only two tracks. The increase in rail service capacity that the Hudson Tunnel Project would create between Secaucus and PSNY could be one element of a larger program to increase rail service capacity on the NEC between Newark, New Jersey and New York City. However, a number of other substantial infrastructure capacity expansion projects must be completed along this stretch of the NEC before Amtrak and NJ TRANSIT can increase peak-period train frequency in this area of the NEC. Even with two new tracks beneath the Hudson River resulting from the new Hudson River Tunnel, Amtrak and NJ TRANSIT cannot provide additional peak hour service to and from PSNY given the current capacity constraints on the NEC between Newark and New York, including at PSNY, and in New Jersey at Harrison, Kearny, and across the Hackensack River.

Thus, while the Hudson Tunnel Project would increase the number of tracks between Secaucus and PSNY, it would not result in an increase in rail service until other improvements occur. A new Hudson River crossing on the NEC is urgently needed to maintain existing service. Therefore, the Project—which would implement critical repairs to the existing North River Tunnel while maintaining the existing level of service—is being advanced independently of any initiatives to expand rail service capacity on the NEC. As such, the Hudson Tunnel Project has independent utility as a project to preserve the current functionality of NEC service between New Jersey and PSNY and to strengthen the resiliency of the NEC in this area. Capacity expansion is not part of the purpose and need of the Hudson Tunnel Project as established in the EIS.

At the same time, the Project would not preclude other future projects to expand rail service capacity in the area. These other future projects would be undertaken separately and would be subject to their own environmental reviews and approvals, as appropriate.

3.2 NEPA PROCESS

Table 1 summarizes the steps of the NEPA process completed for the Hudson Tunnel Project.

Table 1
Hudson Tunnel Project NEPA Process Milestones

Date	Milestone
May 2, 2016	FRA and NJ TRANSIT initiated the NEPA process and announced the start of the Scoping comment period with publication of the Notice of Intent in the *Federal Register*
May 17, 2016 and May 19, 2016	FRA and NJ TRANSIT held public and agency scoping meetings in New York City and New Jersey, respectively
May 31, 2016	Scoping comment period ended
October 2016	FRA and NJ TRANSIT completed Scoping Summary Report and posted on the Project website
Summer 2016-Fall 2016	FRA and NJ TRANSIT developed initial alternatives and conducted preliminary screening evaluation of alternatives
November 10, 2016 and November 17, 2016	FRA and NJ TRANSIT held public open houses regarding screening of alternatives and proposed Preferred Alternative
Fall 2016-Spring 2017	FRA and NJ TRANSIT completed evaluation of alternatives
April 2017	FRA and NJ TRANSIT completed Final Alternatives Development Report and posted on the Project website
July 7, 2017	FRA and NJ TRANSIT published Notice of Availability of DEIS in the *Federal Register*, which initiated the public comment period
August 1, 2017, August 3, 2017, and August 10, 2017	FRA and NJ TRANSIT held DEIS public hearings (one in New York City and two in New Jersey)
August 21, 2017	Comment period on the DEIS ended (comments were accepted and reviewed after the deadline)
June 2018	PANYNJ became current Project Sponsor and joint lead agency
May 28, 2021	Issuance of combined FEIS and ROD: FRA, NJ TRANSIT, and the PANYNJ issued the FEIS and FRA and FTA issued the joint FRA-FTA ROD

FRA and NJ TRANSIT initiated the NEPA process with publication of the NOI in the *Federal Register* on May 2, 2016. The NOI announced FRA and NJ TRANSIT's intent to prepare an EIS, provided background information on the Project, presented the draft Purpose and Need Statement, explained the alternatives development process, and provided an initial list of environmental resources to be analyzed. The NOI also announced the start of the public scoping comment period, announced the public scoping meetings and invited the public and other interested parties to submit comments through the end of the scoping comment period, May 31, 2016.

Public and agency coordination are integral aspects of the NEPA process. Pursuant to the CEQ NEPA regulations, Cooperating Agencies are Federal agencies, other than a lead agency, that have jurisdiction by law or special expertise with respect to environmental impacts for a proposed project. For the Hudson Tunnel Project, the USACE and FTA are Cooperating Agencies. Participating Agencies are Federal, state, or local agencies or Federally recognized tribal governmental organizations with an interest in the project. FEIS Chapter 25 provides a list of Participating Agencies for the Project. FRA and NJ TRANSIT conducted regular outreach with Cooperating and Participating Agencies throughout the NEPA process, notifying them of important milestones and requesting agency review of key technical documents. Chapter 25 of the FEIS describes the agency coordination conducted as part of the Project.

FRA and NJ TRANSIT provided information to the public through the NEPA process using public meetings and the Project website to present information and solicit comments at the following Project milestones: during scoping at the beginning of the Project (May 2016), during the alternatives development process in November 2016, during the public comment period on the

DEIS in summer 2017, and during development of the FEIS to address specific concerns for neighborhoods where Project activities would occur, in summer and fall 2017 and winter 2018.

3.3 PURPOSE AND NEED

The purpose of the Hudson Tunnel Project is: to preserve the current functionality of Amtrak's NEC service and NJ TRANSIT's commuter rail service between New Jersey and PSNY by repairing the deteriorating North River Tunnel; and to strengthen the NEC's resiliency to support reliable service by providing redundant capability under the Hudson River for Amtrak and NJ TRANSIT NEC trains between New Jersey and the existing PSNY. These improvements must be achieved while maintaining uninterrupted commuter and intercity rail service and by optimizing the use of existing infrastructure.

The existing North River Tunnel is a critical NEC asset and is the only intercity passenger rail crossing into New York City from New Jersey and areas west and south. This tunnel, constructed between 1904 and 1908 and opened for service in 1910, is more than 100 years old and was designed and built to early 20th-century standards. While the tunnel is safe for use, service reliability through the tunnel, already suboptimal because of the tunnel's age and antiquated standards, has been further compromised because of the damage to tunnel components caused by seawater inundation during Superstorm Sandy in October 2012. Chlorides from the seawater remain in the tunnel's concrete liner, bench walls, and ballast, causing ongoing damage to these elements as well as to embedded steel, track and third rail systems, and signaling, mechanical and electrical components. The damage to the bench walls and ballast and track systems necessitates full portal-to-portal replacement of these elements, which form integrated systems running the length of the tunnel.

The existing two-track North River Tunnel operates at its full peak period capacity. With the lack of redundant capability across the Hudson River into PSNY, any service outage, either unplanned or for planned maintenance, can thus substantially reduce or suspend rail service, causing delays that cascade up and down the NEC and throughout NJ TRANSIT's commuter system, disrupting service for hundreds of thousands of passengers. Because of the importance of the North River Tunnel to essential commuter and intercity rail service between New Jersey and New York City, rehabilitation of the existing North River Tunnel needs to be accomplished without material reductions in weekday service, and the NEC's resiliency to support reliable service by providing redundant capability must be strengthened in order to reduce disruptions from planned or unplanned service outages.

3.4 ALTERNATIVES CONSIDERED

The CEQ regulations implementing NEPA require that Federal agencies "use the NEPA process to identify and assess the reasonable alternatives to proposed actions that would avoid or minimize adverse effects of these actions upon the quality of the human environment."[5] The regulations call for an EIS to "rigorously explore and objectively evaluate all reasonable alternatives, and for alternatives which were eliminated from detailed study, briefly discuss the reasons for their having been eliminated."[6]

In compliance with NEPA regulations and FRA procedures, FRA and NJ TRANSIT conducted a multi-step alternatives development and evaluation process to identify reasonable alternatives that will meet the purpose and need for the Project while avoiding or minimizing adverse effects on the environment. The process involved developing an initial list of preliminary alternatives, comprising

[5] 40 CFR §1500.2.

[6] 40 CFR §1502.14(a).

many different possible means of providing a Hudson River rail crossing, and conducting a high-level qualitative evaluation to determine which of those alternatives were feasible, reasonable, and met the Proposed Action's purpose and need. As the result of this process, two alternatives were identified for analysis in the DEIS and FEIS: the No Action Alternative, in which the North River Tunnel is not rehabilitated and no redundant rail capability is provided; and a single Build Alternative, the Preferred Alternative, which will rehabilitate the North River Tunnel and provide redundant rail capability in a new Hudson River rail tunnel.

A detailed description of the alternatives development and evaluation process is provided in the "Hudson Tunnel Project Alternatives Development Report," April 2017, included in Appendix 2 of the FEIS.

3.4.1 NO ACTION ALTERNATIVE

The No Action Alternative would not include rehabilitation of the North River Tunnel or construction of a new passenger rail tunnel under the Hudson River. The No Action Alternative does not meet the purpose and need for the Project because it would not repair the deteriorating North River Tunnel, and would not strengthen the NEC's resiliency to support reliable passenger rail service by providing redundant capability under the Hudson River. The No Action Alternative serves as a baseline against which the potential benefits and impacts of the Preferred Alternative are compared in the EIS.

The No Action Alternative assumes that ongoing maintenance in the North River Tunnel will continue, and no new passenger rail tunnel under the Hudson River would be constructed. As part of the ongoing maintenance under the No Action Alternative, Amtrak would implement a North River Tunnel Interim Reliability Improvements Program, a program to advance critical repair work during short-term tunnel outages to improve reliability and safety in the North River Tunnel. The North River Tunnel Interim Reliability Improvements Program would take place in the near term in all cases, and under the Preferred Alternative it would take place before complete rehabilitation of the North River Tunnel as proposed in the Hudson Tunnel Project (see FEIS Chapter 2, Section 2.4). However, the North River Tunnel Interim Reliability Improvements Program cannot address the damage to the ballast and bench walls in the tunnel, which require full removal of the tracks, ties, and bench walls. Therefore, despite the ongoing maintenance that will continue in the No Action Alternative, including the Interim Reliability Improvements Program, damage to the North River Tunnel caused by the storm will continue to degrade systems in the tunnel. This deterioration combined with the tunnel's age and intensity of use will likely lead to increasing instability of rail operations in the tunnel, and may lead to its eventual closure before the analysis year of this Project is reached. However, given the uncertainty about the timing and extent of any closure of the tunnel, for purposes of analysis in the EIS, FRA and NJ TRANSIT assumed that the North River Tunnel would remain functional and in operation at least through the EIS analysis year of 2033. Since the No Action Alternative is the baseline against which the impacts of the Preferred Alternative are compared in the FEIS, this approach allows for a conservative and rigorous analysis of the impacts of the Preferred Alternative.

3.4.2 PREFERRED ALTERNATIVE

The Preferred Alternative for the Project consists of a new two-track tunnel, the Hudson River Tunnel, together with rehabilitation of the existing North River Tunnel. The new Hudson River Tunnel would have two new tracks extending from the NEC in Secaucus, New Jersey, beneath the Palisades (North Bergen and Union City, New Jersey) and the Hoboken/Weehawken, New Jersey waterfront area, and beneath the Hudson River to connect to the existing tracks in PSNY. Upon completion of the Preferred Alternative, the NEC would have four tracks (two in the new Hudson River Tunnel and two in the North River Tunnel) between New Jersey and New York

under the Hudson River, which would provide operational flexibility and redundancy for Amtrak and NJ TRANSIT rail operations.

The new Hudson River Tunnel would be parallel to, and south of, the existing NEC between Secaucus, New Jersey and PSNY. This alignment would extend for a distance of approximately 4.5 miles. New ventilation shafts and associated fan plants would be located above the tunnel in New Jersey and New York for regular and emergency ventilation and emergency access and egress. The western terminus of the new tunnel and related tracks and infrastructure would be at Allied Interlocking, east of County Road in Secaucus, New Jersey and the eastern terminus would be at approximately Ninth Avenue in Manhattan, New York. No changes east of A Yard at approximately Ninth Avenue in New York, and no changes to PSNY platforms or platform tracks, are proposed as part of the Preferred Alternative.

FEIS Chapter 2, Section 2.5, provides a detailed description of the Preferred Alternative. Major components of the Preferred Alternative are described in this section.

3.4.2.1 New Hudson River Tunnel

New Jersey Surface Alignment

Two new tracks would diverge from, and run alongside and to the south of, the existing NEC between approximately NJ TRANSIT's Frank R. Lautenberg Secaucus Junction Station and the new tunnel in New Jersey. The new tracks would begin at a realigned Allied Interlocking in Secaucus, New Jersey just east of Secaucus Junction Station. The new surface alignment would be on a new retained embankment beside the existing NEC embankment in the Meadowlands between approximately County Road and Secaucus Road in Secaucus, and then on a new viaduct from just east of Secaucus Road to just west of Tonnelle Avenue (U.S. Routes 1 and 9) in North Bergen, New Jersey. From Tonnelle Avenue it would continue on an embankment transitioning to a below-grade cut approaching the new tunnel portal. A new maintenance road would run along the south side of the new viaduct. The two new tracks would cross Secaucus Road and a freight railroad right-of-way near Tonnelle Avenue on new undergrade rail bridges.

New Tunnel Segment in New Jersey

The new Hudson River Tunnel would have two tracks in two separate tubes that would begin at a new portal in the western slope of the Palisades near Tonnelle Avenue in North Bergen, New Jersey, about 600 feet south of the existing North River Tunnel portal. The tunnel would be 150 to 250 feet beneath the surface of the rock formation of the Palisades and then would continue about 60 to 75 feet below the surface beneath Hoboken and Weehawken.

New Tunnel Segment Beneath Hudson River

Beneath the Hudson River, the top (i.e., crown) of the tunnel would generally be located 25 to 50 feet below the river bottom for much of its length across the Hudson. In one area near the Manhattan shoreline, the tunnel would be shallower (at its shallowest it would be 9.5 feet below the river bottom), and ground improvements would be undertaken during construction to facilitate tunnel boring in this area (discussed below).

New Tunnel in Manhattan

The new tunnel would continue through the below-ground foundation of the Manhattan bulkhead below the bottom of the Hudson River and continue about 45 feet below the surface beneath Hudson River Park and Twelfth Avenue (New York State Route 9A); beneath the block between West 29th and West 30th Streets on the west side of Twelfth Avenue (Manhattan Block 675); and beneath West 30th Street. On the north side of West 30th Street, the alignment would meet the underground Hudson Yards Right-of-Way Preservation Project that Amtrak is currently working to complete beneath the Hudson Yards overbuild project at the Western and Eastern Rail Yards in

Manhattan. The Preferred Alternative would then continue with new tracks and associated rail systems within the concrete tunnel box of the Hudson Yards Right-of-Way Preservation Project beneath the West Side Yard to connect to the existing approach tracks that serve PSNY.

From the end of the Hudson Yards Right-of-Way Preservation Project, the new Hudson River Tunnel would continue beneath Tenth Avenue to a tunnel portal east of Tenth Avenue, within the complex of tracks located beneath the existing building that spans the tracks on the east side of Tenth Avenue (450 West 33rd Street) and connect to the existing PSNY approach tracks there in an area referred to as A Yard.

Tunnel Design

The new Hudson River Tunnel would comply with the fire-life safety standards established by the National Fire Protection Association (NFPA), and particularly NFPA 130, *Standard for Fixed Guideway Transit and Passenger Rail Systems*. Like the North River Tunnel, the new Hudson River Tunnel would consist of two separate tubes, each containing one track. The two tubes of the new Hudson River Tunnel would be connected by cross passages approximately every 750 feet, with fire-rated doors to separate the tubes. Each tube of the tunnel would have two bench walls, one on each side of the trackbed, that would house utility conduits. The bench wall on the inner tunnel wall would have a height of 4 feet above the top of rail, and would serve as a walkway for evacuation of passengers from a train in an emergency. The bench wall on the outer wall of the tunnel would be at the height of the top of rail. Track in the new Hudson River Tunnel would be continuous welded rail with a direct fixation rail system. Traction power would be provided via an overhead contact system; the new tunnel would also have third-rail power that could be used to rescue a stranded train.

3.4.2.2 Ventilation Shafts and Fan Plants

The new Hudson River Tunnel would have a ventilation system designed to bring fresh air into the tunnel passively, through normal train movement. It would also have an active component, driven by fans, to remove hot air from the tunnel during congested (i.e., perturbed) conditions, when trains are stopped or moving slowly for extended periods, particularly during the summer. The active component would also be used to control and exhaust hot air and smoke during emergency conditions, such as a fire on a train in the tunnel. The fans would be used to move smoke so that smoke-free emergency routes are available for safe evacuation of passengers and fire-fighting operations.

To support the ventilation system, the new Hudson River Tunnel would have intermediate fan plants on each side of the Hudson River (in Hoboken in New Jersey and at Twelfth Avenue in New York) as well as additional supply/exhaust points at each of the tunnel portals (the portal at Tonnelle Avenue in New Jersey and the below-grade portal at Tenth Avenue in New York, connected to outside air via a fan plant).

The three fan plants at Hoboken, Twelfth Avenue, and Tenth Avenue would connect to the ventilation duct system within the two tubes of the Hudson River Tunnel. At Hoboken and Twelfth Avenue, where the tunnel would be deep below grade, a ventilation shaft from the tunnel level to the surface would provide the connection to the fan plant. At Tenth Avenue, the tunnel would be immediately below the fan plant and no shaft would be needed. The fan plants would include reversible tunnel ventilation fans that connect to the tunnel by a configuration of ventilation ducts (i.e., plenums) and dampers. These fans, in conjunction with the ventilation ducts in the tunnel, would provide push-pull ventilation in the tunnel: the fans would push fresh air into the tunnel from one end of the vent zone and pull hot air and smoke out at the other end of the vent zone. In addition, the tunnel ventilation shafts would have additional shafts connected to each tube to allow train-generated airflow to be exchanged with the outdoor ambient air, without the use of fans.

3.4.2.3 Rehabilitation of the Existing North River Tunnel

The Preferred Alternative would also include a rehabilitated North River Tunnel. The rehabilitation would include:

- Full replacement of the bench walls to: 1) ensure that the North River Tunnel can meet modern safety standards for emergency egress and for access for maintenance and first responders; 2) provide protection for high-voltage feeder cables and signal and communication cables; and 3) provide for long-term integrity of the rail system;
- Localized repairs on the existing tunnel lining as needed to address leaks, cracks, and spalls, including areas that are currently inaccessible beneath the ballast and behind the bench walls;
- Replacement of the ballasted trackbed with a new direct fixation track system and track drainage system; and
- Installation of new or rehabilitated systems, including signal, overhead contact system, communications, traction power, and fire-life safety.

In addition, the rehabilitation would include modifying the track alignment and profile to improve ride quality, maximize drainage, and optimize side and overhead catenary clearances, all of which are currently substandard.

3.4.2.4 Resiliency and Flood Protection Measures

During Superstorm Sandy in 2012, seawater entered the North River Tunnel from Manhattan. The low-lying West Side Yard was inundated, and water flowed from the yard into the North River Tunnel portal at Tenth Avenue and its ventilation shaft at Eleventh Avenue. The new Hudson River Tunnel would incorporate measures to protect the new tunnel from flooding and storm damage such as the damage incurred to the North River Tunnel during Superstorm Sandy. Given the critical importance of the new tunnel and the vulnerability exhibited by the North River Tunnel during Superstorm Sandy, all Project features would be designed using a Design Flood Elevation (DFE) that is 5 feet higher than the current Base Flood Elevation mapped by the Federal Emergency Management Agency (FEMA) at the time final design is complete.[7] In addition, the new Hudson River Tunnel would include floodgates within the tunnel on both the New Jersey and New York sides of the river, to protect both the tunnel and landside areas (e.g., PSNY) from future flooding such as occurred during Superstorm Sandy. Such floodgates could be deployed in advance of anticipated flooding to completely seal off the tunnel, preventing water from passing through. In New Jersey, a floodgate would be located in the tunnel at the ventilation shaft in Hoboken and soil berms and other design features would be incorporated at the new tunnel to prevent floodwater from entering the tunnel. In New York, floodgates would be located in the tunnel at the Twelfth Avenue ventilation shaft and at the new tunnel's eastern portal beneath the building at 450 West 33rd Street, just east of Tenth Avenue.

In addition, the rehabilitated North River Tunnel would also incorporate additional resiliency measures, including a hardened drainage system that can operate during a flooded condition, and relocated electronics that are protected from flooding. The new tunnel's portal at Tenth Avenue and its Tenth Avenue fan plant, as well as the North River Tunnel's portal at Tenth Avenue and its ventilation shaft, would be protected from flooding by a new perimeter wall that New York State's Metropolitan Transportation Authority Long Island Rail Road is planning to construct around its West Side Yard separately from the Hudson Tunnel Project.

