

Chapter 9: Historic and Archaeological Resources

9.1 INTRODUCTION

This chapter of the Environmental Impact Statement (EIS) presents the analysis the Federal Railroad Administration (FRA) and the New Jersey Transit Corporation (NJ TRANSIT) conducted of the potential effects of the No Action and Preferred Alternatives on historic properties. This chapter identifies historic properties (including architectural and archaeological resources) in the area of potential effects (APE) for the Preferred Alternative, adverse effects of the Preferred Alternative on such properties, and proposed measures to resolve adverse effects through avoidance, minimization, and/or mitigation. The chapter considers both the potential temporary effects of the Preferred Alternative on historic properties during construction and the permanent operational effects on historic properties. The Port Authority of New York and New Jersey (PANYNJ), in its role as Project Sponsor, has accepted and relied on the evaluations and conclusions of this chapter.

This analysis was prepared in accordance with Section 106 of the National Historic Preservation Act of 1966¹ (NHPA) (Section 106), and the Advisory Council on Historic Preservation's (ACHP) regulations for implementing Section 106 at 36 CFR Part 800. As described below and as required by the Section 106 regulations, consultation has occurred and will continue with the relevant State Historic Preservation Officers (SHPOs)—the New Jersey State Historic Preservation Office (NJHPO) and the New York State Historic Preservation Office (NYSHPO)—ACHP, and other consulting parties, including the PANYNJ. This analysis was also prepared in accordance with Section 4(f) of the Department of Transportation Act of 1966 (see Chapter 24, "Final Section 4(f) Evaluation"). FRA coordinated the NEPA process with consultation pursuant to 36 CFR § 800.8.

This chapter reflects the following changes made since the Draft EIS (DEIS) for the Hudson Tunnel Project:

- The chapter incorporates design modifications related to the permanent features of the Project (e.g., modifications to surface tracks and tunnel alignment) and changes to construction methods and staging.
- The chapter is updated to describe current conditions in the affected environment.
- The chapter describes additional Section 106 consultation that occurred following completion of the DEIS.
- The discussion related to mitigation was updated in accordance with the commitments set forth in the executed Programmatic Agreement (PA) for the Project. Note also that the executed PA is included in **Appendix 9** of this EIS.

¹ NHPA (54 USC § 306108).

This chapter contains the following sections:

- 9.1 Introduction
- 9.2 Analysis Methodology
 - 9.2.1 Regulatory Context
 - 9.2.2 Analysis Methodology
- 9.3 Affected Environment: Existing Conditions
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 - 9.3.3 New York
- 9.4 Affected Environment: Future Conditions
- 9.5 Impacts of No Action Alternative
- 9.6 Construction Impacts of the Preferred Alternative
 - 9.6.1 New Jersey
 - 9.6.2 Hudson River
 - 9.6.3 New York
- 9.7 Permanent Impacts of the Preferred Alternative
 - 9.7.1 New Jersey
 - 9.7.2 Hudson River
 - 9.7.3 New York
- 9.8 Measures to Avoid, Minimize, and Mitigate Impacts
 - 9.8.1 Historic Architectural Resources
 - 9.8.2 Archaeological Resources

9.2 ANALYSIS METHODOLOGY

During development of this EIS, FRA and NJ TRANSIT developed methodologies for evaluating the potential effects of the Hudson Tunnel Project in coordination with the Project's Cooperating and Participating Agencies (i.e., agencies with a permitting or review role for the Project). The methodologies used for analysis of historic properties in accordance with Section 106 and the National Environmental Policy Act (NEPA) are summarized in this chapter.

9.2.1 REGULATORY CONTEXT

Section 106 requires that Federal agencies take into account the effects of their undertakings on historic properties and afford ACHP a reasonable opportunity to comment on such undertakings. As defined in 36 CFR § 800.16(l)(1), historic properties are:

“any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places [NRHP] maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria.”

Historic properties include both historic architectural resources and archaeological resources. Historic properties are generally over 50 years old; possess integrity of location, design, setting, materials, workmanship, feeling, and association; and meet one or more of the following NRHP criteria for evaluation, as defined in 36 CFR Part 60:

- Criterion A: Are associated with historic events;
- Criterion B: Are associated with significant people;

- Criterion C: Embody distinctive characteristics of a type, period, or method of construction, represent the work of a master, possess high artistic value, or are otherwise distinguished; or
- Criterion D: May yield information important in prehistory or history.

In accordance with 36 CFR § 800.2(c), Section 106 requires consultation with the appropriate SHPOs, in this case NJHPO and NYSHPO; Tribal Historic Preservation Officers (THPOs) or other appropriate tribal representatives from Federally recognized Indian tribes that might attach religious and cultural significance to historic properties affected by the undertaking; representatives of local governments; applicants for Federal assistance, permits, licenses, and other approvals; and additional consulting parties with a demonstrated interest in the undertaking based on a legal or economic relation to affected properties, or an interest in the undertaking's effects on historic properties. The lead Federal agency, in consultation with the SHPO(s) and consulting parties, must determine whether a proposed undertaking would have any adverse effects on historic properties within the Project's APE and seek ways to avoid, minimize, or mitigate any adverse effects to such properties.

Following completion of the DEIS, the PANYNJ became the Project Sponsor for the Hudson Tunnel Project (see Chapter 1, "Purpose and Need," Section 1.1.2, for more information). Consistent with the roles and responsibilities defined in Section 1.1.1 of that chapter, as the current Project Sponsor, the PANYNJ will comply with mitigation measures and commitments identified in the Record of Decision (ROD).

FTA designated FRA as the lead Federal agency pursuant to 36 CFR § 800.2(a)(2) to act on its behalf to fulfill its responsibilities under Section 106. However, as the Project advances toward and through final design and construction, it is possible the lead Federal agency may change if FRA does not provide the majority of Federal funding for construction of the Project; the PA for the Project provides a process for designating an alternative lead Federal agency under this scenario. The lead Federal agency will ensure that the identification, assessment, and adoption of treatment measures identified in the PA are carried out. The PA for the Project is described in greater detail below in Section 9.8, and the executed PA is included in **Appendix 9** of this EIS. The lead Federal agency will also have sole authority to conduct government-to-government consultation with Federally recognized Indian tribes with respect to the PA.

When a project is being reviewed pursuant to Section 106, the procedures of Section 14.09 of the New York State Historic Preservation Act do not apply, and any review and comment by NYSHPO must be within the framework of Section 106 procedures (New York State Historic Preservation Act § 14.09(2)). The Project, however, may be subject to the New Jersey Register of Historic Places Act (NJRHPA) due to the involvement of NJ TRANSIT, an instrumentality of the State of New Jersey. If components of the Project would affect resources listed on the New Jersey State Register, an Application for Project Authorization would need to be filed, pursuant to the NJRPA. As described in greater detail below, no properties listed on the New Jersey State Register have been identified within the Project's APE, and, therefore, an Application for Project Authorization is not required.

9.2.2 ANALYSIS METHODOLOGY

9.2.2.1 CONSULTATION

FRA engaged in consultation related to the Project and its potential effects on historic properties in accordance with Section 106. FRA sent Section 106 consultation initiation letters to NJHPO and NYSHPO on May 12, 2016. In addition, FRA sent Section 106 consultation initiation letters to seven Federally recognized Indian tribes on May 11, May 12, and August 5, 2016: the Delaware Nation, the Delaware Tribe, the Delaware Tribe of Indians, the Shawnee Tribe of Oklahoma, the Shinnecock Indian Nation, the Stockbridge-Munsee Community of Mohican Indians, and the



Eastern Shawnee Tribe of Oklahoma (the “Consulting Tribes”). FRA invited additional consulting parties, including organizations and individuals that could have an interest in the Project based on a legal or economic relation to affected properties or an interest in the Project’s effects on historic properties, to participate in the Section 106 process in correspondence dated August 5 and September 30, 2016. The consulting party letters provided information about the Project and requested information regarding any concerns the parties may have related to the potential effects of the Project on historic properties. In addition, FRA also provided information regarding the Project’s proposed APE, identification of historic properties, assessment of the Project’s potential effects on historic properties, and measures proposed to avoid, minimize and/or mitigate adverse effects to historic properties to consulting parties. This consultation is described in greater detail below in Section 9.2.2.2 and Section 9.2.2.3.

The invited consulting parties are as follows:

- NJHPO
- NYSHPO
- Amtrak
- PANYNJ
- NJ TRANSIT
- FTA
- U.S. Army Corps of Engineers (USACE)
- ACHP
- Delaware Nation
- Delaware Tribe
- Delaware Tribe of Indians, Oklahoma
- Shawnee Tribe of Oklahoma
- Shinnecock Indian Nation
- Stockbridge-Munsee Community of Mohican Indians
- Eastern Shawnee Tribe of Oklahoma
- Eastern Delaware Nations
- Eastern Lenape Nation of Pennsylvania
- Nanticoke Lenni-Lenape Indians of New Jersey
- Unkechaug Nation
- New York City Landmarks Preservation Commission
- Hoboken Mayor’s Office
- Hoboken Historic Preservation Commission
- Hudson County
- City of Jersey City’s Mayor’s Office
- City of Jersey City Historic Preservation Commission
- North Bergen Mayor’s Office
- Secaucus Mayor’s Office
- Union City Mayor’s Office
- Union City Landmarks Commission
- Weehawken Mayor’s Office
- Weehawken Historical Commission
- Hudson River Park Trust
- Archaeological Society of New Jersey
- Society for Industrial Archeology
- Professional Archaeologists of New York City
- Hoboken Historical Museum

- Hoboken Quality of Life Coalition
- Jersey City Landmarks Conservancy
- New Jersey Historical Society
- Weehawken Historical Society
- Hudson Riverkeeper
- Anthracite Railroads Historical Society
- Erie Lackawanna Historical Society
- National Railway Historical Society, Jersey Central Chapter
- Railway & Locomotive Historical Society, New York Chapter
- Pennsylvania Railroad Technical & Historical Society, Philadelphia Chapter
- Tri-State Railway Historical Society
- United Railroad Historical Society of New Jersey
- National Railway Historical Society, North New Jersey Chapter

Correspondence with consulting parties is summarized in a table provided in **Appendix 9** along with copies of the correspondence among FRA, NJHPO, NYSHPO, ACHP, and invited signatories to the PA.²

In a letter dated June 10, 2016, ACHP accepted FRA's invitation to participate in the environmental review process for the Project as a participating agency pursuant to NEPA and 23 USC § 139. FRA will continue to keep ACHP apprised of Project activities through its role as a NEPA participating agency. In addition, on March 29, 2017 FRA notified ACHP that the Project would adversely affect historic properties and that FRA proposes to develop a PA for complex or multiple undertakings in accordance with 36 CFR § 800.14(b)(3), and invited ACHP to participate in consultation to resolve those effects. In a response letter dated April 4, 2017 ACHP indicated that it will participate in Section 106 consultation for the Project, including development of the PA.

On April 7, 2017, FRA provided a preliminary Draft PA to NJHPO, NYSHPO, and Consulting Tribes for review and comment and NJHPO, NYSHPO and the Delaware Nation provided comments to FRA (see **Appendix 9**). Also on April 7, 2017, FRA invited FTA, USACE, and others to be invited signatories to the PA and provided them the preliminary Draft PA for review and comment. The preliminary Draft PA was also provided to ACHP on May 9, 2017, and ACHP reviewed and provided comments on the preliminary Draft PA. ACHP, FTA, and Amtrak accepted FRA's invitation to become signatories to the PA.³

Based on comments received on the preliminary Draft PA from signatories, invited signatories, and Consulting Tribes, FRA provided a revised Draft PA for review and comment to all consulting parties on July 6, 2017. On July 25, 2017, FRA held a webinar to review the Draft PA with the consulting parties; all consulting parties were invited to attend the webinar.

The Draft PA was included in the DEIS made available for public review on July 6, 2017. As described in Chapter 25 of the FEIS, "Process, Agency Coordination, and Public Involvement,"

² Appendix 9-2 of **Appendix 9** provides information with respect to which of the invited consulting parties participated in the Section 106 process, including those parties that responded to FRA's invitation to participate in the Section 106 process and provided input and comments on documents provided to them, including the PA. To be conservative and to provide the greatest opportunity for consulting party engagement in the Section 106 process, FRA elected to send information to all the invited consulting parties, regardless of whether they responded to the initial consulting party invitation.

³ USACE declined to be a signatory to the PA, indicating that USACE will review any undertaking it may have related to the Project in accordance with Appendix C of 33 CFR Part 325. FRA, NJHPO, NYSHPO, and ACHP are signatories to the PA. FTA, the PANYNJ, and Amtrak are invited signatories to the PA.



Section 25.2.1, FRA and NJ TRANSIT sent electronic and/or hard copy notices to a wide distribution list informing them that the DEIS was available for review, providing information on the comment period and how to make comments, and inviting them to three public hearings at which comments could be made. The comment period remained open through August 21, 2017. During the public comment period, some elected officials, agency representatives, and members of the public commented on the DEIS with respect to its conclusions related to historic properties, and where appropriate, FRA and NJ TRANSIT considered those comments to be comments on the Draft PA as well.

On November 29, 2017, FRA provided a preliminary draft of the Final PA that incorporated comments received on the Draft PA to all consulting parties. FRA, NJ TRANSIT and Amtrak conducted additional coordination with Hudson River Park Trust (HRPT) about the Project's potential effects on the Hudson River Bulkhead and measures to avoid, reduce, and mitigate those impacts that are incorporated in the PA. On April 5 and 6, 2021, FRA provided a Draft Final PA to signatories, invited signatories, Consulting Tribes and consulting parties that participated in the Section 106 process.⁴ FRA incorporated comments received from these parties into the Final PA, which was executed by FRA, NJHPO, NYSHPO, ACHP and the invited signatories. On May 10, 2021, FRA provided all consulting parties the opportunity to indicate concurrence with the outcome of Section 106 consultation by signing the executed PA as a Concurring Party. (The Final and executed PA is provided in **Appendix 9** of this EIS.)

9.2.2.2 DEFINITION OF THE AREA OF POTENTIAL EFFECTS

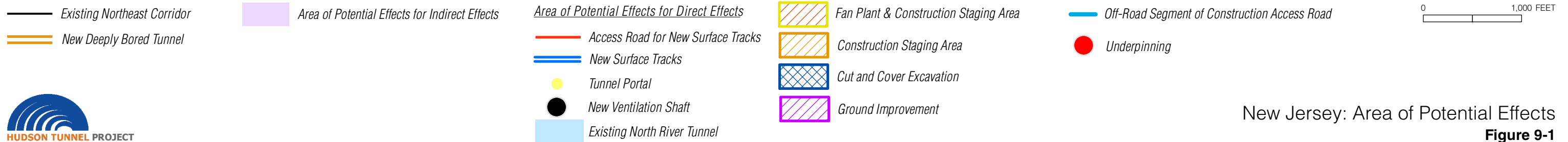
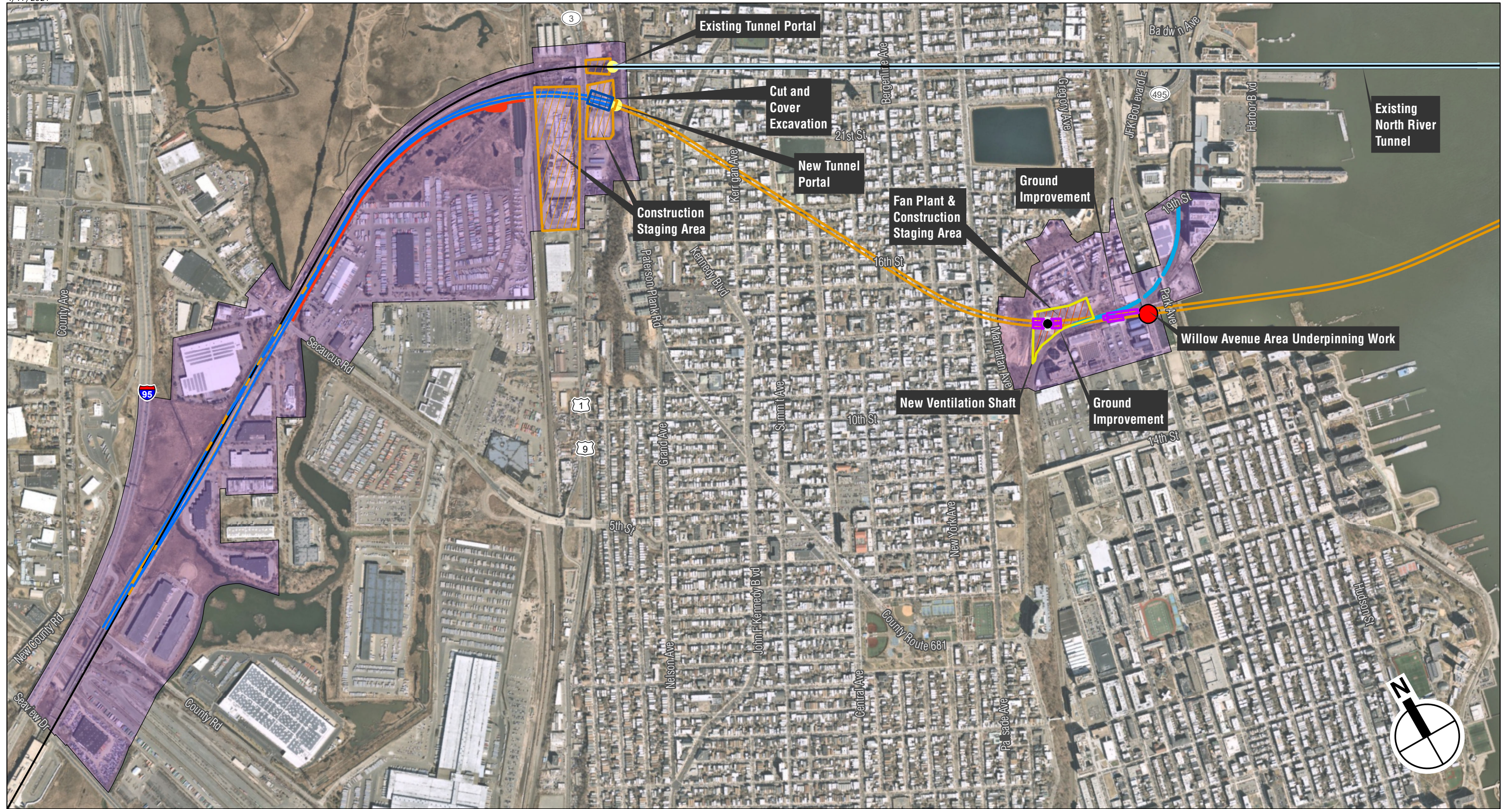
A required step in the Section 106 process is determining the APE which is defined as “the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if such properties exist.”⁵ The APE is influenced by the scale and nature of an undertaking.

