New Jersey Turnpike Authority
Newark Bay–Hudson County Extension
Interchange 14 to Interchange 14A / Newark Bay Bridge and Associated Improvements

NEW JERSEY EXECUTIVE ORDER 215 ENVIRONMENTAL IMPACT STATEMENT

Submitted to:

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION

Submitted by:

New Jersey Turnpike Authority

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GLOSSARY/ACRONYMS

ACS	American Community Survey
AMSL	above mean sea level
APE	Area of Potential Effects
APE-Archaeology	APE for Archaeology
APE-Architecture	APE for Historic Architecture
ATR	Automated Traffic Recorder
Authority	New Jersey Turnpike Authority
AVE	Area of Visual Effect
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
CAA	Clean Air Act
CEA	Classification Exception Area
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalent
Conrail	Consolidated Rail Corporation
CWA	Clean Water Act
CY	calendar year
CZMA	Coastal Zone Management Act
dB	decibel
dBA	A-weighted decibel
DPS	Distinct Population Segment
EDR	Environmental Data Resources, Inc.
EFH	Essential Fish Habitat
EIS	Environmental Impact Statement
ENSP	Endangered and Nongame Species Program
E.O.	Executive Order

EO 215	State of New Jersey Executive Order No. 215
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
EWR	Newark Liberty International Airport
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FHA	Flood Hazard Area
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FTA	Federal Transit Administration
FWPA	Freshwater Wetlands Protection Act
FY	fiscal year
GHG	greenhouse gas
HAP	hazardous air pollutant
HAPC	Habitat Area of Particular Concern
HPO	Historic Preservation Office
HUC	hydrologic unit code
HW	height to width
IPaC	Information for Planning and Consultation
IRM	Interim Remedial Measure
JD	jurisdictional determination
kW	kilowatt
LCP	Linear Construction Project
LNAPL	light non-aqueous phase liquid
LOI	Letter of Interpretation
LOS	level-of-service
LSRP	Licensed Site Remediation Professional
MHWL	mean high water line
MPO	Metropolitan Planning Organization
MSAT	mobile source air toxic
MOVES3	MOtor Vehicle Emission Simulator
NAAQS	National Ambient Air Quality Standards

NAC	Noise Abatement Criteria
NBB	Newark Bay Bridge
NB-HCE	Newark Bay-Hudson County Extension
NCHRP	National Cooperative Highway Research Program
NEH	no-exceed height
NEPA	National Environmental Policy Act of 1969, as amended
NFHL	National Flood Hazard Layer
NHP	National Historic Preservation Act of 1966
NHS	National Highway System
NJ	New Jersey
N.J.A.C.	New Jersey Administrative Code
NJDEP	New Jersey Department of Environmental Protection
NJDOT	New Jersey Department of Transportation
NJHPO	New Jersey Historic Preservation Office
NJRTM-E	North Jersey Regional Travel Model Enhanced
N.J.S.A	New Jersey Statutes Annotated
NJSM	New Jersey State Museum
NJTPA	North Jersey Transportation Planning Authority
NMFS	National Marine Fisheries Service
NPL	National Priority List
NOAA	National Oceanic and Atmospheric Administration
NOx	oxides of nitrogen
NO_2	nitrogen dioxide
N_2O	nitrous oxide
NRHP	National Register of Historic Places
O_3	ozone
OPPN	Office of Permitting and Project Navigation
OPRA	Open Public Records Act
PAH	polycyclic aromatic hydrocarbon
PAMT	Port Authority Marine Terminal
PANYNJ	Port Authority of New York and New Jersey
Pb	lead

PCB	polychlorinated biphenyl
PM_{10}	particulate matter with an aerodynamic diameter smaller than or equal to 10 micrometers
$PM_{2.5}$	particulate matter with an aerodynamic diameter smaller than or equal to 2.5 micrometers
POM	polycyclic organic matter
ppt	parts per thousand
ROSI	Recreation and Open Space Inventory
SESC	soil erosion and sediment control
sf	square feet
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
SRHP	New Jersey Register of Historic Places
SRP	Site Remediation Program
SSHASP	site-specific health and safety plan
STRAHNET	Strategic Highway Network
SVOC	semi-volatile organic compound
TIC	Tentatively Identified Compound
TIP	Transportation Improvement Plan
TNM2.5	FHWA Traffic Noise Model Version 2.5
TOY	time of year
TSS	total suspended solids
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USCG	U.S. Coast Guard
USDA-NRCS	U.S. Department of Agriculture Natural Resources Conservation Service
USFWS	U.S. Fish and Wildlife Service
UST	underground storage tank
VIA	Visual Impact Assessment
VOC	volatile organic compound
WMA	Wildlife Management Area

EXECUTIVE SUMMARY

Introduction

The New Jersey Turnpike Authority (Authority), as the project sponsor, proposes a modernization of the Newark Bay-Hudson County Extension (NB-HCE) between Interchange 14 in Newark, Essex County, and Interchange 14A in Bayonne and Jersey City, Hudson County, to meet current and future needs of patrons of the NB-HCE, current design standards, and the Authority's operational and maintenance needs (the Proposed Project). A major element of the Proposed Project is the replacement of Newark Bay Bridge (NBB), officially, the Vincent R. Casciano Memorial Bridge, which comprises nearly half of the total length of the NB-HCE between Interchanges 14 and 14A.

The Authority was established by the Turnpike Authority Act (N.J.S.A 27:23-1 et seq.), which was enacted by the State Legislature in October 1948 with the purpose "to construct, maintain, repair and operate a modern express highway in New Jersey." The Authority has prepared this Environmental Impact Statement (EIS) under New Jersey Executive Order 215 of 1989 (EO 215). EO 215 requires state departments, agencies, and authorities to submit an environmental assessment or EIS to the New Jersey Department of Environmental Protection (NJDEP) to document the environmental effects of major construction projects. Projects with construction costs in excess of $5 million and land disturbance in excess of five acres, which includes the Proposed Project, are categorized as Level 2 projects and are subject to the preparation of an EIS.

Consistent with the requirements of EO 215, this EIS provides the information needed to evaluate the effects of the Proposed Project upon the environment using a systematic interdisciplinary approach. This EIS identifies measures to be taken as part of the Proposed Project to mitigate adverse environmental impacts. Based on the analyses documented in this EIS, there are no impacts of the Proposed Project which cannot be reduced to acceptable levels.

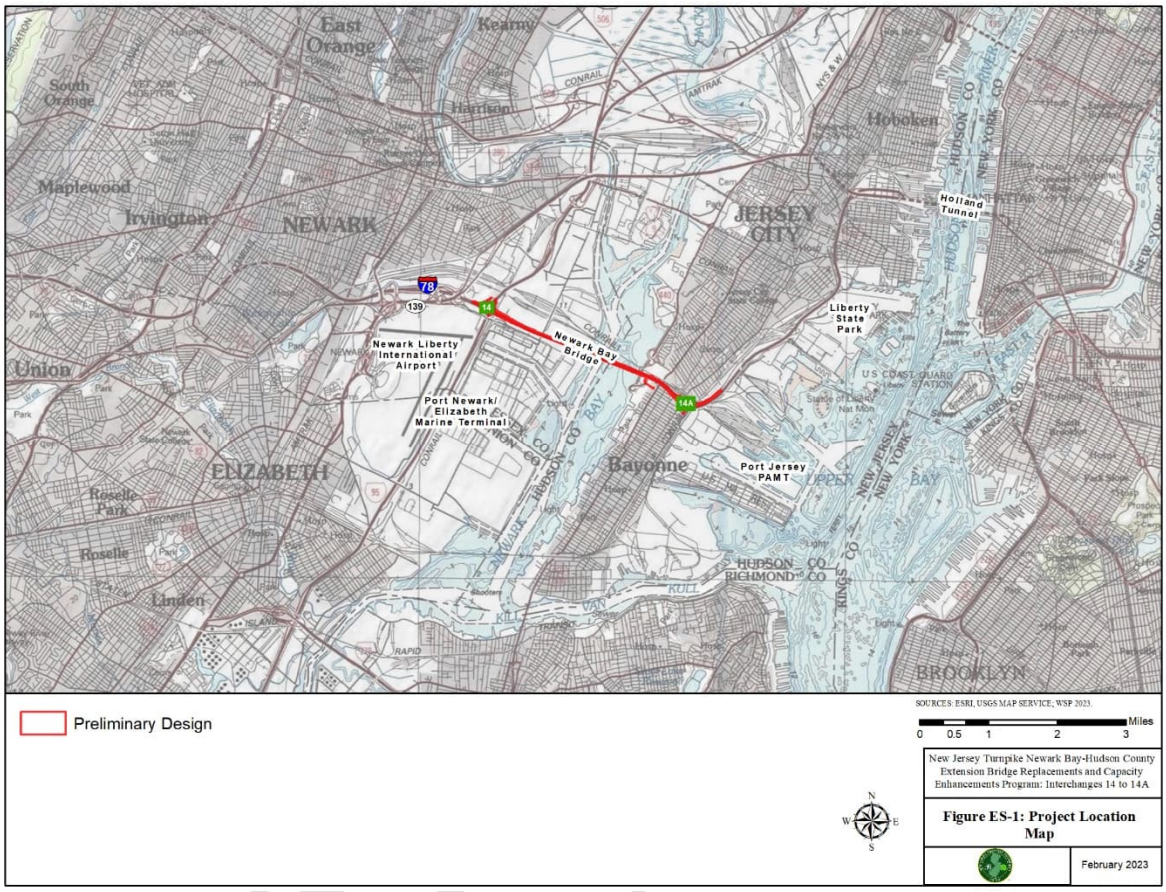
A National Environmental Policy Act (NEPA) Environmental Assessment was also prepared for United States Coast Guard (USCG) review in support of USCG decision-making on a bridge permit application for replacement of the NBB.

Background

The NB-HCE consists of two travel lanes in each direction from Interchange 14 in Newark (milepost N0.0) to its eastern terminus at Jersey Avenue in Jersey City, Hudson County (milepost N8.1) (see Figure ES-1). The NB-HCE forms a portion of Interstate Route 78 (I-78) which has its western terminus at I-81 northeast of Harrisburg, Pennsylvania, and its eastern terminus at the New York portal of the Holland Tunnel in Lower Manhattan. At the Jersey Avenue NB-HCE terminus, I-78 merges with New Jersey (NJ) Route 139 to form the Port Authority of New York and New Jersey's approach roadways to and from the Holland Tunnel under the Hudson River connecting Hudson County and New York County in New York.

The NB-HCE provides access between Newark in Essex County, at the Turnpike's Mainline (I-95), and I-78 west at Turnpike Interchange 14 and Bayonne and Jersey City in Hudson County. The NB-HCE serves facilities of national, regional, statewide, and local importance, including Newark Liberty International Airport (EWR) and Port Newark-Elizabeth Marine Terminal (Interchange 14), the Port Jersey Port Authority Marine Terminal (Port Jersey PAMT) (Interchange 14A, milepost N3.5), Liberty State Park and Statue of Liberty National Monument (Interchange 14B, milepost N5.5), Liberty Science Center and Hudson-Bergen Light Rail Park-Ride (Interchange 14C, milepost N5.9), and New York City via the Holland Tunnel (at Jersey Avenue). The Port of New York and New Jersey, of which the Port Newark-Elizabeth and Port Jersey PAMT are major components, is the second largest port in the United States based on cargo volume, and EWR is the nation's fifteenth busiest airport by passenger volume.

Figure ES-1. Project Location Map



Purpose & Need for the Proposed Project

The purpose of the Proposed Project is as follows:

- Improve the long-term integrity of the structures on the NB-HCE between Interchanges 14 and 14A to maintain the structures in a state of good repair over a minimum 100-year service life to a goal of a 150-year service life by resolving the factors contributing to the deterioration of the structures and in so doing minimizing the frequency of disruptions to the roadway's users from maintenance and repair of the structures over the life cycle of the improvements.
- Improve mobility between Interchanges 14 and 14A by attaining level-of-service (LOS) D or better traffic flow quality and in so doing enhance access to communities, businesses, and multimodal facilities served by the NB-HCE near the interchanges, while safely and efficiently accommodating growing vehicular demand on this portion of the NB-HCE into the foreseeable future.

These purposes are consistent with the goals of the Authority's Strategic Plan.

Traffic growth and substantial port-related heavy vehicle/truck activity have degraded operating conditions in the corridor and have contributed to the current poor physical conditions of the NB-HCE's roadway pavement and bridges, leading to development of a Proposed Project that addresses the associated state of good repair and mobility needs, while addressing substandard roadway and structural features. The North Jersey Transportation Planning Authority (NJTPA) Long-Range Plan addresses multiple projects for mass

transportation and roadway improvements.[1] The Proposed Project is necessary even with all of these other planned and programmed investments in mass transportation to handle projected increases in vehicular trips (including those originating and destined for Jersey City) and other freight-based trips associated with regional port activity.

Alternatives Including the Proposed Project

Section 2 of this EIS describes the Proposed Project, the No Action Alternative, and other alternatives to the Proposed Project considered but screened out from further environmental review. Section 2 documents the reasons why the No Action and other alternatives considered were not acceptable as the proposed action.

The Proposed Project will:

- Replace all existing structures, including the NBB with two parallel spans, to address underlying structural integrity issues.
- Increase the number of travel lanes in each direction from two to four to address the underlying need to provide travel lane capacity sufficient to carry existing and future traffic volumes with uncongested traffic flow.
- Provide adequately wide roadway left shoulder area to provide for safety, future maintenance, and emergency vehicles.
- Modify and improve ramp merges with the NB-HCE roadway and the sequencing of consecutive merges and lane drops to address the underlying issue of current substandard design.

Under the No Action Alternative, the Proposed Project described above would not be constructed. The Authority would continue to make state-of-good-repair improvements to the NB-HCE structures but would not add capacity or safety improvements. The No Action Alternative is, however, the baseline against which the environmental consequences of the Proposed Project are compared.

Nine discrete alternatives were considered and evaluated, including the Proposed Project and No Action alternatives. Of the nine alternatives considered other than the No Action, four alternatives involved replacement of the NBB, and four alternatives involved rehabilitation of the NBB. Each alternative was evaluated for its ability to meet the criteria of the stated purpose and underlying needs for the project in an initial round of evaluation. Five alternatives were eliminated in the first-round evaluation: the four rehabilitation alternatives and the alternative that involved replacing the NBB and widening the NB-HCE between Interchanges 14 and 14A to three travel lanes instead of four travel lanes as under the Proposed Project. The rehabilitation alternatives were eliminated primarily because none could meet the stated purpose to improve the long-term integrity of the structures on the NB-HCE between Interchanges 14 and 14A to maintain the structures in a state of good repair generally over a 150-year life cycle by resolving the factors contributing to the deterioration of the structures, and in so doing minimize the frequency of disruptions to the roadway's users from future maintenance and repair of the structures over the life cycle of the improvements. The three-lane in each direction widening alternative was eliminated because it would not provide for the traffic flow demand to at least 2050.

The Proposed Project and the other two NBB replacement alternatives were further evaluated and compared using four key performance measures for the project. The Proposed Project meets all the key performance measures while the other two NBB replacement alternatives do not. Alternative 3 (realigning the NB-HCE so that a parallel bridge would be constructed to the south of the existing NBB before replacing the NBB) was eliminated from further consideration because it would require displacement of multiple businesses, would

[1] https://www.njtpa.org/Planning/Plans-Guidance/Plan-2050.aspx

impact two assets of major energy supply infrastructure, and would penetrate the regulated airspace of EWR. Alternative 4 (replacing the NBB with structures having a shorter main span over Newark Bay) was eliminated from further consideration because the alternative would alter and occupy the Newark Bay Main Channel North Reach Federal Navigation Channel, a civil works project authorized by the U.S. Congress and maintained by the U.S. Army Corps of Engineers (USACE) for navigation operation and safety.

Two alternatives, the Proposed Project and the No Action Alternative, are, therefore, retained for further evaluation and comparison in this EIS.[2]

Affected Environment and Environmental Consequences

Section 3 of the EIS describes the human environment and natural resources that would be affected by the Proposed Project. The description of the environment prior to implementation of the Proposed Project provides the baseline for comparing the probable environmental impacts of the Proposed Project, if implemented, with those of the No Action Alternative.

Land Use

The western end of the NB-HCE between Interchanges 14 and 14A extends through a heavily developed portion of Northern New Jersey characterized by major port intermodal and other transportation infrastructure, including receiving and shipping terminals, warehouses, railroad facilities, highways, access roads anchored by the Port Newark-Elizabeth Marine Terminal on Newark Bay immediately south of the NBB and EWR at Interchange 14, and the Port Jersey Port Authority Marine Terminal on Upper New York Bay immediately east of Interchange 14A. The residential and business districts of Newark lie to the west of Interchange 14. Crossing Newark Bay into Bayonne, the NB-HCE passes through a less densely developed southern end of the New Jersey Palisades, locally Bergen Hill, with waterfront parks and highways, a scattering of late nineteenth- and early twentieth-century residential and commercial development, and extensive highway interchanges, connector roads, and railroads along the boundary of Bayonne and Jersey City.

City of Newark

The Proposed Project is estimated to result in the following property impacts from right-of-way in Newark: aerial easements on 16 tax lots and partial fee acquisitions of five tax lots. Of the aerial easements, 10 are on railroad-owned (Conrail) tax lots, five are on commercially owned tax lots (four individual businesses), and one is on a vacant City-owned tax lot. Of the partial fee acquisitions, one is on a railroad-owned tax lot, two are on commercially owned lots (two individual businesses), and one is on the vacant City-owned tax lot. While the railroad and commercial properties have rail track, buildings, and other improvements, none of the easements or partial acquisitions are expected to impact business operations, buildings, or access.

With respect to the potential for the Proposed Project to cause indirect effects on land use, the underlying factors that shape land uses in the Newark portion of the study area, specifically, the continued operations of EWR, the Port Newark-Elizabeth Marine Terminal, the City's access to the regional highway and rail systems, zoning, and real estate market conditions would not be affected by the Proposed Project as the access and connections afforded by the NB-HCE through its interchanges have been in place since the mid-1950s.

[2] As noted in Section 2.3 of this EIS, the No Action Alternative is not considered feasible as: (1) the integrity of structures, which comprise 80 percent of the NB-HCE between Interchanges 14 and 14A, would continue to deteriorate from traffic load and the elements to the point where the structural sufficiency of the structures, including the NBB, could not be maintained even with extensive repairs and maintenance; (2) traffic flow would continue to deteriorate from already congested conditions, and from disruptions due to increasingly frequent repair and maintenance activities, and access to Bayonne, Jersey City's Greenville neighborhood, and Port Jersey PAMT would be increasingly impeded by traffic delays on the NB-HCE; and (3) roadway operations and drainage, vehicle maneuverability, and emergency response would be compromised by inadequate left shoulder areas, inadequate ramp merge areas, and other roadway geometric deficiencies that would not be corrected.

Cumulatively, the Proposed Project combined with the other actions in the study area that have, are, or will affect land use will not substantially change land use.

City of Bayonne

The Proposed Project is estimated to result in the following property impacts from right-of-way in Bayonne: three aerial easements on State-owned (New Jersey Department of Transportation) tax lots (associated with NJ Route 440), one partial fee acquisition of a City-owned tax lot (associated with West 58th Street), and full acquisition of four tax lots. Neither the aerial easements nor the partial fee acquisition, both of which are on portions of roadway right-of-way, are expected to have substantial impact on the use of the right-of-way or transportation operations. The Proposed Project will not encroach on paved portions of State-owned land (NJ Route 440 right-of-way). The portion of West 58th Street near Avenue B, while not relocated, will be permanently narrowed by the Proposed Project. The existing single one-way travel lane will be maintained. However, parking on both sides of the street for approximately 100 feet on each side of the roadway, or approximately 12 on-street parking spaces in total, will be eliminated. Reconnaissance of the affected area indicates that the capacity of on-street parking exceeds the demand for on-street parking, likely because many residential units in the area have off-street parking. Consequently, the elimination of the on-street parking will have a minor adverse effect on this land use.

One full property acquisition, consisting of four tax lots, would be of the former Marist High School property. The proposed use of this property is for a stormwater basin constructed for treating runoff to comply with New Jersey Department of Environmental Protection (NJDEP) stormwater management regulations from the NB-HCE, and for contractor lay down areas and future maintenance needs. This acquisition would not result in displacement or relocation as there is presently no active use of the property. However, the Proposed Project would eliminate the potential for redeveloping this property into residential or commercial uses per the redevelopment plan or any other use as the entire property consisting of three tax lots would be acquired under the Proposed Project.

With respect to the potential for the Proposed Project to cause indirect effects on land use, the underlying factors that shape land uses in the Bayonne portion of the study area (i.e., the redevelopment of the former Military Ocean Terminal and nearby properties), transit-oriented development near the Hudson-Bergen Light Rail Transit stations, the City's access to the regional rail and highway systems, zoning, and real estate market conditions would not be affected by the Proposed Project as the access and connections afforded by the NB-HCE through its interchanges have been in place since the mid-1950s. Cumulatively, the Proposed Project combined with the other actions in the study area that have, are, or will affect land use will not substantially change land use.

City of Jersey City

The Proposed Project is estimated to result in aerial easements on 10 tax lots and partial fee acquisitions of four tax lots. Of the aerial easements, eight are over railroad-owned (Conrail) tax lots, one is over railroad tracks owned by Jersey City Redevelopment Agency, and one is in NJDOT's Route 440 right-of-way. Of the partial fee acquisitions, one is over a vacant portion of a commercially owned lot, one is on a PANYNJ lot within the Route 440 interchange with Route 185, and two are on slivers of vacant City-owned tax lots adjoining the NB-HCE.

With respect to the potential for the Proposed Project to cause indirect effects on land use, the underlying factors that shape land uses in the Jersey City portion of the study area (i.e., the port growth and redevelopment of nearby properties for port-oriented uses), transit-oriented development near the Hudson-Bergen Light Rail Transit stations, the City's access to the regional rail and highway systems, zoning and other land use policies, and real estate market conditions would not be affected by the Proposed Project as the access and connections afforded by the NB-HCE through its interchanges has been in place since the mid-1950s. Indeed, the Proposed Project supports Jersey City Master Plan's element supporting continued use of "port-related uses where located close to highway access and with limited impacts on residential areas." Cumulatively, the Proposed Project

combined with the other actions in the study area that have, are, or will affect land use will not substantially change land use.

Conclusion

The Proposed Project will have no significant impact on land use, zoning, or public policy. The Proposed Project includes such measures as compensation of property owners for the aerial easements, partial acquisitions, and the full acquisition required to implement the Proposed Project based on property appraisals and negotiations regarding compensation with the property owners, and the design and construction on the property in the case of aerial easements and partial acquisitions. The full acquisition of the former Marist High School property would represent a foregone opportunity for economic development (and property tax revenues) within the City of Bayonne. The assessed value of the land is less than one-half of one percent of the total assessed value of all properties in Bayonne. Thus, the foregone tax revenues would not have a significant fiscal effect on the City of Bayonne. In addition to coordination with owners of the affected properties, the Authority will continue to coordinate with the municipalities, counties, and State on measures to manage temporary impacts on land uses during construction and avoid or minimize long-term effects on land use following construction. With incorporation of these measures, no mitigation is necessary.

Socioeconomics and Environmental Justice

Social and Economic Factors – The Proposed Project will not affect the community character of the study area as it will not affect those factors influencing community character: land use plans and planned investments in open space, the Morris Canal Greenway, and transit-oriented development around Hudson-Bergen Light Rail Stations, among other changes to the physical environment. It is anticipated that the Proposed Project will not affect community cohesion in the study area as the Proposed Project involves widening and improving a highway and NBB that have been in place for nearly 75 years under which existing travel corridors crossed by the NB-HCE will be retained. The Proposed Project will not affect potential future investments along major north-south corridors that are expected to enhance community cohesion, such as increased neighborhood retail development identified in the Jersey City Master Plan along JFK Boulevard and Garfield Avenue corridors. The Proposed Project will have little to no effect on population and household demographics.

The Proposed Project will not affect the availability of essential business services for community residents as it does not conflict with efforts such as the Ocean Avenue South Redevelopment Plan in Jersey City to attract and retain local businesses to serve the community.

One property (four tax lots) will be acquired in full for the Proposed Project. Acquisition of the former Marist High School property by the Proposed Project will remove this property from the tax rolls as the Authority is exempt from property taxes. Under the Proposed Project, the former Marist High School property will be repurposed for use as a stormwater management basin and for contractor lay down areas and future maintenance needs.

The Proposed Project is expected to have a beneficial effect on planned port and port-related growth in and around the study area by providing sufficient roadway capacity to at least 2050 on the section of the NB-HCE between Interchanges 14 and 14A, both of which provide access between the ports, railyards, and warehouses and the regional transportation system. In this way, the Proposed Project supports the continued economic growth and employment opportunities of Transportation and Warehousing, a major industrial sector in the area, as well as increases in assessed values and property tax payments from related property improvements. Finally, by providing sufficient roadway capacity to at least 2050 on the section of the NB-HCE between Interchanges 14 and 14A, the Proposed Project will also have a beneficial effect on workers and other users of the region's roadway system for journey to work and other trip purposes.

Construction Economic Effect – As shown in Table ES-1, the project's construction expenditures are anticipated to generate the following economic impacts:

- Approximately 25,500 total jobs during the construction period.
- $2.0 billion earned in labor income by employees.
- $2.8 billion in value added (value added is equivalent to the investment's contribution to the gross regional product).
- $519.8 million in federal, state, and local taxes ($357.8 million in federal taxes and $162.0 million in state and local taxes).

Table ES-1. Estimated Construction Economic Impact

Metrics	Direct	Indirect	Induced	Total
Employment	18,786	2,845	3,863	25,494
Value Added	$1,902.0	$478.8	$468.5	$2,849.3
Labor Income	$1,437.1	$314.8	$262.6	$2,014.6
State/Local Taxes	$50.4	$62.9	$48.7	$162.0
Federal Taxes	$247.4	$59.0	$51.4	$357.8

Source: WSP 2022
Note: Monetary values are in millions of 2021 dollars.

Environmental Justice – The NB-HCE between Interchanges 14 and 14A traverses census block groups in the study area having population that meet the criteria of low-income populations, minority populations, or both. The following assessments summarize the detailed impact evaluations conducted in the referenced sections of this Environmental Assessment, and provide the specific reasons why the Proposed Project will have no disproportionately high and adverse effects on environmental justice populations through comparison with the No Action Alternative and with applicable standards:

- Destruction or disruption of community cohesion or a community's economic vitality. As discussed under Social and Economic Factors, no adverse effect is anticipated for either the Proposed Project or the No Action Alternative.
- Destruction or disruption of the availability of public and private facilities and services. As discussed under Social and Economic Factors, no adverse effect is anticipated.
- Adverse employment effects. As discussed under Social and Economic Factors, no adverse effect is anticipated. As noted above, the Proposed Project is expected to have a beneficial effect on planned port and port-related growth in and around the study area by providing sufficient roadway capacity to at least 2050 on the section of the NB-HCE between Interchanges 14 and 14A, both of which provide access between the ports, railyards, and warehouses and the regional transportation system.
- Bodily impairment, infirmity, illness or death. One of the purposes of the Proposed Project is to improve motorist and worker safety on the section of the NB-HCE between Interchanges 14 and 14A. Maintenance and protection of traffic and work-zone safety measures will be incorporated into the project to protect the safe movement of travelers and workers during construction.
- Air pollution. The results of the mobile source air toxics analysis of the Proposed Project indicate no meaningful differences are expected between the No Action Alternative and the Proposed Project. Further, based on review of project-related heavy-duty diesel vehicles, a fine particulate matter ($PM_{2.5}$) hot-spot analysis is not warranted, and any changes in $PM_{2.5}$ emissions associated with the project are not expected to create or contribute to any new violations of the national ambient air quality standards, increase the frequency or severity of National Ambient Air Quality Standards violations, or delay timely attainment of the standards. Assessment of construction-period air emissions indicates that construction of the Proposed Project would not exceed *de minimis* thresholds and, therefore, would conform to the New Jersey SIP.

- Noise. A noise analysis of existing conditions and conditions under the No Action and Proposed Project alternatives was conducted in accordance with the Authority's Noise Barrier Policy and is generally consistent with the Federal Highway Administration's *Procedures for Abatement of Highway Traffic Noise and Construction Noise* (23 CFR 772). Based on the analysis, the existing noise barrier on the NB-HCE in the study area along the south side of the NB-HCE beginning west of the NB-HCE crossing of JFK Boulevard and continuing past the crossing of Avenue C to the east will be replaced under the Proposed Project with a noise barrier designed to mitigate NB-HCE traffic noise under the Proposed Project's 2050 traffic conditions. Construction-period noise may create impacts within census block groups meeting low income or minority thresholds. Measures to minimize construction noise, as described in Section 3.9.5.3, will be implemented to minimize impacts to the maximum extent practicable.
- Water pollution. By increasing the number of travel lanes and providing full width shoulders, the Proposed Project increases the area of impervious surface on the NB-HCE between Interchanges 14 and 14A. However, while the existing NB-HCE provides no stormwater treatment of roadway stormwater runoff, the Proposed Project will provide stormwater management of this section of the NB-HCE by collecting stormwater in basins for treatment. The Proposed Project addresses potential flooding through being designed to conform with NJDEP's Flood Hazard Area requirements.
- Soil and groundwater contamination. The Proposed Project will not create any new contaminated sites. The Proposed Project includes measures to manage, control, and treat contaminated sites in the study area that will be affected by construction in a manner that protects public and worker health and safety.
- Destruction or disruption of man-made or natural resources. Replacement of bridge structures on the NB-HCE is an integral part of maintaining the structural reliability aspect of the project's purpose. The project's construction will also result in the unavoidable temporary disruption of utilities and other roadways affected by the project's construction. The Authority is coordinating with the owners of the affected utilities and other roadways on measures to minimize disruption of service.
  The replacement of NB-HCE bridge structures will result in unavoidable adverse effects on Newark Bay and nearby wetlands. The effects will be minimized through such measures as using structure rather than fill material in wetlands and avoiding in-water construction in Newark Bay between January 1 and June 30. Unavoidable impacts that cannot be minimized will be mitigated through compensatory mitigation, such as habitat restoration or enhancement.
- Destruction or diminution of aesthetic values. The NB-HCE, NBB, and the nearby Conrail Upper Bay Bridge are important aesthetic features of portions of the study area near Newark Bay to residents, users of waterfront parks, and to roadway users. The NBB would be replaced under the Proposed Project with two new parallel bridge structures. Views of the nearby Conrail Upper Bay Bridge will be the same or similar to existing views.
- Vibration. According to the U.S. Department of Transportation Federal Highway Administration (FHWA) guidance, there are no federal requirements directed specifically to highway traffic induced vibration (FWHA 2011). Prior studies documented by FHWA with the guidance that assessed the impact of operational traffic induced vibrations have shown that both measured and predicted vibration levels are less than any known criteria for structural damage to buildings. The Proposed Project will include measures to reduce construction-related vibration (e.g., use of drilled shafts as opposed to driven piles).
- Displacement of persons, businesses, firms, or nonprofit organizations. The Proposed Project would not displace persons, businesses, firms, or nonprofit organizations.
- Increased traffic congestion. A stated purpose of the Proposed Project is to reduce traffic congestion on the NB-HCE between Interchanges 14 and 14A. The Proposed Project reduces traffic congestion from levels projected under the No Action Alternative.
- Isolation, exclusion, or separation of minority or low-income individuals within a given community or from the broader community. The Proposed Project will not create circumstances that would isolate, exclude, or separate minority or low-income individuals within the study area's

communities. By addressing congestion on the NB-HCE between Interchanges 14 and 14A, the Proposed Project improves access and mobility to and from the study area's communities and the broader community.

- The denial of, reduction in, or significant delay in the receipt of, benefit of the Proposed Project. The Proposed Project will not deny, reduce, or delay benefits of the project (e.g., reduced traffic congestion and travel times and improved treatment of stormwater from the NB-HCE) to minority populations and to low-income populations.

Therefore, the Proposed Project will not cause a disproportionately high and adverse effect on environmental justice populations nor deny, reduce, or delay benefits of the Proposed Project to environmental justice or overburdened community populations.

Conclusion

The Proposed Project will have no significant impact on socioeconomics, demographic conditions, or community facilities in the study area. Pursuant to Executive Order (E.O.) 12898, the Proposed Project will not result in any disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, or overburdened communities.

Historic Resources

Background research conducted for the cultural resources survey identified four historic properties formally listed in the New Jersey State Register of Historic Places (also referred to as the "New Jersey Register" and herein abbreviated as "NJR") and National Register of Historic Places (NRHP) or determined to be eligible for listing in the NRHP within the Area of Potential Effect (APE)-Architecture. An additional archaeological historic property in the APE-Archaeology was formally determined eligible for listing in the NRHP. Although the New Jersey Historic Preservation Office (NJHPO) has made no formal determination of eligibility for the NBB and Port Authority Administration Building (Building 260) in the APE-Architecture, previous NJHPO technical assistance correspondence indicates that both resources would be considered NRHP-eligible, if subject to a formal project review by the state agency. As such, the cultural resources survey considered project effects on both historic resources. Additional project effects to historic properties may be identified upon the completion of the cultural resources survey following an NRHP-eligibility evaluation of all surveyed historic architectural resources within the APE-Architecture and the identification, and, if necessary, evaluation of previously unrecorded archaeological resources that may exist in the APE-Archaeology.

Conclusion

The Proposed Project has the potential to impact historic and cultural resources. Pursuant to the New Jersey Register of Historic Places Act of 1970 (N.J.S.A. 13:1B-15.128 et seq.), the Proposed Project has the potential to result in an adverse effect on properties listed or eligible for listing on the NJR/NRHP.

Under the Proposed Project, the NBB, a historic resource considered by the NJHPO as individually eligible for listing in the NRHP as an intact example of a mid-twentieth-century cantilevered truss structure, would be removed. The removal of the current NBB would have an adverse effect on the bridge because it would physically destroy all features of the structure that contribute to its anticipated NRHP eligibility under Criterion C.

The Proposed Project may have an adverse effect on the NJR and NRHP-listed Morris Canal and archaeological monitoring within the canal footprint is proposed to enable recordation of canal-related structural features and to mitigate project-related adverse effects to the historic property.

Archaeological monitoring of the outfall stormwater pipe trench excavation adjacent to the Jersey Eagle archaeological site is recommended to mitigate potential Proposed Project-related adverse effects to the archaeological historic property.

In addition to the above referenced historic properties, the remains of a circa 1908 New York Bay Railroad Co. turntable may be present within the proposed stormwater detention basin HUC3-C located southeast of the NB-HCE on Block 30306, Lot 2 in the City of Jersey City. This area has an assessed moderate to high sensitivity for archaeological resources associated with the railroad turntable. Additional archaeological survey is recommended to identify and record archaeological structural remains associated with the turntable, if present.

Visual Resources

A Visual Impact Assessment was prepared in accordance with FHWA visual assessment policies, which are consistent with the policies, procedures, and guidelines contained in established methodologies, including the FHWA Guidelines for the Visual Impact Assessment of Highway Projects (FHWA 2015).

The visual analysis study area, the Area of Visual Effect (AVE), is defined as the area within visual range of Interchange 14 in Newark to Interchange 14A in Bayonne. The potential viewshed is shaped by the study area's topography, as well as its built (e.g., structures) and natural (e.g., primarily vegetation) environment. For the most part, the viewshed of the NB-HCE from adjoining lands is limited, primarily because of topographic features, vegetative screening, and obstructing structures. The study area is more expansive along Newark Bay to account for the many views possible of the NBB.

The AVE primarily includes a heavily developed portion of Northern New Jersey characterized by major port intermodal and other transportation infrastructure, including receiving and shipping terminals, warehouses, railroad facilities, highways, access roads anchored by the Port Newark-Elizabeth Marine Terminal on Newark Bay immediately south of the NBB and EWR at Interchange 14, and the Port Jersey Port Authority Marine Terminal on Upper New York Bay immediately east of Interchange 14A. The adjacent industrial properties have parking lots and driveways close to the right-of-way line. The residential and business districts of Newark lie to the west of Interchange 14. Crossing Newark Bay into Bayonne, the NB-HCE passes through a less densely developed southern end of the New Jersey Palisades, locally Bergen Hill, with waterfront parks and highways, a scattering of late nineteenth- and early twentieth-century residential and commercial development, and extensive highway interchanges, connector roads, and railroads along the boundary of Bayonne and Jersey City.

Visibility of the existing NB-HCE structure west of Newark Bay from public rights-of-way is limited by existing industrial development along Port Street south of the existing NB-HCE viaduct and other industrial land uses north of the existing NB-HCE viaduct. Where the viaduct is visible, it is not a major visual element or an element that is out of character with the overall industrial landscape. Even along portions of Port Street east of Doremus Avenue, where the viaduct continues to elevate toward the western approach of the NBB, the viaduct is visible within the context of empty industrial lots or large storage tanks.

The City of Bayonne occupies the land east of Newark Bay north and south of the NB-HCE. Interchange 14A occupies a small corner of the City of Jersey City. Mixed-use neighborhoods occupy the southwest to northeast trending major avenues within Bayonne (JFK Boulevard, Avenue B, Avenue C, and Broadway). Visibility of the NB-HCE viaduct is limited to the last few city blocks south and north of the NB-HCE and primarily along the major avenues. Residences and businesses immediately adjacent to the NB-HCE have partial views of the viaduct.

The Proposed Project would be a notable change to the AVE. However, given the generally low visual sensitivity of the AVE, this notable change may be considered a positive benefit. Although, the new bridges would be distinct from the mid-20th century bridge, the proposed cable-stayed bridges would be consistent with a bridge type commonly used in the United States for long spans today. It has also become a common bridge form for long spans particularly in the New Jersey-New York metropolitan area. The proposed bridges' superstructure would likely be visually lighter and more transparent than the denser steel truss work of the existing NBB. Because of the lighter superstructure and considerably wider span, the decks of the proposed bridges would create a strong, horizontal form across the water in approximately the same location as the

existing NBB. While span length, general alignment, and vertical clearance above the water are similar for the existing NBB, the proposed bridge design could have fewer piers and taller towers. Consequently, the overall visual experience of the Proposed Project over the water would be notably different from the existing one; however, the overall character of this transportation infrastructure would not be changed significantly. The proposed bridges would become a notable visual element reinforcing the commercial and transportation character of the visual environment.

Conclusion

The Proposed Project will have no significant impact on visual resources, and no mitigation is required.

Traffic, Transportation, and Utilities

Traffic

The construction of the Proposed Project will be staged and sequenced to maintain two travel lanes in each direction between Interchanges 14 and 14A, that is, the travel lane capacity of the existing roadway.

The Proposed Project will improve the LOS compared to both Existing and No Build conditions and provide LOS D or better traffic flow.

Railroads and Other Roadways

Under the Proposed Project, there will be no realignment or relocation of railroads and other roadways crossed or otherwise in proximity of the Proposed Project, except for one roadway: the existing connector roadway between JFK Boulevard and Avenue C in Bayonne, essentially one block north of West 58th Street, from which point drivers can turn onto Avenue C or continue straight to enter NJ Route 440 southbound. Permanent elimination of the connector roadway will be necessary to minimize the impact on NJ Route 440 and adjacent properties caused by the Proposed Project's addition of two new travel lanes in each direction on the NB-HCE between Interchanges 14 and 14A. The impact on traffic from eliminating the connector roadway will be minimal as there are numerous alternate roadway routes between JFK Boulevard and Avenue C to Route 440. Among the alternate routes for southbound traffic on JFK Boulevard that currently uses the connector roadway are Pamrapo Avenue to Avenue C and NJ Route 440 southbound via Ocean Avenue and Merritt Street, and West 63rd Street to NJ Route 440 Southbound. Among the alternate routes for northbound traffic on JFK Boulevard that currently uses the connector roadway are West 56th Street, West 54th Street, and West 53rd Street all of which connect JFK Boulevard and Avenue C. As the former Marist High School is no longer operational, vehicles destined to that site have been dramatically reduced from previous years. Said property is being acquired by the Authority for stormwater management, contractor lay down, and future maintenance. Access to this site is proposed to be directly from the adjacent existing transportation right-of-way between NJ Route 440 southbound and the property for property access/egress needs, thereby minimizing the impact of this traffic on the local street system.

While not eliminated, the portion of West 58th Street near Avenue B will be permanently narrowed by the Proposed Project. The existing single one-way travel lane will be maintained. However, parking on both sides of the street for approximately 100 feet on each side of the roadway, or approximately 12 on-street parking spaces in total, will be eliminated. Reconnaissance of the affected area indicates that the capacity of on-street parking exceeds the demand for on-street parking, likely because many residential units in the area have off-street parking. Consequently, the elimination of the on-street parking will have a minor adverse effect.

Utilities

Construction of the Proposed Project will require modifications to or relocations of several major utilities within the corridor, including existing power, telephone, fiber optic, water and wastewater utilities that are currently attached to the NBB.

In addition, Williams Companies' fuel line and two 16-inch Gas Mains of an unknown owner, all in Newark, will require protection during construction. Utility relocations should be completed in advance of construction to avoid or minimize adverse impacts. Coordination will occur with utility providers during Proposed Project design and prior to construction on and in the vicinity of the infrastructure on measures to avoid or minimize adverse construction impacts.

Waterway Navigation and Ports

The main span of the replacement NBB structures over the 500-foot wide Federal Newark Bay Main Channel North Reach will be approximately 800 feet. Consequently, the replacement structures' piers and pier foundations will not encroach on the channel and will avoid an impact on the channel. Meanwhile, each of the structures will have minimum navigational clearances of 550 feet horizontal and 135 feet vertical (accounting for potential for sea level rise, thereby preserving navigational clearance in the future), matching the existing, authorized clearances of the existing bridge.

There may be a need for temporary use of the channel by construction tugboats and barges. Such use will be coordinated with the USCG to avoid or minimize any interference with navigation through the channel. Methods such as the use of cantilevered construction of the main spans and trestles outside the navigation channel to serve as platforms to construct the Proposed Project structures and demolish the existing structure should minimize the need for using tugboats and barges during construction once the trestles are in place.

The Proposed Project will not acquire port property nor interfere with goods movements by rail or roadway except for the temporary closures or detours during construction. The Authority will coordinate with Conrail and port operators and tenants on the timing of the temporary closures and detours to minimize the impact on goods movement and customers.

By increasing the long-term capacity and improving traffic flow on the NB-HCE between Interchanges 14 and 14A, the Proposed Project complements the goals and objectives of the Port Master Plan 2050 (PANYNJ 2019) by improving the service reliability for an increased volume of containers and automobiles entering the port and shipped by truck from the growing Port Jersey Port Authority Marine Terminal to distribution centers along the NJ Turnpike (I-95) Mainline and I-78 in Pennsylvania.

Navigable Airspace

The maximum height of the replacement NBB structures will be at or below the EWR Runway 29 approach and departure paths no-exceed heights for each structure's respective locations.

Federal Aviation Administration (FAA) regulations, specifically, 14 Code of Federal Regulations (CFR) Part 77, establish that notification of construction or alteration in the vicinity of airports, including potential obstruction and lighting impacts, must be submitted 45 days prior to construction. Given the time required to conduct an aeronautical study, FAA recommends a 45- to 60-day advance notification to accommodate the extensive review process and allow timely issuance of the FAA determination letter. A completed FAA Form 7460-1, "Notice of Proposed Construction or Alteration," along with appropriate supplemental information will be submitted to FAA for the Proposed Project accordingly.

Conclusion

The Proposed Project will have no significant impact on traffic, transportation, or utilities.

Air Quality

The Proposed Project is part of the proposed NB-HCE Program and is located within the planning area of the NJTPA. The NJTPA performs regional emissions analyses to demonstrate that emissions from the area's transportation system are within the limits outlined in the New Jersey State Implementation Plan (SIP). The NB-HCE Program (DBNUM: TPK22100) is included in Appendix B of the fiscal year (FY) 2022 TIP for

regionally significant non-federally funded projects. The FY 2022 to FY 2025 TIP was approved on September 13, 2021. Operational emissions resulting from the NB-HCE Program were included in the previous conformity determination for scenario year 2030. NJTPA detailed the analysis demonstrating conformance to the SIP within "The Northern New Jersey Air Quality Conformity Determination Plan 2050: Transportation, People, Opportunity and the FY 2022-2025 Transportation Improvement Program" document, dated August 10, 2021. Consequently, the Proposed Project meets the Clean Air Act Transportation Conformity requirement as it is included in the regional emissions analysis of a conforming Plan and TIP.

Motor vehicle emissions were computed using EPA's Motor Vehicle Emission Simulator (MOVES3) based on a project-specific fleet mix and speed data. The inputs and use of MOVES3 (version MOVES3.0.2) incorporate the most current guidance available from EPA. It is noted that the MOVES model has not been updated to account for recent and planned Federal and State regulations that will reduce motor vehicle emissions in the future. Consequently, the actual air pollutant emissions and concentrations with adoption of the regulations are expected to be substantially lower than the air pollutant emission levels presented in this document.

Construction-related emissions were calculated for ozone precursors (oxides of nitrogen and volatile organic compounds), carbon monoxide, PM_{10}, and $PM_{2.5}$ for two peak construction years (2028 and 2029). As no emissions would result from operation of the Proposed Project or the 2050 No Action Alternative, construction-related emissions are the only source of emissions to compare with General Conformity Rule *de minimis* thresholds. Peak construction-related emissions were estimated in 2029 since demolition of the existing westbound structure, construction of the remaining temporary trestle, and the initial stages of construction for the eastbound bridge will occur within this calendar year. The analysis performed demonstrated that construction of the Proposed Project does not exceed *de minimis* thresholds and, therefore, can be presumed to conform to the New Jersey SIP.

Conclusion

The Proposed Project will have no significant impact on air quality. Pursuant to Clean Air Act requirements, the Proposed Project's construction and operational effects on air quality must conform with the SIP. The analysis of construction-related emissions shows that the emissions do not exceed the General Conformity Rule *de minimis* thresholds and, therefore, can be presumed to conform to the New Jersey SIP. The Proposed Project is included in a long-range transportation plan that has been subject to Transportation Conformity Rule requirements. In addition, no meaningful differences in regional greenhouse gas or mobile-source air toxics emissions are expected for the 2050 Proposed Project, as compared to the 2050 No Action Alternative.

Noise

Traffic Noise

Based on noise prediction modeling, noise levels under the Proposed Project would approach or exceed the FHWA and New Jersey Turnpike Authority Noise Abatement Criteria (NAC) threshold of noise interference of 67 A-weighted decibels (dBA) (L_{eq}) for Activity Category B (residential properties) at 32 single-family, 67 dual-family, and four multi-family residential structures within the noise study area, equating to 181 total dwelling units. Noise levels would "approach" or exceed the threshold of noise interference of 67 dBA (L_{eq}) for Activity Category C (exterior noise levels at schools, hospitals, and parks) within a portion of Mercer Park (approximately 158,585 square feet [sf]), equating to 54 total dwelling units. Interior noise levels would approach or exceed the Activity Category D NAC (52 dBA L_{eq}) at the Woodrow Wilson School #10, including all three classroom floors of the east building and the second and third floors of the west school building. Without access to school building floor plans, it was assumed the impacted receptors represent 13 highway-facing classrooms.

South of the NB-HCE. As the existing noise barrier would need to be removed to accommodate the proposed widening, analysis reflects noise levels predicted without a noise barrier. The Authority is committed to replacing the noise barrier. Predicted traffic noise impacts south of the NB-HCE roadway are primarily located

along JFK Boulevard, West 56th Street, West 57th Street, and West 58th Street, where the existing noise barrier required removal to accommodate the NB-HCE widening. Additional impacted residential structures include fourth and fifth floor balconies at the Liberty Bay Club multi-family residential structure. Impact to the Liberty Bay Club is likely resulting from a combination of traffic changes on NJ Route 440 as well as changes to the NB-HCE corridor as a result of the Proposed Project. The predicted interior impact would occur at the Woodrow Wilson School #10, located along West 57th Street.

Based on the Authority's second impact criterion, four dual-family residential structures on Sunset Avenue, equating to eight dwelling units, were predicted to experience a noise level increase of 10 dBA or greater, relative to 2021 Existing Condition noise levels. Noise levels were predicted to increase by more than 10 dBA under the Proposed Project due to the removal of shielding provided by the Marist High School building and associated ancillary structures. Proposed Project noise levels on Sunset Avenue would only increase by 1 dB, relative to the No Action Alternative, which is not perceivable.

A noise barrier was thereby evaluated along the widened eastbound NB-HCE shoulder at a uniform height of 18 feet (i.e., the maximum allowable height under the Authority's policy), from just east of where the NB-HCE roadway crosses over NJ Route 440 to approximately 75 feet west of Garfield Avenue. The eastern terminus is approximately the same as the existing noise barrier's eastern terminus; however, the western terminus was extended approximately 556 feet west. The western extension was evaluated to mitigate Proposed Project noise impacts predicted at three dual-family residential structures on West 57th Street, adjacent to the former Marist High School property, and noise impacts predicted at four dual-family residential structures on Sunset Avenue meeting the Authority's second impact criterion (i.e., 10 dBA or greater increase in Build noise levels, relative to existing noise levels). The western extension was also evaluated to mitigate noise impacts predicted at one fourth-floor and three fifth-floor balconies at the Liberty Bay Club, south of NJ Route 440.

North of the NB-HCE. North of NB-HCE roadway, Activity Category B impacts are located along Merritt Street within the Jersey City Housing Authority Curries Woods neighborhood and on Garfield Avenue. In addition, the Activity Category C NAC would be exceeded at Mercer Park within the football field and along the walking trail that parallels JFK Boulevard (approximately 158,585 sf), equating to 54 residential dwelling units.

To mitigate predicted Proposed Project impacts to Mercer Park, two dual-family residences on Merritt Street that are part of the Jersey City Housing Authority's Curries Woods neighborhood, and one dual-family residence on Garfield Avenue, a potential three-part noise barrier system was evaluated along the westbound shoulder of the widened NB-HCE roadway.

Construction Noise

Noise-sensitive receivers within project limits will experience an increase in noise levels during construction activities. Typical construction activities, such as roadway deck demolition, bridge repairs and milling/paving are known to produce high noise levels. Equipment such as but not limited to hoe rams, jackhammers, impact pile drivers, rivet removers, concrete trucks, scarifiers, paving machines, backhoes, and dump trucks, may be utilized. Resultant noise levels can range between approximately 70 to 90 dBA at noise-sensitive sites.

For construction activities, standard specifications for inclusion in the proposed construction contract documents may include the following:

- All construction equipment powered by an internal combustion engine shall be equipped with a properly maintained muffler.
- Air compressors shall meet current U.S. Environmental Protection Agency noise emission exhaust standards.

- Air powered equipment shall be fitted with pneumatic exhaust silencers.
- Stationary equipment powered by an internal combustion engine shall not be operated within 150 feet of noise-sensitive areas without portable noise barriers placed between the equipment and noise-sensitive sites. Portable noise barriers shall be constructed of plywood or tongue and groove boards with a noise absorbent treatment on the interior surface (facing the equipment).
- Powered construction equipment shall not be operated before 8:00 a.m. or after 8:00 p.m. within 150 feet of a noise-sensitive site.

Conclusion

The Proposed Project will have adverse impacts to noise at several receptors. However, with implementation of proposed noise walls those impacts will be mitigated to the maximum extent practicable such that they would not be considered significant impacts.

Hazardous Materials and Contaminated Sites

The presence of contamination potentially affects the development and construction of the project in multiple ways, including: (1) design of cut areas and other subsurface elements; (2) construction document specifications for managing and handling contaminated soils and groundwater; (3) regulatory oversight by NJDEP; (4) worker and public health and safety during construction; and (5) property acquisition process and costs, as well as liability concerns.

During project construction, historic fill and otherwise contaminated soil and/or water could be encountered in places along the entirety of the project during clearing, excavation, grading, demolition, and the construction of piers and footings of the viaducts and bridges. Soil disturbance will also occur during construction of temporary and permanent access roads, construction staging areas, and stormwater basins. Construction activities within contaminated media (soil, sediment, groundwater) have the potential to cause contaminants to migrate both vertically and horizontally. Contaminant release and transport mechanisms during construction include contaminated soil transported as dust and volatilization of contaminants from the soil and groundwater matrices to the soil vapor phase, and existing soil vapor contaminants. The most likely route of exposure will be through breathing volatile/semi-volatile compounds or particulate-laden air released during demolition, excavation, and construction activities.

A Licensed Site Remediation Professional will be retained to oversee the management of contamination encountered during the linear construction project. Coordination with and approvals from NJDEP will occur prior to the disturbance, handling, and disposal of any contaminated waste and materials, and appropriate preventive measures will be undertaken to protect the safety of the public, construction workers, and the greater environment from exposure to contaminated materials.

Conclusion

The Proposed Project will have no significant impact on hazardous materials. The systematic approach to identifying hazardous waste and site contamination has occurred during project development. Further investigations, including sampling of soil and groundwater, will occur during final design to identify measures to be undertaken during construction to protect public and worker health and safety and avoid the spread of contamination. The sampling plan and protective measures will be developed in coordination with NJDEP, the counties, and the municipalities, as well as with relevant property owners, as appropriate. By following this approach, no significant impacts will result.

Natural Resources

The Proposed Project will have impacts to natural resources; however, the measures outlined below will reduce any impacts to the maximum extent practicable. The Proposed Project will have measurable impacts on water quality, but pollutant concentrations would be below applicable standards, regulations, and guidelines, and within existing conditions or designated uses. Pursuant to the Coastal Zone Management Act, the Proposed

Project will have no reasonably foreseeable effects on coastal uses and resources. Pursuant to the Marine Mammal Protection Act, the Proposed Project is not likely to or will not result in takes of marine mammals. Pursuant to the Magnuson-Stevens Act, the Proposed Project will have no effect to Essential Fish Habitat or Habitat Areas of Concern. Pursuant to the Migratory Bird Treaty Act, the Proposed Project will not result in take of migratory birds or the parts, nests, or eggs of such bird. Pursuant to the Bald and Golden Eagle Protection Act (BGEPA), the Proposed Project will not result in take of Bald or Golden Eagles or the parts, nests, or eggs of such bird.

Geology and Soils

Under the Proposed Project, construction and associated excavation and drilling activities would reconfigure surface topography but are not expected to adversely affect the underlying geology of the area. Vibration due to pile driving would be largely avoided by using drilled shaft foundations for the bridge piers.

Construction and demolition activities would involve the excavation of soils for installing cofferdams around pier structures, building stormwater basins, and establishing permanent access roads for construction, maintenance, and security access. To avoid and minimize potential increases in soil erosion during construction, erosion and sediment control measures would be implemented, which may include a combination of turbidity barriers, silt fences, hay bales, diversion ditches, temporary grading, and vegetative or other protective coverings for exposed soils. All excavations in wetlands and open water would be conducted from within cofferdams, where water within would be pumped out to settling tanks before being discharged. In accordance with the Soil Erosion and Sediment Control Act of 1975, as amended (New Jersey Administrative Code [N.J.S.A.] 4:24-39 et. seq.), a soil erosion and sediment control plan will be prepared and implemented. The plan would meet the Standards for Soil Erosion and Sediment Control in New Jersey at New Jersey Administrative Code (N.J.A.C.) 2:90 (New Jersey SSCC 2017) and be certified by the Hudson Essex Passaic Soil Conservation District. Upon completion of the replacement bridges and demolition of the existing NBB, all staging areas and temporary access roads would be removed, and the soils would be restored to their original grade and revegetated.

Groundwater Impacts

Groundwater would be encountered during excavation for the construction and demolition of pier footings for the viaducts and bridges. Based on previous monitoring of several properties in the study area, groundwater encountered may be considered contaminated. A pre-construction sampling plan will be developed during final design to identify locations of contaminated groundwater that may need to be managed during construction. Construction activities within contaminated groundwater have the potential to cause contaminants to migrate both vertically and horizontally. Appropriate remedial actions, such as engineering controls, would be developed and implemented to avoid the potential for adverse impacts to construction workers, surrounding communities, and the environment. Dewatering will be required to lower the groundwater table and reach the proposed excavation depths. Appropriate groundwater management approaches will be used for the safe disposal of water removed from the ground during construction. Remedial actions or measures may include off-site disposal or treatment of contaminated groundwater. Institutional and engineering controls would be used to avoid the potential for post-construction impacts. The contractor would obtain a Surface Water General Permit from NJDEP's Division of Water Quality prior to undertaking activities that would discharge groundwater from construction activities to surface waters. The Proposed Project would also follow the NJDEP Linear Construction Technical Guidance to address any contaminated groundwater that is encountered during excavation and prevent the excavation from serving as a conduit for the spread of contaminated water.

Coordination with and approvals obtaining required permits from NJDEP will occur prior to the disturbance, handling, and disposal of any contaminated groundwater. The specifications for any remedial measures would be established in permit documents and would be subject to NJDEP review (should a reportable condition be encountered or if the site is already subject to agency oversight) and would address the procedures for monitoring/oversight to ensure the remedial measures are properly implemented. Appropriate preventive measures will be undertaken to protect the safety of the public, construction workers, as well as the greater environment from exposure to contaminated groundwater.

Tidal Waters

The Proposed Project will result in approximately 5.853 acres of permanent impacts and 15.507 acres of temporary impacts to tidal waters of Newark Bay, a Traditionally Navigable Waterway under the jurisdiction of the USACE. Permanent impacts to tidal waters would occur as a result from the filling of waters from new pier placement and the new fender system. All activities considered temporary (to be removed) will be in place for greater than six months. Temporary impacts[3] include 12.598 acres for the installation of the construction trestle piles, including its shading, to construct the westbound bridge (approximately 550 piles) and demolish the existing bridge and construct the eastbound bridge (approximately 600 piles); other temporary impacts include the placement of cofferdams around the new and existing bridge pier footings and fenders, and construction access. Table ES-2 provides a summary of tidal water impacts, as well as freshwater wetlands and transition areas, discussed further below.

Table ES-2. Summary of Anticipated Tidal Waters and Freshwater Wetland Impacts

Regulated Area	Permanent Impacts (acres)	Temporary Impacts (acres)
Tidal Water	5.853	15.507
Freshwater Wetland (PEM, E2EM)	8.856	7.913
Wetland Transition Area	3.205	2.765
Total	17.914	26.185

The tidal water impacts described above include impacts to intertidal and subtidal shallows, which are regulated under N.J.A.C. 7:7. The spring high tide line (mean higher high water) is 3.61 feet above sea level, and the Mean Low Water is -2.84 feet below sea level (North American Vertical Datum of 1988). Therefore, any development, filling, or dredging to land between elevation +3.61 feet to –6.84 feet is considered impacts to intertidal and subtidal shallows. The Proposed Project would result in 2.512 acres of permanent impacts to intertidal and subtidal shallows associated with new pier footings and fenders, and construction of a permanent access and maintenance area under the new structure. Temporary tidal water impacts also include 5.516 acres of intertidal and subtidal shallows due to the installation of the construction trestle piles, and its shading; the placement of cofferdams around the new and existing bridge pier footings and fenders; and construction access.

During construction, soil erosion and resuspension of bottom sediments would be expected to cause the greatest impacts to surface waters. Construction activities such as clearing and grubbing, excavations, and creating equipment staging areas would expose and disturb soil, potentially leading to soil erosion. Construction of additional impervious surfaces would lead to increased stormwater runoff volumes and impact surface water quality via potential increase of sediments and contaminants entering Newark Bay. In-water construction would impact water quality via increases in suspended sediments. The introduction of suspended sediment in the water column of Newark Bay could result in increased total suspended solids and turbidity, decreased dissolved oxygen levels (due to increases in Biochemical Oxygen Demand), and decreased photosynthesis due to increased turbidity. Surface water quality in Newark Bay could also be affected by additional metal or chemical (organic or inorganic) loadings associated with sediments. Metals, nutrients, and other chemicals may be released into the surrounding waterways during the dredging, dewatering of cofferdams, and movement of construction material, fuels, and lubricants.

Because sediments within Newark Bay are known to be heavily impacted with polychlorinated biphenyls, dioxins, and metals, best management practices would be implemented to minimize the potential for, and magnitude of, adverse environmental impacts that could result. Adverse water quality impacts associated with

[3] All impacts considered temporary (to be removed) will be in place for greater than six months.

construction would be minimized by restricting in-water work to dry conditions within cofferdams and implementing a soil erosion and sediment control (SESC) plan. Measures will be taken during construction of piers to minimize disturbance of bottom sediments and reduce turbidity, such as driving piles within casings using turbidity barriers or bubble curtains around drilled shafts. The Proposed Project would comply with the New Jersey Stormwater Management rules at N.J.A.C. 7:8 and the stormwater design would achieve the required design and performance standards. Lastly, as Newark Bay is a Traditionally Navigable Waterway under the jurisdiction of the USACE, the Authority would comply with all the terms and conditions of a Section 404 Permit and provide compensatory mitigation for permanent impacts, inclusive of temporary impacts greater than 6 months in duration, by restoring 0.842 acres of tidal waters through the removal of the existing bridge piers following construction of the new bridge. Compensation for unavoidable impacts would include purchasing mitigation credits from existing mitigation banks within Watershed Management Area (WMA) 5 (Hackensack River, Hudson River and Pascack Brook Watersheds) and WMA 7 (Arthur Kill Watershed); or potentially, permittee-responsible mitigation project(s).The Proposed Project would increase the area of existing paved roadway by almost 45 percent, from approximately 60 to 86 acres, including both pavement at ground level and elevated bridge/viaduct surfaces. The paved surface area of the existing NBB over top of open water in Newark Bay would approximately double, from around 7 acres under existing conditions to over 15 acres, after accounting for the demolition of the existing bridge. Stormwater runoff from these paved surfaces would be improved over existing conditions by installing approximately 19 new stormwater basins. Impacts to water quality would be minimized over the long-term, despite an increase in impervious surfaces, because the new basins would intercept and treat stormwater runoff from the roadway. The proposed stormwater basins proposed will achieve the goal of not increasing peak flows to any local storm sewer system receiving runoff from the NB-HCE.

Freshwater Wetlands

Several delineated wetlands would be disturbed by the implementation of the Proposed Project. Most are freshwater (palustrine) wetlands dominated by the invasive *Phragmites australis*. Approximately 8.856 acres of freshwater wetlands would be permanently disturbed by the implementation of the Proposed Project, of which 3.764 acres are identified as Waters of the United States (WOTUS) and under federal jurisdiction as detailed in an Approved Jurisdictional Determination request submitted to USACE on May 13, 2022. Permanent freshwater wetland impacts can be divided into three areas: (1) 8.674 acres impacted by the footprint of the elevated NB-HCE roadway and "permanent access" underneath the structure for maintenance, inspections, and security, including impacts from viaduct support structures and stormwater basins; (2) 0.062 acres impacted by proposed pier footings that would extend beyond the edge of the permanent access; and (3) 0.120 acres impacted by roadway embankment. Additionally, approximately 7.913 acres of freshwater wetlands would be subject to temporary disturbance during construction, of which 2.777 acres are identified as WOTUS. Temporary freshwater wetland impacts can be divided into four areas: (1) 6.614 acres impacted by construction staging and access areas; (2) 0.422 acres impacted by the installation and removal of cofferdam sheetpiles around bridge pier footings; and (3) 0.877 acres impacted by NBB construction trestle piles and its shading of freshwater wetlands. Additionally, these activities would cause approximately 3.205 acres of permanent and 2.765 acres of temporary impacts to wetland transition areas.

Wetlands temporarily disturbed during construction will be restored to their original grade and planted with indigenous wetland vegetation. Wetland mitigation will be required for all wetland and open water impacts, and because wetland disturbances are expected to exceed 1 acre, NJDEP would require mitigation for permanent impacts at a minimum of a 2:1 ratio. Wetland mitigation plans are only developed conceptually at this time and would likely include mitigation bank credits, but could also include restoration, creation, and/or preservation of wetland habitats. Overall, a total of approximately 14.709 acres of permanent impacts is unavoidable and will require compensation. Also, accounting for the compensation of unavoidable long-term temporary impacts (i.e., greater than six month duration) and the restoration of habitats following the removal of the existing bridge, the net acreage requiring off-site compensation is approximately 36.428 acres, as summarized in Table 3.11-10 below. The anticipated off-site mitigation has been calculated based on the impacts of the preliminary design plans, although impacts are expected to be reduced through consultation with USACE and NJDEP as

the final design progresses. Further detail about wetland mitigation will be developed and confirmed as part of the permitting process. These detailed wetland mitigation plans will include a discussion of the mitigation type; watershed needs; site selection narrative; timing of the mitigation; and the amount of compensation being proposed, in comparison to the amount of wetland impacts.

Riparian Zones

A 150-foot wide riparian buffer is located along both sides of Newark Bay and along a regulated ditch at the western end of the project limits. Approximately 4.295 acres of permanent riparian zone impacts would occur due to the removal of vegetation associated with construction of the various project elements, and 2.343 acres of temporary impacts to riparian zone would occur. Details regarding impacts to the riparian zone are shown in the Flood Hazard Area permit plans and accompanying Stormwater Management Report for the Proposed Project. All temporarily disturbed riparian areas will be restored subsequent to construction. Project elements within the riparian zone would conform to the requirements at N.J.A.C. 7:13, as appropriate. Vegetation lost within the riparian zone due to project construction would be mitigated for under the project's overall mitigation plan. Since the amount of permanent riparian zone disturbance is greater than the amount of riparian zone created by the project (0.007 acres), mitigation credits would be purchased from a riparian zone mitigation in WMA 5. Riparian zone mitigation will be coordinated NJDEP related to a Flood Hazard Area Individual Permit application.

Floodplains

The Proposed Project would require construction within the 100- and 500-year floodplains of Newark Bay. Bridge piers and towers would be constructed in the floodplains and the placement of these structures would displace some floodplain volume. However, the existing and proposed NB-HCE structure is above the floodplain except for the piers and abutments that are located within the floodplain.

Given the minor modifications to the floodplain that would result from the Proposed Project, and its location within a tidal waterbody, adverse impacts to the floodplain or flooding of areas adjacent to the study area are not expected. The final design of the proposed structures will ensure that all elements adhere to the Flood Hazard Area requirements.

The Proposed Project would comply with the provisions of E.O. 11988 and E.O. 13690 by following the Interagency Water Resources Council implementation guidelines (Interagency Water Resources Council 2015). The Proposed Project would comply with U.S. Department of Transportation Order 5650.2, Floodplain Management and Protection.

Coastal Zone and Tidelands

As part of this Environmental Impact Statement, a draft Coastal Zone Consistency Assessment for the Proposed Project has been developed that evaluates how it is consistent with the state's coastal policies. Based on this preliminary evaluation pursuant to the Coastal Zone Management Act, the Authority has determined that the Proposed Project will be conducted in a manner fully consistent or consistent to the maximum extent practicable with the federally approved enforceable policies of the New Jersey coastal management program.

The construction of new in-water structures would require an application to the Bureau of Tidelands for a new Instrument. For the tidally claimed areas impacted by the Proposed Project, the Authority would determine whether there is a Tidelands License or Riparian Grant for these areas and if any licenses are still valid. If there is no grant or licenses are no longer valid, then the Authority would apply for a new Tidelands Instrument for work proposed within the claimed areas.

Aquatic Biota

Construction of the bridge support structures would directly impact aquatic ecosystems, including freshwater and tidal wetlands, and open water in Newark Bay. Bridge construction methods may include a combination of

drilling shafts and pile driving for the bridge support structures, which would introduce sound into the water and would disturb fish habitat in Newark Bay. This could disturb important fish habitat and disrupt migration of fish during spring spawning runs of striped bass, as well as shad and river herring, through the Newark Bay area. Other temporary impacts such as suspension of sediments and increased turbidity would occur during construction.

Short-term effects on aquatic biota resulting from the Proposed Project include the following: displacement of fish from available water column habitat in Newark Bay due to avoidance of areas of hydrological disturbance; noise and vibrations caused by construction; increased turbidity and levels of resuspended solids and contaminants; and temporary sediment disturbance and associated loss of the benthic community within cofferdams. These impacts to Newark Bay would last for the duration of construction, or around two years, but would not be simultaneous because of construction sequencing.

Additional temporary impacts would result from spud barge movements and associated vessel propeller wash in the shallow waters of Newark Bay. Any temporary impacts to pelagic species from the Proposed Project are expected to be negligible. At this point, it is anticipated that the Authority will perform its formal consultation with National Marine Fisheries Service (NMFS) during its regulatory review of the Bridge Permit Application, pursuant to the Magnuson-Stevens Act Provisions for Federal Agency Consultation with the Secretary (50 CFR Part 600.920).

Long-term effects on aquatic biota include effects resulting from construction activities in Newark Bay, including the alteration of substrate types and benthic habitats; changes in depth, hydrodynamics, and sedimentation rates; and permanent loss of water column and benthic habitats resulting from new bridge piers.

To avoid interference with spring spawning runs of striped bass and other migratory fish, as well as Atlantic Sturgeon, NJDEP recommended that the Proposed Project follow the "NY/NJ Harbor Agreement: February 1 – May 31" (NJDEP 2021b). Additionally, best management practices will be implemented to reduce impacts of construction on migrating fish by monitoring and controlling turbidity, noise, and overall habitat disturbance.

Terrestrial Vegetation and Wildlife

The Proposed Project would result in the permanent loss of approximately 10.5 acres of wetland communities, which provide most of the limited wildlife habitat within the study area, split between approximately 9 acres of freshwater wetlands and 1.5 acres of tidal wetlands, and cause temporary impacts to approximately 8.4 acres of wetlands, split between approximately 7.9 acres of freshwater wetlands and 0.5 acre of tidal wetlands. Most impacted wetlands are dominated by *Phragmites australis*, except for the *Spartina* marsh located west of Newark Bay, north of the NB-HCE. The habitat value of the *Phragmites*-dominated communities is generally low due to low species diversity, and high levels of anthropogenic activities and disturbance; thus, impacts to wildlife and vegetative species are anticipated to be negligible. The loss of tidal marsh may cause adverse impacts to foraging habitat used by many species, including mammals like mink, muskrat, and raccoon; reptiles like the northern diamondback terrapin; wading birds, including several threatened or endangered species; other water birds like mallard, double-crested cormorant, and ring-billed gulls; diurnal raptors like osprey, peregrine falcon, and red-tailed hawk; and many passerines including killdeer, red-winged blackbird, song sparrow, swamp sparrow, and marsh wren. The removal of suitable habitat would cause displacement of individuals to nearby suitable habitat and may increase competition for reproductive, foraging, nesting, and migratory habitat. Wildlife mortality could increase if no suitable habitat exists nearby, but the loss of vegetation communities would result in minor adverse impacts to wildlife resources of the region. Marsh vegetation would be removed outside of the breeding window for these species in New Jersey (March through August) to eliminate the potential for nesting during the active season if work cannot avoid breeding season timing restrictions for migratory bird species.

In total, the Proposed Project would intersect approximately 47 acres of unpaved, vegetated uplands as identified on preliminary design plans. In addition to the wetland impacts discussed above, the Proposed Project would cause approximately 17.5 acres of permanent impacts and 18.4 acres of temporary impacts to these

uplands, of which the vast majority are mowed grass and bare ground that provides little to no wildlife habitat. Upland vegetative communities within the survey area are also very limited in size and dominated by invasive plant species. Following construction, disturbed areas not occupied by permanent structures would be revegetated with a native seed mix of species indigenous to this region of New Jersey to the greatest extent practicable in accordance with a revegetation plan that would be in compliance with E.O. 13112, Invasive Species.

Given the existing levels of noise and other human activity to which birds and other wildlife are accustomed and the low disturbance sensitivity of these species, the Proposed Project is not expected to elevate noise levels to the point that there would be significant disturbance to birds. The bird species occurring closer to the NB-HCE are expected to be habituated to elevated noise and anthropogenic activity from ongoing traffic and maintenance work. However, construction and demolition activities may affect species that are habituated to only lower levels of baseline disturbance and some species could potentially be temporarily displaced or otherwise adversely affected.

Threatened or Endangered Species

The Proposed Project would have no effect on federally threatened or endangered species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) because USFWS indicates that no species listed under the Endangered Species Act (ESA) may occur within the boundary of the Proposed Project and/or may be affected by the Proposed Project; they identified one proposed endangered species (tricolored bat) and one candidate species (monarch butterfly). Thus, there are only potential effects to ESA-listed species under NMFS jurisdiction. Also, the Proposed Project would have no potential to affect the designated or proposed critical habitat of any ESA-listed species. Direct impacts to Newark Bay, which comprises potential habitat for the ESA-listed endangered Atlantic sturgeon and shortnose sturgeon, would occur during construction of bridge support structures. While Newark Bay is not within a migration path to spawning grounds for Atlantic sturgeon and shortnose sturgeon, adult Atlantic sturgeon could occur near the NBB. No eggs, larvae, or juvenile Atlantic or shortnose sturgeon are anticipated to occur within Newark Bay and its adjacent bays and tributaries. Per the NMFS Harbor Deepening Biological Opinion, shortnose sturgeon are not expected to occur in the study area; they have only been observed as far south as the Statue of Liberty, which is more than 10 miles away via the most direct water route.

The Proposed Project would introduce sound into the water and potentially impact adult Atlantic sturgeon. Injurious levels of underwater noise for sturgeon would only occur very near the source, within 230 feet. Underwater noise levels that may affect sturgeon behavior would also only occur near the source, within 295 feet. Use of a soft start would give sturgeon the opportunity to vacate the area, minimizing the likelihood for potential injury. Should sturgeon enter into areas within the threshold distances for injury or behavior, it is likely that they would move away from the noise source. This possible modification of normal movement patterns of some individuals is expected to be insignificant because underwater noise would be limited in duration, affect only a small area within Newark Bay, and would not pose a barrier to migration or the availability of other more suitable habitat. Thus, interference with feeding, reproduction, migration, or other activities necessary for survival is not expected. Adherence to New Jersey in-water time-of-year restrictions from January 1 to June 30 would be protective of sturgeon for half of the year.

Vessel traffic associated with bridge construction and demolition could increase the risk of vessel strikes with Atlantic and shortnose sturgeon. Tugboats, spud barges, crew boats, and other vessel types would be operating daily over a seven-day work week for the four-year duration of construction and demolition. Vessel traffic associated with bridge construction and demolition would constitute most of vessel traffic in the area. Most of the construction and demolition would be performed via the temporary access trestle, thereby minimizing vessel use. However, work vessels would be slow moving with drafts well above the portion of the water column used by sturgeon, so have very low likelihood of striking a sturgeon. Lastly, the potential aquatic habitat modification and loss, as detailed above under *Aquatic Biota*, could displace Atlantic sturgeon from water column and benthic habitat occupied by cofferdams and trestle piles for the duration of construction, or approximately two years

for any given temporary in-water structure. As sturgeon forage in the sediment, they would be potentially affected by the loss of bay bottom foraging habitat. However, the area of loss is relatively small compared to the overall area of intertidal and subtidal shallows available in Newark Bay. Based on the impacts described above and the fact that adults of both species are highly mobile and could easily avoid the area during active construction, no adverse effects are anticipated.

Several Birds of Conservation Concern and state-listed endangered, threatened, and special-concern species could occur in the study area, including the bald eagle, black-crowned night-heron, cattle egret, glossy ibis, least tern, little blue heron, osprey, peregrine falcon, snowy egret, tricolored heron, and yellow-crowned night-heron. The Proposed Project would involve construction within and adjacent to habitat suitable for threatened or endangered wildlife. Impacts would depend on the species' population size and type of activity. This is primarily a concern for construction activities within the vicinity of waters and wetlands, where the vast majority of suitable habitat occurs in the study area. One exception is the checkered white butterfly (*Pontia protodice*), a butterfly that is found in a wide variety of sites, including dry weedy areas, vacant lots, fields, pastures, sandy areas, railroad beds, and roads. In the past, checkered white butterflies have been observed at EWR along the Peripheral Ditch near the NB-HCE. Portions of the airfield and Port Newark have been classified as suitable habitat for the butterflies (NJDEP 2017). However, ecologists performing surveys of the study area did not find suitable habitat for the checkered white butterfly, which typically occurs in open areas such as savannas, old fields, vacant lots, power line rights-of-way, and along forest edges. Also, construction would be performed outside of the checkered white butterfly habitat. Therefore, the Proposed Project would not be expected to have any effect on the checkered white butterfly.

The shorelines of Newark Bay and wetlands located on either side of the Bay provide suitable foraging habitat for state-listed wading bird species, including black-crowned night-heron and yellow-crowned night-heron (State threatened) which were observed during field investigations. Other species that may forage in or around the study area include the State-endangered bald eagle and peregrine falcon, the State-threatened cattle egret (*Bubulcus ibis*), and other state species of concern. As these birds are highly mobile and capable of avoiding construction activities, disturbance from construction activities would be minor, short-term and localized.

Peregrine falcons have been documented nesting on the NBB during the past two years and presumably remain in the area year-round. The nesting activity and associated behavior of peregrine falcons would continue to be monitored on a weekly basis during the breeding season (February 15 to July 31), or until fledging occurs, prior to bridge replacement, during construction activities, and for two years following completion of bridge construction and demolition activities. This would promote adaptive management of the mitigation proposed for the falcon nest over the course of the Proposed Project. A proactive approach will be taken to coordinate protective measures for peregrine falcon in consultation with the NJDEP Division of Fish and Wildlife, Endangered and Nongame Species Program. Activities, especially those that may disturb the birds (e.g., construction), should be scheduled outside of the peregrine falcon nesting season (March 1 to June 30), where possible. It is anticipated that a 300-foot work restriction zone would be implemented during the breeding season and alternative nest boxes would be installed to minimize potential impacts.

Construction activities within or alongside Newark Bay could impact bald eagles that forage in the bay. Tree clearing or disturbances to mature trees or dead snags, which would be required in limited areas along the eastern shoreline of Newark Bay, may affect eagles roosting or foraging in the area. The NJDEP Landscape Project mapping shows foraging habitat for the bald eagle within the study area and a nest is located about 1.5 miles to the north, at Kearny Point. Reproduction is the period when bald eagles are most sensitive to disturbance, but the Proposed Project would occur far enough away that no disturbance to nesting would occur. Based on USFWS (2008) guidelines for minimizing disturbances to bald eagles, which recommend a maximum buffer distance of 0.5 miles between bald eagles and extremely loud noises, it can be conservatively estimated that bald eagles would avoid a maximum of 0.5 miles of river in each direction from the bridge during construction. Displacement of eagles from this area would represent an insignificant temporary reduction in the amount of foraging habitat available on Newark Bay and the lower Passaic and Hackensack River.

NJDEP Landscape Project Mapping indicates that emergent wetlands within the vicinity of the Proposed Project provide suitable foraging habitat for State-listed wading birds. The black-crowned night-heron and yellow-crowned night-heron were observed during field investigations. However, heron nesting habitat is absent in the study area due to a lack of suitable wetland tree and shrub cover, dominance of *Phragmites australis*, and high levels of human disturbance. Because there is no documented nesting habitat for threatened or endangered species, it is unlikely that agencies would require mitigation (preservation, enhancement, or creation of new habitat) for impacts to foraging habitat because it is not the limiting factor for these species.

There is potential for the Proposed Project to affect bats via tree clearing and bridge demolition, which could reduce roosting habitat or potentially cause direct mortality if an occupied roost tree or bridge is disturbed when bats are present. USFWS did not identify any ESA-listed bat species that may occur within the boundary of the Proposed Project and/or may be affected by the Proposed Project; they identified one proposed endangered species (tricolored bat). NJDEP notes that the northern long-eared bat, little brown bat, eastern small-footed myotis, and tricolored bat are found state-wide and have a "Consensus Status" of "Endangered" in NJ; therefore, these species are presumed to be present and must be considered if tree clearing is required. Because potential bat habitats cannot be avoided, the Authority would coordinate with USFWS and New Jersey Fish and Wildlife to identify appropriate avoidance and minimization measures, which would include avoiding tree cutting or destruction of known roost structures during the pup season (June 1 to July 31).

Impacts to marine mammals is not anticipated based on their unlikely occurrence within the study area. Only temporary, insignificant disturbances to marine mammals would be anticipated to occur from disturbance related impacts. No harassment to marine mammals would be anticipated at either Level A (injury) or Level B (disturbance).

Summary of Required Permits and Approvals

Various permits and approvals will be required to implement the Proposed Project. Decisions on applications for federal permits are subject to review under NEPA to ensure that federal agencies consider the environmental impacts of their actions in the decision-making process. In addition to review of the applications for federal permits and review of the Proposed Project under NEPA, several other regulatory requirements must be met before the federal permits are issued. For the most part, the Authority will make applications for the state and local permits required to implement the Proposed Project after the federal permits are issued and the NEPA process is completed. A summary of all required permits and approvals is provided below. Additional detail is provided in Section 4 of this EIS.

Applicable Permits and Approvals Required under State Laws and Regulations

The Authority submitted a Permit Readiness Checklist to NJDEP's Office of Permitting and Project Navigation (OPPN) on April 16, 2021, for the NB-HCE Program. OPPN's reply on May 14, 2021, described the following anticipated permits, approvals, and other NJDEP requirements:

- Executive Order No. 215 – NJDEP
- Land Resource Protection Permits – NJDEP
- Fish and Wildlife Coordination – NJDEP
- Freshwater Wetlands Letter of Interpretation – NJDEP
- Stormwater Management – NJDEP
- Historic and Cultural Resources – NJHPO
- New Jersey Register Review – NJHPO
- Tidelands License – NJDEP
- State Owned Lands – NJDEP
- Linear Construction Project – NJDEP

- Soil Erosion and Sediment Control – Hudson-Essex and Passaic Soil Conservation District and NJDEP
- Surface Water General Permit – NJDEP.

Applicable Permits and Approvals Required by Federal Laws and Regulations

- Bridge Permit – USCG
- Section 10/404 Permit – USACE
- Approved Jurisdictional Determination – USACE
- Section 408 Review – USACE
- National Environmental Policy Act – USCG
- Section 401 Water Quality Certification – NJDEP
- Section 307 Coastal Zone Consistency Determination – NJDEP
- Section 106 of the National Historic Preservation Act – USCG
- Section 7 Endangered Species Act Consultation – USFWS

Public and Agency Coordination

The Authority has met with numerous agency and public stakeholders throughout the concept plan and preliminary engineering development and environmental review phases of the project. In some cases, the Authority met on a recurring basis with certain agencies or stakeholders. The following list identifies those agencies or stakeholders with which the Authority met:

- USCG
- USACE
- Port Authority of New York and New Jersey
- NJDEP
- NJHPO
- New Jersey Department of Transportation
- New Jersey Transit
- The Maritime Association of the Port of New York – New Jersey: Harbor Safety, Navigation, and Operations (Harbor Ops) Committee
- Hudson County
- City of Jersey City
- City of Bayonne
- City of Newark
- Global Container Terminal (tenant of Port Jersey PAMT)
- Conrail
- PSE&G
- Texas Eastern

1 Purpose and Need for the Proposed Project

1.1 Introduction

The New Jersey Turnpike Authority (Authority) proposes a modernization of the Newark Bay-Hudson County Extension (NB-HCE) between Interchange 14 in Newark, Essex County, and Interchange 14A in Bayonne and Jersey City, Hudson County, to meet current and future needs of patrons of the NB-HCE, current design standards, and the Authority's operational and maintenance needs (the "Proposed Project"). A major element of the Proposed Project is the replacement of Newark Bay Bridge (NBB), officially, the Vincent R. Casciano Memorial Bridge, which comprises nearly half of the total length of the NB-HCE between Interchanges 14 and 14A.