---

[7] FEMA's flood maps indicate the area where flooding will occur during the 1 percent probability storm (i.e., the "100-year storm," which has a 1 percent probability of occurring in any given year) and the Base Flood Elevation, which is the elevation of floodwaters during that storm.

Finally, the Preferred Alternative would provide resilience in the form of redundancy by providing both the rehabilitated North River Tunnel and the new Hudson River Tunnel as options for use once all construction and rehabilitation are completed.

3.5 SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The FEIS identifies the impacts of the No Action Alternative and the Preferred Alternative on social, economic, and environmental conditions as well as measures to avoid, minimize, or mitigate impacts.

The No Action Alternative would not involve construction and therefore no construction-related impacts would occur. In terms of direct and indirect permanent effects, the No Action Alternative would not involve any permanent new facilities and therefore no direct or indirect permanent impacts would generally occur to environmental resources. However, without full rehabilitation of the North River Tunnel, the increased instability of rail operations and the potential for eventual closure of the tunnel would have wide-ranging impacts on travel in the region and on the regional economy. Extreme overcrowding and delays in public transportation service would likely occur. A large shift from train to auto travel, as well as some trips shifting to ferry service, would result, which would exacerbate already congested conditions on the Hudson River crossings and major roads on both sides of the river and in the region. In this case, the No Action Alternative would result in adverse effects on socioeconomic conditions in New Jersey, New York, and the cities in the Northeast that currently benefit from Amtrak's intercity rail service. In the absence of rehabilitated rail infrastructure, delays on Amtrak and NJ TRANSIT service for unplanned maintenance and repairs would continue to worsen. As trans-Hudson travel demand continues to grow, more and more people would be affected as access to work, home, and areas of commerce would be more difficult in New Jersey, New York, and throughout the Northeast.

For the Preferred Alternative, the FEIS describes temporary impacts as a result of construction activities and impacts resulting from the completed Project. Most of the impacts of the Preferred Alternative relate to temporary impacts during construction, since the completed Project would not result in notable changes to train operations in comparison to the No Action Alternative.

Table 2 provides a summary of the benefits and impacts of the Preferred Alternative as identified in the FEIS as well as a summary of measures to avoid, minimize, or mitigate those impacts and **Attachment A** to this ROD provides detailed mitigation commitments.

Table 2
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
Traffic and Pedestrians	• Disruptions from construction traffic at nearby intersections at the Tonnelle Ave staging area in North Bergen (11 years); on streets in Hoboken and Weehawken during construction at the Hoboken staging area (7 years); and on streets used as truck routes during construction in Manhattan (7 years). • Near Tonnelle Avenue staging area, adverse traffic impacts at three locations during peak periods on weekdays during construction for the new Hudson River Tunnel: o Tonnelle Ave at Wendy's and White Cap Construction Supply (1500 Tonnelle Ave, signalized) o Tonnelle Ave northbound at 10th St (unsignalized) o Tonnelle Ave northbound at the entrance ramp from Secaucus Rd (unsignalized). • Near Tonnelle Ave staging area, adverse traffic impacts at four locations during peak periods on weekdays and Saturdays during North River Tunnel reconstruction: o Tonnelle Ave at Wendy's and White Cap Construction Supply (1500 Tonnelle Ave, signalized) o Tonnelle Ave northbound at 10th Street (unsignalized) o Tonnelle Ave northbound at the entrance ramp from Secaucus Rd (unsignalized) o Tonnelle Ave at Taco Bell (2020 Tonnelle Avenue, signalized). • Near Hoboken staging area, adverse traffic impacts at up to four locations during peak periods on weekdays: o Willow Ave at 19th St (signalized) – with haul route Options 1 and 2 o Park Ave at 19th St (signalized) – with haul route Option 1 o Willow Ave at 15th St (signalized) – if workers park off-site o Park Ave at 16th St (signalized) – if workers park off-site	• Maintenance and Protection of Traffic (MPT) plans for vehicular traffic during construction, including the use of traffic enforcement agents where needed. • Coordination with the appropriate local transportation authorities where adverse traffic impacts were identified to implement mitigation measures, as appropriate, including changes to signal timing or phasing, changes to pavement markings, changes to lane designations, and modifications to parking regulations. The costs for these mitigation measures would be Project costs that will be borne by the Project Sponsor rather than the local community. • Maintenance, repair, and cleaning of designated truck routes on local streets; reconstruction of any streets damaged by Project trucking activity. Advance or preventive rehabilitation of the proposed truck routes before the onset of construction, as necessary. • Strict enforcement of identified Project truck routes; trucks will wait inside construction staging areas rather than in the public right-of-way, to the extent practicable. • Evaluation during final design, in coordination with NJDOT, the potential creation of new signalized intersection on Tonnelle Ave at the staging area driveway to avoid unnecessary construction vehicle movements on Tonnelle Ave. • Maximum of no more than 8 trucks per hour (cap) in each direction traveling to and from the Hoboken staging area; no trucks on local roads in Weehawken or Hoboken between 10 PM and 7 AM. • Use of construction haul route along the north side of the HBLR that would connect to the existing street network at Willow Ave, Park Ave, and/or 19th St in Weehawken to divert construction traffic headed to and from the Hoboken staging area away from the nearby Shades neighborhood of Weehawken. The Project Sponsor, in coordination with the Project contractor, will select the final truck route during final design and will coordinate with the local municipality regarding this selection. • Construction workers at the Hoboken staging area will park either within the staging area or at a designated off-site parking facility, with shuttle transportation provided between the staging area and the parking facility. Construction workers will not park on local streets in Weehawken. • Creating high-visibility crosswalks at appropriate intersections near truck routes in Weehawken.

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts

Traffic and Pedestrians (Cont'd)	• Near Twelfth Ave staging area, adverse traffic impacts at five locations during peak periods on weekdays:
	  ○ Twelfth Ave at West 29th St (signalized)
	  ○ Eleventh Ave at West 40th St (signalized)
	  ○ Tenth Ave at West 30th St (signalized)
	  ○ Tenth Ave at West 34th St (signalized)
	  ○ Dyer Ave at West 34th St (signalized)
		• Maintaining at least one traffic lane on West 30th Street between Eleventh and Twelfth Aves at all times, except for potential short-term closures for utility relocations.
		• Provision of flaggers at the Hudson River Park walkway and Route 9A bikeway where construction trucks access the construction staging area in the West 30th St Heliport.
		• Maintaining sidewalks at least 10 feet wide on both sides of Tenth Avenue between West 31st and West 33rd Sts in New York.

Transportation Services (Passenger and freight rail, mass transit, maritime, and helicopter services)	• Maintenance of full NEC peak-hour rail passenger service (Amtrak and NJ TRANSIT) during rehabilitation of North River Tunnel. • Rehabilitated North River Tunnel that would provide new resiliency against severe weather and redundancy for operational flexibility. • Potential for disruptions to rail passenger service during construction in the vicinity of active passenger rail tracks on the NEC and near PSNY, including PSNY approach tracks and storage tracks to the west of PSNY. • Possible conflicts with HBLR right-of-way during construction at the Hoboken staging area. • Potential effects on bus service on and near truck routes near the Hoboken and Twelfth Ave staging areas because of traffic congestion due to construction trucks. • Potential adverse effects on throughput capacity and volume of helicopter operations at West 30th St Heliport during 1.5 years of construction at the Manhattan waterfront. • Possible effects on freight rail operations during construction of a bridge over the Conrail and New York, Susquehanna & Western Railway (NYSW) freight rail right-of-way in North Bergen, NJ. • Construction work in the Hudson River's navigation channel that could affect maritime traffic. • 1.5-year ground improvement operation at the Manhattan waterfront that would require closing the West 30th St Heliport's fueling station and one to two landing pads.	• To the extent practicable , construction work on and near the NEC during nights and weekends to avoid the need for daytime train outages. • Construction work within the operating envelope of the HBLR scheduled during off-peak time periods to avoid impacts on HBLR services; coordination of any required special safety protocols with NJ TRANSIT and the operators of the HBLR. • Traffic mitigation measures, including an MPT plan, to minimize traffic delays that might affect buses. • Construction activities at the new bridge over the freight rail right-of-way scheduled in coordination with the freight rail companies to avoid impacts on their operations. • Construction in the Hudson River in stages to minimize the area of navigable waterway that is disturbed at any one time. Safety measures to protect maritime commerce and boating safety, including notifications to mariners via the U.S. Coast Guard, installation of lighting on barges and the cofferdam, and Automatic Identification System (AIS) transponders affixed to barges and the cofferdam to enable electronic locating of the cofferdam and tracking of the barges. • Relocation of the heliport fueling station and coordination with the West 30th St Heliport operator and the Hudson River Park Trust (HRPT) regarding disruptions to helicopter operations; Project Sponsor would pay for costs associated with the temporary relocation of fueling facilities or landing pads.
Land Use, Zoning, and Public Policy	• Temporary but long-term disruption to nearby activities due to construction traffic, noise, dust; may affect religious facility and businesses on Tonnelle Ave in North Bergen (11 years); residences and a park on Paterson Plank Rd, Grand Ave, and along Tonnelle Ave in North Bergen (11 years); residents in Weehawken and Union City adjacent to the Hoboken construction staging area and truck routes (7 years); and residents, businesses, and park users in Manhattan (7 years). • Modified construction approach to reduce impacts near Hoboken staging area.	• Outreach program to local neighborhoods, to include a staffed local neighborhood outreach office near each of the construction sites (i.e., Tonnelle Ave, Hoboken, and Twelfth Ave); a dedicated Project liaison; a 24-hour hotline for emergencies and construction complaints; and regular meetings and notifications about construction status and upcoming activities. • Mitigation for traffic, noise, vibration, air quality, contaminated materials, and temporary and permanent property acquisition, as discussed in each respective section of this table.

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
Land Use, Zoning, and Public Policy (Cont'd)	• Disruption to activities at the West 30th Street Heliport during 1.5 years of construction at the Manhattan waterfront • Potential delay to possible Fire Department of New York (FDNY) Emergency Medical Services (EMS) station or garage, because of the use of part of Block 675 Lot 12 (the site of the EMS station or garage) for construction staging for the Preferred Alternative. • Temporary delays for completion of a future development project on Block 675 Lot 1 and related park improvements that could be funded by transfer of development rights from the park to Lot 1. • New permanent above-ground fan plants at Hoboken fan plant site in Hoboken, NJ, and at the Twelfth Ave fan plant site in NY.	• Use of construction haul route along the north side of the HBLR that would connect to the existing street network at Willow Ave, Park Ave, and/or 19th St in Weehawken to divert construction traffic headed to and from the Hoboken staging area away from the nearby Shades neighborhood of Weehawken. • MPT plan to ensure access to the street network for fire trucks and emergency vehicles at the North Hudson Regional Fire and Rescue Engine 3 station on Park Ave at 19th St in Weehawken. • Noise mitigation including barriers at construction sites and providing funding for sound-reducing windows for residences above Tonnelle Ave staging area and along truck routes for the Tonnelle Ave staging area and Hoboken staging area. • Removal of excavated materials from construction of the river tunnel segment primarily via the Tonnelle Ave staging area, in order to minimize trucking to and from the Hoboken staging area. • Truck trips serving the Hoboken staging area would not exceed a maximum (cap) of 8 trucks per hour in each direction throughout the construction period and trucking would not occur between 10 PM and 7 AM. • Lighting at staging areas designed to minimize light pollution affecting adjacent areas. • Coordination with the West 30th St Heliport operator and HRPT, which receives revenues from the heliport, to minimize disruption to the heliport operation during construction. • Fan plants designed to be compatible with adjacent uses; the Project Sponsor, in cooperation with the other Project Partners, will coordinate with the local community in Weehawken and with NYCDCP and Community Board 4 in Manhattan regarding the visible elements of the fan plants.
Property Acquisition	• Temporary and permanent surface easements and permanent acquisitions for the rail right-of-way in Secaucus and North Bergen, NJ; possible temporary easements on private properties in Hoboken/Weehawken to accommodate truck routes, depending on which route(s) are selected to avoid other adverse effects. • Permanent easements for the below-grade Hudson River Tunnel alignment in Hudson River Park; permanent easements and/or fee acquisitions for the below-grade Hudson River Tunnel alignment and above-grade Twelfth Ave fan plant on Block 675 Lot 1 in NY; temporary easements for construction activity on Block 675 Lots 1 and 12.	• Coordination with private property owners regarding access during construction, to minimize adverse impacts on business activities. • Property acquisition in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the Uniform Act) and all other relevant property acquisition procedures that apply.

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
Socioeconomic Conditions	• Economic modeling conducted for the Project shows that the Project would result in direct, indirect, and induced economic benefits in NJ and NY from construction expenditures, including an estimated total of 55,312 jobs (full-time equivalents (FTEs))—30,650 direct construction jobs (FTE), 9,567 indirect jobs, and 15,095 induced jobs in NJ and NY over the full 11-year construction period. On an annual basis (jobs per year), estimated total of 5,028 jobs in NJ and NY—2,786 direct construction jobs, 870 indirect jobs, and 1,372 induced jobs. • Temporary, short-term disruption to businesses in the Meadowlands near the NEC because of the need to use portions of parking lots for Project construction access (generally 6 to 12 months per property). Depending on the disruptions required, some businesses may need to relocate. • Temporary effects to West 30th St Heliport during ground improvement in NY, requiring relocation of helicopter fueling facilities and rendering one or more of the landing pads inaccessible for 18 months.	• Coordination with property owners and businesses regarding timing of outages. • Maintaining access to businesses at all times, including use of MPT plans for roadways to minimize disruptions to access. • Property acquisition in accordance with the Uniform Act and all other relevant property acquisition procedures that apply. • Coordination with the West 30th St Heliport operator and HRPT, which receives revenues from the heliport, to minimize disruption to the heliport operation during construction; mitigation for the temporary use of a portion of the heliport to comply with the Uniform Act.
Open Space and Recreational Resources	• Construction noise that would exceed FTA noise impact thresholds at three neighborhood parks in Hoboken (1600 Park, future park space at Harborside/ Hoboken Cove Park, and Hudson River Waterfront Walkway) from construction activities during limited period (two months) for pile installation at Willow Ave viaduct over the HBLR. • Temporary construction activities in Hudson River Park for tunnel segment beneath the park (total of 1.5 years) requiring temporary narrowing of park walkway and Route 9A bikeway for about 150-200 linear feet. • Potential inconvenience for recreational boaters at and near Pier 66 boathouse because of in-river construction activities for up to approximately two years that would require boaters to navigate around the construction zone; however, the Project would not limit access to and from the navigation channel. • Construction noise that would exceed FTA noise impact thresholds at the High Line if cut-and-cover excavation with pile driving is performed in West 30th St (seven months).	• Use of pile drilling rather than pile driving to install piles at Willow Ave. • Coordination with the City of Hoboken and Township of Weehawken regarding Willow Ave pile installation to avoid disruption to special events in nearby parks. • Measures to mitigate noise impacts (see category below). • Use of underground tunnel mining in Hudson River Park to avoid excavation across the park; Hudson River Park walkway and Route 9A bikeway to be kept open during ground improvement. • During construction in and under Hudson River Park, maintain a minimum 8-foot-wide segment of the Hudson River Park walkway (potentially shifted to the Route 9A bikeway to avoid the construction zone) and a minimum 10-foot-wide segment of the Route 9A bikeway (except possibly for short-term trenching for installation of freeze pipes). • Use of construction barricades to block views of construction equipment at West 30th St Heliport from Hudson River Park during ground improvement. • Measures to warn maritime traffic, including recreational boaters and other measures to protect boaters' safety during in-water construction in the Hudson River. • Full restoration of all areas of Hudson River Park affected by construction of the Preferred Alternative in coordination with and at no cost to HRPT.
Historic and Archaeological Resources	• Adverse effects on historic architectural resources that are eligible for the National Register of Historic Places (NRHP): ○ Pennsylvania Railroad NY to Philadelphia Historic District (NJ), North River Tunnel (NJ), and NY Improvements and Tunnel Extension of the Pennsylvania Railroad (NY).	• Programmatic Agreement (PA) developed through Section 106 consultation between FRA, NJHPO, NYSHPO, ACHP, FTA, the PANYNJ, and Amtrak and other consulting parties as part of the Section 106 process that sets forth detailed measures to avoid, minimize, and/or mitigate adverse effects on historic properties, including:

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
Historic and Archaeological Resources (Cont'd)	○ NY Hudson River Bulkhead. • Potential for accidental construction damage to NRHP-Eligible historic architectural resources near construction: Substation No. 3 (North Bergen, NJ), Bergen Portal of the North River Tunnel (North Bergen, NJ), High Line (NY), Master Printers Building (NY). • Potential for archaeological resources to be present in construction zone that could be affected by construction: ○ Historic sea wall in Hoboken (NJ). ○ Historic piers, wharves, and fill-retaining devices in Hudson River Park, Block 675 Lot 1, and West 30th St (NY). ○ Industrial and manufacturing resources and domestic sites in Block 675 Lot 1 (NY).	○ Documentation of the North River Tunnel to the standards of the Historic American Engineering Record prior to rehabilitation work to supplement existing histories and/or to target a specific audience; interpretive displays about the tunnel to be located in a station along the NEC in NJ and at Moynihan Station in NY. ○ Preparation of a report that documents the characteristics of the affected Hudson River Bulkhead location based on information gathered and drawings made in preparation for, and during the construction at, the bulkhead structure. ○ Provisions for the historic interpretation of the Hudson River Bulkhead within Hudson River Park. ○ Implementation of Bulkhead Protection Plan at the bulkhead and associated bulkhead impact area and identification of measures for the long-term maintenance of the bulkhead and associated impact area, in coordination with HRPT and NYSHPO. ○ Implementation of Construction Protection Plans (CPPs) to protect Substation No. 3, Bergen Portal, the High Line, and Master Printers building. The CPPs will include provisions for vibration monitoring, adherence to vibration limit thresholds, measures to reduce vibration levels, and modification of construction methods if necessary. ○ Archaeological testing and/or monitoring for potential archaeological resources at specific locations in NJ and NY.
Visual and Aesthetic Resources	• Potential visual disruption to surrounding neighborhoods from construction activities at Tonnelle Ave, Hoboken, and Twelfth Ave staging areas. • New fan plant in Hoboken adjacent to Shades neighborhood in Weehawken and to a new adjacent residential development in construction on Manhattan Avenue in Union City; to be designed to be compatible with surrounding area. • New fan plant on Block 675 in Manhattan that would be similar in bulk and height to many of the mid-rise buildings that will be present in the surrounding area in the future; to be designed to be compatible with the character of the surrounding area.	• Use of construction barricades to block views of construction equipment; construction wall up to 25 feet high at Hoboken staging area. Landscaping in front of the noise wall at the Hoboken staging area. Construction fencing and landscaping to be designed in coordination with the local community. • Fan plants designed to be visually compatible with surrounding neighborhood; consultation with the local community in Weehawken and with Community Board 4 and NYCDCP in NY regarding the visible elements of the fan plants. • Construction lighting at staging areas to be designed to minimize light pollution affecting adjacent residential areas. If an up-to 25-foot-high noise wall is constructed at the Hoboken staging area, lighting will be no higher than that temporary barrier.
Natural Resources	• Use of viaduct instead of sloped embankment in the Meadowlands to reduce impacts on wetlands. • Temporary impacts during construction: ○ Temporary impact to 1.5 acres of emergent wetlands and associated open water areas in the Meadowlands. ○ Potential temporary impacts to water quality and aquatic species in Penhorn Creek in the Meadowlands.	• Coordination with Permittees to comply with the requirements of all permits from the USACE, NJDEP and NYSDEC. • Minimize impacts through erosion and sediment controls, best management practices (BMPs), restoration of wetland areas after construction. • Wetland mitigation developed in consultation with NJDEP and the USACE, including purchase of mitigation credits from approved mitigation bank within the same watershed unit as the Project site.