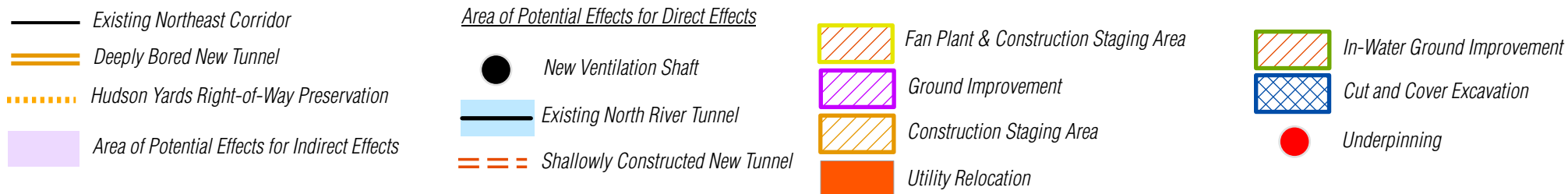
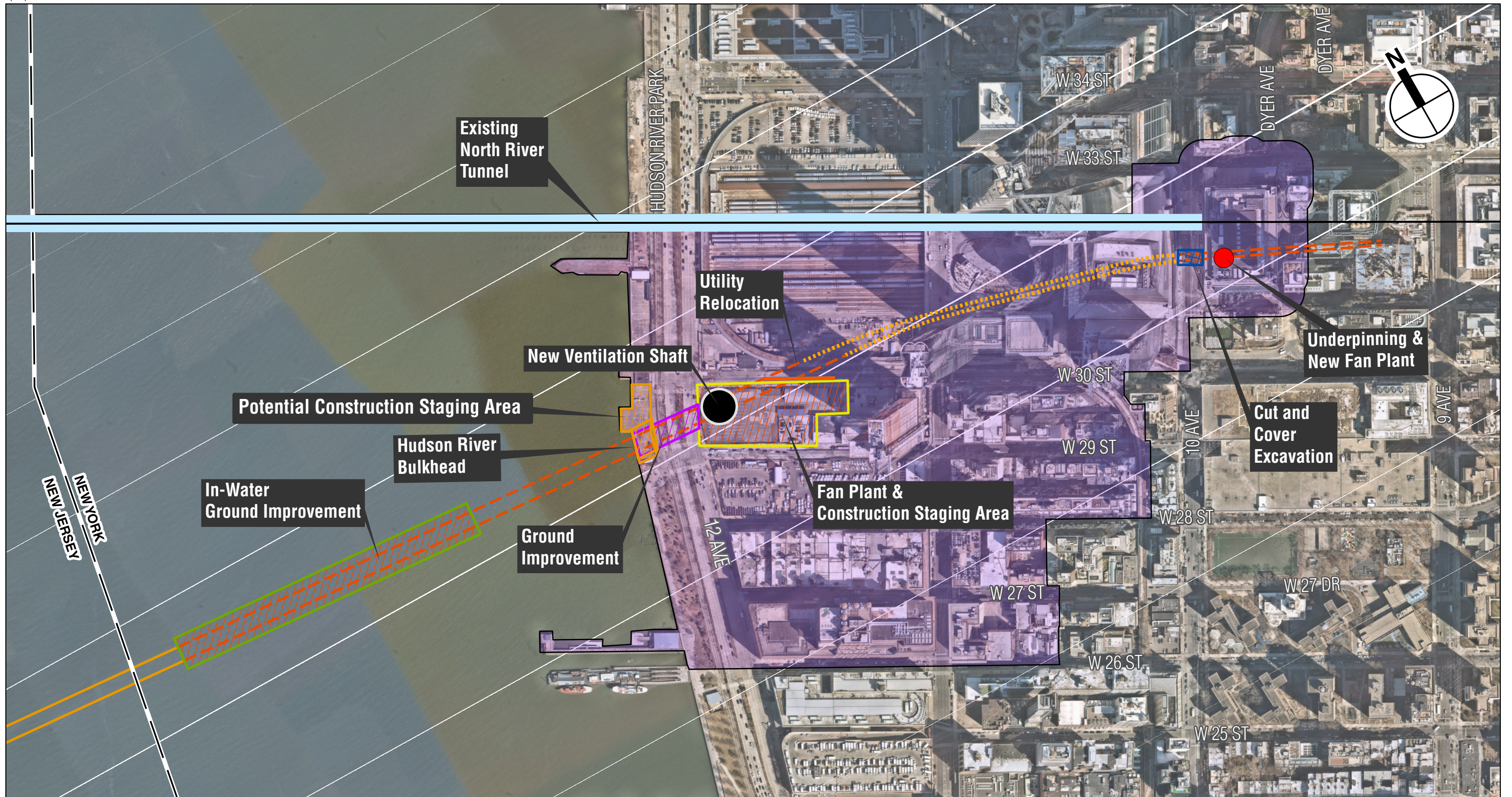
FRA and NJ TRANSIT developed the APE by based on proposed construction activities for the Preferred Alternative and the potential for those activities to have direct or indirect effects on historic properties. The APE in New Jersey and New York is shown in **Figures 9-1 and 9-2**.

Direct effects may include subsurface disturbance of archaeological resources or demolition, alteration, or damage to architectural properties. The portion of the APE in which there is the potential for the Preferred Alternative to cause direct effects (the APE for Direct Effects) includes most locations where construction for the Preferred Alternative would occur, including construction of new surface tracks along the Northeast Corridor (NEC) in New Jersey, ventilation shafts and fan plants, shallowly constructed portions of the new Hudson River Tunnel, construction staging areas, and rehabilitation work within the existing NEC tunnel beneath the Hudson River, which is known as the North River Tunnel. In addition to the APE for Direct Effects, an APE for Indirect Effects was developed to encompass any potential indirect effects on historic properties from the Preferred Alternative, such as noise, vibration, and changes in visual character and setting. The APE for Indirect Effects typically includes a buffer of at least 100 feet from the construction limits of the Preferred Alternative, with a greater distance included around permanent above-ground components of the Preferred Alternative (such as new surface tracks along the NEC and fan plants) to consider changes in visual character. The delineation of the APE for Indirect Effects has taken into consideration topography, vegetation, and other intrusions (such as the existing built environment) that diminish existing sight lines.

⁴ These include the invited consulting parties which responded to FRA's invitation to participate in the Section 106 process and provided input and comments on documents provided to them, including the PA.

⁵ 36 CFR § 800.16[d].





Certain components of the Preferred Alternative do not have the potential to affect historic properties, and, therefore, an APE has not been defined for those components. These include the portions of the new tunnel that would be deeply bored in New Jersey beneath the Palisades, the land area east of the Palisades, and beneath the Hudson River to a point just east of the New York/New Jersey State line in New York. These components also include the installation of tracks and infrastructure within the existing right-of-way being preserved beneath the Western and Eastern Rail Yards in Manhattan via an underground concrete casing that Amtrak is currently developing (the Hudson Yards Right-of-Way Preservation Project).

On December 9, 2016, FRA provided NJHPO, NYSHPO, and the Consulting Tribes a memorandum describing the proposed APE for the Preferred Alternative (see **Appendix 9**). In correspondence dated December 19, 2016 and January 13, 2017, respectively, NYSHPO and NJHPO concurred with the proposed APE. The Stockbridge-Munsee Community of Mohican Indians of Wisconsin and the Eastern Shawnee Tribe additionally provided concurrence with the proposed APE in correspondence dated December 19, 2016 and March 17, 2017, respectively. No other correspondence has been received from Consulting Tribes regarding the APE.

9.2.2.3 IDENTIFICATION OF HISTORIC PROPERTIES IN THE APE

As explained above, Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties, which include both architectural and archaeological resources.

9.2.2.3.1 Historic Architectural Resources

Once the APE was established, FRA and NJ TRANSIT compiled a list of historic architectural resources within the APE for Direct Effects and Indirect Effects.

This involved conducting research to locate previously identified historic architectural resources in the APE and to identify the potential in the APE for previously unidentified and un-surveyed resources over 50 years of age that may meet NRHP eligibility criteria. To identify historic architectural resources, information on file with NJHPO and NYSHPO was reviewed and research was conducted, including reviewing properties designated as historic by local municipalities, as well as previous surveys and available historic information such as maps, historic photographs, and other data. In addition, architectural resources field surveys were conducted by architectural historians who meet the Secretary of the Interior's Professional Qualification Standards for Architectural History, codified under 36 CFR Part 6, to identify the potential in the APE for previously unidentified and un-surveyed resources over 50 years of age that may meet NRHP criteria.

Determinations of NRHP eligibility are made by the lead Federal agency in consultation with the SHPO and THPO and considering any information provided by consulting parties. As described in 36 CFR § 800.4(c)(2), "If the agency official determines any of the National Register criteria are met and the SHPO/THPO agrees, the property shall be considered eligible for the National Register for Section 106 purposes." For any historic architectural resources, FRA and NJ TRANSIT prepared Historic Architectural Resource Background Study (HARBS) and Effects Assessments (EA) for the APEs in New Jersey and New York.⁶ The goals of the HARBS and EA reports were to identify historic architectural resources in the APE, assess the Project's potential effects on historic architectural resources according to the Criteria of Adverse Effect (36 CFR §

⁶ *Historic Architectural Resources Background Study and Effects Assessment* prepared for the New Jersey portion of the APE by RGA, Inc., January 26, 2017; *Historic Architectural Resources Background Study and Effects Assessment* for the New York portion of the APE prepared by AKRF, Inc., January 24, 2017.



800.5), and to provide recommendations with respect to avoiding, minimizing, and/or mitigating adverse effects on historic architectural resources.

FRA provided the HARBS and EA reports to NJHPO, NYSHPO, and Consulting Tribes in late January 2017. In correspondence dated February 17, 2017 NYSHPO concurred with findings and recommendations of the New York HARBS and EA report. In correspondence dated March 6, 2017, NJHPO concurred with the previously identified historic architectural resources in the APE, provided comments on Recommended-NRHP eligible properties, and concurrence with potential effects of the Project on historic properties as described in New Jersey HARBS and EA report.

FRA provided the HARBS and EA reports to additional consulting parties on March 17, 28, and 29, 2017. Two consulting parties responded. On March 20, 2017, the Union City Landmarks Commission accepted the conclusions of New Jersey HARBS and EA report, and on March 24, 2017, the New York City Landmarks Preservation Commission accepted the New York HARBS and EA report.

The historic architectural resources identified in the APE are discussed in Section 9.3.

9.2.2.3.2 *Archaeological Resources*

Archaeological investigations typically proceed in a multiphase process generally consisting of Phase 1A (determining the archaeological potential of a project site through documentary and cartographic research), Phase 1B (determining the presence or absence of archaeological resources through subsurface testing and/or monitoring), Phase 2 (determining the integrity, significance, and NRHP eligibility of any affected resources), and Phase 3 (mitigating unavoidable effects through data recovery or other form of mitigation). The need for the next phase is dependent upon the results of the preceding phase and in urban settings the later phases are often conducted concurrently.

Two Phase 1A Archaeological Documentary Studies, one for the New Jersey portion of the APE and one for the combined Hudson River and New York portions of the APE, provided conclusions on the archaeological potential of the APE for Direct Effects.⁷ The reports identify previously identified archaeological resources in the APE vicinity, areas of sensitivity for prehistoric or historic-period archaeological resources (indicating a potential for those resources to be present) in the APE for Direct Effects, assess the potential effects of the Preferred Alternative on identified areas of sensitivity, and provide recommendations for avoiding, minimizing, and mitigating adverse effects on archaeological resources. The analysis ranks the potential archaeological sensitivity of areas identified as low, moderate, or high (see Section 9.3), indicating the likelihood of resources being present.

The two studies included background research, consultation with interested parties, site reconnaissance to examine existing conditions, a review of geotechnical data, review of geophysical data, and assessment of archaeological sensitivity. The reports were prepared in compliance with applicable standards and guidelines for archaeological surveys, including those promulgated by NYSHPO (2005), the New York Archaeological Council (NYAC 1994), NJHPO (2003), and the U.S. Secretary of the Interior (48 FR 44716).

FRA provided the Phase 1A archaeological studies to NJHPO and NYSHPO and Consulting Tribes in late January 2017. On February 24, 2017, NYSHPO provided its concurrence with the findings and recommendations of the New York Phase 1A report and with emphasis added that

⁷ *Phase 1A Archaeological Study, Hudson Tunnel Project*, Town of Secaucus, Township of North Bergen, City of Union City, Township of Weehawken, and City of Hoboken, Hudson County, New Jersey, January 2017, prepared by RGA, Inc.; and *Phase 1A Archaeological Documentary Study, Hudson Tunnel Project, New York, NY*, January 2017, prepared by AKRF, Inc.

testing in advance of construction as opposed to monitoring during construction is preferred whenever feasible. In its March 6, 2017 letter, NJHPO provided comments and revisions with respect to areas identified as archaeologically sensitive and where testing and monitoring should be implemented as identified in the New Jersey Phase 1A report. In correspondence dated March 6, 2017, the Stockbridge-Munsee Community of Mohican Indians of Wisconsin indicated that it had no significant cultural resources concerns based on review of the New Jersey and New York Phase 1A reports, and additionally requested continued consultation should the Project design change, or in the event of inadvertent discoveries. No other Consulting Tribes provided comments on the Phase 1A reports.

FRA provided the Phase 1A reports to additional consulting parties on March 17, 28, and 29, 2017. One consulting party responded. On March 24, 2017 the New York City Landmarks Preservation Commission concurred with the findings of the New York Phase 1A report, and provided concurrence with NYSHPO February 24, 2017 comments that archaeological testing should occur before construction, if at all possible.

9.2.2.4 *EVALUATION OF POTENTIAL EFFECTS ON HISTORIC PROPERTIES*

FRA used the reports and recommendations to make a determination of effects to historic properties that would result from the Preferred Alternative (the undertaking). Effects to historic properties identified in this chapter may include both direct effects and indirect effects resulting from the Preferred Alternative's construction or operation. Assessments of effects are based on ACHP's Criteria of Adverse Effect.⁸ According to ACHP's criteria, an adverse effect is found "when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association." Examples of adverse effects include, but are not limited to "physical destruction or damage of all or part of the property;" "removal of the property from its historic location; change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance;" and "introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features." Adverse effects may include "reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative." The effects of the Preferred Alternative are described below in Section 9.6 and Section 9.7.

9.3 **AFFECTED ENVIRONMENT: EXISTING CONDITIONS**

9.3.1 **NEW JERSEY**

9.3.1.1 *HISTORIC ARCHITECTURAL RESOURCES*

FRA has determined that there are eight historic architectural resources in the New Jersey portion of the APE for Direct Effects and Indirect Effects. These include six historic architectural resources that were previously determined eligible for listing on the NRHP by NJHPO (NRHP-Eligible). Of these, the existing North River Tunnel also extends through the Hudson River and New York portions of the APE. FRA through the HARBS and EA report prepared for the New Jersey portion of the APE recommended three additional properties in the New Jersey portion of the APE as meeting NRHP criteria (Recommended NRHP-Eligible). Of these, NJHPO concurred that two, the Charles X. Harris House and Studio at 254 Mountain Road and the Residence at 320-324

⁸ 36 CFR § 800.5(a)(1) and (2).



Mountain Road in Union City, were eligible for listing on the New Jersey Register of Historic Places and NRHP by NJHPO on March 6, 2017. NJHPO did not concur that the third, the Willow Avenue Historic District in Weehawken, was eligible for inclusion in the NRHP due to the loss of buildings in the potential historic district and alterations to the extant buildings.

Table 9-1 identifies the eight historic architectural properties located within the New Jersey portion of the APE. These resources are described below, based on information in the HARBS and EA report for the New Jersey portion of the APE, and mapped on **Figure 9-3**.

**Table 9-1
Historic Architectural Resources
in the APE – New Jersey**

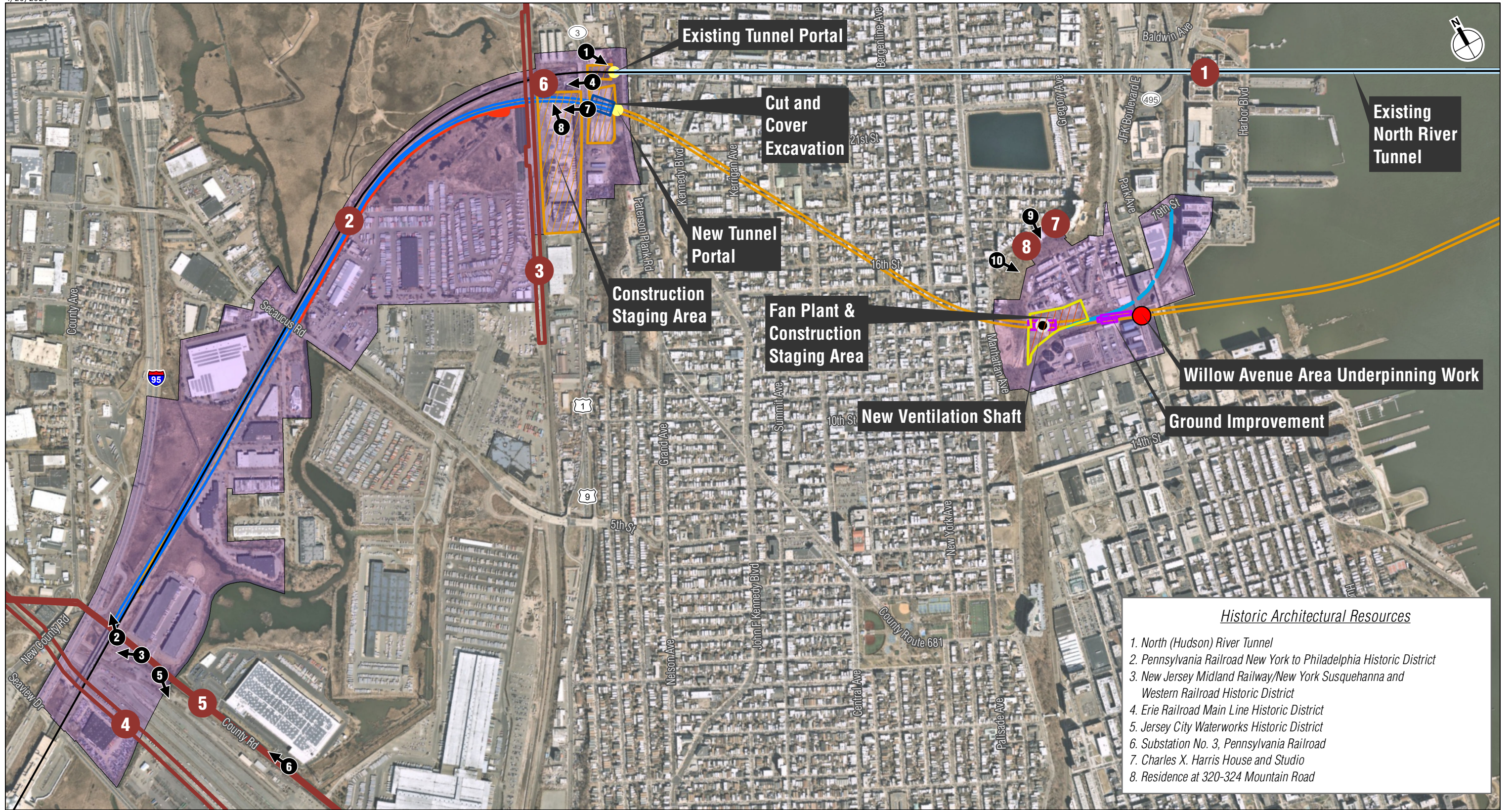
Ref. No. ¹	Name	Municipality/Address	NRHP Status
1	North River Tunnel	North Bergen; Union City; and Weehawken	NRHP-Eligible ²
2	Pennsylvania Railroad New York to Philadelphia Historic District	Multiple	NRHP-Eligible
3	New Jersey Midland Railway New York, Susquehanna and Western Railroad Historic District	Multiple	NRHP-Eligible
4	Erie Railroad Main Line Historic District	Multiple	NRHP-Eligible
5	Jersey City Waterworks Historic District	Multiple	NRHP-Eligible
6	Substation No. 3, Pennsylvania Railroad	North Bergen	NRHP-Eligible
7	Charles X Harris House and Studio	356 Mountain Road, Union City	NRHP-Eligible
8	Residence	320-324 Mountain Road, Union City	NRHP-Eligible
Notes:			
¹ Corresponds to Figure 9-3 .			
² NJHPO determined the North River Tunnel to be NRHP-Eligible on November 12, 1998. NYSHPO determined the North River Tunnel NRHP-Eligible on March 21, 2011.			
NRHP: National Register of Historic Places.			
NRHP-Eligible: Eligible for listing on the New Jersey State and National Registers of Historic Places.			

9.3.1.1.1 North River Tunnel

The NEC’s existing tunnel beneath the Hudson River, the North River Tunnel, extends from the Bergen Portal in the Township of North Bergen, Hudson County, New Jersey to the Tenth Avenue Portal in New York City, New York County, New York. The tunnel was determined eligible for listing in the NRHP under Criteria A and C by NJHPO on November 12, 1998. That determination referred to the tunnel as “the North (Hudson) River Tunnels;” in this chapter it is referred to as the North River Tunnel. The tunnel is significant for its contribution to advances in tunneling technology and railroad electrification, which together allowed for the first major direct rail connection between New York and New Jersey. The tunnel is also a contributing resource within the Pennsylvania Railroad New York to Philadelphia Historic District and is significant for its role in the continued expansion of the railroad.

Subsequently, on March 21, 2011, NYSHPO made a determination that the subterranean and subaqueous railroad tracks and tunnels (North River Tunnel) of the New York Improvement and Tunnel Extension of the Pennsylvania Railroad, extending from Weehawken, New Jersey, beneath the Hudson River, beneath Manhattan, and under the East River to Long Island City, Queens meet NRHP Criterion A for transportation history and Criterion C for engineering design.