The Authority has prepared this Environmental Impact Statement (EIS) under New Jersey Executive Order 215 (EO 215). A National Environmental Policy Act (NEPA) Environmental Assessment was also prepared for United States Coast Guard (USCG) review in support of USCG decision-making on a bridge permit application for replacement of the NBB.

The Proposed Project is described in Section 2.2. This section explains the purpose and need for the Proposed Project, setting out the essential requirements that must be satisfied.

1.2 Background

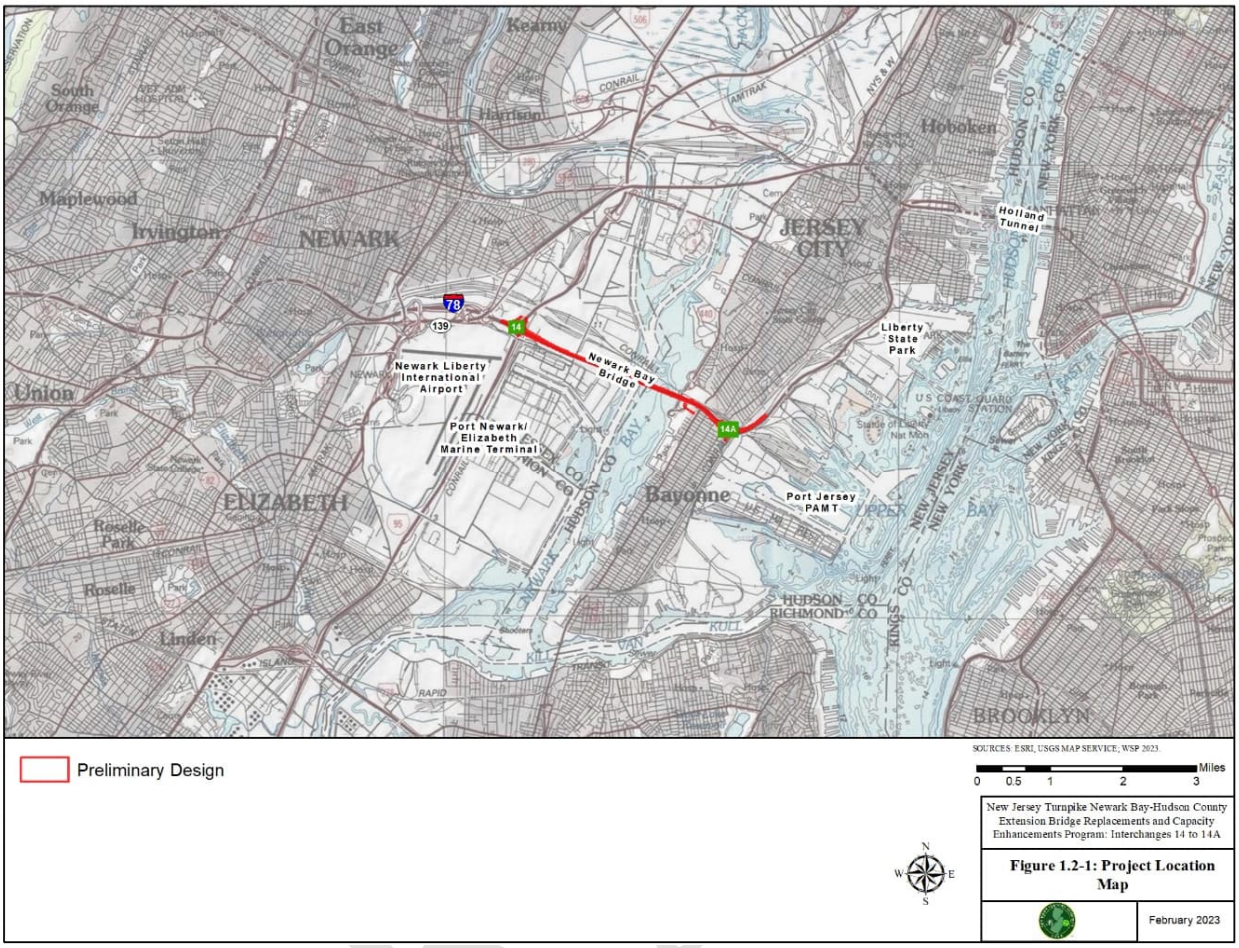
1.2.1 Newark Bay-Hudson County Extension and the Regional Context

The New Jersey (NJ) Turnpike was the first modern toll road in New Jersey and the third in the nation when it opened in 1951. The 8.1-mile long NB-HCE was added to the NJ Turnpike system in 1956.

The NB-HCE consists of two travel lanes in each direction from Interchange 14 in Newark (milepost N0.0) to its eastern terminus at Jersey Avenue in Jersey City, Hudson County (milepost N8.1). The location, limits, and route of the NB-HCE are shown in Figure 1.2-1. The NB-HCE forms a portion of Interstate Route 78 (I-78) which has its western terminus at I-81 northeast of Harrisburg, Pennsylvania, and its eastern terminus at the New York portal of the Holland Tunnel in Lower Manhattan. At the Jersey Avenue NB-HCE terminus, I-78 merges with NJ Route 139 to form the Port Authority of New York and New Jersey's (PANYNJ's) approach roadways to and from the Holland Tunnel under the Hudson River connecting Hudson County and New York County in New York.

The NB-HCE provides access between Newark in Essex County, the NJ Turnpike's mainline (I-95) at I-78 west at Turnpike Interchange 14 and Bayonne and Jersey City in Hudson County. The NB-HCE serves facilities of national, regional, statewide, and local importance, including Newark Liberty International Airport (EWR) and Port Newark-Elizabeth Marine Terminal (Interchange 14), the Port Jersey Port Authority Marine Terminal (Port Jersey PAMT) (Interchange 14A, milepost N3.5), Liberty State Park and Statue of Liberty National Monument (Interchange 14B, milepost N5.5), Liberty Science Center and Hudson-Bergen Light Rail Park-Ride (Interchange 14C, milepost N5.9), and New York City via the Holland Tunnel (at Jersey Avenue). The Port of New York and New Jersey), of which the Port Newark-Elizabeth and Port Jersey PAMT are major components, is the second largest port in the United States based on cargo volume and EWR is the nation's fifteenth busiest airport by passenger volume (Burnson 2021).

Figure 1.2-1. Project Location Map



The NB-HCE is part of the National Highway System (NHS) which was established by National Highway System Designation Act of 1995 and approved by Congress. As such, the NB-HCE is part of the network of nationally significant highways that are important to the nation's economy, defense, and mobility. With the Moving Ahead for Progress in the 21st Century Act of 2012, the scope and extent of the NHS was modified to create the Strategic Highway Network (STRAHNET) of highways critical to the Department of Defense's domestic operations. The STRAHNET is a system of roads deemed necessary for emergency mobilization and peacetime movement of heavy armor, fuel, ammunition, repair parts, food, and other commodities to support U.S. military operations. The NB-HCE is part of the STRAHNET, and the portion of NJ Route 440 between Prospect Avenue/Port Terminal Road and Interchange 14A is designated as a STRAHNET connector.

The NB-HCE is also designated as a Coastal Evacuation Route by the New Jersey Office of Emergency Management.

1.2.2 NJ Turnpike Authority Strategic Plan and Long-Range Capital Plan

The Authority adopted a Long-Range Capital Plan in May 2020 that includes capacity enhancements to the NB-HCE between Interchanges 14 and 14A and Interchanges 14A and 14C, and reconstruction of the NB-HCE between Interchange 14C and Jersey Avenue. The Long-Range Capital Plan is an outgrowth of the Authority's Strategic Plan, adopted in January 2020. During the development of the Strategic Plan, specific goals were identified for each of five major categories – safety, finance, mobility, state of good repair, and

people – of which safety, mobility, and state of good repair relate directly to the development of the NB-HCE Program.

With respect to safety, the Strategic Plan notes:

Safety of our customers, employees, and contractors has always been and will continue to be a priority of the Authority. We provide our customers with safe roadways by maintaining our infrastructure and implementing emerging safety technologies. We also deliver our customers safe passage through work zones and offer service areas to rest along their journeys.

The mobility goal of the Strategic Plan is summarized as follows:

A primary goal of the Authority is to provide mobility, that is, a safe and efficient roadway system to allow people and goods to travel from one location to another. Maintaining and improving mobility is directly related to the Authority's core values of customer satisfaction, innovation, and resiliency and sustainability.

One specific initiative of mobility in the Strategic Plan is vehicle throughput. The initiative identifies and implements solutions to relieve high congestion areas at toll collection points, ramps, and mainline sections.

As for state of good repair, the Strategic Plan notes:

As a foundation of safety, resiliency and sustainability, and customer satisfaction, the Authority strives to maintain a state of good repair for all of our assets. A state of good repair means that existing assets are functioning as designed and are sustained through preventive maintenance and replacement programs. Maintaining a state of good repair will increase the useful life of Authority assets, result in cost savings over time, and is vital to customer safety.

The intent of this goal is to maintain a state of good repair for the Authority's bridges using both timely preservation methods for bridges in poor condition, and the replacement of those determined to be at or near the ends of their service lives. This goal provides continued safety and well-being of the customers. In addition, the Authority endeavors to maintain its drainage infrastructure to properly route water. This increases resiliency, prevents damage to infrastructure, and allows continued use of the roadways during storm events.

1.3 Purpose of the Proposed Project

The purpose of the Proposed Project is as follows:

- Improve the long-term integrity of the structures on the NB-HCE between Interchanges 14 and 14A to maintain the structures in a state of good repair over a minimum 100-year service life to a goal of a 150-year service life by resolving the factors contributing to the deterioration of the structures and in so doing minimizing the frequency of disruptions to the roadway's users from maintenance and repair of the structures over the life cycle of the improvements.
- Improve mobility between Interchanges 14 and 14A by attaining level-of-service (LOS) D or better traffic flow quality and in so doing enhance access to communities, businesses, and multimodal facilities served by the NB-HCE near the interchanges, while safely and efficiently accommodating growing vehicular demand on this portion of the NB-HCE into the foreseeable future.

These purposes are consistent with goals of the Authority's *Strategic Plan*.

1.4 Underlying Transportation Problems and Needs

As described more fully below, traffic growth and substantial port-related heavy vehicle/truck activity have degraded operating conditions in the corridor and have contributed to the current poor physical conditions of the NB-HCE's roadway pavement and bridges, leading to development of a Proposed Project that addresses

the associated state of good repair and mobility needs, while addressing substandard roadway and structural features. The North Jersey Transportation Planning Authority (NJTPA) Long-Range Plan ("Plan 2050", NJTPA 2021a) addresses multiple projects for mass transportation and roadway improvements. The Proposed Project is necessary even with all of the other planned and programmed investments in mass transportation to handle projected increases in vehicular trips and other freight-based trips associated with regional port activity.

1.4.1 Need to Address the Integrity of Roadway and Structures

Over 80 percent of the NB-HCE roadway between Interchanges 14 and 14A is on bridge structures, all of which are approaching or at the end of their design service lives. The NBB is the main feature of the NB-HCE between Interchanges 14 and 14A. Approximately 1.85 miles long and comprising the main bay span and the west and east approaches, the bridge itself encompasses nearly half of the approximately 4-mile NB-HCE length between Interchanges 14 and 14A.

The main span of the NBB is a through tied arch. As such it has two major load carrying members known as tie-chords. These tie-chords are non-redundant tension members that are designated as Fracture Critical Members (FCMs) and, as is typical with a bridge of this age, have experienced a degree of deterioration. Structural redundancy is required for the long-term serviceability and resiliency of new bridges and highly desired in rehabilitation schemes for existing bridges. There is no economically feasible way to retrofit the existing NBB to provide long-term full-service structural redundancy. Therefore, full replacement is required to remedy the current FCM status of the bridge.

Most of the NB-HCE structures were constructed circa 1955, putting the typical structure's age at 67 years; 75 years is the generally accepted anticipated useful life of bridges constructed in the 1950s. The structures were designed to 1949 American Association of State Highway Officials Standard Specifications for Highway Bridges, which primarily used riveted steel member superstructures and cast-in-place concrete substructures supported on steel H-piles and timber piles. Most of the bridges do not meet current truck live loading capacity or seismic (earthquake event-related) standards.

The NBB has experienced nearly 70 years of fatigue-inducing dynamic live load stresses on steel members, typical of any structure of that age. Current and future live loading substantially exceeds the original design loads both in magnitude and frequency. As a result, future fatigue cracks in critical structural members are inevitable.

The NB-HCE structures require regular, extensive, and costly maintenance and rehabilitation, which necessitate complicated traffic control and protection measures and cause substantial delays and inconvenience to motorists. Recently, the Authority has realized an increase in the required repairs for the existing structures resulting in a nearly constant state of construction, which is anticipated to continue for the foreseeable future. In addition, the Authority has experienced emergency repairs of the existing structures necessitating the temporary closure of the roadway until repairs could be completed.

1.4.2 Need to Reduce Congestion

There has been long-term overall growth in traffic using the NB-HCE since its opening in 1956 despite periodic disruptions to roadway usage such as the 1970s oil crisis, 1990 and 2008 recessions, traffic diversions to NB-HCE from the 2014 to 2018 Pulaski Skyway Reconstruction, and recoveries from 9/11, Superstorm Sandy, and the COVID pandemic. The increase in traffic volumes on the NB-HCE between Interchanges 14 and 14A in two recent years are largely outside a "disruption period," which is reflected by the differences in 2013 (pre-Pulaski Skyway Reconstruction) and 2019 (post-Pulaski Skyway reconstruction and pre-COVID) traffic volumes. In terms of two-way annual traffic volumes, the 2013 volume was 28,111,653 and the 2019 volume was 33,994,191; this is a 20.9 percent increase. While these data points do not represent a trend, they are indicative of increasing travel demand between Interchanges 14 and 14A during a period of economic growth.

The traffic growth on the NB-HCE is attributed to various factors, including the following:

- Population and employment growth in the region.
- A general increase in automobile ownership and usage over time.
- Transformation of large portions of the Jersey City and Hoboken waterfront from port and railroad uses into densely developed commercial, retail, and residential uses.
- The increase in the movement of goods through the ports served by the roadway, including the repurposing of the former Military Ocean Terminal at Bayonne into Port Jersey South and the Global Container Terminal.
- The increase in online merchant deliveries to homes and businesses, among other factors.

Jersey City has experienced strong population growth since 1980, turning around 50 years of population decline. Between 2010 and 2020 alone, Jersey City's population grew 18.1 percent, while Jersey City employment grew 23.4 percent. The Jersey City waterfront business district has also seen substantial growth since 1980, transforming the district into "Wall Street West." Strong population and employment growth in the cities served by the NB-HCE, and associated travel demand growth, is expected to continue to the current regional planning forecast year, 2050, as shown in Table 1.4-1.

Table 1.4-1. NB-HCE Cities' Projected Population and Employment Growth: 2020-2050

	Population Projections			Employment Projections		
City	2020	2050	Compound Average Growth Rate	2020	2050	Compound Average Growth Rate
Bayonne	66,655	74,750	0.3%	18,022	22,999	0.7%
Hoboken	53,488	58,282	0.2%	23,261	27,503	0.5%
Jersey City	274,752	387,098	1.0%	130,425	165,144	0.7%
Newark	289,500	334,773	0.4%	159,745	183,214	0.4%
Four-City Total	684,395	854,903	0.6%	331,452	398,860	0.5%

Source: NJTPA 2021b

During the 2020 to 2050 time frame, Jersey City's population is expected to grow at a robust 1.0 percent annual rate. Jersey City's employment is also projected to experience strong growth at a 0.7 percent annual rate. Meanwhile, Bayonne's employment growth rate is projected to match that of Jersey City's, driven in large part by port and intermodal employment growth from the expected expansion of Port Jersey PAMT near Interchange 14A in Bayonne and Jersey City along the New York Upper Bay waterfront, as described in the PANYNJ 2050 Port Master Plan (PANYNJ 2019).

The chief measure of freeway operational quality is Level of Service (LOS), which is categorized as follows:

- LOS A - Free-flow operation.
- LOS B - Reasonably free flow.
  - Ability to maneuver is only slightly restricted.
  - Effects of minor incidents still reasonably absorbed.
- LOS C - Speeds at or near free-flow speeds.

- Freedom to maneuver is noticeably restricted.
- Queues may form behind any significant blockage.

- LOS D - Speeds decline slightly with increasing flows.
  - Density increases more quickly.
  - Freedom to maneuver is more noticeably limited.
  - Minor incidents create queuing.
- LOS E - Operations at or near capacity.
  - No useable gaps in the traffic stream.
  - Operations extremely volatile.
  - Any disruption causes queuing.
- LOS F - Breakdown in flow.
  - Queues form behind breakdown points.
  - Demand exceeds capacity.

LOS D is the Authority's desired operational quality of service for such urbanized sections of the NJ Turnpike system as the NB-HCE.

As shown in Table 1.4-2, existing (2021) roadway traffic volumes exceed the roadway's capacity, causing LOS F traffic flow conditions during the peak hour in both directions, except for the PM peak westbound direction where volumes are only slightly below the roadway's capacity (LOS E).

Table 1.4-2. 2021 (Base Year) and 2050 No Build Travel Conditions between Interchanges 14 and 14A

	AM Peak Hour Traffic Flow			PM Peak Hour Traffic Flow		
	Traffic Volume	Volume/Capacity Ratio	Level of Service	Traffic Volume	Volume/Capacity Ratio	Level of Service
2021 Existing						
Eastbound	4,533	1.26	F	3,853	1.01	F
Westbound	3,639	1.04	F	3,570	0.95	E
2050 No Build						
Eastbound	4,909	1.36	F	4,173	1.10	F
Westbound	3,942	1.12	F	3,866	1.03	F

Source: WSP 2022

Traffic flow on the NB-HCE will only worsen in future years as travel demand within and through the NB-HCE grows. Without additional roadway capacity between Interchanges 14 and 14A, LOS on the NB-HCE will further deteriorate from already congested conditions.

In addition, while there are alternate routes to the NB-HCE for vehicles traveling between areas served by Interchange 14 and Interchange 14A and other destinations served by the NB-HCE, these routes have limitations. U.S. Route 1/9 provides a connection between Newark and Jersey City via two paths: the Pulaski Skyway and U.S. Route 1/9 Truck. Trucks have been barred from the Pulaski Skyway since 1934. U.S. Route 1/9 design is considered functionally obsolete for an expressway; for example, the roadway has no shoulders, making it subject to frequent traffic congestion. U.S. Route 1/9 Truck begins at Raymond Boulevard in Newark, crosses over the Passaic and Hackensack Rivers on moveable lift bridges and reconnects with U.S. Route 1/9 north of the Tonnele Circle in Jersey City before NJ Route 139 carries traffic from the end of the Pulaski Skyway and the Tonnele Circle to a junction with the NB-HCE at Jersey Avenue and the approach to the Holland Tunnel. The portion of U.S. Route 1/9 Truck in Jersey City is a land-access route with numerous signalized intersections with local streets and curb cuts for driveways.

NJ Route 440 connects the Bayonne Bridge to the south and U.S. Route 1/9 Truck in Jersey City, and it intersects with the NB-HCE at Interchange 14A. Much of NJ Route 440 is predominately an arterial roadway and not a freeway and using it as part of an alternate route between the Interchange 14 area and the Interchange 14A area, via either U.S. Route 1/9 Truck or via the Goethals Bridge/I-278 and the Bayonne Bridge, greatly increases the travel distance and duration relative to the NB-HCE route. This explains why only the short segment of NJ Route 440 between Port Jersey PAMT's access roads and Interchange 14A is designated as a connector to the STRAHNET, of which the NB-HCE is a component.

Among the consequences of the increasing traffic congestion between Interchanges 14 and 14A in the absence of additional NB-HCE capacity are increased travel costs for users of the roadway from delays and general impedance of economic activity at the major economic activity centers served by the roadway.

1.4.3 Need to Address Substandard Features of the Existing Roadway

The following three existing substandard roadway issues for substantial portions of the NB-HCE between Interchanges 14 and 14A affect safety factors such as driver maneuverability, roadway drainage, and emergency response to incidents:

1. A left shoulder width of 2 feet, below the minimum required 5 feet for a two-lane roadway section.
2. Roadway cross slope of 1.0 percent on the NBB, below the minimum 1.5 percent desired for proper drainage from the higher centerline of the roadway to a drainage system on the lower sides of the roadway during rainfall events. Other sections of the NBB roadway between Interchanges 14 and 14A also have roadway cross slopes of less than 1.5 percent.
3. Substandard geometric elements, including inadequate configuration of interchange ramp merges with the NB-HCE, and undesirable consecutive ramp merges and lane drops. In addition, the area of the NB-HCE in Bayonne between the east end of the NBB and Interchange 14A has inadequate stopping sight distance and acceleration/deceleration lane lengths.

Inadequate shoulder width negatively affects the following:

- The ability of motorists to have an "escape zone" to avoid potential crashes or reduce crash severity.
- Driver comfort and roadway capacity.
- Emergency response vehicle mobility.
- The ability to provide lane shifts to maintain traffic flow during roadway maintenance activities. Specifically, the substandard existing left shoulder widths contribute to the complicated traffic control necessary to maintain the traffic lanes during frequent maintenance operations discussed in Section 1.4.1.
- The available lateral clearance for the placement of signs, guide rails, or other roadside appurtenances.

The flatter-than-desired minimum roadway cross slope translates into slower roadway drainage during precipitation events, which can negatively affect vehicle tire contact with the roadway and driver visibility due to excessive roadway spray. Meanwhile, substandard geometric elements negatively affect roadway capacity and vehicle maneuverability.

There is a need to address these issues to enhance NB-HCE roadway user, maintenance and construction worker, and emergency responder safety.

1.5 Key Performance Measures

In addition to the purpose and need, the Proposed Project has the following key performance measures:

- Incorporate measures to avoid and minimize environmental and community impacts.
- Avoid displacement of residences, businesses, and community facilities.
- Minimize impacts on other infrastructure assets, specifically navigation channels, aviation airspace, railroads, transit facilities, bicycle-pedestrian facilities, and electrical transmission and petroleum product distribution infrastructure.
- Minimize the economic impacts of existing and potential sea level rise in Newark Bay on such factors as navigational vertical (height) clearance of the NBB.

These performance measures provide a further basis for the comparative evaluation in Section 2.4 of those alternatives that meet the project purpose and adequately resolve the project needs.

1.6 Conclusion

There are numerous underlying and generally interrelated transportation problems that urgently need to be addressed through a modernization of the NB-HCE between Interchanges 14 and 14A, a roadway that was constructed nearly 75 years ago to the design requirements, truck weights, and operational needs of that period. Over 80 percent of the roadway is on bridge structures and nearly half of the roadway is on the NBB. The road and structures are nearing the end of their useful service lives. Without the modernization, more frequent and disruptive maintenance and repair investments will be needed for the Authority to maintain the roadway and structures in a state of good repair. Replacing the structures, including the NBB, to meet current loads and seismic requirements is an opportunity to address substandard design features of the existing roadway, provide a modern facility with at least a 150-year service life, and provide sufficient travel lane capacity for growing travel demands from rapidly growing population and employment in the cities served by the NB-HCE and from goods movement related to the growing Port Jersey PAMT, which is primarily accessed through the connecting NJ Route 440 at Interchange 14A.

2 Description of the Proposed Project and Alternatives to the Proposed Project

2.1 Introduction

This section of the EIS describes and assesses the Authority's Proposed Project for which the Authority has applied to the USCG for a Bridge Permit. This section also describes the process and criteria for comparing the Proposed Project with other alternatives considered leading to identification of alternatives for evaluation and comparison of environmental consequences in Section 2.4.

2.2 Description of the Proposed Project

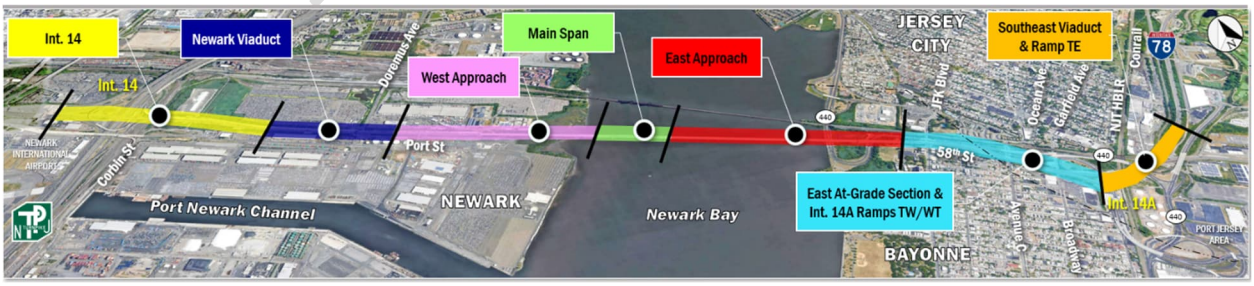
The Proposed Project was initially identified through a needs assessment conducted by the Authority for the entire 8.1-mile NB-HCE corridor. The recommendations of the needs assessment with respect to the portion of the NB-HCE between Interchanges 14 in Newark, Essex County, and 14A in Bayonne and Jersey City, Hudson County, were as follows:

- Replace all existing structures, including the NBB, to address the underlying structural integrity issues described in Section 1.4.1. The NBB replacement bridge type, and associated main span length, was not identified by the needs assessment pending further evaluation of the length of the main span relative to navigational clearances for the Newark Bay Main Channel North Reach Federal Navigation Channel, including further discussion with the USCG and U.S. Army Corps of Engineers (USACE) regarding the navigation needs of this area.
- Increase the number of travel lanes in each direction from two to four to address the underlying need to provide travel lane capacity sufficient to carry existing and future traffic volumes with uncongested traffic flow described in Section 1.4.2.
- Provide adequately wide roadway left shoulder area to provide for safety, future maintenance, and emergency vehicles and address the underlying need described in Section 1.4.3.
- Modify and improve ramp merges with the NB-HCE roadway and the sequencing of consecutive merges and lane drops to address the underlying issue of current substandard design described in Section 1.4.3.

Following the needs assessment, conceptual planning of the NB-HCE corridor was undertaken to advance further development of the Proposed Project.

The portion of the NB-HCE between the Interchanges 14 and 14A was divided into seven discrete areas longitudinally and laterally into preliminary limits of disturbance to facilitate analysis of design options in consideration of environmental resources and right-of-way impacts. The limits of the seven areas are shown on Figure 2.2-1.

Figure 2.2-1. Interchanges 14 to 14A Project Overview



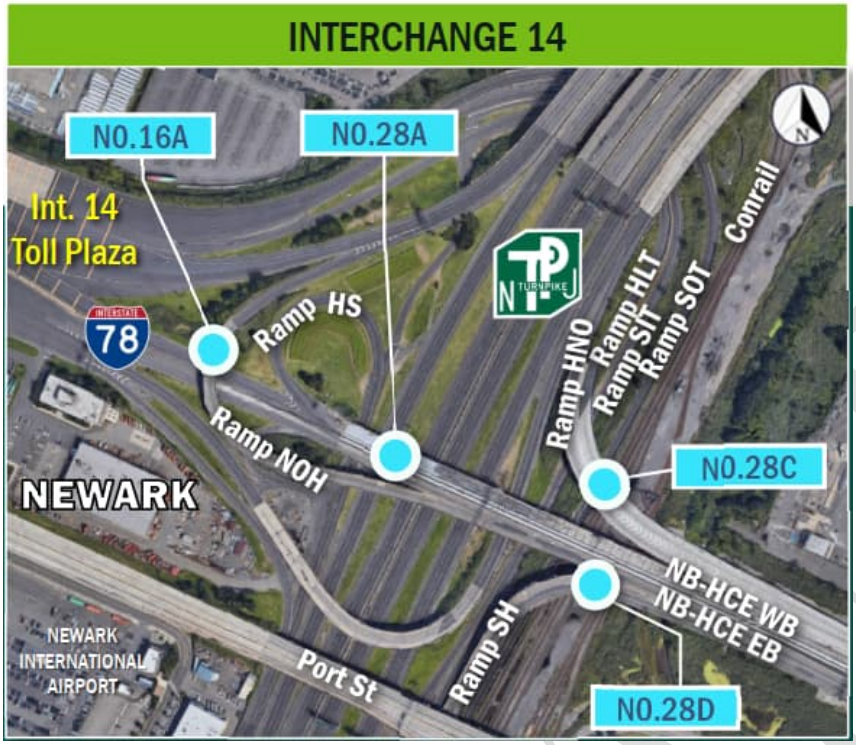
Source: Gannett Fleming (2022)

The limits of the discrete areas analyzed and the proposed improvements within each area are as follows.[4]

1. Interchange 14 ramp connections (MP N0.0 to MP N0.9). An interchange configuration that minimizes Ramp NOH intrusion into the approach flight path to EWR Runway 29L while improving the Ramp SH profile grade by crossing under the NB-HCE eastbound (see Figure 2.2-2).
2. Newark Viaduct (MP N0.9 to MP N1.2). An alignment realigning the NB-HCE westbound to the north to avoid impacting an existing Colonial Pipeline facility, minimize right-of-way acquisition, and allow a crossover between the existing and proposed NB-HCE viaduct structures to facilitate construction sequencing.
3. NBB West Approach - Newark (MP N1.2 to MP N1.7). A horizontal alignment realigning the NB-HCE westbound to the north to avoid staged demolition of the NB-HCE westbound viaduct structure, provide the necessary median gap width to accommodate the long-span main span bridge over Newark Bay, and minimize right-of-way impacts to a chemical facility property to the north.
4. NBB Main Span over the Newark Bay Federal Navigation Channel (MP N1.7 to MP N2.0). An alignment realigning the NB-HCE westbound to the north to provide the minimum distance between the existing and proposed bridges to accommodate a long-span bridge.
5. NBB East Approach - Bayonne (MP N2.0 to MP N2.7). An alignment realigning the NB-HCE westbound to the north that transitions gradually from the main span offset to the horizontal curve in Area 6.
6. Embankment Section through Bayonne and into Jersey City to the NB-HCE eastbound off-ramp to Interchange 14A and the Interchange 14A on-ramp to NB-HCE westbound toward Newark (N2.7 to MP N3.4). An alignment that improves substandard geometric elements (minimum radius, stopping sight distance, acceleration/deceleration lane length) while minimizing impacts to adjacent residences and avoiding impacting Route 440 (see Figure 2.2-3).
7. Southeast Viaduct and Ramp TE. Reconstruction of Structure No. N3.73 and Structure No. 3.53D, which carry the NB-HCE and Interchange 14A Ramp TE, respectively, over Interchange 14A Ramps ET and TW, multiple Conrail tracks, NJ Transit's Hudson Bergen Light Rail (HBLR), and NJ Route 440.

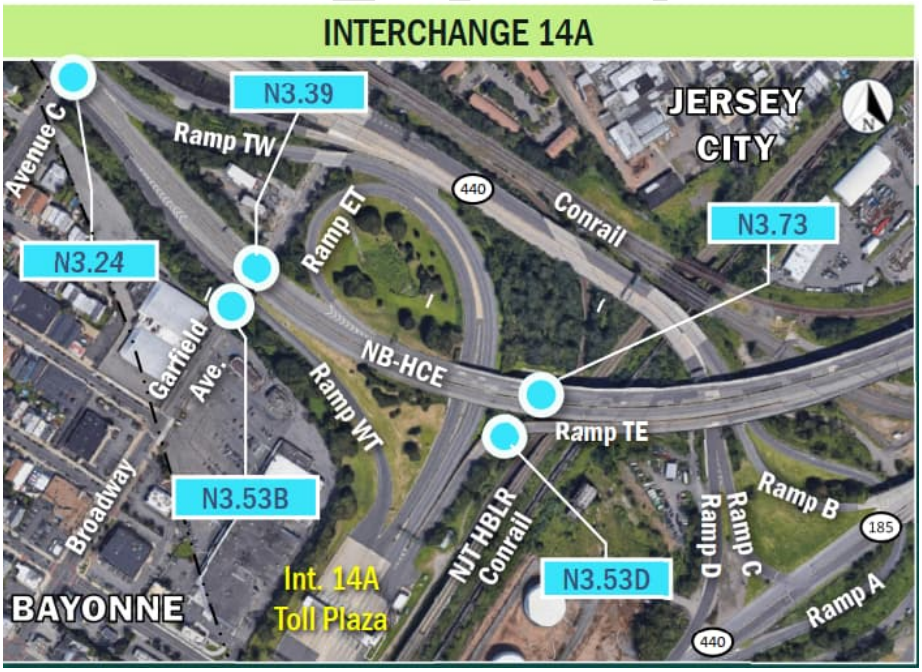
[4] "MP" indicates milepost and "N" refers to the NB-HCE, with MP N0.1 representing a point just east of the Interchange 14 Toll Plaza where the NB-HCE diverges eastward from the ramps connecting Interchange 14 to the north-south NJ Turnpike Mainline.

Figure 2.2-2. Interchange 14 Ramp and Structures



Source: Gannett Fleming (2022)

Figure 2.2-3. Interchange 14A Ramp and Structures



Source: Gannett Fleming (2022)

Traffic studies conducted during concept planning confirmed the need to increase the NB-HCE travel lane capacity of all six areas between Interchanges 14 and 14A from the existing two travel lanes in each direction to four travel lanes in each direction to accommodate existing and future travel demand safely and efficiently, with LOS D conditions in the 2050 planning year of analysis. In addition to replicating the 12-foot right roadway shoulders of the existing NB-HCE, the new roadway would provide standard 12-foot wide left shoulders from Interchange 14 to Interchange 14A. The cross slope of the new roadway will also provide a standard slope for improved drainage relative to that of the existing roadway.

The existing NBB and its approaches would be replaced with two parallel bridges. The replacement bridges' main spans would maintain the existing bridge's main span horizontal and vertical clearances of 550 feet and 135 feet, respectively. Like the existing bridge's main span, the replacement bridges' main spans would be wider than the 500-foot Newark Bay Main Channel North Reach Federal Navigation Channel. The proposed bridge approach spans will have a 3 percent profile grade, consistent with the profile grade of the existing approach spans. The proposed NBB will also not intrude on the designated EWR runway takeoff and landing airspace. The west and east approaches of the existing bridge would be replaced in conjunction with construction of the new bridges.

The replacement NBB construction would be staged as follows: (1) one of the new parallel bridges and its approaches would be constructed north of and nearby the existing bridge; (2) after construction of the first of the new bridges, eastbound and westbound traffic would be temporarily shifted from the existing bridge to the new bridge and the existing bridge would be demolished; (3) after demolition of the existing bridge, the second of the new bridges and approaches would be constructed on essentially the same roadway alignment of the existing bridge; and (4) after completion of the second bridge, eastbound NB-HCE traffic would be shifted to that new bridge's four travel lanes while westbound traffic would remain on the initially constructed bridge's four travel lanes.

The construction of the ramp and roadway improvements west and east of the NBB approaches would also be staged to maintain traffic flow during construction.

The preliminary schedule for the Proposed Project is to begin construction in 2026 and complete construction in 2031.

The project design concept resulting from the conceptual planning level analysis meets all elements of the Purpose and Need identified in Sections 1.3 and 1.4:

- Achieves current structural load standards and otherwise provides a 150-year service life to enable a state of good repair with minimal traffic disruption during maintenance activities.
- Eliminates all substandard features by providing a full left shoulder width (in addition to a full right shoulder width), a minimum 1.5 percent roadway cross slope, and standard ramp merges, stopping sight distance, and acceleration and deceleration lane lengths.
- Provides at least LOS D traffic flow quality to at least 2050, thereby addressing increasing travel demand generated by growth in port activity and residential and commercial development.

Meanwhile, the Proposed Project has been planned and designed to meet the project objectives identified in Section 1.5:

- Avoids and minimizes environmental and community impacts to the extent practicable.
- Avoids displacement of residences, businesses, and community facilities.
- Avoids impacts on other infrastructure assets, specifically, navigation channels, aviation airspace, railroads, transit facilities, bicycle-pedestrian facilities, and major electricity and petroleum product distribution infrastructure.
- Provides adequate vehicle throughput and work-zone safety throughout the duration of construction.

- Minimizes NB-HCE life-cycle maintenance needs and costs over the next 150 years to the extent practicable.
- Accommodates projected sea level rise consistent with NJDEP guidance while maintaining the existing NBB vertical clearance of 135 feet.

The Proposed Project has independent utility from the three NB-HCE Program improvements proposed by the Authority east of Interchange 14A. Specifically, the Proposed Project:

- Is independently justified, that is, it addresses a transportation purpose and need on its own without needing to construct other projects;
- Has logical beginning and end points, that is, at Interchange 14 at the beginning of the NB-HCE and at Interchange 14A, which serves the substantial travel demand of Port Jersey PAMT, Bayonne, and the Greenville neighborhood of Jersey City via connections to NJ Route 440 and NJ Route 185; and
- Does not limit the range of alternatives for the three NB-HCE Program projects east of Interchange 14A.

2.3 Description and Assessment of Alternatives Considered

This section describes various alternatives considered by the Authority. Section 2.4 and Section 2.5 describe a screening process to assess feasibility of each of the alternatives and why only the Proposed Project and No Action alternatives are advanced for evaluation of environmental impacts.

Alternative 1: Proposed Project

Description – The Proposed Project is described in Section 2.2.

Assessment – The Proposed Project would enable the Authority to construct a project that meets all elements of the purpose and need, and the project objectives as discussed in Section 2.2.

Alternative 2: No Action Alternative

Description – Under the No Action Alternative, the improvements described in Section 2.2 would not be constructed. The Authority would continue to make state-of-good-repair improvements to the NB-HCE structures but would not add capacity or safety improvements. The No Action Alternative is, however, the baseline against which the environmental consequences of the Proposed Project are compared.

Assessment – With this alternative: (1) the integrity of structures, which comprise 80 percent of the NB-HCE between Interchanges 14 and 14A, would continue to deteriorate from traffic load and the elements to the point where the structural sufficiency of the structures, including the NBB, could not be maintained even with extensive repairs and maintenance; (2) traffic flow would continue to deteriorate from already congested conditions, and from disruptions due to increasingly frequent repair and maintenance activities, and access to Bayonne, Jersey City's Greenville neighborhood, and Port Jersey PAMT would be increasingly impeded by traffic delays on the NB-HCE; and (3) roadway operations and drainage, vehicle maneuverability, and emergency response would be compromised by inadequate left shoulder areas, inadequate ramp merge areas, and other roadway geometric deficiencies that would not be corrected. For these reasons, the No Action Alternative does not address the underlying needs nor fulfill the project purpose.

Alternative 3: Fully Replace NBB and Add New Parallel NBB Structure to the South

Description – This alternative is identical to the Proposed Project except that instead of constructing a new parallel bridge to the north of the existing bridge to carry westbound traffic and then replacing the existing NBB with a new bridge to carry eastbound traffic, a new parallel bridge would be constructed to the south of the existing bridge to carry eastbound traffic, and the existing bridge would be replaced with a new bridge to carry westbound traffic.

Assessment – Conceptually, this alternative could meet the stated project purpose and all the underlying need criteria as it would essentially mimic the Proposed Project except that the new parallel structure would be provided to the south of the existing alignment rather than to the north.

Alternative 4: Fully Replace NBB with Structures Having Shorter Main Spans

Description – This alternative is identical to the Proposed Project except that instead of the new NBB main span maintaining the existing NBB's permitted horizontal clearance of 550 feet relative to the congressionally authorized 500-foot wide Newark Bay Main Channel North Reach Federal Navigation Channel, the new NBB would provide as narrow as 300 feet horizontal clearance. This alternative was considered by the Authority because the nearby Upper Bay (Lehigh Valley Railroad) Bridge over Newark Bay has a horizontal clearance of 300 feet, which is less than the Federal Channel's authorized 500-foot width.

Assessment – Conceptually, this alternative could meet the stated project purpose and all the underlying need criteria.

Alternative 5: Fully Replace NBB and Increase Directional Capacity to Three Travel Lanes

Description – This alternative would be like the Proposed Project in that it would provide a full replacement of the NBB. However, under this alternative the roadway travel lane capacity between Interchanges 14 and 14A would increase from two to three lanes in each direction rather than increased to four travel lanes in each direction as with the Proposed Project.

Assessment – This alternative would address geometric and other design-related issues of the NB-HCE between Interchanges 14 and 14A, including those of the existing NBB. While the NB-HCE capacity increases, LOS E or worse would still occur in the eastbound direction during the AM peak hour. In addition, operational deficiencies would not be fully resolved. Immediately east of Interchange 14 toll plaza and NJ Turnpike Mainline, five lanes of traffic from three eastbound ramps would merge into the three-lane NB-HCE, requiring the dropping of the two right lanes. All traffic exiting the northbound NJ Turnpike to the eastbound NB-HCE would be required to merge. On the westbound side, three lanes would approach four ramps that require five lanes requiring two lanes to open up on the right side. The right lane would carry all traffic exiting to the north-south NJ Turnpike and local side of the Interchange 14 toll plaza.

Alternative 6: Rehabilitate Existing NBB without Adding Travel Lanes or Making Other Roadway Operational Changes

Description – Under this alternative, the existing NBB and other structures would be extensively rehabilitated and modified, and there would be no change in the travel lane capacity between Interchanges 14 and 14A. It is assumed that sections between Interchanges 14 and 14A having substandard roadway horizontal issues such as inadequate roadway and interchange ramp merge areas and limited sight distances could be corrected through reconstruction and realignment.

Assessment – The following factors were considered in assessing this alternative:

1. Extending the life of the existing NBB for another 150 years would be a continuous task of repairing deterioration (rust and rot) and repairing fatigue cracks which would accelerate and intensify. In addition, existing superstructure elements would need to be substantially replaced with modern materials and connections. The significant rehabilitation and frequent continued maintenance of the existing NBB would produce frequent disruption of travel and delays for roadway users from the maintenance activities because of lane closures and traffic shifts needed to accommodate equipment and materials and provide a safe working environment.
2. The existing NBB piers do not meet the current design codes for items such as seismic design. To achieve the stated purpose of the project, the piers would need to be reinforced with bulky collars

surrounding the piers, which would reduce the bridge's horizontal clearance from that permitted, and supplemental subsurface foundation enhancements would also be required.

3. Further modification to the NBB structure would be required to achieve the Proposed Project's resiliency goals, including meeting current design codes for redundant structural system load paths and materials used in critical members as well as adjustment of the NBB superstructure to address sea level rise.
4. Correcting the relatively flat roadway cross surface would require replacing the deck of the bridge and stringers, at substantial cost and disruption, or placing "fill" on the existing deck to raise the roadway centerline which would increase the deadload, accelerate fatigue, and possibly induce fatigue failure.
5. As noted in Section 1.4.1, there is no economically feasible ways to retrofit the existing NBB to provide long-term full-service structural redundancy.

In addition to the above considerations, this alternative would not address the stated purpose of reducing congestion, because it would not add travel lane capacity to attain at least LOS D traffic flow, nor would it address the roadway and ramp geometric deficiencies that impede the Authority's ability to accommodate growing travel demand safely and efficiently between Interchanges 14 and 14A.

Alternative 7: Rehabilitate Existing NBB and Improve Traffic Flow through Roadway Operational Changes

Description – This alternative would be like Alternative 6 (Rehabilitate Existing NBB without Adding Travel Lanes or Making Other Roadway Operational Changes) except operational changes would be made in an attempt to improve traffic flow on the existing roadway between Interchanges 14 and 14A. Such operational changes that could theoretically be used are peak-period reversible travel lanes and peak-period shoulder use as a travel lane, as well as a combination of the two traffic management concepts. Implementing reversible lanes would require retrofitting the roadway cross-section and signage to have a moveable median barrier and transition zones for tapering directional lane drops and adds. Peak-period shoulder use would similarly require retrofitting signage, implementing transition zones, and providing at-the-ready incident response for crashes and breakdowns given the lack of a shoulder to better manage such incidents. A peak-period shoulder use concept alone could provide three lanes for vehicle travel in each direction, that is, the two existing travel lanes plus the right shoulder used as a travel lane. Meanwhile, the reversible lanes/shoulder use combination could provide up to four travel lanes in the peak-period peak direction while leaving two travel lanes in the other direction.

Assessment – The Authority temporarily implemented eastbound morning peak-period shoulder use during the Pulaski Skyway reconstruction to support the multi-agency regional approach to maintaining overall transportation system performance between Essex and Hudson counties during the reconstruction period between 2014 and 2018, and for an additional nine months after the Skyway reopened to traffic.

Research and case studies of this temporary shoulder use and implementation of shoulder use on other freeways have produced criteria for assessing the suitability of altering a freeway to allow shoulder use (FHWA 2016; Transportation Research Board 1995). Application of these criteria shows that an alternative providing permanent peak shoulder between Interchanges 14 and 14A while reducing congestion would not meet the stated purpose of safely and efficiently accommodating growing vehicular demand into the foreseeable future for the following reasons:

- The NBB cannot be retrofitted to provide pull-off or vehicle refuge areas for disabled vehicles or vehicles damaged in a crash. This situation applies to not only the NBB but also to most of the NB-HCE between Interchanges 14 and 14A as the roadway is 80 percent on structure. The general inability to provide periodic vehicle refuge areas combined with an elimination of the shoulder as a breakdown or emergency response lane during shoulder use periods means that emergency response times will be

slowed and incidents stopping traffic will cause a relatively quicker deterioration in traffic flow relative to the effect that similar incidents have on an unaltered NB-HCE.

- Vehicles in the shoulder lane would have a shorter sight distance and greatly limited lateral clearance, negatively affecting traffic flow and vehicle maneuverability in the shoulder lane relative to conditions in normal travel lanes.
- A higher truck crash rate would be expected with shoulder use compared to an unaltered freeway having a comparable number of travel lanes.
- A higher crash rate at ramp entries and exits would be expected with shoulder use compared to an unaltered freeway having a comparable number of travel lanes. Interchange 14A and the ramps between the NB-HCE and NJ Turnpike Mainline are all relatively high traffic volume entries and exits.

Meanwhile, an alternative of retrofitting the NB-HCE between Interchanges 14 and 14A, whether with or without peak period shoulder use, would not reduce congestion or meet the stated purpose of safely and efficiently accommodating growing vehicular demand into the foreseeable future. A reversible lane reallocates roadway capacity for one direction of travel to provide additional capacity for the opposite direction of travel, typically, the higher travel direction during the peak period. For reversible lanes to be effective as a congestion reduction strategy, there needs to be a relatively large percentage difference in the directional traffic volumes, such as on freeway corridors that exhibit heavy commuter-oriented traffic directionality, so that the "lane-donor" direction's traffic flow is not negatively impacted by the shift of a travel lane for use by the other direction. As shown by the traffic volume data in Table 1.4-2, directional volumes between Interchanges 14 and 14A are relatively balanced during the peak travel hours with a 55.5 percent/44.5 percent eastbound/westbound split in the morning peak hour and a 51.9 percent/49.1 percent eastbound/westbound split in the evening peak hour. Even with a combined reversible-lane and peak shoulder use scenario, the two lanes for travel in the lower westbound direction would be insufficient for providing LOS D traffic flow.

In addition to the operational and safety issues, by retaining and rehabilitating the existing NBB structure, this alternative would have the same structural integrity issues of Alternative 6 (Rehabilitate Existing NBB without Adding Travel Lanes or Making Other Operational Changes), noting that correcting the roadway cross slope issue would be necessary not only for proper drainage but also for roadway safety given that the left travel lanes would have varying directional traffic flow between peak and off-peak periods.

Alternative 8: Rehabilitate Existing NBB and Add New Parallel NBB Bridge

Description – This alternative is similar to the Proposed Project in that it would provide adequate travel lane capacity to the NBB. However, unlike the Proposed Project, the existing NBB would be rehabilitated rather than replaced and would carry NB-HCE traffic in one direction and a new parallel structure, either north or south of the existing NBB, would be constructed to carry traffic in the opposite direction.

Assessment – While this alternative would meet the stated purpose of reduced traffic congestion, retaining the existing NBB structure and rehabilitating it would have the same structural integrity issues of Alternative 6 (Rehabilitate Existing NBB without Adding Travel Lanes or Making Other Operational Changes), noting that correcting the roadway cross slope issue would be necessary not only for proper drainage but also for roadway safety given that the existing NBB roadway would be converted from bi-directional traffic flow to one-way flow. This would greatly magnify the negative effects discussed for Alternative 6.

Alternative 9: Rehabilitate Existing NBB for Cars-Only Use and Add New Parallel Bridges for Mixed Car-Truck-Bus Use

Description – This alternative would be similar to Alternative 8 (Rehabilitate Existing NBB and Add New Parallel NBB Bridge) except that instead of having one eastbound bridge and one westbound bridge, the existing NBB would be rehabilitated to carry two-way car-only traffic, and two flanking parallel bridges, one to the north and one to the south, would be constructed to carry all vehicle classes, that is, cars, trucks, and buses

in each direction. This concept is the "dual-dual" roadway concept that characterizes the existing NJ Turnpike Mainline between the Pearl Harbor Memorial Turnpike Extension near Interchange 6 and the split between the NJ Turnpike Eastern and Western Spurs just north of Interchange 14. The "dualization" of the NB-HCE between Interchanges 14 and 14A would require extensive reconstruction and expansion of the footprint of the interconnections between the NB-HCE and the NJ Turnpike Mainline northbound and southbound roadways, and between the NB-HCE eastbound exit to Interchange 14A and the Interchange 14A entrance to the NB-HCE westbound. Moreover, the separate westbound roadways would then merge after the exiting ramps to the Mainline southbound and then immediately pass through the Interchange 14 barrier toll plaza a short distance away. Similarly, the separate eastbound roadways would merge after the eastbound Interchange 14A exit ramps to the two-travel lane NB-HCE east of Interchange 14A. Based on the similar merges on the NJ Turnpike Mainline from a dual-dual roadway to a dual roadway carrying all vehicle classes, a merge transition area of over 0.50 mile and a greater than 0.50-mile eastbound diverge transition from the dual roadway to the dual-dual roadway would also be necessary.

Assessment – While this alternative would meet the stated purpose of reduced traffic congestion, retaining the existing NBB structure and rehabilitating it would have the same structural integrity issues of Alternative 6 (Rehabilitate Existing NBB without Adding Travel Lanes or Making Other Operational Changes) as the seismic retrofit and substantial replacement of bridge elements would still be necessary and significant and frequent continued maintenance during the life cycle would still be required on the remaining bridge elements. While wear on the existing bridge would be reduced from shifting trucks and buses to new bridges, trucks and buses would still use the existing NBB during times when one or both of the mixed-vehicle roadways is closed for routine maintenance. The alternative would also not address the substandard left shoulder width need. Meanwhile, dualization of the less than 4-mile section of roadway between Interchanges 14 and 14A would be inefficient from a traffic operations perspective given the complexity of the system and the need to provide relatively long merge and diverge transition roadway sections between the dual roadway and dual-dual roadways of adjoining sections of the NB-HCE.

These reasons aside, the massive reconstructions of the NB-HCE interconnections with Interchanges 14 and 14A, and well as the NJ Turnpike Mainline, required for the dualization combined with the alignments of the mixed traffic roadways on both sides of the existing NB-HCE alignment would require extensive amounts of additional right-of-way.

2.4 Comparative Evaluation of Alternatives

Based on the assessments of the alternatives in Section 2.3, two rounds of alternatives comparisons were conducted. In the first round, alternatives were evaluated and either retained for additional analysis in a second round or eliminated from further analysis. Table 2.4-1 summarizes the assessments for comparison in the first round of analysis. An alternative was retained for analysis in the second round if it met both components of the stated purpose and adequately addressed all the underlying transportation problems and needs. An alternative was eliminated from consideration in the second round of analysis if it did not meet one or both components of the stated purpose because it does not adequately address one or more underlying needs, that is, the alternative cannot solve the transportation problem(s) articulated in the statement of purpose and need.

Based on the first round of evaluation, all the alternatives under which the existing NBB would be rehabilitated were eliminated from further analysis as each of them would have multiple unresolved issues related to long-term structural integrity and roadway user operations and safety. The lesser widening alternative of replacing the NBB with new structures providing three lanes of travel in each direction rather than four as under the Proposed Project does not meet the stated purpose of operating with LOS D level of traffic flow.

Although it does not meet the purpose and needs, the No Action Alternative is retained to provide a baseline for the evaluation of existing and future conditions.

The following three alternatives passed the first round of alternatives evaluation:

- Alternative 1: Fully Replace NBB and Add a New Parallel NBB Structure to the North (Proposed Project)
- Alternative 3: Fully Replace NBB and Add a New Parallel NBB Structure to the South.
- Alternative 4: Fully Replace NBB with Structures Having Shorter Main Spans (including a new structure and directional alignment either being north of or south of the alignment of the present NBB).

Table 2.4-1. Summary Comparative Evaluation of Alternatives

	Long-Term Structural Integrity Factors		Roadway User Operational & Safety Factors			
Alternative	Resolves Structural Deterioration and Recurring Substantial Costs and Roadway User Disruptions	Achieves Current Load & Seismic Requirements	Achieves Minimum of LOS D to at least 2050	Provides Standard Left Shoulder Width	Eliminates Substandard Roadway & Ramp Geometry	Achieves Desired Roadway Cross Slope
1. Proposed Project – Fully Replace NBB and Add New Parallel NBB Structure to the North	●	●	●	●	●	●
2. No Action (No Build)	○	○	○	○	○	○
3. Fully Replace NBB and Add New Parallel NBB Structure to the South	●	●	●	●	●	●
4. Fully Replace NBB with Structures Having Shorter Main Spans	●	●	●	●	●	●
5. Fully Replace NBB and Increase Directional Capacity to Three Lanes	●	●	○	●	●	●
6. Rehabilitate Existing NBB without Adding Travel Lanes or Making Operational Changes	○	◐	○	○	●	○
7. Rehabilitate Existing NBB and Improve Traffic Flow through Roadway Operational Changes	○	◐	○	○	●	○
8. Rehabilitate Existing NBB and Add New Parallel NBB Bridge	○	◐	●	●	●	◐
9. Rehabilitate Existing NBB for Cars-Only Use and Add New Parallel Bridges for Mixed Use	○	◐	●	○	●	◐

Key: ● Meets stated purpose and underlying need(s). ◐ Partially meets stated purpose and underlying need(s). ○ Does not meet stated purpose and underlying need(s).

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In the second round of evaluation, the three retained alternatives were evaluated based on each alternative's performance with respect to key performance measures identified in Section 1.5. These alternatives were Alternative 1 (the Proposed Project), Alternative 3 (Fully Replace NBB and Add New Parallel NBB Structure to the South), and Alternative 4 (Fully Replace NBB with Structures Having Shorter Main Spans).

Based on conceptual planning, it was concluded that the Proposed Project can be designed to adequately accomplish each of the key performance measures by incorporating measures to avoid, minimize, or mitigate environmental and community impacts; avoiding displacement of residences, businesses, and community facilities; generally avoiding and otherwise minimizing impacts on other major infrastructure assets; and addressing projected sea level rise in Newark Bay.

Alternative 3 (Fully Replace NBB and Add a New Parallel NBB Structure to the South) performs similarly to the Proposed Project except for two measures, specifically, Alternative 3 would not avoid displacing a business, and would not avoid impact to other major infrastructure. One business operation related to Port Newark along the south side of the NB-HCE in Newark would be displaced by Alternative 3, including the warehouse/distribution complex at 233-258 Port Street, which houses the operations of multiple logistics companies. The major infrastructure impacted by Alternative 3 would be PSE&G Port Street Substation and a Colonial Pipeline Company pumping station in Newark. Meanwhile, a southerly bridge would be closer to EWR Runway 29. Attaining a vertical height needed for a long-span bridge at the southerly location that maintains existing navigation clearances and also avoids penetrating EWR airspace regulated by the Federal Aviation Administration (FAA) would be extremely difficult. The impacts of Alternative 3 cannot be avoided through design.

Other impacts of Alternative 3 would be comparable to those of the Proposed Project given the same traffic volumes, similar footprint, and similar affected environment of the Proposed Project, that is, Newark Bay and associated wetlands, and proximate residential neighborhoods in Bayonne and Jersey City between Newark Bay and Interchange 14A.

Because the notable differences between Alternative 3 and the Proposed Project have been identified as the unavoidable business displacements and major infrastructure and regulated airspace impacts of Alternative 3, and there is a clear distinction in favor of the Proposed Project in a relative comparison of impacts, there is no need to consider Alternative 3 as a reasonable alternative to evaluate further.

Alternative 4 (Fully Replace NBB with Structures Having Shorter Main Spans) performs similarly to the Proposed Project except for one measure: Alternative 4 would impact the Newark Bay Main Channel North Reach Federal Navigation Channel. The Authority met on several occasions with representatives of the USACE, which developed and maintains the Channel as authorized by Congress; the USCG, which is authorized to approve the location and plans, including the horizontal and vertical navigational clearances of bridges over navigable waters; and the Maritime Association of the Port of New York-New Jersey sponsored Harbor Safety, Navigation, and Operations Committee which leads coordination of a major portion of the operational waterway stakeholders. Together, all ensure the continued safe and efficient operation of area waterways. During these meetings, the Authority discussed the alternative of instead of replacing the NBB with parallel bridges having main spans replicating the existing NBB's permitted horizontal clearance of 550 feet relative to the congressionally authorized 500-foot wide Newark Bay Main Channel North Reach Federal Navigation Channel, the new NBB parallel bridges main spans would provide as narrow as 300 feet horizontal clearance. This alternative was considered by the Authority because the nearby (approximately 1,000 feet upstream) Upper Bay (Lehigh Valley Railroad) Bridge over Newark Bay has a horizontal clearance of 300 feet, which is less than the Federal Channel's authorized 500-foot width, and a shorter NBB main span could potentially have lower construction and long-term maintenance costs with a replacement NBB relative to those of the Proposed Project. The general feedback to the Authority on this alternative was that it would substantially impact navigation operations and safety in the federal navigation channel.

As an alteration or permanent occupancy of the Federal Navigation Channel, Alternative 4 would be reviewed by USACE under 33 Code of Federal Regulations (CFR) 408 (Section 408). As noted by the USACE, "Proposed alterations must not be injurious to the public interest or impair the usefulness of the USACE project" (USACE 2018). Based on the feedback from stakeholders, this alternative could not be designed to meet the public interest in navigation operations and safety, and that the alternative would impair the usefulness of the congressionally authorized USACE civil works project. Further, under the USACE guidance, if there is a practicable alternative that avoids altering the USACE civil works project, in this case the Proposed Project, then USACE will not authorize the alteration. For this reason, Alternative 4 is not a reasonable alternative to evaluate further.

2.5 Conclusion

Nine discrete alternatives were considered and evaluated, including the Proposed Project and No Action alternatives. Of the nine alternatives considered other than the No Action, four alternatives involved replacement of the NBB, and four alternatives involved rehabilitation of the NBB. Each alternative was evaluated for its ability to meet the criteria of the stated purpose and underlying needs for the project in an initial round of evaluation. Five alternatives were eliminated in the first-round evaluation: the four rehabilitation alternatives and the alternative that involved replacing the NBB and widening the NB-HCE between Interchanges 14 and 14A to three travel lanes instead of four travel lanes as under the Proposed Project. The rehabilitation alternatives were eliminated primarily because none could meet the stated purpose to improve the long-term integrity of the structures on the NB-HCE between Interchanges 14 and 14A to maintain the structures in a state of good repair over at least a 150-year life cycle by resolving the factors contributing to the deterioration of the structures, and in so doing minimize the frequency of disruptions to the roadway's users from future maintenance and repair of the structures over the life cycle of the improvements. The three-lane in each direction widening alternative was eliminated because it would not provide for the traffic flow demand to at least 2050.

The Proposed Project and the other two NBB replacement alternatives were further evaluated and compared using four key performance measures for the project. The Proposed Project meets all the key performance measures while the other two NBB replacement alternatives do not. Alternative 3 (realigning the NB-HCE so that a parallel bridge would be constructed to the south of the existing NBB before replacing the NBB) was eliminated from further consideration because it would require displacement of multiple businesses, would impact two assets of major energy supply infrastructure, and would penetrate the regulated airspace of EWR. Alternative 4 (replacing the NBB with structures having a shorter main span over Newark Bay) was eliminated from further consideration because the alternative would alter and occupy the Newark Bay Main Channel North Reach Federal Navigation Channel, a civil works project authorized by the U.S. Congress and maintained by the USACE for navigation operation and safety.

Two alternatives, the Proposed Project and the No Action, are, therefore, retained for further evaluation and comparison in this environmental assessment.

3 Affected Environment and Environmental Consequences

3.1 Introduction

This section of the Environmental Impact Statement describes the human environment and natural resources that would be affected by the Proposed Project. The description of the existing environment provides the baseline for comparing effects or impacts of the Proposed Project and No Action alternatives on the affected environment (or the Existing Conditions). An effect or impact is identified in terms of whether it is direct, indirect, or cumulative relative to those factors most evidently affected by the Proposed Project.

The Council on Environmental Quality's (CEQ's) NEPA regulations (40 CFR 1500-1508) are used herein to define effects and impacts as follows:

1) Direct effects, which are caused by the action and occur at the same time and place.

2) Indirect effects, which are caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems.

3) Cumulative effects, which are effects on the environment that result from the incremental effects of the action when added to the effects of other past, present, and reasonably foreseeable actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

4) Effects include ecological (such as the effects on natural resources and on the components, structures, and functioning of affected ecosystems), aesthetic, historic, cultural, economic, social, or health, whether direct, indirect, or cumulative. Effects may also include those resulting from actions which may have both beneficial and detrimental effects, even if on balance the agency believes that the effects will be beneficial.

Compliance with applicable regulatory requirements is described along with descriptions of measures proposed to be undertaken in implementing the Proposed Project to avoid, minimize, and otherwise mitigate and monitor adverse environmental impacts, where appropriate.

3.2 Regional and Local Settings

The western end of the NB-HCE between Interchanges 14 and 14A extends through a heavily developed portion of Northern New Jersey characterized by major port intermodal and other transportation infrastructure, including receiving and shipping terminals, warehouses, railroad facilities, highways, access roads anchored by the Port Newark-Elizabeth Marine Terminal on Newark Bay immediately south of the NBB and Newark Liberty International Airport (EWR) at Interchange 14, and the Port Jersey PAMT on Upper New York Bay immediately east of Interchange 14A. The residential and business districts of Newark lie to the west of Interchange 14. Crossing Newark Bay into Bayonne, the NB-HCE passes through a less densely developed southern end of the New Jersey Palisades, locally Bergen Hill, with waterfront parks and highways, a scattering of late nineteenth- and early twentieth-century residential and commercial development, and extensive highway interchanges, connector roads, and railroads along the boundary of Bayonne and Jersey City.

3.3 Land Use

3.3.1 Study Area and Data Collection

"Land use" is the term used to describe the human use of land (EPA 2021). It represents the economic and cultural activities (e.g., agricultural, residential, industrial, mining, and recreational uses) that are practiced at a given place.

The land use study area for the Proposed Project represents the NB-HCE corridor between Interchanges 14 and 14A including portions of Newark, Bayonne, and Jersey City within approximately a quarter mile (1,320 feet) of the NB-HCE (see Figures 3.3-1a and 3.3-1b). This distance reflects the typical extent of freeway operational and accessibility effects, for example, noise and development influence, on land uses near the freeway.

Land use changes occur constantly and at many scales and can have specific and cumulative effects on air and water quality, watershed function, generation of waste, extent and quality of wildlife habitat, climate, and human health. Transportation infrastructure has always been a critical element to land development in Newark, Bayonne, and Jersey City. The Morris Canal was constructed in the 1830s, linking Jersey City to the Delaware River and solidifying the city's central role in waterborne transportation. In the mid to late nineteenth century, major railroad companies built lines through the cities to terminals along the Hudson River waterfront, serving commerce between Manhattan and New Jersey and the nation's interior. The western edge of Newark Bay was originally the Newark Meadows, shallow tidal wetlands covering about 12 square miles. In the 1910s, the city of Newark began excavating an angled shipping channel in the northeastern quadrant of the wetland. This became the basis of Port Newark. Work on the channel and terminal facilities on its north side accelerated during World War I, when the federal government took control of Port Newark. The PANYNJ was formed in 1921 and the Newark Bay Channels were authorized by the Rivers and Harbors Acts in 1922. Shipping operations languished after the war, and in 1927, the city of Newark started construction of Newark Airport (now known as Newark Liberty International Airport [EWR]) on the northwestern quadrant of the wetlands that lay between Port Newark and the edge of the developed city. The Port Authority took over the operations of Port Newark and Newark Airport in 1948 and began modernizing both facilities and expanding them southward.

On the east side of Newark Bay, Bayonne became one of the largest centers in the nation for refining crude oil notably including the Standard Oil of New Jersey's facility, originally established in 1877, which employed approximately 6,000 workers. A 430-acre site in Bayonne on the Upper New York Bay waterfront that had been originally developed for industrial uses in the 1930s was taken over by the U.S. government during World War II as the Military Ocean Terminal at Bayonne. Meanwhile, the development of the railroad system required the expansion of Jersey City's eastern boundary to extend into the Hudson River, which resulted in filling low-lying wetlands. This historic area of fill accounts for a large portion of the city's total land acreage.

By the time the NB-HCE and NBB were constructed in the mid-1950s, highway routes were already well developed between the New Jersey mainland and the Hudson County peninsula, most notably the Goethals Bridge/Bayonne Bridge route and the Pulaski Skyway constructed in the 1920s as efforts to adapt to individual passenger vehicles and heavy commercial truck traffic took hold. The NB-HCE was built largely on filled land alongside railroad routes now comprising the Consolidated Rail Corporation's (Conrail's) National Docks Branch.

Figure 3.3-1a. Land Use, Community Resources and Proposed Development – Newark

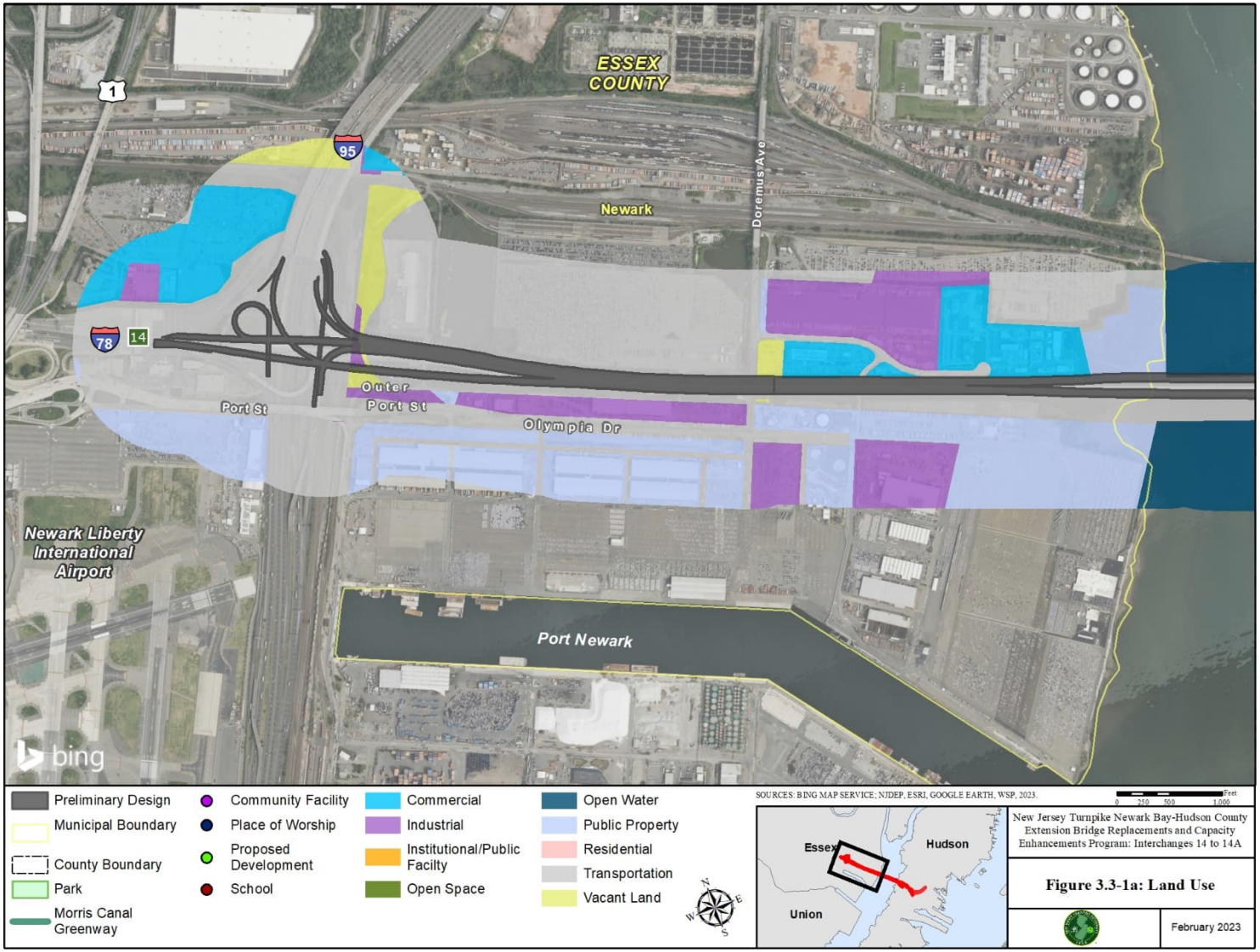
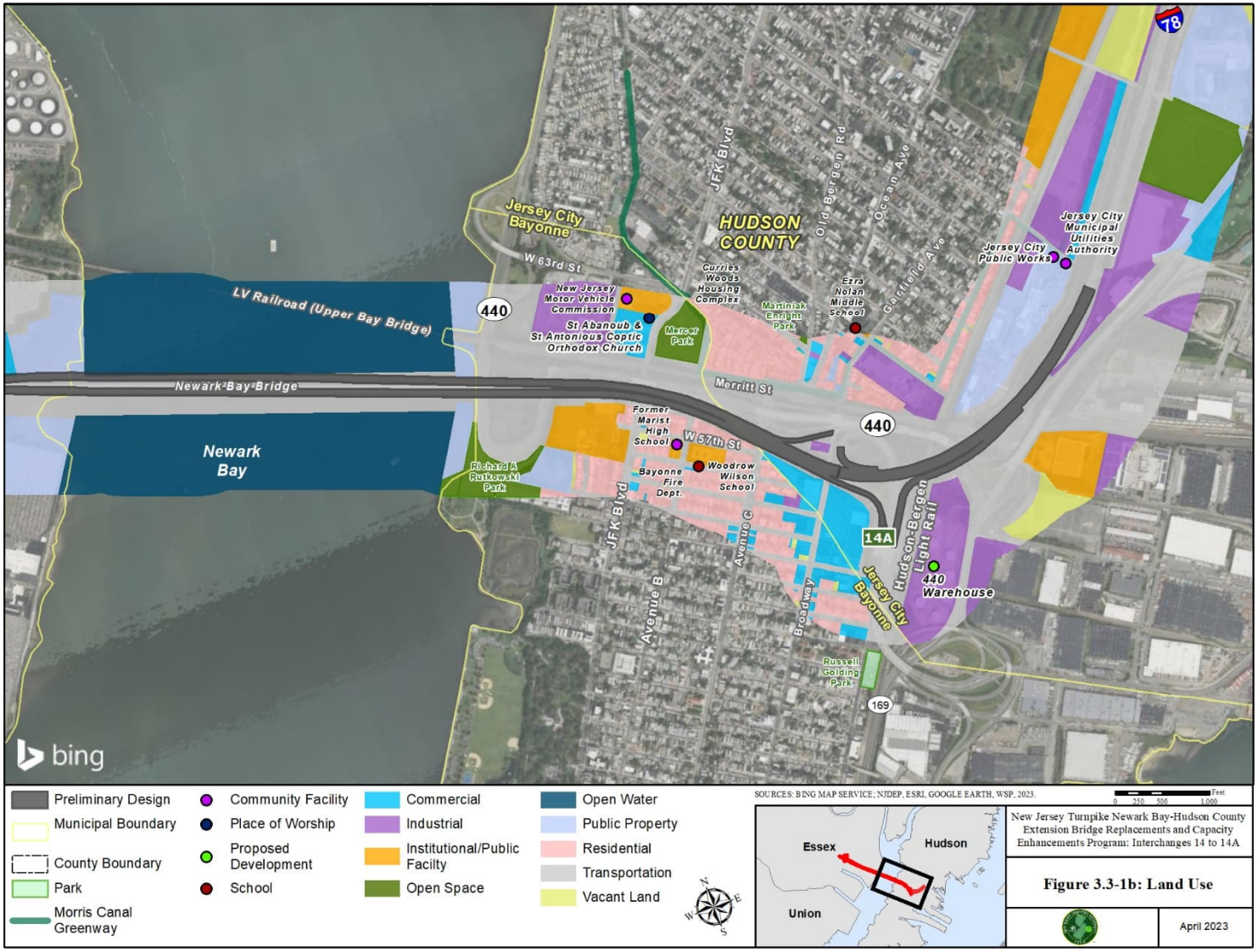


Figure 3.3-1b. Land Use, Community Resources and Proposed Development – Bayonne and Jersey City



Sources of data characterizing existing land uses within the study area include municipal and other governmental land use and zoning mapping and comprehensive plans, coordination with municipal planning and engineering departments, as well as windshield survey and aerial photographic analysis of the area. Parkland was identified through a search of the Recreation and Open Space Inventory (ROSI) database maintained by the New Jersey Department of Environmental Protection (NJDEP) Green Acres Program and the Office of Transactions and Public Land Administration (NJDEP 2022). The ROSI database includes municipal, county, and nonprofit parkland encumbered as a condition of Green Acres funding. Other sources consulted for parkland information include NJDEP's Division of State Parks and Forests online directories, the U.S. Department of the Interior National Park Service online directory, and a map of Federal Land and Water Conservation Fund supported projects maintained by the Land and Water Conservation Fund Coalition. Farmland was identified through a search of the New Jersey State Agriculture Development Committee Preserved Farmland Web Map.[5] There are no agricultural districts or farm properties within the study area limits; thus, an assessment of impacts to farmland is not required.

3.3.2 Methodology and Criteria

The assessment of the effects on land use of the No Action and Proposed Project alternatives evaluated the following relevant considerations:

- Whether the alternative would conflict with local and State plans.
- Whether the alternative would result in displacement or relocation of existing or planned residences or businesses.
- Whether the alternative would encroach on, affect access to, or otherwise effect parks, community facilities, or places of worship.

With respect to compliance with other applicable regulatory processes, the NJ Turnpike system is not subject to local land use regulations and the State Plan is guidance to State agencies and is not regulation of State agency activities. Diversion or disposal of parkland encumbered by New Jersey's Green Acres Program is subject to approval of the NJDEP Commissioner and the State House Commission. However, as no parkland will be acquired under the Proposed Project, there will be no disposal or diversion of parkland and this regulation does not apply to the project.

3.3.3 Existing Conditions

3.3.3.1 Planning and Land Use by Municipality

New Jersey Municipal Land Use Law requires that municipalities update and adopt a new master plan every 10 years as a blueprint for shaping the municipality's future. This section describes master plans and redevelopment plans relevant to the land use study area, as well as current land uses by type.

City of Newark – The City of Newark Master Plan was updated in 2022 through the "Newark360, Shaping Our City Together" initiative (City of Newark 2022a). Newark 360 is grounded in health, equity, and resilience and includes the following goals:

- Connect Newarkers to well-paying jobs within the city.

[5] SADC (New Jersey State Agriculture Development. 2022. Preserved Farmland of New Jersey. GIS dataset. Last updated September 28, 2022. Available [online] at the SADC Interactive Web Map, https://njdasadc.maps.arcgis.com/apps/webappviewer/index.html?id=fdca805ed431458da03ac706517057f6. Accessed December 16, 2022.

- Protect our residents from vulnerabilities.
- Continue to leverage our educational and medical anchor institutions.
- Leverage our assets – the Airport, Sea Port, and Industrial Districts as economic engines for the city.
- Continue to foster new jobs, clean industries, and a range of industry sectors.
- Support and encourage locally grown businesses across all sectors.
- Build Community Wealth for all Newarkers.
- Support Newark's diverse and vibrant arts and culture scene.
- Bring new vibrancy to our existing historic buildings and public spaces.
- Support Newark's artists and makers.
- Enhance the accessibility, functionality, experience, and condition of Newark's existing parks.
- Pursue opportunities to expand the park system and add usable green space to the city.
- Connect Newark neighborhoods to each other and to job centers.
- Invest in and expand our neighborhood corridors.
- Ensure affordable housing at all income levels, calibrated to needs of each neighborhood.
- Increase neighborhood health, resilience, and preparedness for climate change impacts.
- Ensure housing security for Newark families.
- Improve the quality of Newark's building stock.
- Enable Newarkers of all ages and abilities to safely move around the city.
- Leverage sustainable development to improve outdoor air quality.
- Expand access to resources for healthier living.
- Address the legacy of environmental injustice by investing in community development.
- Create capacity to manage stormwater equitably.
- Bridge the digital divide for all Newarkers.
- Leverage the energy transition to build a cleaner, greener, smarter, and more efficient city.
- Expand regional connectivity and recreation networks.

- Improve existing transit infrastructure.

There are no redevelopment plans for any area of the city within this project's study area. However, Newark initiated a planning process in 2020 known as Forward Bound Doremus for the City's core port-industrial area anchored by Doremus Avenue with a southern boundary of the NB-HCE. A redevelopment plan has not yet been published.

Land use in the Newark portion of the study area is consistent with that shown on the Newark Zoning Map (City of Newark 2022b) and consists of the following designations:

- EWR: Airport/Airport Support north and south of the NB-HCE and west of the NJ Turnpike Mainline (related to Newark Liberty International Airport).
- I-3: Industrial High north of the NB-HCE and between the NJ Turnpike Mainline and Newark Bay.
- PORT: Port Industrial south of the NB-HCE and between the NJ Turnpike Mainline and Newark Bay (Port Newark).

There are no public parks, community facilities, places of worship, or proposed developments in the Newark portion of the study area (Figure 3.3-1a).

City of Bayonne – Bayonne completed a Reexamination of its 2000 Master Plan in 2017 (Bayonne 2017). The primary areas of focus of the 2000 Master Plan were affirmed through the Reexamination, including the following items, among others: redevelopment of the Military Ocean Terminal as a livable and real urban district; thriving mixed-use center with a deepwater port; promoting the Broadway Central Business District as a livable and real urban district; and capitalizing on the Hudson-Bergen Light Rail Transit Stations (Avenue E Transit District) (City of Bayonne 2000). The Reexamination noted that at that time the Authority was reconstructing Interchange 14A to address congestion and inadequate connections that were identified in the 2000 Plan. The 2017 Reexamination supported the Port Jersey complex as an active marine terminal, including providing adequate truck and freight access with an emphasis to increase intermodal connections. Another major objective was to increase the supply and location of parkland in the city and promote the Newark Bay/Hackensack River Walkway (now referred to as the Hackensack RiverWalk) (City of Bayonne 2017).

Land use in the Bayonne portion of the study area is generally consistent with that shown on the Bayonne Zoning Map (City of Bayonne 2020), proceeding from west (Newark Bay) to east (Interchange 14A) as follows:

- C-2: Community Commercial District.
- R-M: High Density Residential District.
- R-2: Detached/Attached Residential District (the predominant district in the Bayonne portion of the study area).
- R-3: Medium Density Residential District.
- UBD: Uptown Business District (Broadway).
- TDD: Transit Development District (Avenue E).
- IL-B: Light Industrial District B.
- BMHO: Bayonne Metropolitan Harbor District (including portions of Port Jersey).

Specific land uses of interest in the Bayonne portion of the study area are shown on Figure 3.3-1b.

There are three public parks in the Bayonne portion of the study area: Richard A. Rutkowski Park, Mercer Park, and Russell Golding Park. These parks are described as follows:

- Richard A. Rutkowski Park (formerly known as Bayonne Passive Waterfront Park, or North Forty Park) is on a 40-acre former industrial site on Newark Bay south of the NB-HCE that received funding for constructing wetland restoration, observation decks, bike trails and other amenities through NJDEP's settlement with a company over natural resources damages (NJDEP 2005). The park is used for bird watching and recreation and has a walking path, a bike path, a Boatworks Monument, and parking facilities. The park is accessed from NJ Route 440 southbound and adjoining Stephen R. Gregg County Park via the Hackensack RiverWalk. Richard A. Rutkowski Park is accessed via transit by JFK Boulevard (NJ TRANSIT 10 and 119 buses). In 2003, the Hudson County Department of Public Resources Division of Parks and Recreation published the Hackensack RiverWalk Plan, a planned 8-mile waterfront park extending from Newark Bay in Bayonne through Jersey City to Bellman's Creek in North Bergen. The RiverWalk is contemplated to extend north from Richard A. Rutkowski Park and cross under the NBB adjacent to NJ Route 440 (Hudson County 2003). Richard A. Rutkowski Park is not listed on the Green Acres ROSI (NJDEP 2022).
- Mercer Park, located on the boundary of Bayonne and Jersey City north of the NB-HCE, is a 6.5-acre park established in 1909 and is part of the Hudson County parks system. Mercer Park contains walkways, two basketball courts, a lighted field for the dual use of youth baseball and football, a playground, spray park, outdoor fitness stations, and a picnic grove (Hudson County 2022). Mercer Park is accessed via transit by JFK Boulevard (NJ TRANSIT 10 and 119 buses) and Merritt Street (NJ TRANSIT 6 and 81 buses). Mercer Park is listed on the Green Acres ROSI (NJDEP 2022).
- Russell Golding Park is a 20.2-acre park established in 1969 located south of the Interchange 14A toll plaza on Avenue E between 48th and 50th streets. It contains a spray park, playground, basketball courts, benches, and walking paths. It was announced in 2022 that the park is to receive $5 million in federal funding for renovations. The park is accessed by transit via NJ TRANSIT 10, 119, and 81 buses and the Hudson-Bergen Light Rail 45th Street Station. Russell Golding Park is listed on the Green Acres ROSI (NJDEP 2022).