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
Natural Resources (Cont'd)	○ Potential impacts to state-listed birds in Penhorn Creek in the Meadowlands. ○ Disturbance to approximately 1.7 acres of upland habitat in NEC right-of-way and potential additional upland habitat for haul route Option 3 in Weehawken. ○ Potential for impacts to aquatic species in Hudson River, including endangered species, during in-water work within cofferdam in Hudson River. ○ Temporary loss of bottom habitat in the Hudson River within cofferdam during ground improvement • Permanent impacts at Project completion: ○ Permanent impact to 4.4 acres of emergent wetlands and associated open waters in the Meadowlands and Hoboken outside the NYSW mitigation site and 0.09 acres of wetlands within the existing NYSW mitigation wetland being developed near the NEC. ○ Alteration of stormwater flow and wetland hydrology in the Meadowlands. ○ Permanent loss of 0.7 acres of soft-bottom habitat where ground improvement would occur in Hudson River and the hardened river bottom would be above mud line. ○ Potential removal of approximately 15 street trees in the median of Twelfth Ave. • FRA received concurrence from NMFS under Section 7 of the Endangered Species Act that the Preferred Alternative is not likely to adversely affect ESA-listed species and designated critical habitat under NMFS jurisdiction.	• Restoration of disturbed wetlands back to original topography and stabilization with mulch, straw or hay following the completion of construction. • Vegetation clearing and fill placement in the Meadowlands to occur only between October 1 and March 14, outside of bird breeding season. • Erosion and sediment controls and BMPs near Penhorn Creek. • In-water and sediment-generating activities and pile driving near Penhorn Creek to occur only between July 1 and February 28 (i.e., not between March 1 and June 30) to protect anadromous fish species. • Addition of a weir downstream of the twin 48-inch culvert to maintain upstream wetland water levels; coordination of weir design with NJDEP and USFWS. • Relocation of a portion of a Penhorn Creek tributary to a trapezoidal channel with a natural bottom developed to reflect a natural channel design; new access road above the relocated tributary on a viaduct with open grid steel grating to minimize shading. Collection of soil samples within the footprint of the relocated channel; removal or capping of any contaminated soils encountered. • Measures such as sheeting or similar methods, and a grouting program to fill cracks and other voids in the rock mass to minimize groundwater intrusion such that dewatering is minimized to the extent practicable. • If the Project contractor uses a below-grade pit at the Tonnelle Avenue staging area to store tunnel spoils, lining or otherwise managing the below-grade area to reduce groundwater inflow into the pit and to minimize the potential for discharge to groundwater. • Sheet piles and king piles for cofferdam in Hudson River in low cover area to be installed and removed using vibratory hammer; turbidity curtains to be used during cofferdam removal. • Pile installation and removal in the Hudson River to occur from July 1 to January 20 to avoid impacts to migratory period for anadromous fish. • Other measures to mitigate effects in the Hudson River as determined in consultation with the National Marine Fisheries Service (NMFS) to minimize impacts to aquatic species during construction and upon Project completion (including Essential Fish Habitat, endangered species, and anadromous fish species during migration). • Monitoring of the recovery of the 0.7 acres of affected river bottom, as well as the remaining 2.3 acres of ground improvement, for five years, in consultation with the USACE, NMFS, and the New York State Department of Environmental Conservation (NYSDEC), to assess the recovery of the area as foraging habitat. Monitoring reports will be available on the Project website.

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
Natural Resources (Cont'd)		• Based on ongoing consultation with the USACE, NMFS, and NYSDEC regarding the monitoring program, additional remediation actions, if necessary as determined during consultation. • Coordination with NYSDEC as part of the permitting process to determine what other mitigation may be required as a condition of permit approval. • Replacement and/or restitution for tree removal in accordance with Local Law 3 and Chapter 5 of Title 56 of the Rules of the City of New York. • All tree work would be carried out under the supervision of a certified arborist, following a tree protection plan approved by New York City Parks' Manhattan Borough Forester.
Noise	• FRA and NJ TRANSIT conducted the analysis of noise using the methodology presented in FTA's 2018 *Transit Noise and Vibration Impact Assessment Manual*, which FRA also uses for assessing non-high-speed rail projects. • Temporary construction noise impacts from on-site construction activities at construction staging areas and along construction truck routes, including the following: o Pile driving along the NEC that would result in overnight noise levels that exceed FTA's residential construction noise impact thresholds for approximately two months for residences on Henry St at Secaucus Rd in Secaucus, NJ. o Noise impacts from construction traffic on Tonnelle Ave at residences on Tonnelle Ave between 10th St and Secaucus Rd in North Bergen, NJ, for up to 11 years. o Noise impacts from construction at Tonnelle Ave staging area on residences in North Bergen, NJ, on Paterson Plank Rd and on Grand Ave between 19th and 23rd Sts and on Hindu temple on Tonnelle Ave near construction site (3 years for new tunnel construction, 4 years for existing tunnel rehabilitation, including overnight). o Noise impacts along truck routes in Weehawken at residences on Willow and Park Aves between 19th St and the HBLR, and on residences in west-facing apartments at 800 Harbor Blvd, for up to 7 years. o Noise impacts from underpinning Willow Avenue viaduct at nearby parks in Weehawken and Hoboken for up to 2 months.	• Community outreach program and noise complaint procedure to address community concerns; meetings with affected buildings to identify activities sensitive to noise and schedule construction activities around those where practicable. • Use of quieter equipment; use of acoustical noise tents and mufflers for loud equipment as practicable; vehicles routed through staging areas to minimize use of backup alarms. • Implementation of a program to certify that all noise control measures specified in the EIS are being fully and properly implemented. • Development and implementation of a noise monitoring plan during construction. • No blasting after 6 PM in NJ and 7 PM in NY except under special circumstances and only with permission from the relevant regulatory agency (i.e., North Hudson Regional Fire and Rescue in NJ and FDNY in NY); community outreach and notification related to anticipated times of blasting. • Coordination with residents on Henry St in Secaucus, NJ, regarding temporary accommodations while pile driving is occurring overnight within 1,000 feet of these residences. • At staging areas in NJ, ventilation fans to be used during construction of the new Hudson River Tunnel and the rehabilitation of the North River Tunnel to achieve a maximum acceptable sound pressure level from fan operation of 63 dBA at a distance of 50 feet; generators and light plants to achieve a maximum sound pressure level of 70 dBA at a distance of 50 feet; conveyors used to transport tunnel spoils from the tunnel during tunnel mining along with any associated pumps to be enclosed in a structure that would provide approximately 25 dBA attenuation to these pieces of equipment. • Evaluation during final design, in coordination with NJDOT, the potential creation of new signalized intersection on Tonnelle Ave at the staging area driveway to avoid unnecessary construction vehicle movements on Tonnelle Ave, which would eliminate some noise impacts along the route.

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
Noise (Cont'd)	○ Noise impacts from construction at the Twelfth Ave staging area on new residential buildings on Block 675 for 2.5 years; potential for an additional year if the EMS facility or garage on Block 675 is delayed and constructed later. These impacts would also constitute noise impacts according to CEQR guidelines. However, these buildings have been designed to account for this construction noise, with window/wall attenuation that results in acceptable interior noise levels. ○ Noise impacts from construction at the Twelfth Ave staging area areas of the High Line within 400 feet of construction according to CEQR criteria but not FTA criteria; if pile driving occurs in West 30th Street, noise levels higher than FTA noise impact thresholds within 200 feet of pile driving for approximately seven months, which is not an adverse effect given its short duration. • No permanent noise impacts associated with train operations on surface alignment or in new Hudson River Tunnel. • No noise impacts from new fan plants, which would operate intermittently and have dampers to reduce noise.	• Offer of installation of sound-reducing windows and air conditioning units to maintain closed-window condition for affected residences in North Bergen, NJ (along truck routes and above staging area) and Weehawken, NJ (near staging area and along truck routes). • Maximum of no more than 8 trucks per hour (cap) in each direction traveling to and from the Hoboken staging area; no trucks on local roads in Weehawken or Hoboken between 10 PM and 7 AM. • At Hoboken construction staging area, provision of a noise barrier and sufficient noise control measures to ensure that exterior noise levels at residences nearest to the construction site would not experience adverse noise impacts according to FTA noise criteria. A wall up to 25 feet high would provide this level of noise mitigation. If the noise wall is lower than 25 feet high, other noise-reducing measures will also be employed so that the same exterior noise levels can be achieved at the nearest residences and adverse noise impacts do not occur (for example, use of quieter equipment, use of noise dampening measures in spoils trucks, placement of the noisiest equipment on the site farther from nearby residences, and use of shields or covers for noise-generating equipment and activities). • At the Hoboken staging area, placement of the grout plant, slurry plant, and compressors within enclosures or buildings capable of providing 25 dBA attenuation (e.g., corrugated steel with spray-on insulation). Any ventilation for such enclosures or buildings would be required to maintain the acoustical performance of the building in the direction of the receptors to the north and west. • At the Hoboken staging area, enclosure of concrete pumps using temporary acoustical curtains or barriers at all times during concrete operations. • Construction of the Hoboken shaft using drilled piles rather than driven piles to the extent practicable, reduce resulting noise levels. • Underpinning of the Willow Ave viaduct in Hoboken using drilled piles rather than driven piles to the extent practicable, to reduce resulting noise levels. • Coordination with the City of Hoboken and Township of Weehawken regarding Willow Ave pile installation to avoid disruption to special events in nearby parks, and to provide advance notification. • At construction staging areas in Manhattan, provision of sufficient mitigation to meet the New York City Noise Control Code construction noise limit at the exteriors of any adjacent residential properties. Site enclosures or temporary noise barriers (e.g., ¾-inch thick plywood) 15 feet high would provide this level of noise mitigation and would avoid adverse impacts according to FTA noise impact criteria during most construction activities. At excavation locations in New York City streets, barriers will be constructed along the curbline while the lane nearest the curb will remain open to accept equipment to complete the excavation across the street.

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
Noise (Cont'd)		• Installation of piles for the tunnel alignment between the Manhattan bulkhead and Tenth Avenue, including in Hudson River Park (if needed), at the Twelfth Avenue shaft, and in West 30th Street, if needed and where practicable, using drilled piles rather than driven piles to reduce resulting noise levels.
Vibration	• FRA and NJ TRANSIT conducted the analysis of vibration using the methodology presented in FTA's 2018 *Transit Noise and Vibration Impact Assessment Manual*, which FRA also uses for assessing non-high-speed rail projects. • Construction vibration levels that would be noticeable at locations in NJ and NY, but no vibration impacts. • No permanent vibration impacts associated with train operations on surface alignment or in new Hudson River Tunnel.	• Construction activities to be coordinated with affected municipalities; community outreach program and vibration complaint procedure to address community concerns. • Blasting to be conducted using controlled blasting techniques. • No blasting after 6 PM in NJ and 7 PM in NY except under special circumstances and only with permission from the relevant regulatory agency (i.e., North Hudson Regional Fire and Rescue in NJ and FDNY in NY); community outreach and notification related to anticipated times of blasting. • Pre-construction inspection and vibration monitoring program for buildings within area of potential influence of construction. • Construction of the Hoboken shaft and underpinning for the Willow Avenue viaduct using drilled piles rather than driven piles to the extent practicable. • Implementation of CPPs for historic architectural resources located near Project construction sites. The CPPs will include provisions for vibration monitoring, adherence to vibration limit thresholds, measures to reduce vibration levels, and modification of construction methods if necessary. • Installation of piles for the tunnel alignment between the Manhattan bulkhead and Tenth Avenue, including in Hudson River Park (if needed), at the Twelfth Avenue shaft, and in West 30th Street, if needed and where practicable, using drilled piles rather than driven piles. • New Hudson River Tunnel and rehabilitated North River Tunnel would incorporate a low-vibration track system.
Air Quality	• Temporary construction air pollutant emissions. • No exceedances of National Ambient Air Quality Standards (NAAQS). • Consistent with general conformity regulations of Clean Air Act. • Temporary exceedance of CEQR *de minimis* criteria for fine particulates ($PM_{2.5}$) during construction at construction sites in New York City.	• Multi-approach fugitive dust control plan including watering, covering loose materials, vehicle rinsing, and a continuous perimeter air monitoring program at the staging areas to identify when additional dust management procedures are warranted. • Use of ultra-low sulfur diesel; idling restrictions; Best Available Tailpipe Reduction Technologies for all diesel engines; use of newer equipment.
Greenhouse Gas (GHG) Emissions and Resilience	• GHG emissions associated with construction and Project operation. • Potential vulnerability to severe storms during construction. • Project to be designed to address potential vulnerability to severe storms for permanent Project elements. Flood and storm resilience measures included in the Project such as:	• Sustainability design guidelines for construction; construction contracts to include provisions related to locally produced, recycled building materials and biodiesel. • Sustainability design guidelines for permanent Project elements; construction contracts to require Energy Star and other high-efficiency building components, efficient lighting and energy systems, use of Building Management Systems for fan plants. • Storm risk management plan for construction sites.

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
GHG Emissions and Resilience (Cont'd)	○ Use of Design Flood Elevation (DFE) for the Project; for the new tunnel all entrances and openings would be above the DFE or any entrances below the DFE would be watertight and any equipment below the DFE would be water-resistant. ○ Floodgates on each side of the river in the new tunnel and at the new NY portal. ○ Use of water-resistant cables and conduits in new and existing tunnel. Use of concrete for tunnel walls and bench walls in new tunnel that would withstand salt water.	• Use of DFE for the Project; incorporate floodgates for new tunnel, and flood resistance and hardening for both new and existing tunnels as well as new fan plants and new surface alignment.
Geology and Soils	• Potential for geological and soil conditions to affect or be affected by construction and result in hazards during construction, including settlement, seismic conditions, instability of slopes, unstable soils. • Potential for encountering naturally occurring hazardous minerals (e.g., serpentinite or other asbestiform minerals).	• Project design reflecting and addressing potential hazards or construction effects. • Safety measures to protect workers and minimize environmental hazards if naturally occurring hazardous minerals encountered. • Erosion and sediment control plans that meet all applicable standards and regulations. • Control measures including ground improvement to stabilize soils, rock mass grouting, installation of waterproof earth retention systems, such as slurry walls or other lateral earth retention in areas of open cut or shaft construction, and underpinning of potentially affected existing structures. • Evaluation of Palisades cliff face for unstable, loosened areas and implementation of vibration monitoring during construction; Implementation of best management practices related to landslide prevention to minimize the potential for landslides at the Palisades cliff; use of stabilization measures, such as rock bolting and installation of surface protection. • Investigations in advance of construction in the Weehawken Cove area, where faults are present, to evaluate potential inflow areas. • Implementation of CPPs for historic architectural resources located near Project construction sites. The CPPs will include provisions for vibration monitoring, adherence to vibration limit thresholds, measures to reduce vibration levels, and modification of construction methods if necessary.
Contaminated Materials	• Potential to encounter contaminated soil or groundwater during construction; Project alignment has long history of industrial and railroad use that may have resulted in contamination.	• Additional site investigation soil and groundwater sampling activities, as well as hazardous materials building investigations, at certain locations along the Project site where existing information is insufficient and/or where the potential for contamination exists. • Remedial measures where appropriate based on site investigation, which may include excavation or in-situ treatment of contaminated soil, and disposal or treatment of contaminated groundwater or liquid from dewatering.

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
Contaminated Materials (Cont'd)		• Implementation of Project-wide Soils and Materials Management Plan to establish procedures for materials handling during construction, BMPs to be implemented during construction, such as procedures for stockpiled or containerized material and testing procedures for sampling material prior to off-site disposal or on-site reuse. • Development of a site-specific Soil Reuse and Alternative Fill Management Plan for management of contaminated soil. • Implementation of a Project-specific Health and Safety Plan (HASP) prior to earth-disturbing activities. • Management of groundwater generated during dewatering activities in accordance with applicable permits. • If the Project contractor uses a below-grade pit at the Tonnelle Avenue staging area to store tunnel spoils, lining or otherwise managing the below-grade area to reduce groundwater inflow into the pit and to minimize the potential for discharge to groundwater. • Restoration of all disturbed areas using engineering controls to prevent direct human exposure to contaminated materials. • Proper handling and disposal of all excavated soils and contaminated material encountered during construction in accordance with all applicable laws and regulations. • Preparation of a fugitive dust control plan including a robust watering program as part of contract specifications; proactive controls to reduce the potential for dust generation during site activities; and ambient air quality monitoring around Project staging areas.
Utilities and Energy	• Relocation or support in place for utilities required for construction in NJ at Secaucus Rd (at the NEC); at Tonnelle Ave for the new bridge over the new tunnel's surface alignment; and at Willow Ave in Hoboken where ground improvement would occur. Temporary service disruptions could occur. • Relocation, replacement, or support in place for utilities, sewers, and water mains required for construction in NY at West 30th St and at Tenth Ave, which could result in temporary service disruptions. • Large sewer within Twelfth Ave (Route 9A) in NY to be supported in place where tunnel alignment would cross.	• Coordination with affected utility providers throughout final engineering design to identify potential issues and prescribe means to resolve them prior to construction. • Agreements with utility providers and government agencies regarding temporary or permanent relocation of utility transmission lines. • Public outreach for any minor, short duration service interruptions. • Mitigation for traffic delays and implementation of rail service plans to reduce transportation delays and associated increases in fuel consumption, as discussed under "Traffic and Pedestrians" and "Transportation Services" of this table.
Safety and Security	• Construction sites, materials, and equipment to be kept secure. • Safety and security measures incorporated into permanent Project elements in accordance with NFPA standards and all appropriate regulations and standards, including all applicable FRA regulations and guidance relative to the operation of railroad infrastructure, including tracks, train signals (including Positive Train Control), and bridges.	• Construction sites to be secured with active and passive security measures; Project contractor to meet all applicable safety and security requirements. • Project design being developed in coordination with emergency responders, including FDNY and North Hudson Regional Fire and Rescue. • Operational safety and security measures to address natural events (e.g., severe storms, flooding, earthquakes), or emergencies caused by human error, mechanical failure, fire, or intentional or unintentional human intervention.

Table 2 (Cont'd)
Summary of Effects of the Preferred Alternative and Measures to Avoid, Minimize, or Mitigate Impacts

Environmental Category	Beneficial and Adverse Effects	Measures to Avoid, Minimize, or Mitigate Impacts
Public Health and Electromagnetic Fields (EMF)	• Construction noise and air emissions, and potential to encounter contaminated materials during construction to be managed to avoid public health effect. • No potential for EMF impacts during construction or operation.	• Implementation of mitigation measures described above for noise, air quality, and contaminated materials.
Indirect and Cumulative Effects	• Cumulative resiliency improvement to PSNY and NEC rail infrastructure with other ongoing resiliency projects. • Potential overlap with construction of other rail system improvements in and near PSNY and on the NEC. • Potential for concurrent construction with redevelopment projects in NJ: Willow Avenue bridge rehabilitation, Hoboken Rebuild By Design project, and Lincoln Tunnel Helix Replacement Program. • Concurrent construction with development projects in the NY study area.	• Coordination of railroad improvements that will affect PSNY operations and NEC service to minimize disruptions to service. • Coordination of regional construction projects in NJ; transparent sharing of information with neighboring communities. • Coordination between the Hudson Tunnel Project and other nearby development projects in NJ and NY to minimize conflicts and cumulative impacts during construction. • Coordination between the Hudson Tunnel Project and the Hoboken Rebuild By Design project during continuing design and engineering for each project, to ensure that the two projects do not have conflicting designs. • Coordination with NYCDCP and Manhattan Community Board 4 regarding the visible elements of the Twelfth Avenue fan plant, so that the fan plant is visually compatible with the character of the surrounding area.

3.6 ENVIRONMENTALLY PREFERABLE ALTERNATIVE

CEQ regulations implementing NEPA require that an agency identify the alternative considered to be environmentally preferable, and discuss relevant factors such as economic and technical considerations, as well as national environmental policy as expressed in the NEPA.[8] The environmentally preferable alternative is the alternative that, on balance, causes the least harm to the natural and physical environment and that best protects, preserves, and enhances historical, cultural, and natural resources, after consideration of relevant factors and national policy.