NYSHPO’s Statement of Significance noted that this project, built between 1903 and 1910, was “the largest and most advanced metropolitan railroad project undertaken in the United States at that point in history.” The North River Tunnel was one element of this larger project. Charles M. Jacobs,



- Historic Architectural Resources*
1. North (Hudson) River Tunnel
 2. Pennsylvania Railroad New York to Philadelphia Historic District
 3. New Jersey Midland Railway/New York Susquehanna and Western Railroad Historic District
 4. Erie Railroad Main Line Historic District
 5. Jersey City Waterworks Historic District
 6. Substation No. 3, Pennsylvania Railroad
 7. Charles X. Harris House and Studio
 8. Residence at 320-324 Mountain Road

<p>— Existing Northeast Corridor</p> <p>— New Deeply Bored Tunnel</p> <p>— Area of Potential Effects for Indirect Effects</p>	<p>↑ Photo Reference No. and View Direction (see Figures 9-5 to 9-12)</p> <p>① Historic Architectural Resource</p>	<p>Area of Potential Effects for Direct Effects</p> <p>— Access Road for New Surface Tracks</p> <p>— New Surface Tracks</p> <p>● Tunnel Portal</p> <p>● New Ventilation Shaft</p> <p>— Existing North River Tunnel</p>	<p>▨ Fan Plant & Construction Staging Area</p> <p>▨ Construction Staging Area</p> <p>▨ Cut and Cover Excavation</p> <p>▨ Ground Improvement</p>	<p>— Construction Access Road to Ventilation Shaft Site</p> <p>● Underpinning</p>	<p>0 1,000 FEET</p>
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New Jersey:
Area of Potential Effects and
Location of Historic Architectural Resources
Figure 9-3

Pennsylvania Railroad engineer, oversaw the design and construction of the tunnel under the North River Division of the larger endeavor. The two subaqueous tubes under the Hudson River were constructed using large shields measuring 18 feet in diameter driven from each side of the Hudson River and joined together mid-river. Each tube is of cast iron construction and is lined with monolithic masonry panels. An important component of the design was the bore segments placed every 15 feet to accommodate a screw pile driven into bedrock to stabilize the tubes. This was done to solve the previous problems in building railroad tunnels under the Hudson River due to the unstable silt river floor. The piles kept the silt surrounding the tubes from shifting and potentially fracturing the cast iron tube while a train was moving through it.

Each tube contains only a single set of tracks to prevent train derailments and collisions (see **Figure 9-4**). The tubes were designed with side benches on both sides of each tube, one foot higher than the average Pullman car in order to prevent derailments. The benches are constructed on hollow terra-cotta tiles to accommodate electrical cables, including high-tension and low-tension power lines and telegraph, telephone, and signal wires. Walkways on these concrete benches allow for maintenance and repair.

The existing portal (the “Bergen Portal”) in North Bergen serves as the western terminus of the North River Tunnel. The portal is a coursed stone structure with two arched tunnel openings and with an upper level containing sealed arched openings (see **Figure 9-5**).

9.3.1.1.2 Pennsylvania Railroad New York to Philadelphia Historic District

The Pennsylvania Railroad New York to Philadelphia Historic District is a linear historic district extending from New York to Philadelphia (see **Figure 9-6**). The NJHPO determined the Pennsylvania Railroad New York to Philadelphia Historic District to be NRHP-Eligible under Criterion A in the areas of Transportation, Engineering, and Commerce, and under Criterion C for its “distinctive and characteristic array of surviving cuts, embankments, grade separations, overgrade and undergrade bridges and culverts, stations, interlocking towers, and overhead catenary system.”⁹ The period of significance for the district is 1863-1966.

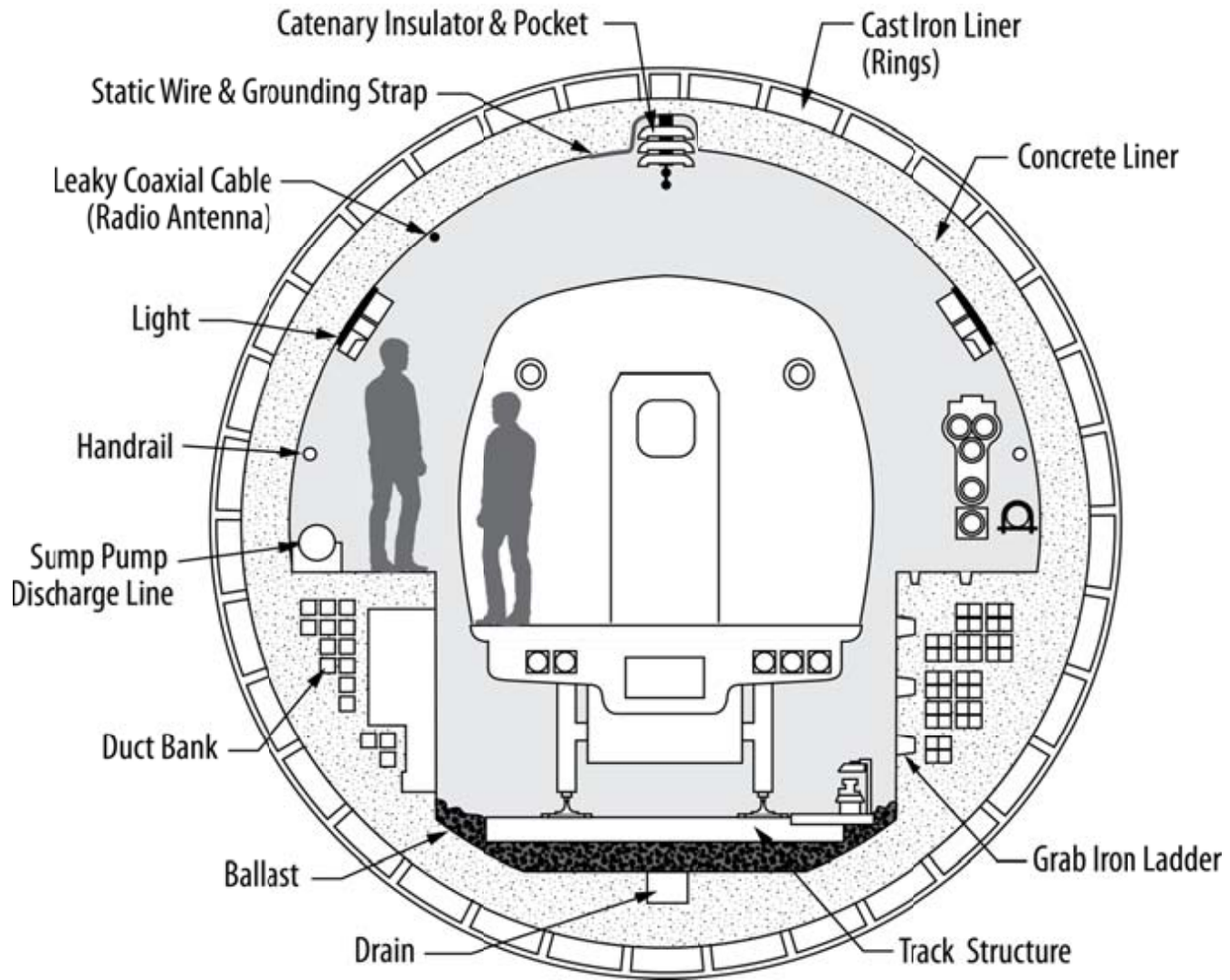
9.3.1.1.3 New Jersey Midland Railway/New York, Susquehanna & Western Railroad Historic District

The New Jersey Midland Railway and New York, Susquehanna & Western Railway (NYSW) Historic District is a linear historic district extending from Jersey City to North Bergen Township in Hudson County (see **Figure 9-7**). The district is eligible for the NRHP under Criterion A for its association with the development of the nation’s railroad industry in the 19th century. The district is also eligible under Criterion C for its engineering, specifically for the distinctive extant contributing resources within the district. The period of significance for the resource has been identified preliminarily as 1873-1953.

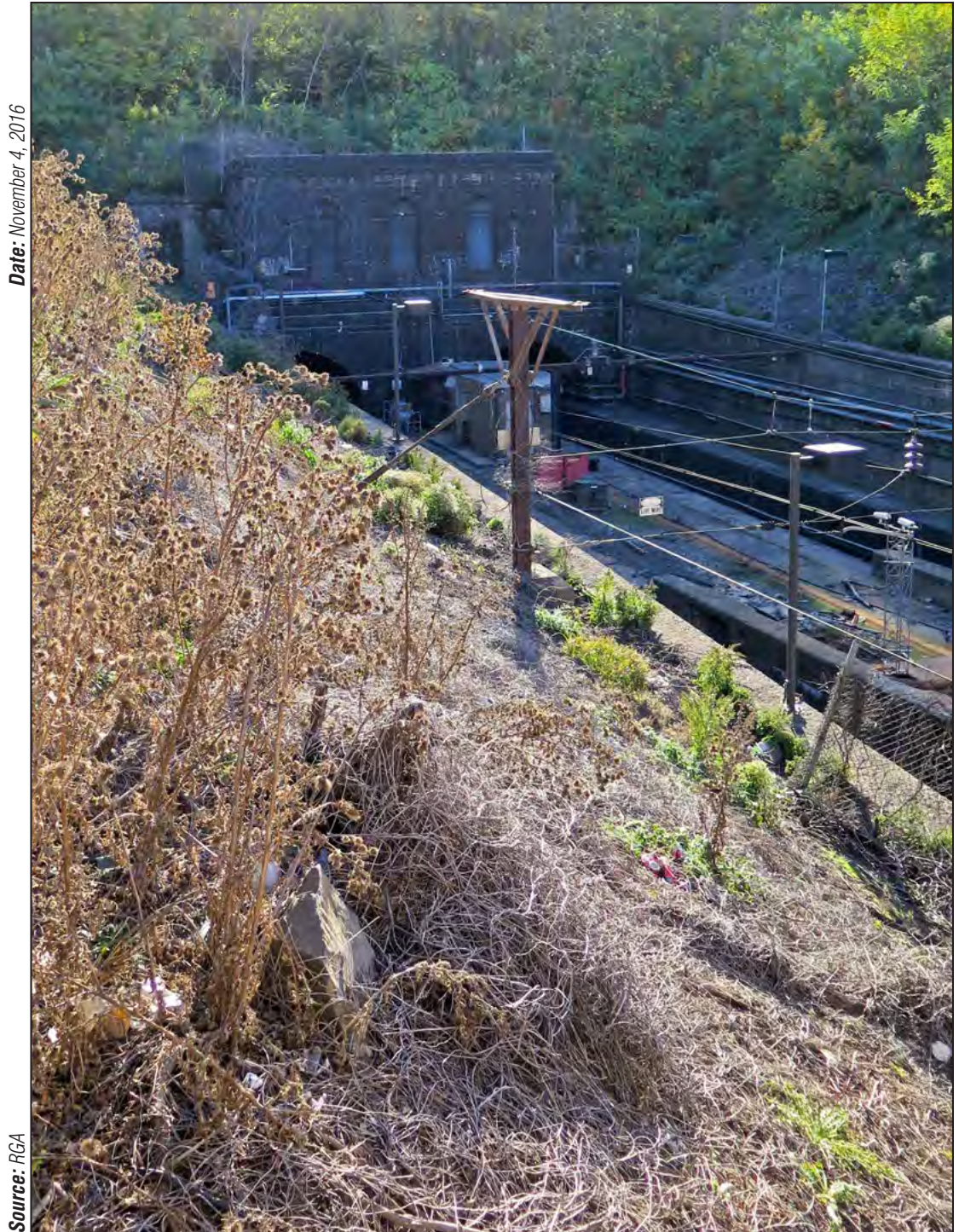
9.3.1.1.4 Erie Railroad Main Line Historic District

The Erie Railroad Main Line Historic District was first identified in 1999 and determined NRHP-Eligible as the “Erie Railroad Marion Main Line Historic District” (see **Figure 9-8**). The Erie Railroad Main Line Historic District is eligible for listing in the NRHP under Criteria A and C in the areas of Transportation and Engineering. The recommended period of significance for the district extends from 1831, with the incorporation of the predecessor Paterson and Hudson River Railroad, to 1960 and the merger of the Erie Railroad with the Delaware, Lackawanna & Western Railroad to form the Erie Lackawanna Railroad. The historic district’s identified boundary begins at the eastern end of the Erie Bergen Hill Tunnel and the Bergen Arches in Jersey City and extends westward along

⁹ NJHPO 2007.



Typical existing North River Tunnel cross-section, showing bench wall (and duct banks) and track structure that will be reconstructed



Date: November 4, 2016

Source: RGA

View southeast of the Bergen Portal, the western terminus of the North (Hudson) River Tunnel from the Tonnelle Avenue Bridge in the Township of North Bergen. **1**

New Jersey Historic Architectural Resources:
North (Hudson) River Tunnel
(NJ Resource No. 1)

Figure 9-5

Date: November 8, 2016

Source: RGA



View northeast of the Northeast Corridor (NEC)/Pennsylvania Railroad (PRR) New York to Philadelphia Historic District at the southwest end of the APE in the Town of Secaucus.

2

Date: November 8, 2016

Source: RGA



View west of the NEC/PRR Historic District at the southwest end of the APE, where it crosses over County Road and the Jersey City Water Works Historic District (below ground), in the Town of Secaucus.

3

New Jersey Historic Architectural Resources:
Pennsylvania Railroad New York to Philadelphia Historic District
(NJ Resource No. 2)

Figure 9-6



Date: November 8, 2016

Source: RGA

View west of Amtrak's Substation 42 at left and the NEC / PRR Historic District at right from Tonnelle Avenue in the Township of North Bergen. The New Jersey Midland Railway/New York, Susquehanna and Western Railroad (NJMR/NYSWRR) Historic District runs north/south directly behind the substation.

4



View southwest of the Erie Railroad Main Line Historic District from County Road in the Town of Secaucus. County Road runs above the Jersey City Water Works Historic District here.

5



the railroad's historic right-of-way to an undetermined point. A subsequent update to the NJHPO Opinion on March 6, 2006 expanded the district boundary to include the NJ TRANSIT Bergen County Line, which departs the Erie Main Line Historic District at Rutherford Junction, Bergen County and rejoins the Main Line at Ridgewood Junction, Bergen County.

9.3.1.1.5 Jersey City Water Works Historic District

The Jersey City Water Works Historic District extends from the Boonton Reservoir to Jersey City and includes pipelines, reservoirs, meter houses, and other related resources (see **Figure 9-9**). These resources are located primarily underground. The district is NRHP-Eligible and nationally significant under Criterion A for its associations with public health and public works and under Criterion C in the area of Engineering. Because many of the associated resources are below-ground, the Jersey City Water Works Historic District is NRHP-Eligible under Criterion D in the area of Archaeology. Its period of significance begins in 1851 and ends in 1925.

9.3.1.1.6 Substation No. 3, Pennsylvania Railroad

Substation No. 3 is NRHP-Eligible under Criteria A and C as a remnant of the Manhattan Transfer Project (see **Figure 9-10**). The electric substation was an essential element of that project that finally gave the Pennsylvania Railroad direct access to Manhattan. It provided electrical power to engines moving between the Manhattan Transfer Station in the Meadows section of New Jersey to Penn Station New York (PSNY).

9.3.1.1.7 Charles X. Harris House and Studio

The Charles X. Harris House and Studio at 356 Mountain Road in Union City is NRHP-Eligible under Criterion B for its association with the artist Charles X. Harris and Criterion C as a relatively intact example of an early 20th century artist's home and studio (see **Figure 9-11**). At the time of his practice, Harris was a notable figure in both the New York City art world and in the United States. In addition, the building is recommended eligible under Criterion C as an intact example of an artist's studio linked to the traditions of Old World Parisian artist studios of the 19th century used by both instructors and students associated with the École des Beaux-Arts. It retains a high degree of architectural integrity and character-defining features including the standing-seam copper roof, Beaux-Arts ornamentation, and most notably the north light. Alterations to the exterior have been minimal, primarily on the south elevation away from the public view from the street.

9.3.1.1.8 Residence at 320-324 Mountain Road

The residence at 320-324 Mountain Road in Union City is NRHP-Eligible under Criterion B for its association with artists Robert Treat Paine and the Menconi brothers (see **Figure 9-12**). It was part of a larger community of artists living and working in the Union City and Weehawken section of the Palisades. Although several of these studios were demolished, 320-324 Mountain Road is a rare surviving example of this formerly robust community. Robert Treat Paine, a sculptor and inventor, owned the property from 1907 to 1912. In 1912, Paine sold the property to Frank and Raphael Menconi, Italian-American Beaux-Arts-style architectural sculptors. Their work included prominent projects for well-known architects across the Northeastern U.S. The property is the only known intact architectural resource owned by the Menconis during the height of their artistic careers. The property remained in the Menconi family until 2009 when the estate of Ramon Menconi sold the property to the current owner.

9.3.1.2 ARCHAEOLOGICAL RESOURCES

The analysis of archaeological resources conducted as part of the Phase 1A Archaeological Documentary Study for the New Jersey portion of the APE includes an inventory of previously identified archaeological sites in or within an approximately one-mile radius of the APE and the identification of areas of archaeological sensitivity within the APE, indicating the potential for



View northeast of County Road where it runs above the Jersey City Water Works Historic District in the Town of Secaucus, looking toward the NEC.

6

Date: November 8, 2016



Source: RGA

View southwest of the Substation No. 3 building. 7

Date: November 8, 2016



Source: RGA

View northwest of Substation No. 3 at right from Tonnelle Avenue in the Township of North Bergen. 8

New Jersey Historic Architectural Resources:
Substation No. 3, Pennsylvania Railroad
(NJ Resource No. 6)

Figure 9-10



View southeast of the main (north) elevation of Charles X. Harris House and Studio in the City of Union City.



View southwest of 320-324 Mountain Road, north and east elevations, in the City of Union City. **10**

prehistoric or historic-period archaeological resources to be present in the APE (prehistoric resources pre-date the European colonization of the country and historic resources begin with the initial period of colonization and extend through the industrial period). The assessment of sensitivity identifies the likelihood that resources are present in the APE as low, moderate, or high.

9.3.1.2.1 Previously Identified Archaeological Sites

The examination of standard references and site files at the New Jersey State Museum and NJHPO's offices indicated that there are no previously identified archaeological sites located in the APE for Direct Effects. However, the New Jersey State Museum's files include three previously identified archaeological sites within, or just beyond, a one-mile radius of the APE for Direct Effects: Hudson County Potter's Field Burial Ground (HD-30); Croxton Yard Engine Maintenance Facility Complex (HD-39); and Old County Road Archaeological Site (HD-40). All three archaeological sites are from the historic period and were identified as a result of development projects in the 1990s and early 2000s. Hudson County Potter's Field Burial Ground is a historic cemetery dating to the late 19th and early 20th centuries at Snake Hill, about 1,000 feet west of the APE. The Croxton Yard Engine Maintenance Facility Complex is associated with early 20th century railroad infrastructure and is approximately 500 feet north of the western end of the APE for Direct Effects. Lastly, Old County Road Archaeological Site is an early to late 19th century roadway and tavern site, located approximately 400 feet north of the APE for Direct Effects near County Road.

In addition, files at NJHPO note two unregistered archaeological sites located within one mile of the APE for Direct Effects. Castle Point, a hill adjacent to the Hudson River, is located approximately 3,500 feet north of the eastern end of the APE for Direct Effects in New Jersey on what is now the campus of the Stevens Institute of Technology. Historically, this was the site of a Late Woodland-Early Historic Period Native American settlement (perhaps with an Archaic component) known as Hobokan or Hobakan-hackingh. An 1874 description of Hobokan-hackingh included the local tradition that the name translated as "the land of the tobacco pipe" because Native Americans came to this location to collect stone to carve their pipes. This stone was likely serpentine, located in an outcrop in Hoboken. The second unregistered and unconfirmed site is identified as the marshy area spanning Penhorn Creek. This area was assessed as potentially sensitive based on its proximity to water and an unverified report from the New Jersey State Museum that prehistoric finds were located in the vicinity.