None of these parks were identified as having received funding through Section 6(f) of the Land and Water Conservation Fund Act of 1965 sources. No other parkland in the Bayonne portion of the study area was identified.

There are three community facilities in the Bayonne portion of the study area: Bayonne Fire Department Engine Company No. 6, Ladder Company No. 3 at 329 Avenue B; Woodrow Wilson Community School at 101 West 56th Street south of the NB-HCE; and the New Jersey Motor Vehicle Commission (MVC) Agency at 1347 JFK Boulevard. The Woodrow Wilson Community School educates approximately 750 students (pre-K through 8th grade) and is part of the Bayonne School District. The MVC Agency provides licensing services.

There is one place of worship in the Bayonne portion of the study area: St. Abanoub and St. Antonius Coptic Orthodox Church at 1325 JFK Boulevard north of the NB-HCE.

One proposed development/redevelopment plan was identified in the Bayonne portion of the study area, specifically, the proposed redevelopment of the former Marist High School property by a private developer and owner of the property: 1241 JFK Boulevard IPX, LLC (Figure 3.3-1b). The property (redevelopment area) consists of four land lots and one tax lot in the northwestern portion of the city. The structures on the property were demolished in 2022. One lot was home to the three-story school, two lots each contained one small building on the northwest portion of the site, and the fourth lot contained a soccer field. The tax lot is the site of a billboard. The site is surrounded by the NB-HCE to the north, residential properties to the south,

Rutkowski Park to the west, and frontage on JFK Boulevard to the east. The redevelopment area is zoned for both residential and industrial uses (Israel 2021, 2022).

The redevelopment plan was adopted by the Bayonne Planning Board in December 2021 (Hudson Reporter 2021). Under the redevelopment plan, permitted uses include: multi-family residential; assisted living; community center; self-storage; warehouse; office space; agricultural growing operations (both indoor and rooftop); retail uses not to exceed 20,000 square feet; hotel auto rental facilities; free-standing billboards; retail non-trucking fuel sales; equipment sales; art galleries; educational uses, including special needs; streets, sidewalks, and walkways; and any combination except warehouse and residential. Permitted accessory uses include: outdoor storage; business offices; pharmacy medical offices; wall-mounted electronic billboards; food service for employees; fitness centers and gyms; residential amenities; off-street parking; signage; rooftop solar arrays; outdoor plazas; outdoor seating, fences, landscaping, lighting, utilities, and refuse enclosures. Wall-mounted electronic message boards would only be on the north facing the NB-HCE.

City of Jersey City – Jersey City's Master Plan was adopted in 2021 (Jersey City 2021a) along with updated Open Space (Jersey City 2021b) and Land Use elements (Jersey City 2021c). The Land Use Element outlines the following Land Use Principles, with an expanded description of those principles relevant to the Proposed Project:

- Continue efforts to enhance residential neighborhoods.
- Ensure the City's available housing is balanced and meets the needs of all current and future city residents.
- Promote the development of a diversified economy. The Greenville Port[6] is a major driver of economic activity and has continued to thrive, largely due to growth in global trade. The City should continue to support the infrastructure and other needs of a twenty-first century port. Land use policies should provide for sufficient land-side facilities in port areas to serve port growth and generate port-oriented development (e.g., adequate rail service, road connections and storage). Given Jersey City's location along the highway network and proximity to New York City, there are also opportunities for last-mile distribution centers at or around highway interchanges.
- Strengthen neighborhood-oriented commercial areas.
- Promote innovation and industrial activity that is cleaner, greener, and job creating.
- Provide flexibility that allows large format retail and offices to adapt.
- Make the City more walkable, bikeable, transit friendly, and less reliant on the automobile. There is a particular need in Jersey City to reconnect areas separated by highway and utility infrastructure or superblock development. The City should require new development to make improvements to the circulation network and streetscape that increase safety and facilitate circulation for pedestrians and bicyclists.
- Improve open space assets and connect them to each other and into the community. The City should link existing parks and open space assets to form interconnected greenways that provide connectivity to neighborhoods, public facilities (i.e., schools and libraries) and employment areas. This network should include continued efforts to complete public access along both the Hudson and Hackensack Rivers and leveraging opportunities to reuse legacy infrastructure for greenways (e.g., Bergen Arches, Sixth Street Embankment, and Morris Canal). Development around these areas should support the transformation of these assets for public recreational use.
- Recognize and promote the richness of the City's historic assets and cultural diversity.
- Celebrate and beautify the public realm. In addition, more could be done to identify and strengthen gateways into the City as well as into individual neighborhoods.
- Protect and restore environmental assets and plan for sustainability. Reducing potential impacts from

[6] The Jersey City Master Plan refers to the area including Port Jersey PAMT as "the Greenville Port."

flooding remains as one of the City's most pressing needs. High volumes of surface water runoff from impervious surfaces exacerbate flooding during storm events, particularly in low-lying areas.

- Upgrade community facilities and infrastructure to accommodate population growth and address changing needs and ensure that major institutions can continue to thrive.
- Undertake zoning revisions to consolidate districts, clarify regulations, and address current issues.

Specific land uses of interest in the Jersey City portion of the study area are shown on Figure 3.3-1b. Land use in the Jersey City portion of the study area generally conforms with the Jersey City Zoning Map (Jersey City 2021d). Predominant zoning districts and land uses in the Jersey City portion of the study area proceeding west to east are as follows:

- NC: Neighborhood Commercial (along JFK Boulevard beginning approximately 1,000 feet north of the NB-HCE and NJ Route 440).
- R-3: Multi-Family Mid-Rise (north of NJ Route 440 and along Merritt Street).
- HC: Highway Commercial (south of NJ Route 440 along Garfield Avenue and Avenue C).
- R-1: One- and Two-Family Housing.
- PI: Port Industrial

The R-3 district encompasses the Jersey City Housing Authority-operated Curries Woods, one of five conventional public housing developments in Jersey City that includes senior housing. Curries Woods comprises one 14-story/91-unit building, 13 two- and three-story/120 units total townhouses, and 20 two-story/84 units total townhouses. Curries Woods also has a 14,500 square-foot Community Revitalization Center, a multi-purpose space accommodating community room space, Head Start Program, and support services (Jersey City Housing Authority 2020).

The Ocean Avenue South Redevelopment Plan Area, between the R-3 and R-1 zoning districts, includes 115 properties fronting on Ocean Avenue in an approximately 21-acre area from Merritt Street to Cator Avenue (Jersey City 2016). The Redevelopment Plan was adopted in 2016 with the purpose of fostering the redevelopment and rehabilitation of Ocean Avenue by providing land use regulations tailored to existing land uses as well as existing social, economic, and historic fabric in order to return Ocean Avenue South to a flourishing main street and neighborhood destination. Transportation uses separate the NB-HCE from the R-3 and R-1 zoning districts and the redevelopment area, specifically, NJ Route 440 and the National Docks Secondary freight rail line.

The portion of Jersey City south of the NB-HCE and west of the Interchange 14A toll plaza is an "HC: Highway Commercial" zoning district. This area includes commercial properties along Avenue C and Garfield Avenue>.

Industrial properties fronting on NJ Route 440 east of the Interchange 14A toll plaza, the PSEG Greenville substation on Garfield Avenue between the NB-HCE and NJ Route 440, and the Jersey City Public Works complex are within the "PI: Port Industrial" zoning district. There is one proposed development in the PI District, 440 Warehouse, which borders NJ Routes 440 and 185. A developer is seeking variances for approval to construct an approximately 1.4 million square-foot warehouse with 1,548 parking stalls, 430 van stalls, and 33 trailer parking stalls.

The Greenville Industrial Redevelopment Plan Area covers the large area generally east of NJ Route 440 and the NB-HCE east of Interchange 14A. This area includes the Port Jersey PAMT and Greenville rail yard as well as other industrial and warehouse uses. The Redevelopment Plan was adopted in 1989, with amendments through 2013, and provides for "comprehensive development regulations to strengthen the industrial nature of the Redevelopment Area" (Jersey City 2013).

There is one public park in the Jersey City portion of the study area, Martiniak-Enright Park located at Pamrapo Avenue and Old Bergen Road north of the NB-HCE. The "parklet" opened in 1949 to honor two Pamrapo

Avenue residents who died while fighting in World War II. In 2019, Jersey City announced that $200,000 from its Open Space Trust Fund would be used for a complete overhaul of the park, including landscaping, benches, and other passive improvements. Transit access to the park is via the NJ TRANSIT 81 bus line which runs along Old Bergen Road. Martiniak-Enright Park is listed on the Green Acres ROSI (NJDEP 2022). The park was not identified as having received funding through Section 6(f) of the Land and Water Conservation Fund Act of 1965 sources. No other parkland in the Jersey City portion of the study area was identified.

In 2013, Jersey City published the Morris Canal Greenway Plan (Jersey City 2013). The purpose of the study was to prepare a plan for a bicycle and pedestrian greenway that is, to the greatest extent possible, on the six-mile former right-of-way of the historic Morris Canal in Jersey City. The proposed Morris Canal Greenway would be a linear bicycling and walking route that can be used to access public destinations across the interior of the city and link the Hudson and Hackensack Rivers. A 2018 Morris Canal Greenway Corridor Study was published by the NJTPA envisioning a continuous pedestrian and bicycle route across the state of New Jersey, connecting people and places and giving new purpose to the state's first industrial transportation corridor (NJTPA 2018). The greenway will follow the former path of the historic Morris Canal, stretching 102 miles across six counties from Phillipsburg in Warren County to Jersey City. The NB-HCE does not cross but is in proximity to the Morris Canal Greenway route in the study area. Specifically, the Greenway would use Merritt Street between Garfield Avenue and Mercer Park (see description under Bayonne), following the northern boundary of the park on the Bayonne-Jersey City border to JFK Boulevard. To construct the first phase of the Greenway in Jersey City, Jersey City was awarded a $3.5 million grant from the New Jersey Department of Transportation for construction of four on-road and off-road segments of the Morris Canal Greenway pedestrian and bicycle path. Two of the segments are along portions of the Greenway route near the NB-HCE described above with design change to City streets in the following locations: Garfield Avenue from Merritt Street to Seaview Avenue, and Merritt Street from Avenue C to Garfield Avenue. The grant will fund improvements including new curb ramps, crosswalks, sidewalk reconstruction, lighting, landscaping and green infrastructure, signage, bike lanes, roadway repair, and other improvements.

There is one community facility in the Jersey City portion of the study area in addition to the Curries Woods Community Revitalization Center: Ezra L. Nolan Middle School #40. At 88 Gates Avenue, the school has approximately 300 students in grades 6 through 8 and is part of the Jersey City School District.

No places of worship were identified in the Jersey City portion of the study area.

3.3.3.2 State Plan

New Jersey Development and Redevelopment Plan (State Plan) – In 2001, the New Jersey State Planning Commission adopted the New Jersey Development and Redevelopment Plan (New Jersey State Planning Commission 2001) to address a requirement of the 1985 State Planning Act (New Jersey Statutes Annotated [N.J.S.A.] 52:18A-196 et seq.). The State Plan is intended to serve as a guide for public and private sector investment in New Jersey's future. The State Plan is a policy document for state, regional, and local agencies, to guide their functional plans, regulatory processes, and investment decisions.

The State Plan recognizes that New Jersey requires different approaches in its Metropolitan, Suburban, Fringe, Rural, and Environmentally Sensitive Planning Areas. The entire study area is designated by the Plan as "PA1: Metropolitan Planning Area," and Newark and Jersey City are both designated as Urban Centers. Metropolitan Planning Areas are to provide for much of the state's future redevelopment; revitalize cities and towns; promote growth in compact forms; stabilize older suburbs; redesign areas of sprawl; and protect the character of existing stable communities. Meanwhile, Urban Centers offer the most diverse mix of industry, commerce, services, residences, and cultural facilities. Urban Centers are repositories of large infrastructure systems, industrial jobs, corporate headquarters, medical and research services, universities, government offices, convention centers, museums, and other valuable built assets.

The Plan's public investment priorities give higher priority for projects and programs encompassing the following aspects:

- Public Health and Safety
- Infrastructure Maintenance and Repair with priority to Urban Centers.
- Capacity Expansion in Urban Centers.

By incorporating these goals, strategies, and priorities, the State Plan provides a guide to targeting growth and development in New Jersey.

3.3.4 No Action Alternative

Under the No Action Alternative, land uses in the study area would continue to conform with municipal master plans and corresponding zoning and would continue to be guided by the State Plan. Future changes in land use in the study area would be based on the activities of individual homeowners and businesses and other government agencies, where appropriate. There would be no changes to parkland boundaries or access or those of community facilities or places of worship.

3.3.5 Proposed Project

3.3.5.1 Impacts

Based on a review of the preliminary design plans for the Proposed Project and the municipal master plans identified in Section 3.3.3.1, the Proposed Project alternative would not conflict with municipal master plans as described further in the following paragraphs.

City of Newark – With respect to the goals of the City of Newark Master Plan, the Proposed Project promotes local and regional connectivity, minimizes traffic congestion, and provides adequate transportation infrastructure to accommodate the job producing growth of the airport, seaport, and industrial districts. Through measures to manage contamination from brownfields during construction, manage stormwater from the roadway, and replace the NBB with structures that account for projected sea-level rise, the Proposed Project is consistent with the Plan's goal to increase neighborhood health, resilience, and preparedness for climate change impacts.. Meanwhile, the Proposed Project does not interfere with the Newark Master Plan goals of encouraging greater use of transit or safe streets for all users.

Coordination of construction will be undertaken with City, Conrail, and PANYNJ staff to maintain vehicular and railroad traffic undercrossing the reconstructed NB-HCE (e.g., along Doremus Avenue) to minimize adverse effects on port and intermodal operations and businesses during construction, and with Port Authority and FAA staff to maintain airspace to minimize adverse effects on Newark Liberty International Airport operations during construction.

The Proposed Project is estimated to result in the following property impacts from right-of-way in Newark: aerial easements on 16 tax lots and partial fee acquisitions of five tax lots. Of the aerial easements, 10 are on railroad-owned (Conrail) tax lots, five are on commercially owned tax lots (four individual businesses), and one is on a vacant City-owned tax lot. Of the partial fee acquisitions, one is on a railroad-owned tax lot, two are on commercially owned lots (two individual businesses), and one is on the vacant City-owned tax lot. While the railroad and commercial properties have rail track, buildings, and other improvements, none of the easements or partial acquisitions are expected to impact business operations, buildings, or access.

With respect to the potential for the Proposed Project to cause indirect effects on land use, the underlying factors that shape land uses in the Newark portion of the study area, specifically, the continued operations of Newark Liberty International Airport, the Port Newark-Elizabeth Marine Terminal, the City's access to the regional highway and rail systems, zoning, and real estate market conditions would not be affected by the

Proposed Project as the access and connections afforded by the NB-HCE through its interchanges have been in place since the mid-1950s. Cumulatively, the Proposed Project combined with the other actions in the study area that have, are, or will affect land use will not substantially change land use.

City of Bayonne – The Proposed Project would not interfere with the goals of Bayonne's Master Plan, including redeveloping the former Military Ocean Terminal, promoting the Broadway central business district, capitalizing on the Hudson-Bergen Light Rail Transit stations (the Avenue E Transit District), increasing the supply of parkland in the city, nor developing the Hackensack RiverWalk.

Maintenance and Protection of Traffic Plans will be developed through coordination with city, county, and state transportation and engineering staff such that vehicular, transit, pedestrian, and bicycle traffic will be maintained in a safe manner during construction of NB-HCE crossings of local streets, and such that access to neighborhoods, businesses, community facilities, parkland, and places of worship will be maintained in a safe manner.

The Proposed Project is estimated to result in the following property impacts from right-of-way in Bayonne: three aerial easements on State-owned (New Jersey Department of Transportation [NJDOT]) tax lots (associated with NJ Route 440), one partial fee acquisition of a City-owned tax lot (associated with West 58th Street), and full acquisition of one property comprising four tax lots. Neither the aerial easements nor the partial fee acquisition, both of which are on portions of roadway right-of-way, is expected to have substantial impact on the use of the right-of-way or transportation operations. The Proposed Project will not encroach on paved portions of State-owned land (NJ Route 440 right-of-way). As discussed in Section 3.8.5.2, while not eliminated, the portion of West 58th Street near Avenue B will be permanently narrowed by the Project. The existing single one-way travel lane will be maintained. However, parking on both sides of the street for approximately 100 feet on each side of the roadway, or approximately 12 on-street parking spaces in total, will be eliminated. Reconnaissance of the affected area indicates that the capacity of on-street parking exceeds the demand for on-street parking, likely because many residential units in the area have off-street parking. Consequently, the elimination of the on-street parking will have a minor adverse effect on this land use.

The full property acquisition would be of the former Marist High School property (Figure 3.3-2). The proposed use of this property is for a stormwater basin, constructed for treating runoff to comply with NJDEP stormwater management regulations from the NB-HCE, and for contractor lay down areas and future maintenance needs. This acquisition would not result in a displacement or relocation as there is presently no active use of the property. However, the Proposed Project would eliminate the potential for redeveloping this property into either residential or commercial uses per the redevelopment plan discussed in Section 3.3.3 nor any other use as the entire property consisting of three tax lots would be acquired under the Proposed Project.

With respect to the potential for the Proposed Project to cause indirect effects on land use, the underlying factors that shape land uses in the Bayonne portion of the study area (i.e., the redevelopment of the former Military Ocean Terminal and nearby properties), transit-oriented development near the Hudson-Bergen Light Rail Transit stations, the City's access to the regional rail and highway systems, zoning, and real estate market conditions would not be affected by the Proposed Project as the access and connections afforded by the NB-HCE through its interchanges have been in place since the mid-1950s. Cumulatively, the Proposed Project combined with the other actions in the study area that have, are, or will affect land use will not substantially change land use.

City of Jersey City – The Proposed Project is consistent with the relevant land use principles of the Jersey City Master Plan's Land Use Element and does not interfere with those principles for which the Proposed Project does not interrelate (e.g., increasing the supply of available housing, adapting large format retail and office space, upgrading community facilities, and zoning revisions). By improving mobility between Interchanges 14 and 14A, the Proposed Project is consistent with the principle of a diversified economy centered in part on port and port-oriented development accessed via Interchange 14A. Indeed, the Proposed Project supports

Jersey City Master Plan's element for supporting continued use of "port-related uses where located close to highway access and with limited impacts on residential areas." With respect to the principle of strengthening neighborhood-oriented centers, the Proposed Project does not cross the Ocean Avenue South Redevelopment Plan Area. Meanwhile, Maintenance and Protection of Traffic Plans will be developed through coordination with city, county, and state transportation and engineering staff such that vehicular, transit, pedestrian, and bicycle traffic will be maintained in a safe manner during construction of NB-HCE crossings of local streets, and such that access to neighborhoods, businesses, community facilities, parkland, and places of worship will be maintained in a safe manner. The NBB spans over the proposed route of the Hackensack RiverWalk multi-use path. The Proposed Project does not cross the Morris Canal Greenway route but is in proximity of the planned route. The Proposed Project will not interfere with implementation of these public open space connecting assets described in the City's Land Use Element. Finally, incorporation of stormwater management and flood hazard area measures into the Proposed Project is consistent with the principle of protecting and restoring environmental assets and wetland planning for sustainability.

Figure 3.3-2. Proposed Full Property Acquisitions

The Proposed Project is estimated to result in aerial easements on 10 tax lots and partial fee acquisitions of four tax lots. Of the aerial easements, eight are on railroad-owned (Conrail) tax lots, one is property owned by Jersey City Redevelopment Authority, and one is on NJ DOT right-of-way. Of the partial fee acquisitions, one is on PANYNJ-owned land, two tax lots are owned by Jersey City, and one tax lot is privately-owned (industrial) land. While the railroad and commercial properties have rail track, buildings, and other improvements, none of the easements or partial acquisitions are expected to impact business operations, buildings, or access. With respect to the potential for the Proposed Project to cause indirect effects on land use, the underlying factors that shape land uses in the Jersey City portion of the study area (i.e., the port growth and redevelopment of nearby properties for port-oriented uses), transit-oriented development near the Hudson-Bergen Light Rail Transit stations, the City's access to the regional rail and highway systems, zoning and other land use policies, and real estate market conditions would not be affected by the Proposed Project as the access and connections afforded by the NB-HCE through its interchanges has been in place since the mid-1950s. Indeed, the Proposed Project supports the Jersey City Master Plan's element for supporting continued use of "port-related uses where located close to highway access and with limited impacts on residential areas." Cumulatively, the Proposed Project combined with the other actions in the study area that have, are, or will affect land use will not substantially change land use.

State Plan – By improving mobility between Interchanges 14 and 14A, the Proposed Project supports the overall State Plan policy for Metropolitan Planning Areas to provide for much of the State's future redevelopment and, specifically, redevelopment of Newark and Jersey City as designated Urban Centers. As a priority investment of the Authority's Long-Range Capital Plan, the Proposed Project aligns with the State Plan's policy that higher priority be paced on projects that encompass public health and safety, infrastructure maintenance, and repair, with priority to Urban Centers and capacity expansion in Urban Centers.

3.3.5.2 Conclusion

Based on the preceding assessment, the Proposed Project will have no significant impact on land use, zoning, or public policy. The Proposed Project includes such measures as compensation of property owners for the aerial easements, partial acquisitions, and the full acquisition required to implement the Proposed Project based on property appraisals and negotiations regarding compensation with the property owners, and the design and construction on the property in the case of aerial easements and partial acquisitions. In addition to coordination with owners of the affected properties, the Authority will continue to coordinate with the municipalities, counties, and State on measures to manage temporary impacts on land uses during construction and avoid or minimize long-term effects on land use following construction. With incorporation of these measures, no mitigation is necessary.

3.4 Socioeconomics and Environmental Justice

3.4.1 Study Area and Data Collection

Socioeconomics refers to the way social and economic factors, for example, race and income, influence one another in local communities and households. The U.S. Environmental Protection Agency (EPA) defines environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."

"Fair treatment" means that no group of people should bear a disproportionate share of the negative environmental consequences resulting from industrial, governmental, and commercial operations or policies.

"Meaningful involvement" means that people have an opportunity to participate in decisions about activities that may affect their environment and/or health; the public's contribution can influence the regulatory agency's decision; community concerns will be considered in the decision-making process; and decision makers will seek out and facilitate the involvement of those potentially affected.

The socioeconomics and environmental justice study area for the Proposed Project represents the portions of Newark, Bayonne, and Jersey City within approximately 0.25 mile (1,320 feet) of the NB-HCE between Interchanges 14 and 14A. This distance reflects the typical extent of freeway operational and accessibility effects, for example, noise and development influence, on communities nearby the freeway.

Population, race, income, and limited English proficiency data for the existing conditions analysis was compiled at the largest scale of Census geography for such data, the Census Block Group, using the most recently available information published by the United States Census Bureau, specifically, the American Community Survey (ACS) 2016-2020 5-year Estimates released on March 17, 2022, and Public Use Microdata Sample files released on March 31, 2022.

The U.S. Environmental Protection Agency (EPA) has developed an environmental justice mapping and screening tool, EJScreen (EPA 2022a), based on nationally consistent data and an approach that combines environmental and demographic indicators in maps and reports. Following enactment of the New Jersey Environmental Justice Law, NJDEP created an online interactive "Environmental Justice Mapping, Assessment and Protection (EJMAP) mapping tool, to identify overburdened communities, the criteria each block group meets, and the municipality for which the overburdened community is designated. The State of New Jersey established the following criteria for identifying census block groups as overburdened:

- At least 35 percent low-income households (at or below twice the poverty threshold as determined by the United States Census Bureau); or
- At least 40 percent of the residents identify as minority or as members of a State recognized tribal community; or
- At least 40 percent of the households have limited English proficiency.

In addition to the State's environmental justice criteria, the following criteria used to identify environmental justice populations under the Federal EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, were used:

- "Low-Income" means a person whose median household income is at or below the Department of Health and Human Services poverty guidelines (the current poverty guidelines are provided in Table 3.4-1).

- "Minority" means a person who is: (1) Black (a person having origins in any of the black racial groups of Africa); (2) Hispanic (a person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race); (3) Asian American (a person having origins in any of the original people of the Far East, Southwest Asia, the Indian subcontinent, or the Pacific Islands); or (4) American Indians and Alaskan Native (a person having origins in any of the original people of North America and who maintains cultural identification through tribal affiliation or community recognition).

- "Low-income population" means any readily identifiable group of low-income persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed program, policy, or activity.

- "Minority population" means any readily identifiable groups of minority persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed program, policy, or activity.

Table 3.4-1. U.S. Department of Health and Human Services 2022 Poverty Guidelines

Persons in Family / Household	Poverty Guideline
1	$14,580
2	$19,720
3	$24,860
4	$30,000
5	$35,140
6	$40,280
7	$45,420
8	$50,560

Source: Federal Register (January 19, 2023)

The ACS data and these screening tools were used to identify environmental justice communities within the study area.

Comparisons of race, income, and limited English proficiency are provided between the study area's census block groups and the following geographies: project municipalities (i.e., Newark, Bayonne, and Jersey City); project counties (i.e., Essex and Hudson); commuter "catchment" counties or counties having at least a portion of land area within one-hour drive time of Downtown Jersey City and the Holland Tunnel via Interstate Route 78 west of Interchange 14 and the NJ Turnpike south of Interchange 14 (i.e., Hunterdon, Somerset, Morris, Union, Essex, Mercer, Monmouth, and Middlesex); and New Jersey as a whole.

Economic data regarding the study area counties and municipalities was obtained from the New Jersey Department of Labor and Workforce Development (2022) website. Included in the analysis are data from the Quarterly Census of Employment and Wages, Local Employment Dynamics, and Labor Force Participation.

3.4.2 Methodology and Criteria

Social and Economic factors – The assessment of potential social and economic effects of the project considered the following factors as being relevant to the study area and how highway improvement projects can affect social and economic factors:

- Effect on community character or community cohesion.
- Effect on population or household demographic characteristics.
- Effect on essential businesses (e.g., displacement of a food, social, or medical service business).
- Effect major industry sector.
- Effect worker inflows or outflows.

Construction economic effect – The assessment of the effect of project construction expenditures on the economy used the IMPLAN input-output model as the analysis tool. In general, input-output models such as IMPLAN allow one to assess the economic impacts of a new spending pattern – in this case, the value for the project's construction costs.

The impacts from construction expenditures come in the following forms:

- Employment – Number of jobs in an industry needed to support economic activity. Sometimes, this is referred to as "job-years" because one person in one job lasting five years results in five "jobs." A job can either be full-time or part-time.

- Value added – Net additional economic activity (e.g., difference between an industry's total output and the cost of its intermediate inputs). It is synonymous with Gross Regional Product.
- Labor Income – Wage/salary earnings paid to the associated jobs.
- Taxes – Various taxes on production and imports (sales, property, excise, etc.), fines, fees, licenses, permits, etc., resulting from business economic activity. Includes all federal, state, and local revenues.

An input-output model estimates economic impacts for three types of effects: direct effects, indirect effects, and induced effects. They are defined as follows:

- Direct – Economic activity generated by injection of spending (known as "change in final demand") to any given industry or set of industries in an economy. This is the initial spending and the first step in a spending pattern. In this case, direct effects are the effects generated from the dollars spent on construction of the project.
- Indirect – Second-order economic impacts that result from inter-industry purchases necessary to produce the goods and services purchased in the direct effects. A construction company will spend money on several non-construction-related items such as legal fees, insurance costs, office supplies, safety equipment, etc. These can be thought of as downstream supply chain effects, as other industries begin to benefit from spending in the initial industry (e.g., construction).
- Induced – Economic impacts generated by the spending patterns of households who, after receiving additional wages from the direct and indirect effects, will use those wages to purchase goods and services. As local businesses employ people, those individuals are consumers who then spend their earnings on everything households spend on. These expenditures subsequently benefit local businesses and produce the induced effects.
- Total – Combines direct, indirect, and induced effects.

Impacts (spending) are applied to specific industries, because each industry has a unique set of spending patterns and "multiplier effects" in the economy. For this analysis, all construction expenditure estimated to take place is classified as spending in the "construction of highway and streets" industry, which generates direct, indirect, and induced impacts.

Environmental Justice – New Jersey's Environmental Justice Law, N.J.S.A.13:1D-157 et seq, requires the NJDEP to evaluate the environmental and public health impacts of certain facilities on overburdened communities when reviewing certain permit applications. The eight specific types of facilities covered by the Act are: (1) major sources of air pollution; (2) incinerators and resource recovery facilities; (3) large sewage treatment plants that process more than 50 million gallons per day; (4) transfer stations and solid waste facilities; (5) recycling facilities that receive at least 100 tons of recyclable material per day; (6) scrap metal facilities; (7) landfills; and (8) medical waste incinerators, except those attendant to hospitals and universities. Highways such as the NB-HCE are not classified as facilities. Separately, State of New Jersey Executive Order 23 directs the NJDEP, in consultation with the Department of Law and Public Safety and any other relevant department, to develop guidance for all Executive Branch departments and agencies for the consideration of Environmental Justice in implementing their statutory and regulatory responsibilities. Following the publication of final guidance, Executive Branch departments and agencies will consider Environmental Justice and make evaluations and assessments in accordance with the guidance, unless the guidance is otherwise inconsistent with the law. The final Guidance has not yet been published.

NJDEP, EPA, and other agencies measure health and other risks to disproportionally affected and overburdened communities in terms of stressors. Stressors individually or combined adversely affect environmental justice and overburdened communities. Relevant stressors for highway and roadway projects include the following: ground level ozone, air toxics, diesel particulate matter, contaminated sites, impervious surfaces, traffic congestion, flooding, and noise. Assessment of the project's effects on these stressors provided a basis for assessing whether the project has the potential to create disproportionately high and adverse effects on minority populations and low-income populations.

3.4.3 Existing Conditions

3.4.3.1 Description of Communities

Access to water and transportation have historically been major influences of the social and economic fabrics of the study area. Before the arrival of the Europeans, the study area was the home to Lenni Lenape Native Americans who were attracted to the area's waters.

City of Newark – The Newark portion of the study area is adjacent to the City's Ironbound community. The Ironbound, also referred to as "Down Neck," is a multi-ethnic, largely working-class neighborhood of approximately 50,000 residents.

German, Lithuanian, Italian and Polish immigrants settled in Ironbound in the nineteenth century. In the early twentieth century, African Americans arrived during the famed Great Migration from the Jim Crow-era South, along with large numbers of Portuguese and Spanish immigrants. In the latter half of the twentieth century immigrants from Central and South America joined the community. These successive waves of migration and immigration all contributed to the richness of Ironbound's cultural diversity. Immigration to Ironbound continues to the present, and now two out of three Ironbound residents have come to the United States as immigrants. Three languages – Spanish, Portuguese, and English – can be heard throughout the community.

The Ironbound composes most of Newark's East Ward City Council district, covering approximately 4 square miles. Its residential community, with Ferry Street as its spine, is interspersed with commerce, covering roughly a third of the neighborhood. The surrounding industrial area includes trucking, chemical, and waste businesses. The name "Ironbound" is derived from the many forges and foundries and railroads that once encircled it. It is bound by Penn Station and the Amtrak line on the west; the Passaic River – the nation's longest Superfund site – on the north; U.S. Routes 1 and 9, the NJ Turnpike, and Port Newark on the east; and Interstate Route 78 and EWR on the south.

The Ironbound is an economic engine within Newark driving approximately 40 percent of its economy and contributing to approximately 33 percent of its tax base (Ironbound Community Corporation 2019). Today local factories, warehouses, and industrial properties continue to operate alongside one-, two-, and three-family homes and public housing complexes.

City of Bayonne – The City of Bayonne is located in the Gateway Region of Hudson County and lies between Newark Bay and New York Bay. The portion of the study area in Bayonne is in the Pamrapo/Saltersville neighborhood named after villages that preceded the formation of Bayonne and, politically, in the City's Third Ward. The neighborhood encompasses approximately 1.5 square miles and is home to slightly over 30,000 residents (City of Bayonne 2022).

In the late nineteenth and early twentieth century, Bayonne urbanized and industrialized rapidly, becoming the home to thousands of European immigrants. In recent decades, sources of immigration have largely been represented from countries in Latin America, the Middle East, and Southeastern Asia. In the decades since World War II, oil refining and other traditional industries have declined and have been replaced by port operations and the service sector. The city's largest employer is the Bayonne Medical Center, a nonprofit hospital, which employs over 1,200 individuals many of whom reside in Bayonne.

City of Jersey City – Jersey City is recognized as the most ethnically diverse city in the nation (WalletHub 2021). The 2020 Census has also revealed that Jersey City is the third most dense city in America (with a population over 100,000).

The portion of the study area in Jersey City is in the South Greenville neighborhood of the City's Greenville/Ward A. The neighborhood is characterized by low- and medium-density housing with JFK Boulevard and Ocean Avenue serving as key commercial corridors.

Greenville was settled by many working-class Irish Catholic families, as well as other ethnic groups. The area's demographics changed dramatically starting in the 1950s, 1960s, and 1970s, with the decline of factories and the collapse of the independent railroad lines. The neighborhood east of JFK Boulevard was later settled by African Americans, while that west of JFK Boulevard is more diverse with a sizable Filipino population. Greenville also has a sizable Hispanic and Egyptian population, and many of the older Irish residents remain in the neighborhood.

The Global Container Terminal at Greenville Yard is a major driver of economic activity in this portion of Jersey City.

3.4.3.2 Social and Economic Profiles

The study area contains portions of 13 census block groups:

- Newark – 340139802001
- Bayonne – 340170101001, 340170101002, 340170101003, 340170102001, and 340170102003
- Jersey City – 340170058021, 340170061011, 340170061021, 340170061022, 340170061023, 340170063002, and 340170063003.

The census block group in the Newark portion of the study area recorded zero population and, hence, zero households in the 2020 Census. Therefore, the data labeled "Study Area" reported in this section identifies the data for those census block groups in the Bayonne and Jersey City portions of the study area and are compared to that of the entire cities of Newark, Bayonne, and Jersey City, Essex and Hudson Counties, and the State of New Jersey. While there are variations in the percentages of low-income and minority populations among the study area block groups, the data show that by several measures the study area as a whole has readily identifiable groups of persons that meet the definition of low-income or minority (or both) and, therefore, an assessment of the Proposed Project relative to environmental justice applies to the entire study area.

Tables 3.4-2 through 3.4-7 provide various population-level statistics for the defined study area and relevant city, county, and state geographies. While there are variations in data among the twelve census block groups of the study area that have population, summary assessments of the statistics at the study area level of geography are as follows:

1. The study area has a high percentage of children under five years of age and a low percentage of adults over 64 years of age relative to the other geographies (Table 3.4-1). These demographic age cohorts are vulnerable to health-related issues such as air pollution.
2. The study area has a high percentage of White and Asian populations and low percentage of African American and Hispanic populations relative to most of the other geographies (Table 3.4-2).
3. The study area has a relatively low percentage of adults without a high school diploma or less than 9th grade level of educational attainment (Table 3.4-3).
4. The study area has high labor force participation relative to most of the other geographies (Table 3.4-4).
5. In terms of mode used to travel to work, the study area has relatively high drive-alone percentages relative to most of the other geographies (Table 3.4-5).
6. The percentages of the study area workers reporting a commute of less than or greater than 35 minutes travel time to work, 55.7 percent and 44.3 percent, respectively, are similar to the county and Bayonne and Jersey City level travel times but less than the Newark and State level travel times (Table 3.4-6). The mean commuting time for workers in Essex and Hudson Counties in 2020 is estimated at 34.79 minutes and 36.23 minutes, respectively (St. Louis Federal Reserve 2022).

Table 3.4-2. Population and Age

	Population	Age			
		<5 Years Old	Pct.	>64 Years Old	Pct.
Study Area	19,274	1,511	7.8%	2,127	11.0%
Newark	281,917	19,836	7.0%	29,914	10.6%
Bayonne	65,112	4,578	7.0%	9,665	14.8%
Jersey City	262,652	20,469	7.8%	29,050	11.1%
Essex County	798,698	52,978	6.6%	109,354	13.7%
Hudson County	671,923	46,656	6.9%	80,389	12.0%
New Jersey	8,885,418	518,349	5.8%	1,442,938	16.2%

Source: ACS 2016-2020 5-year Estimates (2022)

Table 3.4-3. Race and Hispanic Ethnicity

	White		African American		American Indian		Asian		Pacific Islander		Some other Race		Two or more Races		Hispanic Ethnicity	
	No.	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*
Study Area	7,130	37.0%	4,043	21.0%	139	0.7%	4,045	21.0%	0	0.0%	2,727	14.1%	1,190	6.2%	5,872	30.5%
Newark	75,589	26.8%	139,660	49.5%	1,102	0.4%	4,989	1.8%	217	0.1%	41,785	14.8%	18,575	6.6%	103,548	36.7%
Bayonne	40,156	61.7%	6,411	9.8%	127	0.2%	6,513	10.0%	68	0.1%	7,177	11.0%	4,660	7.2%	22,487	34.5%
Jersey City	88,293	33.6%	60,777	23.1%	1,534	0.6%	68,445	26.1%	61	0.0%	25,753	9.8%	17,789	6.8%	70,547	26.9%
Essex County	328,493	41.1%	313,839	39.3%	2,116	0.3%	43,682	5.5%	324	0.0%	67,473	8.4%	42,771	5.4%	185,818	23.3%
Hudson County	338,748	50.4%	81,178	12.1%	3,274	0.5%	105,812	15.7%	379	0.1%	89,283	13.3%	53,249	7.9%	286,039	42.6%
New Jersey	5,820,147	65.5%	1,189,681	13.4%	22,288	0.3%	857,873	9.7%	3,156	0.0%	564,662	6.4%	427,611	4.8%	1,815,078	20.4%

Source: ACS 2016-2020 5-year Estimates (2022)

Table 3.4-4. Educational Attainment

	Total Post-High School Age	Less than 9th Grade Education		9th to 12th Grade; no Diploma		No High School Diploma	
	No.	*No.*	*Pct.*	*No.*	*Pct.*	*No.*	*Pct.*
Study Area	12,386	659	5.3%	573	4.6%	1,232	9.9%
Newark	184,100	22,678	12.3%	20,643	11.2%	43,321	23.5%
Bayonne	45,582	2,745	6.0%	2,281	5.0%	5,026	11.0%
Jersey City	187,996	11,441	6.1%	10,454	5.6%	21,895	11.6%
Essex County	538,203	36,110	6.7%	35,639	6.6%	71,749	13.3%
Hudson County	481,233	41,255	8.6%	27,639	5.7%	68,894	14.3%
New Jersey	6,169,501	287,866	4.7%	312,895	5.1%	600,761	9.7%

Source: ACS 2016-2020 5-year Estimates (2022)

Table 3.4-5. Labor Force Participation

	Total Population 16 years and older	In Labor Force Population 16 years and older	Pct. in Labor Force
Study Area	14,805	9,238	62.4%
Newark	219,996	120,095	54.6%
Bayonne	51,762	31,172	60.2%
Jersey City	212,899	140,051	65.8%
Essex County	629,085	379,534	60.3%
Hudson County	547,213	360,200	65.8%
New Jersey	7,161,184	4,426,619	61.8%

Source: ACS 2016-2020 5-year Estimates (2022)

Table 3.4-6. Journey to Work by Travel Mode

	Total	Drove alone	Carpool	Public transportation	Taxicab	Motorcycle	Bicycle	Walked	Other means	Worked from home
Study Area	8,997	49.2%	11.9%	26.0%	0.8%	0.0%	0.6%	2.3%	2.0%	7.2%
Newark	115,068	53.9%	8.1%	23.7%	0.7%	0.0%	0.1%	5.6%	5.2%	2.7%
Bayonne	30,602	53.5%	8.1%	25.1%	0.6%	0.2%	0.2%	6.4%	1.3%	4.6%
Jersey City	137,183	30.2%	6.3%	45.3%	0.8%	0.0%	0.8%	6.8%	0.9%	8.9%
Essex County	368,427	59.1%	7.0%	20.1%	0.5%	0.0%	0.1%	3.5%	2.3%	7.1%
Hudson County	353,155	36.9%	6.8%	39.5%	0.7%	0.1%	0.5%	7.1%	1.1%	7.3%
New Jersey	4,332,443	69.6%	7.8%	10.8%	0.4%	0.0%	0.3%	2.6%	1.2%	7.3%

Source: ACS 2016-2020 5-year Estimates (2022)

Table 3.4-7. Journey to Work Travel Time

	Total	< 5 minutes	5 - 9 minutes	10 - 14 minutes	15 - 19 minutes	20 - 24 minutes	25 - 29 minutes	30 - 34 minutes	35 - 39 minutes	40 - 44 minutes	45 - 59 minutes	60 - 89 minutes	90 + minutes
Study Area	8,348	2%	3%	10%	11%	12%	3%	16%	6%	6%	11%	13%	8%
Newark	112,015	2%	4%	9%	10%	14%	5%	21%	3%	6%	9%	11%	6%
Bayonne	29,208	1%	8%	10%	10%	9%	5%	16%	3%	6%	13%	13%	6%
Jersey City	124,937	1%	3%	6%	9%	10%	4%	17%	4%	8%	18%	15%	4%
Essex County	342,127	2%	5%	9%	11%	14%	6%	17%	3%	5%	10%	13%	6%
Hudson County	327,262	1%	4%	7%	9%	10%	5%	17%	3%	7%	17%	15%	4%
New Jersey	4,016,070	2%	8%	11%	13%	13%	6%	13%	3%	5%	10%	11%	5%

Source: ACS 2016-2020 5-year Estimates (2022)

Table 3.4-8 provides summary household-level statistics for the defined study area and relevant city, county, and state geographies. While there are variations in data among the twelve census block groups of the study area that have households, summary assessments of the statistics at the study area level of geography are as follows:

1. On average, the study area household size (i.e., the number of people comprising the average household) is high relative to the other geographies.
2. The median household income within the block group level varies widely between $37,750 for households in block group 340170061022 and $201,875 for households in block group 340170058021, both of which are in Jersey City.
3. The study area has a low percentage of zero car owning households relative to the other compared geographies, except New Jersey.
4. The study area has a low percentage of households with limited English proficiency relative to the other compared geographies, except New Jersey.

The lowest geographic level of employment data is at the municipal level. Table 3.4-9 summarizes average annual labor force participation data for the three study area municipalities, two counties, and the State of New Jersey for 2010 (post-recession), 2019 (pre-COVID), and 2021 (the most recent full year of data). As shown, Newark's average annual labor force size in 2021 was slightly higher than in 2010 and was higher than 2019. Newark's percent unemployment for each of the periods was higher than that of all the other geographies. Bayonne's average annual labor force in 2021 was the same as in 2019 and slightly higher than in 2010. Jersey City's average annual labor force grew nearly six percent between 2010 and 2019 before declining slightly over one percent between 2019 and 2021. Jersey City's percent unemployment for each of the three periods was the lowest of the three study area municipalities and generally tracked closely with the percent unemployment of Hudson County and New Jersey.

Table 3.4-10 shows the top five employment sectors (government and private) for each of the study area municipalities for 2010 and 2019 (the most recent year of reporting). The data shows the diversity of key employment sectors across the municipalities framed by Newark's having Transportation/Warehousing as its largest employment sector and Jersey City's having Finance/Insurance as its largest employment sector. Also notable is Newark's having Local Government and State Government as the second and third ranked employment sectors. The data also show the relative concentration of private industry in the municipalities. Adding the Accommodation/Food and Administration/Waste Management sectors to the top three private employment sectors in Newark indicates that nearly 59 percent of Newark's private sector employment is in the top five private employment sectors. Adding Manufacturing to the top four private employment sectors in Bayonne indicates that nearly 70 percent of Bayonne's private sector employment is in the top five employment sectors. Adding the Professional/Technical sector to the top four private employment sectors in Jersey City indicates that nearly 67 percent of Jersey City's private sector employment is in the top five private employment sectors.

The New Jersey State Data Center publishes Worker Inflow/Outflow Reports annually for larger municipalities. Changes in Worker Inflow/Outflow over the last decade in Newark, Bayonne, and Jersey City are shown in Tables 3.4-11 and 3.4-12, respectively. Both cities exhibit relatively high percentages of city residents working outside the city and people employed in the city but living outside the city. While the data do not reveal worker commute origins and destinations, the relatively high resident outflow to jobs outside each city and non-resident inflows to jobs in each city indicates the importance of mobility for travel to place of employment that transcends city boundaries.

Table 3.4-8. Summary Household Statistics

				Zero Car Ownership		Limited English Proficiency (LEP)					
	Total Households No.	Mean Household Size	Median Household Income	No.	Pct.	Spanish	Other Indo-European languages	Asian and Pacific Island languages	Other languages	Total LEP	Pct. LEP
Study Area	6,528	2.95	$36,880-$201,875	1,294	19.8%	343	97	108	69	617	9.5%
Newark	102,195	2.76	$37,476	38,111	37.3%	12,241	5,478	251	326	18,296	17.9%
Bayonne	24,784	2.63	$69,511	5,655	22.8%	1,426	523	232	442	2,623	10.6%
Jersey City	103,880	2.53	$76,444	39,283	37.8%	6,417	2,300	2,250	1,446	12,413	11.9%
Essex County	290,680	2.75	$63,959	64,040	22.0%	16,847	9,850	1,340	1,086	29,123	10.0%
Hudson County	261,289	2.57	$75,062	83,307	31.9%	27,029	4,814	4,033	2,246	38,122	14.6%
New Jersey	3,272,054	2.72	$85,245	367,585	11.2%	130,827	51,490	34,294	8,354	224,965	6.9%

Source: ACS 2016-2020 5-year Estimates (2022)

Table 3.4-9. Summary Labor Force Statistics (annual averages)

	Labor Force	Employment	Unemployment	Unemployment Rate
Newark				
2021	122,600	109,500	13,000	10.6%
2019	120,800	113,900	6,900	5.7%
2010	122,500	105,400	17,100	14.0%
Bayonne				
2021	34,000	31,300	2,800	8.2%
2019	34,000	32,800	1,300	3.7%
2010	33,200	29,600	3,600	10.9%
Jersey City				
2021	144,000	133,800	10,100	7.0%
2019	145,500	140,700	4,800	3.3%
2010	137,600	123,900	13,700	9.9%
Essex County				
2021	386,000	355,100	30,900	8.0%
2019	385,600	369,200	16,300	4.2%
2010	382,800	340,700	42,100	11.0%
Hudson County				
2021	371,000	345,700	25,400	6.8%
2019	376,200	364,500	11,700	3.1%
2010	354,000	319,800	34,300	9.7%
New Jersey				
2021	4,661,100	4,365,400	295,700	6.3%
2019	4,686,700	4,528,200	158,500	3.4%
2010	4,559,800	4,119,000	440,800	9.7%

Source: New Jersey Department of Labor and Workforce Development (2022) Information

Table 3.4-10. Study Area Municipalities' Top Five Employment Sectors

2019					2010				
NAICS Code[1]	Sector	Average Units	Average Annual Employment	Annual Average Wages	NAICS Code	Sector	Average Units	Average Annual Employment	Annual Average Wages
Newark									
48	Transportation / Warehousing[2]	333	25,687	$59,691	48	Transportation / Warehousing	333	25,154	$55,245
	Local Government (Total)	154	17,942	$72,884		Local Government (Total)	174	18,998	$66,639
	State Government (Total)	41	16,639	$88,833		State Government (Total)	13	14,496	$73,147
62	Health / Social	1,021	13,861	$55,181	62	Health / Social	439	12,741	$49,848
52	Finance / Insurance	162	10,267	$173,644	52	Finance / Insurance	179	8,657	$117,485
Bayonne									
44	Retail Trade	178	2,459	$29,766	62	Health / Social	166	2,299	$41,336
	Local Government (Total)	34	2,245	$72,330		Local Government (Total)	7	2,249	$64,682
62	Health / Social	263	2,134	$48,411	44	Retail Trade	194	1,731	$27,577
48	Transportation / Warehousing	82	2,122	$84,212	48	Transportation / Warehousing	72	1,439	$48,272
72	Accommodations / Food	114	1,233	$19,812	42	Wholesale Trade	61	1,156	$55,356
Jersey City									
52	Finance / Insurance	318	30,945	$182,189	52	Finance / Insurance	339	28,145	$172,316
	Local Government (Total)	41	12,699	$66,943		Local Government (Total)	40	13,955	$64,429
62	Health / Social	957	12,276	$48,234	62	Health / Social	507	10,663	$39,484
44	Retail Trade	756	9,244	$37,980	44	Retail Trade	763	7,911	$27,116
56	Admin / Waste Remediation	203	7,619	$47,355	54	Professional / Technical	586	5,939	$108,979

Source: New Jersey Department of Labor and Workforce Development (2022)
[1] NAICS = North American Industry Classification System, the standard used by federal statistical agencies in classifying business establishments for the purpose of collecting, analyzing, and publishing statistical data related to the U.S. business economy.
[2] Transportation/Warehousing data for 2012; the last year this sector was reported.

Table 3.4-11. Worker Inflow/Outflow: Newark

	2019		2010	
	Count	Share	Count	Share
Living in Newark	96,862	100.0%	83,261	100.0%
Living and Employed in Newark	24,310	25.1%	25,588	30.7%
Living in Newark but Employed Outside	72,552	74.9%	57,673	69.3%
Employed in Newark	138,183	100.0%	140,634	100.0%
Employed and Living in Newark	24,310	17.6%	25,588	18.2%
Employed in Newark but Living Outside	113,873	82.4%	115,046	81.8%
Net Job Inflow (+) or Outflow (-)	41,321	-	57,373	-

Source: U.S. Census Bureau 2022

Table 3.4-12. Worker Inflow/Outflow: Bayonne

	2019		2010	
	Count	Share	Count	Share
Living in Bayonne	25,405	100.0%	21,932	100.0%
Living and Employed in Bayonne	3,121	12.3%	3,472	15.8%
Living in Bayonne but Employed Outside	22,284	87.7%	18,460	84.2%
Employed in Bayonne	11,098	100.0%	10,123	100.0%
Employed and Living in Bayonne	3,121	28.1%	2,472	34.3%
Employed in Bayonne but Living Outside	7,977	71.9%	6,651	65.7%
Net Job Inflow (+) or Outflow (-)	-14,307		-11,809	

Source: U.S. Census Bureau 2022

Table 3.4-13. Worker Inflow/Outflow: Jersey City

	2019		2010	
	Count	Share	Count	Share
Living in Jersey City	130,151	100.0%	100,986	100.0%
Living and Employed in Jersey City	23,875	18.3%	18,773	18.6%
Living in Jersey City but Employed Outside	106,276	81.7%	82,213	81.4%
Employed in Jersey City	118,206	100.0%	98,574	100.0%
Employed and Living in Jersey City	23,875	20.2%	18,773	19.0%
Employed in Jersey City but Living Outside	94,331	79.8%	79,801	81.0%
Net Job Inflow (+) or Outflow (-)	-11,945	-	2,412	-

Source: U.S. Census Bureau 2022

3.4.3.3 Environmental Justice Populations

Analysis of various sources of data on low-income and on minority populations indicates that the study area as a whole and each of the census block groups comprising the study area are environmental justice communities by virtue of meeting the low-income population criteria, the minority population criteria, or both criteria as per USEPA guidelines.

As documented below, analysis of the 2016-2020 ACS estimates published by the U.S. Census Bureau, the most recent estimates available, provided in Table 3.4-14, indicates the following:

1. The study area overall has a relatively low percentage of working age population with income below the poverty level compared with the study area municipalities and counties. The study area's percentage of work age population with income below the poverty level is on par with that of the NB-HCE catchment counties and the State of New Jersey.
2. The study area percent minority population is at a level roughly comparable to the study area municipalities and counties but well above the levels of the NB-HCE catchment counties and the State of New Jersey.

The EPA's EJScreen and New Jersey's EJMAP online tools are both based on the 2016-2020 ACS estimates and census geography. Table 3.4-15 highlights the EJMAP measurements for the study area's census block groups having population (see also Figure 3.4-1). This tool shows that four of the twelve census block groups are greater than 40 percent low-income population and eleven of the twelve census block groups are greater than 50 percent minority population. Two of the census block groups in the Jersey City portion of the study area between JFK Boulevard to the west and the Hudson-Bergen Light Rail Transit to the east are greater than 95 percent minority population.

Based on the EJMAP tool, the Newark census block group is designated as meeting the "adjacent" criteria as it is adjacent to one or more census block groups identified as overburdened under one or more criterion. Of the twelve census block groups in the study area, five are identified as meeting both the low-income and the minority criteria (Bayonne 340170101002, 3401701003, and Jersey City 340170061022, 340170061023, and 340170063002) and the other seven are identified as meeting the minority criterion. None of the census block groups in the study area exceed the State's limited English proficiency criterion for designation as overburdened.

Table 3.4-14. Environmental Justice Populations (Federal definition) – Comparative Geographies

Geography	Total Population	Population (Ages 24-64)	Ages 20-64 with Income Below Poverty Level		Minority Population	
			No.	*Pct.*	*No.*	*Pct.*
Study Area	19,278	11,510	1,007	5.7%	14,739	78%
Newark	281,917	166,711	37,215	22.3%	251,322	89%
Bayonne	65,112	39,598	3,995	10.1%	36,298	56%
Jersey City	262,652	173,945	21,490	12.4%	204635	78%
Essex County	798,698	469,451	62,489	13.3%	558,938	70%
Hudson County	671,923	438,519	50,437	11.5%	479,931	71%
Catchment Counties	4,115,756	2,414,095	192,139	8.0%	1,953,502	47%
New Jersey	8,885,418	5,196,222	442,284	8.5%	4,026,611	45%

Source: ACS 2016-2020 5-year Estimates (2022)

Table 3.4-15. Environmental Justice Populations (Federal definition) – Study Area Detail

Municipality/Census Block Group #	Total Pollution	Population (Ages 24-64)	Ages 20-64 with Income Below Poverty Level		Minority Population	
			No.	*Pct.*	*No.*	*Pct.*
Bayonne						
340170101001	2,012	1,316	111	8.4%	1,068	53.1%
340170101002	1,773	930	100	10.8%	1,401	79.0%
340170101003	1,857	1,133	43	3.8%	1,400	75.4%
340170102001	1,221	800	9	1.1%	548	44.9%
340170103003	995	522	106	20.3%	743	74.7%
Jersey City						
340170058021	1,822	1,192	32	2.7%	1,072	5.8%
340170061011	2,606	1,314	67	5.1%	2,193	12.2%
340170061021	495	220	22	10.0%	495	18.6%
340170061022	524	237	34	14.3%	519	71.0%
340170061023	2,379	1,492	162	10.9%	2,095	45.4%
340170063002	1,330	857	124	14.5%	1,083	36.5%
340170063003	2,260	1,497	197	13.2%	2,122	23.5%

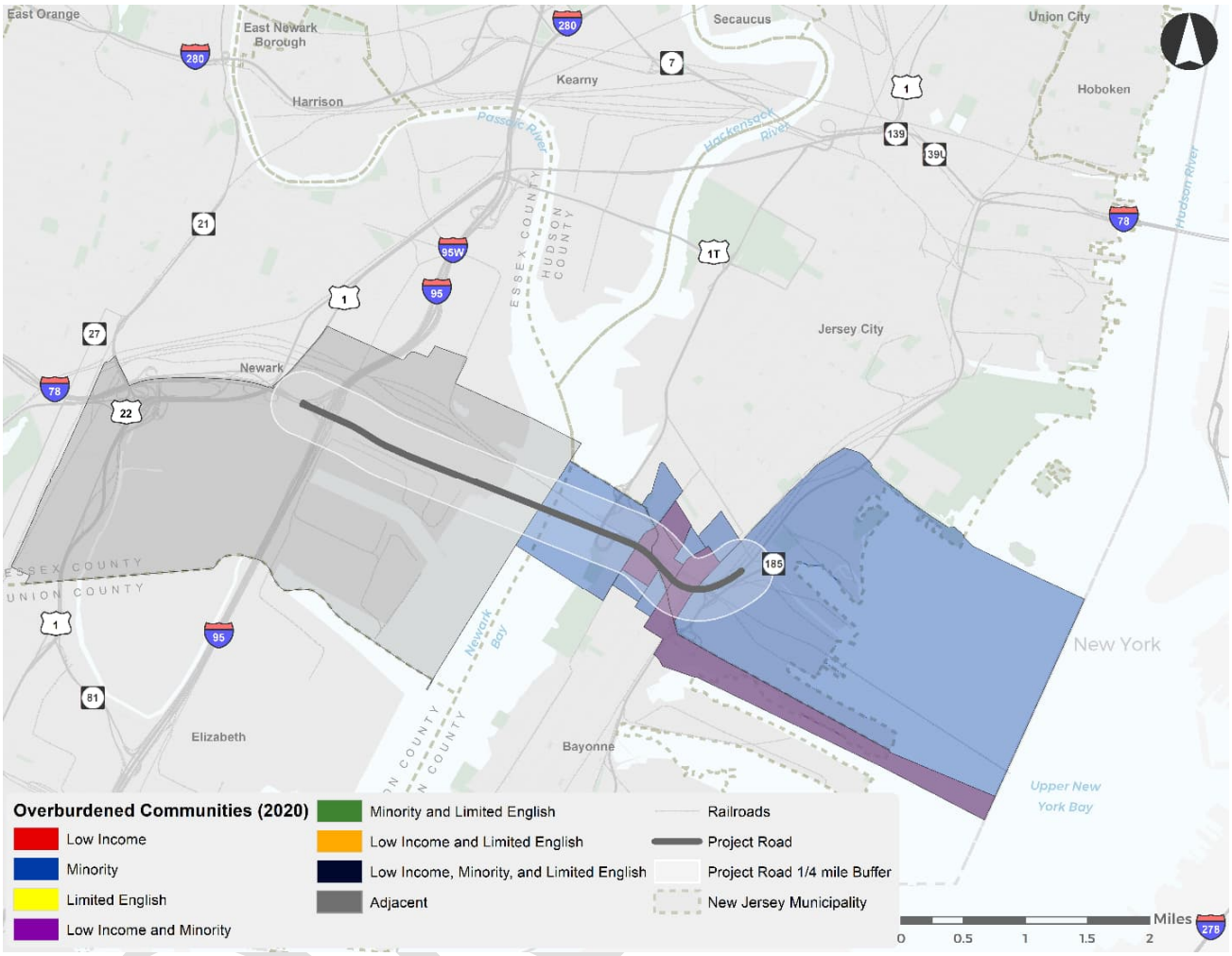
Source: ACS 2016-2020 5-year Estimates (2022)

Table 3.4-16. Environmental Justice Populations (New Jersey definition)

Municipality / Census Block Group #	Low Income	Minority	Under Age 5	Over Age 64	Less than High School Education	Linguistically Isolated
Bayonne						
340170101001	29.7%	53.1%	10.1%	9.6%	6.0%	7.5%
340170101002	45.0%	79.0%	8.1%	11.4%	12.0%	27.3%
340170101003	20.4%	75.4%	11.1%	2.6%	3.9%	9.9%
340170102001	10.5%	44.9%	8.4%	10.4%	3.3%	5.5%
340170103003	41.9%	74.7%	8.9%	18.3%	8.0%	19.3%
Jersey City						
340170058021	5.8%	58.8%	6.6%	8.1%	1.8%	4.6%
340170061011	12.2%	84.2%	9.6%	19.2%	7.5%	0.0%
340170061021	18.6%	100.0%	0.0%	45.5%	17.3%	14.7%
340170061022	71.0%	99.0%	9.7%	0.0%	9.6%	0.0%
340170061023	45.4%	88.1%	2.6%	10.5%	16.3%	9.6%
340170063002	36.5%	81.4%	6.5%	7.5%	8.7%	5.1%
340170063003	23.5%	93.9%	8.7%	6.7%	23.0%	14.3%

Source: NJDEP, 2020

Figure 3.4-1. New Jersey Overburdened Communities in the Study Area



Source: WSP

3.4.4 No Action Alternative

Social and Economic Factors – Under the No Action Alternative, the community character of the study area is expected to be influenced by implementation of land use plans and planned investments in open space, the Morris Canal Greenway, and transit-oriented development around Hudson-Bergen Light Rail Stations, among other changes to the physical environment. Community cohesion is expected to be enhanced by investments along major north-south corridors, such as JFK Boulevard and Garfield Avenue, that are crossed by the complex of east-west infrastructure formed by the NB-HCE, NJ Route 440, and Conrail's National Docks Secondary freight rail line near the Bayonne-Jersey City boundary.

While population and household projections are not made at the census block group level, the relatively built-out nature of the study area likely translates into modest population growth within the study area. Meanwhile, it can be expected that the study area's historic trend of being a place for newly arrived immigrants to reside and work alongside existing members of the community will continue.

Efforts such as the Ocean Avenue South Redevelopment Plan in Jersey City to attract and retain local businesses to serve the community will shape the availability of essential business services for community residents.

Port and related investments (e.g., the Doremus Avenue area of Newark, Port Jersey Marine Terminal, and the Global Container Terminal) will continue to contribute to economic growth and employment opportunities maintaining Transportation and Warehousing as a major industrial sector in the area.

Finally, as evidenced by regional transportation model projections of travel, workers and other users of the region's roadway and transit networks will continue to use roadways and transit for journey to work and other trip purposes.

Environmental Justice – Effects of the No Action Alternative on environmental justice populations are assessed in comparison with the effects of the Proposed Project Alternative in Section 3.4.4.1.

3.4.5 Proposed Project

3.4.5.1 Impacts

Social and Economic Factors – It is anticipated that the Proposed Project will not affect the community character of the study area as it will not affect those factors influencing community character, that is, land use plans and planned investments in open space, the Morris Canal Greenway, and transit-oriented development around Hudson-Bergen Light Rail Stations, among other changes to the physical environment. It is anticipated that the Proposed Project will not affect community cohesion in the study area as the Proposed Project involves widening and improving a highway and the NBB that have been in place for nearly 75 years under which existing travel corridors crossed by the NB-HCE will be retained. The Proposed Project will not affect potential future investments along major north-south corridors that are expected to enhance community cohesion, such as increased neighborhood retail development identified in the Jersey City Master Plan along JFK Boulevard and Garfield Avenue corridors (Jersey City 2021a). Meanwhile, the scope of the Proposed Project, that is, improvement of existing transportation infrastructure in an area with a relatively mature transportation system, on top of the relatively built-out nature of the study area likely translates into the Proposed Project having little to no effect on population and household demographics.

The Proposed Project does not affect the availability of essential business services for community residents as it does not conflict with efforts such as the Ocean Avenue South Redevelopment Plan in Jersey City to attract and retain local businesses to serve the community.

One property (multiple tax lots) will be acquired in full for the Proposed Project. Acquisition of the former Marist High School by the Proposed Project will remove this property from the tax rolls as the Authority is exempt from property taxes. Under the Proposed Project, the former Marist High School property will be repurposed for use as a stormwater management basin and for contractor lay down areas and future maintenance needs.

The former Marist High School was sold to a private developer in December 2021. While a redevelopment plan was subsequently approved by the Bayonne City Council for the property, no specific site plan has been submitted by the developer for the property. While the assessed value of the four tax lots comprising the property may change in the future based on improvements that could be built on the property, the current combined assessed value of the tax lots is $25,857,200 (New Jersey County Tax Boards Association 2022).

The Proposed Project is expected to have a beneficial effect on planned port and port-related growth in and around the study area by providing sufficient roadway capacity to at least 2050 on the section of the NB-HCE between Interchanges 14 and 14A, both of which provide access between the ports, railyards, and warehouses and the regional transportation system. In this way, the Proposed Project supports the continued economic growth and employment opportunities of Transportation and Warehousing, a major industrial sector in the area, as well as increases in assessed values and property tax payments from related property improvements. Finally, by providing sufficient roadway capacity to at least 2050 on the section of the NB-HCE between Interchanges 14 and 14A, the Proposed Project will also have a beneficial effect on workers and other users of the region's roadway system for journey to work and other trip purposes.

Construction Economic Effect – As shown in Table 3.4-17, the project's construction expenditures are anticipated to generate the following economic impacts:

- Approximately 25,500 total jobs during the construction period.
- $2.0 billion earned in labor income by employees.
- $2.8 billion in value added; value added is equivalent to the investment's contribution to the gross regional product.
- $519.8 million in federal, state, and local taxes ($357.8 million in federal taxes and $162.0 million in state and local taxes).

Table 3.4-17. Estimated Construction Economic Impact

Metrics	Direct	Indirect	Induced	Total
Employment	18,786	2,845	3,863	25,494
Value Added	$1,902.0	$478.8	$468.5	$2,849.3
Labor Income	$1,437.1	$314.8	$262.6	$2,014.6
State/Local Taxes	$50.4	$62.9	$48.7	$162.0
Federal Taxes	$247.4	$59.0	$51.4	$357.8

Source: WSP 2022
Note: Monetary values are in millions of 2021 dollars.

Environmental Justice – As noted in Section 3.4.4, the NB-HCE between Interchanges 14 and 14A traverses census block groups in the study area having population that meet the criteria of low-income populations, minority populations, or both. Following are assessments of the Proposed Project effects on environmental justice populations by various factors through comparison with the No Action Alternative and with applicable standards:

- Destruction or disruption of community cohesion or a community's economic vitality. As discussed under Social and Economic Factors, no adverse effect is anticipated for either the

Proposed Project or the No Action Alternative.

- Destruction or disruption of the availability of public and private facilities and services. As discussed under Social and Economic Factors, no adverse effect is anticipated.
- Adverse employment effects. As discussed under Social and Economic Factors, no adverse effect is anticipated. The Proposed Project is expected to have a beneficial effect on planned port and port-related growth in and around the study area by providing sufficient roadway capacity to at least 2050 on the section of the NB-HCE between Interchanges 14 and 14A, both of which provide access between the ports, railyards, and warehouses and the regional transportation system.
- Bodily impairment, infirmity, illness or death. One of the purposes of the Proposed Project is to improve motorist and worker safety on the section of the NB-HCE between Interchanges 14 and 14A. Maintenance and protection of traffic and work-zone safety measures will be incorporated into the project to protect the safe movement of travelers and workers during construction.
- Air pollution (measured by changes in stressors including ground level ozone and air toxics including diesel particulate matter). Ground level ozone is not formed locally; it is formed by reactions of certain air pollutants in the atmosphere from the cumulative contribution of the air pollutants from use of transportation facilities (roads and highways). The cumulative effect of transportation system contributions to the formation of ground level ozone in northern New Jersey is assessed by comparing NJTPA's regional emissions analysis of the transportation improvement program with the goals of the State Implementation Plan (SIP) for attaining the National Ambient Air Quality Standard for ozone. The most recent regional emissions analysis of the TIP, including the NB-HCE Program, demonstrates that the transportation improvement program conforms with the SIP. In other words, the Proposed Project does not interfere with the State's goals for attainment of the ozone standard. The results of the mobile source air toxic (MSAT) analysis of the Proposed Project documented in Section 3.8 indicate no meaningful differences are expected for the 2050 Build Alternative, as compared to the 2050 No Build Alternative. Further, based on review of project-related heavy-duty diesel vehicles, a fine particulate matter hot-spot analysis is not warranted, and any changes in such emissions associated with the project are not expected to create or contribute to any new violations of the national ambient air quality standards, increase the frequency or severity of NAAQS violations, or delay timely attainment of the standards. Assessment of construction-period air emissions indicates that construction of the Proposed Project does not exceed *de minimis* thresholds and, therefore, can be presumed to conform to the New Jersey SIP.
- Noise. As documented in Section 3.9, a noise analysis of existing conditions and conditions under the No Action and Proposed Project alternatives was conducted in accordance with the Authority's Noise Barrier Policy. That policy is modeled after FHWA and NJDOT policies for the abatement of highway traffic noise. Based on the analysis, the existing noise barrier on the NB-HCE in the study area (along the south side of the NB-HCE, beginning west of the NB-HCE crossing of JFK Boulevard and continuing past the crossing of Avenue C to the east) will be replaced under the Proposed Project with a noise barrier designed to mitigate NB-HCE traffic noise under 2050 traffic conditions. Construction-period noise may create impacts within census block groups meeting low income or minority thresholds. Measures to minimize construction noise, as described in Section 3.9.5.3, will be implemented to minimize impacts to the maximum extent practicable.
- Water pollution (measured by changes in stressors including impervious surfaces and flooding). By increasing the number of travel lanes and providing full width shoulders, the Proposed Project increases the area of impervious surface on the NB-HCE between Interchanges 14 and 14A. However, as documented in Section 3.11, while the existing NB-HCE provides no stormwater treatment of roadway stormwater runoff, the Proposed Project will provide stormwater management of this section of the NB-HCE by collecting stormwater in basins for treatment. Meanwhile, the Proposed Project

addresses potential flooding through being designed to conform with NJDEP's Flood Hazard Area requirements.

- Soil and groundwater contamination (measured by changes in stressors including contaminated sites). As documented in Section 3.10, the Proposed Project will not create any new contaminated sites. Meanwhile, the Proposed Project includes measures to manage, control, and treat contaminated sites in the study area that will be affected by construction in a manner that protects public and worker health and safety.
- Destruction or disruption of man-made or natural resources. Replacement of bridge structures on the NB-HCE between Interchanges 14 and 14A is an integral part of maintaining the structural reliability aspect of the project's purpose. The project's construction will also result in the unavoidable temporary disruption of utilities and other roadways affected by the project's construction. The Authority is coordinating with the owners of the affected utilities and other roadways on measures to minimize disruption of service. The replacement of NB-HCE bridge structures will result in unavoidable adverse effects on Newark Bay and nearby wetlands. The effects will be minimized through such measures as using structure rather than fill material in wetlands and avoiding in-water construction between January 1 and June 30. Unavoidable impacts that cannot be minimized will be mitigated through compensatory mitigation, that is, habitat restoration or enhancement.
- Destruction or diminution of aesthetic values. The NB-HCE, NBB, and the nearby Conrail Upper Bay Bridge are important aesthetic features of portions of the study area near Newark Bay to residents, users of waterfront parks, and to roadway users. The NBB would be replaced under the Proposed Project with two new parallel bridge structures. The effect of replacing the existing NBB on the visual environment will be mitigated by constructing the replacement bridges in the general area of the existing bridge with similar height and gradient as the existing bridge and with a modern cable-stay structure type that has been employed on other long-span bridge replacement projects in the region in recent years, including the Goethals Bridge between Elizabeth, New Jersey, and Staten Island, New York, the Kosciusko Bridge between Brooklyn and Queens in New York, and the Tappan Zee Bridge between Rockland and Westchester counties, New York. Views of the nearby Conrail Upper Bay Bridge will be the same or similar to existing views.
- Vibration. According to the U.S. Department of Transportation Federal Highway Administration (FHWA), there are no federal requirements directed specifically to highway traffic induced vibration (FWHA 2011). Prior studies documented by FHWA with the guidance that assessed the impact of operational traffic induced vibrations have shown that both measured and predicted vibration levels are less than any known criteria for structural damage to buildings. The Proposed Project will include measures to reduce construction-related vibration (e.g., use of drilled shafts as opposed to driven piles).
- Displacement of persons, businesses, firms, or nonprofit organizations. The Proposed Project would result in no displacement of persons, businesses, firms, or nonprofit organizations.
- Increased traffic congestion. A stated purpose of the Proposed Project is to reduce traffic congestion on the NB-HCE between Interchanges 14 and 14A. As documented in Section 3.7, the Proposed Project reduces traffic congestion from levels projected under the No Action Alternative.
- Isolation, exclusion, or separation of minority or low-income individuals within a given community or from the broader community. The Proposed Project will not create circumstances that would isolate, exclude, or separate minority or low-income individuals within the study area's communities. By addressing congestion on the NB-HCE between Interchanges 14 and 14A, the Proposed Project improves access and mobility to and from the study area's communities and the broader community.
- The denial of, reduction in, or significant delay in the receipt of, benefit of programs, policies, or activities. The Proposed Project will not deny, reduce, or delay benefits of the project (e.g., reduced

traffic congestion and travel times and improved treatment of stormwater from the NB-HCE) to minority populations and to low-income populations.

The above assessments demonstrate that the Proposed Project will not cause a disproportionately high and adverse effect on environmental justice populations nor deny, reduce, or delay benefits of the Proposed Project to environmental justice populations.

3.4.5.2 Conclusion

Based on the preceding assessment, the Proposed Project will have no significant impact on socioeconomics, demographic conditions, or community facilities in the study area. Pursuant to E.O. 12898 and NJDEP's policy on environmental justice, the Proposed Project will not result in any disproportionately high and adverse human health or environmental effects on minority populations, low-income populations, or overburdened communities.

The Authority will continue to engage with study area communities regarding the Proposed Project, including evaluation of any potential additional measures to avoid or minimize impacts and create benefits to the communities. No mitigation is necessary to address environmental justice requirements.

3.5 Cultural Resources

3.5.1 Study Area Definition and Data Collection

Since 1970 the State of New Jersey has recognized and protected historic properties under the New Jersey Register of Historic Places Act. The law allows historic properties to be nominated and entered in the New Jersey Register of Historic Places, which is maintained by the Department of Environmental Protection, Division of Parks & Forestry, Historic Preservation Office. Once a property is listed in the New Jersey Register of Historic Places, any public undertaking that would "encroach upon, damage or destroy" the registered historic property must receive prior authorization from the Commissioner of the Department of Environmental Protection. Strictly private undertakings are not reviewable under the law. The Historic Sites Council, an advisory board to the Commissioner, reviews all such proposed encroachments at an open public meeting and makes recommendations to the Commissioner for final action.

In 1966, the National Historic Preservation Act (80 Stat. 915, as amended) established a National Register of Historic Places (NHRP) to include districts, sites, structures, buildings, and objects of local, state, and national significance. The New Jersey Register of Historic Places is the official list of New Jersey's historic resources of local, state, and national interest. Created by the New Jersey Register of Historic Places Act of 1970 (N.J.S.A. 13:1B-15.128 et seq.), the New Jersey Register is closely modeled after the National Register program. Both Registers have the same criteria for eligibility, nomination forms, and review process. As detailed in the NHPA National Register Criteria of Evaluation (36 CFR Part 60.4), a historic property must possess the following to be eligible for inclusion in the NRHP:

> The quality of significance in American history, architecture, archaeology, engineering, and culture [that] is present in districts, sites, buildings, structures, and objects that possess integrity of location, design, setting, materials, workmanship, feeling, and association, and:
>
> (a) that are associated with events that have made a significant contribution to the broad patterns of our history; or
>
> (b) that are associated with the lives of persons significant in our past; or
>
> (c) that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or

(d) that have yielded, or may be likely to yield, information important in prehistory or history.

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 NJR/NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of a historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the NJR/NRHP. 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. Adverse effects on historic properties include, but are not limited to the following:

- Physical destruction of or damage to all or part of the property.
- Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access that is not consistent with the Secretary of the Interior's standards for the treatment of historic properties and applicable guidelines.
- 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.
- Introduction of visual, atmospheric, or audible elements that diminish the integrity of the property's significant historic features.
- Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization.
- Transfer, lease, or sale of property out of federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

3.5.2 Area of Potential Effects

The study area used in this EIS to evaluate potential impacts on properties listed in or eligible for listing in the NJR/NRHP is the Area of Potential Effects (APE), defined as follows:

> *The geographic area or areas within which an undertaking may directly or indirectly cause changes in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking.*

The APEs take into account all locations where an undertaking may result in disturbance of the ground, from which elements of the undertaking may be visible, and where the activity may result in changes in traffic patterns, land use, and public access. Project effects on historic resources may include both physical effects and contextual effects. Direct physical effects could include physical destruction, demolition, damage, or alteration of a historic resource. Indirect contextual effects may include isolation of a property from its surrounding environment; the introduction of visual, audible, or atmospheric elements that are out of character with a property or that alter its setting and context; or elimination of publicly accessible views to the resource.

Consistent with the requirements, separate APEs are defined for the Proposed Project for Historic Architecture and Archaeology.

3.5.2.1 APE-Architecture

The APE for Historic Architecture (APE-Architecture) includes the area in which the project may directly or indirectly cause changes in the character of use of historic properties, if they exist, in the project area (Figures 3.5-1a – 3.5-1c). The APE-Architecture includes all locations subject to ground-disturbing activities (consisting of the APE for Archaeology [APE-Archaeology]). To account for potential visual or contextual effects, the

APE-Architecture extends beyond the actual construction limits of the project to include those properties that may be impacted by visual changes, patterns of use, or may experience a change in historic character associated with the construction of the proposed project.

The Proposed Project would expand the NBB footprint to the north, creating a wider structure. At 265 feet, the overall height of the new bridge would not change substantially from its current maximum height of 263 feet and its visibility from the surrounding area would remain largely unchanged. To verify the visibility of the new bridge, a 0.75-mile buffer was considered based on the Federal Communication Commission's guidance for cellular towers measuring between 200 and 400 feet. Within the 0.75-mile buffer, GIS-based viewshed modeling delineated areas of visibility and non-visibility based on the proposed height of the NBB replacement bridges and intervening topography to determine areas in which the Proposed Project has the potential to be seen from street level. The viewshed modeling resulted in unnecessarily broad views due to the flat nature of the surrounding landscape. However, visibility was generally low to the horizon with little or no potential to affect historic properties, especially at greater distances. Further analysis using available street views indicated that intervening development and vegetation greatly reduced overall visibility to areas immediately fronting on the roadway, open space, and water. Accordingly, a 500-foot study buffer limit was adopted to account for reasonable visual, atmospheric, or audible effects. Using available street views that were verified during field survey, the APE-Architecture was further refined to only include resources directly or partially within the line of sight of the proposed undertaking to ensure full coverage.

The western portion of the APE-Architecture in Newark includes certain industrial and commercial properties adjacent to the Newark Viaduct and NBB West Approach and south of Interchange 14. Based on current project plans, the proposed Interchange 14 connector ramps to the east of the EWR are within an area of dense transportation infrastructure and will likely be at a similar height as the existing routes around the Port Street overpass. The potential for the proposed undertaking to create indirect visual impacts on any historic properties west of the NJ Turnpike main stem within the EWR complex is negligible and would not introduce new incompatible visual elements within the current setting. As a result, the APE-Architecture was drawn more narrowly in this area, along the west side of the NJ Turnpike main stem and excludes the EWR. Over Newark Bay, the APE-Architecture follows the 500-foot buffer. In the dense urban environment of Bayonne and Jersey City east of Newark Bay, the southern boundary of the APE-Architecture was more narrowly defined to encompass portions of Sunset Avenue, JFK Boulevard, West 54th Street, West 55th Street, West 56th Street, West 57th Street, West 58th Street, Avenues B and C, Garfield Avenue, and Interchange 14A. The eastern boundary of the APE-Architecture encompasses parcels flanking the NB-HCE, as well as certain industrial properties south of Caven Point Road (also known as New Jersey Route 185). The northern boundary line of the APE-Architecture in Jersey City and Bayonne follows a railroad embankment and the Hudson-Bergen Light Rail (HBLR) right-of-way. The railroad corridors, combined with the raised elevation of New Jersey Route 440 and surrounding pockets of dense vegetation, provide a visual barrier from the NB-HCE and thereby limit potential visual indirect impacts on adjacent residential neighborhoods and commercial development to the north and west of the highway. The APE-Architecture terminates adjacent to the east of Linden Avenue.

Figure 3.5-1a. Areas of Potential Effect—Newark

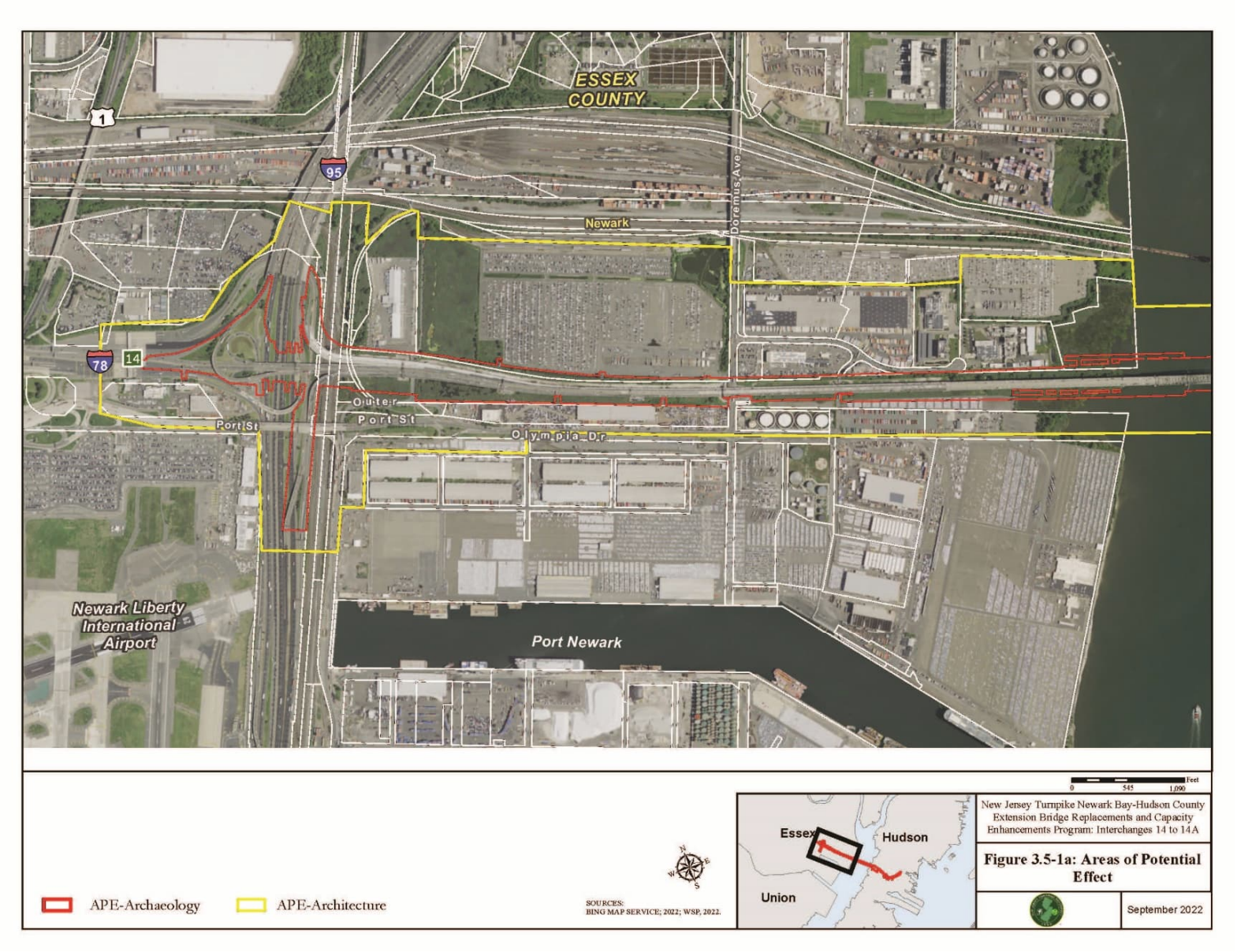


Figure 3.5-1b. Areas of Potential Effect—Bayonne and Jersey City

Figure 3.5-1c. Areas of Potential Effect—Jersey City

3.5.2.2 APE-Archaeology

The APE-Archaeology encompasses any area of land disturbance required for obtaining permits or for successful completion of the project (see Figure 3.5-1a-c). Land disturbances include, but are not limited to, areas subject to excavation or deep grading, wetlands mitigation sites, construction staging areas, or borrow areas opened expressly for the project. It includes the expected limits of disturbance for the proposed Interchange 14 improvements, Newark Viaduct, NBB, east at-grade segment, stormwater management areas, temporary and permanent parking areas, and construction staging and laydown areas. Because project plans remain in the early stages of development, vertical and horizontal areas of direct physical disturbance have not been fully identified, including the final plans for potential stormwater basins and infrastructure.