In the case of the Hudson Tunnel Project, while the No Action Alternative would avoid the temporary and permanent impacts to the natural and built environment that would occur with the Preferred Alternative, the Preferred Alternative would have substantial beneficial impacts on transportation that outweigh its impacts. The Preferred Alternative would preserve the current functionality of Amtrak's NEC service and NJ TRANSIT's commuter rail service between New Jersey and PSNY by repairing the deteriorating North River Tunnel, and it would strengthen the NEC's resiliency to support reliable service by providing redundant capability under the Hudson River for Amtrak and NJ TRANSIT NEC trains between New Jersey and the existing PSNY. These benefits would not occur with the No Action Alternative. In contrast with the Preferred Alternative, the No Action Alternative would have long-term adverse effects on transportation along the NEC and throughout the Northeast. As described in Section 3.4.1 of this ROD, the No Action Alternative would result in increased instability of rail operations and the potential for eventual closure of the tunnel that would have wide-ranging impacts on travel in the region and on the regional economy,

[8] 40 CFR § 1505.2.

including the potential for extreme overcrowding and delays in public transportation service; a shift from train to auto travel that would exacerbate already congested conditions on the Hudson River crossings and major roads on both sides of the river and in the region; increases in net greenhouse gas (GHG) emissions due to the shift to auto travel; adverse effects on socioeconomic conditions in New Jersey, New York, and the cities in the Northeast that currently benefit from Amtrak's intercity rail service; worsening delays on Amtrak and NJ TRANSIT service for unplanned maintenance and repairs; and potential for increasing difficulty accessing work, home, and areas of commerce in New Jersey, New York, and throughout the Northeast. FRA considered and balanced the environmental effects of the Preferred Alternative against those of the No Action Alternative and identified the Preferred Alternative as the Environmentally Preferable Alternative.

4 MEASURES TO MINIMIZE HARM

FRA and FTA have identified commitments to provide mitigation for the Hudson Tunnel Project, which are listed in **Attachment A** to this ROD. These commitments are the result of agency consultations, comments on the DEIS, and regulatory requirements and reflect all practicable means to avoid or minimize environmental harm from the Selected Alternative.

The lead Federal agency will be responsible for ensuring compliance with mitigation commitments identified in this ROD. The PANYNJ is currently the Project Sponsor, and will be responsible for committing to the mitigation measures that would be implemented, as appropriate, during design, construction, and/or following construction.

As noted in Section 1 of this ROD, the PANYNJ will remain the Project Sponsor until such time as the GDC assumes the role of Project Sponsor.[9] The PANYNJ and GDC anticipate that this change will occur prior to the award of any Federal financial assistance for the Project. In such an event, the PANYNJ and GDC will notify FRA and FTA in writing of the change, and the PANYNJ, FRA, and FTA will assist in transition to the new Project Sponsor to effectuate fulfillment of any outstanding mitigation measures.

Actual dates for future Project design and implementation are dependent upon identifying and securing funding, completing Project design, and finalizing all necessary approvals and permits.

5 PUBLIC OUTREACH AND OPPORTUNITIES TO COMMENT

During preparation of the EIS, FRA and NJ TRANSIT informed and solicited early and continued feedback from the public and provided opportunities for comments and questions. FRA and NJ TRANSIT conducted a robust outreach effort that included a focused effort to compile a comprehensive mailing list of stakeholders, including elected officials, potentially interested organizations, and owners and residents of properties near the proposed construction staging areas, and to provide multiple forums for those stakeholders to provide input. Project outreach efforts included:

- A Project website (www.hudsontunnelproject.com) with a library of Project documents for public review, additional information on the Project, and a means for providing comments and requesting further information.
- Fact sheets published at major Project milestones that were made available on the Project website and sent to the Project mailing list. These included Fact Sheet 1 (spring 2016), which provided a Project overview; Fact Sheet 2 (fall 2016) summarizing the scoping process and

[9] On May 12, 2021, the Board of the GDC voted to formally recognize its commitment to take over the role of Project Sponsor of the Hudson Tunnel Project from the PANYNJ prior to the award of any Federal financial assistance for the Project.

comments received, Fact Sheet 3 (fall 2016) presenting the Preferred Alternative, and Fact Sheet 4 (summer 2017) providing a Project update, information on construction methodologies, and information about the public comment period and public hearings. These were published in English and in Spanish (due to the presence of large Spanish-speaking communities in the vicinity of the Project area).

- Public meetings during the public scoping period (May 2016), after announcement of the Preferred Alternative (November 2016), during the DEIS comment period (August 2017), and during FEIS development (fall 2017 and winter 2018). FRA and NJ TRANSIT used the Project website, meeting flyers, and email notices to the Project mailing list to publicize all public meetings, public hearings, and open houses. The flyers were in English and Spanish (due to the presence of large Spanish-speaking communities in the vicinity of the Project area) and were mailed or emailed to the Project mailing list. FRA and NJ TRANSIT also distributed flyers to libraries and community centers. Flyers and meeting notices were sent out at least two weeks in advance of meetings. In addition, meetings were advertised in area newspapers (in English, with Spanish ads in corresponding local area papers) and on the Project website.
- Comment periods in which comments were solicited from the public: during the scoping period, after announcement of the Preferred Alternative, and during the DEIS comment period.
- Targeted community meetings to provide additional outreach to specifically affected groups, including owners of property near the Project site and residents of neighborhoods close to the construction sites, including environmental justice communities in New Jersey.

In addition, representatives of local communities in New Jersey requested that FRA and NJ TRANSIT coordinate directly with local government agencies and elected officials to reduce the impacts of the Project on their communities. They also requested that the local community be involved in developing mitigation for the Project's impacts. As a result, FRA and NJ TRANSIT met with representatives of the local communities and other stakeholders during development of the DEIS, during the public comment period for the DEIS, and after the comment period during development of the FEIS to clarify their concerns, review the impacts of the Preferred Alternative on those communities, and develop measures to reduce and avoid those impacts.

During ongoing coordination, elected officials and members of the public proposed ideas for mitigation of Project impacts on their communities, and FRA and NJ TRANSIT considered these ideas when developing mitigation proposed in the DEIS and the FEIS and incorporated many of them into the Project commitments.

6 DETERMINATIONS AND FINDINGS REGARDING OTHER LAWS

6.1 SECTION 106 OF THE NATIONAL HISTORIC PRESERVATION ACT

FRA completed consultation in accordance with Section 106 of the National Historic Preservation Act of 1966[10] (Section 106) and its implementing regulations,[11] which require Federal agencies to consider the impacts of their undertakings on historic properties. Section 106 regulations require that FRA identify historic properties listed in or eligible for listing in the National Register of Historic Places (NRHP) within the Project's Area of Potential Effects (APE); assess effects to historic properties; avoid, minimize, or mitigate any adverse effects; and consult with the relevant State Historic Preservation Officer (SHPO), which for the Hudson Tunnel Project are the New Jersey

[10] 54 USC 306108.

[11] 36 CFR Part 800.

Historic Preservation Office (NJHPO) and New York State Historic Preservation Office (NYSHPO). Through the Section 106 process, FRA determined, with NJHPO and NYSHPO concurrence, that the Selected Alternative will have adverse effects on the following historic properties:

- Pennsylvania Railroad NY to Philadelphia Historic District (New Jersey), North River Tunnel (New Jersey), and New York Improvements and Tunnel Extension of the Pennsylvania Railroad (New York).
- New York Hudson River Bulkhead.

The Selected Alternative has a potential for adverse effect as a result of accidental construction damage on the following historic properties:

- Substation No. 3 (North Bergen, New Jersey).
- Bergen Portal (North Bergen, New Jersey).
- High Line (New York).
- Master Printers Building (New York).

In addition, FRA identified the potential for archaeological resources to be present in the construction zone that, if present, could be adversely affected by the construction of the Selected Alternative:

- Historic sea wall in Hoboken (New Jersey).
- Historic piers, wharves, and fill-retaining devices in Hudson River Park, Block 675 Lot 1, and West 30th St (New York).
- Industrial and manufacturing resources and domestic sites in Block 675 Lot 1 (New York).

In accordance with 36 CFR § 800.14(b)(3), FRA developed detailed measures to avoid, minimize, and/or mitigate adverse effects that are included in a Section 106 Programmatic Agreement (PA). These measures were developed through consultation between FRA, NJHPO, NYSHPO, the Advisory Council on Historic Preservation (ACHP), FTA, Amtrak, and the PANYNJ (the Signatories and Invited Signatories), as well as other Consulting Parties and Concurring Parties to the PA as part of the Section 106 process. The PA is provided in Appendix 9 to the FEIS. The PA is a refinement of the Draft PA that was included in the DEIS.

Refinements to the PA since the DEIS was published are the result of further consultation among the Signatories and with Consulting Parties regarding the roles and responsibilities of Signatory agencies and Project Partners, and Project minimization and mitigation commitments related to the affected historic properties.

Adherence to the stipulations in the executed PA demonstrates FRA and FTA compliance with Section 106.

6.2 SECTION 4(f) DETERMINATION

Section 4(f) of the Department of Transportation Act of 1966 (Section 4(f)) protects publicly owned parks, recreation areas, wildlife and/or waterfowl refuges, and publicly or privately owned

significant historic sites.[12] Section 4(f) states that USDOT operating administrations, including FRA and FTA, may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the Federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if (a) the agency determines that the use of the property will have a *de minimis* impact; or (b) there is no feasible and prudent avoidance alternative to the use of the land, and the action includes all possible planning to minimize harm to the Section 4(f) property resulting from the use.[13]

FRA and FTA have determined that the Selected Alternative will result in the use of two Section 4(f) properties, the New York Hudson River Bulkhead and Hudson River Park based on the Final Section 4(f) Evaluation (provided in Chapter 24 of the FEIS). FRA and FTA have determined that there is no feasible and prudent alternative to the use of these Section 4(f) properties. The Selected Alternative includes all possible planning to minimize harm to the Section 4(f) properties. The use of the Section 4(f) properties and measures to minimize harm are summarized below:

- **New York Hudson River Bulkhead**, a historic property along the edge of the Hudson River that has been determined eligible for the National Register of Historic Places. This historic property is located within Hudson River Park. The new Hudson River Tunnel must pass directly through the substructure portion of Manhattan's Hudson River Bulkhead, removing original components of the bulkhead and resulting in use of this Section 4(f) property. No feasible and prudent alternative to the use of the New York Hudson River Bulkhead exists.

  The Selected Alternative includes measures to minimize harm to the Hudson River Bulkhead, which were developed through the Section 106 process in consultation with the Consulting Parties, and Concurring Parties to the PA. The officials with jurisdiction for the Hudson River Bulkhead—ACHP, NYSHPO, and the Hudson River Park Trust (HRPT)—were included in this consultation process. These measures to minimize harm are set forth in the Selected Alternative's PA, which is included in Appendix 9 to the FEIS.

- **Hudson River Park,** a 4-mile-long linear park along Manhattan's Hudson River waterfront in New York. Construction activities for the Selected Alternative will involve placing a temporary construction staging area in a portion of the park that is not used for recreational purposes (since it is currently occupied by a commercial heliport). This temporary staging area will also affect approximately 150 to 200 linear feet of a walkway in Hudson River Park, requiring a narrowing of the walkway and potentially requiring that the walkway be shifted eastward into the adjacent Route 9A bikeway during the construction period of approximately 18 months. No feasible and prudent alternative to the use of this small area in Hudson River Park exists.

  The Selected Alternative includes measures to minimize harm to Hudson River Park related to this construction activity, which are included in **Attachment A** to this ROD. Among those measures, the Project Sponsor and Project Partners will continue to coordinate with HRPT regarding construction for the Selected Alternative and will seek to identify further practicable measures to avoid and minimize harm. During construction in and under Hudson River Park, a minimum 8-foot-wide segment of the Hudson River Park walkway will be maintained open

[12] 49 USC § 303 and 23 § USC 138. FTA and the Federal Highway Administration promulgated regulations implementing Section 4(f) at 23 CFR Part 774. Following publication of the Draft EIS and Draft Section 4(f) Evaluation, in October 2018, FRA formally joined the 23 CFR Part 774 Section 4(f) implementing regulations, making them FRA's Section 4(f) implementing regulations. Because the effective date of this change was after the Notice of Intent for the Hudson Tunnel Project (which was published in the Federal Register in 2016), for this Section 4(f) Evaluation and Determination, FRA relied on its *Procedures for Considering Environmental Impacts* (64 FR 28545 (May 26, 1999) and 78 FR 2713 January 14, 2013) and looked to the Part 774 regulations as guidance.

[13] 23 CFR Part 774.3.

and a minimum 10-foot-wide segment of the adjacent Route 9A bikeway that is not part of the park will remain open (except possibly for short-term trenching for installation of freeze pipes). Following completion of the construction, the Project Sponsor, will restore the affected area of Hudson River Park in coordination with HRPT. The Project Sponsor will undertake this restoration at no cost to HRPT or relevant New York State and City agencies.

FRA consulted with the U.S. Department of Interior (DOI) regarding the use of Section 4(f) properties during the public comment period for the DEIS and again during preparation of the FEIS. On May 10, 2021, DOI concurred with FRA's conclusions (see Appendix 24 of the FEIS).

6.3 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), requires Federal agencies to identify and address disproportionately high and adverse effects of their actions on minority populations and low-income populations (environmental justice communities). Executive Order 12898 also requires Federal agencies to work to ensure greater public participation in the decision-making process. USDOT Updated Environmental Justice Order 5610.2(a), *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, imposes similar obligations on USDOT operating administrations to promote the principles of Executive Order 12898 and incorporate such principles in all programs, policies, and activities, including the NEPA process.

FRA and NJ TRANSIT prepared an analysis of the Selected Alternative's effects on environmental justice populations following guidance and methodologies for compliance with Executive Order 12898 established by CEQ, USDOT Updated Environmental Justice Order 5610.2(a), and FTA *Environmental Justice Policy Guidance for Federal Transit Administration Recipients* FTA C 4703.1, as well as New Jersey and New York State guidance.

In New York, while adverse construction impacts will occur in environmental justice communities, similar or greater adverse construction impacts will also occur in areas that are not environmental justice communities. Therefore, in New York, the Selected Alternative will not result in disproportionately high and adverse effects on environmental justice communities.

The alignment of the Selected Alternative in New Jersey will be located predominantly in areas with environmental justice communities. Even considering proposed mitigation measures, the adverse effects associated with the construction of the Selected Alternative will result in disproportionately high and adverse effects to environmental justice communities in New Jersey.

As described in Section 5 of this ROD, Project outreach efforts included targeted community meetings located in the affected environmental justice communities.

As set forth in the USDOT Order, for any actions that are found to have a disproportionately high and adverse effect on minority or low-income populations, these actions will only be carried out if:

(1) Further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse effect are not practicable.

(2) A substantial need for the action exists, based on overall public interest, and alternatives that would have less adverse effects on protected populations (and that still satisfy the need for the project) would have other adverse social, economic, environmental, or human health impacts that are severe; or would involve increased costs of extraordinary magnitude.

As described above in Section 3.3 of this ROD, a substantial need exists for the Hudson Tunnel Project. No alternatives that would avoid or reduce the disproportionately high and adverse effect are available; the Project alignment must pass through the affected environmental justice communities, and there is no alternative location for Project elements and construction staging

areas in those communities. After completion of the DEIS, to address the concerns raised by local environmental justice communities, FRA and NJ TRANSIT, working with the other Project Partners, evaluated alternative methods for constructing the Preferred Alternative and have incorporated modifications to the construction methods into the Selected Alternative that will reduce the construction impacts to local residents associated with the Selected Alternative. During ongoing coordination, elected officials and members of the public proposed ideas for mitigation of Project impacts on their communities (which are environmental justice communities), and FRA and NJ TRANSIT considered these ideas when developing mitigation proposed in the DEIS and the FEIS and incorporated many of them into the Selected Alternative commitments. Mitigation measures for the adverse effects of the Selected Alternative on local communities in New Jersey are identified in Section 4 of this ROD.

In the design and construction phases of the Selected Alternative, FRA and FTA will ensure that the Project Sponsor will continue to involve environmental justice communities in the study area, including targeted outreach to Limited English Proficient (LEP) populations. During construction, the Project Sponsor will establish complaint procedures to promptly address community concerns and implement additional control methods where necessary.

Based upon these findings, and with these mitigation measures in place, FRA and FTA determine that the Selected Alternative is consistent with requirements of Executive Order 12898.

6.4 COASTAL ZONE MANAGEMENT ACT

The Federal Coastal Zone Management Act (CZMA) of 1972 was established to encourage coastal states to manage development within the states' designated coastal areas, reduce conflicts between coastal developments, and protect resources within the coastal zone. Requirements for Federal approval of coastal zone management programs and grant application procedures for development of the state programs is included in 15 CFR Part 923, Coastal Zone Management Program Development and Approval Regulations, National Oceanic and Atmospheric Administration (NOAA). The Coastal Zone Management Act requires that Federal activities within a state's coastal zone be consistent with that state's coastal zone management plan. New Jersey and New York each have a Federally approved coastal zone management program, which are administered by NJDEP and NYSDOS, respectively. As discussed in the FEIS, the Selected Alternative will be consistent with each state's coastal zone management policies (see Chapter 21 of the FEIS). Both states have issued coastal zone consistency determinations for the Preferred Alternative based on information in the DEIS and will issue updated determinations as part of the permitting process (see Appendix 21 of the FEIS).

6.5 CLEAN AIR ACT

6.5.1 GENERAL CONFORMITY

In accordance with 40 CFR Part 93 Subpart B, as an action taken by FRA, the Project is subject to general conformity requirements. General conformity regulations apply to the Selected Alternative because it is located in an area that the U.S. Environmental Protection Agency has designated as under a maintenance plan for attainment of the National Ambient Air Quality Standard (NAAQS) for fine respirable particulate matter ($PM_{2.5}$) and in serious non-attainment for ozone (O_2). As part of the environmental review process, FRA conducted an analysis of potential emissions from the Project pursuant to 40 CFR Part 93. FRA has determined that Project-generated predicted annual pollutant emissions will be below General Conformity *de minimis* thresholds and that no General Conformity determination is required.

6.5.2 TRANSPORTATION CONFORMITY

If FTA provides funding for implementation of the Selected Alternative, the Project would also be subject to transportation conformity regulations under 40 CFR Part 93 Subpart A. The area's Metropolitan Planning Organizations (MPOs)—the North Jersey Transportation Planning Authority (NJTPA) and the New York Metropolitan Transportation Council (NYMTC)—are responsible for overseeing transportation conformity. Both New Jersey and New York have established Interagency Consultation Groups (ICGs) of agencies with responsibility for transportation and air quality to coordinate the transportation conformity process statewide. The ICGs for New Jersey and New York have reviewed the Selected Alternative and determined that according to the transportation conformity regulations (40 CFR § 93.126), the Selected Alternative is an exempt project and therefore does not require transportation conformity analysis (see Appendix 13 of the FEIS).

6.6 SECTION 7 ENDANGERED SPECIES FINDING

FRA requested formal consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA/NMFS) under Section 7 of the Endangered Species Act (ESA). In response, the USFWS concurred that no listed species under the Service's jurisdiction in New Jersey will be adversely affected by the Selected Alternative, and NMFS concurred that the Selected Alternative is not likely to adversely affect ESA-listed species and/or designated critical habitat (see Appendix 11 of the FEIS). Based on these findings, FRA and FTA determine that the Selected Alternative is in accordance with requirements of Section 7.

6.7 ESSENTIAL FISH HABITAT

The Magnuson-Stevens Fishery Conservation and Management Act, as amended by the Sustainable Fisheries Act (Public Law 104-267), requires all Federal agencies to consult with NOAA/NMFS on all actions, or proposed actions, permitted, funded, or undertaken by the agency that may adversely affect Essential Fish Habitat (EFH). The Selected Alternative could cause the disruption of habitat for various life stages of some EFH-designated species during construction in Penhorn Creek in the Hackensack Meadowlands in New Jersey and during construction in the Hudson River in New York. As required, FRA has prepared an EFH assessment and undertaken consultation with NOAA/NMFS regarding impacts to EFH. In response, NOAA/NMFS made recommendations regarding measures to reduce the impacts of the Selected Alternative on EFH species, including the incorporation of compensatory mitigation for wetlands (see Appendix 11 of the FEIS). FRA and FTA have adopted those measures to avoid, mitigate, or offset the impact of the Selected Alternative on EFH (see **Attachment A** to this ROD) and therefore is consistent with the requirements of the Magnuson-Stevens Fishery Conservation and Management Act.