9.3.1.2.2 Areas of Prehistoric Archaeological Sensitivity

9.3.1.2.2.1 Hackensack Meadowlands

The Phase 1A includes a summary of the work of previous researchers who suggest that higher ground and the banks or confluences of primary stream tributaries within the now inundated low-lying Hackensack Meadowlands are sensitive for prehistoric occupation. Others, including studies conducted for the Access to the Region's Core (ARC) Project,¹⁰ have opined that the Hackensack Meadowlands were wooded with "wet and poorly drained soils prior to the development of tidal marsh" and therefore not sensitive for prehistoric occupation. Despite this, prehistoric resources could be located within the upper layers of deeply buried peat (if they have not been disturbed by filling activities) and in the deeply buried alluvial sands within the Hackensack Meadowlands. Based on the previous research summarized in the Phase 1A, the Hackensack Meadowlands portion of the APE is assessed with moderate sensitivity for prehistoric archaeological resources between 5 and 20 feet below ground surface due to the environmental setting and the presence of peat and alluvial soils underlying portions of the APE.

¹⁰ Prepared by A.D. Marble Co. in August 2005/Revised October 2007.

9.3.1.2.2 Eastern Margin of the Hackensack Meadowlands

The APE for Direct Effects on the eastern margin of the Hackensack Meadowlands, at the western slope of the Palisades, could have been at a high enough elevation to avoid inundation from meadow waters and would have been a potential site of Native American occupation. Disturbance at the site associated with the grading and redevelopment of properties adjacent to U.S. Route 1 and 9 (Tonnel Avenue) in the 20th century likely disturbed any potential near-surface prehistoric archaeological resources along the roadway. Deeper buried deposits could have been preserved if the stratigraphy remains undisturbed. However, geotechnical information prepared by Amtrak's design consultant as part of conceptual design for the Preferred Alternative indicates that the stratigraphy within the upland area of the APE for Direct Effects is artificial fill directly underlain by glacial deposits (Gateway Trans-Hudson Partnership 2016). No archaeologically sensitive peat or sandy silt layers appear to be present in this area. As such, the western slope of the Palisades within the APE for Direct Effects is assessed as having low potential for prehistoric archaeological resources.

9.3.1.2.3 East of the Palisades

East of the Palisades, the APE for Direct Effects is a low-lying area of former tidal marshlands that is now developed. This area has a history of unstable land, inundation from nearby water sources, and extensive historic fill. As noted in previous studies conducted for the ARC Project, the most likely areas for prehistoric occupation in the APE would be northeast of the APE in upland locations where a meadow was once located. Although there is the possibility of prehistoric occupation in the APE during periods when the sea level was lower and the area could have been drier, other more favorable locations would have been located nearby. The effects of sea level rise, tidal cycles, storm events, erosion, and flooding over thousands of years would have compromised the integrity of any early prehistoric sites in this area prior to filling and urbanization. Previous cultural resources surveys have similarly assessed this area of Weehawken and northern Hoboken as having low potential for prehistoric archaeological resources. Based on this research and the land-use history of the vicinity, the APE east of the Palisades is assessed with low potential for prehistoric archaeological resources.

9.3.1.2.3 Areas of Historic-Period Archaeological Sensitivity

9.3.1.2.3.1 Hackensack Meadowlands

Since the APE for Direct Effects within the Hackensack Meadowlands was historically an inundated tidal marsh, it was less likely to have been chosen for historic occupations than the surrounding upland areas. Therefore, the Meadowlands portion of the APE has low sensitivity for 19th and 20th century historic-period archaeological resources. Some evidence suggests that this section of the Hackensack Meadowlands was used as a repository for debris from the demolition of original Penn Station (demolished 1964). However, structural remnants that may be present in this area are not considered historic properties.

9.3.1.2.3.2 Eastern Margin of the Hackensack Meadowlands

At the eastern margin of the Meadowlands/western slope of the Palisades, the portion of the APE on the east side of Tonnel Avenue was once occupied by 19th and early 20th century uses, including at least one late 19th to early 20th century dairy and horse farm that was present until at least the late 1930s. If any subsurface features remain from this farm, they would be shallowly buried in the upper few feet of the ground surface. However, extensive ground disturbance associated with the improvement of lots and the construction of buildings on the properties bordering U.S. Route 1 and 9 in the 1920s-1950s would have impacted any shallow archaeological deposits associated with these resources. Therefore, the area on the western slope of the Palisades was identified as having low historic-period archaeological sensitivity.

9.3.1.2.3.3 East of the Palisades

The portion of the APE east of the Palisades is within an area along the Hudson River waterfront that has seen a wide variety of development in the past, which may have resulted in archaeological resources being present in the APE. However, a review of 18th through 20th century historic maps, atlases, and aerial photographs indicated that the majority of the APE for Direct Effects remained undeveloped until the late 19th century. The Phase 1A identifies several areas of archaeological sensitivity related to 19th century infrastructure, late 19th and early 20th century railroad structures, and late 19th and early 20th century industrial resources. However, in its review of the Phase 1A, NJHPO provided comments and revisions with respect to areas identified as archaeologically sensitive, and determined that the APE for Direct Effects is only sensitive for two 19th century infrastructure resources, the Hackensack Plank Road and the Swartwout sea wall, both of which have moderate to high sensitivity.

In the late 18th through mid-19th century, the only development within the bounds of the APE east of the Palisades were the Hackensack Plank Road and a seawall dating to the early 19th century, referred to as the Swartwout sea wall. These long, linear features extended approximately north-south through the APE between the current location of approximately Clinton and Grand Streets (see **Figure 9-13**). As described below, portions of the APE have moderate to high sensitivity for the presence of these features.

Hackensack Plank Road

The Hackensack Plank Road was first laid out in 1718. A variety of changes and improvements to the road were made in the 19th century, but historic maps suggest that the road's historic alignment was retained. This road, like other plank roads, was originally constructed of wooden boards laid on a roadbed to provide stability where the road passed through soft ground. North of 19th Street in Weehawken, the historic alignment remains as Hackensack Avenue continuing into Hackensack Plank Road. The area where Hackensack Plank Road was formerly located south of 19th Street crosses the APE for Direct Effects. This area is determined to have moderate to high sensitivity for this historic-period resource at a depth of approximately 14 to 17 feet below ground surface (see **Figure 9-13**).

Swartwout Sea Wall

The Swartwout sea wall was built by Samuel Swartwout between 1814 and 1819, and was likely constructed from peaty marsh soils cut into blocks and piled high enough to be above the high-tide water table. If still present, the remains of this sea wall are estimated to be approximately 10 to 15 feet below ground surface. The portion of the APE for Direct Effects located approximately between 16th and 18th Streets, Clinton Street to Willow Avenue (see **Figure 9-13**), has moderate to high sensitivity for this historic-period archaeological resource at a depth of 10 to 15 feet below ground surface.

9.3.2 HUDSON RIVER

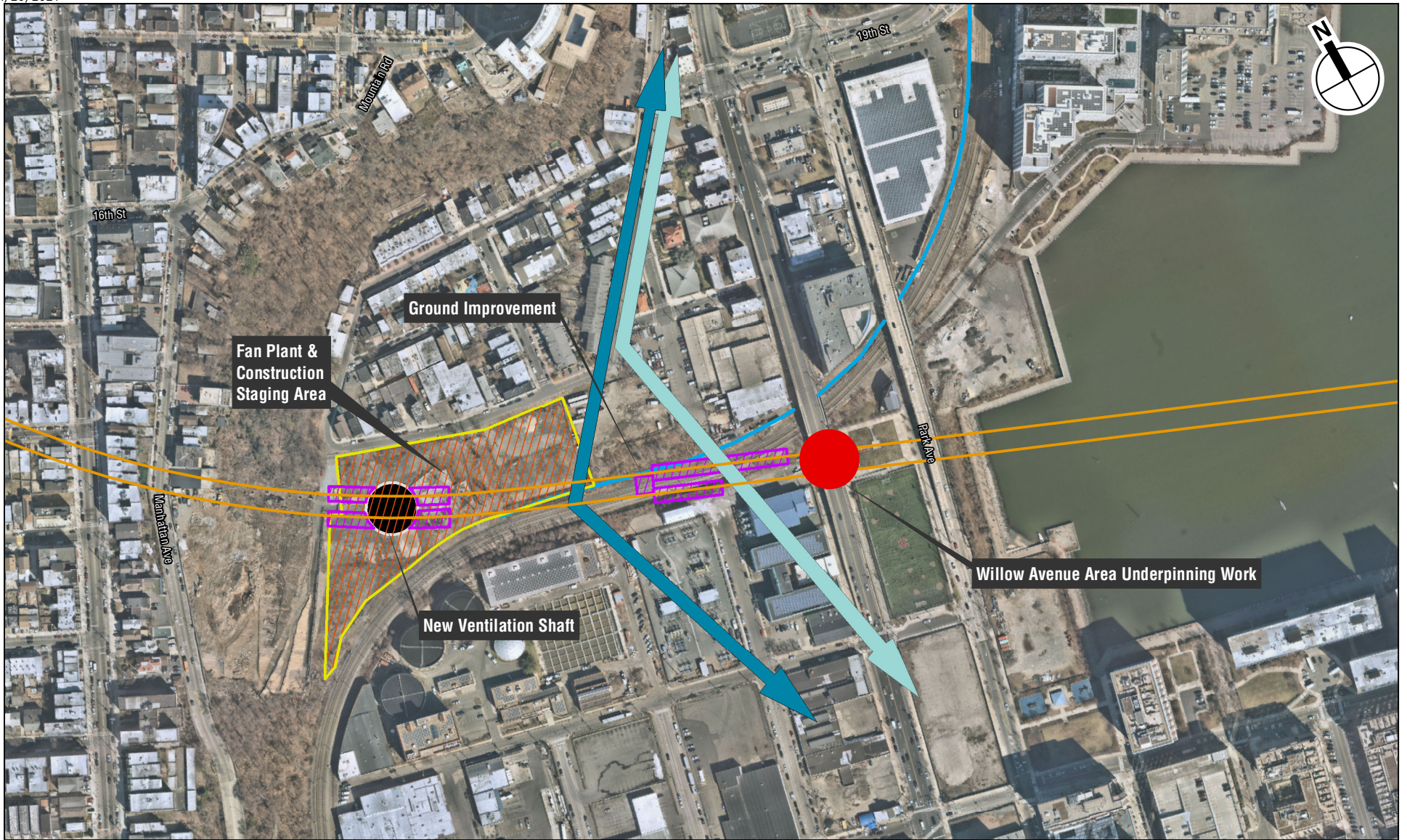
9.3.2.1 HISTORIC ARCHITECTURAL RESOURCES

One historic architectural resource has been identified in the Hudson River portion of the APE: the North River Tunnel, described above.

9.3.2.2 ARCHAEOLOGICAL RESOURCES

Multiple geophysical surveys have been conducted of the portion of the Hudson River that is within the APE (the area proposed for in-water construction) both for previous projects¹¹ and for the

¹¹ For a summary see A.D. Marble Co. 2005/rev. 2007.



— New Deeply Bored Tunnel

Area of Archaeological (Moderate to High) Sensitivity

Area of Potential Effects for Direct Effects

— Construction Access Road to Ventilation Shaft Site

0 400 FEET

Historic Hackensack Plank Road (located 14 to 17 feet below ground surface and below area of proposed project impacts)

● New Ventilation Shaft

● Underpinning

Fan Plant & Construction Staging Area

Ground Improvement

Historic Sea Wall



New Jersey: Area of Potential Effects for Direct Effects and Areas of Archaeological Sensitivity
Figure 9-13



current Project¹² and no shipwrecks or shipwreck-like anomalies have been identified. Therefore, the Hudson River portion of the APE for Direct Effects is not considered to have sensitivity for shipwrecks. The silts and clays that comprise the river bed in this area are also not considered sensitive for the presence of submerged prehistoric landforms. This area has been submerged for the entirety of the prehistoric period and has no potential for the presence of such submerged resources.

9.3.3 NEW YORK

9.3.3.1 HISTORIC ARCHITECTURAL RESOURCES

FRA has determined that there are seven historic architectural resources in the New York portion of the APE. These resources are identified in **Table 9-2**, mapped on **Figure 9-14**, and described below, based on information in the HARBS and EA report for the New York portion of the APE. These historic architectural resources were previously determined NRHP-Eligible by NYSHPO. The HARBS and EA report prepared for New York identified eight historic architectural resources in the New York portion of the APE and did not identify any additional properties recommended NRHP-Eligible in the New York portion of the APE. In a letter dated February 17, 2017, NYSHPO concurred with the findings and recommendations of the New York HARBS and EA report. Subsequent to the preparation of HARBS and EA report and completion of the DEIS, one identified historic architectural resource, the Charles P. Rodgers & Company Building at 517-523 West 29th Street has been demolished by its private property owner. The demolition was not related to the Project.

9.3.3.1.1 New York Improvements and Tunnel Extension of the Pennsylvania Railroad (North River Tunnel)

The North River Tunnel extends from the Bergen Portal in the Township of North Bergen, Hudson County, New Jersey to the Tenth Avenue Portal in New York City, New York County, New York. The New York portal of the North River Tunnel is located just east of Tenth Avenue beneath the building at 450 West 33rd Street (between Dyer and Tenth Avenues and West 31st and West 33rd Streets, see **Figure 9-15**). As noted above, NJHPO and NYSHPO previously determined that the tunnel is eligible for listing in the NRHP.

9.3.3.1.2 Hudson River Bulkhead

The NRHP-Eligible Hudson River Bulkhead extends from the Battery to West 59th Street. Significant under Criterion A in the areas of commerce or industry, Criterion C in the area of engineering, and Criterion D for the potential of the bulkhead to yield information about historic engineering methods, the bulkhead and its associated structural systems were constructed between 1871 and 1936 by the New York City Department of Docks. The majority of the construction consisted of masonry walls on a variety of foundation systems, with quarry-faced ashlar granite block forming the visible face along most of the armored frontage. Built between 1876 and 1898, the bulkhead between approximately West 23rd and West 34th Streets consists of a granite wall on narrow concrete block with inclined bracing piles and timber binding frames around the piles (see **Figure 9-16**).

Design of the bulkhead was the responsibility of George B. McClellan, a general during the Civil War who became the first Engineer-in-Chief of the Department of Docks. McClellan's plans contemplated the creation of a 250-foot-wide marginal street, from which 60- to 100-foot-wide piers with cargo sheds would project 400 to 500 feet around 150- to 200-foot-wide slips. Initiated to respond to the deteriorated, congested, and silt-filled condition of the waterfront, the carefully

¹² *Marine Geophysical Survey Report* prepared by the Gateway Trans-Hudson Partnership, 2016.

Historic Architectural Resources

1. New York Improvements and Tunnel Extension of the Pennsylvania Railroad [North (Hudson) River Tunnel]
2. Hudson River Bulkhead
3. High Line
4. Master Printers Building
5. Charles P. Rodgers & Co. Building (Now Demolished)
6. W & J Sloane Warehouse and Garage
7. Starrett-Lehigh Building
8. West Chelsea Historic District



↑ Photo Reference No. and View Direction (see Figures 9-15 through 9-24 for photographs)
 1 Historic Architectural Resource

— Existing Northeast Corridor
 — Deeply Bored New Tunnel
 Hudson Yards Right-of-Way Preservation
 Area of Potential Effects for Indirect Effects

Area of Potential Effects for Direct Effects
 ● New Ventilation Shaft
 — Existing North River Tunnel
 = = = Shallowly Constructed New Tunnel

▨ Fan Plant & Construction Staging Area
 ▨ Ground Improvement
 ▨ Construction Staging Area
 ▨ Utility Relocation

▨ In-Water Ground Improvement
 ▨ Cut and Cover Excavation
 ● Underpinning

0 500 FEET

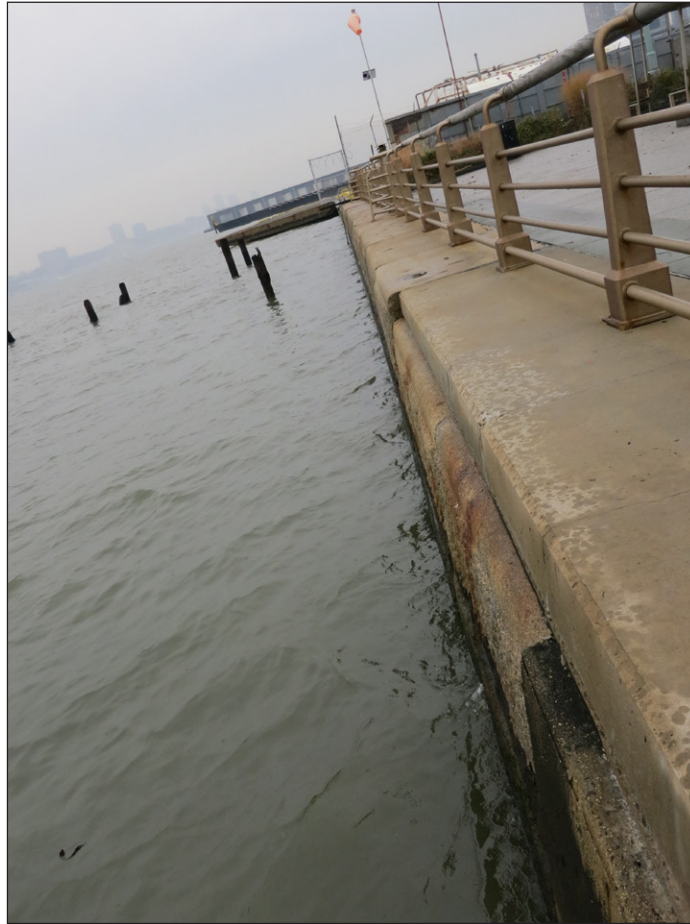
New York: Area of Potential Effects and Location of Historic Architectural Resources
Figure 9-14

Date: January 23, 2015

Source: Amtrak



Entrance to the North River Tunnel in New York **1**



Date: November 30, 2016

Photographer: Erica Mollon

View north of the Hudson River bulkhead (at the foot of West 29th Street). **2**



*Photographer: Erica Mollon
Date: November 30, 2016*

Additional view north of the Hudson River bulkhead (at the foot of West 29th Street). **3**

built granite walls created a consistent monumental surface to the waterfront that reinforced an image of New York City's commercial prominence. As property was acquired and as commerce warranted, New York City built the bulkheads, built or rebuilt pier substructures, and leased redeveloped areas to private companies that were usually responsible for piershed and headhouse construction.

**Table 9-2
Known Historic Architectural Resources
in the APE – New York**

Ref. No. ¹	Name	Address	NRHP Status	NYCL/ NYCHD	NYCL- Eligible
1	New York Improvements and Tunnel Extension of the Pennsylvania Railroad (North River Tunnel)	Between Weehawken, New Jersey and Long Island City, New York	NRHP-Eligible ²		
2	Hudson River Bulkhead	Between Battery Pl and West 59th St	NRHP-Eligible		
3	High Line	Along West 30th St between Tenth and Twelfth Aves, and Twelfth Ave between West 30th and 34th Sts	NRHP-Eligible		
4	Master Printers Building	406-416 Tenth Ave	NRHP-Eligible		LPC Opinion 11/18/03
5	Charles P. Rodgers & Company Building (demolished since DEIS)	517-523 West 29th St	Not NRHP-Eligible (Demolished)		
6	Former W & J Sloane Warehouse and Garage	541-561 West 29th St and 306-310 Eleventh Ave	NRHP-Eligible		
7	Starrett-Lehigh Building	601-625 West 26th St (block between Eleventh and Twelfth Aves, West 26th and 27th Sts)	NRHP-Eligible	Designated	
8	West Chelsea Historic District	Roughly bounded by West 26th and 28th Sts, Tenth and Twelfth Aves	NRHP-Eligible ³	Designated	

Notes:

¹ Corresponds to **Figure 9-14**.

² NJHPO determined the North River Tunnel NRHP-Eligible on November 12, 1998. NYSHPO determined the North River Tunnel NRHP-Eligible on March 21, 2011.

³ The West Chelsea Historic District was additionally certified by the Secretary of the Interior for purposes of the Tax Reform Act of 1986 as substantially meeting the requirements for listing on the National Register of Historic Places on September 5, 2013.

NRHP: National Register of Historic Places.

NRHP-Eligible: Eligible for listing on the New York State and National Registers of Historic Places.

NYCL: New York City Landmark.

NYCL-Eligible: The New York City Landmarks Preservation Commission (LPC) has determined that the property appears eligible for NYCL designation.

NYCHD: New York City Historic District.