3.5.3 Cultural Resources Survey Methodology

To identify historic properties and assess potential impacts in accordance with Section 106, a cultural resources survey was performed within the APE for the Proposed Project (see Appendix A: Cultural Resources). The investigation consisted of a Phase I archaeological survey and an Intensive-level historic architectural survey. The purpose of the Phase I archaeological survey was to assess the archaeological sensitivity of the APE-Archaeology to determine if previously identified archaeological sites and archaeological historic properties are present in the APE-Archaeology, and to determine if previously unidentified pre-Contact or historic archaeological resources are present within the APE-Archaeology. The purpose of the Intensive-level historic architectural survey was to assess the NRHP-eligibility of newly identified above-ground historic architectural resources within the APE-Architecture and to assess potential project effects on above-ground historic properties listed in the NJR and/or NRHP or eligible for listing in the NRHP within the APE-Architecture. Although the National Register Criteria for Evaluation requires a historic resource to be at least 50 years of age, the intensive-level historic architectural survey expanded the minimum age requirement of previously unevaluated historic resources to account for the potential extended timeline of the Proposed Project. The cultural resources survey evaluated the significance and integrity of previously unevaluated historic architectural resources within the APE-Architecture and assessed the significance of identified archaeological resources in the APE-Archaeology according to the National Register Criteria for Evaluation. The criteria of adverse effect (36 CFR 800.5) was applied to assess whether the Proposed Project would result in an adverse effect on any listed or eligible historic properties. In addition to Section 106 regulations, the cultural resources survey adhered to the archaeological and historic architectural survey guidelines of the New Jersey Historic Preservation Office (NJHPO) (1994, 1996) (Splain 1999).

Research for the cultural resources survey was conducted to determine if any archaeological sites or historic properties have been previously identified within the APE-Archaeology and APE-Architecture and to assess the potential for unidentified archaeological resources or historic properties. Research at the NJHPO's facilities in Trenton to identify listed or eligible historic properties and examine previous historic sites surveys and regulatory surveys on file was not possible due to COVID-19 restrictions. However, a good faith effort was made by the project's cultural resource consultants, Richard Grubb & Associates, Inc. (RGA), to conduct NJHPO research by reviewing the NJ-GeoWeb database (NJDEP-GIS 2022), the updated list of historic properties, and the list of cultural resources survey reports on the NJHPO's website, and surveys on file in RGA's in-house library. For historic architectural resources, background research included the examination of accessible local historic sites inventories, the New Jersey historic bridge and roadway surveys, as well as master plans from Bayonne, Newark, and Jersey City to identify previously surveyed and/or locally significant historic resources within the APE-Architecture. Files at the New Jersey State Museum (NJSM) were checked for the presence of registered archaeological sites within or near the APE-Archaeology. The National Oceanic and Atmospheric nautical maps showing shipwrecks were examined and the NJHPO was asked for mapping it has on file regarding previously identified submerged targets in the Newark Bay. Additional background research consisted of a review of pertinent primary and secondary sources available online, including maps, historic photographs, and local histories.

3.5.4 Existing Conditions

3.5.4.1 Historic Properties

The Intensive-level historic architectural survey identified 41 historic architectural resources over 45 years of age in the APE-Architecture, including four historic properties listed in the NJR and NRHP or eligible for listing in the NRHP (Figure 3.5-2a – Figure 3.5-2d):

- Newark and Elizabeth Branch of the Central Railroad of New Jersey (SHPO Opinion: 8/29/2000)
- Pennsylvania Railroad New York Bay Branch Historic District (SHPO Opinion: 12/17/2019)
- Lehigh Valley Railroad Historic District (SHPO Opinion: 3/14/2002)
- Morris Canal (NJR: 11/26/1973; NRHP: 10/1/1974; SHPO Opinion: 5/27/2004)

In addition, one archaeological historic property is present and previously identified within the APE-Archaeology:

- Site 28-Hd-45 (Jersey Eagle archaeological Site) (a.k.a. The Jersey Eagle Site; SHPO Opinion: 5/17/2013)

To facilitate its planning, the Authority requested Technical Assistance from the NJHPO regarding the possible eligibility of the NBB and NB-HCE Corridor for listing in the NRHP. The Intensive-level Architectural Survey forms for the NBB and the entire NB-HCE Corridor were submitted separately by the Authority. In correspondence dated August 9, 2021, the Authority submitted an Intensive-level Architectural Survey Form for the NBB recommending the structure not eligible for listing in the NRHP. The NJHPO requested additional information on September 24, 2021 (HPO-I2021-156), which the Authority provided in a subsequent submission dated December 6, 2021. On February 2, 2022 (HPO-B2022-011), the NJHPO responded by disagreeing with the survey form's not eligible recommendation. It concluded that the NBB would meet Criterion C as a well-preserved example of a cantilevered truss bridge of the mid-twentieth century. The boundaries of the historic property would include the bridge in its entirety, and the period of significance would be limited to its year of construction, 1956.The NJHPO comments were informal and did not constitute project review under any state or federal law; however, for the purposes of the intensive-level historic architectural survey, the NBB was considered a historic property.

The Intensive-level Architectural Survey form for the entire NB-HCE Corridor, dated March 15, 2023, recommended no other portion of the NB-HCE corridor as eligible for listing in the NRHP. NJHPO's reply on April 4, 2023 concurred "due to a lack of significance in the broad patterns of automotive transportation history under National Register Criterion A; a lack of associations with significant persons under Criterion B; and a lack of technological significance or aesthetic distinction under Criterion C" (HPO Project #21-1041-6, HPO- D2023-005).

The Port Authority Administration Building (Building 260) is another previously surveyed historic resource within the APE-Architecture that received informal NJHPO comments on its NRHP-eligibility. In a letter dated April 12, 2018, the NJHPO stated that the Port Authority Administration Building (Building 260) may be eligible for the NRHP under Criterion C as an intact and representative example of New Formalism architecture. Based on this NJHPO correspondence, the Port Authority Administration Building was considered a historic property for the purposes of intensive level historic architectural survey.

Among the historic architectural resources identified within the APE-Architecture, the NJHPO previously determined the NJT main stem ineligible for listing in the NRHP and as such, this historic resource was not evaluated further as part of the current survey. Similarly, the PSE&G Building and Former Tide Water Oil Company Pumping Station, were previously surveyed resources not recommended NRHP-eligible and not further evaluated as part of the intensive-level historic architectural survey.

Figure 3.5-2a. Cultural Resources — Newark

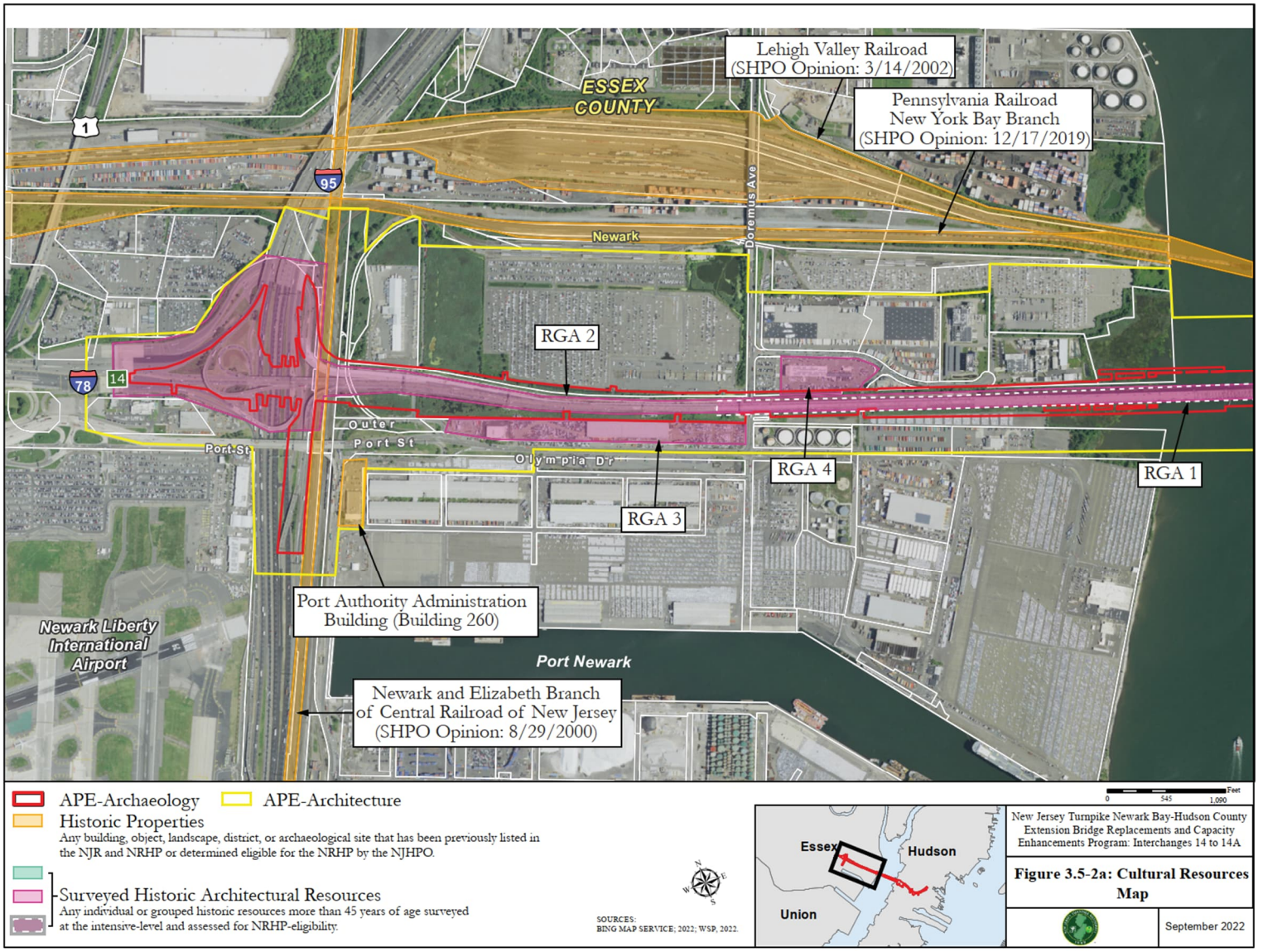


Figure 3.5-2b. Cultural Resources — Bayonne and Jersey City

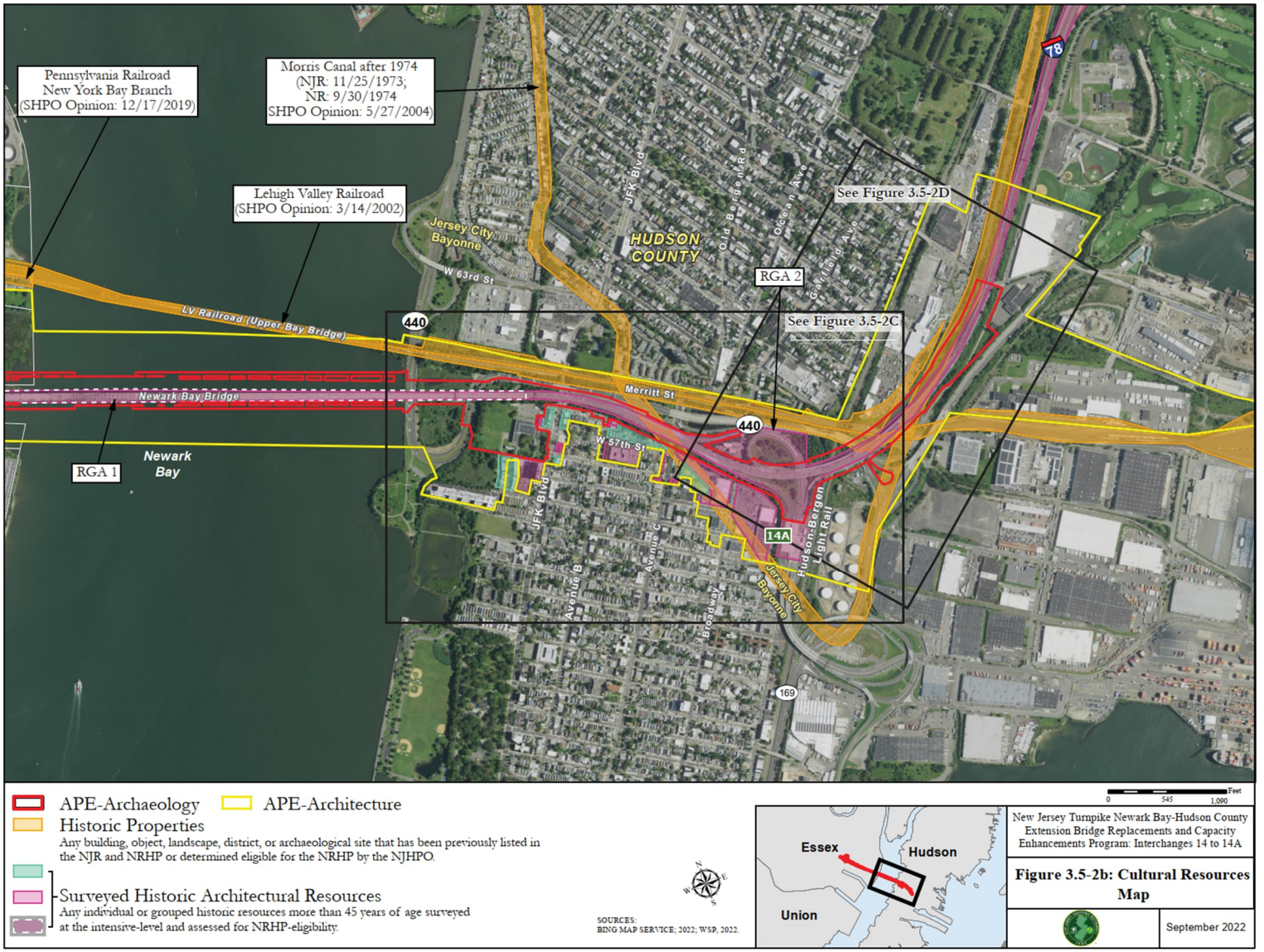


Figure 3.5-2c. Cultural Resources — Bayonne and Jersey City (detail)

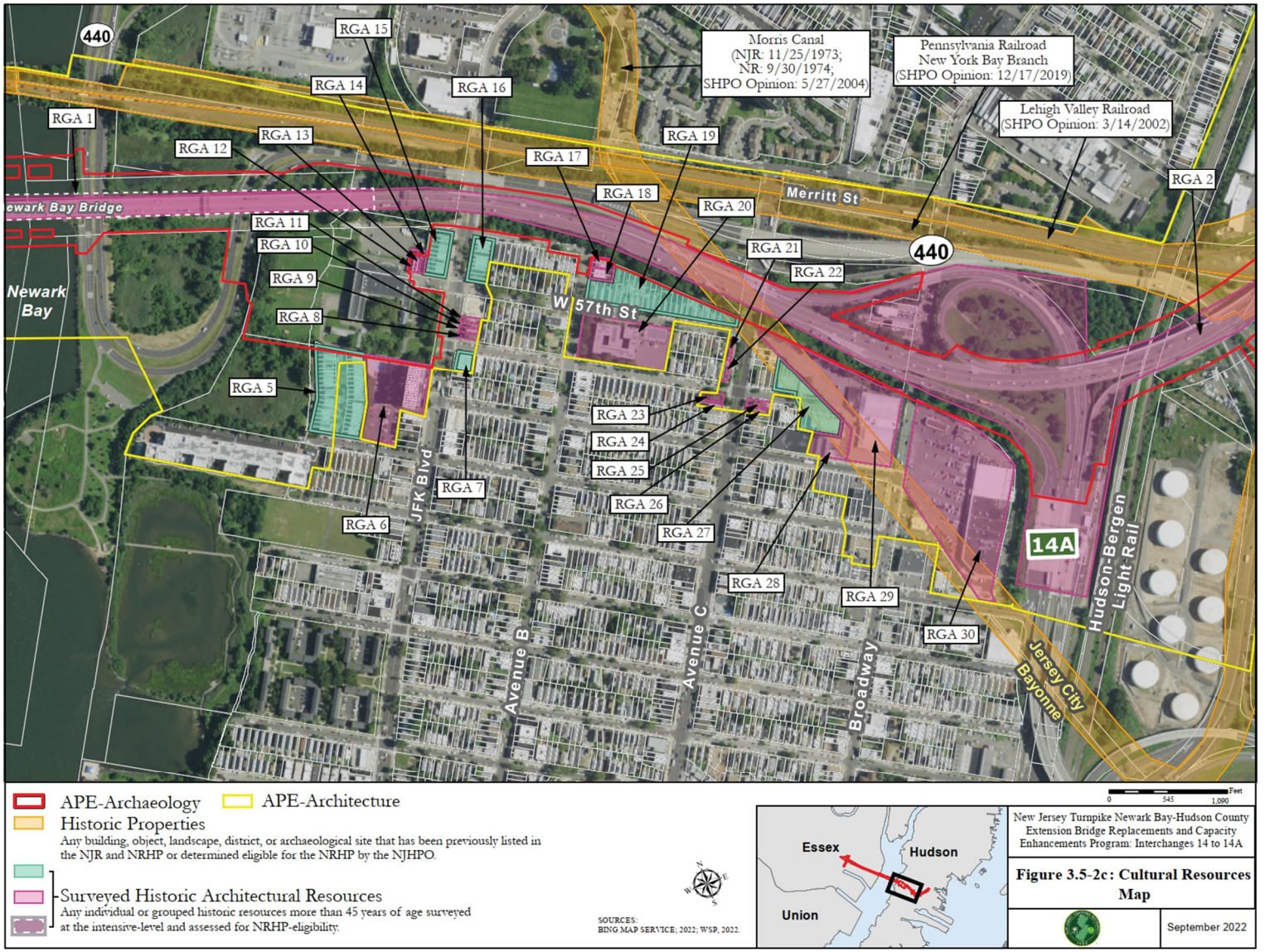
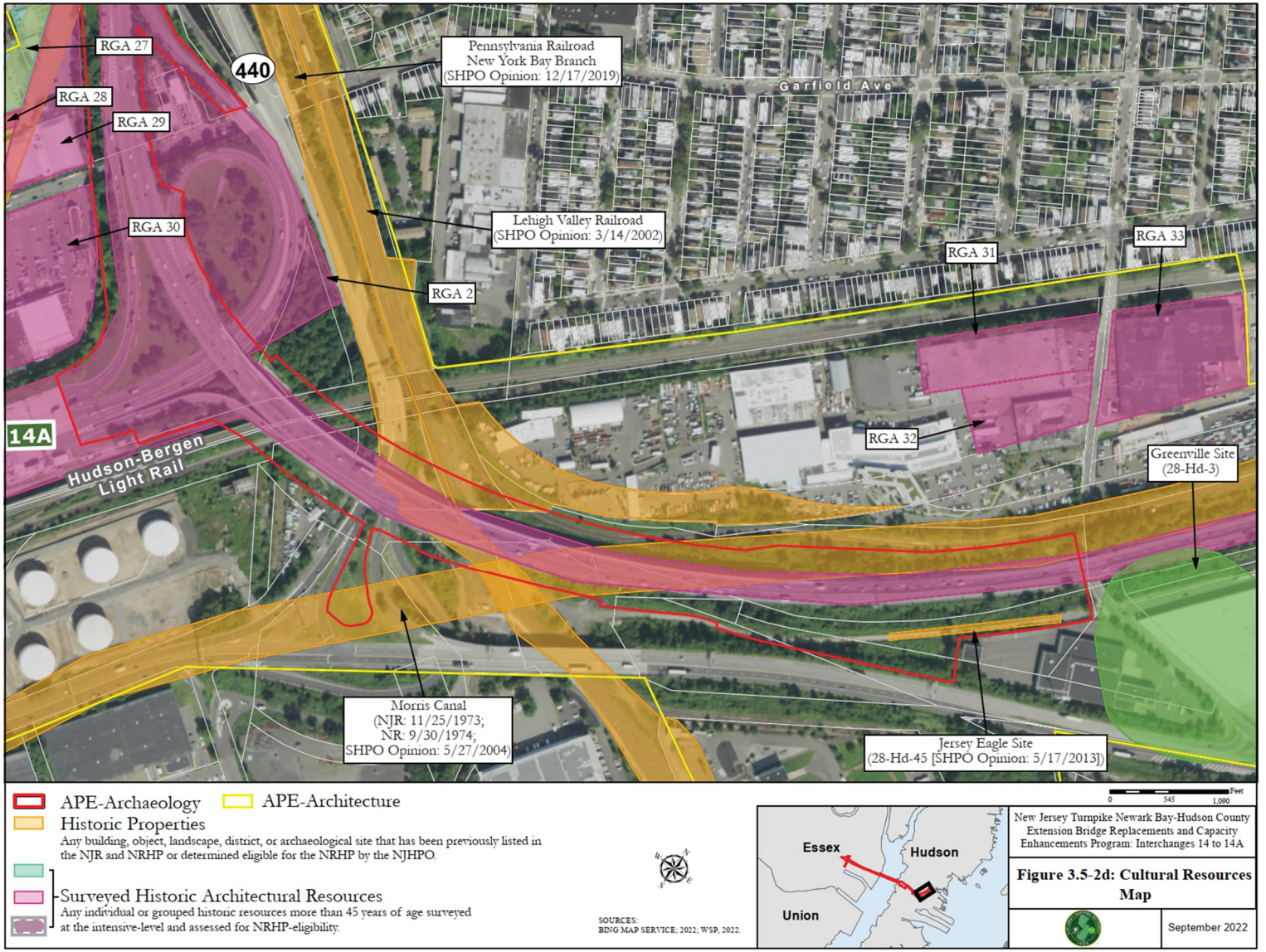


Figure 3.5-2d. Cultural Resources — Jersey City (detail)


RGA 27
RGA 28
RGA 29
RGA 30
RGA 2
RGA 31
RGA 33
RGA 32
440
14A
Hudson-Bergen Light Rail
Garfield Ave
Pennsylvania Railroad
New York Bay Branch
(SHPO Opinion: 12/17/2019)
Lehigh Valley Railroad
(SHPO Opinion: 3/14/2002)
Greenville Site
(28-Hd-3)
Morris Canal
(NJR: 11/25/1973;
NR: 9/30/1974;
SHPO Opinion: 5/27/2004)
Jersey Eagle Site
(28-Hd-45 [SHPO Opinion: 5/17/2013])
APE-Archaeology
APE-Architecture
Historic Properties
Any building, object, landscape, district, or archaeological site that has been previously listed in the NJR and NRHP or determined eligible for the NRHP by the NJHPO.
Surveyed Historic Architectural Resources
Any individual or grouped historic resources more than 45 years of age surveyed at the intensive-level and assessed for NRHP-eligibility.
SOURCES:
BING MAP SERVICE; 2022; WSP, 2022.
Feet
0
545
1,090
Essex
Hudson
Union
New Jersey Turnpike Newark Bay-Hudson County Extension Bridge Replacements and Capacity Enhancements Program: Interchanges 14 to 14A
Figure 3.5-2d: Cultural Resources Map
September 2022

Newark and Elizabeth Branch of the Central Railroad of New Jersey Historic District (SHPO Opinion: 8/30/2000)

The Newark and Elizabeth Branch of the Central Railroad of the New Jersey Historic District is eligible for the NRHP under Criterion A for its role in regional transport of freight and passengers (Guzzo 2000). This traffic includes passengers traveling to vacation locations along the northern New Jersey Shore, excursion riders traveling to the New Jersey Shore and numerous points along the Central Railroad of New Jersey Main Line, and employees commuting to Newark. The branch also handled significant freight traffic to and from Newark, Elizabeth, and the Port of Newark. The original survey forms and the subsequent NJHPO Opinion of Eligibility did not define a period of significance for the Newark and Elizabeth Branch of the Central Railroad of New Jersey; however, the significance period would likely extend from 1870 (i.e., the date the railroad was first chartered) to at least 1938, when previously identified contributing resources were built within the corridor (Richard Grubb & Associates, Inc. 2005). The district boundaries consist of the line's historic right-of-way and extend from the Central Railroad of New Jersey main line at Elizabethport, Union County to the Newark and New York Branch of the CRRNJ at Brills Junction in the City of Newark, Essex County. The NRHP-eligible railroad historic district traverses a portion of the APE-Architecture at Interchange 14.

Pennsylvania Railroad New York Bay Branch Historic District (SHPO Opinion: 12/18/2019)

The Pennsylvania Railroad New York Bay Branch Historic District is eligible for listing in the NRHP under Criterion A in the area of transportation for its contribution to the state's industrial, commercial, and urban expansion. The district is also eligible under Criterion C in the area of engineering and for the district's significant collection of contributing bridges, culverts, yards, and surviving overhead electrified catenary system (Guzzo 2005, Saunders 2015). The railroad's period of significance extends from 1889, when the two predecessor railroads received their corporate charters, to 1945, when the railroad completed the last transfer bridge (Transfer Bridge No. 9) at the contributing Greenville Yard Piers in Greenville Yard, Jersey City. The boundaries of the historic district are limited to the historic right-of-way and extend in two branches from Waverly Yard in Newark to just beyond the Point-No-Point Bridge over the Passaic River in Kearny and from Waverly Yard in Newark to Greenville Yard in Jersey City (Guzzo 2005, Saunders 2015, Marcopul 2019). The railroad is currently operated by Conrail for freight service. The historic district intersects with a portion of the APE-Architecture between Newark Bay and Caven Point Road (NJ Route 185) in Bayonne and Jersey City.

Lehigh Valley Railroad Historic District (SHPO Opinion 3/15/2002)

The Lehigh Valley Railroad Historic District follows a route across the state of New Jersey, spanning seven counties, beginning in Phillipsburg, Warren County, and terminating in Jersey City, Hudson County. The Lehigh Valley Railroad Historic District is eligible for the NRHP under Criterion A in the area of transportation at the state level of significance for its role in transporting coal from Pennsylvania coal fields to the New York market and for its local significance in leading to the industrial development of South Plainfield and various Middlesex County communities, such as Perth Amboy (Guzzo 2002). Subsequent reviews for other projects clarified and elaborated on the significance, integrity, and character of the historic district. While no period of significance is specified in the NJHPO Opinion of Eligibility, researchers have suggested a period beginning in 1875, when the first shipment was sent to Perth Amboy, through 1951, after which it did not meet the test for "exceptional significance" for resources less than 50 years old (ARCH2, Inc 2001: 21). A portion of the historic district extends along the northern boundary of the APE-Architecture from Newark Bay in Bayonne to the Hudson-Bergen Light Rail right-of-way in Jersey City, just north of the NB-HCE Interchange 14A. From the HBLR, the historic district continues northeastward within the APE-Architecture before terminating at a point just west of the existing NB-HCE between New Jersey Route 440 and Linden Avenue.

Morris Canal (NJR: 11/26/1973; NRHP: 10/1/1974; SHPO Opinion: 5/27/2004)

The Morris Canal, which was completed in 1836 after little more than a decade of construction, was listed on the NJR and NRHP in the early 1970s as a linear historic district under Criteria A, B, C and D. The canal is significant under Criterion A for its association with canal transportation, American technical education, and

the demographic and industrial growth in northern New Jersey, New York City, and the Lehigh Valley. Because several inventors, engineers, and important men were associated with the construction and operation of the canal, the canal is significant under Criterion B. The Morris Canal meets Criterion C as a major technological feat of construction and operation, including the inclined plane design. The potential information relating to canal engineering and construction as well as the lifeways of nineteenth-century canal culture that archaeological investigations may yield makes the canal significant under Criterion D (Guzzo 2004). The period of significance established in the Morris Canal Historic District nomination form cover the years from 1836 to the turn of the century (Guzzo 2004). In 2004, the NJHPO expanded the period of significance for the Morris Canal to 1930 when the closure of the canal was complete (Guzzo 2004). Portions of the APE-Archaeology cross the footprint of the infilled Morris Canal in a right-of-way south of I-78/NJ Turnpike in the City of Bayonne and on Block 30203, Lot 3; Block 30204, Lots 3 and 4; Block 30306, Lots 2, 3, and 4; and Block 30303 in the City of Jersey City.

Port Authority Administration Building (Building 260)

The Port Authority Administration Building (Building 260) is a multi-story, steel-frame building constructed in 1967 in the northwest corner of Port Newark. The building assumes a T-shaped footprint comprised of a three-story office block and garage/storage area extending from the northeast elevation. The office block exterior contains a distinctive angular façade treatment characterized by the composition of full-height, precast concrete vertical panels and alternating glass and spandrel panels. The remaining building exterior consists primarily of glazed face brick and translucent, insulated fiberglass panels framed by structural steel mullions. In correspondence dated April 12, 2018 (HPO-D2018-109), the NJHPO concluded that the subject building may be eligible under NRHP Criterion C as an intact and representative example of the New Formalism style, a mid-twentieth century architectural style that characterized many high-profile cultural, institutional, and civic buildings of the period (Marcopul 2018). The boundaries of the historic property encompass the property boundaries, and the period of significance would be limited to its year of construction, 1967. Character-defining features include the building's form, precast concrete vertical panels, glass and spandrel panels, glazed brick veneer, insulated fiberglass panels with structural steel mullions, and aluminum sash windows.

Newark Bay Bridge

The NBB, also known as the Vincent R. Casciano Memorial Bridge, was built in 1956 as part of the NB-HCE to carry the highway over Newark Bay between the cities of Newark and Bayonne. The main span consists of a three-part, cantilevered through-truss with east and west anchor arms and a central shouldered tied-arch span. A 43-span west approach and 32-span east approach comprised of a combination of steel stringer beam spans and steel riveted girder spans flank the main bridge span. Two types of reinforced concrete piers support the entire bridge superstructure. Since its construction, the structure has undergone various alterations, including the replacement of its deck, median, and parapet walls, along with the addition of new overhead directional signs, lighting, and security fencing.

The NBB was among the last of the bridge structures erected for extensions to the original (main stem) NJ Turnpike, a limited-access highway first envisioned in the early 1930s as part of a nationwide network of superhighways. As part of the larger NJ Turnpike corridor, the bridge and NB-HCE helped reduce travel times and served as a feeder into the NJ Turnpike system, but as an element of a limited-access expressway serving Hudson County, the NBB contributed little to appreciable changes in patterns of growth in Bayonne or Jersey City.

Architecturally, the NBB embodied widespread, mid-twentieth-century design standards adopted by the NJTA and highway builders for major bridges across the country, including along the NJ Turnpike's main stem. These design features included the use of concrete bridge piers, beam and girder spans, parapet walls, and a cantilevered through-truss and shouldered tied-arch span. Though considered technologically insignificant, in correspondence dated February 2, 2022 (HPO-B2022-011), the NJHPO indicated during technical assistance for the current undertaking that the Newark Bay Bridge would be eligible under NRHP Criterion C as an example of a mid-twentieth century cantilevered truss bridge. The cantilevered through truss structure is no

longer a preferred bridge design by engineers and is one of three remaining twentieth century structures of its type in New Jersey (Marcopul 2022). As indicated in the NJHPO correspondence, the historic property boundaries would encompass the entire bridge and its period of significance would be limited to the year of its construction (1956) (Marcopul 2022).

Site 28-Hd-45 (SHPO Opinion: 5/17/2013)

Site 28-Hd-45 (Jersey Eagle archaeological Site) (a.k.a. The Jersey Eagle Site; SHPO Opinion: 5/17/2013) is a multi-component archaeological site on the western shore of the Hudson River situated within the footprint of a Conrail railroad access road on Block 30306, Lot 7 in the City of Jersey City just south of Linden Avenue in the northern portion of the APE-Archaeology. The archaeological site was identified within the footprint of a natural gas pipeline and its full horizontal extent was not delineated. While no pre-Contact period cultural features were found, the pre-Contact period artifacts recovered indicate stone tool manufacture and maintenance, as well as subsistence-related resource processing activities were conducted at the site. The historical component of the site yielded artifacts related to eighteenth- to twentieth-century domestic refuse. One historic feature was identified consisting of a stone wall feature that may represent a property subdivision marker (PAL 2013a, 2013b). The artifacts were recovered from buried plowzone layer, which had a top subsurface depth ranging from roughly 2.3 feet in the northern portion of the site to 7.9 feet below grade in the southern portion of the site. The site was determined eligible for listing in the NRHP under Criterion A for its association with events that made a significant contribution to the broad patterns of history and Criterion D for the potential to yield new, important information in Native American per-Contact history and the early colonial settlement of Hudson County from 0 to 1850 AD.

None of the remaining 32 historic architectural resources identified within the APE-Architecture and surveyed at the intensive level were recommended eligible for listing in the NRHP.

3.5.4.2 Archaeological Resources

A review of NJSM site files and published accounts (Cross 1941; Skinner and Schrabisch 1913; Public Archaeology Laboratory, Inc. [PAL] 2013) indicated that there is one registered archaeological site within the APE-Archaeology (Figure 3.5-2d). The aforementioned Site 28-Hd-45 (Jersey Eagle archaeological Site) (a.k.a. The Jersey Eagle Site; SHPO Opinion: 5/17/2013) is a multi-component pre-Contact and historic period site found within the footprint of a natural gas pipeline corridor on Block 30306, Lot 7 in the City of Jersey City, just south of Linden Avenue in the northern portion of the APE-Archaeology. This site was determined eligible for listing in the NRHP under Criterion A for its association with events that made a significant contribution to the broad patterns of history and Criterion D for the potential to yield new, important information in prehistory and history regarding the pre-Contact period occupation and the early colonial settlement of Hudson County from 0 to 1850 AD. While the full site boundaries of the deeply buried deposits associated with the site were not defined in the prior 2013 archaeological survey, the area proximate to the site boundaries is sensitive for deeply buried archaeological deposits related to the site. Proposed nearby stormwater basin HUC3-F has a base depth of 5.0 feet below grade and does not appear to exceed the identified top depth of 6.0 to 6.5 feet for the nearby 28-Hd-45 Site. Further, examination of a soil boring log revealed the presence of truncated, hydric subsoil at the basin location that is capped by historic fill. The proposed associated stormwater outfall pipe between the basin and Linden Avenue may be in or proximate to the existing natural gas pipeline trench excavation footprint that measured 16 feet in width.

The Greenville Site (28-Hd-3) is a Woodland period Native American site on the western shore of the Hudson River adjacent to the northeast terminus of the APE-Archaeology near Linden Avenue (see Figure 3.5-2d). This site was first recorded by Skinner and Schrabisch in 1913 who reported that "potsherds daubed over with red paint" were said to have been collected on the point at Greenville (Skinner and Schrabisch 1913: 42). Based on the proximity of the Greenville and the Jersey Eagle sites, it is possible that the pre-Contact components of the sites are related and represent the same archaeological resource.

Files also indicate that two previously identified sites are located within 1,000 feet of the APE-Archaeology. Site 28-Hd-12 is a temporally and functionally undetermined pre-Contact period Native American site located roughly 200 feet north of the APE-Archaeology. The Morris Canal Fiddler's Elbow Segment Archaeological Site (28-Hd-47) is situated roughly 1,000 feet south of the APE-Archaeology and is associated with the abandonment and filling of the Morris Canal, circa 1920-1940.

Eight submerged targets have been documented in proximity to APE-Archaeology between the NBB and the Conrail Line Bridge based on information provided by the NJHPO in an email dated July 1, 2021 (USGS 1955a, 1955b). The closest of these targets is located within the footprint of the proposed bridge replacement temporary construction trestle and the farthest is situated at the Conrail Line roughly 700 feet north of the APE-Archaeology. According to the NJHPO, these targets may represent "debris of some kind and/or pilings." In an email dated July 1, 2021, the NJHPO specified that the submerged targets would require survey to confirm if the target represents an archaeological resource. Examination of historic United States Geological Survey map from 1955 indicates that three of the targets are located within an area containing wooden piling along the Newark shoreline along the west side of the dredged navigation channel, while the other submerged targets, one of which is in the APE-Archaeology near the east side of the bridge span, appear to align with the east side of the dredged navigation channel, strongly suggesting that they correspond with pilings installed to ensure large vessels did not venture from the dredged channel in this portion of the bay (USGS 1955a, 1955b). Additionally, a visible shipwreck is also mapped about 480 feet to the south (Latitude 40.692181, Longitude -74.113403) of the NJ Turnpike Extension bridge and a submerged wreck is mapped roughly 600 feet to the north (Latitude 40.699108, Longitude -74.121117) of the NB-HCE bridge, in proximity to the Conrail bridge (NOAA 2021). Both previously identified wrecks are outside of the APE-Archaeology and are not registered as archaeological sites.

Three additional areas of archaeological sensitivity were identified. The footprint of the infilled Morris Canal (SHPO Opinion: 4/27/2004; NJR: 11/26/1973; NR: 10/1/1974), a NRHP and NJR-listed resource, crosses the eastern portion of the APE-Archaeology in two locations. Therefore, buried archaeological features associated with the Morris Canal may be present in a right-of-way south of I-78/NJ Turnpike in the City of Bayonne and on Block 30203, Lot 3; Block 30204, Lots 3 and 4; Block 30306, Lots 2 and 4; and Block 30303 TURN in the City of Jersey City. These areas have an assessed moderate to high sensitivity for intact buried archaeological elements associated with the canal's towpath and prism.

During the early twentieth century, several railroad related structures were present within the APE-Archaeology that have likely been destroyed through subsequent construction, however, a circa 1908 New York Bay Railroad Co. turntable was present within the proposed stormwater detention basin HUC3-C located southeast of the NB-HCE on Block 30306, Lot 2 in the City of Jersey City. This area contains a moderate to high sensitivity for archaeological resources associated with the railroad turntable. Additionally, a grassy area just east of the former Marist High School building on Block 13, Lot 1 in the City of Bayonne, measuring 75 feet by 200 feet in plan, was identified as having archaeological sensitivity for Pre-Contact period Native American resources. Phase I archaeological testing was conducted at this location on August 17, 2022 that included the excavation of 13 hand-dug shovel test pits. No cultural features were identified. Soils encountered appeared to have been reworked and re-deposited and recovered artifacts were assessed as not potentially significant due to compromised integrity. No further archaeological survey was recommended for Block 13, Lot 1 in the City of Bayonne.

3.5.5 No Action Alternative

Under the No Action Alternative, the Proposed Project would not be undertaken, and the historic and archaeological properties would retain their respective existing conditions and settings. The existing bridge would remain. As such, there would be no effect on historic or archaeological properties under the No Action Alternative.

3.5.6 Proposed Project

3.5.5.1 Historic Properties

Background research conducted for the cultural resources survey identified four historic properties formally listed in the NJR and NRHP or determined eligible for listing in the NRHP within the APE-Architecture. An additional archaeological historic property in the APE-Archaeology was formerly determined eligible for listing in the NRHP. Although the NJHPO has made no formal determination of eligibility for the NBB and Port Authority Administration Building (Building 260) in the APE-Architecture, previous NJHPO technical assistance correspondence indicates that both resources would be considered NRHP-eligible if subject to a formal project review by the state agency. As such, the cultural resources survey considered project effects on both historic resources.

Additional project effects to historic properties may be identified upon the completion of the cultural resources survey following an NRHP-eligibility evaluation of all surveyed historic architectural resources within the APE-Architecture and the identification, and, if necessary, evaluation of previously unrecorded archaeological resources that may exist in the APE-Archaeology.

Port Authority Administration Building (Building 260)
The realigned NB-HCE eastbound lanes and ramps within and south of Interchange 14 will be visible from the historic property. The construction of new highway infrastructure will generally be in keeping with the property's existing setting, which includes the main stem of the NJ Turnpike to the west and NB-HCE to the north. The introduction of the realigned NB-HCE into the property's setting will not diminish the overall integrity of the historic property and its significant features that render the building eligible under NRHP Criterion C. The character-defining features identified on the building's exterior will remain visible from the public right-of-way and continue to convey its architectural significance as an example of a mid-twentieth-century New Formalism-style civic building. For these reasons, the indirect visual project impacts associated with the undertaking will have no adverse effect on the Port Authority Administration Building (Building 260).

Newark and Elizabeth Branch of the Central Railroad of New Jersey (SHPO Opinion: 8/29/2000)
The proposed realigned and widened NB-HCE falls within the boundaries of the NRHP-eligible Newark and Elizabeth Branch of the Central Railroad of New Jersey and will likely require a permanent aerial easement over a portion of the railroad corridor within the APE-Architecture as part of its construction. Current project plans do not call for any direct impacts to railroad-related resources within the historic district boundaries. Any project impacts to the rail corridor associated with the installation of new roadway piers within the right-of-way will be temporary and will not alter the existing alignment or tracks within the historic district boundaries.

The proposed NB-HCE is located within a section of the railroad historic district that has experienced significant alterations to its setting since its assumed period of significance (1870 to 1938). These changes include the introduction of multiple highway lanes parallel and over the rail corridor. As a new multi-lane highway, the proposed NB-HCE will not introduce a new visual element incompatible with the district's current setting. Above-grade, multi-lane roads such as the current NB-HCE and Port Street overpass already traverse the railroad corridor at this location and include existing piers within its right-of-way.

The widening of the NB-HCE will be within a small portion of the overall historic district and as currently proposed will not directly or indirectly alter the railroad-related features within the district's setting that contribute to its historical significance and eligibility as an important transportation corridor. The historic district will continue to function according to its historic use as an active railroad corridor. For these reasons, the Proposed Project will not have an adverse effect on this NRHP-eligible historic district.

Pennsylvania Railroad New York Bay Branch Historic District (SHPO Opinion: 12/17/2019)
An approximate 1.20-mile-long section of the Pennsylvania Railroad New York Bay Branch Historic District falls within the APE-Architecture north of the current NB-HCE alignment and parallel to the NRHP-eligible Lehigh Valley Railroad Historic District through Jersey City. Current project plans call for no direct impacts to railroad-related resources within the historic district boundaries; however, the proposed NB-HCE will likely require a permanent aerial easement over a portion of the railroad corridor within the APE-Architecture as part of its construction. Potential visual impacts will be limited to a small portion of the larger district and not indirectly alter any associated railroad-related features that may contribute to its historical significance as a transportation corridor. Much of the Pennsylvania Railroad New York Bay Branch Historic District within the APE-Architecture has experienced significant alterations to its setting since its defined period of significance (1889 to 1945), including the removal and realignment of tracks and above-grade railroad bridges west of Garfield Avenue and the addition of multiple highway lanes south of and adjacent to the rail corridor. Therefore, the proposed realignment and widening of the NB-HCE will not negatively diminish the district's integrity of setting or introduce a new visual element incompatible within the built environment. Above-grade, multi-lane roads, including the current NB-HCE and NJ Route 440, already traverse the railroad corridor at this location For these reasons, the Proposed Project will have no adverse effect on the NRHP-eligible Pennsylvania Railroad New York Bay Branch Historic District.

Lehigh Valley Railroad Historic District (SHPO Opinion: 3/14/2002)
The Lehigh Valley Railroad Historic District runs north of the existing NB-HCE and NBB and terminates just northeast of the Hudson-Bergen Light Rail crossing in Jersey City. An approximate 1.35-mile-long portion of the NRHP-eligible railroad historic district from Newark Bay to its eastern terminus in Jersey City falls within the APE-Architecture. Proposed work within the railroad historic district includes the construction of the proposed NB-HCE as well as a permanent easement over a portion of the railroad line as part of the construction of the new highway. Although a portion of the Project Project falls within the historic district boundaries, current plans do not include any direct impacts to the district's railroad-related resources. The construction of the widened NB-HCE will not negatively alter the district's historic use or features within its setting that collectively contribute to its historical significance and NRHP-eligibility as an important New Jersey railroad line. Similar multi-lane highways, such as the existing NB-HCE and NJ Route 440, already run adjacent to the historic district in Jersey City and would therefore not introduce a new visual element incompatible with the district's current setting. As such, the Proposed Project will not adversely affect the Lehigh Valley Railroad Historic District.

Newark Bay Bridge
Under the Proposed Project, the NBB, a historic resource considered by the NJHPO as individually eligible for listing in the NRHP as an intact example of a mid-twentieth-century cantilevered truss structure, would be removed. The removal of the current NBB would have an adverse effect on the bridge because it would physically destroy all features of the structure that contribute to its anticipated NRHP eligibility under Criterion C.

Morris Canal (NJR: 11/26/1973; NRHP: 10/1/1974; SHPO Opinion: 5/27/2004).
The portion of the canal's footprint in a right-of-way south of I-78/NJ Turnpike in the City of Bayonne and on Block 30204, Lots 3 and 4, Block 30306, Lots 2, 3, and 4; and Block 30303 TURN in the City of Jersey City has a high sensitivity for intact buried structural elements associated with the canal's prism and towpath. There, the proposed undertaking may have an adverse effect on the NJR and NRHP-listed Morris Canal and archaeological monitoring within the canal footprint is proposed to enable recordation of canal-related structural features and to mitigate project-related adverse effects to the historic property.

Site 28-Hd-45 (SHPO Opinion: 5/17/2013)
The portion of Site 28-Hd-45 (Jersey Eagle archaeological Site) (a.k.a. The Jersey Eagle Site) in the APE-Archaeology on Block 30306, Lot 7 in the City of Jersey City was only previously defined vertically and horizontally within the footprint of a 16-foot wide linear trench excavation in 2013 for the installation of a

natural gas pipeline than parallels the east side of the NB-HCE. There, the top of archaeological deposits associated with the site were identified 2.3 feet below grade in the northern portion of the site and 7.9 feet below grade in the southern portion of the site. Project actions near this site will include the construction of stormwater detention basin HUC3-F, which has a base depth of 5.0 feet below grade and is present near the southern end of Site 28-Hd-45. An associated outfall pipe is proposed between the basin and Linden Avenue that will parallel and may be within the 16-foot wide trench for the existing natural gas pipeline. In the vicinity of the proposed basin, the top depth of the archaeological site starts at 6.0 and 6.5 feet below grade. A soil boring log for the basin reveals the presence of 5.0 feet of fill over a partially truncated hydric subsoil. Hydric soils were not present within Site 28-Hu-45, suggesting a different, inundated buried landscape was present at the proposed basin. The proposed basin excavation may not extend vertically into the buried archaeological site. Archaeological monitoring of the outfall stormwater pipe trench excavation is recommended to mitigate potential Proposed Project-related adverse effects to the archaeological historic property if the proposed trench will not be located within the former 16-foot wide existing trench excavated for the gas pipeline in 2013.

3.5.5.2 Archaeological Resources

In addition to the above referenced historic properties, the remains of a circa 1908 New York Bay Railroad Co. turntable may be present within the proposed stormwater detention basin HUC3-C located southeast of the NB-HCE on Block 30306, Lot 2 in the City of Jersey City. This area has an assessed moderate to high sensitivity for archaeological resources associated with the railroad turntable. Additional archaeological survey is recommended to identify and record archaeological structural remains associated with the turntable, if present.

3.5.7 Conclusion

Pursuant to Section 106 of the NHPA, the Proposed Project will have an adverse effect on historic properties due to project-related excavations within the footprint of a potentially intact, buried section of the Morris Canal south of the NB-HCE. Archaeological monitoring during construction excavations that adhere to a monitoring protocol approved by the NJHPO is recommended in portions of the Morris Canal and areas proximate to Site 28-Hd-45 that have an assessed moderate to high archaeological sensitivity to mitigate Project Project-related adverse effects to these historic properties. In addition, an archaeological review and observation of geotechnical soil borings at proposed detention basin HUC3-F east of Site 28-Hd-45 on Block 30306, Lot 7 in Jersey City is recommended to confirm the top vertical depth of the buried plowzone that may be associated with Site 28-Hd-45 and determine if additional archaeological survey or no further survey is necessary. In the event the buried plowzone is less than 5.0 feet below grade, consultation with the NJHPO will be necessary to determine if archaeological monitoring would be suitable or if another survey method is required. Archaeological monitoring is also recommended at proposed detention basin HUC3-C located southeast of the NB-HCE on Block 30306, Lot 2 in Jersey City to record, evaluate archaeological resources associated with a railroad turntable, if present. The archaeological monitoring effort would serve to mitigate Project Project-related adverse effects to the archaeological features if determined eligible for the NRHP. Archaeological monitoring for this potential archaeological resource should be preceded by the preparation of an archaeological monitoring protocol that is reviewed and approved by the NJHPO.

Further coordination and consultation with the NJHPO are recommended to consider ways to mitigate adverse effects on the NBB. At minimum, recordation of the NBB to the standards of the Historic American Engineering Record is recommended as a mitigation measure. Recommendations for additional mitigation measures include:

- Development of interpretive signage that would interpret the history and significance of the NBB, including the subject bridge's involvement in the construction of the NB-HCE Corridor and its design as a cantilevered truss bridge. The interpretive sign should be installed in a publicly accessible location, such as the Richard A. Rutkowski Park which is situated to the south of the bridge's eastern limits, in Bayonne.

- A historic context study of the firm of Howard Needles Tammen & Bergendoff (now HNTB), consulting engineers of the NBB, which would detail the history of the firm with special emphasis on its work in New Jersey, including its involvement in the original construction of the NJ Turnpike and NB-HCE Corridor. The document could also include an inventory of all extant bridges in New Jersey attributed to the firm.
- An update to the New Jersey Historic Bridge Survey (A.G Lichtenstein & Associates, 1994) to include bridges built between 1947 (the original survey cut-off date) to 1972, the current 50-year cut-off date at the time of the cultural resources survey.

Additional mitigation measures may be required for any additional historic resources the NJHPO determines to be NRHP-eligible following its formal review of the cultural resources survey. Such additional mitigation measures should be identified in coordination with the NJHPO and other project consulting parties through the development of a Memorandum of Agreement to resolve adverse effects and conclude the Section 106 process.

3.6 Visual Resources

3.6.1 Introduction

3.6.1.1 Purpose of the Visual Impact Assessment

This Visual Impact Assessment (VIA) was prepared to assess potential visual effects (or impacts) of the Proposed Project and No Action Alternative.

This VIA was prepared in accordance with FHWA visual assessment policies, which are consistent with the policies, procedures, and guidelines contained in established methodologies including FHWA Guidelines for the Visual Impact Assessment of Highway Projects (FHWA 2015). The purpose and methodology of the VIA is further described in Section 3.6.2.

FHWA's Visual Impact Assessment for Highway Projects and Environmental Impact Statement Visual Impact Discussion provide further guidance on assessing visual impacts (FHWA 1981, 1990).

The FHWA (2015) guidelines represent the agency's current thinking about best practices in visual assessments. These guidelines also recognize that state laws, local laws, and ordinances may be applicable to the project. In accordance with these guidelines, the existing visual character and quality of the affected environment, as well as the viewer response to those resources, provide the framework for assessing the change in visual character that would occur as a result of the Proposed Project.

3.6.1.2 Description of the Alternatives

This VIA evaluates the potential visual effect of the Proposed Project relative to the existing character and quality of the visual environment. The VIA also considers the potential visual effect of the No Action Alternative, which would retain the existing NBB and NB-HCE structures.

No Action Alternative

Under the No Action Alternative, the Authority would retain the existing NBB and continue to conduct repair and maintenance of the existing structures that comprise the NB-HCE.

Existing visual conditions within the vicinity of the project corridor would remain unchanged under the No Action Alternative, as described in Section 3.6.4. For the purposes of this analysis, the existing conditions (with respect to the visual environment) are assumed to represent conditions under the No Action Alternative.

Proposed Project

The Proposed Project includes widening of the NB-HCE roadway from Interchange 14 to Interchange 14A from two lanes to four lanes in each direction, including replacement of Interchange 14 ramps. West of Newark Bay and over the Bay, the widening is generally to the north of the existing viaducts.

In addition, the existing NBB would be replaced with two parallel cable-stayed bridges to span the 550-foot navigational channel. A new westbound bridge is proposed fully offline, while the new eastbound bridge will be in the general location of the existing NBB.

3.6.2 Methodology

3.6.2.1 Visual Impact Assessment Process

This VIA was prepared consistent with the FHWA Guidelines for the Visual Impact Assessment of Highway Projects (FHWA 2015). The steps in the analysis include:

1. Identifying the project's Area of Visual Effect (AVE), which includes the visual range of proposed project elements under the No Action and Proposed Project Alternatives.
2. Identify viewsheds in the AVE, defined as what can be seen in the environment in and near the visible project components after consideration of physical constraints and the limits of human perception.
3. Defining the visual character in the AVE by describing natural and man-made features and identifying visual resources.
4. Identify the viewer groups whose views would be affected by the Proposed Project.
5. Assess the visual quality in the AVE and establish a set of key views that would serve as the basis for the characterization of visual impacts.
6. Assess the compatibility of the Proposed Project with the visual environment and the viewer sensitivity to changes in the visual character of visual resources to determine the degree of impact.
7. Develop mitigation or visual enhancement measures, if and where warranted.

The preparation of the VIA involved collection and review of data, including existing plans and studies relevant to visual resources within the AVE. Land use, topography, property, and other types of data were reviewed.

3.6.2.2 Area of Visual Effect

The visual analysis study area, the AVE, is defined as the area within visual range of Interchange 14 in Newark to Interchange 14A in Bayonne. The potential viewshed is shaped by the study area's topography, as well as its built (e.g., structures) and natural (e.g., primarily street trees) environment.[7] For the most part, the viewshed of the NB-HCE from adjoining lands is limited, primarily because of topographic features, vegetative screening, and obstructing structures. The study area is more expansive along Newark Bay to account for the many views possible of the NBB.

Visual quality is most frequently the result of the relationship of all the components of a landscape, rather than the presence of a single feature. Therefore, the landscape's visual features must be objectively identified, and

[7] FHWA's Visual Impact Assessment for Highway Projects defines a viewshed as the surface area visible from a given viewpoint or series of viewpoints; it is also the area from which that viewpoint or series of viewpoints may be seen (FHWA 2015).

their character and quality assessed. In addition, the assessment must identify the importance to people ("viewer groups"), or sensitivity of views of visual resources in the landscape.

3.6.2.3 Viewer Groups

Viewer groups (i.e., population that could be potentially affected in different ways by project-related changes) are defined in Section 5.3 of the FHWA Guidelines as viewers from the roadway (e.g., motorists) or viewers of the roadway (e.g., residents, users of recreational resources including parks, boaters, pedestrians and bicyclists on other trails, rail travelers, and motorist on local roadways). Viewers are considered in terms of their sensitivity and view duration, with residents considered among the most sensitive viewers because they may view the proposed visual change from a stationary viewpoint for the most prolonged periods of time. Travelers on the roadways, on the other hand, would be much less sensitive because they may only see the proposed visual change for only a short duration. Also considered in the analysis is the distance of the observer from the visual change; as the distance increases, the ability of the viewer to see the details of an object decreases.

In accordance with the FHWA guidelines on aesthetics and visual quality, two viewer groups were considered in this visual assessment:

- Travelers (those who would have views from the NB-HCE corridor)
- Neighbors (those who would have views of the NB-HCE corridor)

Travelers

Two types of travelers were identified within the AVE: motorists and commercial trucks.

Motorists are the largest viewer group within the AVE. This viewer group consists of motorists traveling the NB-HCE or using it to access destinations within the study area. Motorists' views are typically in a dynamic mode while moving. Viewer exposure is moderate due to speeds and the number of users and trips. Viewer activity consists of either driving or being a passenger in a vehicle. For drivers, viewer awareness may be moderate, while for passengers, viewer awareness may be high. Motorists traveling in and along the NB-HCE would have low exposure to visual changes in the environment due to limited visibility and short viewer duration. Therefore, overall, motorists have relatively moderate sensitivity to detailed visual changes along the NB-HCE.

Commercial travelers use the roadway primarily to move goods. The type of vehicle and the distance traveled vary. Most commercial travel is routine and commercial travelers' primary interests lie in operational considerations, such as traffic, lane changes, etc., to help them arrive at destinations for delivery and pick-up purposes. This viewer group has a low sensitivity to visual change.

Neighbors

As defined in the FHWA's guidelines, the term "neighbor" does not always mean that a person is adjacent to the roadway. Rather, the guidelines refer to people who are not traveling on the roadway but may see it from their geographic location in the AVE.

3.6.3 Existing Conditions

The visual environment of a given project area often consists of that area's natural environment (landform or topography, and cultural environment) buildings, infrastructure (roads, etc.), public utilities (poles and wires), and signage (cultural environment). In general, visibility of the NBB and NB-HCE from within the AVE is limited due to topographic features, existing buildings, and existing vegetation; however, there are locations along the Bayonne waterfront where direct and unobstructed views of the NBB are possible. There are no

significant land use or infrastructure development projects within the AVE that would result in significant changes to the visual landscape between existing conditions and future conditions.

3.6.3.1 West of Newark Bay

The AVE west of Newark Bay is primarily characterized by major port intermodal and other transportation infrastructure, including receiving and shipping terminals, warehouses, railroad facilities, highways, and access roads anchored by EWR at Interchange 14 and the Port Newark-Elizabeth Marine Terminal on Newark Bay immediately south of the NBB. The adjacent industrial properties have parking lots and driveways close to the right-of-way line. The residential and business districts of Newark lie to the west of Interchange 14.

Visibility of the existing NB-HCE structure west of Newark Bay from public rights-of-way is limited by existing industrial development along Port Street south of the existing NB-HCE viaduct and other industrial land uses north of the existing NB-HCE viaduct. Where the viaduct is visible, it is not a major visual element or an element that is out of character with the overall industrial landscape. Even along portions of Port Street east of Doremus Avenue, where the viaduct continues to elevate toward the western approach of the NBB, the viaduct is visible within the context of empty industrial lots or large storage tanks. The elevated viaduct and main span of the NBB is visible from East Port Road beyond a car parking lot (currently used by Toyota Logistics Services) and deciduous vegetation on the banks of Newark Bay. On the north side of the NB-HCE viaduct, views are possible from Firmenich Way but within the context of the industrial landscape to the north and with a partial screen of vegetation immediately adjacent to the right-of-way. Partial views of the NBB main span and views of the NBB western approach are possible from the cul-de-sac at the eastern end of Firmenich Way.

Lands north and south of NB-HCE on the waterfront west of Newark Bay are heavily port and industrial related, and there is little public access to waterfront areas that would provide direct line of sight to the NB-HCE viaduct or NBB.

There are no public parks or open spaces east of the NJ Turnpike on the west side of Newark Bay. The closest open space is within the City of Newark, approximately one mile northwest of Interchange 14. Ironbound Little League field occupies the small block bounded by Malvern Street, Denbigh Street, Chestnut Street, and Hanover Street. Views from the field toward Interchange 14 are obscured by intervening buildings.

3.6.3.2 Newark Bay Bridge

The NBB, also known as the Vincent R. Casciano Memorial Bridge, is a component of the NB-HCE and carries that roadway 9,560 feet across Newark Bay between the City of Newark, Essex County, and the City of Bayonne, Hudson County (see Figure 3.6-1). It includes a 43-span west approach, a 32-span east approach, and a 3-span main truss carrying a 78-foot-wide roadway consisting of two 12-foot-wide travel lanes and one 12-foot-wide right shoulder in each direction and a 6-foot-wide median. The out-to-out roadway width measures 86 feet, 8.75 inches; the overall truss width totals 89 feet. At its highest, the structure stands 263 feet above Newark Bay and provides a 550-foot-wide navigation channel with a 135-feet minimum clearance above mean high tide.

Figure 3.6-1. Existing Newark Bay Bridge

3.6.3.3 East of Newark Bay

The City of Bayonne occupies the land east of Newark Bay north and south of the NB-HCE. Interchange 14A occupies a small corner of the City of Jersey City. The Port Jersey PAMT on Upper New York Bay occupies a large area to the southeast of Interchange 14A. Mixed-use neighborhoods occupy the southwest to northeast trending major avenues within Bayonne: JFK Boulevard, Avenue B, Avenue C, and Broadway. Visibility of the NB-HCE viaduct is limited to the last few city blocks south of the NB-HCE and primarily along the major avenues. See Figure 3.6-2 and Figure 3.6-3 for representative views looking north toward the NH-HCE from West 54th Street at Broadway and Avenue B, respectively. Residences and businesses immediately adjacent to the NB-HCE have partial views of the viaduct.

Figure 3.6-2. NB-HCE looking north from West 54th Street and Broadway in Bayonne

Figure 3.6-3. NB-HCE looking north from West 54th Street and Avenue B in Bayonne

The NBB is visible from West 54th Street looking west from Avenue B (see Figure 3.6-4), although it is seen within the context of the multi-family housing on the north side of the street.

Figure 3.6-4. NBB as seen from West 54th Street from Avenue B

On JFK Boulevard and Avenue C north of the NB-HCE looking south, views are primarily of the elevated CSX rail line and NJ Route 440 (see Figure 3.6-5).

Figure 3.6-5. CSX Rail Line, NJ Route 440, and NB-HCE viaducts crossing Avenue C. View from Merritt Street, Jersey City

There are several City of Bayonne and Hudson County parks within the City of Bayonne that offer views for the NBB and NB-HCE.

Mercer Park is an approximately 6.5-acre Hudson County Park on JFK Boulevard north of the NB-HCE and NJ Route 440. A football field occupies the park's southernmost area immediately adjacent to a Conrail right-of-way and NJ Route 440. Any views of the NB-HCE or NBB are limited by existing vegetation within the park or within the Conrail or NJ Route 440 right-of-way.

Richard A. Rutkowski Park is an approximately 40-acre waterfront park maintained by the City of Bayonne approximately 750 feet south of the NBB and NB-HCE. NJ Route 440 immediately abuts this park to the north. Rutkowski Park is primarily a wildlife habitat, including a butterfly garden at its northern end, and includes waterfront walking trails and a boardwalk that connects with Stephen R. Gregg Park to the south. Expansive views of Newark Bay and the NBB are available from multiple locations within Rutkowski Park. Figure 3.6-6 provides a view of the NBB immediately north of the boardwalk trail's southern terminus in Gregg Park.

Figure 3.6-6. NBB as seen from Rutkowski Park Boardwalk

Stephen R. Gregg Park is an approximately 100-acre Hudson County Park south of Rutkowski Park occupying approximately 0.5-mile of waterfront land. The park includes active ball fields and ball courts as well as flower gardens and playground areas within its wooded eastern side (Hudson County 2022). Expansive views of Newark Bay and the NBB are available from multiple locations along the park's waterfront at its western edge. Figure 3.6-7 provides a view of the NBB from an elevated boardwalk crossing a small embayment within the park.

Figure 3.6-7. NBB from Stephen R. Gregg Park

Veterans Park is an approximately 10-acre City of Bayonne Park approximately 1.5 miles south of the NBB. Veterans Park is directly on Newark Bay and provides direct line of sight to the NBB. However, at this distance, prominence of the NBB in views to the north are diminished. PANYNJ's Port Newark and Port Elizabeth are immediately west of Veterans Park approximately 0.75-mile across Newark Bay and are the more prominent elements of this viewshed. Veterans Park includes several lighted ballfields and a large spectator stand as well as a waterfront seating area.

G. Thomas DiDomenico Park is an approximately 27-acre City of Bayonne Park approximately 2 miles south of the NBB. Similar to Veterans Park, views from DiDomenico Park are dominated by Port Elizabeth immediately west of Newark Bay.

Within the Jersey City portion of the study area, views of the Southeast Viaduct portion of the Interchange 14A complex are generally limited to NJ Route 185, a limited-access roadway, or entrance ramps to NJ Route 440.

3.6.3.4 Staten Island

The north shore of Staten Island in the City of New York is approximately 4.5 miles south of the NBB. Mariner's Marsh Park (south of Richmond Terrace) and Arlington Marsh (north of Richmond Terrace on the Kill van Kull waterfront) are approximately 178-acre City of New York parks on reclaimed industrial lands. City of New York Department of Parks and Recreation has prepared a Master Plan for these areas that could include improvement of waterfront access that would allow public views of Newark Bay and, possibly, the NBB. However, distance from Arlington Marsh Park to the NBB and the intervening presence of Port Elizabeth, approximately 1.5 miles north of Arlington Marsh Park and within the line of sight of the NBB, would minimize views of the NBB from this location.

3.6.4 No Action Alternative

Under the No Action Alternative, the Authority would continue to maintain the existing NBB and structures comprising the NB-HCE. Thus, no changes to the visual quality of the AVE would result and there would be no impacts to the viewshed or visual resources within the AVE.

3.6.5 Proposed Project

The largest viewer group that would potentially be affected by the Proposed Project would be motorists within the NB-HCE corridor, including on the NBB, and on the NJ Turnpike and other nearby roadways. Other viewer groups that would potentially be affected by the Proposed Project include workers along the Newark waterfront west of Newark Bay; residents of the Bayonne neighborhood to the east of Newark Bay; and park users along the Bayonne waterfront, south of the existing bridge. Recreational boaters on Newark Bay would also have clear views of the new bridges, but this viewer group is very small in number.

Widening and realigning the NB-HCE on both sides of the existing roadway on the east approach would require right-of-way acquisitions of multiple properties in Bayonne. Impacts are primarily in undeveloped areas, or areas used to convey drainage, park vehicles, or access parts of the property. Widening and realigning the NB-HCE on both sides of the existing roadway alignment at JFK Boulevard would result in right-of-way impacts to 12 properties in Bayonne. Impacts include an existing developed property, and construction easements on residential properties. The roadway widening component of the Proposed Project will not introduce new visual elements into the study area or change the visual environment along the roadway.

The NBB is an historic structure, eligible for listing on the NRHP. In addition, longer-range views of the bridge are possible to the north and south along open waters. The most notable visibility of the Proposed Project would occur from the eastern side of Newark Bay, where the Proposed Project would be visible to pedestrians and recreational users from Mercer Park, Richard A. Rutlowski Park, Stephen R. Gregg Park, and Veterans Park in Bayonne. Because of its location and proposed cable-stayed design, the Proposed Project would be a notable change to the AVE. However, given the generally low visual sensitivity of the AVE, this notable change may be considered a positive benefit. Although, the new bridges would be distinct from the mid-twentieth-century bridge, the proposed cable-stayed bridges would be consistent with a bridge type commonly used in the United States for long spans today. It has also become a common bridge form for long spans particularly in the New Jersey-New York metropolitan area. The proposed bridges' superstructure would likely be visually lighter and more transparent than the denser steel truss work of the existing NBB. Because of the lighter superstructure and considerably wider span, the decks of the proposed bridges would create a strong, horizontal

form across the water in approximately the same location as the existing NBB. While span length, general alignment, and vertical clearance above the water are similar for the existing NBB, the proposed bridge design could have fewer piers and taller towers. Consequently, the overall visual experience of the Proposed Project over the water would be notably different from the existing one; however, the overall character of this transportation infrastructure would not be changed significantly. The proposed bridges would become a notable visual element reinforcing the commercial and transportation character of the visual environment.

Distant views of the Proposed Project from the parks to the southeast and residential communities to the northeast would be similar to existing partially obstructed views and not a significant change or impact.

3.6.6 Conclusion

Based on the preceding assessment, the Proposed Project will have no significant impact on visual resources and no mitigation is required.

3.7 Traffic, Transportation, and Utilities

3.7.1 Study Area and Data Collection

An element of the Proposed Project's purpose is to address capacity needs on the NB-HCE roadway. This section provides details on the traffic analysis used to identify capacity needs on the NB-HCE roadway, as well as assessments of how the Proposed Project's construction and operation potentially affect railroads and other roadways, major utilities, waterway navigation and ports, and navigable airspace for aviation in the vicinity of the NB-HCE.

The primary study area for the effects of the Proposed Project on NB-HCE traffic includes the NB-HCE extending from just east of the Interchange 14 Toll Plaza in Newark to Interchange 14A in Bayonne and Jersey City, an approximate length of 3.3 miles. A secondary study area for the traffic analysis includes highways comprising parallel or alternate routes to the NB-HCE and includes the following highways: NJ Turnpike (I-95) Mainline north of Interchange 14; NJ Turnpike Mainline south of Interchange 14; I-278 (Goethals Bridge); NJ Route 440 (Bayonne Bridge); U.S. Routes 1/9 Truck; Pulaski Skyway; and NJ Route 7 (Wittpenn Bridge).

The study area for railroads and other roadways and utilities encompasses the limits of disturbance of the NB-HCE between Interchanges 14 and 14A. The primary study area for waterway navigation and ports encompasses Newark Bay and a secondary study area encompasses port and intermodal facilities in the vicinity of the NB-HCE. The study area for navigable airspace consists of approach and departure paths for aircraft using EWR that cross the NB-HCE.

3.7.1.1 Traffic Data Collection

A comprehensive traffic data collection program was undertaken to collect corridor and off-corridor traffic volume data using Automated Traffic Recorder (ATR) machine counts for a period of seven days and manual turning movement counts at intersection locations for six hours during the morning and evening peak periods.

Manual Turning Movement Counts. Single-day mid-week (Tuesday, Wednesday, or Thursday) manual turning movement counts were conducted at key locations outside the corridor, including the following: U.S. Route 1/9 Truck southbound leaving Communipaw Avenue in Jersey City; U.S. Route 1/9 Truck northbound approaching Communipaw Avenue in Jersey City; U.S. Route 1/9 Truck at Communipaw Avenue; JFK Boulevard to NJ Route 440 Southbound entrance in Bayonne; and Avenue C to NJ Route 440 Southbound entrance in Jersey City. Counts were performed for a total of six hours during the morning and evening peak periods, 6:00 a.m. to 9:00 a.m. and 3:00 p.m. to 6:00 p.m., respectively. This information was collected during June, July, or September 2021.

Automatic Traffic Recorder Counts. Continuous (24-hour) directional ATR machine counts were conducted for seven days in June, July, and September 2021. ATR machines were placed to record traffic at all entry and exit points to the NB-HCE between Interchanges 14 and 14A and at locations along alternate and parallel routes, including U.S. Route 1/9 Truck, Pulaski Skyway, and NJ Route 440.

Physical Inventory. Using Straight-line Diagrams available from NJDOT, information from the PANYNJ Traffic Division, and other sources, key local roadways at NJ Turnpike Interchange intersections were inventoried to compile information such as the number and width of travel lanes on each approach roadway, presence and width of shoulders, signal timing, on-street parking regulations, bus stop locations, etc. This information was also supplemented with a desktop survey conducted with aerial imagery from the NJDOT Video Log and Google Maps.

Toll Transaction Data. Origin-and-Destination daily and hourly toll transaction data was obtained from the Authority for the years 2019, 2020, and 2021. This information was compiled, summarized, and analyzed to determine existing travel patterns in the study area. NJ Turnpike Mainline volumes, interchange entry/exit ramp volumes by direction, hourly profiles, vehicle classification, and seasonal factors were estimated using this dataset. This information was also very useful for the analysis and assessment of the impacts of COVID-19 to travel in the study area. Additionally, 15-minute toll transaction data were obtained for selected periods, specifically, June 2019 and June 2021, for Interchanges 14 and 14A and analyzed to understand toll plaza operations.

System Peak Hour. Using ATR data and the NJ Turnpike toll plaza transaction data, localized peak hours were determined for the morning and evening peaks for the NB-HCE and ramps in the study area. To develop consistent and balanced traffic flows for the overall corridor the localized peak hour, results were weighted using traffic volumes. This resulted in the following overall system peak hours: 7:00 a.m. to 8:00 a.m. and 5:00 p.m. to 6:00 p.m. for the morning and evening peak hours, respectively.

Seasonal and COVID-19 Adjustments. To assess the impacts of COVID-19 on travel patterns along the NB-HCE corridor and the project area, the origin-and-destination toll plaza transactions from the NJ Turnpike system were analyzed. This dataset contains daily and hourly toll plaza transactions for the years 2019, 2020, and 2021. This information was used to obtain traffic volumes along the NB-HCE segments between Interchanges 14 and 14A. Traffic volumes were then used to create hourly volume profiles to display and compare the changes in traffic during the COVID-19 conditions. From February to April of 2020, when the lockdown started, there was a large reduction in traffic during the peak periods. However, through 2021 the traffic volumes started to rebound. The results from these comparisons helped to develop seasonal and COVID-19 factors to adjust existing 2021 volumes and reflect typical pre-pandemic traffic conditions.

In addition, these monthly hourly profiles were created to develop seasonal adjustment factors. These figures also demonstrate the seasonal variation in the peak periods. In 2019 the seasonal effects can be seen in June through August when the lowest morning peak hours are seen, and January through May peak hours have the highest volumes in the morning peak. In the evening peak, the maximum volumes can be observed during March and April, and lower volumes during July through September.

Table 3.7-1 shows the COVID-19 and seasonal factors by month for the AM and PM peak periods for the NB-HCE between Interchanges 14 and 14A.

The highlighted months are the months that counts were taken in 2021 (June July, and September). For the segment between Interchanges 14 and 14A the combined averaged monthly factors between 1.165 and 1.662 in the AM peak period, and 1.110 to 1.573 in the PM peak period.

Table 3.7-1. 2021 COVID-19 and Seasonal factors by Month for NB-HCE between 14 and 14A

Month	AM Peak Period			PM Peak Period		
	COVID-19 and Seasonal Adjustment Factor (Weighted by Average Annual Daily Traffic)					
	Eastbound	Westbound	Eastbound + Westbound	Eastbound	Westbound	Eastbound + Westbound
Jan	1.615	1.486	1.557	1.619	1.314	1.462
Feb	1.674	1.646	1.662	1.712	1.437	1.573
Mar	1.424	1.350	1.392	1.375	1.192	1.284
Apr	1.378	1.309	1.348	1.276	1.159	1.219
May	1.283	1.249	1.268	1.198	1.141	1.171
Jun	1.251	1.228	1.242	1.139	1.094	1.118
Jul	1.194	1.203	1.198	1.127	1.099	1.114
Aug	1.204	1.203	1.204	1.086	1.081	1.084
Sep	1.163	1.167	1.165	1.132	1.086	1.110
Oct	1.164	1.094	1.133	1.090	1.037	1.065
Nov	1.288	1.144	1.223	1.094	1.107	1.100
Dec	1.326	1.215	1.277	1.103	1.146	1.122

Source: WSP 2022

Similarly, a peak hour analysis was conducted to determine hourly adjustment factors. As shown in Table 3.7-2, the maximum and average volumes are shown for 2019 and 2021. These traffic volumes were used to estimate seasonal factors for the peak hours of 7 a.m. to 8 a.m. and 5 p.m. to 6 p.m. For the NB-HCE segment between Interchanges 14 and 14A, the bi-directional average adjustment was 1.24 for the AM peak hour, and 1.13 for the PM peak hour.

Table 3.7-2. 2021 COVID-19 and Seasonal Factors by Peak Hour for NB-HCE between 14 and 14A

		EB			WB			EB+WB		
Hour	Volume	2019	2021	Factor	2019	2021	Factor	2019	2021	Factor
AM Peak Hour										
7 am	Avg.	3,761	3,238	1.16	2,917	2,600	1.12	6,678	5,838	1.14
7 am	Max.	4,682	3,238	1.45	3,101	2,600	1.19	7,783	5,838	1.33
		Weighted Average		1.30	Weighted Average		1.16	Weighted Average		1.24
PM Peak Hour										
5 pm	Avg.	3,480	3,211	1.08	3,062	2,975	1.03	6,542	6,186	1.06
5 pm	Max.	3,949	3,211	1.23	3,440	2,975	1.16	7,389	6,186	1.19
		Weighted Average		1.16	Weighted Average		1.09	Weighted Average		1.13

Source: WSP 2022

With both effects analyzed, an overall system factor was estimated resulting in traffic volume factors of 1.40 and 1.20 for the AM and PM peak hours, respectively.

The impacts of the COVID-19 pandemic, while severe, were assumed not to be long-lasting and thus no adjustments were made to future traffic volume projections. This assumption is consistent with long-term travel forecasting used by other transportation agencies in the region, including the NJTPA.

Vehicle Classification. Vehicle classification was calculated using the Authority's toll transaction data. The NJ Turnpike tolling system classifies vehicles based on axles. There are 6 tolling classifications for cars and trucks: two-axles cars, trucks, and motorcycles (Class 1); dual-tire two-axle trucks (Class 2); trucks with three axles, including trailers (Class 3); trucks with four axles, including trailers (Class 4); trucks with five axles, including trailers (Class 5); and trucks with six axles or more, including trailers (Class 6). There are also two classes of buses: buses with two axles (Class B1), and buses with three or more axles (Class B2).

The vehicle mix along the NB-HCE corridor changes based on the location, direction, and time of day. Generally, truck percentages ranged between 2.5 percent at nighttime and 15 percent in the morning peak hour. To measure the impacts of COVID-19 in terms of vehicle mix along the project area, the 2019 and 2021 vehicle mix data were compared. The results indicate a slight increase in truck percentages, likely due to the impact of the imposed lockdown and the reduction in overall car traffic with more people working from home, and the increase of home deliveries leading to the same or a slight increase in truck traffic (Tables 3.7-3 and 3.7-4).

Table 3.7-3. Comparison of Vehicle Mix between 2019 and 2021, AM Peak Hour

Year	Direction	Car Class 1	Truck Class 2	Truck Class 3	Truck Class 4	Truck Class 5	Truck Class 6	Bus Class B2	Bus Class B3
2019	Westbound	90.9%	3.1%	0.8%	0.6%	3.8%	0.1%	0.2%	0.5%
	Eastbound	89.7%	3.2%	0.9%	0.4%	4.0%	0.1%	0.2%	1.5%
2021	Westbound	88.2%	3.6%	1.1%	1.0%	5.5%	0.2%	0.3%	0.1%
	Eastbound	88.3%	3.9%	1.1%	0.5%	5.4%	0.2%	0.1%	0.4%

Source: WSP 2022

Table 3.7-4. Comparison of Vehicle Mix between 2019 and 2021, PM Peak Hour

Year	Direction	Car Class 1	Truck Class 2	Truck Class 3	Truck Class 4	Truck Class 5	Truck Class 6	Bus Class B2	Bus Class B3
2019	Westbound	96.1%	1.4%	0.2%	0.1%	1.1%	0.0%	0.1%	0.8%
	Eastbound	97.3%	0.9%	0.2%	0.1%	0.9%	0.1%	0.1%	0.4%
2021	Westbound	95.7%	1.5%	0.3%	0.2%	1.7%	0.0%	0.2%	0.4%
	Eastbound	96.9%	1.2%	0.4%	0.2%	1.1%	0.0%	0.1%	0.1%

Source: WSP 2022

Similarly, the vehicle mix of the corridor-wide morning and evening peak hours for each segment and direction was analyzed. Table 3.7-5 illustrates the average vehicle classification mix selected for the corridor by time period. Cars, or Class 1, are the majority of the vehicles on the roadways in all time periods with Class 2, dual-tire and box trucks, being the second-largest component of the vehicle mix.

Table 3.7-5. Vehicle Mix for the Peak Hours

Peak Hour	Car Class 1	Truck Class 2	Truck Class 3	Truck Class 4	Truck Class 5	Truck Class 6	Bus Class B2	Bus Class B3
7:00 to 8:00 a.m.	87.15%	3.92%	1.37%	0.79%	6.21%	0.18%	0.17%	0.22%
5:00 to 6:00 p.m.	97.40%	1.00%	0.22%	0.07%	0.52%	0.02%	0.43%	0.34%

Source: WSP 2022

2021 Year Base Traffic Volumes. The 2021 Year Base traffic peak hour volumes were estimated using a combination of the different data sources, including the NJ Turnpike origin-and-destination toll plaza transactions, field traffic counts, and historical data. It should be noted that field counts obtained in 2021 were adjusted using the Seasonal and COVID-19 factors described in previous sections to reflect the 2019 pre-COVID-19 pandemic levels as needed.

3.7.1.2 Railroads and Other Roadways

An inventory of roadways and railroads crossed by the Proposed Project was developed based on a review of as-built plans, NJDOT Straight-Line Diagrams and other mapping sources, and meetings with Conrail, NJDOT, PANYNJ, Essex and Hudson Counties, and Newark, Bayonne, and Jersey City staff. The locations of roadways and railroads were confirmed through field visits.

3.7.1.3 Major Utilities

An inventory of utilities, both underground and above ground, in the vicinity of the Proposed Project was developed based on a review of as-built plans, coordination with utility owners, and field visits to review visible utility mark-outs on site.

3.7.1.4 Waterway Navigation and Ports

An inventory of navigation channels and navigation use in the vicinity of the Proposed Project was developed based on the following data sources:

- Detailed Navigation Chart No. 12337, Passaic and Hackensack Rivers, published by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA) (NOAA 2020).
- Fact Sheet - Newark Bay, Hackensack and Passaic Rivers, New Jersey: Newark Bay Channels Federal Navigation Channel Maintenance and Stewardship (USACE 2022a).
- Abridged subset of USCG Nationwide Automatic Identification System Historical Data (USCG 2022a).
- Marine Traffic Online Services (MarineTraffic.com 2022).
- Port State Information Exchange (USCG 2022b).
- Automatic Identification Databases (VesselFinder.com 2022, MyShipTracking.com 2022, FleetMon.com 2022).
- Vessel Company Summary and Vessel Characteristics (USACE 2022b).
- Universal Licensing System (FCC 2022).
- U.S. Department of Transportation Maritime Administration List of U.S. Flagged Carriers (USDOT 2021).
- USACE Institute for Water Resources Waterborne Commerce Statistics Center Annual Waterborne Commerce and Trips Data for the most recent reporting year (2020) (USACE 2022c).

Information regarding future plans for port facilities in the vicinity of the Proposed Project was also obtained from the PANYNJ Port Master Plan 2050 (PANYNJ 2019). The inventory was also based on coordination

with USCG, USACE, PANYNJ, and the Harbor Safety, Navigation, and Operations Committee of the Maritime Association of the Port of New York - New Jersey.

3.7.1.5 Navigable Airspace

An inventory of navigable airspace in the vicinity of the Proposed Project was conducted through coordination with PANYNJ and the FAA.