6.8 EXECUTIVE ORDER 11990, WETLANDS AND USDOT ORDER 5660.1a

In accordance with Executive Order 11990, *Protection of Wetlands*, and USDOT Order 5660.1a, *Preservation of the Nation's Wetlands*, FRA must avoid undertaking or providing assistance for new construction in wetlands unless there is no practical alternative to such construction and the proposed action includes all practicable measures to minimize harm to the wetland.

The Selected Alternative will result in impacts on waters of the United States. Specifically, the Selected Alternative will result in temporary impacts to 1.5 acres of emergent wetlands and associated open water areas in New Jersey during construction in the Hackensack Meadowlands and permanent impacts to 4.4 acres of emergent wetlands and associated open water areas in the Hackensack Meadowlands and in Hoboken, New Jersey. Approximately 5,569 linear feet of

the Selected Alternative will extend beneath the Hudson River, a navigable waterway, and the Selected Alternative will result in changes to 3.0 acres of the bottom habitat in the Hudson River, with permanent fill within 0.7 acres where hardened soil (soilcrete) will be 1 to 2 feet above the mudline. Compensatory mitigation to address the wetland impacts and Hudson River bottom habitat impact will be developed in consultation with the USACE and NMFS as well as NJDEP and NYSDEC during the permitting phase of the Selected Alternative. Design requirements and permit conditions will require the Project Sponsor to avoid impacts on jurisdictional waters wherever feasible. Mitigation measures will include implementation of a five-year monitoring program for the affected area of the river bottom following completion of construction, in consultation with USACE, NMFS, and NYSDEC, to assess recovery as fish foraging habitat. Mitigation for wetland impacts will be determined in consultation with NJDEP and USACE and will likely include the purchase of mitigation credits from an approved mitigation bank within the same watershed unit(s) as the Project site.

Based upon the information in the FEIS, FRA and FTA have found that (1) there is no practicable alternative to such construction; and (2) the construction of the Selected Alternative includes all practicable measures to minimize the temporary and permanent harm to wetlands that may result from such use. Therefore, FRA finds that the Selected Alternative is consistent with Executive Order 11990 and USDOT Order 6550.1A.

6.9 EXECUTIVE ORDER 11988, FLOODPLAIN MANAGEMENT AND USDOT ORDER 5620.2

USDOT Order 5620.2 implements Executive Order 11988, Floodplain Management and Protection. These orders state that FRA may not approve an alternative involving a significant encroachment unless FRA can make a finding that the proposed encroachment is the only practicable alternative. The major purposes of Executive Order 11988 are to avoid Federal support for floodplain development; to prevent uneconomic, hazardous, or incompatible use of floodplains; to restore and preserve the natural and beneficial floodplain values; and to be consistent with the standards and criteria of the National Floodplain Insurance Program.

FRA and FTA conclude that the Selected Alternative will not result in any substantial adverse impact on natural and beneficial values of the floodplains, and will not result in a substantial change in flood risks or damage. Based on these findings, FRA and FTA determine that the Selected Alternative is consistent with requirements of Executive Order 11988.

6.10 PERMITS AND APPROVALS

Implementation and construction of the Selected Alternative is subject to a number of Federal, New Jersey and New York, and local permits and approvals in addition to NEPA. Table 25-1 in Chapter 25, “Process, Agency Coordination, and Public Involvement,” of the FEIS lists the anticipated permits for the Selected Alternative.

7 CONCLUSION

FRA and FTA have carefully considered the Project record including the DEIS, FEIS, and associated technical reports and analysis; the Section 4(f) Determination; the mitigation measures required including commitments made in the Section 106 PA; and the written and oral comments offered by agencies, stakeholders, and the public on this record. Based on this consideration, FRA and FTA have determined that the Selected Alternative is the best option for the Hudson Tunnel Project and that its approval of the Selected Alternative is in the best interest of the public. FRA and FTA have selected this alternative because the alternative 1) best satisfies the purpose and need for the proposed action; and 2) minimizes impacts to the natural and human environment by

using and rehabilitating an existing transportation corridor where practicable and incorporating other mitigation measures.

FRA and FTA have further determined that all practicable measures to minimize environmental harm have been adopted as part of the Selected Alternative and that mitigation commitments are outlined in this FEIS/ROD to be implemented by the Project Sponsor, currently the PANYNJ, in final design, construction contracts, and post-construction monitoring. The PANYNJ will remain the Project Sponsor until such time as the GDC assumes the role of Project Sponsor. The PANYNJ and GDC anticipate that change will occur prior to the award of Federal financial assistance for the Project.

Changes to the Project will be evaluated in accordance with 23 CFR Sections 771.129 and 771.130, and if required therein, they must be approved in writing by the lead Federal agency before the Project Sponsor may proceed with the change.

Hudson Tunnel Project

Record of Decision

Prepared by:

U.S. Department of Transportation – Federal Railroad Administration

U.S. Department of Transportation – Federal Transit Administration

Submitted Pursuant to:

National Environmental Policy Act (42 USC § 4321 et seq.), and implementing regulations (40 CFR Parts 1500-1508); Section 4(f) of the U.S. Department of Transportation Act (49 USC § 303) and implementing regulations (23 CFR Part 774); Federal Railroad Administration Procedures for Considering Environmental Impacts (64 Federal Register [FR] 28545 [May 26, 1999] and 78 FR 2713 [January 14, 2013]); Efficient Environmental Reviews for Project Decisionmaking (23 USC § 139); the Federal Highway Administration and Federal Transit Administration Environmental Impact and Related Procedures (23 CFR Part 771); National Historic Preservation Act (54 USC § 306101) and implementing regulations (36 CFR Part 800); Clean Air Act as amended (42 USC § 7401 et seq.) and implementing regulations (40 CFR Parts 51 and 93); the Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.) and implementing regulations (50 CFR Part 402); the Clean Water Act (33 USC § 1251 et seq.) and implementing regulations (33 CFR Part 320 et seq. and 40 CFR Part 230); the Rivers and Harbors Act of 1899 (33 USC § 403); and the Coastal Zone Management Act of 1972 (16 USC § 1451).

May 28, 2021

Paul Nissenbaum
Associate Administrator for Railroad Policy & Development
Federal Railroad Administration

Date of Approval

Hudson Tunnel Project

Record of Decision

Prepared by:

U.S. Department of Transportation – Federal Railroad Administration

U.S. Department of Transportation – Federal Transit Administration

Submitted Pursuant to:

National Environmental Policy Act (42 USC § 4321 et seq.), and implementing regulations (40 CFR Parts 1500-1508); Section 4(f) of the U.S. Department of Transportation Act (49 USC § 303) and implementing regulations (23 CFR Part 774); Federal Railroad Administration Procedures for Considering Environmental Impacts (64 Federal Register [FR] 28545 [May 26, 1999] and 78 FR 2713 [January 14, 2013]); Efficient Environmental Reviews for Project Decisionmaking (23 USC § 139); the Federal Highway Administration and Federal Transit Administration Environmental Impact and Related Procedures (23 CFR Part 771); National Historic Preservation Act (54 USC § 306101) and implementing regulations (36 CFR Part 800); Clean Air Act as amended (42 USC § 7401 et seq.) and implementing regulations (40 CFR Parts 51 and 93); the Endangered Species Act of 1973 (16 U.S.C. § 1531 et seq.) and implementing regulations (50 CFR Part 402); the Clean Water Act (33 USC § 1251 et seq.) and implementing regulations (33 CFR Part 320 et seq. and 40 CFR Part 230); the Rivers and Harbors Act of 1899 (33 USC § 403); and the Coastal Zone Management Act of 1972 (16 USC § 1451).

5/28/21

Stephen Goodman
Regional Administrator, Region 2
Federal Transit Administration

Date of Approval

Attachment A: Mitigation Commitments

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Traffic and Pedestrians	• For all construction locations, the Project Sponsor will develop and implement of Maintenance and Protection of Traffic (MPT) plans during final design in consultation with the appropriate local transportation agencies. The MPT plans will maintain travel lanes and detour through traffic away from construction activities and equipment to the extent practicable. The MPT plans will include strict enforcement of Project truck routes by specifying the routes in contract documents. • For all locations where adverse traffic impacts were identified, the Project Sponsor will coordinate with the appropriate local transportation authorities to implement mitigation measures, as appropriate. Traffic mitigation measures may include changes to signal timing or phasing (e.g., shifting green time from underutilized phases to over-capacity approaches), changes to pavement markings (e.g., restriping lanes), changes to lane designations, and modifications to parking regulations. The identified mitigation measures are subject to approval and implementation by the appropriate local government agency in New Jersey and NYCDOT in New York, and may be revised after agency review. The costs for these mitigation measures would be Project costs that will be borne by the Project Sponsor rather than the local community. • The Project Sponsor will be responsible for maintenance, repair, and cleaning of designated truck routes on local streets and will reconstruct any streets damaged by trucking activity associated with construction of the Selected Alternative. The Project Sponsor will also undertake any advance or preventive rehabilitation of the proposed truck routes before the onset of construction. The Project Sponsor will ensure that these requirements are included in the contract specifications. • The Project Sponsor will strictly enforce identified Project truck routes. Trucks will wait to be loaded within each construction staging area. There will be no trucks waiting in the public right-of-way, to the extent practicable. • Where the use of traffic enforcement agents to direct and help keep traffic moving is appropriate, the costs for these agents would be Project costs that will be borne by the Project Sponsor rather than the local community. • Project construction contracts will specify that on-site vehicle idle time will be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or are otherwise required for the proper operation of the engine. **Tonnelle Avenue Staging Area Study Area** • For intersections in the Tonnelle Avenue staging area study area, the Project Sponsor will coordinate with the Township of North Bergen and NJDOT, as appropriate, regarding mitigation. • The Project Sponsor will further evaluate during final design, in cooperation with the Project Partners and in coordination with NJDOT, the potential for introduction of a new traffic signal at the proposed location of the access driveway to the Tonnelle Avenue staging area, to avoid unnecessary vehicle movements on Tonnelle Avenue from construction vehicles that would otherwise use the nearest U-turn. **Hoboken Staging Area Study Area** • For intersections in the Hoboken staging area study area, the Project Sponsor will coordinate with Hudson County, NJ TRANSIT, City of Hoboken, or Township of Weehawken, as appropriate, regarding mitigation. • Construction traffic will be routed via designated truck routes, making use of a new off-street access point to the Hoboken staging area along the north side of the HBLR right-of-way. • The Project Sponsor, in coordination with the Project contractor, will select the final truck route during final design and will coordinate with the local municipality regarding this selection. • The Project Sponsor will remove excavated materials from construction of the river tunnel segment primarily via the Tonnelle Avenue staging area, in order to minimize trucking to and from the Hoboken staging area. • While construction activities are under way at the Hoboken staging area, the Project Sponsor will require that there be a maximum (cap) of no more than 8 trucks per hour in each direction traveling to and from the Hoboken staging area.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Traffic and Pedestrians (Cont'd)	• The Project Sponsor will require that no construction-related trucks will use local roads in Weehawken or Hoboken between 10 PM and 7 AM. • Construction workers working at the Hoboken staging area will either park within the boundaries of the staging area or will park at a designated off-site parking facility, with transportation provided to shuttle the workers between the staging area and the off-site parking facility. Construction workers will not park on local streets in Weehawken. • To increase pedestrian visibility at intersections on 19th Street, the Project Sponsor will coordinate with the Township of Weehawken to restripe the basic transverse striped crosswalks at 19th Street and Park Avenue to high-visibility crosswalks if haul route Options 2 and/or 3 are selected. The Project Sponsor will also coordinate with the Township of Weehawken to provide high-visibility crosswalks at the new intersection of the haul route and 19th Street in haul route Option 3 if that route is selected. **New York** • For roads in New York, the Project Sponsor will coordinate with NYCDOT and/or New York City Police Department, and for intersections on Route 9A (i.e., Twelfth Avenue), NYCDOT and NYSDOT. • The Project Sponsor will maintain at least one traffic lane on West 30th Street between Eleventh and Twelfth Avenues at all times, except for potential short-term closures as necessary for utility relocations. • If construction activities for the Selected Alternative in the Manhattan waterfront area involve SEM mining in Hudson River Park, the Project Sponsor will provide full-time flaggers to protect pedestrians on the Hudson River Park walkway and bicyclists on the adjacent Route 9A bikeway from construction truck traffic crossing into and out of the construction staging area in the West 30th Street Heliport. • The Project Sponsor will maintain the sidewalk on both sides of Tenth Avenue between West 31st and West 33rd Streets with a minimum width of 10 feet.
Transportation Services (Passenger and freight rail, mass transit, maritime, and helicopter services)	• The Project Sponsor, working with Amtrak, NJ TRANSIT, and the Metropolitan Transportation Authority (MTA), will carefully stage construction work in the vicinity of active passenger rail tracks on the NEC and near PSNY, including at the ladder tracks and yard tracks west of PSNY, to minimize impacts to train operations. This work will be conducted during nights and weekends to avoid the need for daytime train outages, to the extent practicable. • If any construction work at or near the Hoboken staging area is within the operating envelope of the Hudson-Bergen Light Rail (HBLR), this work will be conducted during off-peak time periods where practicable, to avoid impacts on HBLR services. • Because of the proximity of the off-street construction access roads in Hoboken/Weehawken to the HBLR tracks, the Project Sponsor will coordinate any required special safety protocols with NJ TRANSIT and the operators of the HBLR. • The Project Sponsor will implement traffic mitigation measures, including an MPT plan (as described under "Traffic and Pedestrians" in this table), to minimize delays to traffic on roads where Project construction would occur or that would serve as truck routes for construction traffic. This would address potential impacts to bus service on those roadways. • The Project Sponsor will coordinate with NYCDOT's Office of Construction Mitigation and Coordination regarding the need to relocate an approximately 250-foot-long area on the south side of West 30th Street in New York that is designated for on-street bus parking spaces and currently used by tour and charter buses. • The Project Sponsor will schedule construction activities at the new viaduct over the Conrail and NYSW right-of-way in coordination with the freight rail companies to avoid impacts on their operations. • The Project Sponsor will conduct construction in the Hudson River following safety measures to protect maritime commerce and boating safety, including notifications to mariners via the U.S. Coast Guard, installation of lighting on barges and the cofferdam, and AIS transponders affixed to barges and the cofferdam to enable electronic locating of the cofferdam and tracking of the barges. • The Project Sponsor will determine measures to mitigate temporary construction period impacts to the West 30th Street Heliport in coordination with the heliport operator and the Hudson River Park Trust (HRPT), the owner of the heliport property, and will pay for costs associated with the temporary relocation of fueling facilities or landing pads, as applicable.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Land Use, Zoning, and Public Policy	**General** • At each Project construction site, the Project Sponsor will develop and implement a comprehensive, active and responsive local community outreach program during construction that will include a staffed local neighborhood outreach office close to each of the Project construction sites (in North Bergen and Weehawken in New Jersey and near the Twelfth Avenue staging site in New York); a dedicated Project liaison who will coordinate with the community about construction activities, address concerns, and work with the community to accommodate special events where possible; a 24-hour hotline for emergencies and construction complaints; and regular meetings and notifications about construction status and upcoming activities. • The Project Sponsor will design construction lighting at staging areas so as to minimize light pollution affecting adjacent residential areas, including such measures as using targeted and downward-directed, shielded lighting, with reduced lighting during hours when construction is not occurring on the sites. • The Project Sponsor will develop traffic mitigation measures, including an MPT plan, to minimize delays to traffic on roads where construction will occur or that will be used as truck routes for construction traffic (see “Traffic and Pedestrians”). • The Project Sponsor will implement Project commitments related to noise to avoid disruption to neighboring communities (see “Noise”). • The Project Sponsor will implement Project commitments related to vibration to avoid disruption to neighboring communities (see “Vibration”). • The Project Sponsor will implement Project commitments related to air quality to avoid disruption to neighboring communities (see “Air Quality”). • The Project Sponsor will remediate contaminated materials at staging areas and restore disturbed areas following construction with clean fill or engineering controls. The Project Sponsor will implement Project commitments related to contaminated materials to avoid disruption to neighboring communities (see “Contaminated Materials”). • The Project Sponsor will use erosion and sediment controls and best management practices to control runoff from construction sites. • The Project Sponsor will implement a storm risk management plan for staging areas located in flood zones to address the potential for flooding during construction. • The Project Sponsor will implement security measures for staging areas to avoid security issues that could affect neighboring communities. • The Project Sponsor will require that construction contract specifications include requirements for a rodent control program. Specifically, prior to beginning any construction or demolition operations, the contract terms will require the Project contractor to conduct a survey for evidence of current rodent activity and initiate a rodent control program by a certified pest control operator if the survey indicates that it is necessary. **New Jersey** • The Project Sponsor, in cooperation with the other Project Partners, will coordinate agreements with property owners and tenants regarding temporary construction access to private properties along the NEC in the Meadowlands for the surface alignment, so as to minimize adverse impacts on business activities. • The Project Sponsor, in cooperation with the other Project Partners, will coordinate with Conrail and NYSW regarding construction of the new bridge over the freight railroad right-of-way to minimize disruption to the freight railroads. • The Project Sponsor will conduct blasting no later than 6 PM in New Jersey except under special circumstances, and only with permission from the appropriate local regulatory agency (i.e., North Hudson Regional Fire and Rescue). The Project Sponsor will provide advance notice of blasting events to residents of nearby areas. • The Project Sponsor will offer to provide sound-reducing windows together with air conditioning units to allow for the maintenance of a closed-window condition, to reduce interior noise levels, for residences close to the Tonnelle Avenue and Hoboken construction staging areas and the associated construction truck routes (see “Noise”).