9.3.3.1.3 High Line

The NRHP-Eligible High Line is a former freight railroad viaduct that has been converted to a public park on the west side of Manhattan. Completed in 1934 as part of the West Side Improvement Project, it replaced the New York Central Railroad along West Street and Tenth Avenue to eliminate dangerous traffic conflicts at grade. The West Side Improvement Project also included construction of the West Side Highway (Route 9A). In the Project APE, the High Line runs in a loop track around John D. Caemmerer West Side Yard along West 34th Street, Twelfth Avenue, and West 30th Street, where it turns south to run west of Tenth Avenue (see **Figure 9-17**). In the 1980s, the northernmost existing section between West 33rd and West 34th Streets

*Photographer: Claudia Cooney
Date: October 11, 2016*



View west on West 30th Street of the High Line including access staircase.

4

*Photographer: Claudia Cooney
Date: October 11, 2016*



View northeast of the High Line at Twelfth Avenue and West 30th Street.

5



was reconstructed and a section between West 34th and West 35th Streets was removed. NYSHPO, in a letter dated February 20, 2004, found the full length of the High Line between West 34th Street and Gansevoort Street to meet NRHP Criterion A as a significant transportation structure from the 20th century industrial development of the city. In addition, NYSHPO found that the High Line retains much of its historic integrity, despite the removal of the section between West 35th and West 34th Streets (and the removal of the southernmost section outside the Project APE between Little West 12th and Bank Streets).

At West 30th Street, a spur runs east to Tenth Avenue, where there is a large, double-track platform over the avenue adjacent to the Morgan General Mail Facility; the platform over Tenth Avenue originally connected to the Morgan General Mail Facility to allow mail trains to simultaneously enter and leave the building. Both the loop track and spur have a concrete parapet simply ornamented with recessed panels and a tubular steel railing broken up with square concrete posts. As it parallels Twelfth Avenue between West 30th and West 33rd Streets, the loop track viaduct has a decorative steel parapet and railing similar to those on the Tenth Avenue platform and the trestles south of West 30th Street, including the trestle over that street.

9.3.3.1.4 *Master Printers Building*

Designed by Parker & Sheaffer, the former Master Printers Building at 406-416 Tenth Avenue was built in 1926-1927 for the printing and allied trades. It is eligible for the NRHP under Criterion A in areas of commerce and industry and Criterion C in the area of architecture as an intact example of printing loft design. This monumental, 18-story, concrete industrial building occupies the east side of Tenth Avenue between West 33rd and West 34th Streets (see **Figure 9-18**). When it was built, it was the tallest concrete structure and the largest printing building in the world. The north, south, and west façades rise flush from the street line for 13 floors before setting back. There are two additional setbacks above the 15th and 17th floors. On the north and south façades, additional setbacks are provided at the east corners above the 11th floor. Concrete piers and window bays of four-over-four industrial metal windows articulate the utilitarian façades. Some minor ornamentation is provided in the form of recessed panels in the spandrels below the windows and Art Deco sculptural treatment of the piers framing the entrance and of the piers on the upper setback floors. The east façade, overlooking a below-grade entrance to the Lincoln Tunnel, rises without setbacks. Original amenities included a bank, restaurant, and private club. East of the Master Printers Building, many buildings were removed by construction of Dyer Avenue, the road that cuts through Manhattan blocks to provide vehicular access to and from the Lincoln Tunnel. In a letter dated November 18, 2003, the New York City Landmarks Preservation Commission (LPC) determined that the Master Printers Building also appears to be eligible for New York City Landmark (NYCL) designation. In 1927, the most significant urban feature in the vicinity of the Master Printers Building was the Penn Station rail yard to the south across West 33rd Street. At that time, buildings in the area included low-rise residential structures, modern loft buildings, and St. Michael's Roman Catholic Church Complex to the east.

9.3.3.1.5 *Charles P. Rodgers & Co. Building (Demolished since DEIS)*

Subsequent to the preparation of HARBS and EA report and completion of the DEIS, the former Charles P. Rodgers & Co. Building at 517-523 West 29th Street, built in 1903 and determined NRHP-Eligible under Criterion A for its association with New York's industrial history and Criterion C for its industrial design, has been demolished by its private property owner. The demolition was not related to the Project. This building was demolished sometime between 2017 and 2019, and as it is no longer extant, NYSHPO has determined it is Not NRHP-Eligible.¹³ The six-story brick

¹³ As noted in NYSHPO's Cultural Resource Information System (CRIS): <https://cris.parks.ny.gov>.

Master Printers Building,
406-416 Tenth Avenue.
View southeast from Tenth Avenue
and West 34th Street.

6



Date: December 9, 2016

Photographer: Colin Duffy



Date: October 11, 2016

Photographer: Claudia Cooney

Master Printers Building, 406-416 Tenth Avenue. View northeast from Tenth Avenue and West 33rd Street.

7

building was originally a stable and factory for the production of bedding and iron bedsteads (see **Figure 9-19**).

9.3.3.1.6 *W & J Sloane Warehouse and Garage*

The three buildings at 541-561 West 29th Street and 306-310 Eleventh Avenue constitute the former NRHP-Eligible W & J Sloane Warehouse and Garage. Founded in 1843, the W & J Sloane company was a retail and wholesale carpet, rugs, and furnishings company. W & J Sloane supplied stores across the country, controlled mills, imported European goods, established branch retail establishments in other cities, and was the first American company to sell oriental rugs retail. Originally located on Broadway near City Hall, the firm relocated several times uptown as the retail business periodically moved northward along Broadway and Fifth Avenue. W & J Sloane's second store was located at 649-655 Broadway near Bleecker Street; this building is located within the NYCL NoHo Historic District. In 1882, the company moved its retail and warehouse operations to 880-886 Broadway; this building is located within the NYCL Ladies' Mile Historic District. In 1912, a new retail building was completed for W & J Sloane at Fifth Avenue and 47th Street. The construction of the company's warehouse on West 29th Street coincides with the construction of the Midtown retail store. The first component of the warehouse—the 10-story brick structure at 306-310 Eleventh Avenue and 557-561 West 29th Street—was built in 1909 and designed by James Barnes Baker. Designed with Renaissance Revival elements, the building is sited around the southwest corner of the block, which is occupied by a parking lot (see **Figure 9-20**). Arched loading docks with stone keystones are located on the ground floor. The second floor is designed with cambered-arched windows. Stone courses run along the tops of the first and second floors with wide brick piers dividing the upper floors into recessed and arched window bays. A projecting cornice caps the avenue and street façades. The two secondary façades facing the parking lot are largely blank brick. (When the building was constructed, two four-story store and dwelling structures occupied the corner at 302 and 304 Eleventh Avenue. By 1930, the corner was occupied by a gas station.) Constructed in 1913, the building at 549-555 West 29th Street is identical and indistinguishable from the 1909 structure. James Barnes Baker also designed the garage, built in 1910, located at 541-547 West 29th Street. The garage is a four-story structure with Romanesque Revival details. Clad in brick with stone trim, the façade features three round-arched, recessed window bays. This historic property is significant under Criterion A for its association with New York's industrial history and Criterion C for its industrial design.

9.3.3.1.7 *Starrett-Lehigh Building*

Occupying the full block between Eleventh and Twelfth Avenues and West 26th and West 27th Streets, the Starrett-Lehigh Building (individual NYCL, located within the West Chelsea Historic District, and NRHP-Eligible) was designed by Russell G. and Walter M. Cory in association with Yusao Matsui, as a cooperative venture of the Starrett Investing Corporation and the Lehigh Valley Railroad. Built in 1930-1931 on a rail yard operated by the Lehigh Valley Railroad, it was one of a few American buildings featured in the Museum of Modern Art's 1932 exhibit, *Modern Architecture: International Exhibition*. Originally a freight terminal and warehouse, trains could enter the building through the northernmost bays on the Twelfth Avenue frontage, and three interior elevators could each lift loaded rail cars. Purdy & Henderson designed the complex reinforced concrete structural system with floor slabs that are cantilevered beyond the outer columns. This structural system creates largely unobstructed floor spaces, and continuous strip windows provide a maximum amount of light to the interior. The dramatically massed brick and glass building rises through a series of setbacks to a height of 22 stories (see **Figure 9-21**). The first four floors are articulated with large window bays separated by brick piers. Beginning on the fifth floor, strips of multi-paned steel ribbon windows encircle most of the building, curving around the rounded corners. On each floor, the large windows are set above narrow brick spandrel bands and exposed concrete floor slabs. The continuity of the strip windows is broken only in the center of the north and south

Date: December 12, 2016

Photographer: Colin Duffy



View northwest of the Charles P. Rodgers & Company Building at 517-523 West 29th Street 8

Date: December 12, 2016

Photographer: Colin Duffy



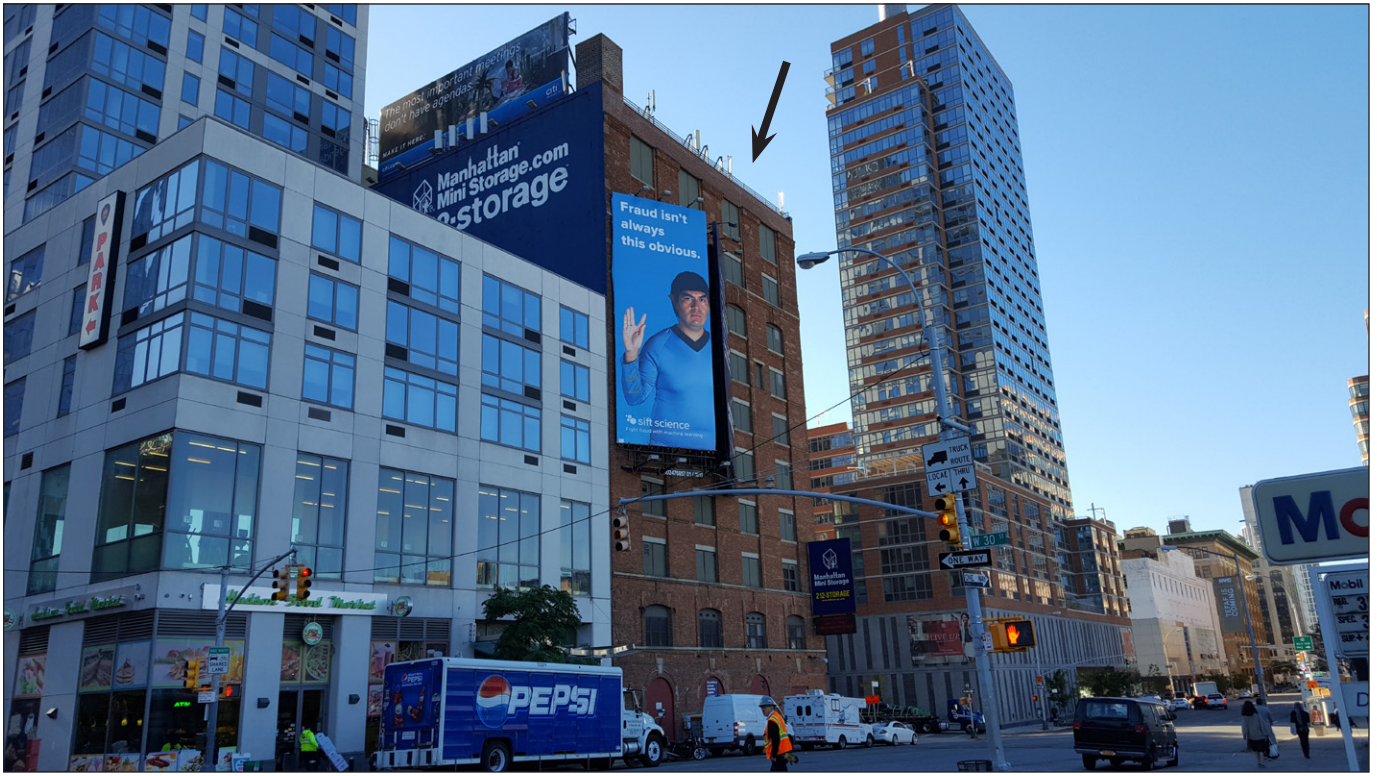
View north of the Charles P. Rodgers & Company Building at 517-523 West 29th Street 9

New York Known Historic Architectural Resources Demolished:
Charles P. Rodgers & Co. Building
(NY Resource No. 5 -- Now Demolished)

Figure 9-19

Date: October 11, 2016

Photographer: Claudia Cooney



Former W & J Sloane Warehouse and Garage, 541-561 West 29th Street and 306 Eleventh Avenue. View southeast on Eleventh Avenue. **10**

Date: October 11, 2016

Photographer: Claudia Cooney



Former W & J Sloane Warehouse and Garage, view east on West 29th Street. **11**

New York Known Historic Architectural Resources:
W & J Sloane Warehouse and Garage
(NY Resource No. 6)

Figure 9-20

Photographer: Claudia Cooney
Date: October 11, 2016



Starrett-Lehigh Building, 601-625 West 26th Street.
View southwest on Eleventh Avenue.

12

Photographer: Claudia Cooney
Date: October 11, 2016



View east of the Starrett-Lehigh Building at 601-625 West 26th Street from Hudson River Park.

13

New York Known Historic Architectural Resources:
Starrett-Lehigh Building
(NY Resource No. 7)

Figure 9-21

façades by rectilinear brick towers massed with setbacks and ornamented with Art Deco brick and concrete detailing. The building is significant under Criterion C for its architectural design and engineering.

9.3.3.1.8 *West Chelsea Historic District*

The West Chelsea Historic District (NYCL, NRHP-Eligible) is roughly bounded by West 28th Street to the north, Tenth Avenue to the east, West 25th and 26th Streets to the south, and Twelfth Avenue to the west. In a letter dated March 19, 2009, NYSHPO found the West Chelsea Historic District eligible for listing on the NRHP under Criterion A for its association with New York City history and Criterion C for its impressive collection of industrial architecture from the late 19th to early 20th centuries. The West Chelsea Historic District stands as a surviving example of Manhattan's industrial past and still contains many of the historic buildings of this era including factories, warehouses, and industrial firms that have long been demolished elsewhere in the city (see **Figures 9-22 through 9-24**). West Chelsea was first developed in the late 1840s with a mixture of tenements and industrial complexes. Few buildings from this earlier period survive, except for the small two-story brick stable building on the south side of West 28th Street east of Eleventh Avenue (at 554 West 28th Street), which was built in 1885 for Latimer E. Jones' New York Lumber Auction Company. The neighborhood experienced a second wave of development around the turn of the 20th century, as the older, smaller industrial buildings were replaced by larger industrial structures and factories. It is during this time that the area was home to some of the City's, and even the country's, most prestigious industrial firms including the Otis Elevator Company. Designed by Clinton & Russell, the building at 246-260 Eleventh Avenue was constructed for the Otis Elevator Company in 1911-1912. The seven-story, brick and stone Classical Revival building originally housed offices and machine shops, a garage, and such employee amenities as a law library, a dining room, and a barber shop. The building's design and massing emphasizes solidity and weight, with façades articulated by wide brick piers and spandrel panels, and by a pre-zoning massing that fills the lot without setbacks (see **Figure 9-22**).

In addition to its manufacturing operations, the area also became well known for its shipping, warehousing, and freight handling capabilities due to its close proximity to the river and accessibility by train. The New York Terminal Warehouse Company, Central Stores complex, which occupies the block bounded by West 28th and West 27th Streets between Eleventh and Twelfth Avenues, was accessed by the New York Central and Hudson River Railroad through tracks that led directly into the building through the large round-arch entrance which fronts on Eleventh Avenue (see **Figure 9-23**). Built in phases between 1890 and 1912, the New York Terminal Warehouse Company's Central Stores complex was designed separately by George B. Mallory and Otto M. Peck. It comprises 25 storage buildings of the same design, forming a single, monolithic architectural composition (see **Figure 9-23**). The seven- and nine-story brick complex is simply articulated with arched window openings and corbelled cornices.

Just south of the warehouses, the entire block bounded by West 27th and West 26th Streets between Eleventh and Twelfth Avenues is occupied by the Starrett-Lehigh Building, which as described above, is also an individual NYCL (see **Figures 9-21 and 9-23**). It stands as an early Modernist design approach to an industrial building with its cantilevered floor slabs and continuous strips of windows.

9.3.3.2 *ARCHAEOLOGICAL RESOURCES*

As noted above, the analysis of archaeological resources conducted as part of the Phase 1A Archaeological Documentary Study for the New York portion of the APE includes an inventory of previously identified archaeological sites in or near the APE and an evaluation of areas of archaeological sensitivity within the APE, indicating the potential for prehistoric or historic-period



Otis Elevator Building in West Chelsea Historic District, 246-260 Eleventh Avenue. View southeast on Eleventh Avenue. **14**

New York Known Historic Architectural Resources:
West Chelsea Historic District
(NY Resource No. 8)

Figure 9-22

Date: October 11, 2016

Photographer: Claudia Cooney



View southwest on Eleventh Avenue of the New York Terminal Warehouse Company buildings that occupy the block bounded by Eleventh and Twelfth Avenue and West 27th and West 26th Street in the West Chelsea Historic District. **15**
The Starrett-Lehigh Building, also in the West Chelsea Historic District, is visible to the south.

Date: November 30, 2016

Photographer: Erica Mollon



View southeast on Twelfth Avenue/Route 9A of the New York Terminal Warehouse Company buildings and the Starrett-Lehigh Building south of it in the West Chelsea Historic District. **16**

New York Known Historic Architectural Resources:
West Chelsea Historic District
(NY Resource No. 8)

Figure 9-23



View of the south side of West 28th Street, east of Eleventh Avenue, 17
in the West Chelsea Historic District.



View east on West 27th Street, east of Eleventh Avenue, 18
in the West Chelsea Historic District.

New York Known Historic Architectural Resources:
West Chelsea Historic District
(NY Resource No. 8)

Figure 9-24

archaeological resources to be present in the APE. The assessment of sensitivity identifies the likelihood that resources are present in the APE as low, moderate, or high.

The Project site and its vicinity, the west side of Midtown Manhattan and Hudson Yards, have been the subject of multiple previous archaeological investigations, many of which were quite substantive. Of most relevance are the Phase 1A Archaeological Survey Report¹⁴ and supplemental studies prepared for the ARC Project, which evaluated a similar APE to the current Project. Other relevant surveys include those prepared for the No. 7 Line/Hudson Yards completed in 2004 and numerous studies associated with reconstruction of Route 9A.

9.3.3.2.1 Previously Identified Archaeological Sites

The review of site file data maintained by NYSHPO revealed only one previously identified archaeological resource, the Hudson River Bulkhead (described below in Section 9.3.3.2.3.1). The closest other previously identified archaeological sites are located dozens of city blocks away from the APE to the southeast in the Greenwich Village area.

9.3.3.2.2 Areas of Prehistoric Archaeological Sensitivity

Those portions of the APE for Direct Effects that were formerly inundated by the Hudson River, from approximately Eleventh Avenue westward, have been inundated for most of prehistory. They are therefore considered to have no potential for prehistoric archaeological resources. The APE for Direct Effects at Tenth Avenue and the railroad tracks to its east have shallow bedrock and have been highly disturbed through development since the mid-19th century. They too are therefore considered to have no potential for prehistoric archaeological resources.

9.3.3.2.3 Areas of Historic-Period Archaeological Sensitivity

The APE for Direct Effects has been determined to be sensitive for several classes of historic-period archaeological resources (see **Figure 9-25**).

9.3.3.2.3.1 Hudson River Bulkhead

The Hudson River Bulkhead (NRHP-Eligible) runs between the Battery and West 59th Street including the western shoreline of the APE for Direct Effects (see description in Section 9.3.3.1.2 and **Figure 9-25**).

9.3.3.2.3.2 Piers, Wharves, Bulkheads, and Landfill-Retaining Structures

Those portions of the APE for Direct Effects that were formerly inundated by the Hudson River, from approximately Eleventh Avenue westward, have a moderate sensitivity for the presence of piers, wharves, bulkheads, and landfill-retaining structures below the depth of modern disturbance.

9.3.3.2.3.3 Industrial and Manufacturing Sites

The portion of the APE for Direct Effects on the block between West 29th and West 30th Streets, from Eleventh Avenue to Twelfth Avenue (Manhattan Block 675, Lot 1 and the western 205 feet of Lot 12) was developed with industrial uses from the mid-19th to the early 20th century. A variety of industrial activities occurred on the block, including lumber, kindling, and coal yards; stables; builders' and masons' materials; a soap factory; and other unspecified activities. According to the Phase 1A archaeological resources study prepared for the ARC Project, the significance of these types of resources is determined by their degree of integrity and ability to provide information on the historical transformation of manufacturing processes that occurred during the late 19th and early 20th centuries. Physical remains of building foundations and associated features may, if

¹⁴ A.D. Marble Co. 2005/rev. 2007.