3.7.2 Methodology and Criteria

3.7.2.1 NB-HCE Traffic

Travel demand modeling. The NJTPA is the federally authorized Metropolitan Planning Organization (MPO) for 7 million people in the 13-county northern New Jersey region. An MPO is a federally mandated and federally funded transportation planning agency made up of representatives from local government and key transportation agencies. Congress created MPOs to give local elected officials a stronger role in guiding federal transportation investment and to ensure that these decisions are based on a continuing, cooperative and comprehensive planning process.

The NJTPA Board of Trustees includes 15 local elected officials representing 13 counties (Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Morris, Ocean, Passaic, Somerset, Sussex, Union, and Warren) and the cities of Newark and Jersey City. The Board also includes a Governor's Representative, the Commissioner of NJDOT, the Executive Director of NJ TRANSIT, the Chairman of the PANYNJ, and a Citizen's Representative appointed by the Governor.

The most recent regional travel demand model, North Jersey Regional Travel Model Enhanced (NJRTM-E), from the local MPO (NJTPA) was obtained and used with some adjustments to ensure all land-use development and transportation projects were included and the model was properly calibrated for 2021 conditions. The NJRTM-E model includes the 13 counties of the NJTPA region and surrounding counties in New York, Pennsylvania, Connecticut, and New Jersey, represented by over 2,900 Traffic Analysis Zones. After coordination with the NJTPA, the latest version of the model (2018) and model runs (2021) were obtained.

NJTPA and other MPOs are required to meet USDOT requirements for metropolitan planning processes found at 23 CFR Part 450. The NJTRM-E model is a key element of NJTPA's planning processes in that it incorporates the latest available estimates and assumptions for population, land use, travel, employment, congestion, and economic activity in the region. The NJTRM-E model reflects the current and projected (to 2050) transportation demand of persons and goods in the region on existing and proposed transportation facilities, e.g., highways (including, NB-HCE) and transit facilities. Per 23 CR 450, the model and other planning products may be used or referenced in preparing a NEPA document. Based on the Authority's pricing methodology, it is acknowledged that over time transactions will likely reduce for customers with access to alternate routes. However, as the Federal Highway Administration accepted NJTRM-E is appropriate for use as a basis of the analysis of travel demand under Existing, No Action, and Proposed Project conditions.

Within the NJTPA region, the highway network includes most arterial roadways (major and minor classification) and most 500-level and 600-level county roads. Most collector or local roads are not included. Outside the NJTPA region, the highway network is more schematic, generally representing major regional roadways in the NHS. The model covers nine trip purposes ranging from home-based work, shopping, and work-based-other to non-home-non-work-based trips as well as airport trips, university trips made by students to and from regional colleges and universities, and truck trip purposes (i.e., heavy, medium, and commercial). Six modes of travel are considered for most trip purposes covering a range of automotive modes such as single-occupancy vehicles to an increasing degree of high occupancy vehicles, public transit-walk access, public transit-drive access, and trucks. The public transportation network includes NJ TRANSIT rail and bus systems, some private bus lines, and ferry services. Modeled traffic forecasts are generated for four different time periods

covering the daily 24-hour journey. The 24-hour model is composed of four separate time periods: AM Peak (6:00 a.m. to 9:00 a.m.), Midday (9:00 a.m. to 3:00 p.m.), PM Peak (3:00 p.m. to 6:00 p.m.), and Night (6:00 p.m. to 6:00 a.m.).

To be able to accurately forecast future travel patterns, the model was updated with the most recent plan-approved sociodemographic data and Transportation Improvement Program (TIP) scheduled projects, and other local known planned and approved land use development and infrastructure projects. To ensure that all relevant projects would be covered by the model, a list of land use and transportation projects was obtained from Jersey City Open Data database, the NJTPA current TIP projects, and the FY2020-2029 Statewide Transportation Improvement Program.

NJTPA-forecasted population and employment growth rates were drawn from its 2050 Regional Transportation Plan update for the 13 counties under the NJTPA jurisdiction. These were included in the NJRTM-E travel demand model. In Hudson County, the expected annual growth in population and employment from 2015 to 2050 is 0.7 percent and 0.8 percent, respectively (Table 3.7-6). These growth rates were used to verify the land-use and sociodemographic inputs required for the trip generation to ensure that the expected 2050 model forecasts were accurate as much possible.

Table 3.7-6. County Population, Employment and Household Forecasts for NJTPA Region

County	Population			Employment		
	2015	2050	Annualized Change 2015-2050	2015	2050	Annualized Change 2015-2050
Bergen	926,330	1,083,869	0.4%	421,284	483,298	0.4%
Essex	791,609	920,335	0.4%	368,662	432,645	0.5%
Hudson	662,619	856,947	0.7%	282,020	366,913	0.8%
Hunterdon	126,250	132,858	0.1%	53,115	56,243	0.2%
Middlesex	830,300	939,723	0.4%	388,309	444,502	0.4%
Monmouth	629,185	669,624	0.2%	262,372	293,290	0.3%
Morris	498,192	528,760	0.2%	291,622	323,287	0.3%
Ocean	583,450	727,653	0.6%	166,005	199,086	0.5%
Passaic	507,574	599,628	0.5%	181,477	206,083	0.4%
Somerset	330,604	363,486	0.3%	185,400	211,386	0.4%
Sussex	145,930	152,337	0.1%	41,935	46,703	0.3%
Union	548,744	652,581	0.5%	233,011	272,803	0.5%
Warren	107,226	115,320	0.2%	35,247	39,410	0.3%
Region	6,688,013	7,743,120	0.4%	2,910,458	3,375,651	0.4%

Source: WSP 2022, NJTPA 2021b

Traffic growth rate. To develop traffic patterns for the 2050 Year No Build and Build conditions the NJRTM-E travel demand model was used to conduct the scenario alternative analysis. Projected traffic volumes from each condition were used to develop growth rate factors. Estimated rates were applied to the 2021 Year Base traffic volumes to estimate future traffic volumes. Traffic projections for the 2021, 2030, 2040, and 2050 Build and No Build conditions were used to estimate growth rates by time of day, the direction of travel, and roadway segment. After analyzing the differences between these, it was determined that weighted average compound annual growth rates were suited for the overall corridor. As seen in Table 3.7-7, the projected growth from

2020 to 2050 for the AM/PM peak hours is 1.08 percent in the No Build Scenario and 1.32 percent in the build scenario.

Vehicle classification. While existing traffic volumes and vehicle mix were obtained for eight different vehicle classes, projected traffic volumes from the NJRTM-E travel demand model are constrained to two vehicle classes only: cars and trucks. Therefore, to estimate a future vehicle mix, projected heavy truck volumes between the 2050 Year No Build and Build conditions were compared to determine the change (i.e., increase or reduction) in truck percentage.

Table 3.7-7. System Growth Rates for Various Condition Years

	AM/PM		Midday		Night	
Condition Year	No Build	Build	No Build	Build	No Build	Build
2020-2030	0.00%	2.00%	0.00%	0.35%	0.00%	0.45%
2030-2040	0.35%	0.50%	0.80%	0.75%	0.00%	0.35%
2040-2050	0.45%	0.50%	0.15%	0.55%	0.50%	0.30%
Year 2050 Growth Factor	1.08	1.32	1.10	1.17	1.05	1.11

Source: WSP 2022

Capacity analysis. Detailed capacity analyses were conducted within the study corridor using the analytical procedures described in the Highway Capacity Manual, Sixth Edition, published by the Transportation Research Board. The NB-HCE between Interchanges 14 and 14A qualifies as a basic freeway segment for analysis purposes. For basic freeway segments, the LOS is estimated based on the density of the vehicles (a measure that quantifies the proximity of vehicles to each other within the traffic stream) and indicates the degree of maneuverability within the traffic stream. Table 3.7-8 displays the LOS criteria used for basic freeway segments.

Table 3.7-8. Basic Freeway Segments Level of Service (LOS) Criteria

LOS	Density Range (Passenger cars per mile per lane)
A	0 to 11
B	>11 to 18
C	>18 to 26
D	>26 to 35
E	>35 to 45
F	>45

Source: Transportation Research Board 2000

LOS A describes completely free flow conditions, densities of up to 11 passenger cars per mile per lane, while LOS F represents forced breakdown flow with densities in excess of 45 passenger cars per mile per lane. The densities corresponding to LOS A, B, C, and D are equal to or less than 35 passenger cars per mile per lane and are considered acceptable operating conditions. LOS E and F represent unacceptable traffic flow conditions.

3.7.2.2 Railroads and Other Roadways

Relevant design standards for roadway and railroad crossings and interfaces include those of the Authority, NJDOT, Conrail, and NJ TRANSIT, as applicable. An impact would potentially occur should the Proposed Project design not meet a relevant and applicable standard (e.g., vertical clearance over a railroad or roadway).

3.7.2.3 Major Utilities

Relevant design standards for utility relocation and protection include those of the utility owner (e.g., fiber optic carriers, gas pipeline companies, PSE&G, and municipal utility authorities). An impact would potentially occur should the Proposed Project design not meet a relevant and applicable standard (e.g., utility location and protection standards).

3.7.2.4 Waterway Navigation and Ports

Based on the research and data collection, as well as through coordination with USCG and USACE, the existing NBB completely spans the Newark Bay Main Channel North Reach Federal Navigation Channel authorized by the U.S. Congress and maintained by USACE at a width of 500 feet and a depth of 35 feet. Construction of the existing NBB was authorized through a Bridge Permit with a 550-foot horizontal clearance and a vertical clearance of 135 feet for navigation needs. An impact on waterway navigation would potentially occur should the Proposed Project design alter an authorized navigation channel or deviate from the authorized horizontal or vertical navigational clearances of the existing NBB.

3.7.2.5 Navigable Airspace

Based on the research and data collection, as well as through coordination with PANYNJ and FAA, the existing NBB is under the departure and approach paths of Runway 29 at EWR. FAA defines aircraft departure and approach surfaces for airports. These surfaces are designed to promote air safety and the efficient use of navigable airspace. The departure surface generally extends at a slope of 34:1 from a point 200 feet from the end of the runway. The approach surface generally extends at a slope of 40:1 from a point 200 feet from the end of the runway. FAA seeks to keep the space below this surface clear of buildings, towers, and other obstacles that pose a safety risk to departing and approaching aircraft. Computer-aided modeling of these surface slopes provides a basis for defining a no-exceed height (NEH) for a potential obstacle. Such modeling of the existing NBB towers indicate an NEH of 265 feet above mean sea level (AMSL) for NBB's western bridge tower and 296 feet AMSL for the eastern bridge tower. An impact on navigable airspace would potentially occur should the Proposed Project design of replacement NBB towers exceed the relevant NEH or the corresponding existing tower heights.

3.7.3 Existing Conditions

3.7.3.1 2021 NB-HCE Traffic

Table 3.7-9 shows the existing freeway conditions on NB-HCE using the existing volumes. As shown, the NB-HCE between Interchanges 14 and 14A currently operates at a LOS E or worse:

- Eastbound roadway operates at LOS F in AM and PM.
- Westbound roadway operates at LOS F in the AM and LOS E in the PM.

Table 3.7-9. 2021 NB-HCE Interchanges 14 to 14A Existing Traffic Conditions

	Weekday AM Peak Hour					Weekday PM Peak Hour			
	Segment	Volume	Density*	v/c	LOS	Volume	Density*	v/c	LOS
Eastbound	14 - 14A	4,533	*	1.26	F	3,853	*	1.01	F
Westbound	14A - 14	3,639	*	1.04	F	3,570	40.4	0.95	E

Source: WSP 2022
Key: v/c = traffic volume divided by roadway lane capacity.
* Density (passenger car equivalents per mile per land) is not calculated when v/c exceeds 1.00.

Eastbound traffic volume on the NBB consists of traffic from Interchange 14, which is fed by I-78, U.S. Route 22, U.S. Route 1/9 and NJ Route 21, and from the NJ Turnpike Mainline from the north and south.

A substantial portion of the traffic volume on the NB-HCE between the interchanges exits or enters the NB-HCE at Interchange 14A as follows:

- In the AM peak hour, 1,696 vehicles (37.4 percent) of eastbound traffic on the NB-HCE exits at Interchange 14A and 1,989 vehicles (54.7 percent) of westbound traffic on the NB-HCE enters at Interchange 14A.
- In the PM peak hour, 1,555 vehicles (40.4 percent) of eastbound traffic on the NB-HCE exits at Interchange 14A and 1,389 vehicles (39.2 percent) of westbound traffic on the NB-HCE enters at Interchange 14A.

The relatively high entering and exiting volumes at Interchange 14A is indicative of trips generated by destinations served by the interchange.

3.7.3.2 Railroads and Other Roadways

Proceeding in order from Interchange 14 to Interchange 14A, the NB-HCE crosses over the following roadways and railroads in Newark:

- NJ Turnpike (I-95) Mainline (12 lanes) and Interchange 14 ramps (five lanes).
- Conrail's Garden State Secondary line immediately east of the NJ Turnpike Mainline. The Garden State Secondary connects Conrail's Oak Island Yard in Newark, located north of the NB-HCE, with the North Jersey Coast Line at Perth Amboy. The number of railroad tracks crossed by the NB-HCE at this location varies between five and seven.
- East Port Street, a two-lane local collector street connecting Corbin and Port Streets within Port Newark to the south of the NB-HCE with Conrail's Oak Island Rail Yard.
- Doremus Avenue, a four-lane principal arterial connecting Port Newark with intermodal and warehouse facilities along Doremus Avenue and with the NJ Turnpike Mainline at Interchange 15E and U.S. Routes 1/9 Truck.
- Warehouse Place, a two-lane local collector connecting Port Street in Port Newark with industrial and warehouse facilities north of the NB-HCE.

Continuing east of Newark Bay into Bayonne, the NB-HCE crosses over the following roadways (no railroads are crossed in the Bayonne portion of the Project):

- NJ Route 440, a state highway maintained by NJDOT. It comprises two segments, a 5.15-mile freeway in Middlesex County linking Interstate 287 (I-287) and the NJ Turnpike Mainline at Interchange 10, in Edison to the Outerbridge Crossing in Perth Amboy and an 8.18-mile four-lane divided highway in Hudson County running from the Bayonne Bridge in Bayonne to U.S. Route 1/9 Truck in Jersey City. These two segments are connected by New York State Route 440, which runs across Staten Island. The NBB's east approach structure crosses over NJ Route 440 immediately east of Newark Bay.
- JFK Boulevard (County Route 501), a principal arterial roadway which provides access to several major parks, educational institutions, and shopping centers among other land uses as it traverses the length of Hudson County beginning at the NJ Route 440/Bayonne Bridge junction in Bayonne and continuing north to NJ Route 63 in North Bergen.

Continuing farther east into Jersey City, the NB-HCE crosses over the following roadways (no railroads are crossed in the Jersey City portion of the Proposed Project):

- Avenue C, a locally important, four-lane retail and residential street that runs the length of Bayonne and terminates at an intersection with Merritt Street immediately north of the NB-HCE.
- Garfield Avenue, a locally important two-lane retail and residential street that runs the length of Bayonne, named as Broadway, and then continues through Jersey City to Grand Street.

3.7.3.3 Major Utilities

Table 3.7-10 lists major utilities along the NB-HCE between Interchanges 14 and 14A.

Table 3.7-10. Major Utilities Along the NB-HCE Between Interchanges 14 and 14A

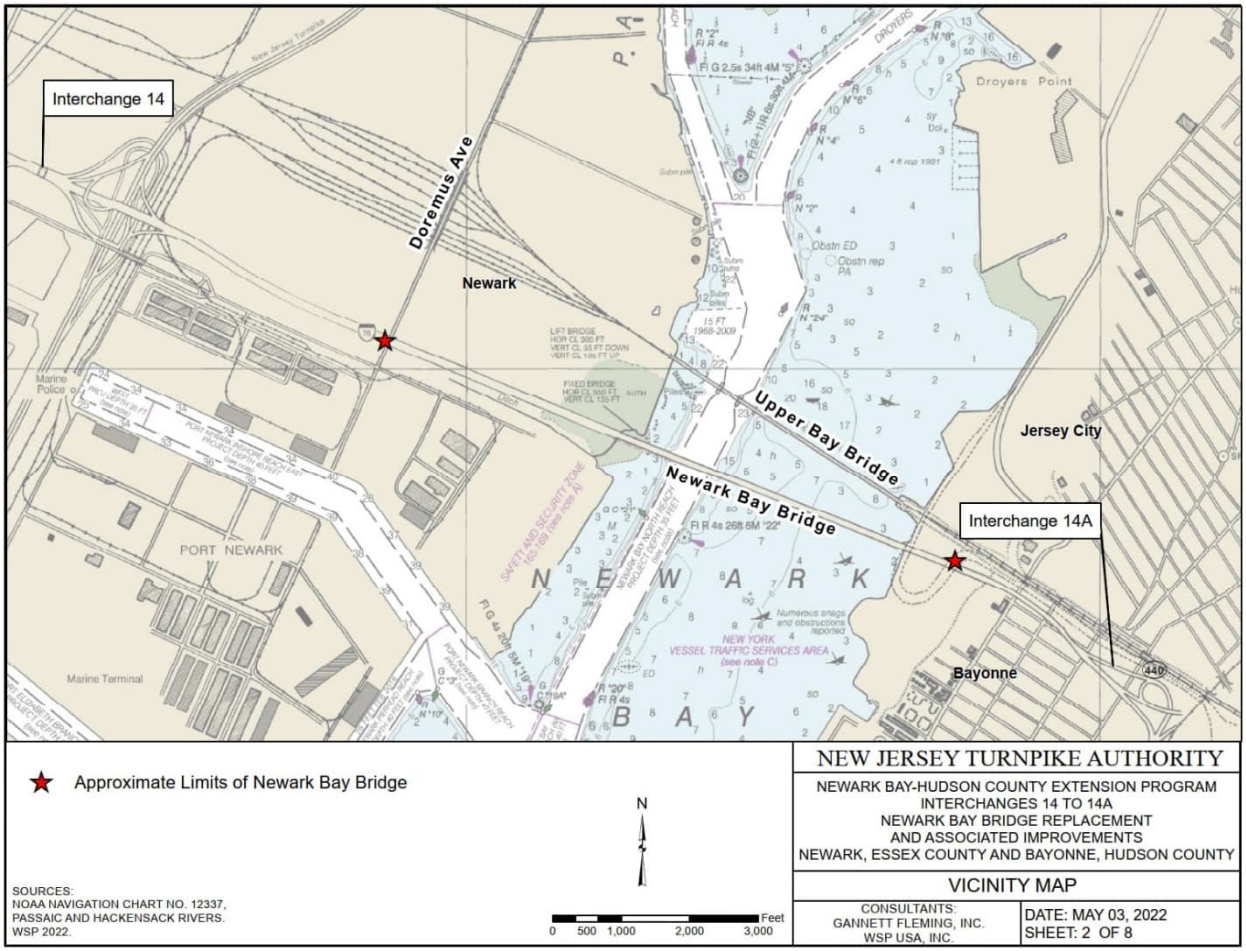
Company	Facility	Longitudinal/Crossing Location
Penta	Bridge-Mounted Fiber Optic	Longitudinal to NB-HCE
	Underground Fiber Optic	Crossing NB-HCE at Interchange 14A
ZAYO	Bridge-Mounted Fiber Optic	Longitudinal to NB-HCE
	Bridge Mounted Cable TV	Longitudinal to NB-HCE
	Bridge Mounted Fiber Line	Longitudinal to NB-HCE
Colonial Pipeline	2" x 14" Liquified Petroleum Pipeline	Longitudinal to NB-HCE eastbound
Williams Companies, Inc.	2"x14" Fuel Pipeline	Crossing NB-HCE at Interchange 14A
Verizon	Overhead Fiber	Crossing NB-HCE eastbound and westbound at Corbin Street
		Crossing NB-HCE eastbound and westbound at Doremus Avenue
PSE&G	Overhead Electric	Crossing NB-HCE eastbound and westbound at Doremus Avenue
		Crossing NB-HCE eastbound and westbound at Warehouse Place
		Longitudinal to 58th Street
	Underground Electric	Crossing NB-HCE at Interchange 14A
Bayonne Municipal Utilities Authority (BMUA)	Culvert over 30" Sanitary Force Main	Crossing NB-HCE eastbound and westbound
	30" Sanitary Main	Crossing NB-HCE westbound between Avenue B and Avenue C
	30" Water Pipe	Longitudinal to 58th Street
	8" Sewer Pipe	Longitudinal to 58th Street
	36" Sanitary Main	Crossing NB-HCE at Interchange 14A
Comcast	Overhead Cable TV	Longitudinal to 58th Street
Passaic Valley Sewerage Commission (PVSC)	12' Sanitary Sewer	Crossing NB-HCE at Interchange 14A

Source: WSP 2022

3.7.3.4 Waterway Navigation and Ports

The NBB spans the federally maintained Newark Bay Main Channel North Reach (Figure 3.7-1). The Newark Bay Main Channel North Reach is generally aligned with Newark Bay's general south-to-north orientation. The channel lies within the western one-third of Newark Bay at the NBB mainspan structure location. The width of Newark Bay at the NBB crossing (the mainspan structure and its approaches over water) is approximately 4,250 feet.

Figure 3.7-1. Newark Bay Bridge Relative to Federal Navigation Channels in Newark Bay



The depth of Newark Bay at the NBB crossing varies from -41.5 feet in the navigation channel to depths of -2 to -3 feet in near shore areas. There is a rapid change in depths on either side of the navigation channel with the gradient steeper on the west side of the channel as that side is nearer the shore. Elevation fluctuations are semi-diurnal, with a mean tidal range of approximately 5 feet.

The Newark Bay Channels include the main channel and several branch and pierhead channels. The main channel, including widening and maneuvering areas, is 50 feet deep, 700 feet wide to the branch channel at Port Newark (downstream of the NBB), then 40 feet deep, 500 feet wide, to a turning basin at the junction of the Hackensack and Passaic River channels (upstream of the NBB).

The Newark Bay Channels were authorized by the Rivers and Harbors Acts of 1922 and subsequently modified in 1943, 1954, 1964, 1966, 1975, and 1985, and by the Water Resources Development Acts of 1986 and 1990.

The navigation channel supports deep-draft commercial navigation to the Port of New York and New Jersey. In 2016, approximately 42 million tons of bulk cargo was transported through the approach channels into Port Newark and Port Elizabeth, including 5.5 million tons of petroleum products. Other major commodities include coal, food products, manufactured goods and equipment, vehicles, and crude materials.

The last maintenance dredging cycle included the critically shoaled areas in the Port Newark approach channels in 2021. A prior maintenance dredging cycle included the critically shoaled areas in the Port Newark approach channels in 2020.

Vessels using the navigation channel in the vicinity of the NBB are bound for the western waterfront of Newark Bay in Newark north of the NBB and the Upper Bay Bridge, and for the Hackensack and Passaic Rivers. The largest vessels (70- and 75-foot vessel widths and 20- to 38-foot vessel drafts) using this portion of the channel are tankers serving the petroleum products terminals on the Kearny Point Reach of the Passaic River, which is immediately upstream of the Newark Bay Main Channel North Reach. There were 14 inbound and outbound tanker trips in 2020 out of a total of 1,706 trips. The other predominant vessel use was by liquid barges (915 trips) and towboats (670 trips). A total of 1,413,821 short tons of cargo was reported in 2020. Of that total, 67.4 percent (952,454 tons) was various petroleum products (gasoline, distillate fuel oil, kerosene, and residual fuel oil), 22.2 percent (313,282 tons) was waste and scrap, and 6.7 percent (95,188 tons) was sand and gravel.

Annual navigational use of the waterway has generally trended downward over the past 40 years from a peak of over 9 million tons in the early 1980s to the present use of less than 1.5 million tons. This decline is due in part to competition from other ports in the region, including, Ports Newark and Elizabeth. Facilities served by the waterway have, however, retained a niche in petroleum products.

Table 3.7-11 provides details on bridges and overhead cables proceeding from the Atlantic Ocean at Lower New York Bay and through waterways into Newark Bay to the confluence of the Passaic and Hackensack Rivers with Newark Bay. As shown, there are two bridge crossings of Newark Bay: NBB and the Upper Bay (Lehigh Valley Railroad) Lift Bridge, located approximately 0.2 mile upstream of the NBB. The Upper Bay Bridge is a limiting factor to navigation in that it has a 300-foot horizontal clearance as compared to the federally maintained channel width of 500 feet. There is no bridge or overhead cable proceeding up the Passaic and Hackensack Rivers that has a vertical clearance greater than the 135-foot vertical clearance of the NBB until the NJ Turnpike (I-95) Mainline bridges over the Passaic and Hackensack Rivers.

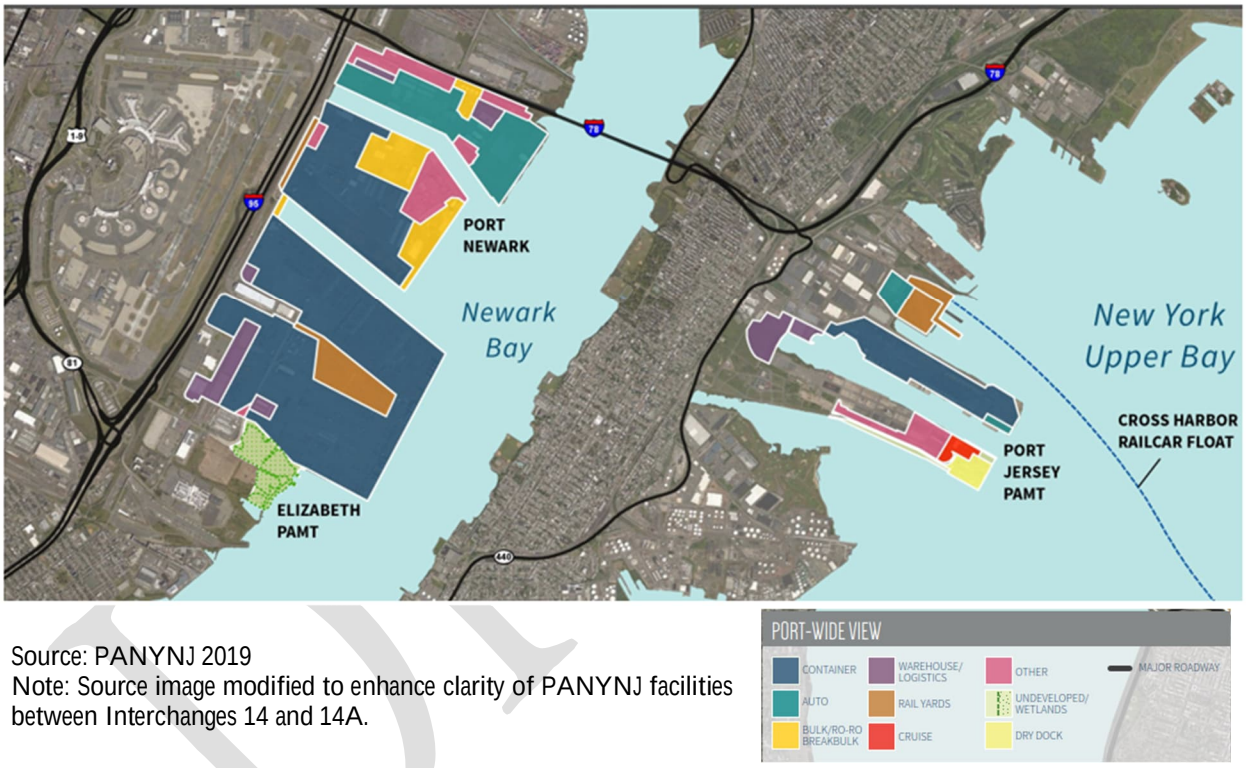
Table 3.7-11. Bridges and Overhead Cables Proceeding from Lower New York Bay

Bridge and Overhead Cables	Horizontal Clearance (feet)	Vertical Clearance (feet)
Verrazzano-Narrows (Lower/Upper New York Bay)	4,259	228
Bayonne (Kill Van Kull)	1,675	215
Outerbridge Crossing (Arthur Kill)	750	143
Overhead Power Cables (Arthur Kill)	-	165
Goethals (Arthur Kill)	768	140
Arthur Kill Vertical Lift	500	31 lowered 135 raised
Newark Bay Bridge	550	135
Upper Bay (Lehigh Valley Railroad) Lift	300	35 lowered 135 raised

Source: WSP 2022

Interchanges 14 and 14A serve as two access points between the roadway network and Port Newark (Interchange 14) and the Port Jersey PAMT and Greenville Yard (Interchange 14A). These facilities are two of the PANYNJ's six marine terminals that make up the largest port complex on the East Coast (see Figure 3.7-2). Port Newark, a 930-acre complex constructed by the City of Newark in 1915, has been leased by the PANYNJ since 1948 and was expanded in 1963. Port Newark's primary activities involve containers, automobiles, bulk, warehousing, and intermodal transport. Approximately 75 to 80 percent of container capacity in the PANYNJ port complex is housed at Port Newark and the neighboring Elizabeth PAMT. The Port Jersey PAMT and Greenville Yard, owned by the PANYNJ, comprises a 386-acre facility in Bayonne and Jersey City. The facility contains the former Military Ocean Terminal at Bayonne, now Port Jersey South. Primary activities at the Port Jersey PAMT and Greenville Yard include containers (approximately 10 percent of container capacity in the PANYNJ port complex), automobiles, warehousing, cruise ship, and intermodal transport. The facility serves as the western terminus of the Cross-Harbor Rail Car Float.

Figure 3.7-2. Port Authority of New York and New Jersey Port Complex



Source: PANYNJ 2019
Note: Source image modified to enhance clarity of PANYNJ facilities between Interchanges 14 and 14A.

As noted in the Port Master Plan 2050, approximately 85 percent of inbound container activity is currently destined for the local truck market (PANYNJ 2019). The current regional goods distribution network, fed by international cargo entering through the Port Authority's container terminals, focuses on a dominant cluster of warehousing/distribution center activity located along the NJ Turnpike.

In part because of its location relative to port facilities, the NB-HCE is part of the NHS that was established by the National Highway System Designation Act of 1995 and approved by Congress. As such, the NB-HCE is part of the network of nationally significant highways that are important to the nation's economy, defense, and mobility. With the Moving Ahead for Progress in the 21st Century Act of 2012, the scope and extent of the NHS was modified to create the STRAHNET of highways critical to the Department of Defense's domestic operations. The STRAHNET is a system of roads deemed necessary for emergency mobilization and peacetime movement of heavy armor, fuel, ammunition, repair parts, food, and other commodities to support U.S. military

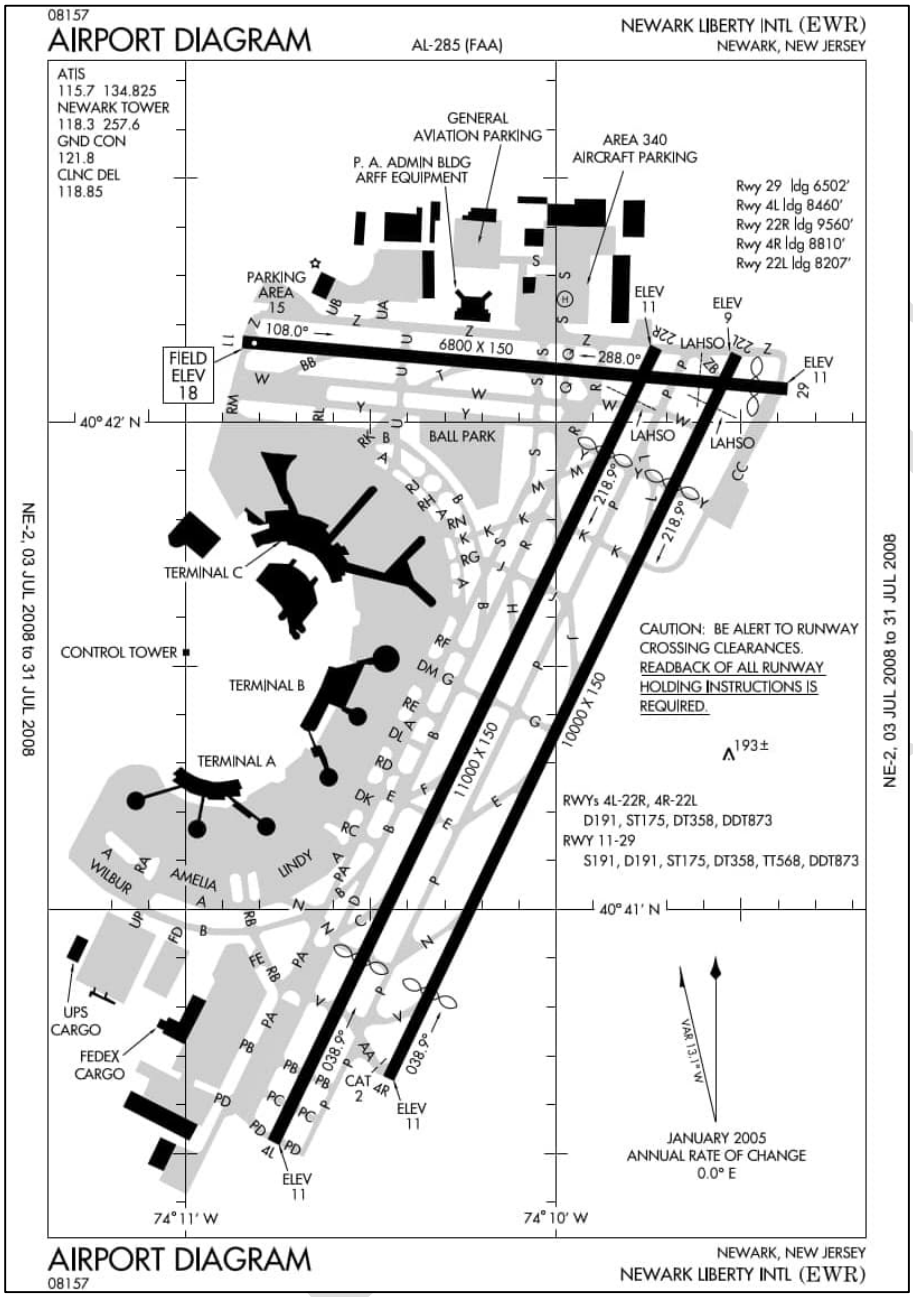
operations. The NB-HCE is part of the STRAHNET, and the portion of NJ Route 440 between Prospect Avenue/Port Terminal Road and Interchange 14A is designated as a STRAHNET connector.

3.7.3.5 Navigable Airspace

Figure 3.7-3 illustrates the runway layout at EWR. The main runways are designated 4L-22R and 4R-22L. Because EWR is a high-volume airline airport, the preferred arrival and departure pattern is to use the main parallel intersecting runways to maximize efficiency. The other runway, designated 11-29, is roughly perpendicular to the main runways. Normally, Runway 29 is used for aircraft arrivals during high west-northwest wind conditions. The runway is used more frequently when there is construction on the main intersecting parallel runways.

A portion of the existing ramp that provides a connection between NJ Turnpike (I-95) Mainline southbound traffic destined to NB-HCE eastbound at Interchange 14 intrudes on the main runways' approach surfaces.

Figure 3.7-3. Newark Liberty International Airport Runway Layout



Source: FAA 2008

As noted in Section 3.7.2.5, the existing NBB lies under Runway 29's approach and departure paths, with a computed NEH of 265 feet AMSL for NBB's western bridge tower and 296 feet AMSL for the eastern bridge tower.

3.7.4 No Action Alternative

3.7.4.1 No Action Scenario

Under this scenario, the configuration of the NB-HCE between Interchanges 14 and 14A would remain unchanged. That is, the roadway would not be widened, and structures would not be reconstructed. Potential

future changes to other roadways, utilities, ports and waterway navigation, and navigable airspace are described in the corresponding subsections.

3.7.4.2 2050 No Build NB-HCE Traffic

Table 3.7-12 displays the projected 2050 No Build freeway conditions on NB-HCE compared with the existing conditions using the projected 2050 No Build volumes. As seen in the table, traffic flow conditions are projected to deteriorate in the future No Build scenario such that LOS F conditions occur in both directions of the NB-HCE during both peak hours.

Table 3.7-12. 2050 NB-HCE Interchanges 14 to 14A No Build Traffic Conditions

	AM Peak Hour Traffic Flow				PM Peak Hour Traffic Flow			
	Traffic Volume	Density	v/c	Level of Service	Traffic Volume	Density	v/c	Level of Service
2021 Existing								
Eastbound	4,533	*	1.26	F	3,853	*	1.01	F
Westbound	3,639	*	1.04	F	3,570	40.4	0.95	E
2050 No-Build								
Eastbound	4,909	*	1.36	F	4,173	*	1.10	F
Westbound	3,942	*	1.12	F	3,866	*	1.03	F

Source: WSP 2022.
Key: v/c = traffic volume divided by roadway lane capacity.
* Density (passenger car equivalents per mile per lane) is not calculated when v/c exceeds 1.00.

3.7.4.3 Railroads and Other Roadways

The NJTPA Board adopted Plan 2050 in September 2021 (NJTPA 2021a). Plan 2050 contains an index of current and future candidate transportation improvement projects that have been identified through the metropolitan planning process in northern New Jersey and whose costs can be accommodated based on 2022 to 2050 funding assumptions. Projects are listed by the county in which they are located and by category (i.e., Highway/Bridges, Transit, and Authority categories) as well as by timeframe. Near-term projects are those that can be completed within one to four years. Mid-term projects are scheduled to be completed in years 5 through 10. Projects Under Study are in various stages of project development and are estimated to be completed during the final 15 years of the plan, years 13 to 28, should they move forward towards construction. Projects in the Study and Development Program are included in the "Projects Under Study" category of the index.

The Plan 2050 project index was examined to identify transportation improvement projects with the potential to measurably affect demand for travel on the NB-HCE (e.g., road expansion and transit expansion projects in the primary and secondary traffic study area). Five near- and mid-term transportation improvement projects were identified. The five projects include the following:

- NJ Turnpike Westerly Alignment Mainline Widening between the Southern Mixing Bowl (between Interchange 14 and Interchange 15E in Newark and Interchange 15W in Kearney.
- PATH Rail Extension to Newark Liberty International Airport Rail Link Station in Newark.
- PATH Railcar Fleet Expansion (systemwide).
- PANYNJ Port Street Corridor Improvement Project in Newark.
- NJ Routes 1 and 9 Truck Extension (New Road) project in Jersey City.

These and other projects included in the travel modeling of Plan 2050 using the NJRTM-E model are accounted for in the travel modeling of the NB-HCE Interchanges 14 to 14A Project, as discussed in Section 3.7.2.1.

One of these projects, the Port Street Corridor Improvement Project, is in the primary study area. The Port Street project improvements are shown in Figure 3.7-4. One of the planned components, the Port Street lead track improvements, crosses under the NB-HCE. None of the other improvements extend into the NB-HCE right-of-way. The Authority and the PANYNJ are coordinating planning of the Interchanges 14 to 14A Project and the Port Street Improvements to avoid or minimize potential conflicts during construction.

Figure 3.7-4. PANYNJ Port Street Corridor Improvement Project in Newark

Source: PANYNJ 2021

No other programmed capital projects of railroads or other roadways in the vicinity of the NB-HCE between Interchanges 14 and 14A were identified from coordination with the railroad and roadway entities.

3.7.4.4 Major Utilities

No future changes in utility locations were identified from coordination with the utility entities. Therefore, the existing conditions for utilities represents the No Action condition.

3.7.4.5 Waterway Navigation and Ports

No future changes in the authorized Newark Bay Main Channel North Reach Federal Navigation Channel dimensions are proposed nor are any changes proposed to the dimensions of federal navigation channels proceeding from the North Reach Channel and into and up the Passaic and Hackensack Rivers. Research of proposed or potential development in municipalities abutting Newark Bay upstream of the NBB (i.e., Newark, Kearney, Jersey City, and Bayonne) indicates that while some berths for recreational boats may constructed, no additional berths for commercial shipping are contemplated. Therefore, it is expected that vessel sizes and vessel use of the North Reach Channel under the NBB in the future will be relatively similar to existing conditions.

As for port activities, the Port Master Plan 2050 notes that container volumes are projected to double or triple over the next 30-year time frame (PANYNJ 2019). Specifically, container demand at Port Authority facilities is

projected to increase from 7.2 million twenty-foot equivalent units in 2018 to between 12 million and 17 million twenty-foot equivalent units by 2050. Meanwhile, auto demand through the Port is projected to increase from 573,000 vehicle units in 2018 to a range of approximately between 800,000 to 1.3 million units by 2050. Average annual growth ranges from 1.6 percent under low forecast assumptions to 3.3 percent under high forecast assumptions. Cruise demand captured by PANYNJ tenants is projected to increase from 856,000 passengers in 2018 to between 1.3 million and 2.6 million passengers by 2050. While these figures apply to the PANYNJ port complex overall, the Port Jersey PAMT served by Interchange 14A handles and distributes containers, automobiles, and cruise ships.

The Port Master Plan 2050 notes that depending on demand and the ability of the Port Authority and its terminal operators to capture more of the discretionary market, volumes will reach this terminal capacity over the next 10 to 20 years, in the 2030 to 2040 timeframe. To this end, the Port Master Plan 2050 laid out a two-phase approach to addressing capacity. Phase I (first 15 years) includes strategic expansion work at Port Jersey. Specifically, over the next 30 years, the Port Jersey facilities in Bayonne and Jersey City could be expanded to form a major integrated hub of container handling and distribution capacity, relieving the stress on the waterway and road infrastructure currently servicing the Port's Newark and Elizabeth facilities. In addition, PANYNJ will work closely with local officials to continue to support the establishment of a ferry terminal on the Port Jersey South peninsula, and the Cape Liberty Cruise facility could be enhanced with provisions for a potential future second berth. Existing dry dock facilities will be maintained to support their vital function to the harbor and preserve their historic and cultural value to the region. The potential need for additional capacity would depend on the direction of Phase II 30-year plan.

3.7.4.6 Navigable Airspace

No future changes to the configurations or dimensions of EWR's runways are currently programmed nor are any changes currently proposed in the FAA rules regulating airspace. Therefore, the existing conditions for navigable airspace represent the No Action condition.

3.7.5 Proposed Project

3.7.5.1 2050 Build NB-HCE Traffic Conditions

The construction of Proposed Project will be staged and sequenced to maintain two travel lanes in each direction between Interchanges 14 and 14A, maintaining the travel lane capacity of the existing roadway.

As shown in Table 3.7-13, by adding two travel lanes in each direction the Proposed Project will improve the LOS over both Existing and No Action conditions and provide LOS D or better traffic flow.

Table 3.7-13. 2050 NB-HCE Interchanges 14 to 14A Existing, No Build, and Build Traffic Conditions

	AM Peak Hour Traffic Flow				PM Peak Hour Traffic Flow			
	Traffic Volume	Density	v/c	Level of Service	Traffic Volume	Density	v/c	Level of Service
2021 Existing								
Eastbound	4,533	*	1.26	F	3,853	*	1.01	F
Westbound	3,639	*	1.04	F	3,570	40.4	0.95	E
2050 No-Build								
Eastbound	4,909	*	1.36	F	4,173	*	1.10	F
Westbound	3,942	*	1.12	F	3,866	*	1.03	F

	AM Peak Hour Traffic Flow				PM Peak Hour Traffic Flow			
	Traffic Volume	Density	v/c	Level of Service	Traffic Volume	Density	v/c	Level of Service
2050 Build								
Eastbound	5,986	33.3	0.83	D	5,088	28.6	0.72	D
Westbound	4,805	25.8	0.65	C	4,714	25.7	0.65	C

Source: WSP 2022
Key: v/c = traffic volume divided by roadway lane capacity.
* Density (passenger car equivalents per mile per lane) is not calculated when v/c exceeds 1.00.

3.7.5.2 Railroads and Other Roadways

Under the Proposed Project, there will be no realignment or relocation of railroads and other roadways crossed by the Proposed Project or otherwise in proximity of the Proposed Project, except for one roadway: the existing connector roadway between JFK Boulevard and Avenue C in Bayonne, essentially one block north of West 58th Street, from which point drivers can turn onto Avenue C or continue straight to enter NJ Route 440 southbound. Permanent elimination of the connector roadway will be necessary to minimize the impact on NJ Route 440 and adjacent properties caused by the Proposed Project's addition of two new travel lanes in each direction on the NB-HCE between Interchanges 14 and 14A. The impact on traffic from eliminating the connector roadway will be minimal as there are numerous alternate roadway routes between JFK Boulevard and Avenue C to Route 440. Among the alternate routes for southbound traffic on JFK Boulevard that currently uses the connector roadway are Pamrapo Avenue to Avenue C and NJ Route 440 southbound via Ocean Avenue and Merritt Street, and West 63rd Street to NJ Route 440 Southbound. Among the alternate routes for northbound traffic on JFK Boulevard that currently uses the connector roadway are West 56th Street, West 54th Street, and West 53rd Street all of which connect JFK Boulevard and Avenue C. As the former Marist High School is no longer operational, vehicles destined to that site have been dramatically reduced from previous years. Said property is being acquired by the Authority for stormwater management, contractor lay down, and future maintenance. Access to this site is proposed to be directly from the adjacent existing transportation right-of-way between NJ Route 440 southbound and the property for property access/egress needs, thereby minimizing the impact of this traffic on the local street system.

While not eliminated, the portion of West 58th Street near Avenue B will be permanently narrowed by the Proposed Project. The existing single one-way travel lane will be maintained. However, parking on both sides of the street for approximately 100 feet on each side of the roadway, or approximately 12 on-street parking spaces in total, will be eliminated. Reconnaissance of the affected area indicates that the capacity of on-street parking exceeds the demand for on-street parking, likely because many residential units in the area have off-street parking. Consequently, the elimination of the on-street parking is anticipated to have a minor adverse effect.

The Proposed Project's design criteria provide for designing crossings of railroads and roadways to provide for existing horizontal and vertical clearances or relevant standards for clearance envelopes, including the following minimum vertical clearances of the new NB-HCE structures over the railroad and other roadways:

- 16 feet over the NJ Turnpike (I-95) Mainline roadways and ramps.
- 23 feet over Conrail's Garden State Secondary line track.
- 16 feet over Corbin Street, Doremus Avenue, and Warehouse Place in Newark, and over JFK Boulevard in Bayonne and Avenue C in Jersey City.
- 16 feet 6 inches over NJ Route 440 in Bayonne.
- 14 feet 6 inches over Garfield Avenue.

For construction over the railroad and other roadways, temporary closures or outages on those crossings will be required for removing existing superstructure, erecting proposed steel, and placement and removal of shielding. Crossing-specific maintenance and protection of traffic plans will be developed to detail temporary detours or other measures to be employed to minimize disruption and maintain traffic flow and safety during the construction activities affecting the crossing until railroad and roadway vehicular (automobile, trucks, and emergency vehicles), pedestrian, and bicycle traffic can be restored to full service, pre-construction conditions.

Coordination will occur with Conrail, NJDOT, Hudson County, and the municipalities during Proposed Project design and prior to construction on the design of the Proposed Project on and in the vicinity of the infrastructure on measures to avoid or minimize adverse construction impacts.

3.7.5.3 Major Utilities

Table 3.7-14 lists utilities impacted by the Proposed Project.

Table 3.7-14. Impacts on Major Utilities along the NB-HCE between Interchanges 14 and 14A

Company	Facility	Impact
Penta	Bridge-Mounted Fiber Optic	Relocate 19,222 LF onto new NB-HCE structure
	Underground Fiber Optic	Relocate 500 LF west of new NB-HCE structure
ZAYO	Bridge-Mounted Fiber Optic	Relocate 3,425 LF onto new NB-HCE structure
	Bridge Mounted Cable TV	Relocate 16,706 LF to new NB-HCE structure
	Bridge Mounted Fiber Line	Relocate 16,744 LF to new NB-HCE viaduct
Colonial Pipeline	2" x 14" Liquified Petroleum Pipeline	Relocate 2 by 1,539 LF Liquified Petroleum Pipeline, Newark
Williams Companies, Inc.	2"x14" Fuel Pipeline	Avoid/Protect 400 LF at Interchange 14A
Verizon	Overhead Fiber	Relocate 392 LF to new utility poles at Corbin Street, Newark
		Relocate 168 LF to new utility poles at Doremus Avenue, Newark
PSE&G	Overhead Electric	Relocate 107 LF to new utility poles at Doremus Avenue, Newark
		Relocate 165 LF to new utility pole at Warehouse Place, Newark
		Relocate/Shift two utilities totaling 1,121 LF along West 58th Street, Bayonne
	Underground Electric	Avoid/Protect 205 LF at Interchange 14A
Bayonne Municipal Utilities Authority (BMUA)	Culvert over 30" Sanitary Force Main	Extend 25 LF of culvert and pipe crossing NB-HCE, Bayonne
	30" Sanitary Main	Relocate 471 LF crossing NB-HCE between Avenue B and Avenue C, Bayonne and Jersey City
	30" Water Pipe	Relocate 252 LF along West 58th Street, Bayonne
	8" Sewer Pipe	Relocate 152 LF along West 58th Street, Bayonne
	36" Sanitary Main	Avoid/Protect 245 LF at Interchange 14A
Comcast	Overhead Cable TV	Relocate 631 LF along West 58th Street, Bayonne

Company	Facility	Impact
Passaic Valley Sewerage Commission (PVSC)	12' Sanitary Sewer	Avoid/Protect 240 LF at Interchange 14A

Source: WSP 2022
Key: LF = linear feet

In addition, Williams Companies' fuel line and two 16-inch gas mains of an unknown owner, all in Newark, will require protection during construction. Utility relocations should be completed in advance of construction to avoid or minimize adverse impacts. Coordination will occur with utility providers during Proposed Project design and prior to construction on and in the vicinity of the infrastructure on measures to avoid or minimize adverse construction impacts.

3.7.5.4 Waterway Navigation and Ports

The main span of the replacement NBB structures over the 500-foot wide Federal Newark Bay Main Channel North Reach will be approximately 800 feet. Consequently, the replacement structures' piers and pier foundations will not encroach on the channel and will avoid an impact on the channel. Meanwhile, each of the structures will have minimum navigational clearances of 550 feet horizontal and 135 feet vertical, matching the existing, authorized clearances of the existing bridge.

There may be a need for temporary use of the channel by construction tugboats and barges. Such use will be coordinated with the USCG to avoid or minimize any interference with navigation through the channel. Methods such as the use of cantilevered construction of the main spans and trestles outside the navigation channel to serve as platforms to construct the new NBB structures and demolish the existing structure should minimize the need for using tugboats and barges during construction once the trestles are in place.

The Proposed Project will not acquire port property nor interfere with goods movements by rail or roadway except for the temporary closures or detours during construction, as noted in Section 3.7.5. The Authority will coordinate with Conrail and port operators and tenants on the timing of the temporary closures and detours to minimize the impact on goods movement and customers.

By increasing the long-term capacity and improving traffic flow on the NB-HCE between Interchanges 14 and 14A, the Proposed Project complements the goals and objectives of the Port Master Plan 2050 (PANYNJ 2019) by improving the service reliability for an increased volume of containers and automobiles entering the port and shipped by truck from the growing Port Jersey PAMT to distribution centers along the NJ Turnpike (I-95) Mainline and I-78 in Pennsylvania.

3.7.5.5 Navigable Airspace

The maximum height of the replacement NBB structures will be at or below the EWR Runway 29 approach and departure paths no-exceed heights for each structure's respective locations.

FAA regulations, specifically, 14 CFR Part 77, establish that notification of construction or alteration in the vicinity of airports, including potential obstruction and lighting impacts, must be submitted 45 days prior to construction. Given the time required to conduct an aeronautical study, FAA recommends a 45- to 60-day advance notification to accommodate the extensive review process and allow timely issuance of the FAA determination letter. A completed FAA Form 7460-1, "Notice of Proposed Construction or Alteration" along with appropriate supplemental information will be submitted to FAA for the Proposed Project accordingly.

3.7.6 Conclusion

Based on the preceding assessment, the Proposed Project will have no significant impact on traffic, transportation, or utilities. The following outlines the measures that the Authority will take to avoid or minimize impacts.

3.7.6.1 NB-HCE Traffic

As existing travel lane capacity on the NB-HCE will be maintained during construction, no mitigation will be necessary. Following construction, no mitigation is necessary on the NB-HCE or local roadways as the Proposed Project addresses rather than causes existing and future No Action congestion.

3.7.6.2 Railroads and Other Roadways

The impact on traffic from eliminating the connector roadway north of West 58th Street and between JFK Boulevard and Avenue C and NJ Route 440 NJ will be minimal as there are numerous alternate roadway routes between JFK Boulevard and Avenue C to Route 440. AAs the former Marist High School is no longer operational, vehicles destined to that site have been dramatically reduced from previous years. Said property is being acquired by the Authority for stormwater management, contractor lay down, and future maintenance. Access to this site is proposed to be directly from the adjacent existing transportation right-of-way between NJ Route 440 southbound and the property for property access/egress needs, thereby minimizing the impact of this traffic on the local street system. Therefore, no further mitigation is necessary.

While no other roadway or the Conrail Garden State Secondary line tracks will be realigned or relocated by the Proposed Project, the Proposed Project will cause temporary closures or outages while the existing NB-HCE crossing are demolished and replaced with new structures. The temporary closures and outages, as well as any detours, will be kept to the minimum duration necessary. Through coordination with Conrail, NJDOT, the counties, and municipalities on the schedule of closures and outages, and on any detour routes, the impacts are expected to be manageable, and no further mitigation is necessary.

3.7.6.3 Major Utilities

The durations of temporary outages of utility service for those lines being relocated will be kept to the minimum necessary. Through coordination with utility providers on the schedule of outages the impacts are expected to be manageable, and no further mitigation is necessary.

3.7.6.4 Waterway Navigation and Ports

As noted in Section 3.7.5.4, construction methods will be employed to avoid or minimize interference with navigation in the Newark Bay Main Channel North Reach during construction of the new NBB structures and demolition of the existing NBB. Construction activities in Newark Bay will be coordinated with USCG and USACE, and conditions on construction in Newark Bay will be incorporated into construction contracts. No further mitigation is necessary. As the replacement NBB structures avoid the channel and maintain the existing authorized clearances, no mitigation regarding the location or design of the new NBB structures is necessary.

3.7.6.5 Navigable Airspace

As noted in Section 3.7.5.5, the maximum height of the replacement NBB structures will be at or below the EWR Runway 29 approach and departure path no-exceed heights for each structure's respective locations. Therefore, no mitigation of the location or design of the new NBB structures is necessary. Construction activities along the NBB that could impact EWR airspace and safety will be coordinated with FAA and any conditions on construction activities that result will be incorporated into construction contracts. No further mitigation is necessary.

3.8 Air Quality

3.8.1 Study Area Definition and Data Collection

The air quality study area for the Proposed Project includes the NB-HCE corridor within project limits as well as beyond the NB-HCE corridor to include roadways that would experience changes in traffic because of the overall proposed NB-HCE Program. The carbon monoxide (CO) and fine-particulate matter 2.5 micrometers or smaller in width ($PM_{2.5}$) hot-spot analyses were performed to calculate emissions resulting from the NB-HCE roadway and ramps between Interchange 14 and Interchange 14A.

The mobile source air toxics (MSAT) and greenhouse gas (GHG) regional emissions inventory analysis includes specific roadways bound by the I-287 corridor, including the NB-HCE roadway. The roadways within the regional emissions inventory analysis include the roadway and travel routes accessing the trans-Hudson crossings developed by the NJRTM-E transportation model. The study area for the MSAT and GHG analyses, therefore, includes parts of Middlesex, Somerset, Morris, Passaic, Bergen, Union, Essex, and Hudson Counties.

3.8.2 Methodology and Criteria

3.8.2.1 Criteria Pollutants

The federal Clean Air Act (CAA) sets forth the framework and goals for improving air quality to protect public health and the environment. It requires the United States Environmental Protection Agency (EPA) to establish National Ambient Air Quality Standards (NAAQS) for the following 'criteria' pollutants: ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter with an aerodynamic diameter smaller than or equal to 10 micrometers (PM_{10}), particulate matter with an aerodynamic diameter smaller than or equal to 2.5 micrometers ($PM_{2.5}$), and lead (Pb). Table 3.8-1 shows current NAAQS. Units of measure for are parts per million by volume, parts per billion by volume, or micrograms per cubic meter of air.

Table 3.8-1. National Ambient Air Quality Standards

Pollutant	Averaging Period	Primary Standard	Secondary Standard
Carbon Monoxide	1 hour 8 hour	35 ppm 9 ppm	- -
Ozone	8 hour	0.070 ppm	0.070 ppm
Nitrogen Dioxide	Annual 1 hour	53 ppb 100 ppb	53 ppb -
Lead	Rolling 3-month Average	0.15 µg/m^3	0.15 µg/m^3
Sulfur Dioxide	3 hour 1 hour	- 75 ppb	0.5 ppm -
Inhalable Particulates (PM_{10})	24 hour	150 µg/m^3	150 µg/m^3
Fine Particulates ($PM_{2.5}$)	24 hour Annual	35 µg/m^3 12 µg/m^3	35 µg/m^3 15 µg/m^3

Source: EPA 2022
Key: µg/m^3 – micrograms per cubic meter of air
ppb – parts per billion
pm – parts per million

The NAAQS are divided into two types of criteria: primary standards, which are intended to protect the public health with an adequate margin of safety, and secondary standards, which are intended to protect the public welfare from any known or anticipated adverse effect of a pollutant (e.g., soiling, vegetation damage, material corrosion).

The NJDEP requires microscale CO analyses at critical project-affected intersections predicted under the Proposed Project. 'Project-affected' intersections are those intersections predicted to experience an increase of 100 peak hour vehicles due to the project. As detailed within the Air Quality Analysis for Intersections document released by NJDEP Bureau of Air Quality Evaluation (dated May 2004), 'critical' project-affected intersections are defined as poorly operating intersections where excess idle emissions may occur. Therefore, project-affected signalized intersections predicted to operate under 2050 Proposed Project LOS D or worse would require microscale CO modeling. In addition, project-affected unsignalized intersections with left-turn movements rated at LOS E or worse predicted for the major roadway approach leg, require microscale CO modeling. The NJDEP does not have any published requirements for microscale PM.

Although not required, both CO and $PM_{2.5}$ hot-spot analyses were performed for the corridor within the project's limits to provide further demonstration that the Proposed Project would not cause or contribute to existing violations or delay timely attainment of the CO and $PM_{2.5}$ NAAQS.

Vehicle Emissions – Motor vehicle emissions for CO and $PM_{2.5}$ (including brake wear and tire wear) were computed using EPA's Motor Vehicle Emission Simulator (MOVES3) based on a project-specific fleet mix and speed data for multiple roadway segments (links) on the NB-HCE roadway and associated ramps within the project limits (based on the Authority's pricing methodology, it is acknowledged that over time transactions will likely reduce for customers with access to alternate routes). This model calculates emissions for various vehicle types based on the fuel type, vehicle speeds, vehicle age, road types, and various other factors that influence emissions, such as inspection and maintenance programs. The inputs and use of MOVES3 (version MOVES3.0.2) incorporate the most current guidance available from EPA. In addition, emissions modeling utilized county-specific data, including hourly meteorological data, provided by the NJTPA. All roadways included in the analysis were assigned to urban restricted roadway type (Road Type 4). Emission processes, such as running exhaust (Process ID 1) and crankcase running exhaust (Process ID 15), were calculated. The CO NAAQS is based on 1-hour and 8-hour averages, and therefore, only the AM (7:00 AM – 8:00 AM) and PM (5:00 PM – 6:00 PM) peak traffic hour emissions were used for the CO analysis.

It is noted that the MOVES model has not been updated to account for recent and planned Federal and State regulations that will reduce motor vehicle emissions in the future. Consequently, the actual air pollutant emissions and concentrations with adoption of the regulations are expected to be substantially lower than the air pollutant emission levels presented in this chapter.

Among recent regulations that are yet to be accounted for in the MOVES model is the rule published by the U.S. Environmental Protection Agency on December 20, 2022, the "Control of Air Pollution from New Motor Vehicles: Heavy-Duty Engine and Vehicle Standards", that establishes revised emission standards for oxides of nitrogen, or NOx, from medium- and heavy-duty on-highway engines that will reduce emissions from heavy-duty engines that contribute to ambient levels of ozone, particulate matter, NOx, and carbon dioxide. EPA projects that by 2045, this final rule will reduce NOx emissions from the in-use fleet of heavy-duty trucks by almost 50%.

Another regulation that will substantially reduce mobile source emissions from the levels accounted for tin MOVES3 is Advanced Clean Cars II (ACCII). On February 15, 2023, Governor Murphy directed NJDEP to initiate a rulemaking process leading toward adoption by the end of 2023 of ACC II in New Jersey. ACC II would set the State on a path to lower vehicle emissions by setting gradually increasing sales targets so that every new light-duty vehicle sold in New Jersey will be a zero-emissions vehicle (ZEV) by 2035. NJDEP projects that all light duty vehicles registered in New Jersey in 2050 will be ZEVs resulting in cumulative

reductions of over 26,000 tons of NOx and over 272 million metric tons of greenhouse gases (GHGs), as well as substantial reductions in CO, $PM_{2.5}$, and other tailpipe emissions between 2024 and 2050. Many nearby states from which travel occurs on the NJ Turnpike system, including the NB-HCE, e.g., New York, Massachusetts, and Virginia, are also adopting ACC II and such widespread adoption of ACCII will lead to additional emissions reductions from vehicles from other states using the Turnpike.

In accordance with the EPA's *Transportation Conformity Guidance for Quantitative Hot-spot Analyses in $PM_{2.5}$ and PM_{10} Nonattainment and Maintenance Areas*, *October 2021* (hereinafter referred to as EPA's 'PM Hot-spot Guidance'), four weekday time periods (morning, midday, evening and overnight) are recommended for developing a 24-hour emissions profile to evaluate compliance with both the 24-hour and annual $PM_{2.5}$ NAAQS. Therefore, MOVES3 was executed for a total of four weekday time periods, including an AM peak hour from 7:00 AM – 8:00 AM, a midday peak hour from 10:00 AM – 11:00 AM, a PM peak hour from 5:00 PM – 6:00 PM, and an overnight peak hour from 8:00 PM – 9:00 PM. Further, EPA's October 2021 PM Hot-spot Guidance also recommends executing MOVES3 for four months (January, April, July, and October) to gain seasonally varying emissions.

As detailed within EPA's PM Hot-spot Guidance, re-entrained road dust must be included within PM hot-spot analyses only if the EPA or state air agency has determined such emissions are a significant contributor to the $PM_{2.5}$ air quality issue in a nonattainment or maintenance area. Since re-entrained road dust was included within New Jersey's latest SIP (*NJDEP Proposed State Implementation Plan (SIP) Revision for the Attainment and Maintenance of the Ozone National Ambient Air Quality Standards, May 2021*), it is considered a significant contributor to the $PM_{2.5}$ air quality issue. Road dust emissions cannot be modeled in MOVES3. In accordance with EPA's PM Hot-spot Guidance, re-entrained road dust emissions were calculated following the methodology and equations provided within EPA's *AP-42, Chapter 13.2.1: Paved Roads*. Road dust emissions were subsequently added to both 24-hour and annual MOVES3 emissions modeled in MOVES3, consistent with the New Jersey's SIP.

Dispersion Model – The latest version of the American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) dispersion model was used to predict 1-hour and 8-hour concentrations of CO and 24-hour and annual concentrations of $PM_{2.5}$ for comparison to their respective NAAQS. Each roadway link was modeled as a line source within AERMOD, accounting for travel width plus a 10-foot mixing zone on either side of each link, per EPA's PM Hot-spot Guidance. A receptor grid was generated to model pollutant concentrations at a breathing height of 6 feet (1.8 meters), based on EPA's PM Hot-Spot Guidance, in areas of continuous public access (e.g., sidewalks) as well as at a height approximately equivalent to second-story windows due to the elevated roadway structure through sections of the study area. Five consecutive years of National Weather Service surface meteorological data from Newark Liberty International Airport (2016 – 2020) and concurrent upper air data collected at Brookhaven, New York, were obtained from NJDEP and used within AERMOD for the project analysis.

Analysis Years – For purposes of this analysis, the estimated year of opening the Proposed Project is 2030. Therefore, CO and $PM_{2.5}$ hot-spot analyses were performed for the estimated year of opening plus 20 years for year 2050 analyses of the No Action and Proposed Project Alternatives.

Traffic Volumes/Speeds – Traffic volumes and speeds utilized for the hot-spot CO and $PM_{2.5}$ analyses for year 2050 No Action and Proposed Project Alternatives were provided using the NJRTM-E regional transportation model as applied to the project's traffic analysis. The transportation model also used socioeconomic data from the latest NJTPA demographic projections as well as development and redevelopment information obtained from the Jersey City Open Data Portal.

Grade – The change in existing roadway elevation, represented as the grade for each link of the current NB-HCE roadway, was accounted for in emission calculations. No major elevation changes are expected from the existing roadway along the NB-HCE roadway under the Proposed Project.

3.8.2.2 Mobile Source Air Toxics

The CAA also specifies a list of regulated hazardous air pollutants (HAPs) and establishes a regulatory framework to reduce emissions, and thus, reduce public exposure to HAPs. The most prevalent HAPs emitted from motor vehicles are referred to as mobile source air toxics (MSATs). Based on the *FHWA Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents,* dated January 18, 2023*,* federal agencies should use an interdisciplinary approach for actions that adversely impact the environment (42 USC 4332) within the planning and decision-making process. EPA has identified nine compounds primarily resulting from mobile sources that are cancer risk indicators. Priority MSATs include 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter, ethylbenzene, formaldehyde, naphthalene, and polycyclic organic matter (POM). The scientific methods to determine project-specific health effects resulting from MSAT exposure is limited at this time. However, FHWA has provided guidance to address MSATs in NEPA documents based on the type of project and the potential to result in meaningful differences in MSAT emissions between alternatives being considered. Projects that include either of the following are considered to have the potential to create meaningful differences in emissions by FHWA:

- Create or significantly alter a major intermodal freight facility with the potential to concentrate high levels of diesel particulate matter in a location.
- Create new capacity or add significant capacity to urban highways (e.g., interstates, urban arterials, urban collector-distributor routes) with projected Average Annual Daily Traffic volumes between 140,000 and 150,000 or greater by the design year.

Regional emissions inventory analyses were performed for the Proposed Project using procedures in the *FHWA Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents, dated October 18, 2016*, and the *EPA Air Toxic Emissions from Onroad Vehicles* in the *MOtor Vehicle Emission Simulator (MOVES3) (EPA0420-R-20-022)*, dated November 2020.

Regional emissions inventory analyses were conducted to compare MSAT emission quantities for the No Action and Proposed Project conditions in the 2050 analysis year. As stated in FHWA's guidance, 1,3-butadiene, acetaldehyde, acrolein, benzene, diesel particulate matter, ethylbenzene, formaldehyde, naphthalene, and POM are considered the priority MSATs and were included in the analysis.

Vehicle Emissions – Motor vehicle emissions for all MSAT pollutants in the regional analysis were computed using EPA's MOVES3 in a similar manner as the CO and $PM_{2.5}$ analyses. However, emissions modeling utilized county-specific data for roadways including urban restricted (Road Type 4) and urban unrestricted roadways (Road Type 5).

Analysis Years – For purposes of this analysis, the estimated year of opening the Proposed Project is 2030. Therefore, regional emissions inventory analyses were performed for the estimated year of opening plus 20 years for year 2050 analyses of the No Action and Proposed Project Alternatives.

Vehicle Miles Traveled/Speeds – Vehicle miles traveled (VMT) and speeds utilized for the regional emissions inventory analyses for year 2050 No Action and Proposed Project Alternatives were provided using the NJRTM-E. The transportation model also used socioeconomic data from the latest NJTPA demographic projections as well as development and redevelopment information obtained from the Jersey City Open Data Portal.

Grade – Due to the numerous roadway links involved in the regional emissions inventory analysis, grade 0 was used for all roadways for year 2050 No Action and Proposed Project Alternatives.

A quantitative regional MSAT analysis was performed to determine whether the Proposed Project would result in meaningful differences (±10 percent) in MSAT emissions as compared with the No Action Alternative.

Should meaningfully different MSAT emissions be predicted from the Proposed Project versus No Action comparison, mitigation options must be identified and considered.

3.8.2.3 Greenhouse Gases

Greenhouse gas (GHG) emissions from anthropogenic sources threaten public health and welfare and are known to contribute to the effects of climate change. Fossil fuel combustion is the principal source of GHG emissions. While GHG emissions are regulated under the CAA, there are no NAAQS established for GHG emissions. The CEQ issued *Revised Draft Guidance for Federal Departments and Agencies on Consideration of Greenhouse Gas Emissions and the Effects of Climate Change in NEPA Reviews, dated December 24, 2014*, which includes guidance to ensure federal agencies providing project funding or approvals address GHG emissions consistently and with certainty when addressing impacts of climate change within NEPA documents. As such, a regional GHG emissions inventory analysis was performed to provide information necessary to make informed evaluation of potential for climate change impacts.

Motor vehicles traveling along roadways produce GHG emissions. GHG emissions reported within are referred to as carbon dioxide equivalent (CO_2e), which is comprised of the three primarily tracked GHGs: carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). CO_2e emissions are based on current Global Warming Potential values of 1, 25, and 298 for CO_2, CH_4, and N_2O, respectively. CO_2e is reported in metric tons.

The GHG air quality analyses were performed using procedures in the *FHWA Handbook for Estimating Transportation Greenhouse Gases for Integration into the Planning Process (FHWA 2013)* and *National Cooperative Highway Research Program (NCHRP) Document 152: Assessing Mechanisms for Integrating Transportation-Related Greenhouse Gas Reduction Objectives into Transportation Decision Making (NCHRP 2010)*.

Direct CO_2e emission rates were calculated utilizing the same methodologies that are used for the regional emissions inventory analysis of MSATs.

3.8.2.4 Construction Related Air Quality

The CAA requires federal agencies to ensure that proposed federal actions in nonattainment or maintenance areas conform (i.e., do not interfere) with the state's SIP to attain and maintain NAAQS. Federal actions, such as projects requiring federal permits, located in nonattainment and maintenance areas are subject to EPA's conformity regulations (40 CFR Parts 51 and 93), which ensure that emissions of air pollutants from planned federal actions would not affect the state's ability to meet the NAAQS. Section 176(c) of the CAA requires that federal actions conform to the purpose of the SIP, meaning that federal actions would not cause any violations of the NAAQS, increase the frequency or severity of NAAQS violations, or delay timely attainment of the NAAQS or any interim milestone.

The conformity requirements of the CAA and its regulations limit the ability of federal agencies to assist, fund, permit, and approve projects that do not conform to the applicable SIP. When subject to this regulation, the federal agency is responsible for demonstrating conformity for its proposed action. Conformity determinations for federal actions other than those related to transportation plans, programs, and projects that are developed, funded, or approved under title 23 U.S. Code (USC) (FHWA projects) or the Federal Transit Act at 49 USC 1601 et seq. (Federal Transit Administration [FTA] projects) must be made according to the federal general conformity regulations (40 CFR 93 Subpart B). The Proposed Project is not an FHWA or FTA project as defined by the regulation as no funding or other approvals from these agencies is necessary to implement the Proposed Project.

Approvals are, however, needed from two federal agencies, the USCG and the USACE, prior to construction. Issuance of these approvals, a Bridge Permit and Section 10/404 Permits, respectively, constitute federal actions. Because the Proposed Project is located within a serious O_3 nonattainment and CO and $PM_{2.5}$ maintenance areas, it must be demonstrated that the Proposed Project conforms with New Jersey's SIP.

Consequently, compliance with General Conformity requirements is necessary before the federal approvals can be issued.

Recognizing that most federal actions do not result in a substantial increase in emissions, EPA has established emissions thresholds below which a proposed federal action is deemed to conform and for which general conformity requirements are not applicable. These thresholds are commonly knowns as *de minimis* thresholds which are presented in Table 3.8-2. An applicability analysis is completed to determine whether a project is subject to General Conformity.

Certain actions and activities are exempted from general conformity review, including the following:

- Stationary source emissions regulated under major or minor New Source Review (air permitting) programs.
- Alteration and additions of existing structures as specifically required by new or existing applicable environmental legislation.
- Actions where the emissions are not reasonably foreseeable.
- Actions that have been defined by the federal agency or by the state as "presumed to conform."
- Activities with total direct or indirect emissions (not including stationary source emissions regulated under New Source Review programs) below *de minimis* levels.
- Emissions from construction activities are subject to air conformity review unless they are shown to be below the applicable *de minimis* levels.

Table 3.8-2. General Conformity Rule De Minimis Thresholds for the Proposed Project

Pollutant	De Minimis Thresholds (Tons/Year)
CO	100
NOx (O_3 Precursor)	50
VOC (O_3 Precursor)	50
$PM_{2.5}$	100

Source: 40 CFR Section 93.153(b)(1)

A proposed action would have a significant impact on air quality if "the action would cause pollutant concentrations to exceed one or more of the NAAQS, as established by the EPA under the CAA, for any of the time periods analyzed, or to increase the frequency or severity of any such existing violations."

General conformity regulations require an analysis of total direct and indirect emissions from the action and must reflect emission scenarios that are expected to occur under each of the following cases, as detailed within 40 CFR Section 93.159(d):

1. The Act mandated attainment year or, if applicable, the farthest year for which emissions are projected in the maintenance plan;
2. The year during which the total of direct and indirect emissions from the action is expected to be the greatest on an annual basis; and
3. Any year for which the applicable SIP specifies an emissions budget.

The latest New Jersey SIP revision was submitted on November 18, 2021 for the required attainment date of July 20, 2021, and addresses O_3 and other pollutants of concern including CO and $PM_{2.5}$. The build year for the Proposed Project is 2030 and postdates the SIP required attainment date (2021). In addition, the SIP does not provide emission budgets (with the exception of McGuire Air Force Base and Lakehurst Naval Air Station). Therefore, emission estimates for scenarios (1) and (3) are not required. However, since the Proposed Project will be constructed over multiple years, direct and indirect emissions would be greatest during the construction phase. Therefore, an assessment of construction-related annual emissions was performed and compared to *de minimis* thresholds.

Construction-related emissions attributed to the following equipment/activities were calculated: off-road construction equipment and marine vessels, fugitive dust from site preparation, land clearing, material handling, and demolition activities, as well as on-road vehicles such as concrete, material delivery, and haul trucks, and contractors' commuting vehicles traveling to and from the site.

The years chosen for the General Conformity applicability analysis include major activities with the greatest potential to generate peak air emissions. Under the Proposed Project, the NBB will be replaced through staged construction, which is estimated to commence in the fourth quarter of 2026. The westbound structure is estimated to be constructed from the fourth quarter of 2026, through 2027 and 2028, and be completed in the second quarter of 2029. Both directions of travel (eastbound and westbound) will then utilize the new bridge structure while the existing structure is demolished, followed by construction of the new eastbound structure. Construction of the temporary trestle necessary to build the new eastbound structure is estimated to commence in the fourth quarter of 2028 and be completed in 4.5 months. Construction of the new eastbound structure is estimated be constructed from the second quarter of 2029, through 2030, and be completed within second quarter of 2031.

Activities such as pile driving to construct the temporary trestle, drilling shafts for bridge pier installation, and demolition of the existing structures result in the greatest number of large equipment and contractors on site, as well as the highest amount of ground disturbance and resultant fugitive dust. Calendar year (CY) 2028 was chosen for the General Conformity applicability analysis since construction of the new westbound structure and construction of the temporary trestle are anticipated to be performed concurrently. In addition, CY 2029 was chosen for the General Conformity applicability analysis as demolition of the existing structure, construction of the remainder of the temporary trestle, and the initial stages of construction for the eastbound bridge are anticipated to occur. Therefore, emission analyses representing CY 2028 and CY 2029 construction activities were conducted and compared to applicable *de minimis* thresholds.

A preliminary construction schedule is presented in Table 3.8-3 for purposes of the General Conformity analysis. Construction activities included within the General Conformity applicability analysis and crew types, organized by construction year, are presented in Table 3.8-4.

Table 3.8-3. Preliminary Newark Bay Bridge Construction Schedule

	2026	2027	2028		2029				2030				2031	
Activities	Q4	Q1-4	Q1-3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
New WB Structure	X	X	X	X	X	X								
EB Temporary Trestle				X	X									
New EB Structure						X	X	X	X	X	X	X	X	X

Note: Highlighted calendar years and quarters represent the time durations used in the General Conformity applicability analyses.

Table 3.8-4. General Conformity Applicability Analysis Estimated 2028 and 2029 Construction-Related Activities and Crew Type

Construction Activity	2028 Construction Crews	2029 Construction Crews
Westbound Structure	Carpenter Crew Lather Crew Concrete Pour Crew	Demolition Crew
Temporary Trestle	Pile Driving Crew Trestle Construction Crew	Pile Driving Crew Trestle Construction Crew
Eastbound Structure	-	Cofferdam Sheeting Crew Drilled Shaft Crew Concrete Pour Crew Steel Erection Crew

Source: Paul Carpenter Associates, Inc.

The air quality assessment was accomplished using the latest version of models and databases for evaluating project effects on air quality. To address General Conformity, emission inventories were estimated for construction of the NBB replacement portion of the Proposed Project as representing the peak of construction activities. Detailed information regarding computer modeling methodologies and data input are presented below.

Air Emissions – Passenger truck (contractor vehicles) and single-unit short-haul trucks (material and concrete delivery trucks) emissions were computed using EPA's MOVES3 model for each analysis year. Emissions modeling utilized county-specific data provided by NJTPA. Emission rates were developed for passenger trucks (source type ID 31) and single-unit short-haul trucks (source type ID 52) traveling on urban unrestricted roadways (road type ID 5). It was assumed that contractor vehicles and project-related trucks (dump trucks, concrete trucks, etc.) would travel 30 miles each way to the site daily. Since no overnight construction activities are expected to construct the Proposed Project, 3 hours per weekday were used to estimate daily emissions representing AM peak hour, midday, and PM peak hour. MOVES3 emissions were evaluated for January, April, July, and October to represent four seasons per analysis year.

As previously discussed, the study area is designated by the EPA as serious nonattainment area for O_3 and maintenance for CO and $PM_{2.5}$. Therefore, pollutants of concern are CO, PM_{10}, $PM_{2.5}$, and O_3 precursors (oxides of nitrogen [NO_x] and VOCs). Nonroad emissions were also computed using EPA's MOVES3, which incorporates NONROAD2008a (NONROAD). The model was executed for the 2028 and 2029 construction analysis years for both construction and commercial equipment categories assuming diesel-powered equipment. In addition, since construction is being conducted in both Essex and Hudson counties, the maximum emission by vehicle/equipment was used for modeling purposes.

Engine Load – Equipment types and reasonable equipment quantities likely to be used were identified. NONROAD provided emission rates for each equipment type for each equipment type by most reasonable horsepower. Equipment load factors, by equipment type, were obtained using guidance within EPA's *Median Life, Annual Activity, and Load Factor Values for Nonroad Engine Emissions Modeling, July 2010*.

Fugitive Dust – Construction-related fugitive dust emission rates were calculated based on EPA's *AP-42, Compilation of Air Pollutant Emissions Factors, Fifth Edition*. According to EPA's AP-42 guidance, a fugitive dust PM_{10} emission factor of 1.2 tons per acre disturbed per month during construction and demolition activities was used. Conservatively, 25 percent of the project area was assumed to be disturbed per month and a 75 percent dust control efficiency through daily watering was also assumed.

Construction Crew Size – Each construction crew was assumed to operate with seven contractors, traveling in seven passenger trucks daily.

Marine Vessels – Construction activities over Newark Bay were assumed to require three forms of marine vessels: tugboat (1559 kilowatts [kW]), barge with auxiliary engine (622 kW), and crew boats (1037 kW). Emissions were obtained based on the EPA's *Ports Emission Inventory Guidance: Methodologies for Estimating Port-Related and Goods Movement Mobile Source Emissions (EPA-420-B-220011)*, dated April 2022. Marine vessels were assumed to be necessary to transport materials and equipment, as well as contractors, for construction activities over Newark Bay to the construction site. During the fourth quarter of 2028 analysis, one tugboat pulling/pushing one barge with an auxiliary engine was assumed to carry materials/equipment to the bridge. During the first quarter of 2029 analysis, two tugboats pulling/pushing two barges with auxiliary engines were assumed to carry materials/equipment to the bridge. Both the fourth quarter of 2028 and first quarter of 2029 analyses assumed two crew boats would travel to/from the barges. Conservatively, marine vessels during these periods were assumed to operate eight hours a day. However, once the temporary trestle construction for the eastbound structure is complete, marine vessel use would be rare and not considered in the emissions assessment.

The resulting calculated emissions of nonattainment or maintenance pollutants are compared to the applicable *de minimis* thresholds to assess whether a more detailed emissions analysis is warranted under the General Conformity Regulations.

3.8.2.5 Transportation Conformity

The Transportation Conformity Regulation was promulgated by EPA under the CAA and requires states to develop state-specific criteria and procedures for determining the conformity of transportation investments with the applicable SIP. The criteria and procedures apply both to FHWA and FTA projects and to certain transportation projects that are not FHWA or FTA projects, such as regionally significant projects. The Proposed Project meets the definition of a regionally significant project under the regulation because it is on a facility that serves regional transportation needs. Therefore, it must be demonstrated that the Proposed Project meets applicable Transportation Conformity Regulation criteria and procedures. Specifically, it must be included in the regional emissions analysis of a conforming regional long-range TIP of the pertinent MPO, in this case NJTPA.

3.8.3 Existing Conditions

3.8.3.1 Criteria Pollutants

NJDEP provides air quality monitoring throughout the state; however, not all pollutants are monitored at each location. To determine which NJDEP monitoring station would best represent existing conditions within the study area, a 20-year wind rose was calculated for the closest NOAA meteorological station (Newark Liberty International Airport). Based on the wind rose provided in Appendix B: Air Quality, the most representative upwind NJDEP monitoring station for the Proposed Project is located at 360 Clinton Avenue in the City of Newark.

In 2020, the COVID-19 pandemic caused interruptions of the air monitoring network. The Governor of New Jersey directed all state government departments to authorize temporary remote work arrangements for as many employees as possible on March 18, 2020. Therefore, state employees who service the air monitors

throughout the state were unable to access stations during this time. Additionally, passenger vehicle trip reductions were recognized, as many "non-essential" employees worked remotely beginning in March 2020; however, truck trips increased regionwide. To avoid any air emission irregularities in 2020 due to the pandemic, 2019 air measurement data were utilized to represent existing conditions and are presented in Table 3.8-5.