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Land Use, Zoning, and Public Policy (Cont'd)	• The Project Sponsor will offer to provide sound-reducing windows together with air conditioning units to allow for the maintenance of a closed-window condition, to reduce interior noise levels, for residences close to the Tonnelle Avenue and Hoboken construction staging areas and the associated construction truck routes (see "Noise"). • The Project Sponsor will construct a temporary noise barrier up to 25 feet high for the duration of the construction period along the entire northern edge of the Hoboken staging area along West 18th Street and wrapping at least 100 feet on the western side of the property and extending to the truck haul route on the eastern side of the staging area, to buffer the nearby residential neighborhood from construction activities (see "Noise"). The Project Sponsor will require that the wall be clad with aesthetically attractive materials developed in consultation with the local community and will be set back approximately 10 feet from the street curb line, to allow street parking and provide an area for landscaping in front of the wall; this landscaping should also be selected in consultation with the local community. • The Project Sponsor will install lighting at the Hoboken staging area that is placed no higher than the noise wall. • In Hoboken and Weehawken, the Project Sponsor will create a construction access route (i.e., haul route) that provides access to the construction staging area via an off-street route along the north side of the HBLR to divert construction traffic away from the nearby Shades neighborhood. • The Project Sponsor will require that truck trips serving the Hoboken staging area not exceed a maximum (cap) of eight trucks per hour in each direction throughout the construction period, and that trucking does not occur between 10 PM and 7 AM. • The Project Sponsor will remove excavated materials from tunnel construction of the river tunnel segment primarily via the Tonnelle Avenue staging area, in order to minimize trucking to and from the Hoboken staging area. • The Project Sponsor, in cooperation with the other Project Partners, will design the Hoboken fan plant to be compatible with the character of the surrounding area and particularly the Shades residential neighborhood to the north. The Project Sponsor, in cooperation with the other Project Partners, will coordinate with the local community and seek input in determining the appropriate design for the visible portions of the fan plant. • The Project Sponsor will implement an MPT plan to ensure that fire trucks and emergency vehicles leaving from and returning to the North Hudson Regional Fire and Rescue Engine 3 fire station at 1900 Willow Avenue (between Willow Avenue and JFK Boulevard East) have access to the street network and are not blocked by traffic queuing at the intersection. • The Project Sponsor will use drilled piles rather than driven piles to underpin the Willow Avenue viaduct to reduce resulting noise levels. The Project Sponsor will coordinate with the City of Hoboken and Township of Weehawken regarding pile installation for the underpinning of the Willow Avenue viaduct, to coordinate construction activities to avoid disruption to special events in 1600 Park, and to provide advance notification so that the city and township can notify the public of this activity and its expected duration. • The Project Sponsor will coordinate construction activities in Hoboken and Weehawken with the New Jersey Department of Environmental Protection's (NJDEP's) Rebuild By Design project to ensure that the two projects do not conflict during their construction and long-term permanent condition. • The Project Sponsor will design the Hoboken fan plant to produce noise levels no greater than 65 dBA at the exterior of the nearest residential building (see "Noise"). **New York** • The Project Sponsor will conduct tunnel excavation from the bulkhead to the shaft site below ground, with ground improvement such as ground freezing to prepare the area. This will avoid the need for cut-and-cover excavation across Hudson River Park. • The Project Sponsor, in cooperation with the other Project Partners, will coordinate with the West 30th Street Heliport operator and HRPT, which receives revenues from the heliport, to minimize disruption to the heliport operation during construction of the Project to the extent practicable. The temporary use of a portion of the heliport will comply with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (see "Property Acquisition"). • If the West 30th Street Heliport fuel tank must be relocated to facilitate tunnel construction, the Project Sponsor will relocate the tank to a suitable temporary location. • The Project Sponsor will restore the area of Hudson River Park affected by construction of the Selected Alternative in coordination with HRPT at no cost to HRPT.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Land Use, Zoning, and Public Policy (Cont'd)	• The Project Sponsor will use site enclosures or temporary noise barriers at construction sites to buffer surrounding areas from construction noise and activity (see "Noise"). • The Project Sponsor, in cooperation with the other Project Partners, will design the Twelfth Avenue fan plant to be compatible with the character of the surrounding area; design of visible elements will be coordinated with the New York City Department of City Planning and Community Board 4. • The Project Sponsor, in cooperation with the other Project Partners, will design the Twelfth Avenue fan plant to produce noise levels no greater than 65 dBA at the exterior of the nearest residential building (a complete description of this measure is provided below under "Noise").
Property Acquisition	• The Project Sponsor, in cooperation with the other Project Partners, will coordinate with private property owners regarding access during construction, to minimize adverse impacts on business activities. • Property acquisitions, including temporary easements, will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, and all other relevant property acquisition procedures that apply to NJ TRANSIT (or the State of New Jersey) for properties in New Jersey and to Amtrak for properties in New York. This will ensure that property owners are fairly compensated for use of their properties, including temporary disruptions during construction.
Socioeconomic Conditions	• Property acquisitions, including temporary easements, will be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, and all other relevant property acquisition procedures that apply to NJ TRANSIT (or the State of New Jersey) for properties in New Jersey and to Amtrak for properties in New York. This will ensure that property owners are fairly compensated for use of their properties, including temporary disruptions during construction • In the Meadowlands, where temporary construction access is required in connection with the Project's surface tracks, the Project Sponsor, in cooperation with the other Project Partners, will make agreements with private property owners and affected businesses regarding how this access will occur, so as to minimize adverse impacts on business activities. Specific access requirements will be coordinated with the property owners and building tenants to minimize the disruption that will occur to business activities, where possible. If any temporary displacement of businesses is required, affected property owners and tenants will be compensated in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970. The Project Sponsor, in cooperation with the other Project Partners, will develop specific information about the scope and timing of restoration of affected properties in the Meadowlands in coordination with the affected property owners as the design advances. • In all locations where disruptions to roadways are required, including at Secaucus Road at the NEC, at Tonnelle Avenue, at local roadways in Hoboken and Weehawken, and in Manhattan near the construction site, the Project Sponsor will implement MPT plans to manage traffic disruptions (see "Traffic and Pedestrians"). • The Project Sponsor, in cooperation with the other Project Partners, will coordinate with the West 30th Street Heliport operator and HRPT, which receives revenues from the heliport, to minimize disruption to the heliport operation during construction of the Project to the extent practicable. • In areas where sidewalks or street lanes will be closed for extended periods of time, the Project Sponsor will follow standard practices for maintaining access, including providing alternative routes of entry into buildings for employees, residents, and deliveries; providing appropriate signage to direct people to these alternative entrances; establishing a traffic management plan to ensure vehicular access to affected properties and to minimize traffic impacts on local streets; and implementing an outreach program to share construction schedules, potential impacts, and mitigation measures for local businesses.
Open Space and Recreational Resources (including Section 4(f) resources)	• The Project Sponsor will implement mitigation measures to reduce noise levels at construction sites, which will reduce disruption to recreational users at nearby parks (see "Noise"). • In Hoboken, the Project Sponsor will use drilled pile installation rather than impact pile driving for the Willow Avenue underpinning to the extent practicable, reducing construction-period noise levels at 1600 Park, Harborside/Hoboken Cove Park, and Hudson River Waterfront Walkway. • The Project Sponsor will coordinate with the City of Hoboken and Township of Weehawken to schedule noisy construction activities to avoid special events in nearby parks will provide advance notification, to the extent practicable, so that the city and township can notify the public of this activity and its expected duration.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Open Space and Recreational Resources (Cont'd)	• During in-water construction for the Project in the Hudson River, the Project Sponsor will take measures to warn maritime traffic, including recreational boaters, of the construction zone to ensure the continued safety of boaters and to ensure the continued safety of boaters (e.g., installation of lighting on barges and the cofferdam (see "Transportation Services"). • In New York, the Project Sponsor will conduct tunnel excavation from the bulkhead to the Twelfth Avenue shaft site below ground, with ground improvement such as ground freezing to prepare the area. This will avoid the need for cut-and cover excavation across Hudson River Park. • The Project Sponsor and the other Project Partners will continue to coordinate with HRPT regarding the effects to Hudson River Park during construction for the Selected Alternative and identifying further practicable measures to avoid and minimize adverse effects. • During construction in and under Hudson River Park, the Project Sponsor will maintain a minimum 8-foot-wide segment of the Hudson River Park walkway (potentially shifted to the Route 9A bikeway to avoid the construction zone), and a minimum 10-foot wide segment of the Route 9A bikeway (except possibly for short-term trenching for installation of freeze pipes). • The Project Sponsor will install construction barricades to block views of the construction zone within the West 30th Street Heliport. Construction fencing will be clad with aesthetically attractive or artistically enhanced fabric selected in consultation with HRPT. • The Project Sponsor will restore the area of Hudson River Park and the Route 9A bikeway affected by construction of the Project in coordination with HRPT at no cost to HRPT.
Historic and Archaeological Resources (including Section 4(f) resources)	• FRA developed a Programmatic Agreement (PA) in consultation with NJHPO, NYSHPO, ACHP, FTA, the PANYNJ, and Amtrak and other consulting parties as part of the Section 106 process that sets forth detailed measures to avoid, minimize, and/or mitigate adverse effects on historic properties, including those listed in the following sub-bullets. The Project Sponsor and other signatories will comply with the terms of the PA. ○ Documentation of the North River Tunnel to the standards of the Historic American Engineering Record prior to rehabilitation work to supplement existing histories and/or to target a specific audience; interpretive displays about the tunnel to be located in a station along the NEC in NJ and at the new Moynihan Station in NY. ○ Preparation of a report that documents the characteristics of the affected Hudson River Bulkhead location based on information gathered and drawings made in preparation for, and during the construction at, the bulkhead structure. ○ Provisions for the historic interpretation of the Hudson River Bulkhead within Hudson River Park. ○ Implementation of Bulkhead Protection Plan at the bulkhead and associated bulkhead impact area and identification of measures for the long-term maintenance of the bulkhead and associated impact area, in coordination with HRPT and NYSHPO. ○ Implementation of Construction Protection Plans (CPP) to protect Substation No. 3, Bergen Portal, the High Line, and Master Printers building. The CPPs will include provisions for vibration monitoring, adherence to vibration limit thresholds, measures to reduce vibration levels, and modification of construction methods if necessary. ○ Archaeological testing and/or monitoring for potential archaeological resources.
Visual and Aesthetic Resources	• At the Hoboken staging area, the Project Sponsor will provide a temporary noise barrier up to 25 feet high along the north, west, and east sides of the site to buffer the nearby residential neighborhood on the north side of West 18th Street from construction noise (see "Noise"). The wall will be set back from West 18th Street by about 10 feet, to allow enough room for parking on the south side of the street and landscaping. The Project Sponsor will determine the height of the noise wall at the Hoboken staging area in consultation with representatives of the local community and will work with the local community to maintain the wall in an attractive visual condition. The Project Sponsor will landscape the area in front of the temporary noise wall during the construction period to soften views of the wall. • For construction sites in New York, the Project Sponsor provide site enclosures or temporary noise barriers to block views into the construction sites (see "Noise"). At the cut-and-cover construction site at Tenth Avenue, the Project Sponsor will construct temporary barriers along the curbline to block views of the construction area from the surrounding neighborhood. The Project Sponsor will work with the local community to maintain the walls in an attractive visual condition. • Construction fencing will be clad with aesthetically attractive or artistically enhanced fabric.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Visual and Aesthetic Resources (Cont'd)	• At all construction sites, the Project Sponsor will design construction lighting to minimize light pollution affecting adjacent residential areas, with targeted and downward-directed, shielded lighting, and minimal site lighting after construction hours. At the Hoboken staging area, if a 25-foot-high noise wall is constructed, the lighting will be placed no higher than that temporary noise barrier. • The Project Sponsor, in cooperation with the other Project Partners, will design the Hoboken fan plant and surrounding site to be compatible with the visual character of the surrounding area. The Project Sponsor will design such elements as the façade of the structure within the site, planting, pavement, and fencing in a manner that is sensitive to the neighboring residential community. The Project Sponsor will coordinate with the local community and seek input in determining the appropriate design for the visible portions of the fan plant. • The Project Sponsor, in cooperation with the other Project Partners, will design the Twelfth Avenue fan plant to be compatible with the character of the surrounding area and will coordinate with the New York City Department of City Planning (NYCDCP) and Manhattan Community Board 4 regarding the visible elements of the fan plant.
Natural Resources	• The Project Sponsor will coordinate with permittees to comply with the requirements of all permits from the U.S. Army Corps of Engineers (USACE), NJDEP and NYSDEC. **New Jersey** • The Project Sponsor will design culverts associated with the surface alignment in compliance with conditions set forth in permits from the NJDEP to avoid changes in hydrology, and therefore to minimize secondary wetland impacts due to changes in hydrology. • The Project Sponsor will relocate a portion of the Penhorn Creek tributary; this relocated portion will be a trapezoidal channel with a natural bottom developed to reflect a natural channel design. • As part of the design of the relocated portion of the Penhorn Creek tributary, the Project Sponsor will collect soil samples within the footprint of the relocated channel in accordance with a sampling plan developed in consultation with NJDEP and USFWS. The Project Sponsor will remove, for disposal at a licensed facility, any soils that would be exposed within the channel bottom that are determined to have contaminants of concern to NJDEP and USFWS, or would cover those soils with at least 2 feet of clean fill material. • The Project Sponsor will use open grid steel grating for the access road above the Penhorn Creek tributary to minimize shading impacts. • The Project Sponsor will replace the weir downstream of the twin 48-inch culvert to maintain upstream wetland, Penhorn Creek, and Penhorn Creek tributary water level elevations. The Project Sponsor will coordinate the design of the weir with NJDEP and USFWS. • The Project Sponsor will develop and implement mitigation for direct and indirect wetland impacts in consultation with NJDEP and the USACE, including the purchase of mitigation credits from an approved mitigation bank within the same watershed unit as the Project site. • The Project Sponsor will implement measures that minimize impacts to wetlands near construction activities in the Meadowlands, such as the use of low-ground-pressure vehicles and marsh matting. • The Project Sponsor will implement erosion and sediment control measures (e.g., hay bales, silt fences, and post-construction stabilization with seeding and mulch, straw or hay) set forth in a stormwater pollution prevention plan (SPPP) and site-specific soil erosion and sediment control plan, which will be prepared in accordance with the Standards for Soil Erosion and Sediment Control in New Jersey, and will be implemented as part of the Project's best management practices (BMPs) for construction to minimize discharge of sediment to Penhorn Creek and wetlands. • The Project Sponsor will restore disturbed wetlands back to the original topography and stabilization with mulch, straw, or hay following the completion of construction. • The Project Sponsor will include a culvert within the construction access road in Hoboken to maintain drainage under the haul route. • The Project Sponsor will treat any groundwater contamination encountered during construction dewatering in New Jersey to state surface water quality standards with discharge to existing surface water bodies in accordance with the regulations at NJAC 7:14A-1.1 et seq. (a New Jersey Pollutant Discharge Elimination System permit may be required).