— Existing Northeast Corridor

== Deeply Bored New Tunnel

..... Hudson Yards Right-of-Way Preservation

Area of Potential Effects for Direct Effects

● New Ventilation Shaft

— Existing North River Tunnel

== Shallowly Constructed New Tunnel

● Underpinning and New Fan Plant

▨ Fan Plant & Construction Staging Area

▨ In-Water Ground Improvement

▨ Cut and Cover Excavation

▨ Ground Improvement

□ Area of Archaeological Sensitivity

□ Utility Relocation

0 200 FEET



New York: Area of Potential Effects for Direct Effects and Areas of Archaeological Sensitivity
Figure 9-25



sufficiently intact, provide information on building organization and thereby an indication of shop-floor organization and how productive facilities were organized.

Subsequent to the DEIS, a more intensive assessment of the archaeological sensitivity of the upper several feet of the portion of the APE for Direct Effects on Block 675 consisting of the western 205 feet of Lot 12 was completed for a separate development project.¹⁵ That intensive assessment determined that the western 205 feet of Lot 12 was the location of industrial activities such as lumber storage which are unlikely to have resulted in the formation of archaeological resources and concluded that it has “low sensitivity for archaeological resources associated with the block’s past industrial and manufacturing uses.”

Therefore, only the portion of the APE for Direct Effects on Block 675 consisting of Lot 1 has a high sensitivity for the presence of historic-period archaeological resources associated with industrial and manufacturing activity.

9.3.3.2.3.4 Domestic/Residential Sites

The portion of the APE for Direct Effects on the block between West 29th and West 30th Streets, from Eleventh Avenue to Twelfth Avenue (Manhattan Block 675, Lot 1 and the western 205 feet of Lot 12) was first developed prior to 1850, when multiple structures appear on historic maps of the block. It is possible that some of these structures were residences, although the general area was dominated by industrial and manufacturing uses through the early 20th century. Archaeological resources recovered from the site could produce data about the individuals who resided and/or worked on the site during the 19th century. For historic-period archaeological resources, domestic shaft features—such as those that could have been located within the former rear yards of the historic lots—can contain important archaeological resources. Domestic refuse can also be buried in backyard areas or accumulate as sheets.

Subsequent to the DEIS, a more intensive assessment of the archaeological sensitivity of the upper several feet of the portion of the APE for Direct Effects on Block 675 consisting of the western 205 feet of Lot 12 was completed for a separate development project.¹⁶ That assessment determined that the western 205 feet of Lot 12 was not the location of residential activities and concluded that it has “no sensitivity for domestic shaft features.” Therefore, only the portion of the APE for Direct Effects on Block 675 consisting of Lot 1 has a moderate sensitivity for the presence of historic-period archaeological resources associated with residential occupancy.

9.4 AFFECTED ENVIRONMENT: FUTURE CONDITIONS

In the future, background conditions related to historic and archaeological conditions will likely remain similar to existing conditions with the exception of work proposed by Amtrak at Substation 3 of the Pennsylvania Railroad in North Bergen, New Jersey. Amtrak proposes to remove existing equipment from Substation No. 3 and to add a new control house and transformer equipment behind (and to the west of) Substation No. 3.

¹⁵ *Block 675 East Redevelopment Project, Block 675, Lot 12 (Part), New York, NY, Supplemental Archaeological Assessment*. Prepared by AKRF, Inc. for DD West 29th LLC and West 30th Street, LLC. November 2017.

¹⁶ *Block 675 East Redevelopment Project, Block 675, Lot 12 (Part), New York, NY, Supplemental Archaeological Assessment*. Prepared by AKRF, Inc. for DD West 29th LLC and West 30th Street, LLC. November 2017.

9.5 IMPACTS OF NO ACTION ALTERNATIVE

For purposes of analysis in this EIS, FRA and NJ TRANSIT have assumed that with the No Action Alternative, the existing North River Tunnel would remain functional and in operation at least through the EIS analysis year of 2033, with continued maintenance as necessary to address ongoing deterioration to the extent possible. The Preferred Alternative would not be constructed.

The North River Tunnel is more than 100 years old and was designed and built to early 20th century standards. Service reliability throughout the tunnel has been compromised because of the damage to tunnel components caused by Superstorm Sandy, which inundated both tubes in the North River Tunnel with seawater in October 2012, resulting in the cancellation of all Amtrak and NJ TRANSIT service into New York City for five days. While the tunnel was restored to service and is now safe for travel, chlorides from the seawater remain in the tunnel's concrete liner and bench walls, causing ongoing damage to the bench walls, embedded steel, track, and signaling and electrical components.

Recent inspections since Superstorm Sandy have revealed a number of damaged features in the tunnels, including exposed steel members, delaminated and cracked concrete in the tunnel lining, embedded reinforcing steel, running and third rail systems, track ballast and the numerous electrical and mechanical systems (see **Figure 9-26** and **Figure 9-27**). Elements of the tunnel that are not accessible for inspection may also be damaged.

The most serious damage in the tunnel was found in the concrete bench walls. These bench walls were found to have a significant number of longitudinal cracks, severe spalls with exposed steel, and corrosion of embedded steel elements. In August 2015, a piece of the bench wall fell onto the tracks, leading to emergency repairs and cascading delays for Amtrak and NJ TRANSIT service.

Despite the ongoing maintenance that would continue in the No Action Alternative, damage to the North River Tunnel caused by Superstorm Sandy will continue to degrade systems in the tunnel. This deterioration combined with the North River 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. However, for purposes of analysis in this EIS, FRA and NJ TRANSIT have assumed that the North River Tunnel will remain functional and in operation at least through the EIS analysis year of 2033.

The No Action Alternative would have no effect on archaeological resources, as there would be no ground disturbance or excavation associated with the Project. Any archaeological resources would remain buried and undisturbed, unless they are disturbed by other projects. The No Action Alternative would also not adversely affect historic architectural resources. Alterations would not be made to the North River Tunnel including the removal of the bench walls and ballast track system, which adversely affects the North River Tunnel, also a contributing feature to the Pennsylvania Railroad New York to Philadelphia Historic District in New Jersey and the New York Improvements and Tunnel Extension of the Pennsylvania Railroad in New York. The Hudson River Bulkhead in New York would not be altered for the construction of the new Hudson River Tunnel.

As described in Chapter 2, "Project Alternatives and Description of the Preferred Alternative," Section 2.4, the No Action Alternative would not meet the Project's purpose and need.

9.6 CONSTRUCTION IMPACTS OF THE PREFERRED ALTERNATIVE

FRA has determined, and NYSHPO and NJHPO have concurred in letters dated February 17, 2017 and March 6, 2017, respectively, that construction of the Preferred Alternative would result in physical alterations that constitute adverse effects to four historic architectural resources: the Pennsylvania Railroad New York to Philadelphia Historic District in New Jersey; the North River

Date: January 23, 2015

Source: Amtrak



North River Tunnel showing damage including the bench walls and concrete lining

Source: Amtrak
Date: January 23, 2015



Damage to bench walls in North River Tunnel

Source: Amtrak
Date: January 23, 2015



North River Tunnel damage, concrete lining



Tunnel in New Jersey, the Hudson River, and New York; the New York Improvements and Tunnel Extension of the Pennsylvania Railroad in New York; and the Hudson River Bulkhead in New York. The Preferred Alternative would also result in the disturbance of areas that have been identified as archaeologically sensitive in New Jersey and New York. These impacts would occur as a result of Project construction but would be permanent impacts.

9.6.1 NEW JERSEY

9.6.1.1 HISTORIC ARCHITECTURAL RESOURCES

The Preferred Alternative’s potential impacts on historic architectural resources in New Jersey are described below and shown in **Table 9-3**.

Table 9-3
Historic Architectural Resources in the APE
and Effects Assessment – New Jersey

Ref. No. ¹	Name	Location	NRHP Status	Assessment of Effects
1	North River Tunnel	North Bergen; Union City; Weehawken	NRHP-Eligible	Adverse effect
2	Pennsylvania Railroad New York to Philadelphia Historic District	Multiple	NRHP-Eligible	Adverse effect
3	New Jersey Midland Railway/New York, Susquehanna and Western Railroad Historic District	Multiple	NRHP-Eligible	No adverse effect
4	Erie Railroad Main Line Historic District	Multiple	NRHP-Eligible	No adverse effect
5	Jersey City Waterworks Historic District	Multiple	NRHP-Eligible	No effect
6	Substation No. 3, Pennsylvania Railroad	North Bergen	NRHP-Eligible	No adverse effect
7	Charles X. Harris House and Studio	356 Mountain Rd, Union City	NRHP-Eligible	No adverse effect
8	Residence	320-324 Mountain Rd, Union City	NRHP-Eligible	No adverse effect

Notes:
¹ Corresponds to **Figure 9-3**.
 NRHP: National Register of Historic Places.
 NRHP-Eligible: Eligible for listing on the New Jersey State and National Registers of Historic Places.

9.6.1.1.1 North River Tunnel

The Preferred Alternative would rehabilitate the North River Tunnel, including both the north and south tubes of the North River Tunnel between the portal at PSNY in Manhattan (within PSNY’s A Yard at approximately Tenth Avenue) and the tunnel portal in North Bergen, New Jersey.

No changes would occur to the Bergen Portal as part of the tunnel rehabilitation. All rehabilitation work would occur inside the North River Tunnel. There are five components of the proposed tunnel rehabilitation work:

1. Bench wall and duct bank removal and reconstruction;
2. Replacing ballast track system to ballast-less track system;
3. Installing new signal, communication, and power cables and associated components;
4. Localized crack, leakage, and spall repairs on the existing tunnel concrete lining; and
5. Fire-life safety and tunnel ventilation during tunnel construction.

The North River Tunnel bench walls would be demolished and reconstructed, portal-to-portal, including the embedded duct banks. The new bench wall arrangement would have one high bench wall, level with the train floor, on the inner tunnel side providing emergency egress via cross passages, and one low bench wall at a height slightly above the top of rail for ease of maintenance

and inspection (see Figure 2-14 in Chapter 2, “Project Alternatives and Description of the Preferred Alternative”). In addition, the existing ballasted track system (rail and ballast) would be removed and replaced with a direct fixation track system, which is the current state of practice for rail tunnels. The construction of the new system would involve setting the track system to the desired grade, then placing concrete to encase the ties, setting the track system into the concrete.

The cast iron ring and concrete tunnel liner of both tubes would not be altered. The rehabilitated tunnel would still include only one set of tracks in each tube and would also have bench walls through which power cables would pass, though the new bench walls would be of different heights than the existing configuration. Due to the damage that the North River Tunnel sustained as a result of Superstorm Sandy and the need to preserve the long-term functionality of the NEC Hudson River rail crossing, there is no alternative to the removal of the existing infrastructure in the tunnel, including the bench walls, ballast track system, and associated signal, electrical, and mechanical systems.

Once the North River Tunnel rehabilitation is complete, both the old and new tunnel would be in service, providing redundant capacity and increased operational flexibility for Amtrak and NJ TRANSIT.

As the Preferred Alternative would remove interior components of the North River Tunnel that include original physical features such as the bench walls, which were technologically innovative and are character-defining features of the NRHP-Eligible resource, and the ballast track system, the Preferred Alternative would result in an adverse effect on this historic architectural resource.

Further, although the Bergen Portal would not be altered as part of the rehabilitation of the North River Tunnel, it is located within a proposed construction staging area for the rehabilitation of the existing North River Tunnel (see **Figure 9-3**). As the Bergen Portal’s architectural elements contribute to the resource’s significance and make up the primary above-ground character defining feature of the North River Tunnel in New Jersey, the Project Sponsor would develop construction protection measures in consultation with FRA and NJHPO prior to Project demolition, excavation, and construction activities to avoid adverse effects and ensure that this historic architectural resource is not damaged during construction of the Project, including through associated construction vibration. The construction measures would be set forth in a Construction Protection Plan (CPP), with the development of the CPP included as a stipulation of the executed PA for the Project, as described in greater detail below in Section 9.8.

9.6.1.1.2 Pennsylvania Railroad New York to Philadelphia Historic District

The Preferred Alternative would directly affect the Pennsylvania Railroad New York to Philadelphia Historic District as work would occur on the existing NEC between County Road and Tonnelle Avenue in the Town of Secaucus and Township of North Bergen (see Figure 2-4 in Chapter 2, “Project Alternatives and Description of the Preferred Alternative”). However, the addition of new surface tracks would be confined to a relatively small portion of this linear historic district. Further, the alterations would be industrial in nature, consistent with the historic railroad character of the historic district, and would support the continued use of this active historic railroad.

The Preferred Alternative would also have a direct effect on the Pennsylvania Railroad New York to Philadelphia Historic District because of the proposed alterations to the North River Tunnel, a contributing resource to the larger historic district. The removal of the bench walls, original physical features of the tunnel that were technologically innovative and are character-defining features of a key contributing resource within the Pennsylvania Railroad New York to Philadelphia Historic District, would result in an adverse effect on the district, as discussed above in Section 9.6.1.1.1.



9.6.1.1.3 Substation No. 3, Pennsylvania Railroad

The Preferred Alternative would not directly affect Substation No. 3; however, Substation No. 3 is located near a proposed construction staging area for the Preferred Alternative and close to construction activities planned at the adjacent Amtrak substation (see **Figure 9-3**). Due to the age of the building and presence of architectural features that contribute to the building's significance, the Project Sponsor would develop construction protection measures in consultation with FRA and NJHPO prior to Project demolition, excavation, and construction activities to avoid adverse effects and ensure that this historic architectural resource is not damaged during construction of the Project, including through associated construction vibration. The construction measures would be set forth in a CPP, with the development of the CPP included as a stipulation of the executed PA for the Project, as described in greater detail below in Section 9.8.

9.6.1.2 ARCHAEOLOGICAL RESOURCES

As discussed in Section 9.3, some portions of the APE for Direct Effects in New Jersey have sensitivity for archaeological resources. Where construction activities for the Preferred Alternative would occur in the same location and depth as the identified sensitivity, this could result in adverse effects to archaeological resources, if they are present. The following components of the Preferred Alternative would affect subsurface areas:

- Construction of new surface tracks along and connecting to the existing NEC.
- Construction of an access road for new surface tracks in Secaucus and North Bergen in New Jersey south of the existing NEC alongside the new surface tracks, including a temporary access road for use during construction as well as a permanent access road in some locations.
- Construction staging areas east and west of Tonnelle Avenue in North Bergen, collectively referred to in this EIS as the Tonnelle Avenue staging area.
- Cut-and-cover excavation for a section of the new tunnel east of Tonnelle Avenue in North Bergen on the Tonnelle Avenue staging area.
- A ventilation shaft, construction staging area, and fan plant on a site south of West 18th Street in Hoboken (with small portions in Union City and Weehawken), referred to in this EIS as the Hoboken staging area.
- A construction access road to the ventilation shaft site and construction staging area in Hoboken to facilitate truck movements to and from the site. Three potential routes for that access road are evaluated in this EIS, all of which have some off-road components where a new road would be constructed.
- Ground improvement at the Hoboken staging area and along the proposed tunnel alignment between the construction staging area and Willow Avenue in Hoboken.
- Underpinning of the Willow Avenue viaduct in Hoboken along the proposed tunnel alignment.

During previous cultural resources surveys of the area, including those performed as part of ARC, construction staging areas and access roads were assessed as having no subsurface impact except where impacts would extend below the ground surface, such as at the locations where substantial features like visual barriers, sound barriers, or utility trenches would be installed. Such types of impacts are not expected to exceed five feet below ground surface. Because detailed plans for the Preferred Alternative's access road to the ventilation shaft and construction staging areas have not yet been developed, and the location of potential substantial features is therefore unknown, it is assumed for purposes of this analysis that these Project components would have a maximum subsurface disturbance of five feet below ground surface.

The Preferred Alternative would have some areas where piles and sheeting would be driven into the ground to depths of 10 to 15 feet or more below ground surface. This construction technique

does not provide the opportunity for viewing subsurface soils, as the steel pipes or sheeting are forcibly driven into the ground with no excavation involved. The piles would be approximately 24 inches in diameter arranged in sets of five piles per section, and driven at approximately 60-foot intervals.

The potential impacts of the Preferred Alternative on areas of archaeological sensitivity in New Jersey are summarized in **Table 9-4** and described below.¹⁷

Table 9-4
Areas of Archaeological Sensitivity
in the APE for Direct Effects and Effects Assessment – New Jersey

Project Component ¹	Construction Impacts (depths)	Sensitivity/Resource ² (depths)	Potential Effects
New surface tracks along NEC	Driven piles/sheeting (12-25 feet below ground surface)	Moderate / Prehistoric resources (5-20 feet below ground surface)	No adverse effect
Access road along NEC	Road construction (0-4 feet below ground surface)	Moderate / Prehistoric resources (5-20 feet below ground surface)	No effect
Staging area at Tonnelle Ave	Staging activities (0-5 feet below ground surface) and storage area for tunnel spoils (0-30 feet below ground surface)	Low sensitivity	No effect
Cut-and-cover excavation east of Tonnelle Ave on Tonnelle Avenue staging area	Excavation (35-40 feet below ground surface)	Low sensitivity	No effect
Hoboken staging area	Staging activities (0-4 feet below ground surface in area of resource)	Moderate to High / Historic Hackensack Plank Road (14-17 feet below ground surface)	No effect
Access road to Hoboken staging area along north side of the Hudson-Bergen Light Rail (HBLR)	Road construction (0-5 feet below ground surface)	Moderate to High / Historic Hackensack Plank Road (14-17 feet below ground surface)	No effect
		Moderate to High / Historic sea wall (10-15 feet below ground surface)	No effect
Hoboken ventilation shaft and ground improvements to the east and west	Excavation and ground improvements (0-80 feet below ground surface)	Low sensitivity	No effect
Ground improvement / underpinning west of Willow Ave at the HBLR	Ground improvements (0-80 feet below ground surface)	Moderate to High / Historic sea wall (10-15 feet below ground surface)	Adverse effect
Underpinning of Willow Ave Viaduct	Excavation (0-80 feet below ground surface)	Low sensitivity	No effect
Notes:			
¹ See Figure 9-1 and Figure 9-13			
² The APE for Direct Effects is sensitive for these resources but it is not known if they are present or not.			
Source: Phase 1A Archaeological Study, Hudson Tunnel Project, Hudson County, New Jersey, RGA 2017.			

¹⁷ Fill layers in the Hackensack Meadowlands may contain structural remnants from the demolition of the original Penn Station (demolished 1964). However, such remains are not considered historic properties and through coordination with NJHPO it has been determined that effects to these potential remains should not be considered under the Section 106 process (email communication with Vincent Maresca, NJHPO, May 23, 2017).



9.6.1.2.1 *New Surface Tracks and Access Road Along the NEC*

New surface tracks and an access road would be constructed along the NEC in Secaucus and North Bergen and would affect the subsurface area there. Disturbance there would include traditional excavation to a depth of approximately four feet below ground surface that would not extend to the depth of potential archaeological resources; piles driven to a depth of approximately 12 feet below ground surface; and installation of temporary metal sheeting to a depth of 25 feet below ground surface. The driving of piles and installation of sheeting would involve relatively minor disturbance in an area of deeply buried moderate sensitivity for prehistoric resources. However, as described above, these construction techniques do not provide an opportunity for viewing soils by an archaeologist and it is not feasible to investigate before construction.. Therefore, FRA, through further consultation with NJHPO, has determined that due to the lack of prudent or feasible archaeological survey methods for machine-driven construction methods, the Preferred Alternative's construction activities for the surface tracks would not result in an adverse effect on the deeply buried area of moderate prehistoric sensitivity.

9.6.1.2.2 *Tonnelle Avenue Construction Staging Area*

The Preferred Alternative would have a construction staging area both east and west of Tonnelle Avenue in North Bergen. Disturbance associated with this area is typically expected to be no more than five feet below ground surface but could also include a temporary tunnel spoils storage area that could extend to a depth of approximately 30 feet below ground surface. The construction staging area at Tonnelle Avenue does not fall within the footprint of any known prehistoric archaeological resource. Historic-period resources that were identified during cartographic analysis in the area east of Tonnelle Avenue are likely to have been destroyed by ground disturbance including grading during the mid-20th century. Sensitivity for prehistoric and historic archaeological resources is assessed as low in the area of construction staging area at Tonnelle Avenue. This Project component would not affect areas of archaeological sensitivity.