Table 3.8-5. Existing Ambient Air Quality Monitoring Data (Newark Firehouse, 360 Clinton Avenue; Essex County)

Pollutant	Averaging Period	Concentration
CO	1-hour 8-hour	2.3 ppm 1.6 ppm
O_3	8-hour	0.065 ppm
NO_2	Annual 1-hour	16 ppb 61 ppb
Pb	3 months	.003 µg/m^3
SO_2	1-hour	2.4 ppb
PM_{10}	24-hour	33 µg/m^3
$PM_{2.5}$	24-hour Annual	19.9 µg/m^3 7.9 µg/m^3

Source: NJDEP, 2019 New Jersey Air Quality Report.

NAAQS Compliance Notes:

CO compliance is based on second-highest maximum value.
O_3 compliance is based on the three-year average value of the fourth-highest maximum eight-hour concentration.
NO_2 compliance is based on a three-year average of the 98th percentile of daily maximum one-hour average concentrations.
Pb compliance is based on the maximum rolling three-month average over a three-year period.
SO_2 compliance is based on a three-year average of the 99th percentile of the annual distribution of daily maximum one-hour average concentrations.
PM_{10} compliance is based on the second highest annual average over a three-year period.
$PM_{2.5}$ compliance is based on the 98th percentile 24-hour concentration averaged over three years. The annual $PM_{2.5}$ compliance is based on the average of three consecutive annual means.

The CAA, as amended in 1990, defines regions that have been designated as not meeting one or more of the NAAQS. Areas with measured air quality concentrations lower than a given NAAQS are designated 'attainment' for that standard. Areas that exceed the NAAQS are designated 'nonattainment'. An area can be designated 'attainment' for one pollutant and 'nonattainment' for others. Areas that previously did not meet one of the NAAQS but have since attained the standard are subject to a SIP for air quality 'maintenance.' Such areas are commonly referred to as 'maintenance areas.' Maintenance areas can also be classified as attainment, maintenance, or nonattainment for other pollutants. The Proposed Project is located within Essex and Hudson Counties, both of which are designated attainment for NO_2, Pb, SO_2, and PM_{10}, serious nonattainment for O_3, and maintenance for CO and $PM_{2.5}$.

Criteria pollutant design values are used to describe the air quality status of an area, relative to the NAAQS. EPA's design values are published annually by the EPA to designate and classify nonattainment areas and assess progress towards meeting the NAAQS. When determining compliance of a Proposed Project with the applicable NAAQS, the receptor with the highest modeled concentration is added to the applicable background concentration (background design value) to account for nearby sources not included within the air quality dispersion model. This total concentration is subsequently compared to the applicable NAAQS. While 2021 design values are available, EPA's 2020 Design Values Report for CO and $PM_{2.5}$ was used to coincide with the available meteorological data set used within microscale hot-spot modeling. In addition, the 2020 design values represent higher concentrations than 2019 pre-pandemic CO and $PM_{2.5}$ measured levels presented in Table

3.8-5, yielding a more conservative analysis. Although not required, both CO and $PM_{2.5}$ hot-spot analyses were performed for the project study area. Ambient design values added to modeled project-related concentrations of CO and $PM_{2.5}$ for determining compliance of the Proposed Project with the NAAQS are summarized in Table 3.8-6.

Table 3.8-6. Existing Ambient Air Quality CO and $PM_{2.5}$ Design Values

Pollutant	Averaging Period	Design Value
CO	1-hour 8-hour	2.7 ppm 2.10 ppm
$PM_{2.5}$	24-hour Annual	22.0 µg/m^3 8.7 µg/m^3

Source: EPA 2020 Design Value Reports.

NAAQS Compliance Notes:

CO compliance is based on second-highest maximum value.

$PM_{2.5}$ compliance is based on the 98th percentile 24-hour concentration averaged over three years. The annual $PM_{2.5}$ compliance is based on the average of three consecutive annual means.

3.8.4 No Action Alternative

The results of the analyses of the No Action Alternative conditions for CO and $PM_{2.5}$ hot-spot, MSATS and GHG regional emissions are presented in Section 3.8.5 through comparison with the Proposed Project condition.

3.8.5 Proposed Project

3.8.5.1 Impacts

CO and $PM_{2.5}$ Hot-Spot Analyses.

Based on modeling results of the entire NB-HCE within project limits, peak concentrations of CO and $PM_{2.5}$ would occur closest to the NB-HCE, specifically along public sidewalks. Table 3.8-7 and Table 3.8-8 summarize maximum modeled and total concentrations for CO and $PM_{2.5}$ NAAQS compliance determination, respectively. Based on modeling results, there are no predicted exceedances of the 1-hour or 8-hour CO NAAQS or 24-hour or annual $PM_{2.5}$ NAAQS. 2050 No Action and 2050 Proposed Project hot-spot assessment result spreadsheets are provided in Appendix B: Air Quality.

Table 3.8-7. 2050 Microscale CO Hot-Spot Assessment Results

CO Averaging Period	2050 No Action Alternative		2050 Action Alternative		NAAQS (ppm)	Exceedance YES/NO
	Maximum Modeled Concentration (ppm)	Total Concentration[1] (ppm)	Maximum Modeled Concentration (ppm)	Total Concentration[1] (ppm)		
1-hour	0.60	3.30	0.62	3.32	35	NO
8-hour	0.27	2.37	0.28	2.38	9	NO

Source: Paul Carpenter Associates, Inc.

Note:

[1] – Total concentrations were calculated assuming a 1-hour CO background concentration of 2.7 ppm and an 8-hour CO background concentration of 2.10 ppm, as detailed within Table 3.8-6. A NAAQS exceedance is determined based on total concentration (background plus modeled concentration) if it is greater than the applicable NAAQS. The estimated values in the table and the extent of the difference between Proposed Project and No Action are conservative as the MOVES3 emissions model used in the analysis has not been updated by USEPA to account for recent and planned regulations that will substantially reduce tailpipe emissions from automobiles and trucks.

Table 3.8-8. 2050 Microscale $PM_{2.5}$ Hot-Spot Assessment Results

$PM_{2.5}$ Averaging Period	2050 No Action Alternative		2050 Action Alternative		NAAQS ($\mu g/m^3$)	Exceedance YES/NO
	Maximum Modeled Concentration ($\mu g/m^3$)	Total Concentration[1] ($\mu g/m^3$)	Maximum Modeled Concentration ($\mu g/m^3$)	Total Concentration[1] ($\mu g/m^3$)		
24-hour	3.19	25.19	3.68	25.68	35	NO
Annual	1.28	9.98	1.43	10.13	12	NO

Source: Paul Carpenter Associates, Inc.

Note:

[1] – Total concentrations were calculated assuming a 24-hour $PM_{2.5}$ background concentration of 22.0 $\mu g/m^3$ and an annual $PM_{2.5}$ background concentration of 8.7 ppm, as detailed within Table 3.8-6. A NAAQS exceedance is determined based on total concentration (background plus modeled concentration) if it is greater than the applicable NAAQS. The estimated values in the table and the extent of the difference between Proposed Project and No Action are conservative as the MOVES3 emissions model used in the analysis has not been updated by USEPA to account for recent and planned regulations that will substantially reduce tailpipe emissions from automobiles and trucks.

Mobile Source Air Toxics. In year 2050, the regional MSAT emissions for the Proposed Project are projected to be -1.02 to +0.12 percent higher, as compared to the No Action Alternative. With implementation of EPA's National Low Emissions Vehicle program, Tier 2 and Tier 3 light-duty vehicle emission standards, which began with 2001 and 2004 model year vehicles, respectively, as well as other engine technology changes and 2050 analysis fleet age, expected 1,3-Butadiene emissions for both 2050 No Action Alternative and 2050 Proposed Project are zero. The results reflect the MSAT emissions in future years as a result of the improvement of vehicle emission control technologies under both 2050 No Action Alternative and 2050 Proposed Project conditions. The results of the MSAT analysis indicate no meaningful differences are expected for the Proposed Project in 2050, as compared to the No Action Alternative in 2050. As no meaningful differences in MSAT emissions are predicted, mitigation does not need to be considered. The predicted MSAT emissions and

percentage differences are presented in Table 3.8-9. Regional MSAT emission analysis results spreadsheet is included in Appendix B: Air Quality.

Table 3.8-9. 2050 MSAT Pollutant Emissions

MSAT Pollutant	Emissions (kilograms per year)		Difference
	No Action	Proposed Project	2050 Proposed Project vs. 2050 No Action
Benzene	765.32	766.19	+0.11%
Naphthalene Particle + Naphthalene Gas	38.05	38.09	+0.11%
1,3-Butadiene	0.00	0.00	+0.00%
Formaldehyde	826.10	826.22	+0.01%
Acetaldehyde	723.08	723.08	+0.00%
Acrolein	37.28	37.29	+0.05%
Ethyl Benzene	352.18	352.50	+0.09%
Diesel Particulate Matter	2030.06	2009.37	-1.02%
POM	16.00	16.02	+0.12%

Source: Paul Carpenter Associates, Inc.

Note: The estimated values in the table and the extent of the difference between Proposed Project and No Action are conservative as the MOVES3 emissions model used in the analysis has not been updated by USEPA to account for recent and planned regulations that will substantially reduce tailpipe emissions from automobiles and trucks.

Greenhouse Gases. The 2050 Proposed Project GHG emissions for the region is predicted to be 0.17 percent higher compared to the No Action Alternative in 2050. The predicted CO_2e emissions and percentage difference is presented in Table 3.8-10. Regional GHG emission analysis results spreadsheet is included in Appendix B: Air Quality.

Table 3.8-10. 2050 Annual CO_2e Pollutant Emissions

Criteria Pollutant	Emissions (metric tons per year)		Difference
	2050 No Action	2050 Proposed Project	2050 Proposed Project vs. 2050 No Action
CO_2e	627,654.37	628,737.08	+0.17%

Source: Paul Carpenter Associates, Inc.

Note : The estimated values in the table and the extent of the difference between Proposed Project and No Action are conservative as the MOVES3 emissions model used in the analysis has not been updated by USEPA to account for recent and planned regulations that will substantially reduce tailpipe emissions from automobiles and trucks.

3.8.5.2 Construction-Related Air Quality Analysis

Construction-related emissions were calculated for ozone precursors (NOx and VOC), CO, PM_{10} and $PM_{2.5}$ for two peak construction years (CY 2028 and CY 2029), as presented in Table 3.8-11. Construction-related emissions are the appropriate source of emissions to compare with General Conformity Rule *de minimis* thresholds. Peak construction-related emissions were estimated in CY 2029 since demolition of the existing

westbound structure, construction of the remaining temporary trestle, and the initial stages of construction for the eastbound bridge will occur within this calendar year. The analysis performed demonstrated that the NBB replacement portion of the NB-HCE Program does not exceed *de minimis* thresholds and, therefore, can be presumed to conform to the New Jersey SIP. The General Conformity applicability emission results spreadsheets is included in Appendix B: Air Quality.

Table 3.8-11. Proposed Project Net Year 2028 and 2029 General Conformity Applicability Emission Results (tons/year)

Source	NO_x	VOC	CO	PM_{10}	$PM_{2.5}$
CY 2028 Construction Emissions	19.1	0.9	5.8	11.4	1.7
CY 2029 Construction Emissions	34.5	1.8	11.7	12.0	2.3
De Minimis Thresholds	*50*	*50*	*100*	*100*	*100*
Exceeds CAA *De Minimis*?	NO	NO	NO	NO	NO

Source: Paul Carpenter Associates, Inc.

3.8.5.3 Transportation Conformity

The Proposed Project is part of the proposed NB-HCE Program and is located within the planning area of the NJTPA. The NJTPA performs regional emissions analyses to demonstrate that emissions from the area's transportation system are within the limits outlined in the New Jersey SIP. The NB-HCE Program (DBNUM: TPK22100) is included in Appendix B of the fiscal year (FY) 2022 TIP for regionally significant non-federally funded projects. The FY 2022 to FY 2025 TIP was approved on September 13, 2021. The project listing in NJTPA's approved TIP is included in Appendix B: Air Quality. Operational emissions resulting from the NB-HCE Program were included in the previous conformity determination for scenario year 2030. NJTPA detailed the analysis demonstrating conformance to the SIP within *The Northern New Jersey Air Quality Conformity Determination Plan 2050: Transportation, People, Opportunity and the FY 2022-2025 Transportation Improvement Program, dated August 10, 2021*. Consequently, the Proposed Project meets the CAA Transportation Conformity requirement as it is included in the regional emissions analysis of a conforming Plan and TIP.

3.8.5.2 Conclusion

Based on the preceding assessment, the Proposed Project's construction and operational effects on air quality must conform with the SIP. The analysis of construction-related emissions shows that the emissions do not exceed the General Conformity Rule *de minimis* thresholds and, therefore, can be presumed to conform to the New Jersey SIP. The Proposed Project is included in a long-range transportation plan that has been subject to Transportation Conformity Rule requirements. In addition, no meaningful differences in regional MSAT emissions are expected for the 2050 Proposed Project, as compared to the 2050 No Action Alternative.

3.9 Noise

3.9.1 Study Area and Data Collection

The roadways incorporated in the traffic noise prediction modeling network include the NB-HCE corridor from approximately Interchange 14 to Interchange 14A, associated ramps, and local roadways such as Firmenich Way in Newark, NJ Route 440, JFK Boulevard, Avenue C, Merritt Street, Garfield Avenue, as well as West 58th Street and West 56th Street in Bayonne and Jersey City. Figure C-1 within Appendix C: Noise details the traffic noise modeling roadway network.

A detailed noise measurement study was performed to document peak traffic noise levels within the study area. Ambient noise levels within the study area are affected by vehicular traffic traveling along the NB-HCE

corridor, NJ Route 440, associated ramps, and the local roadway network. Other mobile sources within the study area affecting ambient noise levels include rail activity associated with the Conrail freight line that parallels the NB-HCE corridor, as well as aircraft flyovers associated with EWR. The noise measurement study was performed in general accordance with the FHWA Measurement of Highway-Related Noise, Final Report (FHWA-PD-96-046). Noise levels were documented in eight locations within Newark, Bayonne, and Jersey City on Tuesday October 19, 2021, Wednesday November 17, 2021, and Wednesday March 16, 2022 (see Figure C-2 within Appendix C: Noise). Roadway construction on JFK Boulevard during the PM measurement period on Wednesday, March 16, 2022, affected two measurement locations (Sites 2A and 2D), therefore invalidating the data. However, sufficient vehicular traffic and terrain data is available to enable noise modeling of these and other sites.

All noise levels were documented using Rion NL-52 (Type 1) noise level meters set to slow response. Noise monitoring equipment was field calibrated before and after noise measurements were conducted to ensure equipment accuracy. A photo log and laboratory calibration certificates for noise meters and field calibrators are included with Appendix C.

Field noise measurement worksheets were completed to document proper meter settings, hourly on-site weather conditions, including wind speed, temperature, and relative humidity, as well as extraneous events occurring during each measurement period. Atypical noise sources such as barking dogs, car alarms, people shouting, etc., were noted within the field worksheets. In addition, time periods with other mobile sources of noise, including rail passbys and aircraft flyovers, were noted. Subsequently, raw data files were reviewed alongside field notes. To obtain existing noise levels resulting from the NB-HCE corridor and local roadway network, atypical and other transportation noise events (freight rail passbys and aircraft flyovers) were removed from the data set. Certified meteorological data for EWR was obtained from NOAA to vet on-site weather conditions and is included within Appendix C.

Several noise measurement sites were located behind the existing eastbound NB-HCE noise barrier, which stretches from approximately 350 feet west of JFK Boulevard to approximately 75 feet west of Garfield Avenue in Bayonne. Consequently, the measured sound levels at these locations reflect the effect of the existing noise barrier as a noise abatement measure. The existing noise barrier was constructed as part of the 1994 NJTA Contract No. R-1234 and ranges from approximately 14 feet to 18 feet high.

Results of the noise measurement study are summarized in Table 3.9-1 and represent peak traffic noise levels documented during AM and PM hours.

Table 3.9-1. 2021 Existing Measured Peak Noise Levels dBA (L_{eq})

Noise Measurement Site Number	Noise Measurement Site	AM Peak Noise Level (6:45 a.m. – 7:45 a.m.)	PM Peak Noise Level (4:00 p.m. – 5:00 p.m.)
1	150 Firmenich Way Newark, NJ	61	61
2A	Former Marist High School Bayonne, NJ	67	63
2B	35 Sunset Avenue Bayonne, NJ	61	NA
2C	Bayonne Towers Pool Bayonne, NJ	56	55
2D	1261 JFK Boulevard Bayonne, NJ	67	NA
3	Mercer Park Jersey City, NJ	66	63
4	114 Merritt Street Jersey City, NJ	64	66
5	West 58th Street Bayonne, NJ	64	62

Source: Paul Carpenter Associates, Inc., 2021, 2022
Key: NA = Local roadway construction invalidated measurement period

Noise measurements were performed during concurrent vehicular traffic volume classification counts at each measurement location, either through manual traffic counts or through use of Miovision cameras. Additionally, toll plaza traffic data was provided by the Authority at Interchanges 14 and 14A during noise measurement periods. Vehicular classification counts included cars and light trucks, medium trucks, heavy-duty trucks, buses, and motorcycles. Concurrent AM and PM peak period traffic counts were used to validate the project-specific noise model through comparison of AM and PM peak measured noise levels in the same locations.

3.9.2 Methodology and Criteria

3.9.2.1 Noise Fundamentals

Certain critical factors affect noise and the way it is perceived by the human ear. Such factors include the acoustical level (noise), frequency and the length of the exposure period. Sound or noise level is measured in units of decibels (dB). Due to the complex manner in which the human ear functions, measurement of different noise sources does not always correspond to relative loudness or annoyances. Therefore, different scales have been developed to furnish guidance in evaluating the importance of different noise sources. The A-weighted scale (unit expressed as dBA) is utilized almost exclusively in mobile-source vehicular noise measurement and prediction as it reflects the frequency range to which the human ear is most sensitive (1,000 to 6,000 Hertz).

As decibels are based on a logarithmic scale, doubling a noise source equates to a 3 dB increase in the sound or noise level (e.g., 60 dB + 60 dB = 63 dB). Under normal circumstances, a 3 dB change is required for the average person to detect a difference without the use of instruments. A change in 5 dB is considered to be a noticeable change. A decrease in 10 dB is perceived by the average listener as a reduction of noise by one-half, while an increase in 10 dB is discerned as a doubling of noise levels.

The A-weighted sound pressure level (expressed as dBA) can be applicable for noise levels at one single moment. As very few noise sources are constant, an alternative way of describing noise over a period of time was needed. One way of describing fluctuating sound is to address it as if the noise occurred at a steady, unchanging level over a specific time period. For this condition, the widely used descriptor accepted to express noise levels has become the dBA (L_{eq}) or an A-weighted equivalent noise level. The dBA (L_{eq}) is the equivalent steady-state sound level, which in a specific period of time, contains the same acoustic energy as the time-varying sound level during that same period. For purposes of this project, noise levels were assessed based on the dBA (L_{eq}) noise metric, as it is commonly used to assess traffic noise levels. Typical community noise levels are shown in Table 3.9-2.

Table 3.9-2. Noise Levels of Common Sources

Sound Source	Sound Pressure Level (dBA)
Air Raid Siren at 50 feet	120
Maximum Levels at Rock Concerts (Rear Seats)	110
On Platform by Passing Subway Train	100
On Sidewalk by Passing Heavy Truck or Bus	90
On Sidewalk by Typical Highway	80
On Sidewalk by Passing Automobiles with Mufflers	70
Typical Urban Area	60-70
Typical Suburban Area	50-60
Quiet Suburban Area at Night	40-50
Typical Rural Area at Night	30-40
Isolated Broadcast Studio	20
Audiometric (Hearing Testing) Booth	10
Threshold of Hearing	0

Sources: NYC MOEC 2021, Cowan 1994, Egan 1988

The Proposed Project will result in mobile sources of noise, specifically related to vehicular traffic traveling on roadways within the study area. Mobile source noise levels reduce at a rate of 3 decibels per distance doubling from the source (e.g., 70 dBA at a distance of 50 feet would reduce to approximately 67 dBA at a distance of 100 feet).

3.9.2.2 Regulatory Framework

No federal-aid highway funds are anticipated for the Proposed Project. As such, the traffic noise analysis for the Proposed Project was performed in general accordance with the Authority's traffic noise policy. Although not required from a regulatory perspective, the Authority's intent is to conduct highway traffic noise analyses in general accordance with the FHWA's standards and procedures established within 23 CFR 772 and the FHWA Highway Traffic Noise: Analysis and Abatement Guidance document. The Authority's policy is generally consistent with 23 CFR 772 and includes the consideration of FHWA Activity Categories A, B, C, and D for noise impact and abatement assessment (Table 3.9.3). The Authority's policy also adopts FHWA's Noise Abatement Criteria (NAC) for each corresponding activity category used for assessing traffic noise impacts. Therefore, the noise assessment was prepared for each of these land use categories, and mitigation was designed based on the Authority's noise barrier design criteria.

Based on field reconnaissance and review of aerial mapping, noise-sensitive land use within the study area is located east of Newark Bay and is comprised of single-, dual-, and multi-family residential structures (Activity Category B), as well as recreational areas, a school, a place of worship, and a community garden (Activity Category C) within Bayonne and Jersey City. The school within the study area would be subject to exterior NAC (Category C) as well as interior NAC (Category D). West of Newark Bay, within the City of Newark, there is no noise-sensitive land use recognized by the Authority's policy. For all residential land uses, property records were accessed via njparcels.com to confirm total number of dwelling units for classification as single-, dual-, and multi-family structures. The descriptions of land uses considered under each activity category as well as the corresponding NAC levels are summarized in Table 3.9-3.

Table 3.9-3. Noise Abatement Criteria (Hourly A-Weighted Sound Levels (dBA))

Activity Category	Threshold of Noise Interference		Evaluation Location	Description of Activity Category
	$L_{eq(h)}$	$L_{10(h)}$		
A	57	60	Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67	70	Exterior	Residential
C	67	70	Exterior	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or non-profit institutional structures, radio studies, recording studies, recreation areas, Section 4(f) sites, schools, and television studios, trails and trail crossings.
D	52	55	Interior	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.

Source: 23 CFR 772.

3.9.2.3 Criteria for Determining Impacts

Traffic noise impacts related to the Proposed Project are considered if either of the following conditions are met:

1. Predicted future traffic noise levels (dBA L_{eq}) approach within one decibel or exceed the NAC defined in Table 3.9-3.
2. Predicted future traffic noise levels exceed existing noise levels by 10 dBA L_{eq} or more, even though the applicable NAC level is not reached.

For all Activity Category B land use, locations of ground-level exterior areas of frequent human use were identified and prioritized for receptor placement, unless none existed. For single-family residential structures with both ground-level use, such as patios, backyards, stoops, etc., and elevated decks/balconies, only the ground level land use was considered for receptor placement. Alternatively, for single-family residential structures with no ground level exterior use but several elevated decks/balconies, the closest elevated outdoor use area to ground level was considered. For multi-family high-rise residential structures, priority was given to

ground-level outdoor common areas/shared spaces, unless none exists, or such areas were physically shielded or located far from the NB-HCE roadway in such a manner that precludes noise impact. In this case, priority was given to patios/balconies with clear line of sight to the NB-HCE roadway for individual dwelling units. In accordance with the Authority's policy, when considering balconies for multi-family residences, receptor placement was limited to the third floor above the maximum NB-HCE roadway grade within a 500-foot radius of the multi-family residential structure.

In accordance with the Authority's policy, the FHWA's lot size-based "equivalent number of residences" methodology was used to place receptor grids for all Activity Category C land use within the noise study area, following Option 5 for receptor grid placement.[8] For evaluating equivalent number of dwelling units, this methodology requires identifying the average residential lot size and dividing the impacted square footage of Category C land use by that average lot size. Average lot size may be determined in several ways based on FHWA guidance. For the Proposed Project, average lot size was determined based on review of the City of Bayonne Zoning Map, updated December 2020, available within Chapter 35 Zoning Regulations of the City of Bayonne Municipal Code. Category C land use within the noise study area is all located within residential zoning district R-2. Section 35-5.3 of the City of Bayonne Municipal Code requires a minimum lot size of 3,000 square feet (sf) for residential development within the R-2 zoning district. Therefore, equivalent number of residences was determined based on dividing the Category C parcel size by a minimum lot size of 3,000 sf.

Although the Woodrow Wilson School #10, located along West 57th Street, includes outdoor use areas, they are physically shielded by the school building and/or located further from the NB-HCE than highway-facing windows. Receptors were placed in the outdoor use areas to determine potential exterior impacts; however, receptors were also placed along the building façade facing the NB-HCE representing each floor with windows to predict interior noise levels. Interior noise levels were calculated by applying a building noise reduction factor of 10 dB, representative of an open window condition, to exterior predicted noise levels. This level of attenuation is recommended within the FHWA (2011) Highway Traffic Noise: Analysis and Abatement Guidance, which states that an open window condition should be assumed unless there is firm knowledge windows remain closed almost every day of the year.

The Authority's traffic noise policy also includes a provision for the consideration of undeveloped land which has received final subdivision or site plan approval or is "permitted" for development, as evidenced through issuance of a building permit, prior to the Announcement date of the project. The Authority defines "Announcement" as the date official notice is given to the public, which shall be considered the date the Board gives authorization to adopt the annual budget in which the project is listed. Undeveloped land with such approvals prior to the project Announcement shall be assigned the appropriate Activity Category and evaluated for noise impact and mitigation, as necessary. Alternatively, to prevent future traffic noise impacts, the Authority shall inform local officials with an estimate of the distance to the future 66 dBA L_{eq} noise impact level for undeveloped lands without such approvals. Undeveloped land within the noise study area consists of a parcel on the east side of JFK Boulevard in Bayonne, south of the NB-HCE roadway at 1248-1254 JFK Boulevard (Block 17, Lot 1). The City of Bayonne was contacted to confirm that there are no active permits on file for this parcel. Therefore, the parcel was not assigned an Activity Category. However, a receptor grid was modeled to determine the location of the 66 dBA L_{eq} noise contour. Additionally, a developer purchased the former Marist High School property and commenced demolition of the main school building and ancillary structures in the second quarter of 2022. While redevelopment plans indicate intent to construct on the property in the future, there are no known current subdivision or site plan approvals for the property demonstrating a firm commitment to construct. Under the Proposed Project, the Authority would acquire the property to address stormwater management requirements contractor lay down areas and future maintenance needs. Use

[8] FHWA, Calculating and Placing Non-Residential Receptors (NRRs), Methodology: Lot Size, FHWA-HEP-17-056, https://www.fhwa.dot.gov/Environment/noise/resources/fhwahep17056.pdf

of the property under the Proposed Project would therefore not be considered noise-sensitive and was not included as part of the noise study.

3.9.2.4 Noise Modeling

All noise modeling was performed utilizing the FHWA Traffic Noise Model Version 2.5 (TNM2.5), which predicts noise levels in the vicinity of highways.

It should also be noted that the noise measurements described in Section 3.9.1 were conducted during the ongoing COVID-19 pandemic. As aforementioned, concurrent traffic counts during noise measurements were necessary to validate the project-specific noise model. However, existing conditions were modeled based on adjusted pre-pandemic traffic data. Specifically, to address any noise and/or traffic disparities caused by the pandemic, origin-and-destination toll plaza transactions from the NJ Turnpike system were analyzed for years 2019, 2020 and 2021 (as of October) for NB-HCE segments between Interchanges 14 and 14A, Interchanges 14A and 14B, and Interchange 14C. Traffic volumes, based on hourly volume profiles, were used to compare 2021 traffic volumes with pre-COVID-19 volumes collected in 2019. Based on this comparison, existing 2021 volumes were adjusted to reflect "typical" traffic conditions for 2021 without the oddity of the pandemic and subsequently were used to predict existing year noise levels at all noise-sensitive sites within the project study area.

TNM2.5 model inputs include roadway geometry, travel volumes and speeds, and areas of shielding due to building rows or natural terrain features. The project-specific TNM2.5 model was considered valid for use in predicting noise levels at additional noise-sensitive receivers within the study area when the differences between measured and modeled levels were less than 3 dB. This is important to note as a 3 dB difference is the lowest change in noise levels that the general public can detect without the use of instruments.

After validation of the project-specific TNM2.5 model at the measurement locations listed within Table 3.9-1, additional receptors were included within the model, representing all noise-sensitive land use in the project study area described above, consistent with Table 3.9.3.

Projected hourly volumes and posted speed limits were utilized within the validated project-specific TNM.5 model to predict No Action Alternative and Proposed Project noise levels within the noise study area. Future year 2050 traffic volumes were determined using projected background growth rates from the NJRTM-E, which incorporates socioeconomic data from the latest NJTPA demographic projections as well as development and redevelopment information obtained from the Jersey City Open Data Portal. The project-specific TNM2.5 model was developed with the following information:

1. Electronic design plans and elevation contours.
2. NJRTM-E traffic volumes and speed limits.
3. Land use identified from field observations and aerial maps.
4. Noise measurement study results.

Additional TNM2.5 model inputs included terrain lines to define significant changes in elevation, as well as locations and heights of rows of buildings that may block line of sight between the highway noise sources and modeled noise-sensitive receptors. The No Action Alternative noise prediction model also included the 14- to 18-foot-high existing noise barrier along the eastbound NB-HCE roadway in Bayonne from approximately 350 feet west of JFK Boulevard to approximately 75 feet west of Garfield Avenue. As part of the Proposed Project, the existing eastbound NB-HCE noise barrier will be removed and replaced. Noise levels under the Proposed Project were evaluated without the noise barrier, and a new wall was investigated to determine length and height requirements to mitigate impacts predicted under the Proposed Project.

3.9.3 Existing Conditions

Using the noise level prediction methodology detailed herein and 2021 existing traffic data adjusted for the COVID-19 pandemic, 30 dual-family residential structures currently experience noise levels that approach (defined by the Authority as being within one decibel of the NAC) or exceed the Activity Category B NAC (67 dBA L_{eq}), equating to 60 residential dwelling units. These residential dwellings are located along JFK Boulevard and West 57th Street, south of the NB-HCE corridor. A portion of Mercer Park, located along JFK Boulevard north of both the NB-HCE and NJ Route 440 corridors, currently experiences noise levels that approach or exceed the Activity Category C NAC (67 dBA L_{eq}). This includes the football field and walking trail that follows JFK Boulevard on the west side of the park (approximately 93,976 sf). Using FHWA's "Equivalent Number of Residences" method, the portion of Mercer Park which currently approaches or exceeds the Activity Category C NAC equates to approximately 32 residential dwelling units. Additionally, fourth floor interior noise levels at the Woodrow Wilson School #10 eastern building, located along West 57th Street, currently approach or exceed the Activity Category D NAC (52 dBA L_{eq}). Without access to school building floor plans, it was assumed the impacted receptors represent three highway-facing classrooms.

3.9.4 No Action Alternative

Under the No Action Alternative, that is, the future 2050 No Build Alternative, the Proposed Project would not be constructed. As such, all NB-HCE roadway geometry would remain the same as under the 2021 Existing Condition. Traffic volumes would increase due to background traffic growth, which was projected to be approximately 8 percent on the NB-HCE corridor relative to the 2021 Existing Condition, during AM and PM peak traffic hours. However, no specific future developments with final subdivision or site plan approvals were identified within the study area. Therefore, all land use and receptors were modeled the same as under the 2021 Existing Condition.

Based on noise prediction modeling, No Action Alternative noise levels would approach or exceed the Activity Category B NAC of 67 dBA (L_{eq}) at 32 dual-family residential structures, equating to 64 dwelling units. These residential structures are located along JFK Boulevard and West 57th Street, south of the NB-HCE roadway, and along Merritt Street at one dual-family residential structure within the Jersey City Housing Authority Curries Woods neighborhood near the corner of Old Bergen Road and Merritt Street. In addition, noise levels would approach or exceed the Activity Category C NAC at a portion of Mercer Park within the football field and along the walking trail that parallels JFK Boulevard (approximately 129,217 sf), equating to approximately 44 residential dwelling units. Fourth floor interior noise levels at the Woodrow Wilson School #10 eastern building, located along West 57th Street, are predicted to approach or exceed the Activity Category D NAC (52 dBA L_{eq}). Without access to school building floor plans, it was assumed the impacted receptors represent three highway-facing classrooms.

It is important to note that demolition of the former Marist High School building by the developer who purchased the property commenced in the second quarter of 2022. As previously discussed, while there are redevelopment plans indicating intent to construct on the property in the future, there are no known currently active final subdivision or site plan approvals demonstrating a definite commitment to build. Therefore, the property was assumed to remain undeveloped under the No Action Alternative. Building demolition removed the shielding from the NB-HCE roadway for several dual-family residences located on Sunset Avenue as well as the Bayonne Towers pool to the south. Under the No Action Alternative, predicted noise levels would not approach or exceed the Activity Category B NAC of 67 dBA (L_{eq}) at any of these residences; however, noise levels for Sunset Avenue structures and the Bayonne Towers pool that were previously shielded by the Marist High School building are predicted to increase by 3 to 11 decibels under the No Action Alternative. A noise level increase of 3 dBA is generally "perceptible" to the average healthy human ear, while an increase of 10 dBA is perceived as a doubling of sound. No Action Alternative noise impacts are presented in Figure C-3 within Appendix C: Noise.

3.9.5 Proposed Project

3.9.5.1 Proposed Project Roadway Traffic Noise Impacts

In the future with the Proposed Project, the NB-HCE roadway will be widened to four lanes in each direction,. Traffic volumes were projected to increase by approximately 32 percent on the NB-HCE, relative to the 2021 Existing Condition, during AM and PM peak traffic hours. The effect of the Proposed Project on traffic volumes on other roadways was estimated using the NJTRE-e model with Proposed Project improvements.

Based on noise prediction modeling, noise levels in the future with the Proposed Project would approach or exceed the Activity Category B NAC of 67 dBA (L_{eq}) at 32 single-family, 67 dual-family, and four multi-family residential structures within the noise study area, equating to 179 total dwelling units. Noise levels would approach or exceed the Activity Category C NAC of 67 dBA (L_{eq}) within a portion of Mercer Park (approximately 164,458 sf), equating to 56 total dwelling units. Interior noise levels would approach or exceed the Activity Category D NAC (52 dBA L_{eq}) at the Woodrow Wilson School #10, including all three classroom floors of the east building and the second and third floors of the west school building. Without access to school building floor plans, it was assumed the impacted receptors represent 13 highway-facing classrooms.

Noise impacts in the future with the Proposed Project are illustrated on Figure C-4 within Appendix C: Noise. A summary of receptors predicted to approach or exceed the applicable NAC under the 2021 Existing Condition, as well as impacts predicted under the No Action Alternative and in the future with the Proposed Project are presented in Table 3.9-4.

Table 3.9-4. Summary of Impacts, 2021 Existing, 2050 No Action, and 2050 Proposed Project

Sensitive Site	2021 Existing	2050 No Action Alternative	2050 Proposed Project Alternative[1]	Noise Level Change (dBA L_{eq})	
				Existing to Proposed Project	No Action to Proposed Project
Activity Category B Structures (Residential Dwelling Unit)	30 (60)	32 (64)	103 (179)	0.4 to 16.9	-0.3 to 16.5
Activity Category C (Equivalent Dwelling Unit)	1 (32)	1 (44)	1 (56)	0.6 to 7.2	0.0 to 5.5
Activity Category D (School)	1 (3)[2]	1 (3)	1 (13)	4.2 to 8.5	3.2 to 7.3

Source: Paul Carpenter Associates, Inc. 2022.

Notes:

[1] 2050 Proposed Project noise levels assume NB-HCE eastbound existing noise wall is removed as a result of the project.

[2] (#) represents total number of assumed highway-facing classrooms with predicted interior noise impact based on a building noise reduction factor of 10 dBA for a windows open condition, in accordance with FHWA guidance.

South of the NB-HCE. As the existing noise barrier would need to be removed to accommodate the proposed widening, the Proposed Project reflects noise levels predicted without a noise barrier. The Authority is committed to replacing the noise barrier, and the proposed noise barrier design is detailed within Section 3.9.5.2, Traffic Noise Mitigation. Predicted traffic noise impacts south of the NB-HCE roadway are primarily located

along JFK Boulevard, West 56th, West 57th Street, and West 58th Streets, where the existing noise barrier required removal to accommodate the NB-HCE widening. Additional impacted residential structures include one fourth-floor and one fifth-floor balconies at the Liberty Bay Club multi-family residential structure. Impact to the Liberty Bay Club is likely resulting from a combination of traffic changes on NJ Route 440 as well as changes to the NB-HCE corridor as a result of the Proposed Project. The predicted interior impact would occur at the Woodrow Wilson School #10, located along West 57th Street.

Based on the Authority's second impact criterion, four dual-family residential structures on Sunset Avenue, equating to eight dwelling units, were predicted to experience a noise level increase of 10 dBA or greater under the Proposed Project, relative to 2021 Existing Condition noise levels. Noise levels were predicted to increase by more than 10 dBA under the No Action Alternative due to the removal of shielding provided by the Marist High School building and associated ancillary structures. In the future with the Proposed Project, noise levels on Sunset Avenue would increase by only one decibel, relative to the No Action Alternative, which is not perceivable.

North of the NB-HCE. North of NB-HCE roadway, Activity Category B impacts are located along Merritt Street within the Jersey City Housing Authority Curries Woods neighborhood and on Garfield Avenue. In addition, the Activity Category C NAC would be exceeded at Mercer Park within the football field and along the walking trail that parallels JFK Boulevard (approximately 164,458 sf), equating to 56 residential dwelling units.

Undeveloped Land. In an effort to prevent future traffic noise impacts on undeveloped land, the Authority, under its traffic noise policy, informs local officials of the distance to the future 66 dBA L_{eq} noise level. As discussed within Section 3.9.2.3, one undeveloped parcel on the east side of JFK Boulevard in Bayonne, south of the NB-HCE roadway, was identified at 1248-1254 JFK Boulevard (Block 17, Lot 1). The City of Bayonne was contacted to confirm that there are no active permits on file for this parcel. Therefore, a receptor grid was modeled on this parcel to determine the distance at which noise levels would be 66 dBA L_{eq} under the future with the Proposed Project. Based on Proposed Project modeling, noise levels would reach 66 dBA L_{eq} up to 87 feet from JFK Boulevard. Beyond this distance, noise levels would be below impact criteria.

3.9.5.2 Traffic Noise Mitigation

The Authority primarily considers noise barriers for traffic noise abatement, although other abatement alternatives detailed within 23 CFR 772.15(c) may be investigated on a project-by-project basis, as appropriate. These additional measures include traffic management measures, alteration of horizontal and vertical alignments, acquisition of property, and noise insulation. These measures were not considered for the Proposed Project because the proposed noise barrier is effective as a noise abatement measure.

Noise barriers are effective means of mitigating noise impacts adjacent to roadways. Several areas of impact were identified through noise modeling of the Proposed Project; however, many factors must be considered before noise barriers can be proposed as part of the project. These factors include both acoustic and engineering feasibility as well as the cost per benefited residence. Acoustic feasibility deals with the level of noise reduction attained while engineering feasibility is reviewed to identify potential obstacles that preclude the construction of an effective noise barrier (e.g., drainage, safety or maintenance requirements, topography of a location).

Noise barriers were evaluated to mitigate traffic noise impacts throughout the project study area. All noise barriers were examined in accordance with the Authority's traffic noise policy. Utilizing a construction cost of $70/sf, the Authority will consider a cost of up to $50,000 per benefited residence for a new noise barrier. An 18-foot maximum noise barrier height has been established under this policy.

A "benefited residence" (primary benefit) is an impacted receptor that results in at least a 5 dBA L_{eq} noise level reduction with a noise barrier. A "supplemental benefit" is a receptor that results in at least a 5 dBA L_{eq} noise

level reduction but is not predicted to experience Proposed Project noise levels above the NAC before mitigation. Supplemental benefits are assigned one-half credit in the total benefits tally. In accordance with the Authority's policy, the minimum reduction to be achieved for any noise barrier is 5 dBA to at least 50 percent of first row impacted receptors, which is consistent with 23 CFR 772. As explained by FHWA (2011) guidance, the purpose of establishing a minimum required noise level reduction of 5 dBA from a noise barrier is to ensure the noise barrier achieves at least a discernible level of noise reduction. The noise barrier design goal stated within the policy is to achieve a 7 dBA noise level reduction to at least 50 percent of first row receptors, regardless of whether they are impacted, and a 10 dBA reduction at any receptor, whether impacted or non-impacted and regardless of location (i.e., the receptor achieving 10 dBA noise level reduction does not have to be located within the first row).

It should be noted that impacted receptors can benefit from a noise barrier but remain impacted. If the noise barrier meets all necessary design and cost criteria, the noise barrier would still be recommended for construction. As detailed within FHWA guidance, the NAC, which the Authority has adopted for FHWA Activity Categories A through D, are not considered design goals. The goal of the design criteria is to ensure noise mitigation provides, at a minimum, a discernible level of noise reduction for impacted receptors (i.e., 5 dBA or greater is generally regarded as a noticeable/discernible change in noise levels), however, with a goal of achieving higher noise level reductions. Noise barriers that achieve less than 5 dBA noise level reductions are not recommended for construction because they do not effectively mitigate traffic noise levels.

Noise barrier investigations for each noise impact area examined based on the previously mentioned impact criteria are described below.

South of the NB-HCE– The existing noise barrier along the eastbound shoulder of the NB-HCE roadway will need to be removed to accommodate the proposed widening. The Authority is committed to replacing the impacted existing noise barrier to mitigate future noise impacts predicted under the Proposed Project. A noise barrier was thereby evaluated along the widened eastbound NB-HCE shoulder at a uniform height of 18 feet (i.e., the maximum allowable height under the Authority's policy), from just east of where the NB-HCE roadway crosses over NJ Route 440 to approximately 75 feet west of Garfield Avenue. The eastern terminus is approximately the same as the existing noise barrier's eastern terminus; however, the western terminus was extended approximately 556 feet west. The western extension was evaluated to mitigate Proposed Project noise impacts predicted at three dual-family residential structures on West 57th Street, adjacent to the former Marist High School property, and noise impacts predicted at four dual-family residential structures on Sunset Avenue meeting the Authority's second impact criterion (i.e., 10 dBA or greater increase in noise levels under the Proposed Project, relative to existing noise levels). The western extension was also evaluated to mitigate noise impacts predicted at one fourth floor and three fifth floor balconies at the Liberty Bay Club, south of NJ Route 440.

A noise barrier 18 feet in height and approximately 2,990 feet in length along the widened eastbound shoulder of the NB-HCE roadway would provide 116 primary benefits and 46 supplemental benefits, for a total of 139 benefits. At a unit cost of $70/sf, the total cost of the noise barrier would be approximately $3,769,640, equating to $27,120 per benefit ($3,769,640/139 = $27,120). Out of 79 first-row impacts, 77 would benefit, equating to approximately 97 percent ([77/79]*100 = 97%); therefore, the noise barrier meets the Authority's acoustic feasibility requirement of achieving a minimum 5 dBA reduction to at least 50 percent of first row impacted receptors. Further, out of 85 first row receptors (including impacted and non-impacted), the noise barrier achieves a 7 dBA noise level reduction at 62 first row receptors, equating to approximately 73 percent ([62/85]*100 = 73%). The noise barrier would provide noise level reductions ranging from 1 to 16 dBA; therefore, the noise barrier achieves both design goals established under the Authority's policy. The noise barrier would mitigate traffic noise impacts at 32 single-, 35 dual-, and seven multi-family residential structures, and seven highway-facing classrooms at Woodrow Wilson School #10 (both east and west buildings), equating to 124 total dwelling units mitigated. Remaining impacts would total 29 dual-family structures (58 dwelling units) on JFK Boulevard and one school on West 57th Street (interior noise impact at Woodrow Wilson School

#10, east building). Without access to school building floor plans, it was assumed the remaining impacted receptors represent six highway-facing classrooms. The noise barrier worksheet is included within Appendix C: Noise.

While impacted dual-family residences on JFK Boulevard benefit within their backyard outdoor use areas, their front stoop outdoor use areas cannot be effectively mitigated and do not receive benefit from a noise barrier on the NB-HCE roadway due to vehicular traffic on JFK Boulevard. In other words, the noise wall does not achieve a 5 dBA reduction at any front exterior use areas along JFK Boulevard. Placing a noise barrier on JFK Boulevard to reduce noise levels within these front exterior use areas would not be feasible due to engineering constraints, and effectiveness would be substantially degraded because the wall would have several gaps to maintain access to residential driveways and other local connecting roadways. Interior impacts predicted at the Woodrow Wilson School #10 on West 57th Street are within the eastern portion of the school building only. It is recommended that under Final Design, a Building Noise Attenuation study be performed to determine actual building noise reduction factors and availability of central or window air conditioning units that would allow windows to remain closed and thereby mitigate traffic noise impacts. Although not all impacts can be effectively mitigated, this noise barrier is cost-effective, per the Authority's policy, meets all noise barrier design criteria established under the policy, and the Authority is committed to replacing the noise barrier and mitigating noise impacts to environmental justice communities south of the NB-HCE corridor that are predicted under the Proposed Project. As such, this noise barrier is recommended for further consideration under Final Design, at which time height and length will be refined based on Final Design horizontal and vertical roadway geometry. The recommended noise barrier and remaining traffic noise impacts are illustrated on Figure C-5 within Appendix C: Noise.

North of the NB-HCE– To mitigate predicted impacts under the Proposed Project to Mercer Park, two dual-family residences on Merritt Street that are part of the Jersey City Housing Authority's Curries Woods neighborhood, and one dual-family residence on Garfield Avenue, a potential three-part noise barrier "system" was evaluated along the westbound shoulder of the widened NB-HCE roadway. Due to the Interchange 14A toll plaza on- and off-ramps (Ramp TW and Ramp ET, respectively) and elevation decreases along those ramps, relative to the NB-HCE, three overlapping noise barriers were investigated on the westbound NB-HCE at the maximum allowable uniform height of 18 feet. The three-part noise barrier "system" was modeled from approximately where the NB-HCE roadway crosses NJ Route 440 to the west to approximately where the NB-HCE roadway crosses the New Jersey Transit Hudson-Bergen Light Rail and Conrail tracks to the east.

The three-part potential noise barrier "system" totals approximately 4,412 feet in length and would provide a noise level reduction ranging from 0 to 5 dBA. Out of 62 total impacts, which includes the 56 equivalent dwelling units calculated for the impacted portion of Mercer Park and three dual-family residential structures (six total dwelling units) on Merritt Street and Garfield Avenue, none would benefit from the noise barrier. In other words, none of the impacted receptors that the noise wall is intended to mitigate would achieve the minimum required noise level reduction of 5 dBA. Noise level reductions within Mercer Park would be barely perceptible, ranging from 2 to 4 dBA. Noise levels on Merritt Street and on Garfield Avenue at the three dual-family residential structures (6 dwelling units) would be reduced by a maximum of 1 dBA or less, which is well below the ability of the human ear to perceive a difference in noise level. A total of three supplemental benefits would result from this potential three-part noise barrier "system" within the western section of the Jersey City Housing Authority's Curries Woods neighborhood on Ruby Brown Place. In other words, non-impacted receptors behind the potential noise wall would achieve 5 dBA noise level reductions. As the three-part noise barrier "system" would not provide benefit to any of the impacted receptors as intended because it would not yield the minimum required noise level reduction of 5 dBA at impacted receptors, the three-part noise barrier "system" is not a recommended mitigation measure.

3.9.5.3 Information for Local Officials

To prevent future traffic noise impacts on undeveloped land, the Authority, under its traffic noise policy, is required to inform local officials of the distance to the future 66 dBA L_{eq} noise level. As discussed within Section 3.9.2.3, one undeveloped parcel on the east side of JFK Boulevard in Bayonne, south of the NB-HCE roadway, was identified at 1248-1254 JFK Boulevard (Block 17, Lot 1). The City of Bayonne was contacted to confirm that there are no active permits on file for this parcel. Therefore, a receptor grid was modeled on this parcel to determine the distance at which noise levels would be 66 dBA L_{eq} in the future with the Proposed Project. Based on Proposed Project modeling, noise levels would reach 66 dBA L_{eq} up to 87 feet from JFK Boulevard. Beyond this distance, noise levels would be below impact criteria.

3.9.5.4 Construction Noise

Noise-sensitive receivers within project limits will experience an increase in noise levels during construction activities. Typical construction activities, such as roadway deck demolition, bridge repairs and milling/paving are known to produce high noise levels. Equipment such as, but not limited to hoe rams, jackhammers, impact pile drivers, rivet removers, concrete trucks, scarifiers, paving machines, backhoes, and dump trucks, may be utilized. Resultant noise levels can range between approximately 70 to 90 dBA at noise-sensitive sites.

Example construction equipment and resultant noise levels at a reference distance of 50 feet are shown in Table 3.9-5.

Table 3.9-5. Construction-Related Noise Levels at 50 feet

Equipment Type	Noise Level (dBA L_{max})
Mounted Impact Hammer (hoe ram)	90
Jackhammer	85
Rivet Buster/Chipping Gun	85
Impact Pile Driver	95
Pavement Scarafier	85
Concrete Mixer	85
Crane	85
Front Loader	79
Backhoe	80
Dump Truck	84

Source: FHWA Roadway Construction Noise Model User's Guide, Table 1.

For construction activities, standard specifications to be considered for inclusion in the proposed construction contract documents may include the following:

- All construction equipment powered by an internal combustion engine shall be equipped with a properly maintained muffler.
- Air compressors shall meet current EPA noise emission exhaust standards.
- Air powered equipment shall be fitted with pneumatic exhaust silencers.
- Stationary equipment powered by an internal combustion engine shall not be operated within 150 feet of noise-sensitive areas without portable noise barriers placed between the equipment and noise-sensitive sites. Portable noise barriers shall be constructed of plywood or tongue and groove boards with a noise absorbent treatment on the interior surface (facing the equipment).
- Powered construction equipment shall not be operated before 8:00 a.m. or after 8:00 p.m. within 150 feet of a noise-sensitive site.

3.9.6 Conclusion

Based on the preceding assessment, the Proposed Project will have adverse impacts to noise at several receptors. However, with implementation of proposed noise walls those impacts will be mitigated to the maximum extent practicable such that they would not be considered significant impacts.

3.10 Hazardous Materials and Contaminated Sites

3.10.1 Study Area Definition and Data Collection

Potential sources of hazardous materials and contaminated sites resulting from previous or existing uses were identified for the NB-HCE corridor between Interchanges 14 and 14A, with a particular focus on areas within 250 feet on either side of preliminary project limits of disturbance, through a Hazardous Waste Survey Technical Environmental Study Report (Dresdner Robin 2022) (Appendix D: Hazardous Materials). The purpose of the hazardous waste survey was to assess whether the soil or shallow groundwater that will be disturbed by project construction activities could contain hazardous waste or other contaminated materials requiring special handling or disposal.

3.10.2 Methodology and Criteria

The hazardous waste survey identified areas of potential environmental concern within and near the study area using a three-step process. The first step included a comprehensive review of relevant environmental information obtained through communications with appropriate local, county, state, and federal regulatory agencies. The starting point involved a review of NJDEP Site Remediation Profile and the NJDEP Site Remediation Program (SRP) GIS data via the NJDEP (2021a) NJ-GeoWeb website. Datasets and databases reviewed included but were not limited to: (1) Known Contaminated Site List, which are sites in the NJDEP SRP with confirmed or suspected contamination; (2) Deed Notice Areas, which are properties with deed notices due to contamination filed with the county where they are located; (3) Classification Exception Areas (CEAs) and Well Restriction Areas, which are sites with groundwater contamination with institutional controls to provide notice that groundwater contamination is present; (4) Chromate Waste Site Boundaries, which are properties in Hudson and Essex counties that currently have or previously had chromate processing waste levels above federal standards; (5) New Jersey Environmental Management System, which is the overarching database identifying sites regulated by NJDEP under one or more regulatory permitting or enforcement programs; (6) Underground Storage Tank Facilities, which are sites with effective, expired, pending, duplicate or terminated underground storage tank (UST) registration; and (7) Historic Fill, which delineates the extent of non-indigenous material deposited to raise the elevation or change the grade of a property. SRP interests intersecting the study area were identified and reviewed further at NJDEP (2016) DEP DataMiner. Additional data provided by DEP DataMiner include the "Case Tracking Tool," which provides the schedule of site regulatory milestones, and "Site Remediation Program Site Detail," which provides details for current and historic activities at a site subject to the NJDEP SRP. A commercially available database search service, Environmental Data Resources, Inc. (EDR), was also consulted to identify contaminated properties or properties with hazardous waste interests. To capture relevant sites within 250 feet of the preliminary project limits, the buffer for the EDR database review was extended an additional 250 feet for a total of 500 feet. The database search compiled information from numerous federal and state environmental databases. Federal databases include but are not limited to the National Priority List, Superfund Enterprise Management System, and Resource Conservation Recovery Act Hazardous Waste Large, Small, and Very Small Quantity Generators databases. State databases include but are not limited to the New Jersey State Hazardous Waste Site (i.e., Known Contaminated Sites in New Jersey) database, New Jersey Leaking Underground Storage Tanks (i.e., UST Active Remediations database), and New Jersey Release (i.e., the Hazardous Material Incident Database).

The second step of the process consisted of a review of sources of historic property information, including aerial photographs extending back to 1930, Sanborn Fire Insurance Maps for the years 1885 to 1979, Hopkins Maps from the late nineteenth and early twentieth centuries, and other historic maps of the study area. The

sources of historic information were acquired through a commercial source, EDR, as well as historic map libraries, and online sources. Historic land use information was reviewed to assess whether historic land uses might have contributed to contamination within the study area.

The third step consisted of a "limited" site reconnaissance, including photo documentation, to identify areas of potential environmental concern that may adversely impact the Proposed Project. Field surveyors identified and described: (1) current land uses and operations within the study area; (2) potentially contaminated sites, based on observed conditions; and (3) properties with underground or above-ground storage tanks. Properties were visually inspected from the property boundaries and did not include inspection of the interior of any buildings. The site reconnaissance was conducted by Dresdner Robin on 15 days between May 2021 and July 2022.

In addition, the NJDEP Regional Enforcement Office (Hazardous Waste and Water Resources) and appropriate EPA Region II Office were contacted to determine if any actions or complaints have been filed against businesses within the study area. Information about UST properties undergoing groundwater monitoring was also sought from the NJDEP Division of Waste Enforcement, Pesticides and Release Prevention, Bureau of Underground Storage Tanks, which has information on the presence of groundwater monitoring wells. NJDEP file reviews were performed on Known Contaminated Site properties that potentially intersect or are located directly adjacent to the study area. Information was gathered from appropriate agencies on any recent or pending hazardous waste incidents. Lastly, Open Public Record Access requests were submitted to the NJDEP, Essex Regional Health Commission, Hudson Regional Health Commission, City of Newark, City of Bayonne, and City of Jersey City.

The assessment of potential impacts and measures for addressing contaminated sites and other sources of hazardous materials identified as having the greatest potential to affect construction of the project were identified through analysis of the potential for disturbing or encountering contamination. All sites identified in the Hazardous Waste Survey Technical Environmental Study Report were reviewed, with particular emphasis given to sites identified as potential environmental constraints to construction because of contamination. The proximity of these sites under the Proposed Project alternative was identified by overlaying the site property boundaries on the project preliminary limits of disturbance using GIS software. The degree of potential impact was assessed based on the severity of contamination and the proximity of the site/contamination source to the preliminary project limits; the history of site operations (current/former) and remedial activities; and the existence of engineering/institutional controls or interim remedial measures at the site.

Analysis of potential impacts related to contaminated materials that could result under the Proposed Project alternative considered the potential for encountering contaminated soil and groundwater and other hazardous materials during construction. Contaminated soils, sediments, and groundwater are likely to be disturbed during subsurface construction. The type of contaminants encountered, and the impacts of the contaminated materials will largely be dependent on the level of disturbance, or extent of excavation required for specific construction activities. Mitigation measures are also discussed to identify means of avoiding potential impacts to human health and the environment during construction, as well as after the project is completed and operational.

3.10.3 Existing Conditions

Numerous contaminated sites were previously identified in and near the study area (Figures 3.10-1a and 3.10-1b). The contamination is generally due to extensive past and present industrial and manufacturing activities in the area surrounding the project. Sites include chromate sites, Superfund site-related issues, and presence of contaminated historic fill. There are no identified brownfield redevelopment areas in or near the study area.

From the larger group of contaminated sites, 22 sites in and near the study area identified as areas of potential environmental concern. These sites are identified in Table 3.10-1.

Table 3.10-1. Areas of Potential Environmental Concern

Name	Property Owner	Block	Lot	Address	City	Preferred ID Number
Interchange 14 Toll Plaza	New Jersey Turnpike Authority	Adjacent to 5084.01	24	NB-HCE	Newark	013187
Pierson's Creek NPL	Troy Chemical	5084	82.01 & 102	1 Avenue L	Newark	G000001344
New Jersey Turnpike Authority Maintenance District 7	City of Newark	5084.01	24	NB-HCE	Newark	013186
T & J Landfill	Port Street Redevelopment Corp.	5084	82.01	70 Port St.	Newark	G000000428
NB-HCE Under "NH" Ramp @ Interchange 14 (Mystic Bulk Carriers)	New Jersey Turnpike Authority	5084	102	NB-HCE under ramp at Interchange 14	Newark	G000039090
Colonial Pipeline	Colonial Pipeline	5078.04	84	984 Doremus Ave.	Newark	G000031911
BP Marine Americas	City of Newark	5078.01	15	350 Coastal St.	Newark	012499
Hudson County Chromate Site 148	City of Newark	5078.01	15	350 Coastal St.	Newark	G000008764
Distribution Center at 888 Doremus Ave	Salson Logistics	5078	60 & 60.1	888 Doremus Ave	Newark	000933
Chem – Fleur Inc.	Chem-fleur Urban Renewal Corp	5078	90	150 Firmenich Way	Newark	208649
Newark Bay Study Area	City of Newark	Newark Bay	91	Newark Bay	Newark	332812
Hudson County Chromate Site 144	New Jersey Turnpike Authority	Block 13, Lots 1, 15, 16 and 18; Block 11, Lots 1 and 2; Block 19, Lot 1; Block 22, Lot 1; Block 23, Lot 19; Block 32, Lot 21; Block 37, Lot 1; Block 42, Lots 1 and 30; Block 48, Lot 1; Block 50, Lot 1; Block 74, Lot 1; and Block 8, Lots 3 and 5		W 48th St. & NB-HCE	Bayonne	G000008760

Name	Property Owner	Block	Lot	Address	City	Preferred ID Number
Marist High School	1241 John F. Kennedy Boulevard IPX, LLC	13	1, 15, 16 & 18	1241 Kennedy Blvd.	Bayonne	020638
161 West 57th Street	Private Individuals	13	3	161 West 57th Street	Bayonne	11-09-16-1333-18
1144 Avenue C	Ivory, J & F & J Pellitteri	27	3	1144 Avenue C	Bayonne	019196 & 032771
Bowling Alley Property	One Garfield LLC	28; 30203	4&5; 4	1-17 West 55th Street & 1 Garfield Ave.	Bayonne & Jersey City	NA
PSE&G Greenville Substation	Public Service Electric & Gas Co.	30302	2	41 Garfield Ave.	Jersey City	585211269
IMTT Bayonne Curries Yard		30305	2 to 6	Former Morris Canal	Jersey City	794826 & 002552
Jersey City Municipal Service Center	City of Jersey City	30305	23-36, 29 & 30	13-15 E. Linden Avenue	Jersey City	591925
Rapid Industrial Plastics	City of Jersey City	30305	30	13-15 E. Linden Avenue	Jersey City	010540
Hudson County Chromate Site 21	Consolidated Rail Corp.	30306	4&5	NB-HCE at Pier 20 & 21	Jersey City	G000008649
101 Linden Avenue East	A-B PP Holdings For Jersey City, LLC	27401	29&30	101 Linden Ave. E	Jersey City	835978

Note: Bold font indicates known contaminated sites identified as potential environmental constraints to project construction.
Source: Dresdner Robin (2022)

Figure 3.10-1a. Hazardous Materials and Contaminated Sites – Newark

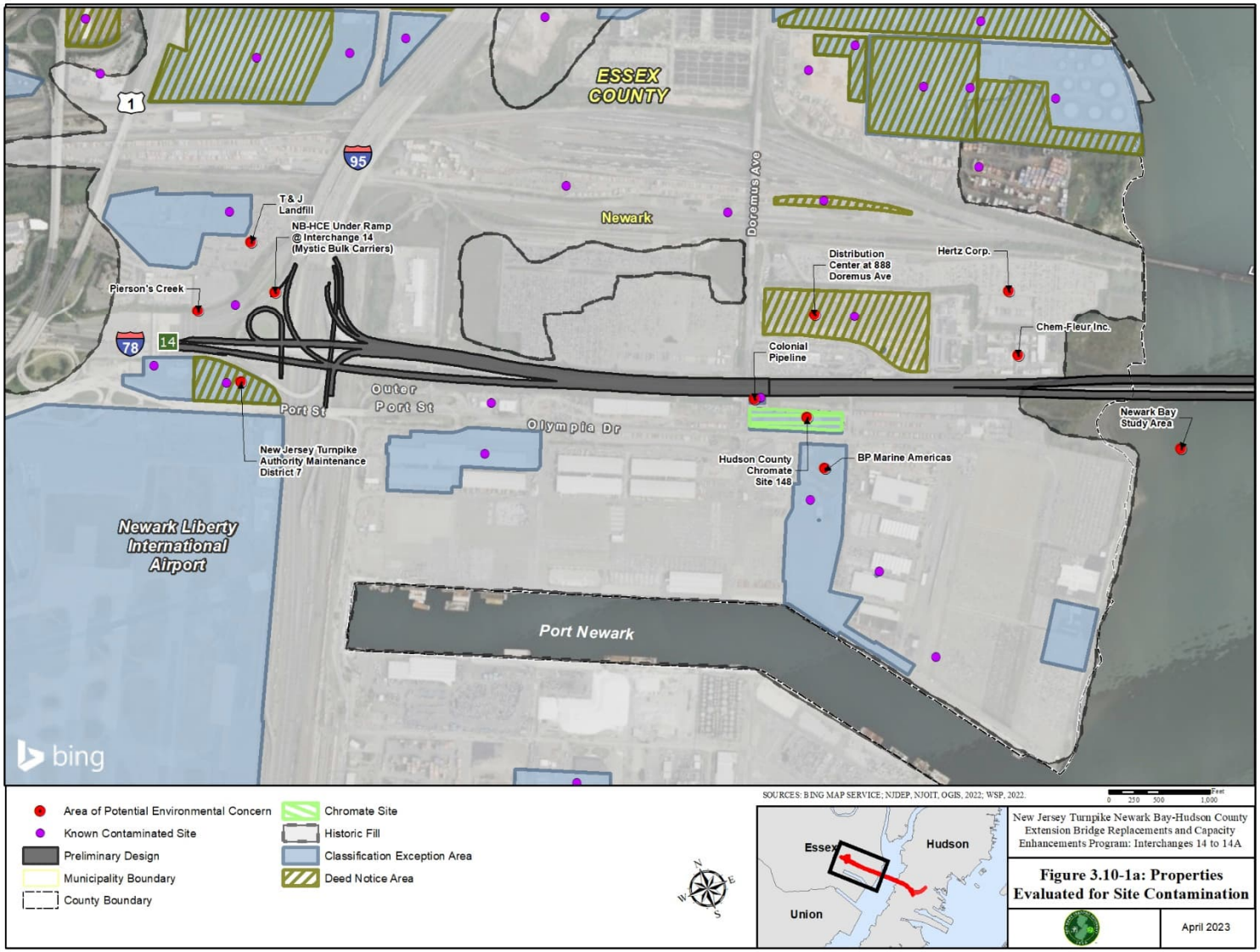


Figure 3.10-1b. Hazardous Materials and Contaminated Sites – Bayonne and Jersey City

Based on evaluation of such factors as the proximity to the project limits of disturbance, 14 of the sites are identified as environmental constraints potentially affecting the project's construction. These sites are indicated in bold in the table and are summarized from west to east in the following paragraphs. More detail regarding each of these sites can be found in the Hazardous Waste Survey Technical Environmental Study Report (Appendix D: Hazardous Materials).

Interchange 14 Toll Plaza – This site has contaminated soil due to a leaking UST that was removed in 1985 and historic fill. Remedial actions for soil contaminated with total petroleum hydrocarbons, polycyclic aromatic hydrocarbons (PAHs), metals, and extractable petroleum hydrocarbons have been undertaken. A Notice in Lieu of a Deed Notice with engineering controls for PAHs and metals was issued on April 15, 2019.

New Jersey Turnpike Authority Maintenance District 7 – This site has contamination related to fuel storage; remediation is largely complete. Seven USTs were removed between 1990 and 1993. Investigations of the USTs were conducted from 1990 to 1996 and remedial investigations and product recovery were conducted from 2006 to 2013 as documented in a remedial investigation report dated March 2014. A Notice in Lieu of a Deed Notice was established on September 13, 2017, to address site-wide historic fill and potential for localized petroleum-related contamination (benzene, methyl t-butyl ether, total petroleum hydrocarbons, and light non-aqueous phase liquid [LNAPL]). Groundwater was impacted from the discharge of gasoline and historic fill constituents (PAHs and metals).

Pierson's Creek NPL – Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), commonly known as Superfund, Pierson's Creek has been listed on the EPA National Priority List (NPL) since 2014. The Lower Creek Section of Pierson's Creek Operable Unit 1, which comprises the creek itself, intersects a portion of the study area near the northwest portion of Interchange 14. Pierson's Creek is 1.5 miles long and flows from the southern Troy Chemical facility, which is one of several potential sources of contamination in the creek. Troy Chemical Corporation is an active chemical plant in operation since 1956 with a history of manufacturing mercury products and reclaiming mercury. A culverted section of Pierson's Creek Operable Unit 1 passes under the NB-HCE at the western extremities of Interchange 14 before turning east on the north side of the New Jersey Turnpike Authority Maintenance District 7 Maintenance Yard described in the preceding paragraph. Contaminants of concern include mercury, lead, nickel, chromium, arsenic, cadmium, polychlorinated biphenyls (PCBs), volatile organic compounds (VOCs) and PAHs, PCBs and dioxin/furans attributed to historical direct industrial process discharges, and wastewater and stormwater discharges from adjacent properties. Cleanup actions to date have not addressed mercury contamination in the creek. EPA is currently working on a remedial investigation/feasibility study for Operable Unit 1, which consists of the creek and upland areas where dredge spoils were side cast.

T & J Landfill – This site is within the Lower Creek Section of the Pierson's Creek Operable Unit 1, a Superfund site described in the preceding paragraph. Based on historical information, the landfill likely received unauthorized material while operating. The site underwent proper landfill closure, which incorporated the installation of an engineered cap and a landfill gas collection system. Contaminants of concern include metals, benzene, alpha-benzenehexachloride, PAHs, bis(2-ethylhexyl) phthalate, and naphthalene. A Deed Notice was recorded on March 26, 2010, memorializing the landfill cap, storm water management system, and landfill gas collection system installed at the site. A Deed Notice was implemented to address remaining soil contamination.

Colonial Pipeline – This site has contaminated soil due to two separate releases of diesel fuel. Previous soil sampling also indicated PAHs, metals, and extractable petroleum hydrocarbons above applicable standards which were attributed to historic fill. A Deed Notice was established on April 18, 2018, for PAHs, extractable petroleum hydrocarbons, arsenic, total chromium, and lead.

BP Marine Americas -This site is co-located with the Hudson County Chromate Site 148. A release of #2 fuel oil from above-grade piping occurred at one of the six former large ASTs on the property. The Remedial Investigation phase delineated exceedances of 2-methylnaphthalene, benzene, EPH and naphthalene. LNAPL

previously was detected in monitoring wells at the site, but has not been detected since 2009. CEA was established on August 21, 2019, for Historic Fill contamination including PAHs, lead and arsenic.

Hudson County Chromate Site 148 – Remediation at this site is complete and the site has been successfully closed. Contaminants of concern include PAHs, metals, and hexavalent and total chromium related to historical fill impacted by chromate production waste. Soil testing has revealed that concentrations of hexavalent and total chromium are not above standards. A CEA was established in August 2019 for historic fill contamination.

Distribution Center at 888 Doremus Ave – Investigations on this site in the 1990s and early 2000s identified historic fill contaminated soil (metals and PAHs). Engineering controls include pavement and buildings and no further action for soils or groundwater was recommended in 1997. A Deed Notice was filed in June 2000 for historic fill contaminated soil. In September 2008, soil adjacent to a diesel fuel above-ground storage tank was identified as impacted by petroleum hydrocarbons; bis(2-ethylhexyl) phthalate was detected above applicable standards. Impacted soil identified was excavated in 2010 and the backfill was capped with concrete, and no further investigation or remediation was required. However, LNAPL was discovered by a groundwater well on property in 2010 and the plume was delineated by groundwater monitoring from 2011 to 2016. Absorbent socks were installed for the removal of LNAPL, which is ongoing. Exceedances have also been identified for several VOCs and semi-volatile organic compounds (SVOCs)/PAHs, including Tentatively Identified Compounds (TICs). A CEA for VOC TICs and SVOC TICs was submitted with a remedial investigation report and established in July 2019 for a portion of the site; a CEA for historic fill related contaminants was submitted in January 2021 for the entire site.

Chem – Fleur Inc. – Community Right to Know surveys list numerous hazardous substances produced, stored and used at this property for the manufacturing of fragrance chemicals for perfumes, soaps, etc. No spills or releases have been reported, except for an air release on June 25, 1996. The potential exists for the hazardous substances to impact soil and/or ground water if products did leak and if the floor is in poor condition. The site is located within an area mapped as historic fill, as is the adjoining section of the NB-HCE; historic fill possibly has impacted soil and ground water in the vicinity.

Newark Bay Study Area – Newark Bay has been heavily contaminated by multiple contaminant sources including two NPL Superfund sites under CERCLA: the Diamond Alkali Company and Pierson's Creek. Contaminants of concern include PCBs, polychlorinated dibenzofurans, pesticides, chlorinated herbicides, PAHs, and mercury. Diamond Alkali operated from 1951 to 1969 on the bank of the Passaic River at 80 Lister Avenue in the Ironbound neighborhood of Newark, approximately 4 miles up-river from the NBB. The Diamond Alkali plant operators manufactured numerous chemicals, including 2,4,5-trichlorophenol, which is likely to contain dioxin as an impurity. Cleanup of Newark Bay is in the planning phase. A multi-year remedial investigation/feasibility study is being conducted by Occidental Chemical Corporation's contractors with EPA oversight (EPA 2022c).

Hudson County Chromate Site 144 – This site includes several impacted blocks and lots within the study area where chromate production waste was used as historical fill, and potential health risk may exist from hexavalent chromium, total chromium, PAHs, and historic fill metals. Remedial actions have included excavation of hexavalent chromium impacted soil, placement of a cap, and institutional controls (Draft Notices in Lieu of Deed Notice and Deed Notices).

Marist High School – This site is co-located with the Hudson County Chromate Site 144. A 20,000-gallon #4 fuel oil UST was abandoned in place in October 1999. An Unrestricted Use AOC NFA was issued on March 14, 2001. A portion of the site is mapped by NJDEP as within Historic Fill.

Bowling Alley Property – The site is currently improved with a building housing a bowling alley. Based on GIS mapping the Morris Canal intersects the rear (southwest side) of this property. The Morris Canal was filled with undocumented material.

Hudson County Chromate Site 21 – Remediation at this site is complete and the site has been successfully closed. Contaminants of concern include hexavalent chromium antimony, beryllium, nickel, and vanadium. Remedial actions for this site consisted of excavations of impacted soil but there is potential for chromate production waste to occur. No Action Alternative.

3.10.4 No Action Alternative

Under the No Action Alternative, no potentially contaminated properties or sites with known contamination would be disturbed by the project. The likelihood of exposure to humans would be as under existing conditions except on those sites where remediation is ongoing or will be undertaken in the future, as is the case with the Pierson's Creek site and Newark Bay, which would have future continue remediation as part of the EPA Superfund program.

3.10.5 Proposed Project

3.10.5.1 Impacts

The presence of contamination potentially affects the development and construction of the project in multiple ways, including: (1) design of cut areas and other subsurface elements; (2) construction document specifications for managing and handling contaminated soils and groundwater; (3) regulatory oversight by NJDEP; (4) worker and public health and safety during construction; and (5) property acquisition process and costs, as well as liability concerns. In addition to the 10 sites identified in Section 3.10.3 as potential environmental constraints to project construction, historic fill, which typically contains contaminants including metals and PAHs at levels in excess of the NJDEP applicable soil remediation, is found along the NB-HCE based on NJDEP (2021a) mapping. Areas of historic fill mapped by NJDEP (2021b) are indicated on Figures 3.10-1a and 3.10-1b. Also, soil and groundwater contamination from transport and other vehicle spills and leaks along this portion of the NB-HCE is likely.

During project construction, historic fill and otherwise contaminated soil and/or water could be encountered in places along the entirety of the project during clearing, excavation, grading, demolition and the construction of piers and footings of the viaducts and bridges. Soil disturbance will also occur during construction of temporary and permanent access roads, construction staging areas, and stormwater basins. Construction activities within contaminated media (soil, sediment, ground water) have a potential to cause contaminants to migrate both vertically and horizontally. Contaminant release and transport mechanisms during construction include contaminated soil transported as dust and volatilization of contaminants from the soil and groundwater matrices to the soil vapor phase, and existing soil vapor contaminants. The most likely route of exposure will be through breathing volatile/semi-volatile compounds or particulate-laden air released during demolition, excavation, and construction activities.

A Licensed Site Remediation Professional (LSRP) will be retained to oversee the management of contamination encountered during the linear construction project. Coordination with and approvals from NJDEP will occur prior to the disturbance, handling, and disposal of any contaminated waste and materials, and appropriate preventive measures will be undertaken to protect the safety of the public, construction workers, and the greater environment from exposure to contaminated materials.

Pre-Construction Planning During Final Design – Pre-construction sampling of potential contaminated media (soil, sediment, and ground water) will be conducted throughout the project area, including within Newark Bay, to assess the nature and extent of contamination to be encountered during construction, determine remedial measures (if necessary), identify waste disposal or reuse options, and determine the level of health and safety measures. A pre-construction sampling plan will be developed during final design to identify locations of contaminated material that may need to be managed during construction. The pre-construction sampling plan will be developed based on such design information as earthwork volumes, excavation limits, the exact horizontal and vertical limits of disturbance, and the exact areas of land to be acquired for project right-of-way.

Land to be acquired for the project will be evaluated by a Phase I Environmental Site assessment in conjunction with developing the sampling plan. Based on the presence of surrounding chromate production waste and contaminated sites throughout the study area, the properties to be acquired may be contaminated and environmental due diligence will be performed in accordance with NJDEP's Technical Requirements for Site Remediation. A Preliminary Assessment would be performed, as warranted, at each property to identify potential Areas of Concern and ensure "innocent purchaser" rights for the Authority. Based on the findings of the Preliminary Assessment, a Site Investigation would be conducted, as warranted, to determine if any discharges to the soil, ground water or sediment has occurred at the areas of concern in question. Further remedial investigations would then proceed to delineate the extent of contamination at the property, as warranted. Once contamination has been fully delineated and reported at the property, a Remedial Action Workplan will be prepared to specify the remedial action measures that would take place at the property, as warranted. The appropriate remedial action approaches may range from the implementation of institutional controls, such as a Deed Notice, which would allow soils above soil cleanup criteria to remain in place, to active remediation measures such as excavation and off-site disposal, in-situ treatment of contaminated groundwater and institutional controls such as a CEA. Upon the completion of remediation at the property a Remedial Action Outcome would be prepared and submitted to the NJDEP for site closure in the Site Remediation Program, as necessary.

Of the 14 contaminated sites identified as potential environmental constraints in Section 3.10.3, none are proposed for full or partial acquisition and no ground disturbance associated from the Proposed Project is anticipated on the parcels themselves. Further, the project is not anticipated to impact any properties within a Deed Notice restricted area. However, contaminants can spread via soil, water, and even walking from one place to another, so further investigations in proximity to these properties will be performed, including the collection of soil and groundwater samples, in advance of excavation or construction. Therefore, the sampling plan will focus on areas within the project limits of disturbance that are in proximity to the 14 properties.

Site investigation work plans will be developed to address the impacted areas in coordination with NJDEP and in accordance with all applicable regulations.

Information obtained from the pre-construction sampling activities will be used to determine specifications for contaminated materials management, dewatering means and methods, and health and safety procedures to be implemented during construction.

Construction – The project will require approval by NJDEP as a Linear Construction Project (LCP) since more than 200 cubic yards of contaminated material will be excavated during construction. The Authority will follow the NJDEP (2012b) Linear Construction Technical Guidance to ensure that contamination encountered during construction is handled in a manner that is protective of human health, safety, and the environment. This technical guidance describes certain practices that should be followed to address contamination, including information on roles and responsibilities, project planning and implementation, best management practices (BMPs) for health and safety and contaminated media management, reporting, fees, and the involvement of LSRPs. As specified in the Linear Construction Technical Guidance, the person conducting an LCP should develop a materials management plan to provide a defined set of procedures to be employed when contaminated soil and ground water are encountered during construction activities.

A Materials Handling Plan will be prepared by the contractor(s) prior to commencing construction. The Materials Handling Plan will conform to the requirements of Subsection 213.03(b) of the Authority's 2016 Standard Specifications and the construction contractor(s) will be required to comply with applicable federal, state, and local laws, rules, and regulations governing construction projects and will be responsible for the proper management of excavated material.

The following are preliminary materials management procedures and considerations which may be implemented throughout the course of the project with respect to the 10 properties identified as environmental constraints in Section 3.10 and in general.

Dewatering will be required to lower the groundwater table and reach the proposed excavation depths. Groundwater encountered during construction may be considered contaminated based on previous monitoring of several properties in the study area.

Several properties in the study area have been placed under a CEA restricting groundwater use for potable purposes due to pollutant exceedances above the state's primary drinking water standards. The preliminary project limits do not intersect any properties identified within a CEA. Nevertheless, due to the potential for groundwater contamination to be present nearby in these areas, precautions will be taken when performing subsurface activities to avoid contaminant migration and prevent contaminant exposure to workers, the public, and the environment. The property owner and LSRP of record will be contacted to determine if additional requirements are warranted prior to subsurface operations. Also, prolonged pumping should be avoided in these areas to prevent any contaminant plume capture and migration to unaffected properties. While the preliminary project limits do not overlap the New Jersey Turnpike Authority Maintenance District 7, contaminated groundwater may be encountered in the western end of the project due to the proximity of a CEA established for the adjacent parcels, both for PAHs and metals (Figure 3.10-1a). Other CEAs on adjacent properties have been established for chlorinated VOCs; benzene, toluene, ethylbenzene and xylene; and metals. Additionally, an open channel section of the NPL site, Pierson's Creek is approximately 250 feet to the north of the project limits. In this location, however, the Pierson's Creek NPL site comprises the creek itself and it then crosses via culvert under the NB-HCE. Pierson's Creek then remains in a culvert for the remainder of its length, crossing south under I-78, turning east north of the New Jersey Turnpike Authority Maintenance District 7 maintenance yard, turning southeast in the maintenance yard, and passing under the northeast portion of the maintenance garage; it leaves the study area at Port Street and continues southeast beneath the NJ Turnpike Mainline roadway, paralleling the east side of the main roadway before terminating at the Port Newark Channel east of Corbin Street. Project construction is not expected to impact the cleanup activities associated with the Pierson's Creek site because surface excavation in this area is anticipated to be minimal, as it only involves constructing the lowermost portions of two new ramps. The first support piers for these ramps, where drilling shafts will be conducted, is more than 200 feet to the east of the Pierson's Creek culvert. Consultation with the EPA and NJDEP will be performed to confirm whether any specific protective measures are necessary and to ensure that project construction does not interfere with ongoing investigation and remediation efforts at this NPL site.

The Colonial Pipeline property is another site where a CEA encompasses the entire property and where special groundwater management procedures may be necessary. This facility is approximately 25 feet from the edge of the elevated NB-HCE, but it would be protected during construction and no direct impacts are anticipated.

Appropriate groundwater management approaches will be used for the safe disposal of water removed from the ground during construction. Management of contaminated groundwater is considered a remedial action and the construction contractor will be required to keep records of this work for future reporting by the Authority. The construction contractor will develop and implement a dewatering effluent management approach and a Pollution Prevention and Control Plan as specified in Subsection 213.03(c) of the Authority's 2016 Standard Specifications. Typically, groundwater management approaches for the treatment of contaminated groundwater include obtaining a NJDEP Treatment Works Approval for the construction of a temporary groundwater treatment system; and discharge of treated effluent under a New Jersey Pollutant Discharge Elimination System Discharge to Surface Water Permit or discharge Publicly Owned Treatment Works through a connection endorsement and various authorizations. Other alternatives to groundwater treatment could include containerization and hauling of groundwater for off-site disposal and Discharge to Groundwater via infiltration basin or well points under Permit by Rule. Securing of dewatering permits will occur during final design and included as part of the construction specifications.

The T & J Landfill site was identified as a potential environmental constraint based on the site's historic landfill operations. While this property is not within the preliminary project limits of disturbance, measures may be considered for any construction activities that may be required near this site to prevent contaminant exposure to workers, the public, and the environment. A perimeter air monitoring plan may also be considered, as appropriate, to monitor landfill gas levels during construction.

The Chem – Fleur Inc site has been identified as a potential environmental constraint based on the site's current operations. Additional measures should be considered while performing construction activities within close proximity to this site to prevent contaminant exposure to workers, the public, and the environment. Based on the air pollutant exceedance observed at this site a perimeter air monitoring plan will be evaluated in further detail when working near this site.

Three areas in the study area are designated as Hudson County Chromate Sites (numbers 21, 144, and 148) due to impacts of chromate production waste. These sites are being remediated under the Hudson County Chromate Project. They typically have Interim Remedial Measures (IRMs) in place to prevent direct exposure to the public while remedial investigations are ongoing. However, any subsurface activity that disturbs an IRM will require involvement from the responsible party's LSRP. In addition, the IRM must be restored in kind and under the supervision and direction of the responsible party's LSRP. Hexavalent chromium contamination is prone to capillary action. Capillary rise is the mechanism by which water is drawn out of the vadose zone by capillary tension into the overlying soil. Capillary action can contribute to frost heave and carry dissolved salts to the ground surface where the salts precipitate as the water evaporates, forming deposits in the surface soils or structures. For hexavalent chromium, chromium salts precipitate to the ground surface and oxidize, resulting in chrome blooms, which are considered by the NJDEP to be gross visual contamination that must be addressed. When designing structures within these areas, special consideration will be taken to avoid preferential pathways that can foster capillary action within surrounding structures. A perimeter air monitoring plan will also be considered when working in these areas, as the primary route of exposure for hexavalent chromium is inhalation. In accordance with the Linear Construction Technical Guidance dated January 2012, to isolate contaminated material that has been left in place, the Authority must restore and cap the disturbed area with a minimum of six inches of clean material (free of contaminants) or other suitable capping material (asphalt or concrete material) to prevent direct contact exposure from surficial contaminated soils. Capping and restoration follow requirements as outlined in the NJDEP's Chromium Guidance Moratorium dated February 8, 2007.