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Natural Resources (Cont'd)	• The Project Sponsor will implement measures during construction (e.g., sheeting or similar methods, and a grouting program to fill cracks and other voids in the rock mass) to minimize groundwater intrusion such that dewatering is minimized to the extent practicable. • If the Project contractor uses a temporary below-grade pit at the Tonnelle Avenue staging area to store tunnel spoils, the below-grade area will be lined or otherwise managed to reduce groundwater inflow into the pit and to minimize the potential for discharge to groundwater. • Although construction dewatering is not expected to affect water supply wells near the tunnel alignment, prior to construction the Project Sponsor will assess the potential impacts and if necessary, the Project Sponsor will eliminate adverse effects to nearby wells and wetlands by controlling seepage using sheeting or similar methods. • During installation of culvert extensions and replacement of the weir in Penhorn Creek, the Project Sponsor will use cofferdams and other best management measures developed in consultation with NJDEP to minimize sediment resuspension (e.g., cofferdam or turbidity curtain) while at the same time maintaining flow within Penhorn Creek. • In the Meadowlands and along the off-street haul route Option 3 in Weehawken, the Project Sponsor will limit tree and other vegetation clearing and/or initial placement of fill material to the period between October 1st and March 14th (i.e., prior to or after the breeding season, which is April through July), to prevent birds from attempting to breed where additional construction activity will later occurs. • The Project Sponsor will limit any in-water or sediment-generating activities and pile driving in Penhorn Creek so that these activities do not occur from March 1 through June 30 to protect anadromous species spawning in Penhorn Creek. • The Project Sponsor will implement stormwater Best Management Practices (BMPs) for construction of the Hoboken fan plant. • The Project Sponsor will use a comprehensive stormwater management system to treat Project runoff and meet all local and state requirements prior to discharge to existing drainage systems. • The Project Sponsor will treat, if appropriate, drainage from the new Hudson River Tunnel to meet local requirements prior to discharge (under permit) to a public sewer. **Hudson River** • The Project Sponsor will use cofferdams in the low-cover area of the Hudson River where in-water construction work occurs to contain construction activities that affect the river bottom, in accordance with BMPs for minimizing silt and as recommended by the National Marine Fisheries Service (NMFS) for the protection of sturgeon. • The Project Sponsor will install and remove steel sheet pile and steel pipe king piles in the Hudson River low-cover area with a vibratory hammer. • The Project Sponsor will use turbidity curtains during cofferdam removal. • The Project Sponsor will not remove the cofferdam until the improved soil within the cofferdam has hardened. • The Project Sponsor will not install or remove sheet piles and king piles from January 21 through June 30, so as to avoid impacts to overwintering and migrating striped bass and other anadromous fish. • The Project Sponsor will check the area surrounded by the cofferdam for sturgeon prior to deep soil mixing. Should sturgeon become entrapped within the cofferdam area, the Project Sponsor will cease work and notify NMFS. • In the 0.7-acre area of the river bottom where the soilcrete would extend above the existing mudline, the Project Sponsor will implement a five-year monitoring program following completion of construction, in consultation with the USACE, NMFS, and the New York State Department of Environmental Conservation (NYSDEC), to assess the recovery of the area as fish foraging habitat. The Project Sponsor will also monitor the recovery of the remaining 2.3 acres of soilcrete for five years post-construction. Regular monitoring reports will be submitted to the USACE, NMFS, and NYSDEC and will be made available on the Project website. • Based on ongoing consultation with USACE, NMFS, and NYSDEC regarding the monitoring program, the Project Sponsor will conduct additional remediation actions, if necessary as determined during consultation. • The Project Sponsor, in coordination with the other Project Partners, will also coordinate with NYSDEC as part of the permitting process to determine what other mitigation may be required as a condition of permit approval.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Natural Resources (Cont'd)	**New York** • The Project Sponsor will conduct groundwater testing prior to construction to determine the quality of the groundwater at construction locations. Should any significantly contaminated groundwater (volatile organic compounds, petroleum contamination, or other visual evidence) be encountered, the Project Sponsor will store this material temporarily on-site and dispose of it off-site at a facility approved to receive and process it. • The Project Sponsor will perform all tree clearing work in compliance with New York City Local Law 3 of 2010 and NYC Parks' Tree Protection Protocol. In addition, the Project Sponsor will provide all required replacement and/or restitution for removed trees in compliance with Local Law 3 and Chapter 5 of Title 56 of the Rules of the City of New York.
Noise	**General Construction Practices** • At each construction site, the Project Sponsor will implement a comprehensive, active and responsive community outreach program during construction that will include a staffed local neighborhood outreach office at each construction staging area (i.e., the Tonnelle Avenue, Hoboken, and Twelfth Avenue staging areas) ; a dedicated Project liaison who will coordinate with the community about construction activities, address concerns, and work with the community to accommodate special events where possible; a 24-hour hotline for emergencies and construction complaints; and regular meetings and notifications about construction status and upcoming activities. • During construction, the Project Sponsor will coordinate construction activities with affected municipalities in New Jersey, New York City, and nearby property owners to schedule construction to avoid or minimize adverse impacts where practicable. • The Project Sponsor will establish a noise complaint procedure to promptly address community concerns and will implement additional control methods where necessary. • With respect to noise from construction equipment, the Project Sponsor will comply with noise emission standards of FTA, NJDEP, and New York City where feasible and practicable. These Federal, state, and New York City requirements mandate that certain classifications of construction equipment and motor vehicles meet specified noise emission standards, and construction material be handled and transported in such a manner to not create unnecessary noise. • The Project Sponsor will require that noise emissions of the various pieces of equipment to be used on site are independently certified for compliance with the applicable noise emission standards and codes. • The Project Sponsor will establish a program to certify that all noise control measures specified in the EIS will be fully and properly implemented. • The Project Sponsor will develop and implement a noise monitoring plan to conduct noise monitoring at sensitive receptors nearest to the construction staging areas. The plan will include spot noise emission level checks of the most noise-intensive equipment and construction activities (e.g., pile installation, concrete operations, truck loading), inspections of noise control measures to ensure that they are implemented properly, and spot checks of noise levels at surrounding receptors during various phases of construction. If equipment noise emissions or receptor noise levels are greater than those presented in the EIS, the Project Sponsor will examine construction means and methods to consider additional noise control measures that may be feasible and practicable. • To the extent practicable given space constraints at the work sites, construction will use acoustical noise tents and/or enclosures surrounding jackhammers or pavement breakers that can provide up to 15 dBA of noise reduction during any demolition activities. For additional noise reduction, jackhammer noise mufflers that can provide up to an additional 10 dBA of noise reduction can be used. • To minimize the noise from backup warning alarms on trucks, vehicles will be routed through construction sites to minimize the use of alarms, where practicable. In addition, the Project Sponsor will require that the Project contractor equip vehicles with Occupational Safety and Health Administration (OSHA)-approved quieter backup alarms.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Noise (Cont'd)	**Construction for Surface Alignment** • The Project Sponsor will coordinate with the occupants of the residential buildings on Henry Street at Secaucus Road in Secaucus, New Jersey, regarding appropriate mitigation such as temporary accommodations elsewhere while pile driving is occurring overnight within 1,000 feet of these residences. **Construction at Tonnelle Avenue Staging Area** • The Project Sponsor will require that the tunnel ventilation fans to be used at the tunnel portals during construction of the new Hudson River Tunnel and the rehabilitation of the North River Tunnel achieve a maximum acceptable sound pressure level from fan operation of 63 dBA at a distance of 50 feet. This maximum sound level is reasonably achievable through proper fan selection and implementation of silencers; the Project Sponsor will include this requirement in the construction equipment specifications so that the ventilation fans do not emit noise above this maximum level. • The Project Sponsor will require that the generators and light plants to be used during construction of the new Hudson River Tunnel and the rehabilitation of the North River Tunnel achieve a maximum sound pressure level of 70 dBA at a distance of 50 feet. This maximum sound level is reasonably achievable through proper generator/light plant selection and implementation of enclosures or available manufacturer attenuation options; the Project Sponsor will include this requirement in the construction equipment specifications so that the generators and light plants do not emit noise above this maximum level. • The Project Sponsor will require that the conveyors used to transport tunnel spoils from the tunnel during tunnel mining along with any associated pumps will be enclosed in a structure that will provide approximately 25 dBA attenuation to these pieces of equipment. It is expected that this will be a 24-gauge corrugated steel structure with insulation on the interior. The Project Sponsor will include this requirement in the construction equipment specifications so that the conveyors and associated pumps are housed in enclosures providing this level of attenuation. • Blasting will not be conducted after 6 PM in New Jersey except under special circumstances, and only if permission from the appropriate local regulatory agency (i.e., North Hudson Regional Fire and Rescue) is provided. The Project Sponsor will provide advance notice of blasting events nearby to residents on Paterson Plank Road and Grand Avenue in North Bergen near the tunnel portal and alignment. • At residences along Paterson Plank Road, along Grand Avenue between 19th Street and 23rd Street, and on Tonnelle Avenue between 10th Street and Secaucus Road in North Bergen, New Jersey, the Project Sponsor will offer to provide façade improvements in the form of sound-reducing windows together with air conditioning units to allow for the maintenance of a closed-window condition. Sound-reducing windows can include acoustical interior windows consisting of laminated glass at least ¼ inch thick with at least 2-inch airgap from the primary (existing) window, along with re-gasketing the existing window; or replacement windows in the existing opening with at least a 1-inch insulated glass unit. Such measures will result in lower levels of construction-generated noise inside these residential buildings by an estimated 5 to 20 dBA, depending on specific building construction, including the façade type and type of air conditioning. • The Project Sponsor will further evaluate during final design, in cooperation with the Project Partners and in coordination with NJDOT, the potential for introduction of a new traffic signal at the proposed location of the access driveway to the Tonnelle Avenue staging area, to avoid unnecessary vehicle movements on Tonnelle Avenue from construction vehicles that would otherwise use the nearest U-turn (see "Traffic and Pedestrians"). If a new traffic signal is installed on Tonnelle Avenue at the driveway of the Tonnelle Avenue staging area as a traffic mitigation measure, no noise mitigation would be required at residential receptors on Tonnelle Avenue as a result of truck traffic. **Construction at Hoboken Staging Area** • Blasting will not be conducted after 6 PM in New Jersey except under special circumstances, and only if permission from the appropriate local regulatory agency (i.e., North Hudson Regional Fire and Rescue) is provided. The Project Sponsor will provide advance notice of blasting events nearby to residents of the Shades neighborhood of Weehawken. • At the Hoboken staging area, the Project Sponsor will require that there be a maximum (cap) of no more than 8 trucks per hour in each direction traveling to and from the Hoboken staging area. • The Project Sponsor will require that no construction-related trucks will use local roads in Weehawken or Hoboken between 10 PM and 7 AM.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Noise (Cont'd)	• At the Hoboken staging area, the Project Sponsor will construct a noise barrier along the full northern boundary of the site on West 18th Street and wrapping on the western side at least 100 feet and on the eastern side to the truck haul route. The Project Sponsor will determine the height of the noise wall at the Hoboken staging area in consultation with representatives of the local community. The analysis presented in the EIS demonstrates that a wall up to 25 feet high would provide the level of noise mitigation needed to avoid adverse noise impacts according to FTA noise criteria, such that exterior noise levels at the residences nearest to the construction site do not exceed an average L_{eq} of 76 dBA during daytime hours (i.e., 7 AM to 10 PM) or an average L_{eq} of 67 dBA during nighttime hours (i.e., 10 PM to 7 AM). • At the Hoboken shaft site and staging area, if the noise wall is lower than 25 feet high, the Project Sponsor will employ other noise-reducing measures so that the same exterior noise levels can be achieved at the nearest residences on West 18th Street and adverse noise impacts do not occur: exterior noise levels at the residences nearest to the construction site should not exceed an average L_{eq} of 76 dBA during daytime hours (i.e., 7 AM to 10 PM) or an average L_{eq} of 67 dBA during nighttime hours (i.e., 10 PM to 7 AM). These additional noise-reducing measures might include, for example, the use of quieter equipment, use of noise dampening measures in spoils trucks, placement of the noisiest equipment on the site farther from West 18th Street, and use of shields or covers for noise-generating equipment and activities. • The Project Sponsor will offer to provide façade improvements in the form of sound-reducing windows together with air conditioning units to allow for the maintenance of a closed-window condition at residences in Weehawken, New Jersey, across from the Hoboken staging area (including those residences that are west of Hackensack Plank Road and south of West 19th Street) and residences along the selected haul routes in Weehawken, New Jersey (potentially including residences on the Park Avenue service road and the Willow Avenue service road between the HBLR and 19th Street and west-facing apartments at 800 Harbor Boulevard. Sound-reducing windows can include acoustical interior windows consisting of laminated glass at least ¼ inch thick with at least 2-inch airgap from the primary (existing) window, along with re-gasketing the existing window; or replacement windows in the existing opening with at least a 1-inch insulated glass unit. Such measures will result in lower levels of construction-generated noise inside these residential buildings, by an estimated 5 to 20 dBA, depending on specific building construction, including the façade type and type of air conditioning. • The Project Sponsor will require that tunnel ventilation fans used at the tunnel portals during construction of the new Hudson River Tunnel and the rehabilitation of the North River Tunnel achieve a maximum acceptable sound pressure level from fan operation of 63 dBA at a distance of 50 feet. This maximum sound level is reasonably achievable through proper fan selection and implementation of silencers; the Project Sponsor will include this requirement in the construction equipment specifications so that the ventilation fans do not emit noise above this maximum level. • The Project Sponsor will require that the generators and light plants to be used during construction of the new Hudson River Tunnel and the rehabilitation of the North River Tunnel achieve a maximum sound pressure level of 70 dBA at a distance of 50 feet. This maximum sound level is reasonably achievable through proper generator/light plant selection and implementation of enclosures or available manufacturer attenuation options; the Project Sponsor will include this requirement in the construction equipment specifications so that the generators and light plants do not emit noise above this maximum level. • At the Hoboken staging area, the Project Sponsor will locate the grout plant, slurry plant, and compressors within enclosures or buildings capable of providing 25 dBA attenuation (e.g., corrugated steel with spray-on insulation). Any ventilation for such enclosures or buildings would be required to maintain the acoustical performance of the building in the direction of the receptors to the north and west. • At the Hoboken staging area, the Project Sponsor will enclose concrete pumps using temporary acoustical curtains or barriers at all times during concrete operations. • The Project Sponsor will construct the Hoboken shaft using drilled piles rather than driven piles, to the extent practicable, to reduce resulting noise levels; • The Project Sponsor will underpin the Willow Avenue viaduct using drilled piles rather than driven piles, to the extent practicable, to reduce resulting noise levels.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Noise (Cont'd)	• The Project Sponsor will coordinate with the City of Hoboken and Township of Weehawken regarding pile installation for the underpinning of the Willow Avenue viaduct, to avoid disruption to special events in nearby parks and will provide advance notification to the extent practicable of when pile installation would occur, so that the city and township can provide public notification of this activity and its expected duration. **Construction in New York** • For construction sites in New York, the Project Sponsor will include sufficient mitigation to meet the New York City Noise Control Code construction noise limit of an L_{max} of 85 dBA at the exteriors of any adjacent residential properties. The analyses described in the FEIS determined that the use of site enclosures or temporary noise barriers (e.g., ¾-inch thick plywood) 15 feet high will provide this level of noise mitigation and will avoid adverse impacts according to FTA noise impact criteria during most construction activities. At excavation locations in New York City streets, barriers will be constructed along the curbline while the lane nearest the curb will remain open to accept equipment to complete the excavation across the street. • Blasting activities will occur in Manhattan only between 9 AM and 7 PM, except under special circumstances, and only with permission from the Fire Department of the City of New York (FDNY). The Project Sponsor will provide a blasting schedule to neighboring building owners and occupants. • The Project Sponsor will use drilled piles rather than driven piles to the extent practicable to reduce resulting noise levels for construction of the tunnel alignment between the Manhattan bulkhead and Tenth Avenue, including Hudson River Park (if needed), at the Twelfth Avenue shaft, and in West 30th Street, if needed. **Operation of the Selected Alternative** • The new Hudson River Tunnel and the rehabilitated North River Tunnel will incorporate a low-vibration track system, which will reduce the potential noise and vibration from train operations. • Equipment included in the new Hoboken fan plant and Twelfth Avenue fan plant will be designed to produce noise levels no greater than 65 dBA at the façade of the nearest residential building.
Vibration	**Community Outreach** • At each construction site, the Project Sponsor will implement a comprehensive, active and responsive community outreach program during construction that will include a staffed local neighborhood outreach office; a dedicated Project liaison who will coordinate with the community about construction activities, address concerns, and work with the community to accommodate special events where possible; a 24-hour hotline for emergencies and construction complaints; and regular meetings and notifications about construction status and upcoming activities. • During construction, the Project Sponsor will coordinate construction activities with affected municipalities in New Jersey, New York City, and nearby property owners to schedule construction to avoid or minimize adverse impacts where practicable. • The Project Sponsor will establish a vibration complaint procedure to promptly address community concerns and implement additional control methods where necessary. **Blasting Controls** • The Project Sponsor will conduct blasting using controlled blasting techniques, including timed multiple charges; covering the area where blasting is being conducted with blast mats to control fly rock; and pre-auguring the rock, where possible. • Blasting in New Jersey will not be conducted after 6 PM except under special circumstances and only with permission from the appropriate local regulatory agency (i.e., North Hudson Regional Fire and Rescue). The Project Sponsor will provide advance notice of blasting events nearby to residents. This includes residents on Paterson Plank Road and Grand Avenue in North Bergen, New Jersey near the tunnel portal and tunnel alignment and residents of the Shades neighborhood in Weehawken near the Hoboken shaft site. • Blasting activities in Manhattan will not be conducted after 7 PM except under special circumstances and only with permission from FDNY. The Project Sponsor will provide a blasting schedule to neighboring building owners and occupants. **Pile Installation** • The Project Sponsor will use drilled piles rather than driven piles for installation of piles at the Hoboken staging area and for underpinning of the Willow Avenue bridge over the HBLR right-of-way in Hoboken and Weehawken, New Jersey, to the extent practicable. • The Project Sponsor will use drilled piles rather than driven piles for installation of piles at the Twelfth Avenue shaft site in Manhattan, New York, to the extent practicable.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Vibration (Cont'd)	**Vibration Monitoring Program** • The Project Sponsor will implement a vibration monitoring program within the area of potential influence of the construction to monitor impacts of construction vibration and ground movement, to protect nearby structures from accidental damage during construction. To account for the variable ground conditions and different construction activities that would occur, the vibration monitoring program will be implemented within an approximately 200-foot distance from the Project construction. In addition, although the three Hudson Tea Buildings on Hudson Street in Hoboken are at a greater distance (approximately 260 feet at the closest point), given their size and historic nature, the Project Sponsor will monitor these buildings as part of the vibration monitoring plan. • The vibration monitoring program will include the following: o A preconstruction survey of buildings in the Project's construction area of influence for potential vibration concerns. Monitoring procedures and instrumentation to be installed on adjacent properties will be coordinated with each property owner. o Monitoring of structures within this area during construction. During construction, copies of monitoring data will be made available to the property owners. Where instrumentation identifies excessive vibration and/or ground movement that exceeds established thresholds, the construction activities will be examined and the construction approach altered to minimize further movements. Also, in any areas where vibration or ground movement exceeds threshold values, the properties will be re-surveyed to document potential construction impacts. o Upon completion of construction activities within an area, the Project Sponsor will perform post-condition surveys and compare them with the pre-construction survey information to determine if damage has occurred, in concurrence with the property owner. Where construction operations cause damage to adjacent properties, the Project Sponsor will promptly repair or replace damaged items to the condition that existed before the damage, to the satisfaction of each adjacent property owner, at no cost to the property owner. **Construction Protection Plans** • The Project Sponsor will develop and implement CPPs for the protection of historic architectural resources located in proximity to Project construction prior to any Project demolition, excavation, and construction activities. The CPPs will include provisions for vibration monitoring, adherence to vibration limit thresholds, measures to reduce vibration levels, and modification of construction methods if necessary. **Operation of the Selected Alternative** • The new Hudson River Tunnel and the rehabilitated North River Tunnel will incorporate a low-vibration track system, which will reduce the potential noise and vibration from train operations.
Air Quality	• Dust Control. To minimize fugitive dust emissions from construction activities, the Project Sponsor will require a multi-approach fugitive dust control plan including a robust watering program as part of contract specifications. For example, all trucks hauling loose material will be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the Project construction sites; and water sprays will be used for all excavation and transfer of soils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air. Loose materials will be dampened or covered and stockpiles will be covered with a heavy duty plastic at the end of the work day and will be bermed to contain water that drains from the soil which will be collected and containerized for disposal as needed. Vehicles will be rinsed at rinsing stations before leaving construction staging areas and mud mats will be used to help protect against dirt being tracked off the sites. In addition, a continuous perimeter air monitoring program will be conducted at the staging areas to identify when additional dust management procedures are warranted and a real-time dust monitoring program will be implemented in order to address potential exposure of the public and the environment to respirable particulates and other contaminants of concern. • Clean Fuel. The Project construction contracts will mandate that ultra-low sulfur diesel be used exclusively for all diesel engines throughout the Project sites. • Idling Restriction. In addition to adhering to the local law restricting unnecessary idling on roadways, the Project construction contracts will specify that on-site vehicle idle time will be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or are otherwise required for the proper operation of the engine.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Air Quality (Cont'd)	• Best Available Tailpipe Reduction Technologies. The Project construction contracts will specify that non-road diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract with the Project), including but not limited to concrete mixing and pumping trucks, will use the best available tailpipe technology for reducing diesel PM emissions. Diesel particulate filters (DPFs) are the tailpipe technology currently proven to have the highest reduction capability. Construction contracts will specify that all diesel non-road engines rated at 50 hp or greater will use DPFs, either installed by the original equipment manufacturer or retrofitted. Retrofitted DPFs must be verified by EPA or the California Air Resources Board. Active DPFs or other technologies proven to achieve an equivalent reduction may also be used. • Utilization of Newer Equipment. EPA's Tier 1 through 4 standards for nonroad diesel engines regulate the emission of criteria pollutants from new engines, including PM, CO, NOx, and hydrocarbons. The Project construction contracts will specify that all diesel-powered non-road construction equipment with a power rating of 50 hp or greater will meet at least the Tier 3 emissions standard. All diesel-powered engines used in the construction of the Project rated less than 50 hp will meet at least the Tier 2 emissions standard as the Tier 3 emissions standard does not apply to these engines. • Diesel Equipment Reduction. The Project construction contracts will specify that electrically powered equipment be used rather than diesel-powered and gasoline-powered versions of that equipment, to the extent practicable.
Greenhouse Gas (GHG) Emissions and Resilience	**Greenhouse Gas Emissions** The Project Sponsor will require that construction is in accordance with Project-specific sustainable design criteria based on best practices related to sustainability. Contract documents will define and require specific measurable sustainable design performance targets for implementation. The Project Sponsor will use the following measures to avoid, minimize, and mitigate GHG emissions: • Use of Recycled Materials: Contracts will include a performance target to use building materials with recycled content, including cement replacements (e.g., fly ash or ground granulated blast furnace slag), recycled steel, and other materials such as insulation or gypsum board where relevant. ○ *Recycled steel*: Construction contracts will ensure the use of recycled steel by requiring a minimum fraction of recycled steel and other metals. ○ *Cement substitutes and optimization*: Contracts will require, to the extent practicable, the use of recycled post-industrial waste products such as slag, silica fume, or fly ash, and/or interground limestone. These materials will be included at varying quantities depending on the cement performance requirements and will be specifically defined with performance targets for the various components. The maximum use of replacements is generally estimated at a maximum of 33 percent of the cement content, but the amount of cement substitutes that would actually be used would likely be less than that amount. In addition, optimizing concrete for the strength required (including safety factors) will be required to help avoid unnecessary waste. • Selecting local materials: Contracts will include, as a performance target, that building materials be manufactured within 500 miles of the jobsite. • Construction nonroad engine emissions: The Project Sponsor will evaluate the use of biodiesel blends of 20 percent (B20, which is a blend of 80 percent standard diesel and 20 percent biodiesel) for all or part of the diesel powered construction engines, as the design progresses, and require B20 use if found to be practicable. The Project Sponsor will include the following measures to avoid, minimize, and mitigate GHG emissions associated with operation of the new tunnel and the rehabilitated North River Tunnel. • Contracts will require Energy Star labeled products and appliances (e.g., mechanical systems) where applicable, National Electrical Manufacturers Association (NEMA) premium efficiency motors for fans and pumps, and variable speed drives for fans, pumps, and motors; • Contracts will require energy efficient lamps and fixtures for programmatic spaces, and LED lighting for all components where practicable; • The Project Sponsor in cooperation with the other Project Partners, will design energy systems to be as efficient as practicable; • The Project Sponsor will undertake energy commissioning for systems after installation to ensure they are properly installed and operated; and • The Project Sponsor will optimize systems through the installation of a Building Management System (BMS) in the Project's fan plants that monitors all energy and water consumption.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
GHG Emissions and Resilience (Cont'd)	**Resilience** • The Project Sponsor will prepare a storm risk management plan prior to construction. The plan will identify the potential risks during each construction period and location. The plan will list the means that will be in place at the various sites and during all construction phases to prepare for severe storms and potential flooding so as to reduce the risk of damage to the facilities. The plan will also identify the procedures for determining when storm preparations should begin and the entities responsible for implementing storm preparations in advance of a potential severe storm. At a minimum, the plan will prepare for potential storms that will include hurricane force winds (including nor'easters and Category 1 hurricanes or stronger, with exact specifications to be developed by the Project Sponsor during final design) and flooding up to current levels. These requirements will be included in the contract documents, and the Project contractor will be responsible for implementing the storm risk management plan. • The design flood elevation (DFE) for all components will be 5 feet higher than the current base flood elevation (BFE) at any given location. The Project Sponsor will base the BFE on the latest and best data available from the Federal Emergency Management Agency when the final design is complete. • When Project elements can be designed without substantial operational or financial implications to an even higher standard, the Project Sponsor will do so. • The track bed supporting new track in the floodplain will be designed to resist flooding, so as to reduce the potential for flood damage. • The new Hudson River Tunnel will include floodgates within the tunnel on each side of the river, to protect both the tunnel and landside areas (e.g., PSNY) from future flooding events. These floodgates could be deployed in advance of anticipated flooding and could completely seal off the tunnel, preventing water from passing through. However, if grading can be accomplished on the New Jersey site of the new tunnel portal and Hoboken shaft site, the need for a floodgate would be eliminated as the ground would be above the DFE. • All entrances and openings to the Hoboken and Twelfth Avenue ventilation shafts and associated fan plants for the new Hudson River Tunnel will be raised above the DFE; any entrances that must be placed below the DFE will be watertight. • The Hoboken and Twelfth Avenue ventilation shafts will include hardening to protect against water incursion, and any equipment within the shafts or fan plants will be above the DFE or will be flood-resistant. • To avoid flooding at the new Hudson River Tunnel portal in New Jersey, the Project will include soil berms and other design features to prevent floodwater from entering the tunnel. If necessary following further evaluation during design, a below-grade cut-off wall will be installed at the portal. • The new Hudson River Tunnel will incorporate resiliency and flood protection measures, including the use of materials within the tunnel that will withstand salt water. • All new rails outside of the new Hudson River Tunnel structure will be designed to withstand a wide range of temperatures and temperature changes to include potential future increases in heatwave duration and severity, to avoid track buckling (rail deformation).
Geology and Soils	**General Construction Practices** • Where protective vegetation and/or pavement would be removed during construction, the Project contractor will implement erosion control measures to prevent adverse impacts to erodible soils due to increased runoff. Erosion control measures may include a combination of silt fences, hay bales, diversion ditches, temporary grading, and vegetative or other protective coverings for exposed soils. The Project Sponsor prepare and implement a soil erosion and sediment control plan in accordance with all applicable standards and regulations. In New York, construction will be performed in accordance with standards and specifications for selection, design, and implementation of erosion and sediment control practices contained in the latest version of *New York State Guidelines for Urban Erosion and Sediment Control*. • The Project design will account for both low-cover and seismic factors, including effects of soil behavior, and will incorporate measures to address these factors in proposed surface and subsurface structures. Structures will be designed in accordance with the established seismic design criteria to resist a specified level of shaking, including a maximum design earthquake load. Liquefaction potential will be rechecked to confirm previous conclusions that liquefaction is not an issue. If different new conclusions are reached regarding liquefaction, then appropriate design changes will be made.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Geology and Soils (Cont'd)	• During excavation of the new Hudson River Tunnel, if the Project contractor encounters serpentinite or other rock that could contain potentially hazardous asbestiform minerals, the Project contractor will implement measures to protect workers and the public, as well as to minimize any environmental hazard associated with excavated material removal and processing. The Project Sponsor will implement a Project-wide Soils and Materials Management Plan to mitigate worker and public exposure to naturally-occurring asbestos (NOA). Typical engineering controls involve the use of covers and caps, vegetation, fencing, landscaping, and in some conditions, the application of water to suppress dust. Common work practices include limiting activities on NOA-containing areas, reducing driving speed on unpaved roads that may contain NOA, and cleaning vehicles driven over NOA. Worker health and safety measures that include respiratory protection may also be warranted. In addition, any on-site reuse, beneficial reuse or off-site disposal of any such asbestos-containing rock will, at a minimum, be conducted in accordance with Federal and state regulations. • To minimize potential ground displacement resulting from dewatering in the vicinity of the Hoboken shaft site and New York excavation areas, the Project contractor will implement control measures, including ground improvement to stabilize soils, rock mass grouting, installation of waterproof earth retention systems, such as slurry walls or other lateral earth retention in areas of open cut or shaft construction, or underpinning of potentially affected existing structures, as necessary. Surface settlement markers will be installed and used to quantify if excessive settlement is occurring as a result of construction. • To minimize dust hazards during excavation of the new Hudson River Tunnel and the Hoboken and Twelfth Avenue shafts, and in processing and transport of excavated materials, the Project contractor will implement dust control measures (see "Air Quality" and "Contaminated Materials"). **New Jersey** • To account for the potential for undermining settlement or structural instability due to excavation beneath or adjacent to existing railroad, roadway, utility structures, or other existing foundations within the construction zone in New Jersey, the Project will include underpinning or otherwise supporting them and monitoring for movements as excavation progresses. The Selected Alternative includes underpinning of the Willow Avenue bridge in Hoboken. Excavation and construction methods will be modified if monitoring indicates that movements exceed established limits. Support may include modular walls, secant pile walls, or soldier piles and lagging. In addition to providing sidewall support, these lateral retention methods would assist in groundwater control for the excavation. • The Project Sponsor will develop and implement CPPs for the protection of historic architectural resources located in proximity to Project construction prior to any Project demolition, excavation, and construction activities. The CPPs will include provisions for vibration monitoring, adherence to vibration limit thresholds, measures to reduce vibration levels, and modification of construction methods if necessary. • To mitigate vibrations generated during rock excavation at the Palisades tunnel portal, cross passages, and the Hoboken shaft site, the Project Sponsor will implement a vibration monitoring program (see "Vibration"). Controlled blasting techniques will be used, and if monitoring during test blasts indicate that allowable peak particle velocity limits may be exceeded, blast patterns and methods will be modified to reduce vibrations to an acceptable level. Vibration monitoring will continue during rock excavation operations. • Prior to the commencement of construction, the Project Sponsor will evaluate the stability of rock slopes in the vicinity of the Palisades tunnel portal and the Hoboken shaft and fan plant site to determine if any of the slopes on either side of the Palisades are unstable and susceptible to shifting during construction. If locations of instability are identified, the Project Sponsor will require the development and implementation of slope stabilization at the necessary locations. Stabilization measures, such as rock bolting and installation of surface protection, will be implemented to address the source of the landslide material located on a steep slope above the staging area and the portal itself. In addition, geotechnical investigations will be undertaken during further design stages to confirm the need and location for any additional stabilization measures. • The Project Sponsor will implement best management practices (BMPs) related to landslide prevention to minimize the potential for landslides, including regular inspections, maintenance of infrastructure, roadways and vegetation, and other BMPs developed specifically for the area. • Given the presence of faults in the Weehawken Cove area, for the cross passage to be constructed here, the contract documents will require the Project contractor to first probe through the entire cross passage length using horizontal drilling to further evaluate potential inflow areas.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Geology and Soils (Cont'd)	• If faults are encountered during construction of the Palisades tunnel, the Hoboken shaft site, or the western portion of the river tunnel, the Project contractor will perform ground stabilization measures such as grouting ahead of the excavation face to stabilize the ground and/or control groundwater inflow. Additional rock support (e.g., rock bolts, shotcrete, or other measures) may also be used. **New York** • If faulting or poor quality rock is present at the proposed Tenth Avenue cut-and-cover site, the Project contractor will use rock grouting, rock bolting, and shotcrete, if necessary, to allow excavation in closely fractured or weathered rock. • To mitigate vibration impacts generated during excavation or other construction activities, the Project contractor will implement a vibration monitoring program, which will include action thresholds (a complete description of these measures is provided above under "Vibration").
Contaminated Materials	**Project-Wide Measures** • The Project Sponsor will perform additional Site Investigations (New Jersey sites) or Phase II Subsurface Investigations (New York sites). This will include soil and groundwater sampling activities, as well as hazardous materials buildings and structures for hazardous materials at certain locations along the Project site where existing information is insufficient and/or where the potential for contamination exists based on available data, and where Project construction could encounter the contamination. The Project Sponsor will determine the specific sites that will be subject to further investigation as Project engineering and design advances. The Project Sponsor will also prepare Property Acquisition Environmental Cost Estimate (PAECE) reports in coordination with property acquisition in New Jersey that will assist with assessing potential environmental concerns. Based on the findings of these initial investigations, the Project Sponsor may undertake additional investigations to further determine the extent and levels of contamination at affected properties. • Based on investigation data, the Project Sponsor will develop and implement appropriate remedial actions, such as engineering controls, to avoid the potential for adverse impacts to construction workers, surrounding communities and the environment. The specifications for the remedial measures will be established in documents (which will be subject to NJDEP or NYSDEC review should a reportable condition be encountered or if the site is already subject to agency oversight) and will address the procedures for monitoring/oversight to ensure the remedial measures are properly implemented. • The Project Sponsor will develop a Project-wide Soils and Materials Management Plan (SMMP) to manage contaminated material encountered during construction. The SMMP will provide procedures for materials handling during construction activities, including Best Management Practices (BMPs) to be implemented during construction, such as procedures for stockpiled or containerized material and testing procedures for sampling material prior to off-site disposal or on-site reuse. The SMMP will set out how regulatory compliance (Federal, state, and local) will be achieved with respect to the management of excavated materials and hazardous waste, petroleum-contaminated materials, and other materials during construction, including naturally occurring asbestos (NOA), and provide protocols for the protection of workers, contingencies for community air monitoring, and other procedures that should be implemented to protect public health and the environment. The SMMP will establish temporary stockpile locations, construction and management requirements. • The Project Sponsor will develop a site-specific Soil Reuse and Alternative Fill Management Plan for management of contaminated soil. Materials handling and results on construction sites in New Jersey will be conducted under oversight by a Licensed Site Remediation Professional (LSRP) pursuant to the NJDEP Linear Construction Technical Guidance. • The Project Sponsor will require that the Project contractor conduct transportation and disposal of contaminated material and soil in accordance with Federal, state, and local regulations—e.g., regarding proper containers, signage, placards, manifests (waste tracking system), and use of appropriately permitted transportation companies/vehicles and disposal facilities. All waste will be transported on designated truck routes using licensed transporters for disposal at an appropriately licensed facility. Each container or load will be accompanied by an applicable non-hazardous or hazardous waste manifest.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Contaminated Materials (Cont'd)	• Because there is the potential to encounter NOA serpentinite minerals during construction of the Project, especially during excavation and tunneling operations, the Project Sponsor will implement measures to mitigate exposure to NOA as part of the SMMP, consistent with OSHA asbestos standards. Approaches for reducing NOA exposure are similar to practices used for asbestos-containing materials (ACM) in commercial applications. Typical engineering controls involve the use of covers and caps, vegetation, fencing, landscaping, and in some conditions, the application of water to suppress dust. Common work practices include limiting activities on NOA-containing areas, reducing driving speed on unpaved roads that may contain NOA, and cleaning vehicles driven over NOA. The Project Sponsor will conduct any beneficial reuse or off-site disposal of NOA-containing rock in accordance with Federal and state regulations. • The Project Sponsor will develop a Project-specific Health and Safety Plan (HASP) prior to earth-disturbing activities to protect workers and the public from potential exposure to contaminated materials. The HASP will be developed during final design in accordance with OSHA requirements, including 29 CFR § 1910.120 (Hazardous Waste Operations and Emergency Response), to protect construction workers from potential exposure. The HASP will set out procedures for handling contaminated materials, conditions triggering personal protective equipment (PPE), response plans, designation and training of appropriate personnel, and monitoring for the presence of contamination (e.g., buried tanks, drums or other containers, sludges, or soil which shows evidence of potential contamination, such as discoloration, staining, or odors). The HASP will also set out procedures to minimize dust generation, such as dust and air monitoring of the work area, the use of water spray, dust retardants, and/or truck wheel wash, during soil disturbance and excavation activities. • During construction, whenever contaminated soils or groundwater or hazardous vapors or new areas of concern are encountered (e.g., discovery of unknown storage tanks), the Project Sponsor will implement appropriate site remediation techniques or other measures to prevent exposure, based on the procedures set forth in the SMMP and, if necessary, other materials management and safety plans. Following construction, the Project Sponsor will restore all disturbed areas using engineering controls that will prevent direct human exposure. The Project Sponsor will restore construction staging areas to preconstruction conditions or cap them. • The local municipalities, as well as county and state agencies and OSHA, will have the ability to inspect a construction site to determine the level of compliance with established safety regulations and Project construction commitments. • The Project Sponsor will require that any chemicals used or stored at construction staging areas have the corresponding Safety Data Sheets available for inspection by workers and other on-site personnel at the local construction office. **Tunnel Spoils and Other Excavated Materials** • With respect to excavated materials, the Project Sponsor, working with the Project contractor, will be responsible for finding a suitable location for reuse or off-site disposal of spoils from the tunnel mining. Spoils will not be disposed in areas within the jurisdiction of the USACE. • During final design, the Project Sponsor will develop protocols to identify spoils that may contain contaminated materials, so that they can be handled appropriately and disposed of at a suitable location. • The Project Sponsor will develop protocols for the transport of spoils from the construction sites in accordance with all applicable Federal, state, and local regulations to ensure the safe handling of these materials; these protocols will include procedures to secure material from spilling off trucks, truck routes, as well as for any inadvertent or accidental spills of materials falling from trucks removing this material from the staging sites. • The Project Sponsor will manage groundwater generated during dewatering activities in accordance with applicable permits from NJDEP in New Jersey and from NYCDEP and/or NYSDEC in New York, depending on the location of discharge. Potential methods for handling the disposal of groundwater from dewatering activities include: discharges to surface water following any necessary and permitted pre-treatment; discharge to stormwater or combined sewer systems following any necessary and permitted pre-treatment; on-site treatment and discharge; and/or off-site disposal.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Contaminated Materials (Cont'd)	**Dust Control** • To minimize fugitive dust emissions from construction activities, the Project Sponsor will require a fugitive dust control plan including a robust watering program as part of contract specifications. The Project Sponsor and Project contractor will be required to meet all applicable Clean Water Act, National Pollutant Discharge Elimination System (NPDES), and corresponding State (SPDES) requirements, and follow best management practices to prevent unacceptable runoff. For example, as a part of the dust control plan, all trucks hauling loose material will be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the construction site, and dust suppression techniques (e.g., spraying with water, surfactants) will be used to minimize dust for all excavation and transfer of soils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air. Loose materials will also be dampened or covered. • The Project Sponsor will implement a SMMP to minimize and control the potential for airborne soil particles from stockpiled materials. The SMMP will establish temporary stockpile locations, construction, and management requirements. Stockpiles will be covered with a heavy duty plastic at the end of the work day and will be bermed to contain water that drains from the soil which will be collected and containerized for disposal as needed. • The Project Sponsor will institute proactive controls to reduce the potential for dust generation during site activities, including maintaining slow travel speeds, stabilization and monitoring of truck entry and exit ways, and the application of a water spray or dust suppressant to control dust generation to prevent exposure of the public and the environment to respirable particulates and other contaminants of concern. Soil attached to the wheels and body of trucks and equipment will be removed at a wash station (with treatment/management of the wash water in accordance with NJDEP/NYSDEC requirements) prior to leaving the site to reduce the potential for trucks to deposit material outside of the project site. Water generated by equipment and truck decontamination activities will be collected and containerized onsite for permitted treatment or offsite disposal. • The Project Sponsor will include specifications in the construction contracts for monitoring ambient air around Project construction/staging areas to prevent exposure of workers, the public, and the environment to respirable particulates and other contaminants of concern. At each construction work zone, the Project Sponsor will conduct air monitoring to alert when dust levels have exceeded pre-determined action levels, which will be based on applicable law and guidance. The air monitoring will be conducted with fixed monitoring stations and/or portable equipment, as warranted, capable of displaying real-time levels of particulate matter. If triggered, work practices and localized engineering controls will be evaluated and corrected (as needed). If exceeded for specified periods of time, additional measures will be implemented, such as limiting the extent of areas of exposed soil, increasing the application of dust control measures, or ceasing work until levels have fallen below the action levels. **New Jersey** • The Project Sponsor will undertake construction in New Jersey in accordance with the latest NJDEP Linear Construction Technical Guidance. The Project Sponsor will complete construction as a Linear Construction Project (LCP) under the oversight of an assigned LSRP. The LSRP will prepare a site-specific soil reuse and alternative fill management plan for the management of contaminated soil and will oversee the reuse or disposal of all Project-related contaminated materials. The Project Sponsor will use certified clean fill on site in accordance with the NJDEP Fill Material Guidance for Site Remediation Program (SRP) Sites. • At the staging area at Tonnelle Avenue in North Bergen, New Jersey, if the Project contractor elects to store tunnel spoils on site using a below-grade pit, measures to reduce groundwater flow into and out of the pit must be implemented. • During construction for the Project on the Hoboken staging area, contaminated soil within the portion of the site where the new ventilation shaft and fan plant are proposed will be excavated, placed in dump trucks or roll-off containers, and transported to appropriate disposal sites. Trucks will be covered to contain the contaminated materials being transported. **Hudson River** • The Project Sponsor will manage any sediment or mixture of sediment and grout removed from the river as contaminated; this material will be characterized for potential reuse offsite or disposal at a suitably permitted facility, after dewatering. • The Hudson River is a National Priorities List (NPL) site (also known as a Superfund site) and sediment may have PCB contamination. Therefore, the Project Sponsor will test material to be excavated in accordance with Federal, state, and local regulations before it is excavated, to determine beneficial reuse or off-site disposal options.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Contaminated Materials (Cont'd)	**New York** • In New York, the Project Sponsor will conduct any beneficial use of the excavated material in accordance with NYSDEC requirements in 6 NYCRR Part 360, which sets out conditions under which excavated materials can be reused. Where material is surplus or not suitable for reuse, the results of laboratory analysis of samples (collected either before or after it were excavated) will be used to determine appropriate disposal facilities.
Utilities and Energy	**Utilities** • The Project Sponsor, in cooperation with the other Project Partners, will coordinate with affected utility providers throughout final engineering design to identify potential issues and prescribe means to resolve them prior to construction. • The Project Sponsor will coordinate with PSE&G to install appropriate vibration monitoring equipment to monitor vibration at specified infrastructure facilities, including the Hoboken substation, underground transmission lines in the Hoboken/Weehawken area, and at the Paterson Plank Road facilities, to ensure that no damage occurs to these assets as a result of Project construction. • All NYCDEP utilities affected by construction of the Project will be protected, relocated, repaired, and/or replaced as required and in consultation with NYCDEP, as necessary and practicable. • The Project Sponsor, in cooperation with the other Project Partners, and NYCDEP will develop an agreement memorializing the responsibilities and liabilities related to NYCDEP infrastructure. This agreement will be executed during final design. • The Project Sponsor will determine if the NYCDEP facility within Tenth Avenue is within the zone of influence and requires monitoring in accordance with §76 of NYCDEP Bureau of Water and Sewer Operation's Standard Sewer and Water Main Specifications. • The Project Sponsor will obtain approval from NYCDEP for connection for the new permanent dewatering discharge from the Hudson River Tunnel via the Twelfth Avenue fan plant into the NYCDEP outfall downstream from Regulator N45. In addition, stormwater will be treated in accordance with requirements of the SPDES permit for this connection prior to being conveyed to the Hudson River. • The Project Sponsor, in cooperation with the other Project Partners, will develop agreements with utility providers and government agencies regarding temporary or permanent relocation of utility transmission lines. • The Project Sponsor will conduct public outreach in affected areas in New Jersey (Secaucus, North Bergen, Union City, Hoboken, and Weehawken) and coordinate with agencies and private utilities with regard to minor, short duration service interruptions. • The Project Sponsor will conduct public outreach in New York City and coordinate with agencies and private utilities with regard to minor, short duration service interruptions. **Energy** • As discussed under "Traffic," MPT plans will be developed, approved, and implemented to maintain travel lanes, and detour through traffic away from construction activities and equipment to the extent practicable. These measures would reduce additional gasoline consumption caused by slower moving and idling roadway vehicles. • Rail service plans will be developed to maximize work within and adjacent to the NEC or other rights-of-way during off-peak rail periods, as practicable, to minimize rail service outages or delays. These measures would reduce additional electric and diesel fuel consumption caused by slower rail operating speeds through construction areas.
Safety and Security	• The Project Sponsor will secure all construction sites with active and passive security measures; the Project contractor will also meet all applicable safety and security requirements. • The Project Sponsor, in cooperation with the Project Partners, will advance the Project design in coordination with emergency responders, including FDNY and North Hudson Regional Fire and Rescue. • The Project Sponsor will develop operational safety and security measures to address natural events (e.g., severe storms, flooding, earthquakes) and emergencies caused by human error, mechanical failure, fire, or intentional or unintentional human intervention.
Public Health and Electromagnetic Fields	• The Project Sponsor will implement the mitigation measures described herein for noise, air quality, and contaminated materials; these measures will also address public health.