9.6.1.2.3 *Cut-and-Cover Excavation*

Cut-and-cover excavation would occur for the section of the new tunnel east of Tonnelle Avenue to the face of the Palisades. In this area, excavation may involve ground disturbance to a depth of approximately 35 to 40 feet below ground surface. The cut-and-cover excavation area does not fall within the footprint of any known prehistoric archaeological resource. Historic-period resources which were identified during cartographic analysis are likely to have been destroyed by ground disturbance in the 20th century including grading during the mid-20th century. This Project component would not affect areas of archaeological sensitivity.

9.6.1.2.4 *Hoboken Ventilation Shaft, Construction Staging Area, and Fan Plant at the Hoboken Staging Area*

The Preferred Alternative's Hoboken ventilation shaft is expected to be approximately 130 feet wide and require excavation to a depth of 100 feet below ground surface. Around the ventilation shaft, the new fan plant would also require excavation, including ground improvement in the area of the proposed tunnel east and west of the ventilation shaft (discussed below under Section 9.6.1.2.6). On the rest of the site, the construction staging area may involve subsurface disturbance up to five feet deep. The ventilation shaft, fan plant, and construction staging area do not fall within the footprint of any known prehistoric archaeological resource and sensitivity for prehistoric archaeological resources is assessed as low. Previous investigations identified potential for historic-period archaeological resources in the western portion of the shaft site and construction staging area, including the Pierson & Goodrich Iron Works and the Detroit Steel Products Company. However, subsequent archaeological testing at the site identified historic

demolition debris associated with these resources and no further archaeological work was recommended.

The eastern edge of the construction staging area falls within the bounds of one historic-period archaeological resource: the Hackensack Plank Road (see **Figure 9-13**). Archaeological resources associated with the Hackensack Plank Road are expected at a depth of approximately 14 to 17 feet below ground surface, below the depth that staging activities would disturb. This component of the Preferred Alternative would not affect areas of archaeological sensitivity.

9.6.1.2.5 Access Road for the Hoboken Staging Area

The Preferred Alternative would include construction of a new access road along the north side of the HBLR between the Hoboken staging area and Willow or Park Avenue, to provide truck access to and from the staging area. In addition, a potential haul route from Willow/Park Avenue to 19th Street along the north and west side of the HBLR is under consideration (referred to as Option 3). Road construction would affect an area of no more than approximately five feet below ground surface. The access road alignment would cross an area where archaeological resources associated with the Hackensack Plank Road may be present at a depth of approximately 14 to 17 feet below ground surface and the historic alignment of the early 19th century sea wall may be present at a depth of 10 to 15 feet below ground surface. These potential resources are below the depth that would be disturbed by the access road. The Preferred Alternative's access road to the Hoboken staging area would not affect areas of archaeological sensitivity.

9.6.1.2.6 Ground Improvement

The Preferred Alternative may include ground improvement or underpinning along the tunnel route at the HBLR right-of-way between approximately Grand Street and Willow Avenue. This would extend from the present ground surface down to the depth of the proposed tunnel, approximately 80 feet below ground surface. This construction activity would have the potential to disturb the historic alignment of the early 19th century sea wall (at a depth of 10 to 15 feet below ground surface). This component of the Preferred Alternative would affect an area of high archaeological sensitivity for historic-period resources.

Ground improvement may also be required east and west of the proposed Hoboken ventilation shaft within the Hoboken construction staging area, also extending to the depth of the proposed tunnel, approximately 80 feet below ground surface. These areas of ground improvement would not affect areas of archaeological sensitivity.

9.6.1.2.7 Underpinning

Along the new tunnel route, the Preferred Alternative would require underpinning of the Willow Avenue viaduct along the proposed new tunnel alignment south of the HBLR right-of-way. This would involve installation of piles extending from the present ground surface down to the depth of the tunnel, approximately 80 feet below ground surface. The proposed area of underpinning does not fall within the bounds of any known prehistoric or historic-period resource. This component of the Preferred Alternative would not affect areas of archaeological sensitivity.

9.6.2 HUDSON RIVER

9.6.2.1 HISTORIC ARCHITECTURAL RESOURCES

As discussed in the previous section, the Preferred Alternative's rehabilitation of the North River Tunnel would remove character-defining features of the North River Tunnel, which would result in an adverse effect on this historic architectural resource.



9.6.2.2 ARCHAEOLOGICAL RESOURCES

The Preferred Alternative's in-water construction has no potential to impact archaeological resources as the river bottom in this area of the Hudson River is not sensitive for the presence of archaeological resources. In addition, no shipwrecks have been identified in the vicinity of this portion of the Hudson River.

9.6.3 NEW YORK

9.6.3.1 HISTORIC ARCHITECTURAL RESOURCES

The Preferred Alternative's potential impacts on historic architectural resources in New York are summarized in **Table 9-5** and described below.

Table 9-5
Historic Architectural Resources in the APE
and Effects Assessment – New York

Ref. No. ¹	Name	Address	Status	Assessment of Effects
1	New York Improvements and Tunnel Extension of the Pennsylvania Railroad	Between Weehawken, New Jersey and Long Island City, New York	NRHP-Eligible ²	Adverse effect
2	Hudson River Bulkhead	Between Battery Pl and West 59th St	NRHP-Eligible	Adverse effect
3	High Line	Along West 30th St between Tenth and Twelfth Aves, and Twelfth Ave between West 30th and 34th Sts	NHRP-Eligible	No adverse effect
4	Master Printers Building	406-416 Tenth Ave	NRHP-Eligible NYCL-Eligible	No adverse effect
5	Charles P. Rodgers & Company Building (Demolished since DEIS)	517-523 West 29th St	Not NRHP-Eligible (Demolished)	Not Applicable
6	Former W & J Sloane Warehouse and Garage	541-561 West 29th St and 306-310 Eleventh Ave	NRHP-Eligible	No effect
7	Starrett-Lehigh Building	601-625 West 26th St (block between Eleventh and Twelfth Aves, West 26th and 27th Sts)	NRHP-Eligible NYCL	No effect
8	West Chelsea Historic District	Roughly bounded by West 26th and 28th Sts, Tenth and Twelfth Aves	NRHP-Eligible ³ NYCHD	No effect

Notes:

- ¹ Corresponds to **Figure 9-14**.
 - ² NJHPO determined the North River Tunnel NRHP-Eligible on November 12, 1998. NYSHPO determined the North River Tunnel NRHP-Eligible on March 21, 2011.
 - ³ The West Chelsea Historic District was additionally certified by the Secretary of the Interior, for purposes of the Tax Reform Act of 1986, as substantially meeting the requirements for listing on the National Register of Historic Places on September 5, 2013.
- NRHP: National Register of Historic Places.
 NRHP-Eligible: Eligible for listing on the New York State and National Registers of Historic Places.
 NYCL: New York City Landmark.
 NYCL-Eligible: LPC has determined that the property appears eligible for NYCL designation.
 NYCHD: New York City Historic District.

9.6.3.1.1 *New York Improvements and Tunnel Extension of the Pennsylvania Railroad (North River Tunnel)*

As discussed above, the Preferred Alternative's rehabilitation of the North River Tunnel would remove character-defining features of the North River Tunnel, which would result in an adverse effect on the New York Improvements and Tunnel Extension of the Pennsylvania Railroad.

9.6.3.1.2 *Hudson River Bulkhead*

The Preferred Alternative would construct a new tunnel with two single-track tubes like the existing North River Tunnel. The two tubes of the new tunnel would be relatively shallow beneath the Hudson River's riverbed near the Manhattan shoreline, in order to align with the existing approach tracks leading into PSNY. Therefore, the tubes must pass directly through the substructure portion of Manhattan's Hudson River Bulkhead, an architectural resource that is NHRP-Eligible (see Figure 2-7 in Chapter 2, "Project Alternatives and Description of the Preferred Alternative" and Figure 3-11 in Chapter 3, "Construction Methods and Activities").

As described in Chapter 3, "Construction Methods and Activities," Section 3.3.6.3, grout would be installed from the land side of the bulkhead to fill voids in the bulkhead riprap prior to ground freezing. The grouting pressures would be as low as possible, high enough to travel horizontally through the riprap voids but low enough not to exceed the resistance of the overlying ground weight of 30 feet of overlying silt and clay, to limit the possibility of grout being released into the river. Instrumentation would be installed that continuously monitors changes of pressures in the ground during grouting. Safe limits of changes of pressures in the ground would be pre-established for specific locations as part of the monitoring plan.

After the grouting, ground improvement would be implemented, potentially using a ground freezing technique, which involves installing a network of piles into the ground through which a freezing agent circulates to freeze the earth, so that it is temporarily hardened for tunneling. Once the ground is frozen at the bulkhead, the tunnel would be constructed through the bulkhead. Excavation through the bulkhead could occur by boring with Tunnel Boring Machines continuing from the west that are designed to be capable of cutting through timber piles and riprap under frozen ground conditions. Alternatively, the Project contractor could mine the tunnel from the east to the bulkhead and then excavate the bulkhead foundation manually. In this scenario, the Project contractor would use a technique known as the Sequential Excavation Method (SEM) for tunnel excavation, in which a tunnel is sequentially excavated underground in phases and supported in a controlled manner.

The Preferred Alternative would remove original components of the Hudson River Bulkhead and therefore would result in an adverse effect on this resource. To avoid damaging the structural integrity of the bulkhead structure during construction of the Hudson River Tunnel tubes through the bulkhead and ensure the Preferred Alternative does not negatively impact its long-term integrity, the following mitigation measures as set forth in the PA and described in more detail in Section 9.8 of this chapter will be carried out:

- Amtrak, in coordination with the Project Sponsor, will enter into an agreement with HRPT (the New York State entity responsible for the Hudson River Park, including the New York Hudson River Bulkhead), separate from the PA. The agreement will define the geographic area within Hudson River Park above or adjacent to the Hudson River Bulkhead that may be affected by the Preferred Alternative (the "Hudson River Bulkhead Impact Area") and will set forth the measures to be implemented by Amtrak for the long-term maintenance of the Hudson River Bulkhead and Bulkhead Impact Area.



- Amtrak, in coordination with the Project Sponsor and FRA, will provide a Design Technical Memorandum to HRPT that describes the proposed bulkhead construction techniques and proposed measures to monitor and protect the bulkhead.
- Amtrak, in coordination with the Project Sponsor and FRA, will develop a Bulkhead Protection Plan that will set forth the specific requirements to protect the bulkhead and Hudson River Bulkhead Impact Area during the Project construction period. The Project Sponsor, in coordination with FRA, will ensure that the provisions of the Bulkhead Protection Plan are implemented by the Project contractors.

As described in greater detail below in Section 9.7, the Bulkhead Protection Plan will be developed in consultation with NYSHPO and HRPT, and the Project Sponsor will submit the final Bulkhead Protection Plan to NYSHPO and HRPT for concurrence no later than 120 days prior to any Project-related demolition, excavation, and/or construction at the Hudson River Bulkhead Impact Area. The requirements to consult with NYSHPO and HRPT and to develop and implement the Bulkhead Protection Plan are included as a stipulation of the PA for the Project.¹⁸

9.6.3.1.3 High Line

The Twelfth Avenue shaft, constructing staging area, fan plant, and West 30th Street construction area would be in close proximity to the High Line, a NHRP-Eligible resource on the north side of West 30th Street adjacent to the construction zone (see **Figure 9-14**). At West 30th Street, the tunnel alignment would continue from the Twelfth Avenue shaft beneath the street to the north side of West 30th Street, at which point the new tunnel would meet the right-of-way being preserved by Amtrak beneath the Western and Eastern Rail Yards. Amtrak is currently constructing this underground right-of-way preservation project, a separate project from the Hudson Tunnel Project that consists of a concrete casing beneath the Eastern and Western Rail Yards in Manhattan to preserve a railroad right-of-way for trains to reach PSNY. As described in the DEIS, the construction work for the Preferred Alternative in West 30th Street would employ cut-and-cover construction. Based on design refinements incorporated since completion of the DEIS, a second construction option for this portion of the tunnel alignment is also being proposed, which would largely be conducted using mining (SEM) techniques, combined with some cut-and-cover construction to relocate a large sewer that is located within West 30th Street. To avoid inadvertent adverse effects to the historic High Line structure because of the adjacent construction in West 30th Street and the other construction activities on the south side of West 30th Street (on Block 675) including associated construction vibration, the Project Sponsor would develop construction protection measures that would be set forth in a CPP to be developed in consultation with FRA and NYSHPO prior to Project demolition, excavation, and construction activities. The requirement for the preparation and implementation of the CPP is included as a stipulation of the executed PA for the Project as described below in Section 9.8.

9.6.3.1.4 Master Printers Building

The Master Printers Building at 406-416 Tenth Avenue is located across West 33rd Street, a 60-foot-wide street, from the building at 450 West 33rd Street (between Dyer and Tenth Avenues and West 31st and West 33rd Streets). The Preferred Alternative's Tenth Avenue fan plant would be constructed beneath and within 450 West 33rd Street to provide ventilation to the segment of the new tunnel east of the Twelfth Avenue fan plant. Depending on the final alignment of the Tenth Avenue fan plant, new horizontal slats (i.e., venting louvers) may be installed on a façade of 450

¹⁸ In addition, on March 24, 2017 Amtrak submitted information to NYSHPO and the HRPT regarding the need to perform a geotechnical boring within the Hudson River Bulkhead on the land side in Hudson River Park in support of preliminary engineering for the Project. On March 28, 2017 NYSHPO indicated that they had no objection to the boring.

West 33rd Street for intake and exhaust of air from the fan plant. In addition, 450 West 33rd Street would be underpinned to accommodate changes to the track layout beneath the building. In addition to these activities, the Preferred Alternative would also include cut-and-cover excavation beneath Tenth Avenue in this vicinity. To avoid inadvertent adverse effects and protect the Master Printers Building during construction of the Preferred Alternative including associated construction vibration, the Project Sponsor would develop construction protection measures that would be set forth in a CPP to be developed in consultation with FRA and NYSHPO, prior to Project demolition, excavation, and construction activities. The requirement for the preparation and implementation of the CPP is included as a stipulation of the executed PA for the Project as described in greater detail below in Section 9.8.

9.6.3.2 *ARCHAEOLOGICAL RESOURCES*

As discussed in Section 9.3, some portions of the APE for Direct Effects in New York have sensitivity for archaeological resources. Where construction activities for the Preferred Alternative would occur in the same location and depth as the identified sensitivity, this could result in adverse effects to archaeological resources, if they are present. The following components of the Preferred Alternative in New York would affect subsurface areas:

- New tunnel from the western face of the Hudson River Bulkhead to West 30th Street;
- Ground improvements at Hudson River Bulkhead, Hudson River Park, and Twelfth Avenue;
- Construction of ventilation shaft and fan plant on Block 675 Lot 1;
- Construction staging area on Block 675 Lot 1 and part of Lot 12;
- SEM construction and cut-and-cover excavation at West 30th Street;
- Cut-and-cover excavation at Tenth Avenue; and
- Underpinning of the building at 450 West 33rd Street.

The Project's potential effects on areas of archaeological sensitivity in New York are summarized in **Table 9-6** and described below.

9.6.3.2.1 *Tunnel from the Western Face of the Hudson River Bulkhead to Block 675*

The Preferred Alternative's tunnel from the bulkhead to Block 675 would impact the Hudson River Bulkhead and has the potential to impact subsurface piers, wharves, and fill-retaining devices, if they are present (see **Figure 9-25**). As discussed in the previous section, the Hudson River Bulkhead is NRHP-Eligible under Criterion A for its association with commerce and industry, under Criterion C for engineering, and Criterion D for its potential to yield data of archaeological significance. In addition, several previous archaeological surveys have concluded that the bulkhead has archaeological sensitivity. In addition to the bulkhead, the area of Hudson River Park and Route 9A along the tunnel alignment has the potential for historic piers, wharves, and fill-retaining devices. These resources are expected below the depth of modern disturbance associated with roadway construction and utilities. This Preferred Alternative component would affect areas of high archaeological sensitivity for historic-period resources.



**Table 9-6
Areas of Archaeological Sensitivity in
the APE for Direct Effects and Effects Assessment – New York**

Project Component ¹	Construction Impacts (depths)	Sensitivity/Resource ² (depths ³)	Potential Effects
New tunnel from the western face of the Hudson River Bulkhead to Block 675	Tunnel excavation (40-80 feet below ground surface)	High / Hudson River Bulkhead (~5-80 feet below ground surface)	Adverse effect
		Moderate / Historic piers, wharves, and fill-retaining devices (~5-80 feet below ground surface)	Adverse effect
Ground improvements at Hudson River Bulkhead	Excavation (0-40 feet below ground surface)	High / Hudson River Bulkhead (~5-80 feet below ground surface)	Adverse effect
Ground improvements at Hudson River Park	Excavation (0-40 feet below ground surface)	Moderate / Historic piers, wharves, and fill-retaining devices (~5-80 feet below ground surface)	Adverse effect
Ground improvements at Twelfth Avenue	Excavation (0-40 feet below ground surface)	Low sensitivity	No effect
Twelfth Avenue ventilation shaft and fan plant structure on Block 675, Lot 1	Excavation (0-40 feet below ground surface)	High / Industrial, manufacturing, and Moderate / domestic sites (0-20 feet below ground surface)	Adverse effect
		Moderate / Historic piers, wharves, and fill-retaining devices (~5-80 feet below ground surface)	Adverse effect
Construction staging area on Block 675 (Lot 1, Lot 12 partial)	Staging activities (0-5 feet below ground surface)	Lot 1: High / Industrial, manufacturing, and Moderate / domestic sites (0-20 feet below ground surface)	Adverse effect, dependent on depths of impacts
		Lot 12: Low / Industrial and manufacturing sites; No / domestic sites	No effect
SEM construction and cut-and-cover excavation at West 30th Street	Mining and excavation (0-40 feet below ground surface)	Moderate / Historic piers, wharves, and fill-retaining devices (~5-80 feet below ground surface)	Adverse effect
Cut-and-cover excavation at Tenth Avenue	Excavation (0-40 feet below ground surface)	No sensitivity	No effect
Underpinning at 450 West 33rd Street	Excavation (0-40 feet below ground surface)	No sensitivity	No effect
Notes:			
¹ See Figure 9-2 and Figure 9-25 . ² The APE for Direct Effects is sensitive for these resources but it is not known if they are present or not. ³ Depths of sensitivity are approximate.			
Sources: Phase 1A Archaeological Documentary Study, Hudson Tunnel Project, New York, NY, AKRF 2017. <i>Block 675 East Redevelopment Project, Block 675, Lot 12 (Part), New York, NY, Supplemental Archaeological Assessment.</i> Prepared by AKRF, Inc. for DD West 29th LLC and West 30th Street, LLC. November 2017.			

9.6.3.2.2 Ground Improvement at Hudson River Bulkhead, Hudson River Park, and Twelfth Avenue

Ground improvement, potentially through ground freezing, at the Hudson River Bulkhead and Hudson River Park have the potential to impact the Hudson River Bulkhead and historic piers, wharves, and fill-retaining devices (see **Figure 9-25**). These resources are expected below the depth of modern disturbance associated with roadway construction and utilities. This component of the Preferred Alternative would affect areas of high archaeological sensitivity for historic-period resources.

Ground improvements on Twelfth Avenue do not have the potential to impact archaeological resources due to the likelihood that all such possible resources were previously destroyed during construction of and improvements to Twelfth Avenue over the past several decades. This component of the Preferred Alternative would not affect areas of archaeological sensitivity.

9.6.3.2.3 Ventilation Shaft on Block 675

Construction of a new ventilation shaft in the APE for Direct Effects on Lot 1 of Block 675 has the potential to impact industrial and manufacturing sites, domestic sites, and historic piers, wharves, and landfill-retaining devices (see **Figure 9-25**). These resource types are expected below the depth of modern disturbance, utilities, or buried tanks. This component of the Preferred Alternative would affect areas of moderate archaeological sensitivity for historic-period resources.

9.6.3.2.4 Construction of New Fan Plant Structure on Block 675

Construction of a new fan plant in the APE for Direct Effects on Lot 1 of Block 675 has the potential to impact industrial and manufacturing sites, domestic sites, and historic piers, wharves, and landfill-retaining devices (see **Figure 9-25**). These resource types are expected below the depth of modern disturbance, utilities, or buried tanks. This Project component would affect areas of moderate archaeological sensitivity for historic-period resources.