Constructing bridge foundations in Newark Bay will require sheet piling to construct cofferdams prior to excavation of sediments. BMPs will be considered, as appropriate, when designing structures and implementing construction activities within this area in order to minimize the potential toxicity impact to ecological receptors. Treatment of sediment-laden water may be required prior to discharging to surface water during dredging and cofferdam installations. BMPs will also be implemented for in-water work when handling contaminated sediment as specified in the NJDEP (1997) Dredging Technical Manual.

The existing NB-HCE right-of-way will be considered sensitive areas and soil excavated during construction activities may be designated as regulated material. Additional waste classification will be conducted to determine the presence of hazardous soils as defined by the Resource Conservation and Recovery Act. Soil excavated during construction would be classified in accordance with a developed sampling plan. If contaminated soil generated during excavation/trenching activities is classified as non-hazardous (ID-27), it could be reused as backfill, if necessary, at the same location, except when it contains free and/or residual product, gross contamination, or any hazardous waste. Soils excavated for these purposes will not be used to build berms or mounds so as to eliminate the potential for contaminant migration into clean areas. Soils with different lithology will be staged separately and the construction contractor will reconstruct the lithology as it was encountered. Excess regulated material generated that cannot be reused and backfilled will be stockpiled and sampled for off-site disposal. Regulated material excavated during project construction exhibiting possible contamination (e.g., staining and odors) will not be used as clean backfill unless demonstrated as such through analytical testing.

Portions of the project limits are adjacent to or intersect railway properties. Typical pollutants associated with railway infrastructure include PAHs, heavy metals, and to some extent PCBs. Other potential contaminants of concern could likely be widespread pesticide use. As a result, contaminated soil and groundwater (i.e., hazardous substances) may exist within the limits of the project corridor. These areas are an example of where the handling of regulated ID-27 non-hazardous soils for on-site reuse and/or off-site disposal during excavation activities will occur. In these areas, the treatment and discharge of groundwater to either a publicly owned treatment works or surface waterbody during dewatering activities may be warranted. Additional measures should be considered while performing subsurface activities to prevent contaminant exposure to workers, the public, and the environment. Also, a site-specific health and safety plan (SSHASP) will be prepared in accordance with 29 CFR 1910.120 and Hazardous Waste Operations and Emergency Response regulations to define the requirements necessary to protect nearby residents and workers involved in the remedial activities to be conducted within the project limits. The contractor(s) undertaking the remedial actions and construction activities will prepare a SSHASP for review and approval prior to the commencement of any work. The SSHASP will also conform to the requirements of Subsection 213.03(a) of the Authority's 2016 Standard Specifications.

The NBB and most structures to be demolished as part of construction activities were built prior to the 1970s and likely contain asbestos-containing material and lead-based paint. Also, because lands to be acquired for the project have been used for industrial activities, among other things, further investigation will be performed to confirm the presence and content of asbestos-containing material, lead-based paint, and other contaminants during final design and prior to construction and demolition activities. Asbestos, lead-based paint, PCB-containing oil in electrical equipment, and other hazardous materials will be removed in accordance with regulations by NJDEP, New Jersey Department of Community Affairs, and New Jersey Department of Labor, as well as the Federal Occupational Safety and Health Administration, EPA. In addition, although not anticipated to be encountered within the project limits, any USTs that would be impacted by construction would be removed in accordance with local and NJDEP regulations.

3.10.5.2 Conclusion

Based on the preceding assessment, the Proposed Project will have no significant impact on hazardous materials. The systematic approach to identifying hazardous waste and site contamination has occurred during project development. As noted in Section 3.10.5.1, further investigations, including sampling of soil and groundwater, will occur during final design to identify measures to be undertaken during construction to protect public and worker health and safety and avoid the spread of contamination. The sampling plan and protective measures will be developed in coordination with NJDEP, the counties, and the municipalities, as well as with relevant property owners, as appropriate. By following this approach, no significant impacts will result.

3.11 Natural Resources

3.11.1 Study Area Definition and Data Collection

The study area for assessing natural resources encompasses all areas within 250 feet of the anticipated limit of disturbance based on preliminary design plans with the following exceptions: (1) the study area was reduced in areas where the study area crossed a rail line, parking lot, or any development that would not be altered by the Proposed Project, and (2) the study area was expanded near Newark Bay to account for changes to the NB-HCE roadway alignment for the NBB replacement.

3.11.1.1 Geology and Soils Resources

The existing conditions of geology and soils in the study area were characterized based on existing data sources, including historic geotechnical borings, surveys conducted by the U.S. Department of Agriculture Natural Resources Conservation Service (USDA-NRCS), U.S. Geological Survey (USGS), USACE, and other secondary sources.

3.11.1.2 Water Resources

Water resources in the study area were identified by reviewing existing maps and databases showing the extent of surface water, hydrology, tributaries, and anthropogenic uses, which included the following:

- USGS 7.5-minute topographic maps
- National Hydrography Dataset (USGS 2022)
- Aerial photography (2020 and historic)
- National Wetlands Inventory (USFWS 2022a)
- Wetlands of New Jersey (from Land Use/Land Cover 2012 Update) (NJDEP 2012a)
- Land Use/Land Cover of New Jersey 2015 (NJDEP 2015)
- Federal Emergency Management Agency (FEMA) FIRMs.
- New Jersey Surface Water Quality Standards (New Jersey Administrative Code [N.J.A.C.] 7:9B, June 2005), as provided by the NJDEP (2021a) NJ-GeoWeb map viewer
- NJDEP (2022) 2018/2020 New Jersey Integrated Water Quality Assessment Report
- Various water and sediment quality characterizations from studies undertaken by the PANYNJ, the USACE, the NJDEP New Jersey Toxics Reduction Workplan for NY-NJ Harbor, and the EPA Regional Environmental Monitoring and Assessment Program.

Water quality standards for water resources are based on the various NJDEP and EPA regulations and guidelines. Groundwater resources are characterized based on field investigations and information from the New Jersey Geological Survey.

3.11.1.3 Wetlands

Prior to performing field investigations, existing maps and databases were reviewed, including the datasets described above underwater resources, plus the USDA-NRCS (2022) soil mapping. After a desktop review, wetland scientists performed a wetland delineation within the study area between April 29 and May 20, 2021. Wetlands were delineated using guidelines established in the 1989 Interagency Federal Manual for Identifying and Delineating Jurisdictional Wetlands. Wetlands, as defined in this manual, are those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted to life in saturated soil conditions. Wetlands thus possess three characteristics: 1) hydric soils, 2) wetland hydrology, and 3) hydrophytic vegetation. Wetland scientists used the USACE "National Wetland Plant List: Northcentral Northeast Region" (USACE 2020) as a guide to identify hydrophytic vegetation. Wetlands, open waters, and streams were photographed and categorized as defined in Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979). Delineated wetlands were also classified according to N.J.A.C. 7:7A-3.2 based on resource value (exceptional, intermediate, and ordinary). The width of a transition area varies by resource classification: 150 feet adjacent to an exceptional value resource wetland, 50 feet adjacent to an intermediate resource value wetland, and zero feet adjacent to an ordinary resource value wetland. Anticipated transition areas were assigned to wetlands delineated in the study area.

3.11.1.4 Floodplains

The identification of the potential floodplains was performed through a review of available Flood Insurance Rate Maps (FIRMs) prepared by FEMA under the National Flood Insurance Program. The National Flood Hazard Layer (NFHL) and FIRM panels (34013C0178F, effective date 6/4/2007; and 34017C0103D, effective date 8/16/2022) were accessed from the FEMA NFHL Viewer. In addition, areas of flood risk and associated

water-surface elevations for flooding in the study area were reviewed in the Flood Insurance Study for Essex County (FEMA 2020) and the Flood Insurance Study for Hudson County (FEMA 2006). Various other FEMA flood risk mapping products were also reviewed.

3.11.1.5 Coastal Zone and Tidelands

NJDEP administers the State of New Jersey's coastal management program through their Coastal Zone Management Rules defined at N.J.A.C. 7:7. New Jersey's rules provide for a balancing between economic development and coastal resource protection, recognizing that coastal management involves explicit consideration of a broad range of concerns. In New Jersey, the Waterfront Development Law (N.J.S.A. 12:5-3) and related requirements (N.J.A.C. 7:7-2.3) provide the authority for issuance of permits for, among other activities, the placement or construction of structures, pilings, or other obstructions in any tidal waterway. New Jersey's Rules on Coastal Zone Management are employed by the NJDEP's Division of Land Resource Protection in the review of permit applications and coastal decision-making; they address issues of location, use, and resources.

3.11.1.6 Aquatic Biota

To describe aquatic biota within Newark Bay, prior aquatic biological surveys were reviewed to prepare a composite summary of the expected seasonal occurrence of aquatic wildlife in the study area. Previous biological investigations have characterized the seasonal distribution and composition of the fish community in various habitats and areas of New York/New Jersey Harbor, including Newark Bay. Several fish sampling studies have been conducted in the general vicinity of the study area, including:

- The USACE New York District surveyed seasonal use patterns and distribution trends of finfish in New York/New Jersey Harbor from October 1998 through September 1999 (USACE 1999). Sampling was conducted bi-monthly using a 30-foot Wilcox flat bottom trawl and ichthyoplankton tows were made using a 0.5-meter net with 500 micron mesh netting mounted in a benthic sled.
- USACE (2002) provided supplemental data to the 1998 to 1999 surveys to obtain additional information on the distribution patterns of the egg and larval stages of demersal species with emphasis on winter flounder. Sampling was conducted from December 2000 through June 2001. During this program, three stations were located within navigational channels and three were located within shoal areas in Newark Bay.
- USACE (2003, 2004a, 2005, 2006) documents the continuation of the USACE's monthly trawl and ichthyoplankton sampling program from December 2001 through July 2005.
- The National Marine Fisheries Service (NMFS) characterized the seasonal distribution and composition of the fish community in various habitat areas in Newark Bay as part of an evaluation of a flood control project for the Passaic River Basin (NMFS 1994).
- During 1995 to 1996, PANYNJ conducted a fisheries sampling program in support of the Newark Bay Confined Disposal Facility Environmental Impact Statement. Monthly surveys using a 30-foot Wilcox flat bottom trawl were conducted at four shallow water stations in Newark Bay (LMS 1996).
- USACE (2012) prepared a summary report focused on juvenile and adult spawning winter flounder occurrence and utilization within the New York/New Jersey Harbor, incorporating data collected as part of the Aquatic Biological Survey bottom trawl program from 2002 to 2010 by the USACE during the Harbor Deepening Project. Six stations were located in channel and non-channel locations within Newark Bay.
- Migratory Finfish Surveys were conducted in 2006 and 2011 to 2013 as part of the New York and New Jersey Harbor Deepening Project, a USACE- and PANYNJ-sponsored project to deepen navigation

channels to 50 feet to accommodate larger commercial vessels. Six stations were located in channel and non-channel locations within Newark Bay.

3.11.1.7 Terrestrial Vegetation and Wildlife

Terrestrial vegetation and wildlife in the study area were described based on numerous sources, including field surveys. Data were obtained from NJDEP reports and file searches, reports for the Newark Bay Study Area (e.g., Tierra Solutions 2015), and the NJDEP NJ-GeoWeb and Landscape Project GIS databases (NJDEP 2017, 2021a). A qualitative habitat and vegetative community survey was performed to provide a general description of land use, identify the upland habitats present in the study area, and to confirm the information obtained from the reports reviewed and NJDEP's databases.

3.11.1.8 Threatened or Endangered Species

To determine whether any potential habitat for ESA- or state-listed threatened or endangered species existed in the study area, information about the historic or current species occurrence was obtained and evaluated. The U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) database identified species that are listed and candidates under the Endangered Species Act (ESA), and Birds of Conservation Concern (USFWS 2022b). The NMFS (2022a) ESA Section 7 Mapper and the NJDEP (2017) Landscape Project mapping were also reviewed. The Landscape Project was developed by the NJDEP Division of Fish and Wildlife (Fish and Wildlife) Endangered and Nongame Species Program (ENSP) as a wildlife-habitat mapping program that is used to identify and map critical habitats for endangered, threatened, and special-concern wildlife. Consultation with the NJDEP Natural Heritage Program was also performed to search the state Natural Heritage Database for locational information of rare species and ecological communities within the study area and its vicinity (see Appendix E: Biological Resources). Consultation was also undertaken with the NMFS Greater Atlantic Fisheries Office.

A habitat assessment for threatened or endangered species was performed in the field in tandem with the wetland delineation between April 29 and May 20, 2021. Ecologists evaluated habitats for the likely presence or absence of rare, threatened, or endangered plant and animal species. Ecologists identified any suitable habitats, as well as dominant vegetation, hydrologic regimes, and levels of human disturbance. Structures that could potentially be used for nesting by state-listed raptors were also investigated, such as bridges, utility towers, billboards, rooftops, and bridges. Identified nests were viewed using a spotting scope.

3.11.2 Methodology and Criteria

3.11.2.1 Geology and Soils

The assessment of the effects on geology and soils from the No Action and Proposed Project alternatives were evaluated based on existing data sources, including surveys conducted by the USDA-NRCS, USACE, USGS, and other secondary sources. The Proposed Project, as defined by the limits identified on preliminary design plans, was overlayed on these datasets and the underlying geology and soils was judged with respect to anticipated construction activities.

3.11.2.2 Water Resources

Surface Water Quality

The assessment of effects to surface water quality from the No Action and Proposed Project alternatives were evaluated based on their anticipated effects on baseline water quality of ponds, perennial and intermittent streams, wetlands, tidal channels, and waterbodies. The following documents were reviewed to determine the requirements for addressing impacts to surface waters during the construction and operational phases of the Proposed Project: NJDEP (2011) Stormwater Best Management Practices Guide; NJDEP (2004) Highway Agency Stormwater Guidance Document; NJDEP (2019) Stormwater Discharge Master General Permit Renewal; and NJDEP (1999) Technical Manual for Stormwater Permitting.

Groundwater Quality

To evaluate effects to groundwater quality, the documents listed above were also used. Stormwater that is not introduced into surface water may not infiltrate pervious areas and impact groundwater quality given the poor soil permeability discussed above. However, the depths to groundwater and confined and unconfined layers were determined. Infiltration testing and groundwater monitoring will be performed during final design. Groundwater recharge criteria that are applicable to the Proposed Project, such as the stormwater infiltration criteria in New Jersey's recently updated Stormwater Management Rules (N.J.A.C. 7:8), were identified.

Due to the presence of known and potential contaminated sites in the vicinity of the study area, groundwater quality is a subject of many hazardous waste studies, as detailed in Section 3.10.

3.11.2.3 Wetlands

E.O. 11990 Protection of Wetlands, states that no federally approved project will occur in wetlands unless there is no practical alternative to constructing in the wetlands. The impacts to regulated wetlands from the Proposed Project were quantified by overlaying the preliminary design plans onto maps of delineated wetlands and calculating the areas of temporary and permanent impacts for the various types of proposed infrastructure or construction activity.

In New Jersey, the USACE jurisdiction includes coastal waterways/wetlands, waterfront development areas, and other waters within 1,000 feet of the mean high water line (MHWL). Per the Coastal Zone Management Rules (N.J.A.C. 7:7), MHWL is the intersection of the land with the water surface at the elevation of mean high water. The MHWL elevation varies along the oceanfront and the tidal bays and streams in the coastal zone. The MHWL of Newark Bay in the study area is 2.38 feet AMSL (North American Vertical Datum of 1988). Wetlands above MHWL are considered freshwater and wetlands at or below are considered tidal. The NJDEP Division of Land Resource Protection regulates the use and development of coastal resources through the Waterfront Development Law and the Coastal Zone. State regulation over wetlands is determined by obtaining a Letter of Interpretation (LOI) from the NJDEP. An LOI indicates the presence or absence of wetlands, State open waters, or transition areas; verifies or delineates the boundaries of freshwater wetlands, State open waters, and/or transition areas; and assigns a wetland resource value classification. Although NJDEP is the only authority that gives resource value classifications to wetlands, an estimate was provided based upon field review of the wetland and its potential to provide habitat for threatened or endangered species.

Federal jurisdiction over wetlands was determined by obtaining a jurisdictional determination from the USACE. While subject to pending judicial review, the USACE currently interprets "waters of the United States" consistent with the pre-2015 regulatory regime, including the EPA (2008) Rapanos Guidance.

3.11.2.4 Floodplains

E.O. 11988, Floodplain Management, directed federal agencies to avoid, to the extent possible, the long- and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. The impacts to regulated floodplains from the Proposed Project were quantified by overlaying the preliminary design plans onto the NFHL (based on and FIRM panels) and calculating the areas within delineated flood zones.

3.11.2.5 Coastal Zone and Tidelands

The Federal Coastal Zone Management Act of 1972 (16 USC 1451 et seq.) was enacted to balance the competing demands of growth and development with the need to protect coastal resources. This is primarily achieved through coastal zone management programs adopted by states to regulate land use activities that could affect coastal waters. To evaluate the Proposed Project's consistency with the New Jersey Coastal Zone Management Rules (N.J.A.C. 7:7), each policy or rule was reviewed to confirm that the Proposed Project

Alternative would be carried out in a manner consistent to the maximum extent practicable with those enforceable policies.

Tidelands, formerly known as riparian lands, are all those lands now or formerly flowed by the mean high tide of a natural waterway. These are public lands subject to certain state rights and one must obtain permission from the State to use these lands. For the tidally claimed areas that would be impacted by the Proposed Project, the Authority would confirm whether there is a Tidelands License or Riparian Grant for these areas and if any licenses are still valid. If there is no grant or licenses are no longer valid, then the Authority would apply for a new Tidelands Instrument for work proposed within the claimed areas.

3.11.2.6 Aquatic Biota

The impacts to aquatic communities from the No Action and Proposed Project alternatives were evaluated via a literature and data review. Based on this review, for the Proposed Project, potential impacts to Newark Bay and wetlands were identified by overlaying the preliminary design plans onto maps of delineated wetlands and open waters. Also, the proposed construction methods and sequencing was reviewed and the locations and area of proposed infrastructure within Newark Bay was evaluated. Of particular value to this assessment are data from various aquatic biology surveys and analysis considered in the Essential Fish Habitat (EFH) Assessment (see Appendix E), surveys as part of the USACE Aquatic Biological Monitoring Program, various species-specific source documents compiled by NMFS, and information collected for the 1997 Final Environmental Impact Statement for the Newark Bay Study Area. In addition, comments and reviews by various state and federal agencies, primarily the NJDEP and NMFS have also been incorporated to provide an accurate assessment of potential impacts to the aquatic resources during the construction and operational phases of the Proposed Project.

3.11.2.7 Terrestrial Vegetation and Wildlife

The impacts to terrestrial vegetation and wildlife from the No Action and Proposed Project alternatives were evaluated via a literature and data review, including reconnaissance-level field surveys conducted concurrently with wetland and waterbody surveys in 2021. Data were obtained from the NJDEP Natural Heritage Program, the NJDEP Landscape Project databases, and various agency studies and reports. Direct impacts on habitat and vegetation were estimated by overlaying the preliminary design plans onto maps of existing ecological communities to identify areas of potential impact. Impacts to migratory birds covered under the Migratory Bird Treaty Act of 1918 were evaluated to ensure that the Proposed Project does not result in the "take" of any migratory bird, or the parts, nests, or eggs of such bird. Also, for compliance with the Bald and Golden Eagle Protection Act (BGEPA), impacts to bald and golden eagles were evaluated. Impacts to threatened or endangered species, including ESA- and state-listed species, are covered below in the next section. Lastly, determine the applicability of the New Jersey No Net Loss Reforestation Act, the forest area within the limits of the preliminary design plans was quantified using the method outlined by the Program Guidelines (NJDEP 2007), although a field survey was not performed.

3.11.2.8 Threatened or Endangered Species

The impacts to threatened or endangered species from the No Action and Proposed Project alternatives were evaluated based on the habitat preferences for various species known or suspected to be in the study area, as well as the quantity and quality of existing habitat. Impacts were analyzed using recent data on the potential for these species to inhabit the study area, including wetland field surveys and habitat assessment observations, and professional expertise and judgment.

3.11.3 Existing Conditions

3.11.3.1 Water Resources

The study area is located within two sub-watersheds of the Newark Bay watershed (12-digit hydrologic unit code [HUC]: 020301040203) and one sub-watershed of the Upper Bay-The Narrows watershed (12-digit HUC: 020301040205). As depicted in Figure 3.11-1, areas west of the NJ Turnpike Mainline/Interstate 95, including most of Interchange 14 in Newark, are within the Newark Airport Peripheral Ditch sub-watershed (14-digit HUC: 1402030104010010). Also, an open channel of Pierson's Creek occurs approximately 250 feet to the north of the study area, but it flows through the study area via a culvert under the NB-HCE until it discharges into the Port Newark Channel. This stream is discussed further in Section 3.10.3, as it is an NPL site. Areas east of Interchange 14A and west of Avenue C in Bayonne, including the NBB, are within the Newark Bay/Kill Van Kull (14-digit HUC: 02030104010020). This portion of the study area contains the tidal waters of Newark Bay, including both open waters and wetlands along the shoreline, and several freshwater wetlands. Areas east of Avenue C, including Interchange 14A, drain into Upper New York Bay and are within the Upper New York Bay/Kill Van Kull sub-watershed (14-digit HUC: 02030104010030). Only one feature, Stream DFL-S, was identified in this portion of the study area.

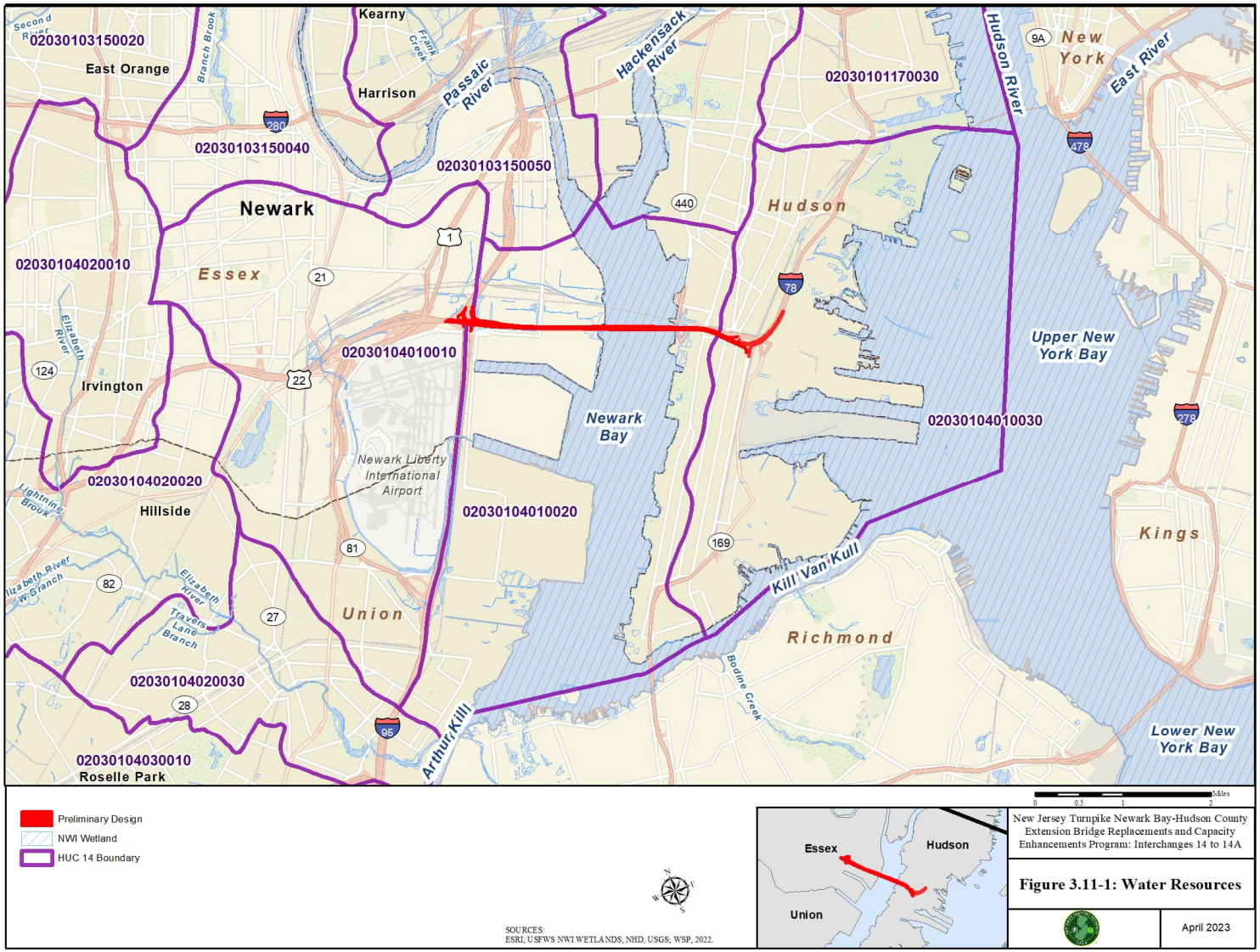
The State of New Jersey's annual rainfall typically ranges between 32 and 48 inches with an average of 45.3 inches from 1895 to present. Newark averages on the high end with a mean of 44.61 inches per year at Newark Liberty International Airport (Rutgers University 2022). Most of the rain falling on the Newark Bay watershed eventually enters Newark Bay in the form of runoff or groundwater influx, the amount of which is highly variable and dependent on the annual climatic conditions.

The NBB spans approximately 4,300 linear feet of open water and tidal wetlands (below the MHWL). Newark Bay begins at the confluence of the Passaic and Hackensack Rivers in northeastern New Jersey and is part of the New York-New Jersey Harbor system. The bay is connected to Upper New York Bay by the Kill Van Kull and to Raritan Bay by the Arthur Kill, through which tides originating in the Atlantic Ocean enter. The hydrodynamics of the system is predominantly controlled by three forcing mechanisms: freshwater flows (buoyancy sources), tides, and winds. Tidal currents in Newark Bay and in the Passaic and Hackensack Rivers are found to be moderate, with maximum amplitudes of 0.5 m/second.

Within the navigation channel of Newark Bay, classic estuarine gravitational circulation occurs, with daily averaged currents (the current averaged over several tidal cycles) directed seaward near the surface and landward near the bottom. data also suggests that while the mean depth-averaged flow in the main navigation channel of Newark Bay is landward, the net flow along the channel flanks is seaward. This classic estuarine gravitational circulation pattern can be broken down – that is, the daily averaged currents become uniform throughout depth – during periods of very low freshwater discharge from the Passaic River. During these periods, the daily averaged currents in Newark Bay are directed largely landward (north) at all depths except near the surface. Strong and persistent winds can have a major effect on water circulation in the Newark Bay Complex, and in the estuary as a whole. During periods of strong west winds acting synoptically over the New York Bight region (that is, including the coastal ocean area offshore of the harbor estuary), the water level in Raritan Bay is lowered, producing a strong pressure gradient from the Kills to the open ocean. Under this condition, the daily averaged currents are directed seaward (south) out of Newark Bay and through the Kill van Kull. During periods of strong east winds acting synoptically over the New York Bight region, the water level in Raritan Bay is raised, producing a strong pressure gradient from the open ocean toward the Kills. Under this condition, the daily averaged currents are directed landward in through the Kill van Kull and into Newark Bay. Annual flow calculations by Blumberg et al. (1999) concluded that approximately 60 percent of annual flows into Newark Bay come from the Kill van Kull, and 34 percent from the Hackensack and Passaic Rivers combined, while net discharge to Raritan Bay occurs through Arthur Kill. Additional details about Newark Bay hydrology can be found in the Newark Bay Study Area Remedial Investigation Work Plan (Tierra Solutions 2005).

Water resources in Newark Bay have been impacted for over 150 years by intense urban and industrial development, including extensive dredging, bridge construction, and heavy commercial shipping. The development of the Newark Bay shoreline and nearshore zone has modified the area's hydrology, degraded water quality, and altered biotic communities. Over the years, most of the salt marsh wetlands that fringed Newark Bay were lost through filling or degraded as a result of invasive vegetation or mosquito control measures (Tierra Solutions 2005).

Figure 3.11-1. Water Resources



Groundwater Quality

The study area is not in a EPA Sole Source Aquifer region; however, surficial and bedrock aquifers are present in the vicinity of the study area. The western portion of the study area is underlain by the Brunswick aquifer and the eastern portion is underlain by the Diabase aquifer. Both aquifers are fractured-rock aquifers of the Newark Basin Part of the Piedmont, where groundwater is stored and transmitted in fractures (i.e., confined-flow conditions) (Herman 2001). A surficial, glacial aquifer is present, associated with Newark Bay and adjacent areas, defined as lake bottom sediment (Herman et al. 1998). Because of the study area's proximity to tidal waterways and the Atlantic Ocean, the natural groundwater table is anticipated to be near sea level. Groundwater recharge is likely provided by infiltration from precipitation through the soil and percolation to the water table, although due to the extensive impervious cover (including impacted gravel) in the study area, the potential for recharge is limited. Some recharge may occur along Newark Bay, along with saltwater intrusion. Freshwater wetlands located above the MHWL elevation may have groundwater at or above the soil surface for portions of the growing season, based on surface hydrology observations.

Groundwater monitoring wells were not installed in historic borings for the existing NBB; however, groundwater measurements were recorded in several historic borings during or immediately after the completion of drilling. The depth to groundwater ranged from zero to 14 feet below the surface within the study area and was highly variable due to seasonal variation in rainfall, temperature and variations in soil or rock permeability. No known groundwater monitoring wells were identified within the study area. Further information will be obtained during geotechnical investigations and groundwater data will be used to inform where appropriate controls may be required during construction activities to protect groundwater from exposure to contaminated soil, spills, and dewatering and excavation.

Groundwater contamination exists in the study area and groundwater use restrictions are in place in several locations. Twenty known contaminated sites were identified as part of hazardous waste investigations, further described in Section 3.10.3. The contamination is generally due to extensive past and present industrial and manufacturing activities in the area surrounding the study area. Groundwater in eastern Newark adjacent to Newark Bay was reported by Hochman (1976) to have high chloride concentrations due to relatively heavy groundwater withdrawals. This pumping lowered the groundwater level in these areas, reversing the natural gradient between the ground and surface waterbodies, and induced a flow of salt water from the river and bay into the underlying water-bearing formations. Hochman (1976) pointed to the dredging of ship canals in Newark Bay and the Passaic River as a probable contributing factor in saltwater intrusion by removing semi-impervious sediments that acted as an imperfect barrier to the infiltration of saltwater.

Surface Water Quality

Newark Bay is designated with a surface water quality classification of "SE3" (N.J.A.C. 7:9B), indicating saline waters of estuaries. This includes the open waters associated with an unnamed tidal tributary that flows into the west side of Newark Bay, north of the NBB. "SE3" is the general surface water classification applied to saline estuarine waters that have the least protective designated uses (i.e., they are managed for lower water quality than those classified as SE1 and SE2). In SE3 waters, designated uses per N.J.A.C. 7:9B-1.12(f) are: (1) secondary contact recreation; (2) maintenance and migration of fish populations; (3) migration of diadromous fish; (4) maintenance of wildlife; and (5) any other reasonable uses. The 2018/2020 New Jersey Integrated Water Quality Assessment Report indicates that only five of the 19 water monitoring stations in Newark Bay fully supported general aquatic life use criteria. High nutrients, total phosphorus, and impairments associated with nutrient over-enrichment are the common cause of aquatic life impairments.

Newark Bay receives water from the Hackensack and Passaic Rivers. These and other navigable waters in the vicinity have been a center of industrial activity since the Industrial Revolution, receiving direct and indirect discharges from numerous industrial facilities. Newark Bay was once believed to be among the most polluted water courses in the United States, suffering from severe pollution and industrial abandonment in the twentieth century. It is known to contain a number of chemical constituents, including but not limited to PCBs, PAHs,

pesticides, herbicides, VOCs, SVOCs, dioxins, polychlorinated dibenzofurans, and metals (Tierra Solutions 2013). Historical and present-day discharges of dioxins and other chemicals have occurred from a number of sites in Newark, Kearny, Jersey City, and Bayonne. Also, garbage, sewage, and contaminants have been released into the waters of Newark Bay, its adjoining tributaries, and tidal areas through dumping, storm sewers, and combined sewer overflows. Extensive shipping traffic in Newark Bay, as well as pipeline and facility operations, have resulted in numerous oil and chemical spills, also leading to contamination of Newark Bay Study Area sediments (Tierra Solutions 2013). Impairments from chemical contamination have been documented in Atlantic tomcods, killifish, and many other aquatic species. Tomcods in Newark Bay had polychlorinated dibenzo-p-dioxins levels over 19 times higher than the tomcods sampled in the Hudson River (Yuan et al. 2006). Bugel et al. (2010) studied the health of killifish in Newark Bay and found that these fish suffered from morphological changes indicative of impaired reproductive health and endocrine disruption.

Water quality parameters of temperature, salinity and dissolved oxygen vary considerably within Newark Bay across the seasons. These variations reflect typical meteorological and hydrological conditions in Newark Bay and the waters that flow into it (Arthur Kill, Kill van Kull, Hackensack and Passaic rivers). Annual low water temperatures of around 2 degrees Celsius occur in late December/January, and seasonally high temperatures up to 24 degrees Celsius occur June through August (USACE 1997). Salinity ranges from around 3 parts per thousand (ppt) to 21 ppt over the year, with salinities greater than 12 ppt in spring through fall and lower salinities in winter. Dissolved oxygen values in the summer are relatively low at 4 to 7 milligrams per liter, with highs of 10 to 14 milligrams per liter in the winter months.

As detailed in Section 3.10.3, the Newark Bay Study Area is included as part of a Superfund site due to its contaminated bottom sediments, as well as portions of the Hackensack River, Arthur Kill, and Kill van Kull. Newark Bay is Operable Unit 3 of the Diamond Alkali Superfund site. The historic manufacture of herbicides at a facility along the Lower Passaic River, upstream from Newark Bay, resulted in considerable contamination of area sediments by a variety of toxic substances including DDT and dioxin. The Newark Bay Study Area of the Diamond Alkali Superfund site includes Newark Bay and portions of the Hackensack River, Arthur Kill, and Kill van Kull. As a result of this contamination, the state of New Jersey prohibits consuming blue crab and gizzard shad and recommends very limited consumption of other fish from Newark Bay (NJDEP/NJDOH 2021). Newark Bay has not undergone Superfund remediation as of 2022.

3.11.3.2 Geology and Soils

The study area is located in the Piedmont physiographic region, which is located between the Atlantic Coastal Province and the Appalachian Province (Tiner 1985). The area west of Newark Bay is underlain by sedimentary rocks (mainly siltstones and shales, and conglomerates) and east of Newark Bay is underlain by igneous rocks (basalt and diabase), and metamorphic rocks (schists and gneiss). These rocks are from the mid-Triassic to early Jurassic periods. Bedrock underlying Newark Bay consists of the Lockatong Formation (light to dark gray silty argillite and laminated mudstone that has been thermally metamorphosed to hornfels where intruded by diabase), Passaic Formation (interbedded red-brown sandstones and shales), and Jurassic diabase (dark gray to black, moderately fractured igneous rock). Almost the entire Bay (including Passaic and Hackensack River Basins) was subjected to glacial erosion and deposition as a result of the last stage of the Wisconsin glaciation. Large quantities of stratified sand, silt, gravel, and clay were deposited in a glacial lake covering the area. These glaciofluvial deposits overlie bedrock and underlie wetlands, fill, and estuarine sediments (NMFS 1994; Drake et al. 1996; Tierra Solutions 2005).

Northeastern New Jersey has a "medium" risk of earthquake hazard (USGS 2014).

According to USACE (1997), sediments outside of the navigation channel within Newark Bay range in thickness from 30 to 45 feet and consist primarily of glacial outwash and till. The pattern of sediment types (sand/gravels versus silt/clays) is indicative of fluvial sediment input at the north end of the Bay, and tidal exchange sedimentation at the south end. Coarser sediments are found at the north end of Newark Bay at the

mouths of the Passaic and Hackensack Rivers. Within the study area, the central part of Newark Bay has primarily silty and clayey bottom sediments. Coarser sediments are also found at the southern end of Newark Bay due to the scouring effect of tidal currents. Based on a total of about 550 historic borings within the limits of the proposed structures, a wide range of subsurface soil and rock conditions are expected. A layer of miscellaneous or man-made fill has been observed within the entirety of the study area. Within the NBB main span and the approaches to the bridge, the majority of the subsurface conditions from available historical borings show a thin layer of soft to medium organic silt, underlain by a stratum of coarse to fine sand up to about 10 feet thick with varying amount of silt and gravel, and a stratum of clay and silt with varying amounts of sand and gravel and thickness of about 60 feet or greater. The eastern limits of the study area includes primarily glacial deposits, silty sand to sandy silt, with coarse to fine gravel, cobbles and boulders. Bedrock over and west of Newark Bay is generally sandstone, sandy mudstone, siltstone, and shale. East of Newark Bay, the bedrock transitions to the diabase formation. Rock core recovery and rock quality designation varies significantly throughout the limits of the study area depending on the parent rock formation.

The Web Soil Surveys of Essex County and Hudson County, New Jersey (USDA-NRCS 2022) indicate that the soils within the study area consist of 16 map units. A mapping unit is a grouping of soils by their natural landscape and soil patterns. Most soil mapping units shown on detailed soil maps are phases of soil series. All soil phases within a soil series that are listed as hydric, or potentially hydric, are not necessarily hydric. By definition, a hydric soil is one that is formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, July 13, 1994). Therefore, hydric soils are typically found within wetlands. Only one soil map unit in the study area is considered hydric – Westbrook mucky peat, 0 to 2 percent slopes, very frequently flooded. Westbrook mucky peat is mapped just east of Newark Bay, in wetland areas north and south of the NB-HCE. The soil map units within the study area are listed in Table 3.11-1 and depicted in Figures 3.11-2a and 3.11-2b.

Table 3.11-1. Soil Characteristics in the Study Area

Map Unit Symbol	Map Unit Name	Drainage Class	Depth to Water Table (in.)	Depth to Restrictive Layer (in.)*	Hydric Rating
BhgA	Bigapple loamy sand, 0-3% slopes	Somewhat excessively drained	>80	>80	0
GtbA	Greenbelt loam, 0-3% slopes	Well drained	>80	>80	0
LagA	Laguardia artifactual coarse sandy loam, 0-3% slopes	Well drained	>80	>80	0
LagB	Laguardia artifactual coarse sandy loam, 3-8% slopes	Well drained	>80	>80	0
UdkttB	Udorthents, loamy fill substratum, 0-8% slopes	Not classified	72	>80	5
URBHGB	Urban land, Bigapple substratum, 0-8% slopes	Not classified	>80	>80	0
UREOLB	Urban land, eolian substratum, 0-8% slopes	Not classified	>80	0	0
URKTTB	Urban land, loamy fill substratum, 0-8% slopes	Not classified	72	>80	0
URTILB	Urban land, till substratum, 0-8% slopes	Not classified	>80	0	0
URWETB	Urban land, wet substratum, 0-8% slopes	Not classified	20	0	5
WectA	Westbrook mucky peat, 0-2% slopes, very frequently flooded	Very poorly drained	0	>80	100

* "Restrictive Layer" is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers.

Figure 3.11-2a. Soils – Newark

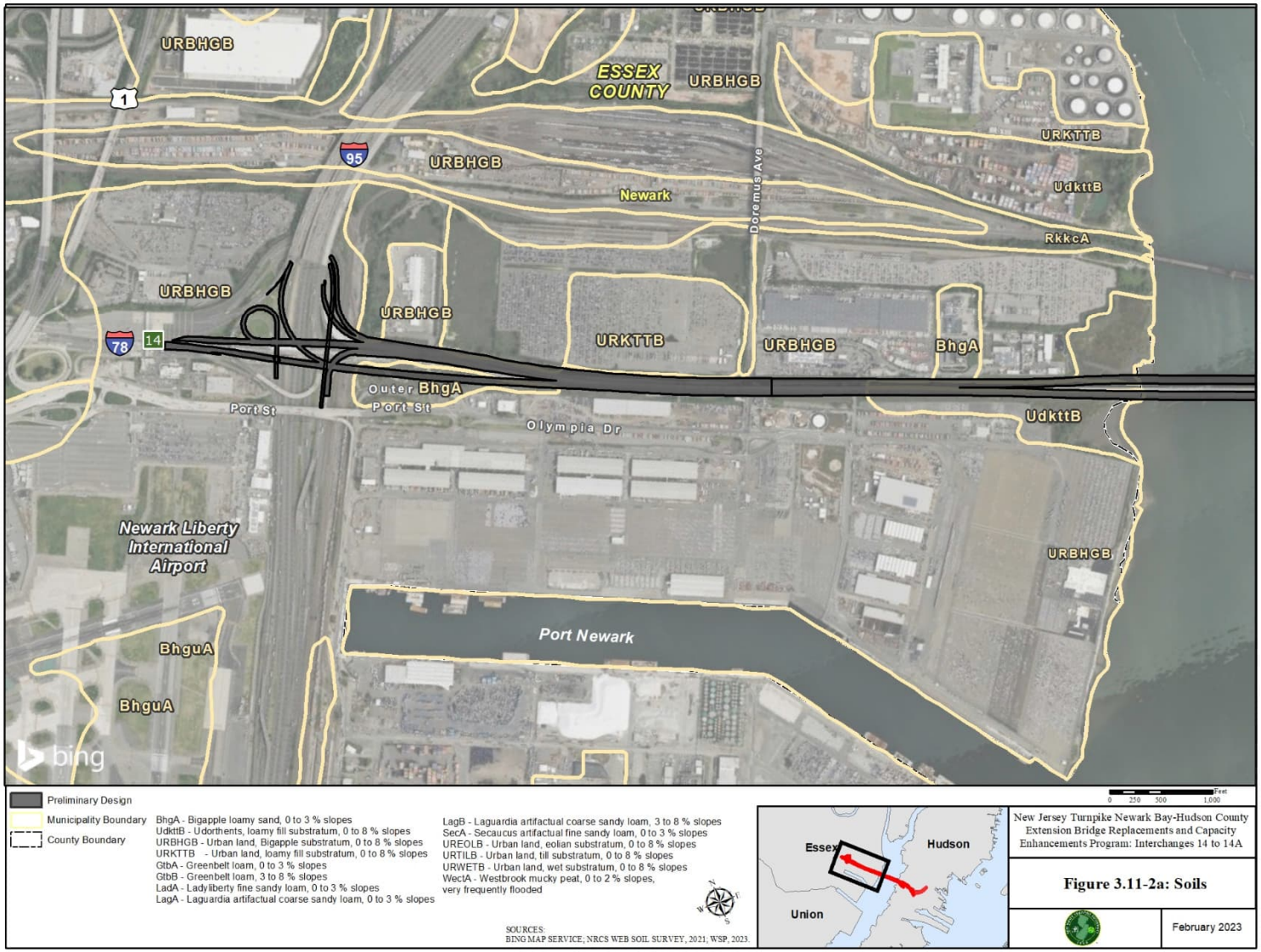


Figure 3.11-2b. Soils – Bayonne and Jersey City

3.11.3.3 Wetlands

Eighteen wetlands, one waterbody, and one stream were delineated within the study area, as shown in Table 3.11-2 and depicted in Figures 3.11-3a and 3.11-3b. Many of the wetland communities are associated with Newark Bay, including two tidal wetlands that directly abut the Bay and several adjacent freshwater wetlands that are within close proximity to the Bay or the abutting wetlands. Wetlands in the Newark portion of the study area occur along and underneath the elevated roadway of the NB-HCE and are constricted by adjacent industrial land uses. Wetlands in the Bayonne portion of the study area are located near Newark Bay in the vicinity of Route 440, on both sides of the NB-HCE. An application for LOI verification has been submitted to NJDEP. An application for a request for an approved jurisdictional determination has been submitted to the USACE. There are no coastal wetlands mapped under the jurisdiction of the Wetlands Act of 1970.

Freshwater Wetlands

Freshwater wetlands are discussed further below, grouped according to their Cowardin et al. (1979) classification.

Palustrine emergent, persistent (PEM1) and palustrine emergent, Phragmites australis (PEM5) – Palustrine wetlands include all non-tidal wetlands. The emergent wetland class is characterized by erect, rooted, herbaceous hydrophytes and the vegetation is present for most of the growing season in most years. In the study area, the wetlands in this community type are dominated either by persistent vegetation (PEM1) or *Phragmites australis* (PEM5). Palustrine emergent persistent vegetation observed within the study area includes swamp dock, (*Rumex verticillatus*), saltmarsh rush (*Juncus gerardii*), seaside goldenrod (*Solidago sempervirens*), field horsetail (*Equisetum arvense*), groundsel tree (*Baccharis hamilifolia*), curly dock (*Rumex crispus*), and sensitive fern (*Onoclea sensibilis*). The majority of emergent wetlands observed in the study area were dominated by *Phragmites australis*. These wetlands are located landward of the MHWL, alongside the NB-HCE in Newark, and near Route 440 in Bayonne.

Palustrine forested, broad-leaved deciduous (PFO1) – These palustrine wetlands are forested and characterized by woody vegetation that is approximately 20 feet or taller. The PFO1 wetlands in the study area contain broad-leaved deciduous tree species including slippery elm (*Ulmus rubra*). The herbaceous layer was dominated by poison ivy (*Toxicodendron radicans*), common reed, and curly dock. The only PFO1 wetland identified in the study area was delineated in a portion of Wetland DFJ, located in Bayonne.

Palustrine scrub-shrub, broad-leaved deciduous (PSS1) – These palustrine wetlands are dominated by woody vegetation less than 20 feet tall, including shrubs, small trees, or trees/shrubs stunted by environmental conditions. PSS1 wetlands in the study are limited to the freshwater portion of Wetland DFG and are dominated by groundsel tree (*Baccharis halimifolia*), saltmarsh rush (*Juncus gerardii*), goldenrods (*Solidago* spp.), and bedstraw (*Galium* spp).

Palustrine unconsolidated bottom, cobble-gravel (PUB1) – These palustrine wetlands include ponded areas, with a cobble bottom, which characterizes Wetland DFC. The unconsolidated bottom class includes habitats with at least 25 percent cover of particles smaller than stones and a vegetative cover less than 30 percent. These ponds are shallow (less than six feet deep) and lack significant surface vegetation. Wetland DFC is located underneath the NB-HCE viaduct and is significantly disturbed by ongoing bridge rehabilitation construction.

One open water ditch (Stream DFL-S) was delineated within the cloverleaf of Interchange 14A in Jersey City and is classified as riverine ephemeral, which only flows after precipitation events. The drainage area of Stream DFL-S is approximately 15 acres, and its waters are confined within a lawfully existing, man-made drainage feature and would not be regulated under the Flood Hazard Control Act (N.J.A.C. 7:13-2.3(c)).

Table 3.11-2. Delineated Wetlands and Waterbodies

Delineated Feature Name	Cowardin Classification[1]	Acreage within the Project Limits[2]	Linear Feet within the Study Area	Type of Aquatic Resource	Anticipated FWW Resource Value Classification[3]	Authority Which Resource "May Be" Subject To[3]
DFA	PEM5	0.636	--	Non-tidal wetland	Ordinary	NJDEP FWW
DFB	PEM5	4.252	--	Non-tidal wetland	Intermediate	NJDEP FWW
DFC	PUB1	0.039	--	Non-tidal wetland	Ordinary	NJDEP FWW
DFD	PEM5	0.063	--	Non-tidal wetland	Ordinary	NJDEP FWW
DFE	PEM5	0.101	--	Non-tidal wetland	Ordinary	NJDEP FWW
DFF	PEM5	0.017	--	Non-tidal wetland	Ordinary	NJDEP FWW
DFG	E2US3/E2EM5/PSS1	0.809	--	Non-tidal/tidal wetland	Intermediate	Section 404/NJDEP FWW & CZMA
DFH	PEM5	0.039	--	Non-tidal wetland	Intermediate	NJDEP FWW
DFI	PEM5	0.052	--	Non-tidal wetland	Intermediate	Section 404/NJDEP FWW
DFJ	PEM1/PFO1	0.153	--	Non-tidal wetland	Ordinary	Section 404/NJDEP FWW
DFK	PEM5	0.345	--	Non-tidal wetland	Exceptional	Section 404/NJDEP FWW
DFL-S (Ditch)	R6	0.012	127	Ephemeral stream	n/a	NJDEP FWW
DFP	PEM5	0.205	--	Non-tidal wetland	Ordinary	NJDEP FWW
DFQ	PEM5	0.212	--	Non-tidal wetland	Ordinary	NJDEP FWW
TSA	PEM5	2.024	--	Non-tidal wetland	Intermediate	NJDEP FWW
TSB	PEM5	0.010	--	Non-tidal wetland	Ordinary	NJDEP FWW
TSC	PEM5	0.467	--	Non-tidal wetland	Ordinary	NJDEP FWW
TSD (Wetlands of Newark Bay)	E2EM1/PEM5	6.340	--	Non-tidal/tidal wetland	Intermediate /Ordinary	Section 404/NJDEP FWW & CZMA
TSD (Open Water of Newark Bay)	E1UB3	24.600	376	Tidal wetland	n/a	Section 404/NJDEP CZMA
TSE	PEM1	0.672		Non-tidal wetland	Ordinary	Section 404/NJDEP FWW
TOTAL		40.895	503			

[1] Cowardin Classification Key:

E2EM1: Estuarine intertidal, emergent, persistent
E2EM5: Estuarine intertidal, emergent, *Phragmites australis*
E1UB3: Estuarine subtidal, unconsolidated bottom, mud
E2US3: Estuarine intertidal, unconsolidated shore, mud
PEM1: Palustrine emergent, persistent
PEM5: Palustrine emergent, *Phragmites australis*
PFO1: Palustrine forested, broad-leaved deciduous
PSS1: Palustrine scrub-shrub, broad-leaved deciduous
PUB1: Palustrine unconsolidated bottom, cobble-gravel
R6: Riverine ephemeral

[2] Most delineated features extend beyond the study area boundary and the acreage presented are clipped to the limits identified on preliminary design plans

[3] FWW: Regulated under the New Jersey Freshwater Wetlands Protection Act; Section 404: Under federal jurisdiction, regulated under Section 404 of the Clean Water Act; CZMA: Regulated under the New Jersey Coastal Management Program in accordance with the federal Coastal Zone Management Act

Tidal Wetlands

Newark Bay is a broad, navigable tidal water body classified as estuarine subtidal, unconsolidated bottom, mud (E1UB3) and was discussed previously under "Water Resources." Tidal wetlands occur on both sides of the bay and are discussed further below, grouped according to their Cowardin et al. (1979) classification.

Estuarine intertidal, emergent, persistent and common reed (Phragmites australis) (E2EM1/E2EM5) – In the intertidal subsystem, the substrate is exposed and flooded by tides. The E2EM wetlands in the study area are associated with tidal influence from Newark Bay and include shoreline areas of Wetland TSD on the west side of Newark Bay and Wetland DFG on the eastern side. This emergent wetland class is characterized by erect, rooted, herbaceous hydrophytes and the vegetation is present for most of the growing season in most years. Portions of Wetland TSD in this community type are dominated by saltmarsh cordgrass (*Spartina alterniflora*) (E2EM1), and portions of Wetland DFG in this community type are dominated by *Phragmites australis* (E2EM5). Wetland TSD is bisected by Warehouse Place, where a portion of the wetland flows underneath the roadway through a culvert, and is thus tidal westward to Doremus Avenue. The tidal portion of Wetland TSD receives tidal flow from Newark Bay and the remaining portion of the wetland is considered freshwater emergent (PEM5).

Estuarine intertidal, unconsolidated shore, mud (E2US3) – These estuarine wetlands are similar to those described above but have unconsolidated shores characterized by substrates lacking vegetation except for pioneering plants. The only E2US3 wetland found in the study area is associated with the tidal portion of Wetland DFG, which occurs infield of Route 440 in Bayonne. This wetland is connected to Newark Bay via a culvert under Route 440 in Bayonne.

Figure 3.11-3a. Wetlands – Newark

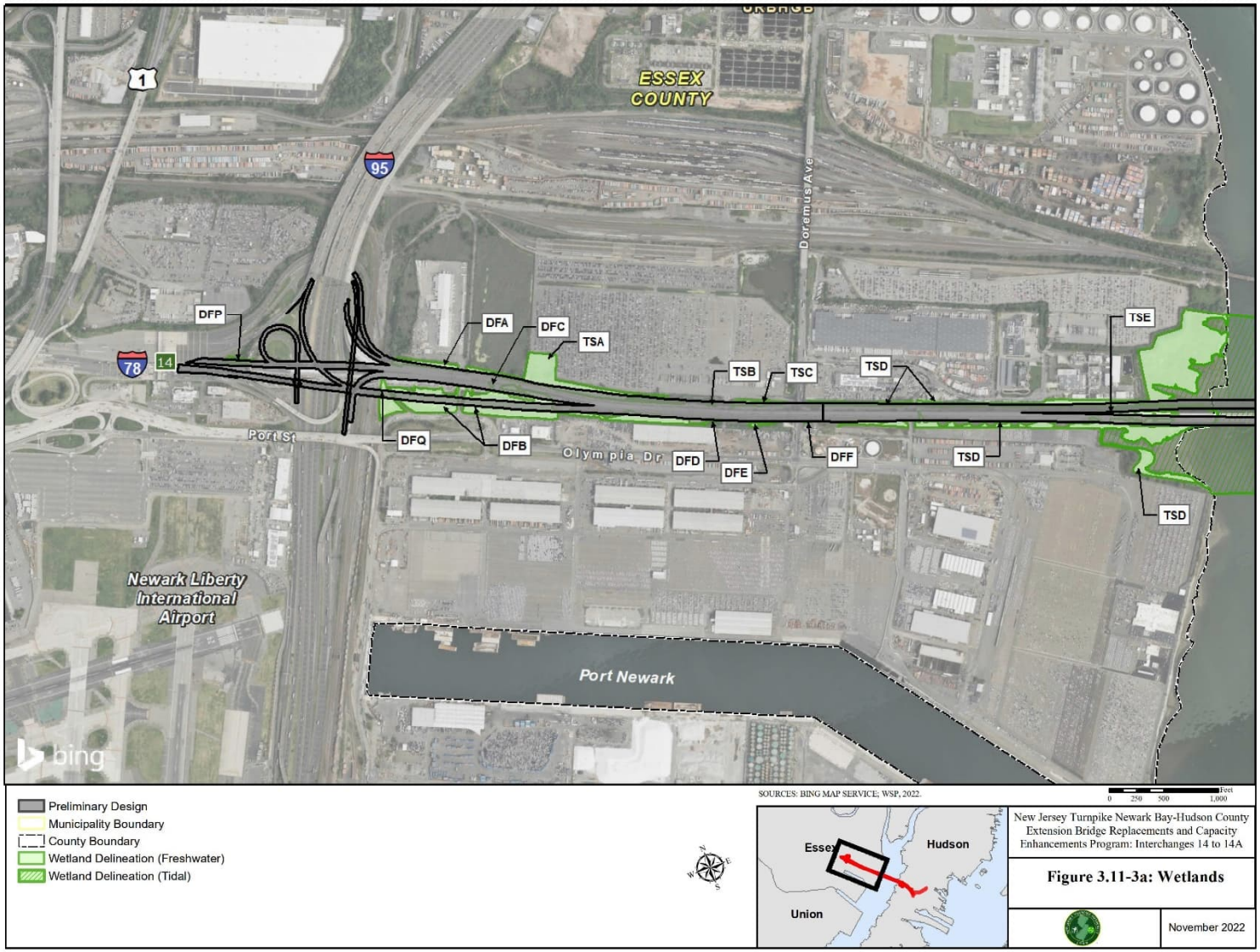


Figure 3.11-3b. Wetlands – Bayonne and Jersey City

3.11.3.4 Riparian Zones

The project crosses the riparian zone of Newark Bay. According to the policy for determining the riparian zone at N.J.A.C. 7:13-4.1, the portion of the riparian zone that occurs outside the regulated water is measured landward from the top of bank. N.J.A.C. 7:13-4.1 establishes a 150-foot riparian zone for waters that contains a threatened or endangered species and/or habitat for those species; therefore, the riparian zone for the Proposed Project is 150 feet wide.

3.11.3.5 Floodplains

Flooding is a common occurrence in coastal wetlands in the study area as tidal fluctuations cause flooding of wetland areas adjacent to Newark Bay. Less frequent flood events which, on average, are expected to be equaled or exceeded during any 100- or 500-year period are mapped by the FEMA in the study area. The 100-year flood zone and 500-year flood zone within the study area vicinity are shown on Figures 3.11-4a and 3.11-4b. For the most part, the existing NB-HCE is not within the floodplain. In places where it intersects a regulated floodplain, the NB-HCE structure is elevated above the floodplain on bridge/viaduct structures except for the piers and abutments that are located within the floodplain.

The effective FIRM panels show that Newark Bay and other low-lying areas in the study area are within the regulatory flood zone VE, which is subject to inundation by the 1-percent-annual-chance flood event and has additional hazards associated with storm waves. This flood zone has a base flood elevation of 8 to 15 feet within the study area (FEMA 2022). Additionally, the FEMA (2016) Flood Risk Map for the Essex County Coastal Project Area shows the area adjacent to Newark Bay are subject to coastal storm surges.

Major flooding events have occurred in the region resulting from the combination of significant storm events, as well as the tidal dynamics. USACE reports a history of significant events that caused "major" flood conditions in the Passaic River, some as recently as 2012, although NOAA indicates that many of the flooding events along the Passaic River are associated with channelization and regulation/diversion conditions in the river (USACE 2006a; NOAA 2011). This implies that not all major floods along the Passaic River resulted in flooding conditions in Newark Bay. Most recently, Hurricane Sandy's 12-foot storm surge submerged the Newark Bay shoreline in 2012, temporarily shutting down the nation's busiest container port. The inundation of flooding into Newark Bay during Hurricane Sandy was measured at 4 to 6 feet across Newark Bay in Elizabeth and the area around Newark Liberty International Airport (NJDEP 2014). With around 95 percent of Newark neighborhoods covered by buildings, roads, and other impervious surfaces, runoff from rainfall is a frequent source of flooding during sustained heavy rain events.

Figure 3.11-4a. Flood Zones – Newark

Figure 3.11-4b. Flood Zones – Bayonne and Jersey City

3.11.3.6 Coastal Zone and Tidelands

The study area is within a regulated waterfront development area of New Jersey. The New Jersey Waterfront Development Law regulates not only activities in tidal waters, but also the area adjacent to the water, extending from the MHWL to the first paved public road, railroad, or surveyable property line (minimum of 100 feet, to a maximum of 500 feet). As such, consistency with applicable Coastal Zone Management Rules (N.J.A.C. 7:7) must be determined. The Waterfront Development permit application would need to include a report and plans demonstrating compliance with the Flood Hazard Area Control Act rules as part of the coastal permit application.

New Jersey tidelands (formerly known as riparian lands) include all lands that are currently and formerly flowed by the mean high tide of a natural waterway. Tideland areas in the study area were identified in review of Land Use/Land Cover of New Jersey 2015 (NJDEP 2015). The areas under the NBB and extending back on the east bank 1,300 feet and on the west bank 3,200 feet, have been identified as containing tidelands claim area.

3.11.3.7 Aquatic Biota

In addition to freshwater wetland habitats, discussed above, the study area includes brackish and saltwater aquatic communities within Newark Bay. Newark Bay has a width ranging from about 0.6 to 1.2 miles. Within the study area, depths are generally less than 8 feet, except for the Newark Bay Main Navigational Channel North Reach, which passes under the Bridge and has an authorized width of 500 feet and a depth of 35 feet. The shoreline type along Newark Bay varies, consisting largely of riprap and bulkheads, with little natural shoreline remaining. The shorelines support algae, crabs, clams, and other invertebrates that serve as prey for fish like striped bass and bluefish. The western shore of Newark Bay below the existing bridge is riprap with tidal wetlands immediately north and south; the eastern shore of Newark Bay under the bridge is composed of riprap. Benthic habitats in Newark Bay in the study area tend to be dominated by silty-clay substrates and are degraded by contaminants. As such, the infaunal communities are relatively impacted in terms of species diversity and abundance (Iocco et al. 2000). Despite these impacts, the existing data as presented in Volume I of the Newark Bay Study Area Remedial Investigation Work Plan (Tierra Solutions 2005) indicate that Newark Bay supports a variety of vegetation, and fish and wildlife species (USACE 1999, USFWS 1997, NOAA 1994). The predominant categories of organisms include plankton/algae, aquatic and wetland plants, infaunal (benthic) invertebrates, bivalves (i.e., clams), crustaceans (i.e., shrimp and crabs), and various fish species occupying several trophic levels.

The NMFS EFH Mapper indicates that the NB-HCE corridor intersects EFH within Newark Bay for 11 fish species/management units (NMFS 2022b). In addition, the NB-HCE intersects one Habitat Area of Particular Concern (HAPC), the Mid-Atlantic HAPC for summer flounder (*Paralichthys dentatus*). NMFS identifies HAPC for juvenile and adult summer flounder across its entire range as "all native species of macroalgae, seagrasses, and freshwater and tidal macrophytes in any size bed, as well as loose aggregations, within adult and juvenile summer flounder EFH" (MAFMC 2016). The surveys described in Section 3.11.1.6 were used to prepare a composite summary of the expected seasonal occurrence of EFH-designated species in the Newark Bay area (Table 3.11-3). Of the 11 species for which EFH has been designated in the Newark Bay area, early life stages (eggs, larvae and juveniles) of five species (winter flounder, Atlantic herring, windowpane flounder, Atlantic butterfish and summer flounder) have been collected there (LMS 1996; USACE 1999, 2002, 2003, 2003, 2004a, 2004b, 2005, 2006b). Newark Bay is designated as EFH for egg, larval, juvenile and adult stages of winter flounder, windowpane flounder, and red hake. The presence of winter flounder and windowpane flounder eggs suggests possible spawning near the study area. Juveniles and/or adults of 10 EFH-designated species (winter flounder, little skate, Atlantic herring, red hake, windowpane flounder, clearnose skate, bluefish, Atlantic butterfish, and summer flounder) have been caught in the study area during the various fish community studies performed in Newark Bay and the USACE's winter flounder and migratory finfish surveys conducted for the New York/New Jersey Harbor Deepening Program (USACE 1999, 2002, 2003, 2003b, 2004a, 2004b, 2005, 2006b, 2012, 2015).

Table 3.11-3. EFH-Designated Species

Common Name	Eggs	Larvae	Juveniles	Adults
Winter flounder (*Pleuronectes americanus*)	X	X	X	X
Little skate (*Raja erinacea*)	--	--	X	X
Atlantic herring (*Clupea harengus*)	--	X	X	X
Red hake (*Urophycis tenuis*)	X	X	X	X
Windowpane flounder (*Scopthalmus aquosus*)	X	X	X	X
Winter skate (*Raja ocellata*)	--	--	X	X
Clearnose skate (*Raja eglanteria*)	--	--	X	X
Longfin inshore squid (*Doryteuthis pealeii*)	X	--	--	--
Bluefish (*Pomatomus saltatrix*)	--	--	X	X
Atlantic butterfish (*Peprilus triacanthus*)	--	X	--	--
Summer flounder (*Paralicthys dentatus*)	--	X	X	X

Many of the fish species in Newark Bay are transient or migratory, passing through Newark Bay to upstream spawning grounds or entering the area seasonally from nearby ocean waters. These include migratory species, such as striped bass, American shad, and river herring, which depend on the estuary as a nursery and a forage area for juveniles and adults. Shad and river herring are currently "depleted" and are experiencing low population abundances coastwide (ASMFC 2022a), while the striped bass are overfished, as determined by a 2018 Benchmark Stock Assessment, but are no longer experiencing overfishing relative to the updated biological reference points (ASMFC 2022b). Other species that frequent Newark Bay during similar life history stages include both marine and estuarine fish like winter flounder, bluefish (*Pomatomus saltatrix*), and summer flounder. Other fish species are year-round residents in Newark Bay; these generally begin spawning in late spring and continue throughout most of the summer following general onshore and offshore seasonal movement patterns (onshore in spring and summer, offshore to deeper waters in fall and winter). Most life stages of these species may be found in the estuary throughout the year. These species, such as the mummichog (*Fundulus heteroclitus*), bay anchovy, striped killifish (*Fundulus majalis*), provide an important forage base for larger predatory species.

The dominant fish species in the nearshore areas, or subtidal flats community, consist of small schooling fish like bay anchovy and Atlantic herring, with fewer larger fish like white perch and striped bass. Striped bass and Atlantic tomcod are more common in deeper waters of transitional zone and navigational channel (Tierra Solutions 2013). From seven shoal stations sampled by USACE (2004b) on the east side of Newark Bay, 28 species of fish were collected with a bottom trawl. Six species (striped bass, winter flounder, bay anchovy, Atlantic herring, Atlantic tomcod, and Atlantic silverside) dominated the catch from all shoal stations combined.

3.11.3.8 Terrestrial Vegetation and Wildlife

The expansion of industry and population surrounding Newark Bay has resulted in a severe reduction in the availability of natural habitats for indigenous and migratory wildlife (Tierra Solutions 2005). Due to the high human population density and extensive land development, terrestrial vegetation and wildlife habitat are extremely limited within the study area. The habitats that exist are remnants of the original ecosystem that contained a substantial diversity of plants and animals. The NJDEP (2015) Land Use/Land Cover of New Jersey 2015 indicates that the study area comprises approximately 54 percent urban land, 18 percent water, 19 percent wetland, 3 percent forest, and 6 percent upland grass/shrub.

Dominant vegetation in the upland communities in the study area include tree of heaven (*Ailanthus altissima*), slippery elm (*Ulmus rubra*), mugwort (*Artemisia vulgaris*), Japanese knotweed (*Reynoutria japonica*), red fescue (*Festuca rubra*), and Kentucky bluegrass (*Poa pratensis*). Most of the upland area in the study area consists of unvegetated gravel access area underneath the NB-HCE structure.

Due to this extensive development, terrestrial wildlife communities in the study area are thus largely composed of disturbance-tolerant species that are associated with fragmented habitats and forest edges, and those species that can habituate and co-exist with anthropogenic activities in disturbed settings. The following wildlife species were observed by ecologists during various site visits to the study area: snapping turtle (*Chelydra serpentina*), white-tailed deer (*Odocoileus virginianus*), northern diamondback terrapin (*Malaclemys terrapin*), ring-billed gull (*Larus delawarensis*), herring gull (*Larus argentatus*), red-throated loon (*Gavia stellata*), bufflehead (*Bucephala albeola*), American black duck (*Anas rubripes*), double-crested cormorant (*Phalacrocorax auritus*), fish crow (*Corvus ossifragus*), red-tailed hawk (*Buteo jamaicensis*), osprey (*Pandion haliaetus*), black-crowned night-heron (*Nycticorax nycticorax*), yellow-crowned night-heron (*Nyctanassa violacea*), brant (*Branta bernicla*), Canada goose (*Branta canadensis*), mallard (*Anas platyrhynchos*), great egret (*Ardea alba*), snowy egret (*Egretta thula*), European starling (*Sturnus vulgaris*), peregrine falcon (*Falco peregrinus*), rock pigeon (*Columbia livia*). Nearly all wildlife observations were associated with Newark Bay or the adjacent marsh to the west.

Newark Bay and its associated tidal wetlands provide migratory stopover habitat for various bird species, including waterfowl, wading birds, and fish-eating species. Water-dependent migratory bird species were observed foraging in Newark Bay during the spring months. While the Newark Bay shoreline is generally rip-rapped with limited foraging habitat, intertidal areas with submerged vegetation and mudflats exposed during low tide are located along the western side of the Bay in the study area. Breeding was not directly observed in these marshes, but on structures within and in the vicinity of the survey area. A fish crow nest was observed on the Conrail bridge to the north of the study area, in Newark Bay, and a red-tailed hawk nest was observed on a billboard located east of the Bay, adjacent to the Conrail line and Route 440 in Bayonne. Nesting by state-listed species, including osprey and peregrine falcon, are discussed below under *Threatened or Endangered Species*.

The USFWS (2022b) IPaC provides a summary of migratory bird records as part of the IPaC Resources List report (Appendix E), which indicates six migratory birds of conservation concern could be affected by activities within or near the study area: bald eagle (*Haliaeetus leucocephalus*), king rail (*Rallus elegans*), prairie warbler (*Dendroica discolor*), red-headed woodpecker (*Melanerpes erythrocephalus*), rusty blackbird (*Euphagus carolinus*), and wood thrush (*Hylocichla mustelina*). Of these, the bald eagle is the only species documented during field surveys, which is also protected by the BGEPA and listed by the State of New Jersey as an endangered species. Due to these protections, bald eagles are discussed further in the following section.

3.11.3.9 Special-Status Species

Certain rare and imperiled plants and animals are protected under the ESA and the New Jersey Endangered Species Conservation Act of 1973. The USFWS (2022b) reported that no ESA-listed species managed by USFWS could occur in the study area; however, one candidate species, the monarch butterfly (*Danaus plexippus*), is potentially affected by activities in this location. Common milkweed (*Asclepias syriacea*) was documented within an upland sample point adjacent to wetland DFE, but no other patches of milkweed were observed within the project limits, and there is very limited suitable foraging habitat within the surrounding developed lands. Important nectar-producing plants like goldenrods were not a dominant plant, as plant communities in the study area are dominated by invasive plants.

The NMFS (2022a) ESA Section 7 Mapper reported that the study area intersects habitat potentially used by the federally endangered Atlantic sturgeon (*Acipenser oxyrinchus oxyrinchus*) and shortnose sturgeon (*Acipenser brevirostrum*). This includes migrating and foraging habitats within Newark Bay for adult and subadult Atlantic sturgeon and for adult shortnose sturgeon. Based on studies in Newark Bay, the potential occurrence of sea turtles in Newark Bay is highly unlikely and they are dismissed from further analysis. This finding is supported

by the USACE Biological Assessment for the New York and New Jersey Harbor Deepening Channel Improvements Feasibility (USACE 2022d). There are no critical habitats found in the vicinity of the Proposed Project (USFWS 2022b, NMFS 2022c).

The NJDEP Natural Heritage Program reports that the survey area includes habitat patches that are potentially suitable for the following 13 state-endangered, threatened, or special-concern wildlife species, including three birds of prey, six wading birds, one shorebird, one butterfly, and two fish. These species are listed in Table 3.11-4 and suitable habitat for them, as mapped by the NJDEP Lands and Landscape Project, is shown in Figures 3.11-5a and 3.11-5b. Additionally, NJDEP indicates that the northern diamondback terrapin, a species of special concern, may occur in the study area. Two additional species, osprey (*Pandion haliaetus*) and yellow-crowned night-heron (*Nyctanassa violacea*), are also listed in Table 3.11-4, as they were observed in the vicinity of the survey area during field investigations.

Appropriate nesting habitat for the state-listed colonial waterbirds is not present in the study area. However, black-crowned night-herons, an extreme habitat generalist relative to other species, is known to occur in the study area and was observed on one occasion during field investigations in the tidal marsh west of Newark Bay. Yellow-crowned night-heron was also observed at the same time as the black-crowned night-heron, both foraging. The tidal marsh located west of Newark Bay, north of the NB-HCE is dominated by *Spartina alterniflora* and provides foraging habitat for wading bird species. All other tidal and freshwater marshes in the study area are mostly dominated by the invasive plant *Phragmites australis*.

Atlantic sturgeon and shortnose sturgeon could be present in the waters of Newark Bay and adjacent bays and tributaries. The New York Bight, Chesapeake Bay, Carolina, and South Atlantic Distinct Population Segments (DPS) of Atlantic sturgeon are endangered; the Gulf of Maine DPS is threatened. Adult and subadult Atlantic sturgeon originating from any of these DPSs could occur in the study area. Shortnose sturgeon are listed as endangered throughout their range. Because the young of both species remain in their natal river/estuary until about age two, and early life stages are not tolerant of saline waters, no eggs, larvae, or juvenile Atlantic or shortnose sturgeon would occur within Newark Bay and adjacent bays and tributaries (see Appendix E).

In 2021, a state-endangered peregrine falcon nest was documented on the NBB. As part of the proposed replacement of the NBB, wildlife biologists began monitoring an active peregrine falcon nest just west of the bridge's main span in 2021. WSP noticed the presence of falcons during wetland delineations in April 2021 and returned to confirm the nest location and observed one fledgling falcon in June 2021. Biologists continued monitoring in 2022, starting in mid-March, and confirmed two nestlings in May of 2022. After June 15, no falcons (adults or nestlings) were observed, and fledging was assumed based on the size and adult plumage of the nestlings observed the prior week. The nest site is located inside a steel beam, visible through a circular hole, approximately 500 feet from the west shore of Newark Bay. While suspected, this nest had not previously been confirmed by the NJDEP Division of Fish and Wildlife.

A bald eagle nest has been active for the past several years at Kearny Point near the confluence of the Hackensack and Passaic Rivers. It is a tree nest and is located approximately 1.5 mile north of the NBB (Smith and Clark 2015, 2020, 2021). The nest was first documented in 2015 and monitoring data suggests that its eggs hatch in late March and chicks fledge the nest in mid to late June. Per NJDEP monitoring, the nest has fledged young by early August during the past several years. Bald eagle reproduction in New Jersey officially begins on December 1, when nest building may commence, and ends on August 31, when fledging young has ended (USFWS 2007). The bald eagles from the Kearny Point nest potentially forage in the study area, although infrequently during nesting due to the distance from the nest area. Bald eagles may also roost and forage in the study area outside of the nesting season, including during winter.

An osprey nest was observed during monitoring in 2020 and 2022, is located on the Conrail bridge to the north of the NBB. Although not confirmed, it is presumed that the nest has successfully fledged chicks due to the nest site fidelity of the osprey pair.

Table 3.11-4. Threatened or Endangered Species

Common Name	Scientific Name	Federal Status	State Status	Suitable Habitat Present? (Type)
Atlantic sturgeon	*Acipenser oxyrinchus*	Endangered	Endangered	Yes (Migration & Foraging)
Bald eagle[1]	*Haliaeetus leucocephalus*	Protected	Endangered	Yes (Foraging)
Black-crowned night-heron	*Nycticorax*	Not Listed	Threatened	Yes (Foraging)
Cattle egret	*Bubulcus ibis*	Not Listed	Threatened	Yes (Foraging)
Checkered white	*Pontia protodice*	Not Listed	Threatened	No
Eastern small-footed myotis	*Myotis leibii*	Not Listed	Endangered[2]	Yes
Glossy ibis	*Plegadis falcinellus*	Not Listed	Special Concern	Yes (Foraging)
Least tern	*Sternula antillarum*	Not Listed	Endangered	Yes (Foraging)
Little brown bat	*Myotis lucifugus*	Under Review	Endangered[2]	Yes
Little blue heron	*Egretta caerulea*	None	Special Concern	Yes (Foraging)
Monarch butterfly	*Danaus plexippus*	Candidate	Special Concern	Yes
Northern long-eared bat	*Myotis septentrionalis*	Endangered	Endangered[2,3]	Yes
Osprey	*Pandion haliaetus*	Not Listed	Threatened[4]	Yes (Nesting & Foraging)
Peregrine falcon	*Falco peregrinus*	Not Listed	Endangered	Yes (Urban nesting)
Shortnose sturgeon	*Acipenser brevirostrum*	Endangered	Endangered	Yes (Migrating & Foraging)
Snowy egret	*Egretta thula*	Not Listed	Special Concern	Yes (Foraging)
Tricolored bat	*Perimyotis subflavus*	Proposed Endangered	Endangered[2]	Yes
Tricolored heron	*Egretta tricolor*	Not Listed	Special Concern	Yes (Foraging)
Yellow-crowned night-heron	*Nyctanassa violacea*	Not Listed	Threatened[5]	Yes (Foraging)

1 The Bald and Golden Eagle Protection Act provides for the protection of bald eagles by prohibiting the taking, possession, and commerce of such birds, except under certain specified conditions.
2 Northern long-eared bat, little brown bat, eastern small-footed myotis, and tri-colored bat, all of which are found state-wide, have been reviewed by Endangered and Non-game Species Program Biologists and the NJ Endangered and Nongame Advisory Committee and are given a "Consensus Status" of "Endangered," but are not formally listed.
3 Northern long-eared bat was not identified by the USFWS (2022b) IPaC as potentially occurring in the Proposed Project area or being potentially affected by the Proposed Project, but NJDEP (2021c) indicated that the species is found state-wide and is presumed to be present.
4 Osprey was not identified by the NJDEP Natural Heritage Program nor the Landscape Project habitat mapping, as potentially occurring on in the study area, but osprey nesting was directly observed during field investigations.
5 Yellow-crowned night-heron was not identified by the NJDEP Natural Heritage Program nor the Landscape Project habitat mapping, as potentially occurring on in the study area, but yellow-crowned night-heron were directly observed during field investigations.

Figure 3.11-5a. Threatened and Endangered Species – Newark

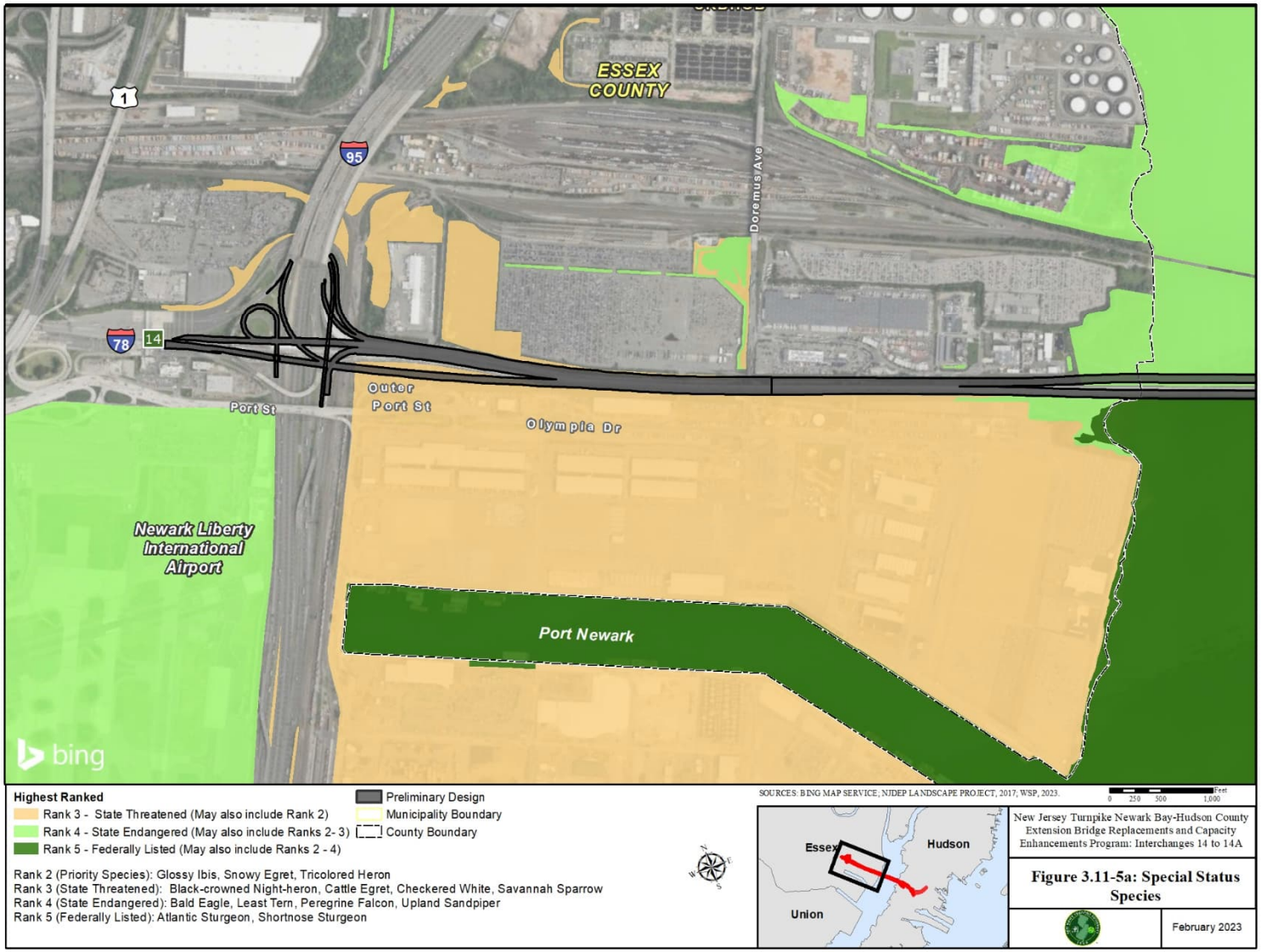
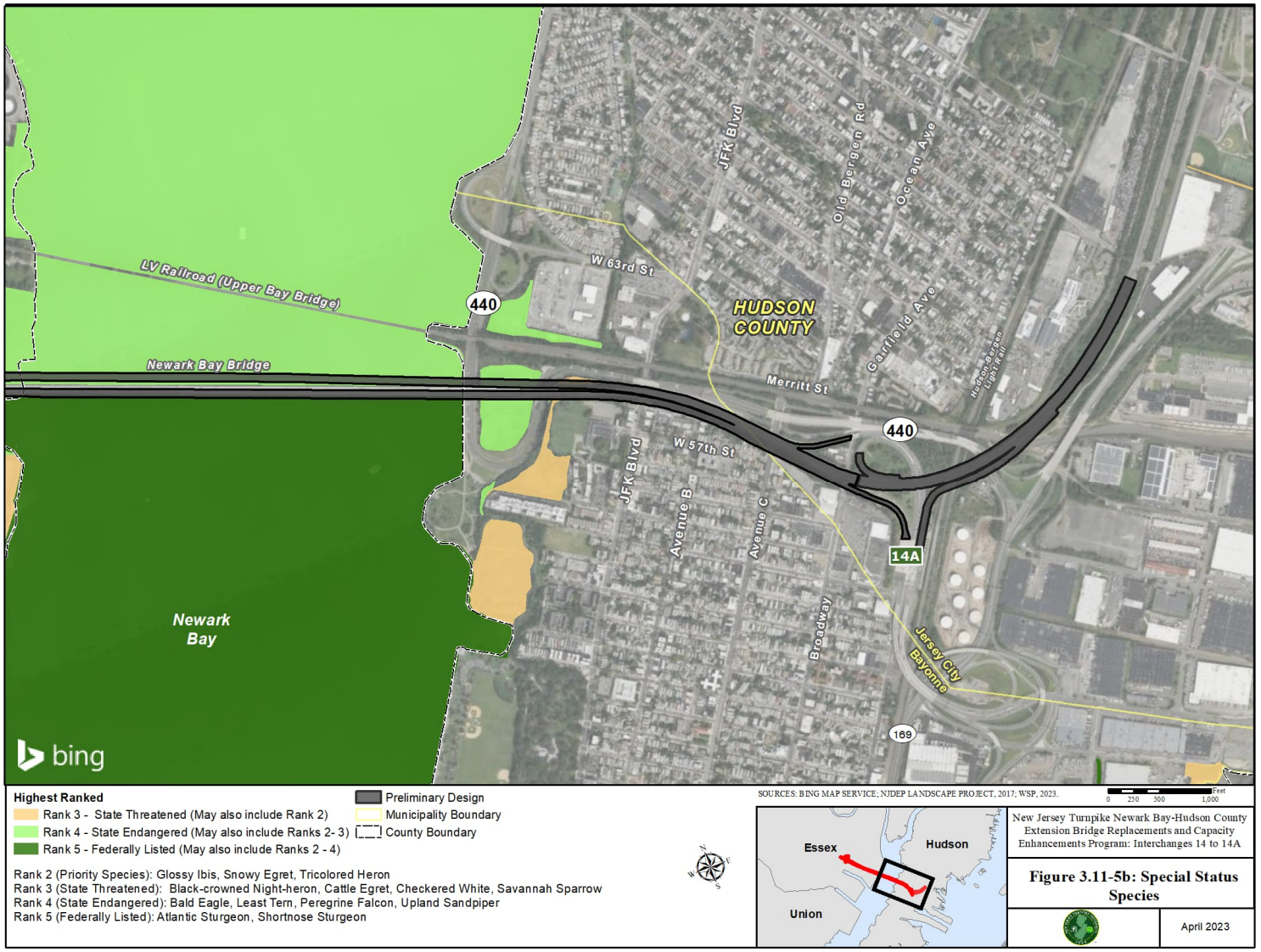


Figure 3.11-5b. Threatened and Endangered Species – Bayonne and Jersey City



In addition, according to NJDEP, the northern long-eared bat, little brown bat, eastern small-footed myotis, and tricolored bat, all of which are found statewide and have a "Consensus Status" of "Endangered" in New Jersey, must be considered if tree clearing is required. USFWS did not identify any occurrence of the northern long-eared bat, but the species may be present in the vicinity. The potential presence of other threatened or endangered bats is also assumed due to the lack of surveys.