Environmental Category	Hudson Tunnel Project Mitigation Commitments
Indirect and Cumulative Effects	• The Project Sponsor, other Project Partners, and MTA will coordinate regarding railroad improvements that will affect PSNY operations and NEC service to minimize disruptions to service. • The Project Sponsor will coordinate with the responsible party for the Hudson Yards Right-of-Way Preservation Project regarding any overlap in construction between that project and the construction of the Selected Alternative for efficiency and to avoid conflicts or adverse impacts related to simultaneous construction. • The Project Sponsor will coordinate with MTA regarding construction activities for the West Side Yard Perimeter Protection project to avoid adverse impacts related to simultaneous construction where practicable. • In the event that the Lincoln Tunnel Helix Replacement Program is under way at the same time as construction activities for the Project in New Jersey the Project Sponsor for the Hudson Tunnel Project will coordinate with those responsible for the Helix reconstruction to avoid cumulative construction impacts where practicable. • If construction activities for the Project in Hoboken and Weehawken would overlap with rehabilitation of the Willow Avenue bridge over the HBLR, the Project Sponsor for the Hudson Tunnel Project will coordinate with Hudson County to avoid cumulative construction impacts where practicable. • The Project Sponsor will coordinate with PANYNJ, NJDOT, and the New Jersey Turnpike Authority regarding construction projects in New Jersey and to facilitate transparent sharing of information between agencies and the neighboring communities. • In New York City, the Project Sponsor for the Hudson Tunnel Project will coordinate with the New York City Department of Transportation's Office of Construction Mitigation and Coordination regarding construction activities for the Project. • The Project Sponsor will coordinate with NJDEP to avoid conflicts during any overlapping construction activities of the Rebuild By Design Project and the Hudson Tunnel Project in Hoboken and Weehawken to the extent practicable. • The Project Sponsor, in cooperation with the other Project Partners, will coordinate with NYCDCP and Manhattan Community Board 4 regarding the visible elements of the Twelfth Avenue fan plant, so that the fan plant is visually compatible with the character of the surrounding area.