9.6.3.2.5 Construction Staging Area on Block 675

Use of a portion of the APE for Direct Effects on Block 675, consisting of Lot 1, as a construction staging area has the potential to impact industrial and manufacturing sites, domestic sites, and historic piers, wharves, and landfill-retaining devices if construction activities have the potential to significantly compress or otherwise disturb the underlying soils (see **Figure 9-25**). These resource types are expected below the depth of modern disturbance, utilities, or buried tanks. This component of the Preferred Alternative would affect areas of moderate archaeological sensitivity for historic-period resources.

9.6.3.2.6 Construction at West 30th Street

The design described in the DEIS proposed to employ cut-and-cover construction for the tunnel segment between the Twelfth Avenue shaft and the north side of West 30th Street. Based on design refinements incorporated since completion of the DEIS, a second construction option for this portion of the tunnel alignment is also being proposed, which would largely be conducted using mining (SEM) techniques, combined with some cut-and-cover construction to relocate a large sewer that is located within West 30th Street. Either construction method has the potential to impact historic piers, wharves, and landfill-retaining devices that may be located beneath the surface of West 30th Street (see **Figure 9-25**). These resource types are expected below the depth of modern disturbance, utilities, or buried tanks. This component of the Preferred Alternative would affect areas of moderate archaeological sensitivity for historic-period resources.

9.6.3.2.7 Cut-and-Cover Excavation at Tenth Avenue

Cut-and-cover excavation at Tenth Avenue has no potential to impact archaeological resources as this area is not sensitive for the presence of archaeological resources due to previous disturbance and shallow bedrock. This component of the Preferred Alternative would not affect areas of archaeological sensitivity.

9.6.3.2.8 Underpinning at 450 West 33rd Street

Underpinning at 450 West 33rd Street has no potential to impact archaeological resources as this site is not sensitive for the presence of archaeological resources due to extensive previous disturbance and shallow bedrock. This component of the Preferred Alternative would not affect areas of archaeological sensitivity.



9.7 PERMANENT IMPACTS OF THE PREFERRED ALTERNATIVE

Permanent impacts include those that may permanently affect historic properties, either directly or indirectly. As discussed in the methodology, direct effects include direct, physical impacts to a resource, such as subsurface disturbance of buried resources, or demolition of, alteration, or damage to an architectural property. Indirect effects include changes to the context or setting of a resource, such as noise, vibration, and changes in visual character of an area.

The permanent impacts of the Preferred Alternative on historic architectural resources include the modifications discussed in Section 9.6 that would permanently affect contributing features of the Pennsylvania Railroad New York to Philadelphia Historic District, North River Tunnel, New York Improvements and Tunnel Extension of the Pennsylvania Railroad and the Hudson River Bulkhead. The discussion below focuses on potential permanent effects on any historic architectural resources beyond those discussed above under Section 9.6, "Construction Impacts of the Preferred Alternative." As described below, no additional impacts to archaeological resources would occur as a result of the Preferred Alternative's operation, beyond the impacts that would occur during construction, which are described in Section 9.6.

9.7.1 NEW JERSEY

9.7.1.1 HISTORIC ARCHITECTURAL RESOURCES

FRA determined, and NJHPO concurred in a letter dated March 6, 2017, that the Preferred Alternative in New Jersey would not result in any permanent adverse effects to historic architectural resources beyond those described above for the Pennsylvania Railroad New York to Philadelphia Historic District and North River Tunnel.

The Preferred Alternative would have no adverse effect on the New Jersey Midland Railway/NYSW Historic District. Although the Preferred Alternative's new surface tracks would cross the right-of-way in this district, the integrity of the district's setting has already been altered by modern development, and the Preferred Alternative would not affect those elements that contribute to the resource's significance, namely its engineering features and association with 19th century railroad development.

With respect to the Erie Railroad Main Line Historic District, the NEC is elevated where it crosses this historic district, and work in the vicinity of this historic district would be limited to minor alterations and upgrades to the existing NEC tracks. Though these changes may be visible from certain vantages, they would not affect the engineering elements of the historic district that contribute to its significance. In addition, the Erie Railroad Main Line Historic District's setting has historically been industrial in nature, and the Preferred Alternative would not substantially alter that setting. The Preferred Alternative would also have no adverse effect on Substation No. 3. Though the proposed new surface tracks would be visible from this historic architectural resource, the new railroad infrastructure would be compatible with the industrial character of the surrounding area and, therefore, would not adversely alter the setting of Substation No. 3.

The Preferred Alternative would have no effect on the Jersey City Water Works Historic District. This resource passes beneath the Project site within the APE, with no above-ground portions of the historic district extending into the APE. As such, there would be no visual or contextual effects on the historic district. In addition, the NEC is elevated where it crosses the historic district, and no ground disturbance would occur within or adjacent to the Jersey City Water Works Historic District.

The Preferred Alternative would not result in permanent effects on two NRHP-Eligible properties, the Charles X. Harris House and Studio and the residence at 320-324 Mountain Road. The

Hoboken fan plant would be visible from certain vantage points on the south side of the Charles X. Harris House and Studio and the residence at 320-324 Mountain Road, which are located atop the Palisades more than 150 feet higher than the fan plant site. However, this would not alter the characteristics that render these properties eligible for listing in the NRHP, namely association with a significant painter and sculptors, respectively. As the setting of these resources below the Palisades has always been industrial in nature, the Preferred Alternative would not constitute a visual or contextual intrusion to the setting of these resources.

The Hoboken fan plant would be approximately 65 feet high and located at the base of the eastern slope of the Palisades. From certain vantage points at the edge of the slope, the new structure would be visible. However, the fan plant would be located in a setting that includes industrial properties, including those to the south of the proposed fan plant location that are of a comparable height and character. Therefore, the proposed fan plant would not noticeably alter the existing environment such that it would adversely affect the setting or significant characteristics of any historic architectural resources in the APE.

9.7.1.2 ARCHAEOLOGICAL RESOURCES

Any potential archaeological resources that would be affected by the Preferred Alternative would be disturbed during the construction period only, as described above in Section 9.6. Once the Preferred Alternative is constructed, no further effects to archaeological resources would occur.

9.7.2 HUDSON RIVER

There would be no additional permanent effects to the North River Tunnel beyond those described above in Section 9.6. There would be no permanent effects to archaeological resources within the Hudson River as this portion of the Project is not sensitive for the presence of archaeological resources.

9.7.3 NEW YORK

9.7.3.1 HISTORIC ARCHITECTURAL RESOURCES

FRA determined, and NYSHPO concurred in a letter dated February 24, 2017, that the Preferred Alternative in New York would not result in any permanent adverse effects to historic architectural resources beyond those described above for the New York Improvements and Tunnel Extension of the Pennsylvania Railroad and the Hudson River Bulkhead.

With respect to the components of the Preferred Alternative that would be visible above grade, the Preferred Alternative's Twelfth Avenue fan plant could stand up to 150 feet above grade and would constitute a permanent visual component of the Project. This fan plant would not adversely affect the context or setting of nearby historic architectural resources. The Hudson Yards area north of West 30th Street and other locations in the APE are experiencing a wave of development of new tall and modern skyscraper buildings that is already dramatically changing the setting and context of the APE. Further, the historic architectural resources in the APE today exist in a built context of smaller, older masonry clad buildings and taller buildings of recent construction with metal and glass curtain walls.

The portion of the High Line located within the APE will be adjacent to a multi-building, high-rise development being created above the Western Rail Yard. The Preferred Alternative's fan plant, located on the western portion of the block between West 29th and 30th Streets near Twelfth Avenue (Block 675), would be in keeping with the heights and bulk of recently constructed buildings in the APE, as well as the historic Starrett-Lehigh Building occupying the block between West 27th and West 26th Streets, Twelfth Avenue/Route 9A, and Eleventh Avenue. In addition, the historic buildings in the APE, including the Master Printers Building at 406-416 Tenth Avenue,



the former W & J Sloane Warehouse and Garage at 541-561 West 29th Street/306-310 Eleventh Avenue, the Starrett-Lehigh Building, and buildings in the West Chelsea Historic District are located at a distance from the proposed fan plant such that there are intervening existing buildings between them and the proposed fan plant, and their setting would not be adversely affected by this permanent visual element.

Another component of the Preferred Alternative that would be visible above grade and would constitute a permanent visual component is the potential addition of venting louvers to 450 West 33rd Street. If new venting louvers are added on one of the façades of 450 West 33rd Street, this would constitute a minimal visual change to a building that currently has existing Amtrak venting louvers fronting on Tenth Avenue and was recently reclad in glass panels. It would therefore not adversely affect the setting of the Master Printers Building at 406-416 Tenth Avenue across West 33rd Street from 450 West 33rd Street.

9.7.3.2 ARCHAEOLOGICAL RESOURCES

Any potential archaeological resources that would be affected by the Preferred Alternative would be disturbed during the construction period only, as described above under Section 9.6, "Construction Impacts of Preferred Alternative." Once the Project is constructed, no further effects to archaeological resources would occur.

9.8 MEASURES TO AVOID, MINIMIZE, AND MITIGATE IMPACTS

Detailed measures to avoid, minimize, and/or mitigate adverse effects have been agreed upon through consultation between FRA, NJHPO, NYSHPO, and other signatories and concurring parties to the PA as part of the Section 106 process. These measures are set forth in the PA that FRA developed in consultation with: NJHPO, NYSHPO, and ACHP; parties invited by FRA to participate in the PA and that have accepted—FTA, the PANYNJ, and Amtrak; and concurring parties. Below is a summary of the proposed treatment and preventative measures that are included in the PA. The executed PA is included in **Appendix 9** of the EIS. It will be the lead Federal agency's responsibility to ensure the Project Sponsor carries out the specified activities as they are described in the PA.

9.8.1 HISTORIC ARCHITECTURAL RESOURCES

The Preferred Alternative would result in an adverse effect on the following resources: Pennsylvania Railroad New York to Philadelphia Historic District in New Jersey; the North River Tunnel in New Jersey; the New York Improvements and Tunnel Extension of the Pennsylvania Railroad in New York; and the Hudson River Bulkhead in New York. Mitigation for these adverse effects is included in the PA and includes the following:

- **Adverse effect on the Pennsylvania Railroad New York to Philadelphia Historic District, North River Tunnel, and New York Improvements and Tunnel Extension of the Pennsylvania Railroad:** The Project Sponsor will document the affected portion of the North River Tunnel between PSNY and North Bergen, New Jersey portals to the standards of the Historic American Engineering Record Level II. Additional mitigation includes: a published history of the North River Tunnel documenting this first rail crossing between New York and New Jersey set in context with the history of Hudson River crossings between the two states to supplement existing histories and/or to target a specific audience; and interpretive displays which could focus on the technological innovations of the North River Tunnel such as the bench walls that made tunnels safer for rail travel, to be located at a station along the NEC in New Jersey and possibly at the new Moynihan Station in New York. The requirement for the

development of an Educational and Interpretive Materials Plan and its implementation is included as a stipulation of the PA.

- **Adverse effect on the Hudson River Bulkhead:** As stipulated in the PA, the following mitigation measures will be implemented for the adverse effect on the Hudson River Bulkhead:
 - The Project Sponsor, in coordination with FRA, will compile the information gathered and drawings made in preparation for, and during the construction at, the Hudson River Bulkhead structure into a report documenting the characteristics of the affected bulkhead location. This information will augment information about the bulkhead as previously documented in the 1997 Building-Structure Inventory Form on file with NYSHPO.
 - The Project Sponsor, in coordination with FRA, will provide for the interpretation of the Hudson River Bulkhead within Hudson River Park, with the type, design, and location of the interpretation to be designed in consultation with NYSHPO and HRPT.
 - To avoid damaging the structural integrity of the Hudson River Bulkhead structure during construction of the Hudson River Tunnel tubes through the bulkhead and ensure that the Project does not negatively impact the long-term integrity of the bulkhead, the following measures will be implemented:
 - Amtrak, in coordination with the Project Sponsor, will enter into an agreement with HRPT separate from the PA that defines the geographic area within Hudson River Park above or adjacent to the Hudson River Bulkhead that may be affected by the Preferred Alternative (the “Hudson River Bulkhead Impact Area”) and sets forth the measures to be implemented by Amtrak for the long-term maintenance of the bulkhead and Hudson River Bulkhead Impact Area.
 - Amtrak, in coordination with the Project Sponsor and FRA, will provide a Design Technical Memorandum to HRPT for review that describes the proposed bulkhead construction techniques and proposed measures to monitor and protect the bulkhead (inclusive of information that will be incorporated into construction contract bid documents).
 - Amtrak, in coordination with the Project Sponsor and FRA and in consultation with NYSHPO and HRPT, will develop a Bulkhead Protection Plan that will set forth the specific requirements to protect the bulkhead and Hudson River Bulkhead Impact Area during the Project construction period, including:
 - How the Project Sponsor will ensure that the Project contractor includes professionals that have experience with complex bulkhead structures such as the Hudson River Bulkhead;
 - Information about a monitoring program to be implemented during Project-related demolition, excavation, and/or construction activities; the structural monitoring measures to be implemented; the thresholds at which specific actions will occur to protect the bulkhead during construction; and the actions that will occur if thresholds are exceeded;
 - Information regarding the design documents that will be provided by the Project Sponsor to HRPT pertaining to the tunnel excavation through the bulkhead and bulkhead protection, including schedule for submission of such documents;
 - Definition of a post-construction period during which monitoring will continue, and which may be extended if an issue arises; and
 - Details regarding when and how repairs will be made if damage occurs during the Project.
 - The Project Sponsor, in coordination with Amtrak and FRA, will provide an initial draft of the Bulkhead Protection Plan to NYSHPO and HRPT for a 45-day review period. The

Project Sponsor, in coordination with Amtrak and FRA, will consider written comments received within the 45-day review period when finalizing the Bulkhead Protection Plan. The Project Sponsor will submit the final Bulkhead Protection Plan to NYSHPO and HRPT for concurrence no later than 120 days prior to Project construction in the location of the Hudson River Bulkhead.

- The Project Sponsor, in coordination with FRA, will ensure that the provisions of the Bulkhead Protection Plan developed in consultation with and approved by NYSHPO and HRPT are implemented by the Project contractors.
- **To avoid inadvertent construction-related damage on Substation No. 3 and the Bergen Portal of the North River Tunnel in New Jersey and the High Line and the Master Printers Building in New York:** As stipulated in the PA, CPPs will be developed for these four historic properties located in proximity to Project construction prior to any Project demolition, excavation, and construction activities. The CPPs will include provisions for pre- and post-construction inspections, vibration monitoring, adherence to vibration limit thresholds, measures to reduce vibration levels, and modification of construction methods if necessary. In addition, the CPPs will also include a provision for the installation of protective construction barricades where appropriate.

9.8.2 ARCHAEOLOGICAL RESOURCES

Several components of the Project have the potential to adversely affect areas of archaeological sensitivity in New Jersey and New York (see **Figure 9-13** and **Figure 9-25**). While the two Phase 1A Studies identified areas of archaeological sensitivity, additional investigation is necessary to determine the actual presence or absence of archaeological resources, to determine their NRHP eligibility, and to mitigate any unavoidable impacts to archaeological resources if any such resources are present. Archaeological monitoring during construction or testing in advance of construction will be provided in compliance with Section 106 of NHPA to determine the effects of the Preferred Alternative on archaeological resources and will be refined as the Project design process progresses.

Any archaeological monitoring or testing will be planned in consultation with NYSHPO or NJHPO and be conducted in accordance with applicable state and Federal laws and guidance. Measures to avoid, minimize, and mitigate adverse effects are included in the PA and have been agreed upon through consultation among FRA, NYSHPO, NJHPO, the other signatories, and concurring parties before execution of the PA.

9.8.2.1 NEW JERSEY

FRA, through further consultation with NJHPO, determined that due to the lack of prudent or feasible archaeological survey methods for machine-driven (e.g. pile driving) construction methods, the Preferred Alternative's construction activities for the surface tracks would not result in an adverse effect on a deeply buried area of moderate prehistoric sensitivity in the Meadowlands.

- Construction in and near the Hoboken ventilation shaft would result in an adverse effect on the historic seawall, if present. Proposed mitigation for the adverse effects on the historic sea wall is included in the PA, and includes Phase 1B field testing and/or archaeological monitoring to determine the presence or absence of this potential archaeological resource, depending on construction methods. If present, additional fieldwork may be necessary to determine its NRHP eligibility. If determined NRHP-Eligible, the Project Sponsor, in consultation with the lead Federal agency, NJHPO, and Consulting Tribes as appropriate, will identify methods to mitigate the unavoidable adverse effects of the Project on the sea wall.

- As stipulated in the PA, the Project Sponsor, in consultation with FRA, NJHPO, NYSHPO, Consulting Tribes, signatories, and concurring parties, will prepare an Archaeological Testing Plan for those areas of archaeological sensitivity that can be tested in advance of construction and/or an Archaeological Monitoring Plan for those areas that would be archaeologically monitored during construction. The decision of whether to test in advance of construction or to monitor during construction would be made in consultation among the lead Federal agency, NJHPO, NYSHPO, and the Project Sponsor and will be based on consideration of the relative costs and benefits of each approach; anticipated construction methods; logistical, site access, and scheduling factors; and in consideration of the views of Consulting Tribes.
- The PA describes the steps to be taken if archaeological resources are identified during testing or monitoring, including what parties will be notified, how resources will be evaluated, what documentation will be prepared, how methods to mitigate adverse effects of the Project will be developed, and curation and reporting for records and artifacts.
- The PA also describes how an Unanticipated Discoveries Plan will be developed for use in the event any previously unidentified historic architectural or archaeological resource is discovered during construction.

9.8.2.2 NEW YORK

The Preferred Alternative would result in an adverse effect on the Hudson River Bulkhead and the following resources, if present: historic piers, wharves, and fill-retaining devices; industrial and manufacturing resources; and domestic resources. Proposed mitigation for these adverse effects is included in the PA and includes the following:

- **Adverse effect on Hudson River Bulkhead:** The Project Sponsor, in coordination with FRA, will compile the information gathered and drawings made in preparation for, and during the construction at, the bulkhead structure into a report documenting the characteristics of the affected bulkhead location. This information will augment information about the bulkhead as previously documented in the 1997 Building-Structure Inventory Form on file with NYSHPO. The Project Sponsor, in coordination with FRA, will provide for the interpretation of the Hudson River Bulkhead within Hudson River Park, with the type, design, and location of the interpretation to be designed in consultation with NYSHPO and HRPT. In addition, as described above in Section 9.7.1 a stipulation that protection measures be developed and implemented for the bulkhead as a result of the construction of the Hudson River Tunnel tubes through the bulkhead is also included in the PA.
- **Historic piers, wharves, and fill-retaining devices:** Phase 1B field testing and/or archaeological monitoring will be conducted to determine the presence or absence of these potential archaeological resources. If present, additional fieldwork may be necessary to determine their NRHP eligibility.
- **Industrial and manufacturing resources:** Phase 1B field testing and/or archaeological monitoring will be conducted to determine the presence or absence of these potential archaeological resources. If present, additional fieldwork may be necessary to determine their NRHP eligibility.
- **Domestic Resources:** Phase 1B Field testing and/or archaeological monitoring will be conducted to determine the presence or absence of these potential archaeological resources. If present, additional fieldwork may be necessary to determine NRHP eligibility.

As stipulated in the PA, the Project Sponsor, in consultation with FRA, NJHPO, NYSHPO, Consulting Tribes, signatories, and concurring parties, will prepare an Archaeological Testing Plan for those areas of archaeological sensitivity that can be tested in advance of construction and/or an Archaeological Monitoring Plan for those areas that would be archaeologically monitored during construction. The Archaeological Testing Plan and/or Archaeological Monitoring Plan will also



include a more detailed analysis of the development of the impacted area to aid in the identification of applicable research questions and sampling strategies. The decision of whether to test in advance of construction or to monitor during construction will be made in consultation among the lead Federal agency, NJHPO, NYSHPO, and the Project Sponsor and will be based on consideration of the relative costs and benefits of each approach; anticipated construction methods; logistical, site access, and scheduling factors; and in consideration of the views of Consulting Tribes. If NRHP-Eligible archaeological properties are identified in the APE, the Project Sponsor, in consultation with the lead Federal agency, NJHPO, and NYSHPO, and Consulting Tribes as appropriate will identify methods to mitigate the unavoidable adverse effects of the Project on such properties. *