All marine mammals are protected under the Marine Mammal Protection Act of 1972, which prohibits, with certain exceptions, the "take" of marine mammals in U.S. waters. "Take" is defined as to "harass, hunt, capture, kill or collect, or attempt to harass, hunt, capture, kill or collect." There is very limited available aquatic habitat for marine mammals, such as dolphins, in the vicinity of Newark Bay. However, the bottlenose dolphin (*Tursiops truncatus*), harbor porpoise (*Phocoena phocoena*), harbor seal (*Phoca vitulina*), and harp seal (*Pagophilus groenlandicus*) have all been sighted in waters adjoining Newark Bay in recent years (Frazier 2011, The Associated Press 2010, New Jersey Meadowlands Commission 2011). Although they are not common in Newark Bay, they are an infrequent potential visitor. The noise and traffic of cargo ships entering and leaving Newark Bay likely deter marine mammals from intentionally entering Newark Bay.

3.11.4 No Action Alternative

3.11.4.1 Geology and Soils

Under the No Action Alternative, current geologic processes such as erosion and sedimentation would continue at a rate comparable to that which currently exists because no new ground disturbance would result from the Proposed Project. No impacts to soils or geology are anticipated under the No Action Alternative.

3.11.4.2 Water Resources

Surface Water Quality

The primary impact associated with the No Action Alternative would be that the stormwater runoff from the existing NB-HCE, including the NBB and approach roads, would continue to be discharged directly into Newark Bay and other surface waters. Existing stormwater drainage for elevated roadway surfaces consists of open scuppers discharging into the open air and falling below the roadway surface. Runoff from the scuppers dissipates as it drops to the ground, similar to normal rainfall and discharges into existing wetlands and open waters. Existing hard paved surface areas associated with the NB-HCE within the study area limits totals approximately 50 acres. The current direct stormwater drainage into Newark Bay does not provide a reduction of the pollutant loading caused by the steadily increasing number of vehicles that travel on the bridge.

Groundwater Quality

The No Action Alternative would continue to allow untreated runoff from the NB-HCE to drain into pervious areas and, therefore, infiltrate into the groundwater, carrying pollutants with it. There are no Sole Source Aquifers located in the study area. Under the No Action Alternative, no potentially contaminated groundwater would be disturbed.

3.11.4.3 Wetlands

No impacts to wetlands are anticipated under the No Action Alternative. Rehabilitation activities as well as routine repair and maintenance on the existing bridge are expected to occur on and from the existing decking and superstructure above ground level. It is anticipated that any required construction staging areas could be located on upland areas, rather than in wetlands. Under the No Action Alternative, shading impacts to wetlands would be identical to those impacts existing under current conditions. Therefore, no changes in shading impacts would occur to wetlands beneath the bridge. However, minor impacts to wetland functions and values could potentially occur due to accidental fills or spills resulting from rehabilitation activities and bridge repair and maintenance.

3.11.4.4 Floodplains

The No Action Alternative would have zero increase in fill and impervious surfaces within the floodplain of Newark Bay. The Proposed Project would not be undertaken and the existing NBB would remain in its current location and configuration. As a result, nothing would occur to change flood risk and flood levels in the study area.

3.11.4.5 Coastal Zone and Tidelands

A Coastal Zone Consistency Assessment would not be needed to address impacts of the No Action Alternative. Also, no tideland conveyances would be necessary if the Proposed Project were to not be implemented.

3.11.4.6 Aquatic Biota

The No Action Alternative would require continued and increasing repair and maintenance needs of the NBB and existing viaducts and surface of the NB-HCE, from Interchange 14 to Interchange 14A. Routine repair and maintenance work is anticipated to include the replacement of the existing deck as well as various superstructure and substructure maintenance repairs. It is anticipated that the rehabilitation, repair, and maintenance work would be conducted on and from the existing decking and superstructure above ground level. As a result, no impacts to aquatic ecosystems are expected under the No Action Alternative. Also, no impacts are expected for marine mammals protected under the Marine Mammal Protection Act under the No Action Alternative.

3.11.4.7 Terrestrial Vegetation and Wildlife

Under the No Action Alternative, the small patches of natural vegetation within the study area would continue to provide low-quality habitat that supports species habituated to human activities. Wetlands would not be impacted and would remain as potential wildlife habitat. However, the existing roadway and NBB would require periodic rehabilitation activities and routine repairs and maintenance that could potentially cause visual and noise impacts that could affect wildlife foraging, breeding, and nesting.

3.11.4.8 Threatened or Endangered Species

Under the No Action Alternative, wetland habitat within the study area would not be filled and would remain as potential foraging habitat for wading birds, including protected species. There would be no impacts to threatened or endangered species, including the Atlantic sturgeon and shortnose sturgeon. The existing NBB would require periodic rehabilitation activities and routine repairs and maintenance that could potentially cause visual and noise impacts that could deter the peregrine falcon from successfully nesting on the bridge. However, these falcons are likely habituated to a high level of disturbance and have not yet been known to experience any adverse impacts of existing bridge maintenance activities. Likewise, any bald eagles that potentially forage in the study area could be disturbed by bridge repairs and maintenance, but no take would be expected to occur.

3.11.5 Proposed Project

3.11.5.1 Impacts

<u>Geology and Soils</u>

Under the Proposed Project, construction and associated excavation and drilling activities would reconfigure surface topography but are not expected to adversely affect the underlying geology of the area. Vibration due to pile driving would be largely avoided by using drilled shaft foundations for the bridge piers. There are no voids, fissures or unusual geologic conditions evidenced which would affect the construction of the Proposed Project Alternative. Geotechnical subsurface information will be used to inform the final designs of foundations to support all bridges, piers, and at-grade roadway widening locations, and will consider the Authority's design

criteria for seismic design requirements in the latest edition of the American Association of State Highway Officials Guide Specifications for LRFD Seismic Bridge Design, Second Edition, 2011.

Construction and demolition activities would involve the excavation of soils for installing cofferdams around pier structures, building stormwater basins, and establishing permanent access roads for construction, maintenance and security access. These activities would require only slight topographic modifications for ground leveling for staging and maneuvering construction equipment. Due to the flat topography of the site, the potential for soil erosion would generally be low. Construction and demolition would also require the laying of metal or wooden mat platforms on wet soils in areas where temporary wetland impacts are proposed. Low-ground-pressure construction equipment would be used whenever possible to perform construction in wetlands. Skid rigs would only be used when wooden planks or snow fencing is laid down to minimize disturbance of the ground surface. The need for construction mats and associated temporary impacts would be reduced where possible by installing temporary trestles for constructing the approach spans, although this would require temporary piles to be installed in places. All approach span piers located within open waters and wetlands would be constructed within sheetpile cofferdams in order to keep earth and water from entering the excavation site so that construction work can be performed in dry conditions. Soil mapping by USDA-NRCS (2022) indicates that over 30 percent of soils in the study area are "urban land" and the majority of the study area's surface area is covered by asphalt, concrete, buildings, and other impervious surfaces. In total, there would be permanent disturbance to approximately 28 acres of soil, including both wetlands (10.5 acres) and uplands (17.5 acres); and temporary disturbance to approximately 26 acres of soil, including both wetlands (7.5 acres) and uplands (18.4 acres). The Westbrook mucky peat soils are very poorly drained soils inundated by salt water at high tide. While soil erosion and sediment control measures would be in place, some amount of soils exposed due to construction and demolition activities would be naturally transported to the surrounding wetlands and waterways via erosion activities. To avoid and minimize potential increases in soil erosion during construction, erosion and sediment control measures would be implemented to mitigate adverse impacts to erodible soils, which may include a combination of turbidity barriers, silt fences, hay bales, diversion ditches, temporary grading, and vegetative or other protective coverings for exposed soils. Many of these methods are extremely effective at reducing sediment loss from construction sites. For example, siltation fencing can reduce off-site loss of sediment by 75 percent. All excavations in wetlands and open water would be conducted from within cofferdams, where water within these cofferdams would be pumped out to settling tanks before being discharged. In accordance with the Soil Erosion and Sediment Control Act of 1975, as amended (N.J.S.A. 4:24-39 et. seq.), a soil erosion and sediment control (SESC) plan will be prepared and implemented. The plan would meet the Standards for Soil Erosion and Sediment Control in New Jersey at N.J.A.C. 2:90 (New Jersey SSCC 2017) and be certified by the Hudson Essex Passaic Soil Conservation District *Urban Erosion and Sediment Control*. Upon completion of demolition of the existing NBB, all staging areas and temporary access roads would be removed, and the soils would be restored to their original grade and revegetated.

During construction, historic fill and other contaminated soil could be encountered during the Proposed Project and cause contaminants to be transferred to water, air, or other natural media. As discussed in Section 3.10, coordination with and approvals from NJDEP will occur prior to the disturbance, handling, and disposal of any contaminated soil and appropriate preventive measures will be undertaken to protect the safety of the public, construction workers, as well as the greater environment from exposure to contaminated soil.

Water Resources

Groundwater

Groundwater encountered during construction may be considered contaminated based on previous monitoring of several properties in the study area. Dewatering will be required within excavation areas where the groundwater table is encountered in order to reach the proposed excavation depths. Appropriate groundwater management approaches will be used for the safe disposal of water removed from the ground during construction. Management of contaminated groundwater is considered a remedial action and the construction contractor will be required to keep records of this work for future reporting by the Authority. The Contractor

would also apply for and obtain a Short-term De Minimis Discharge Permit (B7; previously the Construction Dewatering Permit) from the NJDEP Division of Water Quality.

During construction, contaminated groundwater could be encountered in places along the entirety of the study area during excavation for the demolition and construction of piers and footings of the viaducts and bridges. Construction activities within contaminated groundwater have a potential to cause contaminants to migrate both vertically and horizontally. As discussed under *Construction* in Section 3.10.5.1, the Proposed Project would follow the NJDEP (2012b) Linear Construction Technical Guidance to address any contaminated groundwater that is encountered during excavation and prevent the excavation from serving as a conduit for the spread of contaminated water. A pre-construction sampling plan will be developed during final design to identify locations of contaminated groundwater that may need to be managed during construction. Appropriate remedial actions, such as engineering controls, would be developed and implemented to avoid the potential for adverse impacts to construction workers, surrounding communities and the environment. Remedial actions or measures may include off-site disposal or treatment of contaminated groundwater. Institutional and engineering controls would be used to avoid the potential for post-construction impacts.

Constructing bridge foundations in Newark Bay will require sheet piling to construct cofferdams prior to excavation of sediments. Best management practices will be considered when designing structures and implementing construction activities within this area in order to minimize the potential toxicity impact to ecological receptors. Treatment of sediment-laden water may be required prior to discharging to surface water during dredging and cofferdam installations. Best management practices will also be implemented for in-water work when handling contaminated sediment as specified in the NJDEP (1997) Dredging Technical Manual.

Coordination with and approvals from NJDEP will occur prior to the disturbance, handling, and disposal of any contaminated groundwater and appropriate preventive measures will be undertaken to protect the safety of the public, construction workers, as well as the greater environment from exposure to contaminated groundwater. This is further detailed in Section 3.10.5.1.

Tidal Waters

The Proposed Project will result in approximately 5.853 acres of permanent impacts and 15.507 acres of temporary impacts to tidal waters of Newark Bay, a Traditionally Navigable Waterway under the jurisdiction of the USACE. Permanent impacts to tidal waters would occur as a result from the filling of waters from new pier placement and the new fender system. All activities considered temporary (to be removed) will be in place for greater than six months. Temporary impacts[9] include 12.598 acres for the installation of the construction trestle piles, including its shading, to construct the westbound bridge (approximately 550 piles) and demolish the existing bridge and construct the eastbound bridge (approximately 600 piles); other temporary impacts include the placement of cofferdams around the new and existing bridge pier footings and fenders, and construction access. The acreages associated with these various types of tidal-water impacts are summarized in Table 3.11-5. Impacts to intertidal and subtidal shallows are broken out in Table 3.11-6.

During the construction phase of the Proposed Project, soil erosion and resuspension of bottom sediments would be expected to cause the greatest impacts to surface waters. Construction activities such as clearing and grubbing, excavations, and the creation of equipment staging areas would expose and disturb the soil in the study area, potentially leading to soil erosion. The construction of additional impervious surfaces would also lead to increased stormwater runoff volumes and impact surface water quality through the potential increase of contaminants and sediments entering Newark Bay. Dissolved chemicals, such as hydrocarbons, nutrients, and road salt can enter the surface waters as stormwater runoff. In-water construction would impact water quality via increases in suspended sediments. The construction of the new NBB piers will involve installation and removal of over a thousand 36-inch steel pipe piles and approximately 10,000 linear feet of temporary sheetpile

[9] All impacts considered temporary (to be removed) will be in place for greater than six months.

cofferdam. The new bridge piers will be constructed by the drilled shaft method. These piers will be accessed via a temporary construction trestle extending out from each shore to the new main span pier locations just outside of the navigation channel. The temporary access trestle for the new westbound bridge would be supported by 36-inch diameter steel pipe piles and is expected to be in place for a period of approximately two years. Once the new westbound bridge is completed, another temporary trestle would be constructed out from each shore alongside the eastbound bridge and used for both demolishing the existing NBB and constructing the new bridge within its existing footprint. Bridge demolition would include removing all of the piers within Newark Bay to 2 feet below the mudline in accordance with Authority practice, except for the two main span piers which would remain to support the fendering system for the new bridges. This trestle would also be in place for a period of approximately two years. New trestle piles located below the MHWL would be installed initially by vibratory driving and finally by impact driving within a larger 60-inch diameter casing set to the mudline and equipped with air compressor lines to reduce sediment resuspension and underwater noise transmission during pile driving. The drilled shafts for the bridge piers would likely be advanced in-water with turbidity barriers used to minimize sediment resuspension and reduce impacts to the aquatic community. Turbidity barriers would minimize disturbances but would not contain 100 percent of suspended sediments and would be susceptible to changing water conditions, such as wave action, wind seiches, and turbulent tidal currents. Bridge pier construction would then take place within steel sheetpile cofferdams. Demolition of the existing bridge piers would also occur within sheetpile cofferdams. Following completion of bridge construction and demolition, cofferdams and trestle piles would be removed by vibratory extraction. All of this in-water construction activity requires considerable use of spud barges, tugboats and other support vessel types over a period of four years. The installation and removal of steel pipe piles and steel sheetpiles and associated spud barge mooring and tugboat propeller wash in the relatively shallow waters of Newark Bay will disturb bottom sediments and cause temporary increases in suspended sediment in the construction area.

Table 3.11-5. Tidal water Impacts in Newark Bay

Impact Type	Activity Duration	Acres
New pier footings	Permanent	3.342
New fenders to protect bridge piers	Permanent	1.544
Permanent access and maintenance	Permanent	0.967
	Total Permanent	5.853
Cofferdam sheeting around existing pier footings	Temporary	1.100
Cofferdam sheeting around new pier footings	Temporary	0.967
Cofferdam sheeting around new fenders	Temporary	0.570
Cofferdam sheeting around existing fenders	Temporary	0.042
Temporary construction trestles	Temporary	12.598
Construction Access	Temporary	0.229
	Total Temporary	15.507

Table 3.11-6. Intertidal and Subtidal Shallows Impacts

Impact Type	Activity Duration	Acres
New pier footings	Permanent	0.824
New fenders to protect bridge piers	Permanent	0.261
Permanent access and maintenance	Permanent	1.427
	Total Permanent	2.512
Cofferdam sheeting around existing pier footings	Temporary	0.266
Cofferdam sheeting around new pier footings	Temporary	0.309
Cofferdam sheeting around new fenders	Temporary	0.102
Temporary construction trestles	Temporary	4.450
Construction Access	Temporary	0.389
	Total Temporary	5.516

The tidal water impacts described above include impacts to intertidal and subtidal shallows, which are regulated under N.J.A.C. 7:7. The spring high tide line (mean higher high water) is 3.61 feet above sea level, and the Mean Low Water is -2.84 feet below sea level (North American Vertical Datum of 1988). Therefore, any development, filling, or dredging to land between elevation +3.61 feet to -6.84 feet is considered impacts to intertidal and subtidal shallows. The Proposed Project would result in 2.512 acres of permanent impacts to intertidal and subtidal shallows associated with new pier footings and fenders, and construction of a permanent access and maintenance area under the new structure. Temporarily impacts also include 5.516 acres of intertidal and subtidal shallows due to the installation of the construction trestle piles, and its shading; the placement of cofferdams around the new and existing bridge pier footings and fenders; and construction access. Approximately 1.5 acres of the permanent impacts to tidal waters comprise *Phragmites australis* emergent wetlands and tidal emergent low marsh located below the mean high water line along the shore of Newark Bay, under the approach spans of the NBB. On the western shore of Newark Bay, these permanent tidal wetland impacts include just over one acre of tidal marsh within Wetland TSD, portions of which are dominated by *Spartina alterniflora* and are of higher ecological value than *Phragmites australis* wetlands elsewhere in the study area. On the eastern shore of the Newark Bay, tidal wetland impacts would occur along the Newark Bay shoreline and an approximately 0.354 acres of permanent impacts would occur to a tidal wetland that is connected to Newark Bay via a culvert under Route 440, north of the existing bridge (Wetland DFG), resulting from permanent access and portions of pier footings.

The introduction of suspended sediment in the water column of Newark Bay could result in increased total suspended solids (TSS) and turbidity, decreased dissolved oxygen levels (due to increases in Biochemical Oxygen Demand), and decreased photosynthesis due to increased turbidity. Surface water quality in Newark Bay could also be affected by additional metal or chemical (organic or inorganic) loadings associated with sediments. Metals, nutrients, and other chemicals may be released into the surrounding waterways during the dredging, dewatering of cofferdams, and movement of construction material, fuels, and lubricants. Because sediments within Newark Bay are known to be heavily impacted with PCBs, dioxins, and metals, best management practices would be implemented to minimize the potential for, and magnitude of, adverse environmental impacts that could result.

The Proposed Project would increase the area of existing paved roadway by almost 45 percent, from approximately 60 to 86 acres, including both pavement at ground level and elevated bridge/viaduct surfaces. The paved surface area of the existing NBB over top of open water in Newark Bay totals around 7 acres and

the paved surface area of the new bridge spans over top of open water, accounting for the demolition of the existing bridge, would be approximately double and total over 15 acres. Stormwater runoff from these paved surfaces would flow either directly into Newark Bay or into wetland and water quality detention basins that ultimately drain into the Bay. To demonstrate compliance with the NJDEP's Stormwater Management Rules (N.J.A.C. 7:8), a stormwater management analysis for the Proposed Project has been developed within each HUC-14 watershed to estimate the number, sizes, and locations of stormwater management basins that may be required. It is expected that, overall, the Proposed Project would improve the water quality of stormwater runoff over existing conditions due to the presence of the new detention facilities. Also, hydrodynamic separator-type Manufactured Treatment Devices would be used to remove floatable debris (e.g., leaves, trash, oil) and to remove suspended solids from storm water runoff. There would not be an increase in peak flows to any of the local storm sewer systems receiving runoff from the NB-HCE. The proposed stormwater basins will achieve that goal, although specific analyses may be required for submission to local sewer authorities.

Long-term impacts to water quality related to the increase in impervious surfaces and associated pollutant loading of stormwater will include the construction of approximately 19 stormwater basins to intercept and treat stormwater runoff from the roadway (Figures 3.11-6a and 3.11-6b). At Interchange 14, seven basins are proposed within infield areas of the right-of-way. East of Interchange 14 and west of Newark Bay, four basins are proposed beneath viaduct structures. East of Newark Bay and west of Interchange 14A, two basins are proposed beneath the viaduct structures near Route 440, and one basin is proposed at the former Marist High School site. One basin is proposed in the infield of Interchange 14A and four basins are proposed between Interchange 14A and Linden Avenue. Stormwater runoff would also be reduced via the use of extended detention basins. These best management practices can also be used for nutrient removal. In addition, the Proposed Project would comply with the storm drain inlet design standard provided in the NJDEP Highway Agency Stormwater Guidance to control passage of solid and floatable materials through storm drain inlets (NJDEP 2004).

Figure 3.11-6a. Proposed Stormwater Management Basins – Newark

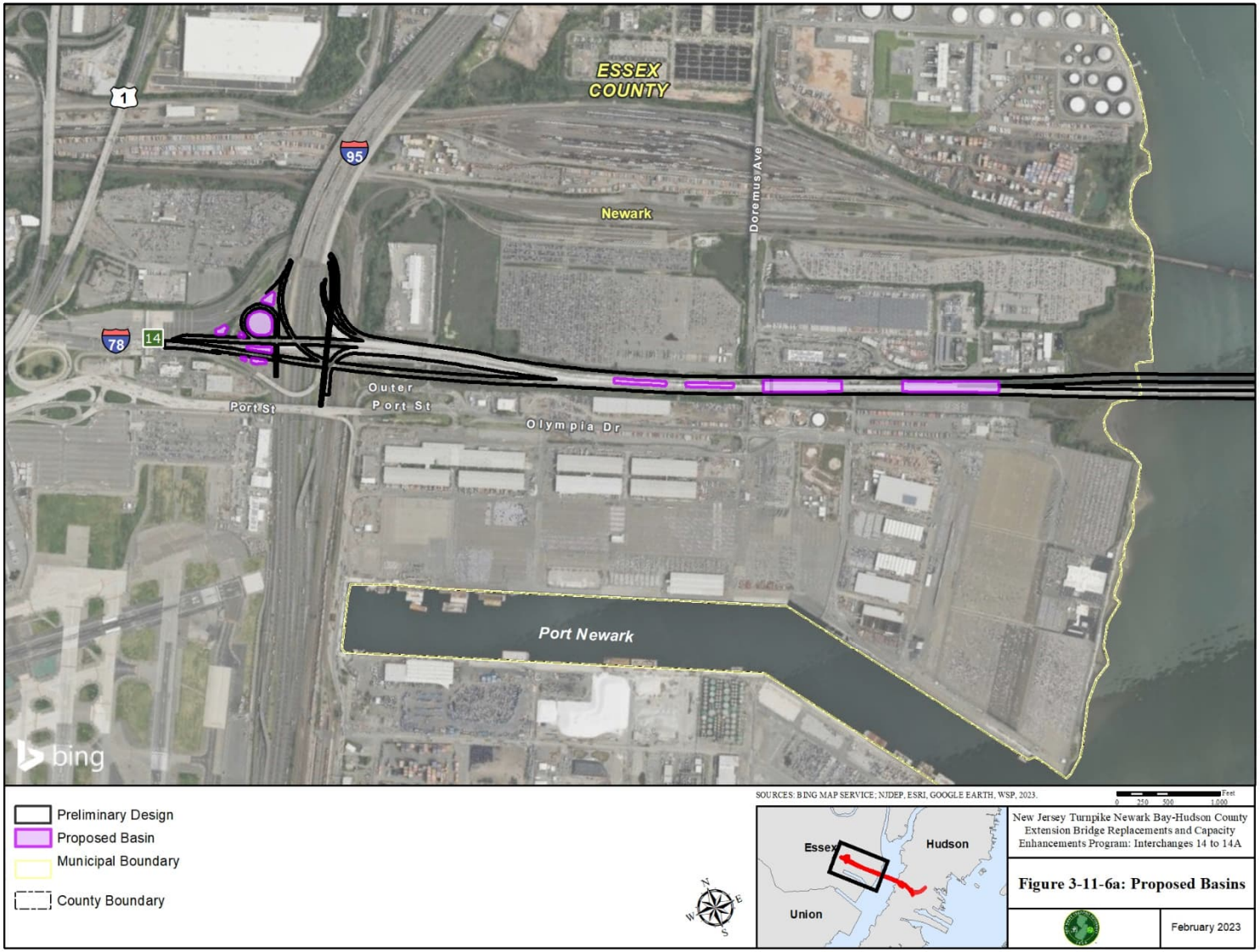
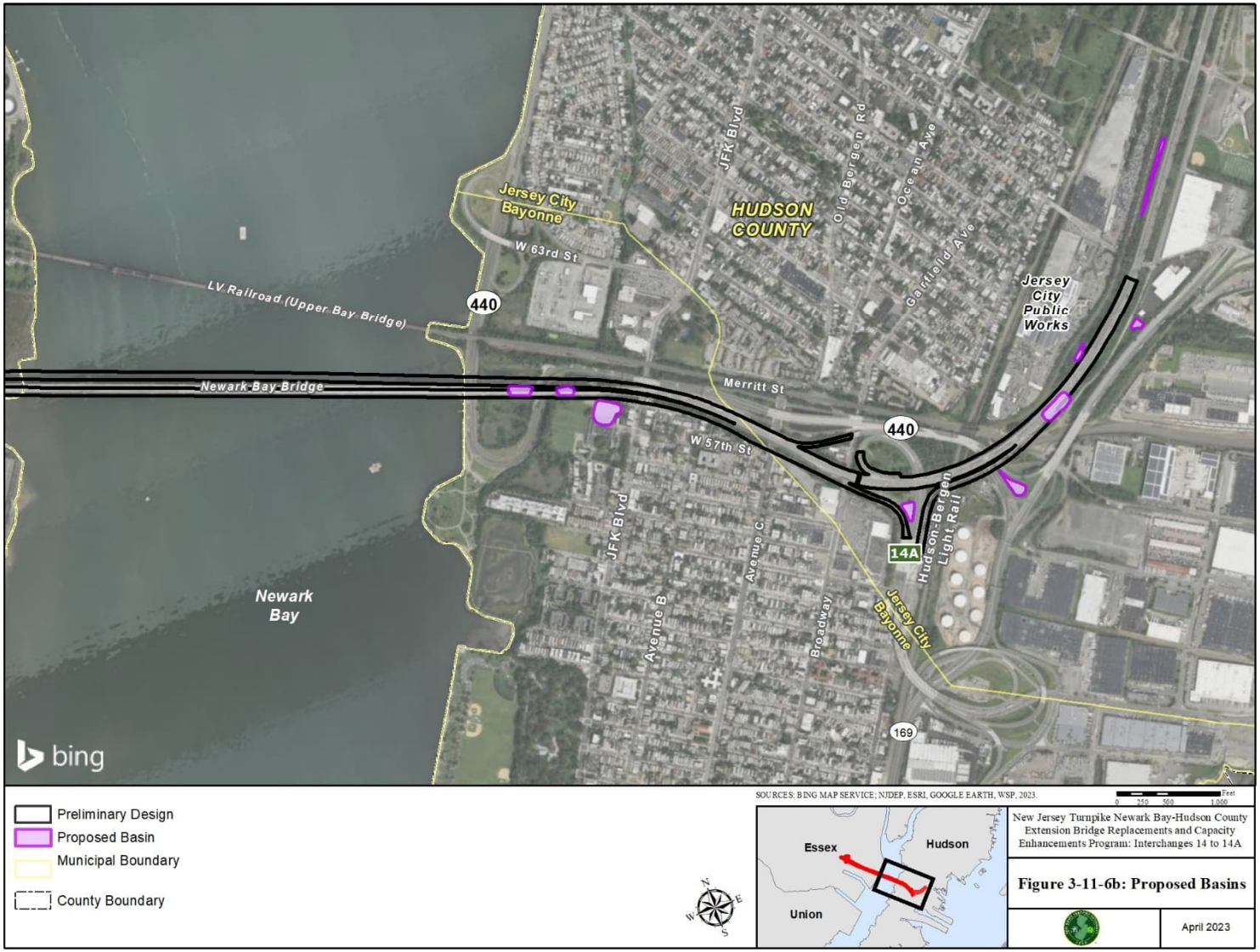


Figure 3.11-6b. Proposed Stormwater Management Basins – Bayonne and Jersey City



It should be noted that, because an Initially Preferred Alternative for the NB-HCE Program was established prior to March 1, 2021, the Proposed Project is not required to comply with the NJDEP's Green Infrastructure rules that went into effect on that date. However, the Proposed Project includes infiltration testing and groundwater monitoring to determine whether infiltration-type best management practices will be feasible, since installing such measures can minimize construction cost and reduce the stormwater runoff burden on combined sewer overflow systems, which currently drain the study area. At the time of this writing, the infiltration testing, and groundwater monitoring are underway. Relevant data gathered from that program will be considered and presented prior to the conclusion of the preliminary design effort.

Impacts associated with construction would be minimized by restricting in-water work to dry conditions within cofferdams and implementing an SESC plan. During construction, impacts due to the increase of TSS and turbidity, and release of metals and chemicals from the sediment into the water column would be mitigated through controlling soil movement and minimizing the resuspension of sediments in the water column. The methods that will be used to achieve this will be specified in the SESC plan that would be developed prior to the initiation of field activities. This plan will specify the best management practices that will be used to minimize the impacts of construction. Control measures that may be used to meet the conditions of the permit include turbidity barriers, hay bales, silt fences, dikes, swales, and cofferdams. Implementation of this plan will be carefully monitored during construction so as to facilitate utilization of the best sediment management options during construction activities. Work for the bridge abutments and piers will be performed with the use of cofferdams and sealing off of sediments which will then be appropriately disposed of offsite. Measures will be employed during demolition to prevent deposition of debris into Newark Bay. Measures will be taken during construction of the piers (i.e., cofferdams, turbidity barriers, etc.) to minimize disturbance of bottom sediments and reduce such sediment resuspension, thereby not affecting turbidity. Trestle piles would be driven within casings; steel sheetpiles will be installed with vibratory hammers; drilled shafts will be advanced with turbidity barriers or bubble curtains; and bridge pier construction and demolition will be performed in dry conditions within cofferdams.

The discharge of excavated material and/or placement fill material into navigable waters, as required for construction under the Proposed Project, would be performed in compliance with the Clean Water Act Section 404 (b) (1), Guidelines for Specification of Disposal Sites for Dredged or Fill Material. Construction impacts will be mitigated in accordance with an SESC plan that will be developed in compliance with stormwater discharge permit requirements, including erosion and sediment control measures in accordance with the Soil Erosion and Sediment Control Act of 1975, as amended (N.J.S.A. 4:24-39 et. seq.). The concepts proposed in the Preliminary Stormwater Management Design Report have been discussed with NJDEP and the final design will be developed after the issuance of the Finding of No Significant Impact and during the NJDEP Waterfront Development permitting process. The USCG would further evaluate water quality impacts associated with filling and excavating activities in navigable waters, and the Authority would obtain a permit from the USACE in accordance with Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act. The Authority would comply with all the terms and conditions of a Section 404 Permit and NJDEP permits, and provide compensatory mitigation for permanent impacts, inclusive of temporary impacts greater than 6 months in duration. Compensation for unavoidable impacts would include purchasing mitigation credits from existing mitigation banks within Watershed Management Area (WMA) 5 (Hackensack River, Hudson River and Pascack Brook Watersheds) and WMA 7 (Arthur Kill Watershed), as detailed further in Section 3.11.5.2 below.

To address water quality impacts associated with potential pollutant discharges during construction, a New Jersey Pollutant Discharge Elimination System permit would be obtained. Because the Proposed Project would result in the disturbance of greater than one acre, it is required by NJDEP that coverage under the General Stormwater Permit (5G3) be obtained. For this permit, certification of an SESC plan would first need to be obtained from the Hudson Essex Passaic Soil Conservation District. Operational impacts due to the increase of runoff, and thus the increase in pollutant loading will be minimized through the development and implementation of an SESC plan. Pursuant to the stormwater quality requirements of the Stormwater Management Rules at N.J.A.C. 7:8, the best management practices would provide the required reduction of

average annual TSS load and will reduce the average annual nutrient load by the maximum extent feasible. The SESC plan and stormwater management design would:

- Comply with applicable design and performance standards;
- Ensure long-term operation and maintenance of best management practices;
- Comply with standards to control passage of solids and floatable materials through storm drain inlets; and
- Reduce the discharge of pollutants to the maximum extent possible.

The Contractor would also apply for and obtain the appropriate Surface Water General Permit(s) required under N.J.A.C. 7:14A a Short-term De Minimis Discharge Permit (B7; previously the Construction Dewatering Permit) from the NJDEP Division of Water Quality. Potentially applicable General Permits include the following:

- • Short-term De Minimis Discharge Permit (B7; previously the Construction Dewatering Permit). The Short-term De Minimis Discharge Permit authorizes short term, uncontaminated discharges of groundwater generated during construction activities for the purpose of lowering the groundwater table. A de minimis discharge for the purposes of this general permit is defined as a discharge containing a relatively insignificant amount of pollutants that complies with all of the conditions specified in this permit.

- • General Petroleum Product Cleanup (B4B). This general permit authorizes the discharge of treated groundwater from remediations, dewatering, and pump test activities that may be necessary due to contamination by petroleum products to eligible surface waters of the State.

- • General Groundwater Remediation Clean-up (BGR). This general permit authorizes the discharge of treated groundwater resulting from groundwater remediations, dewaterings, and pump test activities as associated with non-petroleum products into eligible surface waters of the State or storm sewers.

Freshwater Wetlands

Several delineated wetlands would be disturbed by the implementation of the Proposed Project. Most are freshwater wetlands, and nearly all are palustrine (non-tidal) features that are dominated by the invasive *Phragmites australis*. A summary of anticipated freshwater (palustrine) wetland impacts is provided in Table 3.11-7 and wetland impacts are depicted in Figures 3.11-7a and 3.11-7b. Approximately 8.856 acres of freshwater wetlands would be permanently disturbed by the implementation of the Proposed Project, of which 3.764 acres are identified as Waters of the United States (WOTUS) and under federal jurisdiction as detailed in an Approved Jurisdictional Determination (JD) request submitted to USACE on May 13, 2022 (see Section 4.1.3). Permanent freshwater wetland impacts can be divided into three areas: (1) 8.674 acres impacted by the footprint of the elevated NB-HCE roadway and the placement of fill to provide "permanent access" underneath the structure for maintenance, inspections, and security, including impacts from viaduct support structures and stormwater basins, (2) 0.062 acres impacted by proposed pier footings that would extend beyond the edge of the permanent access; and (3) 0.120 acres impacted by roadway embankment. Additionally, approximately 7.91 acres of freshwater wetlands would be subject to temporary disturbance[10] during construction, of which 2.777 acres are identified as WOTUS. Temporary impacts can be divided into four areas: (1) 6.614 acres impacted by construction staging and access areas, (2) 0.422 acres impacted by the installation and removal of cofferdam

[10] All temporary impacts associated with the proposed action will persist for more than six months but will be restored to their original topography, and all necessary measures will be implemented to ensure that the original vegetative cover onsite is restored to its previous, or improved condition.

sheetpiles around bridge pier footings, and (3) 0.877 acres impacted by NBB construction trestle piles and its shading of freshwater wetlands. Additionally, these activities would cause approximately 3.205 acres of permanent and 2.765 acres of temporary impacts to freshwater wetland transition areas. To prevent soil compaction and minimize impacts within freshwater wetlands and transition areas during temporary disturbance, construction pats, timber matting, and/or geotextile fabric would be used, in addition to standard BMPs like using oversized, low-pressure tires.

Mitigation for these impacts is discussed in Section 3.11.5.2 below.

Figure 3.11-7a. Wetland Impacts – Newark

Figure 3.11-7b. Wetland Impacts – Bayonne and Jersey City

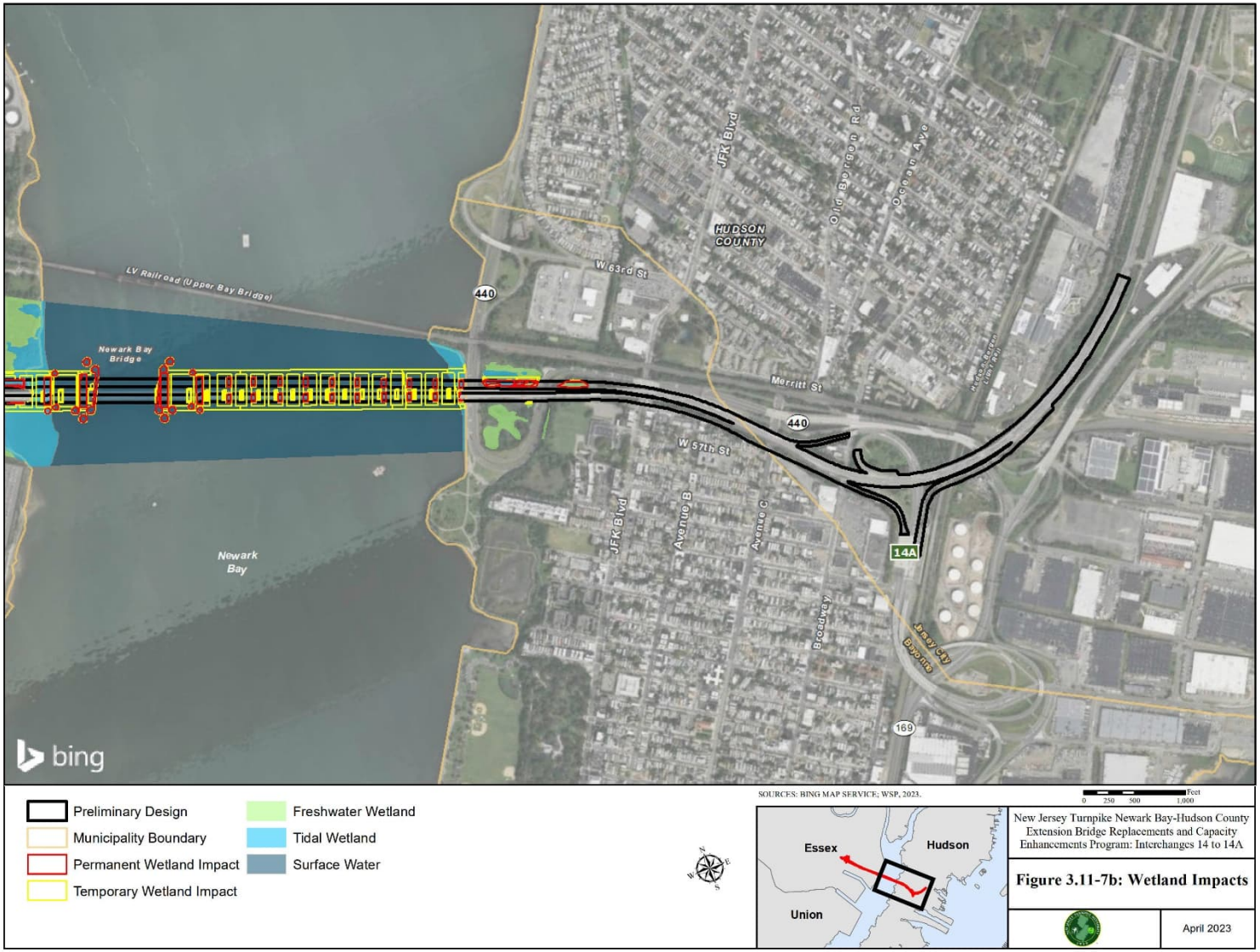


Table 3.11-7. Freshwater Wetland Impacts

Impact Type	Activity Duration	Impacted Wetland(s)	Acres
Permanent access	Permanent	DFA (0.316 acres), DFB (3.655 acres), DFC (0.039 acres), DFD (0.019 acres), DFF (0.004 acres), DFG (0.320 acres), DFK (0.311 acres), TSA (1.005 acres), TSB (0.010 acres), TSC (0.253 acres), TSD (2.070 acres), & TSE (0.673 acres)	8.674
New pier footings	Permanent	DFB (0.010 acres), DFD (0.004 acres), DFG (0.005 acres), DFQ (0.030 acres), TSA (0.0001 acres), TSC (0.007 acres), & TSD (0.001 acres)	0.062
Road fill (embankment)	Permanent	DFP	0.120
		Total Permanent	8.856
Construction access	Temporary	DFB (3.758 acres), DFD (0.034 acres), DFE (0.101 acres), DFG (0.174 acres), DFI (0.020 acres), DFK (0.028 acres), DFP (0.071 acres),TSA (0.048 acres), & TSC (0.191 acres), TSD (2.187 acres)	6.614
Cofferdam sheeting around existing pier footings	Temporary	DFB (0.047 acres), DFQ (0.024 acres), & TSD (0.053 acres)	0.124
Cofferdam sheeting around new pier footings	Temporary	DFA (0.016 acres), DFB (0.087 acres), DFD (0.006 acres), DFF (0.002 acres), DFG (0.010 acres), DFQ (0.022 acres), DFK (0.003 acres), TSA (0.060 acres), TSC (0.016 acres), & TSD (0.076 acres)	0.298
Temporary construction trestles	Temporary	TSD	0.877
		Total Temporary	7.913

The Proposed Project would result in more than double the area of existing impervious surface and there would be corresponding increases in stormwater runoff, ultimately discharged to Newark Bay and adjacent wetlands. However, surface runoff from paved surfaces would be collected on bridge and viaduct sections and conveyed to detention basins that will treat the water for TSS, contaminants, and nutrients, and the Proposed Project would result in a decrease in pollutant loading. Stormwater treatment structures will not be placed in wetlands. As noted previously, a final design of the stormwater treatment structures and methods will be developed during the subsequent permitting process described in Section 4.12.

Riparian Zones

A 150-foot wide riparian buffer is located along both sides Newark Bay and along a regulated ditch at the western end of the project limits. Approximately 4.294 acres of permanent riparian zone impacts would occur due to the removal of vegetation associated with construction of the various project elements, and 2.343 acres of temporary impacts to riparian zone would occur (Table 3.11-8). Details regarding impacts to the riparian zone are shown in the Flood Hazard Area permit plans and accompanying Stormwater Management Report for the Proposed Project. All temporarily disturbed riparian areas will be restored subsequent to construction.

Table 3.11-8. Riparian Zone Impacts

Regulated Area	Permanent Impacts (acres)	Temporary Impacts (acres)
Riparian Zone	4.295	2.343

Floodplains

Newark Bay is tidally influenced throughout the study area and is a primary cause of potential flooding, and its floodplains would be regulated as a tidal flood hazard area under the New Jersey Flood Hazard Area Control Act Rules (N.J.A.C. 7:13). The Proposed Project would require construction within the 100- and 500-year floodplains of Newark Bay. Bridge piers and towers would be constructed in the floodplains and the placement of these structures would displace some floodplain volume. However, the existing and proposed NB-HCE structure is above the floodplain except for the piers and abutments that are located within the floodplain. The proposed structure will require the addition of 28 new pier footings to be installed entirely within the 100-year floodplain but within Newark Bay. Because the fill from these structures is entirely within tidal waterbodies, no impacts to the flood heights are anticipated. Very localized changes in water circulation around bridge piers would occur, but that would not impact flooding or floodplain storage, as flooding is influenced by tidal surge emanating from the Atlantic Ocean through Newark Bay. All bridge components, including the superstructure and mechanical and electrical equipment, would be resilient to both normal tidal fluctuation and storm-related ocean surges and to saltwater. These design features decrease future risk of damage and loss of life associated with the Proposed Project and would not result in a substantial impact to floodplain values.

The footprint area of permanent structures within the floodplain would increase in comparison to the existing structures because of the need for larger bridge piers to support the wider bridge decks carrying more traffic lanes than at present. The need for a permanent access road to the bridge piers and towers would also increase the footprint area. The total area of new fill within the 100-year floodplains is anticipated to be 0.55 acres due to portions of 20 new pier footings. The majority of these impacts, or 0.34 acres would result from 16 new pier footings within the 100-year floodplain on the north side of the NB-HCE in Newark between Interchange 14 and Newark Bay. The remaining impacts, or 0.21 acres of four new pier footings within the 100-year floodplain, would occur in Bayonne to the north of the Marist High School property. Generally, these types of impacts within regulated flood hazard areas require separate Flood Hazard Area permits for authorization. However, portions of the study area would be subject to regulation under the NJDEP Waterfront Development Law (N.J.A.C. 7:7) and by rule, compliance with the Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) can take place within the context of a Waterfront Development Permit and a separate Flood Hazard Act Permit would not be required. Given, the minor modifications to the floodplain that would result from the Proposed Project, and its location within a tidal waterbody, adverse impacts to the floodplain or flooding of areas adjacent to the study area are not expected. The final design the proposed structures will ensure that all elements adhere to the Flood Hazard Area requirements.

In conjunction with the roadway improvements the Proposed Project would build a new stormwater drainage system that would include provisions for water quality treatment for the stormwater runoff generated by the proposed roadway surfaces. As required by New Jersey stormwater runoff quantity standards at N.J.A.C. 7:8-5.6, the stormwater management design would ensure that the post-construction peak runoff rates from the proposed surfaces for the 2-, 10-, and 100-year storm events would be reduced to 50, 75, and 80 percent, respectively, of the pre-construction peak runoff rates. The existing drainage system would be replaced with a new closed pipe system with roadway runoff being conveyed to approximately 20 stormwater detention basins. The Authority's preferred method for achieving those reductions is via above-ground basins due to the excessive life-cycle costs and access limitations associated with below-ground stormwater storage facilities. The basins will be designed according to NJDEP specifications to treat areas of new and reconstructed pavement. The basins are located to avoid impacting existing wetlands, utilities, and hazardous material "hot-spots," with locations coordinated with the proposed structures and embankments. Basins proposed beneath the viaduct

structures would be designed to include maintenance/inspection access roads within the 100-year storm storage volumes of the basins. There are also basins proposed along embankment-supported segments of the NB-HCE, including those located outside of the existing NB-HCE right-of-way.

The Proposed Project must not increase peak flows to any of the local storm sewer systems receiving runoff from the NB-HCE. Based on the concepts proposed in a Preliminary Stormwater Management Design Report, the proposed stormwater basins would achieve that goal, but specific analyses may be required for submission to local sewer authorities.

Temporary soil stockpiling may occur within the 100-year floodplain, which would be conducted in accordance with NJDEP Flood Hazard Area Control Act Rules and the NJDEP Flood Hazard Area Permit and plans approved for the Proposed Project. As outlined in N.J.A.C. 7:13-12.17(b), in order to minimize the potential that hazardous substances would be transported off site by floodwaters during the conduct of subsurface activities in sensitive areas, all material necessary to facilitate the excavation and/or removal of hazardous substances would be stored and stockpiled as follows: (1) outside any floodway; (2) as far as practicable from any regulated water; and (3) where practicable, within flood-resistant containment areas; and (4) where such material does not meet the Residential Direct Contact Soil Remediation Standards at N.J.A.C. 7:26D, above the 10-year flood elevation.

The Proposed Project would comply with the provisions of E.O. 11988 and E.O. 13690 by following the Interagency Water Resources Council implementation guidelines (Interagency Water Resources Council 2015). Also, based on the above analysis, the Proposed Project would comply with U.S. Department of Transportation Order 5650.2, Floodplain Management and Protection.

Coastal Zone and Tidelands

As the study area is within the coastal zone boundaries of New Jersey, the Proposed Project will be required to address New Jersey state policies to certify compliance with New Jersey's Coastal Management Program, as approved under the National Coastal Zone Management Program. As part of this draft environmental assessment, a draft Coastal Zone Consistency Assessment for the Proposed Project has been developed that evaluates how it is consistent with the state's coastal policies. Based on this preliminary evaluation pursuant to the Coastal Zone Management Act (CZMA), the USCG has determined that the Proposed Project will be conducted in a manner fully consistent or consistent to the maximum extent practicable with the federally approved enforceable policies of the New Jersey coastal management program.

The construction of new in-water structures would require an application to the Bureau of Tidelands for a new Instrument. For the tidally claimed areas impacted by the Proposed Project, the Authority would determine whether there is a Tidelands License or Riparian Grant for these areas and if any licenses are still valid. If there is no grant or licenses are no longer valid, then the Authority would apply for a new Tidelands Instrument for work proposed within the claimed areas.

Aquatic Biota

Construction of the bridge support structures would directly impact aquatic ecosystems, including freshwater and tidal wetlands, and open water in Newark Bay. Bridge construction methods may include a combination of drilling shafts and pile driving for the bridge support structures, which would introduce sound into the water and would disturb fish habitat in Newark Bay. This could disturb important fish habitat and disrupt migration of fish during spring spawning runs of striped bass, as well as shad and river herring, through the Newark Bay area. Other temporary impacts such as suspension of sediments and increased turbidity would occur during construction. The water quality impacts of the Proposed Project are discussed above under "Water Resources."

Short-term effects on aquatic biota resulting from the Proposed Project include the following: displacement of fish from available water column habitat in Newark Bay due to avoidance of areas of hydrological disturbance; noise and vibrations caused by construction; increased turbidity and levels of resuspended solids and

contaminants; and temporary sediment disturbance and associated loss of the benthic community within cofferdams. Most impacts would be temporary and would include 2.679 acres for the placement of cofferdams around the new and existing bridge pier footings and fenders, and 12.598 acres for the trestle to construct the westbound bridge (approximately 550 piles) and demolish the existing bridge and construct the eastbound bridge (approximately 600 piles) (Table 3.11-5). In addition to these impacts to Newark Bay, there would also be 0.234 acres of temporary impacts to wetland DFG, including 0.224 acres for construction access, and 0.010 acres for the placement of cofferdams around new bridge piers; however, Wetland DFG is connected to Newark Bay via culvert and does not likely provide suitable habitat for most species found in tidal water column and benthic habitats. Temporary impacts to Newark Bay would last for the for the duration of construction, or around two years, but would not be simultaneous because of construction sequencing.

Additional temporary impacts would result from spud barge movements and associated vessel propeller wash in the shallow waters of Newark Bay. Small turbidity increases are expected to occur during construction from these activities which in turn may impact some fish species that are sensitive to water quality fluctuations. Flounder species are particularly susceptible to bay bottom disturbance because of their demersal habitat preference and dependence on benthic forage species. Winter flounder eggs, which are demersal, adhesive, and stick together in cluster are particularly susceptible to burial from sediment resuspension and deposition. However, turbidity in Newark Bay is naturally highly variable, depending on freshwater inflow, strong tidal currents, storms, and other factors. Other fish such as little skate, Atlantic herring, red hake, clearnose skate, bluefish, and Atlantic butterfish are less demersal or fully pelagic and are only seasonally present in the Newark Bay area. Following bridge construction and demolition, fish and other aquatic habits are expected to resume use of temporarily lost portions of the water column; any temporary impacts from the Proposed Project are expected to be negligible. Other EFH-designated species (little skate, Atlantic herring, red hake, clearnose skate, bluefish, and Atlantic butterfish) are less demersal or fully pelagic and are only seasonally present in the Newark Bay area. Pelagic species, including forage species of EFH-designated species are expected to resume use of temporarily lost portions of the water column following bridge construction and demolition. Any temporary impacts to pelagic species from the Proposed Project are expected to be negligible. Further detail about impacts on EFH-designated species can be found in the EFH Assessment (Appendix E). At this point, it is anticipated that the Authority will perform its formal consultation with NMFS during its regulatory review of the Bridge Permit Application, pursuant to the Magnuson-Stevens Act Provisions for Federal Agency Consultation with the Secretary (50 CFR Part 600.920).

Upon completion of bridge construction, areas of water column and benthic habitat occupied by cofferdams and trestle piles will be available to all fish species. The 2.679 acres of benthic habitat temporarily lost due to cofferdam placement and 12.598 acres temporarily lost due the construction trestle (Table 3.11-5) would be devoid of benthic forage species after cofferdam and trestle removal. Substrates around the new bridge piers and in areas where the existing NBB piers were removed would be recolonized by mobile organisms from adjacent unaffected areas and by natural recruitment. Recovery of the natural benthic assemblage to baseline conditions of abundance, biomass, and community composition should occur within one to five years in most cofferdam areas where sediment type and hydrodynamics remain unchanged (Newell et al. 1998). The presence of the new bridge piers will alter hydrodynamics in the immediate area around each bridge pier, so sediments may be coarser adjacent to piers due to lack of settlement of silt particles and a different benthic community composition may result in these areas. Areas of pier removal would be backfilled to adjacent grades with sand and would become naturally recolonized over time. Areas of salt marsh temporarily impacted by construction trestles and cofferdams would be regraded to original elevations and replanted with native salt marsh species. Monitoring required by NJDEP permits would ensure that restored salt marsh areas meet performance standards.

Long-term effects on aquatic biota include effects resulting from construction activities in Newark Bay, including the alteration of substrate types and benthic habitats; changes in depth, hydrodynamics, and sedimentation rates; and permanent loss of water column and benthic habitats resulting from new bridge piers. The new bridge pier footings and fenders would result in the permanent fill in Newark Bay totaling

approximately 5.853 acres (Table 3.11-5). The removal of the existing NBB piers, except for the main span piers that would remain, would result in the gain of 0.842 acres of tidal waters, for a net permanent habitat loss in Newark Bay of 5.011 acres. The permanent loss of natural sand-silt benthic habitat of Newark Bay would impact flounder species, which are the EFH-designated species most affected by the loss of bay bottom because they are largely demersal and require this habitat for shelter and foraging. Winter flounder also require fine-grained bottom habitat for spawning. However, the area of loss is relatively small compared to the overall area of intertidal and subtidal shallows available in Newark Bay. Wetland mitigation would be required to offset ecological impacts to tidal wetlands, as detailed in Section 3.11.5.2. The loss of bay bottom would be somewhat offset by the habitat functions provided by the new bridge piers. The intertidal and subtidal surfaces of the new bridge piers will provide hard substrate for the epibenthic fouling estuarine community, such as mussels, barnacles, and tunicates, and will likely support algae, and will function as fish habitat for pelagic and structure-oriented fish species.

Salt marsh adjacent to the NBB, are designated as HAPC for summer flounder. Direct impacts within tidal portions of Wetland TSD are expected to be minor because juvenile and adults are mobile and would likely move from the study area due to disruptions from construction. Impacts to larvae could include loss of individuals during construction (direct impact), and increased turbidity and reduced water quality (indirect impacts) that would affect habitat condition and feeding. These impacts would be located along the western shoreline of Newark Bay where approximately 1.240 acres of impacts to tidal marsh HAPC would occur, including 1.055 acres of permanent impacts due to new pier footings, fenders, and construction access, and 0.185 acres of temporary impacts due to cofferdam sheeting around pier footings, existing pier footing removal, and trestle pile installation. There is no region-wide mapping of summer flounder EFH and GARFO (2021) indicates that local sources and on-site surveys may be needed to identify submerged aquatic vegetation beds. Due to its connection to Newark Bay via culvert, Wetland DFG would not likely provide this habitat. Future surveys would be performed to delineate the extent of vegetated shallows within the limits of the Proposed Project. Following construction, these tidal wetlands would be graded to appropriate elevations, replanted with native salt marsh species and would be subjected to permit-mandated monitoring to ensure restoration success.

To avoid interference with spring spawning runs of striped bass and other migratory fish, as well as Atlantic Sturgeon (see below under "Threatened or Endangered Species"), NJDEP recommended that the Proposed Project follow the "NY/NJ Harbor Agreement: February 1 – May 31" (NJDEP 2021c). Additionally, best management practices would be implemented to reduce impacts of construction on migrating fish by monitoring and controlling turbidity, noise, and overall habitat disturbance. These practices are expected to include the following: constructing and demolishing bridge piers within cofferdams to reduce sediment and contaminant resuspension; vibratory pile-driving of sheetpile cofferdams and use of turbidity barriers and/or air bubble curtains to minimize noise generation and sediment resuspension and escapement; and installation of trestle piers within casings using compressed air to reduce noise transmission to surrounding waters. Potential soil stockpile erosion into Newark Bay would also be minimized through the use of standard best management practices like silt fences or hay bales. NMFS and NJDEP will likely place restrictions on the scheduling of in-river activities to protect fisheries. Coordination between these agencies will take place during the permitting phase. NMFS and FHWA have developed best management practices for in-water work (GARFO 2018). These best management practices include time of year (TOY) restrictions for each state in the greater Atlantic region so that in-water work (i.e., turbidity producing activities) may be avoided during sensitive life stages of managed species. These standard TOY restrictions consider the breeding, nursery, and migration stages of species which are especially vulnerable to in-water silt-producing activities, noise impacts, or activities which may encroach greater than 25 percent into a waterway interfering with migration. Bridge construction and demolition activities would adhere to the New Jersey in-water TOY restrictions from January 1 to June 30 which minimize turbidity-related impacts to winter flounder spawning and river herring migration and would be protective of aquatic resources for half of the year. Work could proceed within cofferdams installed outside of this restriction period. Bridge construction and demolition would not substantially block Newark Bay in the fall, so the diadromous fish restriction from September to November 30 may not be warranted. Submerged aquatic vegetation is not present in Newark Bay. The overwintering blue crab and striped bass restriction period

from November 15 to April 15 would be substantially protected by observing the winter flounder and diadromous fish restriction periods from January 1 to June 30.

Terrestrial Vegetation and Wildlife

The Proposed Project would result in the permanent loss of approximately 10.5 acres of wetland communities, which provide most of the limited wildlife habitat within the study area, split between approximately 9 acres of freshwater wetland impacts and 1.5 acres of tidal wetland impacts; and cause temporary impacts to approximately 8 acres of wetlands, split between approximately 7.9 acres of freshwater wetland impacts and 0.5 acres of tidal wetland impacts. Most impacted wetlands are dominated by *Phragmites australis*, except for the *Spartina* marsh located on the western shore of Newark Bay, north of the NB-HCE. The habitat value of the *Phragmites*-dominated communities is generally low due to low species diversity and high levels of anthropogenic activities and disturbance; thus, impacts to wildlife and vegetative species are anticipated to be negligible. The loss of tidal marsh may cause adverse impacts to foraging habitat used by many species, including mammals like mink, muskrat, and raccoon; reptiles like the northern diamondback terrapin; threatened or endangered wading birds (see below under "Threatened or Endangered Species"); other water birds like mallard, double-crested cormorant, and ring-billed gulls; diurnal raptors like osprey, peregrine falcon, and red-tailed hawk; and many passerines including killdeer, red-winged blackbird, song sparrow, swamp sparrow, and marsh wren. Migratory species that utilize the marsh for foraging are prone to impacts and the portion of the marsh to be impacted has the potential to provide nesting habitat for passerine and waterfowl species. The removal of vegetation and filling of wetlands during construction could cause displacement of individuals to nearby suitable habitat and may increase competition for reproductive, foraging, nesting, and migratory habitat. Wildlife mortality could increase if no suitable habitat exists nearby, but the loss of vegetation communities would result in minor adverse impacts to wildlife resources of the region. Marsh vegetation would be removed outside of the breeding window for these species in New Jersey (March through August) to eliminate the potential for nesting during the active season if work cannot abide by breeding season timing restrictions for migratory bird species. Based on this analysis, pursuant to the Migratory Bird Treaty Act, the Proposed Project will not result in take of migratory birds or the parts, nests, or eggs of such bird. While habitat used by migratory birds may result in destruction or modification, construction activities would be performed outside of the nesting season when there is no potential for take of any birds or eggs. Other raptor and corvid species observed nesting in the vicinity of the study area (osprey, red-tailed hawk, and fish crow) are unlikely to be impacted by the Proposed Project because their nests are located on structures outside of the study area and in areas with existing elevated levels of traffic, noise, and human disturbance (active trains, billboard lighting). There is no potential nesting habitat for diamondback terrapin in study area and the Proposed Project would only disturb potential foraging habitat.

In total, the Proposed Project would intersect approximately 47 acres of unpaved, vegetated uplands as identified on preliminary design plans. In addition to the wetland impacts discussed above, the Proposed Project would cause approximately 17.5 acres of permanent impacts and 18.4 acres of temporary impacts to these uplands, of which the vast majority are mowed grass and bare ground that provides little to no wildlife habitat. Upland vegetative communities within the survey area are also very limited in size and dominated by invasive plant species such as mugwort, tree of heaven, Japanese knotweed, and various turf grass species. Due to the limited size and quality of the upland vegetated communities in the study area, impacts from the Proposed Project would be negligible for terrestrial wildlife species. Following construction, disturbed areas not occupied by permanent structures would be revegetated with a native seed mix of species indigenous to this region of New Jersey to the greatest extent practicable in accordance with a revegetation plan that would be in compliance with E.O.13112, Invasive Species.

Given the existing levels of noise and other human activity to which birds and other wildlife are accustomed and the low disturbance sensitivity of most species, the Proposed Project is not expected to elevate noise levels to the point that there would be significant disturbance to birds. The birds occurring closer to the NB-HCE, including the threatened or endangered species in Table 3.11-4, are expected to be habituated to elevated noise and anthropogenic activity from ongoing traffic and maintenance work. However, construction and demolition

activities may affect species that are habituated to only lower levels of baseline disturbance and some species could potentially be temporarily displaced or otherwise adversely affected. The birds with the most potential to be affected are those that would occur in closest proximity to the areas of construction, such as peregrine falcons that nest on the bridge, and waterbirds that forage in Newark Bay. A more detailed analysis of the impacts to the peregrine falcon is discussed below under "Threatened or Endangered Species." Waterbirds that forage in Newark Bay would in most cases be expected to temporarily avoid the areas of construction activity and instead utilize other sections of the river slightly up or down stream. Temporary displacement is not considered to have the potential to significantly affect these species given the small size of the bridge area relative to the extensive areas of water that would remain unaffected and accessible. Additionally, nearby expanses of open river would remain accessible and free of disturbances throughout the duration of construction.

The closest Audubon Society Important Bird Areas are Meadowlands District, about 3.5 miles north of the study area in in Bergen and Hudson Counties; Harbor Herons Complex, which includes Shooters Island, about 4 miles south of the study area at the southern end of Newark Bay; and Arthur Kill Complex, about 5.5 miles south of the study area along the entire length of the Arthur Kill. At this distance, construction and operation activities of the Proposed Project would not affect birds inhabiting any Audubon Society Important Bird Area in the region.

A desktop review of potentially impacted forest, per NJDEP (2007), identified three ½-acre grids with 33 percent forest canopy cover or greater, which may be considered existing forested area and counted for reforestation. In total, less than one acre of forested land within the existing Turnpike right-of-way could be removed by construction of the Proposed Project. If necessary, a reforestation plan will be developed for the project during final design, in coordination with NJDEP to obtain the necessary project approval per the State's No Net Loss Reforestation Act. On-site and adjacent off-site areas will be explored within community or on Authority-owned land.

Threatened or Endangered Species

ESA-listed Species Under USFWS Jurisdiction

The Proposed Project would have no effect on federally threatened or endangered species under the jurisdiction of the USFWS because USFWS (2022b) indicates that no ESA-listed species may occur within the boundary of the Proposed Project and/or may be affected by the Proposed Project; they identify one proposed endangered species (tricolored bat) and one candidate species (monarch butterfly). There is no suitable habitat for monarch butterfly and potential impacts tricolored bat, as well as the endangered northern long-eared bat, are discussed below under *Bats*. Also, the Proposed Project would have no potential to affect the designated or proposed critical habitat of any ESA-listed species.

ESA-listed Species Under NMFS Jurisdiction

Direct impacts to Newark Bay, which comprises potential habitat for the ESA-listed endangered Atlantic sturgeon and shortnose sturgeon, would occur during construction of bridge support structures. While Newark Bay is not within a migration path to spawning grounds for Atlantic sturgeon and shortnose sturgeon, adult Atlantic sturgeon could occur near the NBB. No eggs, larvae, or juvenile Atlantic or shortnose sturgeon are anticipated to occur within Newark Bay and its adjacent bays and tributaries. Per the NMFS Harbor Deepening Biological Opinion, shortnose sturgeon are not expected to occur in the study area; they have only been observed as far south as the Statue of Liberty, which is more than 10 miles away via the most direct water route (NMFS 2012).

Bridge construction may include a combination of drilling shafts and pile driving for the bridge support structures and could temporarily disturb aquatic habitat used by sturgeon in Newark Bay via suspension of sediments and increased turbidity during construction. Since sediments in Newark Bay are composed of sand and silt, sheetpile cofferdams would be installed using vibratory hammers instead of impact hammers, and

removed via vibratory extraction, thereby reducing potentially harmful noise generation. Any increases in turbidity caused by construction are expected to be short-lived, minor, and local to the immediate area, and would be quickly dissipated by the swift currents within the bay. Turbidity levels are not expected to reach levels that are toxic to sturgeon or benthic communities that support them. Further information about the bridge construction methods and construction impacts on water quality is found above under "Surface Water Impacts." It should also be noted that urban estuaries such as Newark Bay frequently experience elevated turbidity from heavy rain events, shipping, and other factors. The water quality impacts of the Proposed Project would have only insignificant and discountable effects to sturgeon.

The Proposed Project would introduce sound into the water and potentially impacting adult Atlantic sturgeon. Historic boring data indicate that trestle pipe piles would need to be driven down about 40 feet into the sediment with a vibratory hammer and then driven an additional 20 to 40 feet be driven with an impact hammer. Approximately 80 days would be required to construct the northern trestle assuming that two pile hammers are used at once during 8-hour workdays. The southern trestle will take the same amount of time with the same assumptions. For in-water installation of the trestle piles, a larger 60-inch diameter casing will be set to the mudline and equipped with air compressor lines at the bottom of the casing, which will create air bubbles in the annular space between the pipe pile and the casing to reduce sediment resuspension and underwater noise transmission during pile driving. Pile installation would begin with a reduced blow energy soft start to minimize initial effects and give any potentially affected species time to vacate the area before the higher energies are used and sound levels rise, reducing potential noise exposure risk. The sound levels in Table 3.11-9 are an estimate and will likely vary depending on the geometry and boundaries of the surrounding underwater environment (i.e., shallow/deep water, obstacles in the waterway). As the distance from the source increases, underwater sound levels produced by pile driving dissipate rapidly. Underwater noise levels will attenuate approximately 5 decibels (dB) every 32.8 feet (10 meters) for steel pipe and sheet piles. Additionally, bubble curtains can reduce noise from impact driving a 36-inch steel pipe pile by about 10 dB (CALTRANS 2015).

Table 3.11-9. Transmission Loss Calculations and NMFS Disturbance and Injury Thresholds

Pile Type	Hammer Type	Estimated Peak Noise Level (dBPeak)	Estimated Pressure Level (dBRMS)	Estimated Single Strike Sound Exposure Level (dBsSEL)	Distance to 206 dBPeak (injury)	Distance to 150 dBsSEL (surrogate for 187 dBcSEL injury)	Distance to Behavioral Disturbance Threshold (150 dBRMS)
36-inch steel pipe pile	Impact hammer	208	190	180	46 feet	230 feet	295 feet
24-inch AZ steel sheet	Vibratory hammer	182	165	165	NA	131 feet	131 feet

Vibratory driving is estimated to be 10 to 20 dB quieter than pile driving with an impact hammer (CALTRANS 2015). Therefore, for the purpose of this analysis, since impact pile driving of the 36-inch steel pipe piles will generate the greatest noise levels and effects on sturgeon, the noise levels produced by starting with a vibratory pile driver were not considered. Impact driving 36-inch steel pipe piles would generate underwater noise levels as follows: peak noise level of 208 dB; pressure level of 190 dB; and single strike sound exposure level of 180 dB. Per the NOAA Fisheries acoustics tool (NMFS 2020), the associated threshold distances that may result in injury to sturgeon extend out 46 feet from the pile for peak noise level and 230 feet for pressure level. The threshold distance for single strike sound exposure level that may disturb sturgeon extends out 295 feet from the pile. The installation of the pipe piles within an air bubble-equipped casing will reduce noise transmission to surrounding waters compared to open-water pile driving by around 10 dB, but the NOAA Fisheries acoustics tool does not have a proxy project for this type of pile installation. Therefore, the threshold distances to sturgeon disturbance

and injury from impact driving of steel pipe piles presented in Table 3.11-9 are conservative. Use of a soft start would give any sturgeon in the immediate area an opportunity to vacate the area before sound levels rise further, reducing potential noise exposure risk.

Per the NOAA Fisheries acoustics tool (NMFS 2020), vibratory driving the 24-inch steel sheet piles would produce peak noise levels that do not exceed the 206 dB Peak threshold for sturgeon injury. Vibratory sheet pile-driving would generate a pressure level and single strike sound exposure level of 165 dB, with associated threshold distances for sturgeon injury and disturbance extending out 131 feet from the sheetpile. The use of air bubble curtains to reduce the escapement of resuspended sediment will also function to reduce noise transmission to adjacent waters compared to open-water pile driving, however the NOAA Fisheries acoustics tool does not have a proxy project for this type of pile installation, but it notes that air bubble curtains can reduce noise levels of a 24-inch pile by 5 dB. Therefore, the threshold distances to sturgeon disturbance and injury from vibratory driving of steel sheet pile presented in Table 3.11-9 are conservative.

Consequently, only about 0.15 acre of Newark Bay would be exposed to noise levels from impact pile driving of the 36-inch steel pipe pile above the 206 dB Peak injury threshold. Exceedance of the 150 dBsSEL injury threshold for fish would affect about 3.8 acres of the bay per steel pipe pile, while exceedance of the 150 dB RMS disturbance threshold would affect about 6.3 acres of the bay per steel pipe pile. The estimated peak sound level produced by vibratory steel sheetpile driving is below the 206 dB peak sound level injury threshold used by NOAA Fisheries. Exceedances of the pressure level injury threshold and single strike sound exposure disturbance threshold from vibratory steel sheetpile driving would affect about 1.2 acres of the bay per steel sheetpile. Again, the affected areas are expected to be smaller than the acreages presented because the steel pipe piles will be driven within casings with air bubbles and the use of air bubble curtains around steel sheetpile.

Injurious levels of underwater noise for sturgeon would only occur very near the source, within 230 feet. Underwater noise levels that may affect sturgeon behavior would also only occur near the source, within 295 feet. Use of a soft start would give sturgeon the opportunity to vacate the area, minimizing the likelihood for potential injury. Should sturgeon enter into areas within the threshold distances for injury or behavior, it is likely that they would move away from the noise source. This possible modification of normal movement patterns of some individuals is expected to be insignificant because underwater noise would be limited in duration, affect only a small area within Newark Bay, and would not pose a barrier to migration or the availability of other more suitable habitat. Thus, interference with feeding, reproduction, migration or other activities necessary for survival is not expected. Adherence to New Jersey in-water TOY restrictions from January 1 to June 30 be protective of sturgeon for half of the year. Work could proceed within cofferdams installed outside of this restriction period. The use of cased trestle piles and vibratory driving of steel sheetpiles would be protective of sturgeon habitat by minimizing noise and turbidity.

Vessel traffic associated with bridge construction and demolition could increase the risk of vessel strikes with Atlantic and shortnose sturgeon. Tugboats, spud barges, crew boats, and other vessel types would be operating daily over a 7-day work week for the four-year duration of construction and demolition. Vessel traffic associated with bridge construction and demolition would constitute the majority of vessel traffic in the area, however the majority of construction and demolition would be performed via the temporary access trestle, thereby minimizing vessel use. However, work vessels would be slow moving with drafts well above the portion of the water column used by sturgeon, and therefore have very low likelihood of striking a sturgeon. Lastly, the potential aquatic habitat modification and loss, as detailed above under "Aquatic Biota," could displace Atlantic sturgeon from water column and benthic habitat occupied by cofferdams and trestle piles for the duration of construction, or approximately two years for any given temporary in-water structure. As sturgeon forage in the sediment, they would be potentially affected by the loss of bay bottom foraging habitat. However, the area of loss is relatively small compared to the overall area of intertidal and subtidal shallows available in Newark Bay. Based on the impacts described above and the fact that adults of both species are highly mobile and could easily avoid the area during active construction, no adverse effects are anticipated. A letter to NMFS has been

prepared for consultation under Section 7 of the ESA, seeking concurrence that the Proposed Project may affect, but is not likely to adversely affect both the Atlantic and shortnose sturgeon (see Appendix E).

Birds

Several Birds of Conservation Concern and state-listed endangered, threatened, and special-concern species could occur in the study area, including the bald eagle, black-crowned night-heron, cattle egret, glossy ibis, least tern, little blue heron, osprey, peregrine falcon, snowy egret, tricolored heron, and yellow-crowned night-heron (Table 3.11-4). The Proposed Project would involve construction within and adjacent areas adjacent to habitat suitable for threatened or endangered wildlife. Impacts would depend on the species' population size and type of activity. This is primarily a concern for construction activities within the vicinity of waters and wetlands, where the vast majority of habitat suitable for threatened or endangered species is found in the study area. One exception is the checkered white (*Pontia protodice*), a butterfly that is found in a wide variety of sites including dry weedy areas, vacant lots, fields, pastures, sandy areas, railroad beds and roads. In the past, checkered white butterflies have been observed at EWR, along the Peripheral Ditch near the NB-HCE. Portions of the airfield and Port Newark have been classified as suitable habitat for the butterflies (NJDEP 2017). However, ecologists performing surveys of the study area did not find suitable habitat for the checkered white, which typically occurs in open areas such as savannas, old fields, vacant lots, power line rights-of-way, and along forest edges. Also, construction would be performed outside of the checkered white butterfly habitat. Therefore, the Proposed Project would not be expected to have any effect on the checkered white butterfly.

The shorelines of Newark Bay and wetlands located on either side of Newark Bay provide suitable foraging habitat for listed wading bird species, including black-crowned night-heron and yellow-crowned night-heron (State threatened) which were observed during field investigations. Other species that may forage in or around the study area include the state-endangered bald eagle and peregrine falcon; the State-threatened cattle egret (*Bubulcus ibis*), and other state species of concern. As these birds are highly mobile and capable of avoiding construction activities, disturbance from construction activities would be minor, short-term and localized, as discussed above under "Terrestrial Fish and Wildlife."

Peregrine Falcon—Peregrine falcons have been documented nesting on the NBB during the past two years and presumably remain in the area year-round. The Proposed Project would destroy the existing nest, but alternative nest boxes could be installed to minimize potential impacts. Further details on mitigation are detailed below and in Section 3.11.5.2. The degree of impact to these falcons from constructing new bridges and demolishing the existing bridge would depend on the level of tolerance by the nesting pair, the visibility of disturbing activities from the nest, and the timing of construction and mitigation measures with respect to nesting chronology (see Slankard et al. 2020). Although urban peregrine falcons are generally more habituated to, and less disturbed by human activities, the behavioral response of individuals to disturbances varies and they are susceptible to nest failure or abandonment if disturbed by construction activities at critical times (NYSDEC 2014). Nesting encompasses the critical time and the timing of the annual cycle for the peregrine falcon in New Jersey (Table 3.11-10). During the non-breeding season from September to February, the peregrine falcon pair may continue to occupy the NBB and regard it as their territory and hunting grounds.

To prevent disturbance to nesting peregrine falcons, recommendations for avoidance buffers have varied between around 2,600 to over 5,000 feet (Richardson and Miller 1997); however, Slankard et al. (2020) found that a 150-to-300-foot buffer was sufficient to avoid disturbance to nesting peregrine falcons during a bridge replacement over the Ohio River. Direct observations of the peregrine falcons and their nest site during monitoring in 2022 indicated that the birds are relatively unresponsive to disturbances associated with bridge maintenance activities and high traffic volumes during normal bridge operation; they have successfully nested amidst construction and maintenance work on the bridge. Based on these observations, the peregrine falcons occupying the NBB are expected to habituate to and tolerate the increased levels of noise and human activity that would occur during bridge construction and demolition.

Table 3.11-10. Annual Cycle for the Peregrine Falcon in New Jersey

Annual Cycle	Timing*
Nesting season (includes courtship and nest site selection/nest-building)	Mid-February to early March
Egg laying	March to mid-April
Incubation (approximately 33-35 days)	Early April to mid-May
Nestling period (approximately 6 weeks)	Mid-May to mid-June
Fledgling period (initially dependent on parental feeding, approximately 9-12 weeks)	Mid-June to early September
Immature stage (dispersal from nest area)	Mid-August to early September
No breeding activity (pair remains at the bridge/territory)	September to February

Sources: Herbert and Herbert 1965, NJDEP 2015

* Dates provided are for a normal nesting season, as courtship and subsequent periods can be pushed back until late June in an unsuccessful nesting season.

The nesting activity and associated behavior of peregrine falcons would continue to be monitored on a weekly basis during the breeding season (February 15 to July 31), or until fledging occurs, prior to bridge replacement, during construction activities, and for two years following completion of bridge construction and demolition activities. This would promote adaptive management of the mitigation proposed for the falcon nest over the course of the Proposed Project. A proactive approach will be taken to coordinate protective measures for peregrine falcon in consultation with the NJDEP Fish and Wildlife ENSP. Construction activities, especially those that may disturb the birds, could be scheduled outside of the Peregrine Falcon nesting season (March 1 to June 30), where possible. Alternatively, a 300-foot work restriction zone may be implemented during the breeding season. The following activities would be prohibited within the work restriction zone: demolition of existing structures, construction/demolition of temporary trestle bridges, installation of temporary cofferdams, installation of new structures (i.e., piers, bridge deck, fenders). The distance and intensity of such activities will need to be determined in consultation with ENSP and evaluated as construction progresses because it is anticipated that the falcon pair will demonstrate resilience. It should be noted that the pair has been successful on the existing NBB during the past two years while road crews have been performing bridge maintenance activities and Slankard et al. (2020) observed that falcons tolerated personnel access as close as the adjacent pier of the bridge staff, which was 250 feet away from a replacement nest box on a new bridge. If an activity has the potential to adversely impact nesting peregrine falcons and cannot be avoided during the nesting season, ENSP staff would be consulted prior to conducting work (or as soon as possible for emergency works) to determine additional management/mitigation (e.g., monitoring) recommendations. Monitoring by an avian biologist, as determined in consultation with the ENSP staff, would also be performed during an activity that has the potential to disturb the birds and cannot avoid the nesting season.

Bald Eagles—Construction activities within or alongside Newark Bay could impact bald eagles. Tree clearing or disturbances to mature trees or dead snags, which would be required in limited areas along the eastern shoreline of Newark Bay, may affect eagles roosting or foraging in the area. The NJDEP Landscape Project mapping shows foraging habitat for the bald eagle within the study area and a nest is located about 1.5 miles to the north, at Kearny Point. Reproduction is the period when bald eagles are most sensitive to disturbance, but the Proposed Project would occur far enough away that no disturbance to nesting would occur. Based on USFWS guidelines for minimizing disturbances to bald eagles, which recommend a maximum buffer distance of 0.5 miles between bald eagles and extremely loud noises, it can be conservatively estimated that bald eagles would avoid a maximum of 0.5 miles of river in each direction from the bridge during construction (USFWS 2007). Displacement of eagles from this area would represent an insignificant temporary reduction in the amount of foraging habitat available on Newark Bay and the lower Passaic and Hackensack River. Bald eagles would also have the potential to occur within the study area during the winter, during which time individuals would usually be found sitting on ice flows within areas of open water. Per USFWS recommendations, all

construction activities would be completed in accordance with the National Bald Eagle Management Guidelines (USFWS 2007). Therefore, in compliance with the BGEPA, the Proposed Project Alternative would not be expected to "take" any bald eagle and there would thus be no meaningful impact to them at either the individual or population level. Similarly, ospreys have nested at the same location on the Conrail bridge in 2021 and 2022, but the nest is located outside of the study area. Red-tailed hawks have nested on a billboard on the east side of Newark Bay, which is outside of the study area also. However, while there could be temporary disturbance to foraging adults, there is no potential for adverse impacts to breeding individuals.

Wading Birds—The NJDEP Landscape Project Mapping (Figures 3.11-5a and 3.11-5b) indicate that emergent wetlands within the vicinity of the Program provide suitable foraging habitat for state-listed wading birds. The black-crowned night-heron and yellow-crowned night-heron were observed during field investigations. However, heron nesting habitat is absent in the study area due to a lack of suitable wetland tree and shrub cover, dominance of *Phragmites australis*, and high levels of human disturbance. Because there is no documented nesting habitat for threatened or endangered wading birds, it is unlikely that agencies would require mitigation (preservation, enhancement, or creation of new habitat) for impacts to foraging habitat because it is not the limiting factor for these species.

Bats

There is potential for the Proposed Project to affect bats via tree clearing and bridge demolition, which could reduce roosting habitat or potentially cause direct mortality if an occupied roost tree or bridge is disturbed when bats are present. Construction activities may also disturb bat foraging and cause indirect impacts via changes in insect prey. Potentially impacted species include the federally endangered northern long-eared bat and proposed endangered tricolored bat, and other bat species given a "Consensus Status" of "Endangered" in by NJDEP (little brown bat and eastern small-footed myotis) (Table 3.11-4). Because potential bat habitats cannot be avoided, the Authority would coordinate with USFWS and NJDEP Fish and Wildlife to identify appropriate avoidance and minimization measures, which would include avoiding tree cutting or destruction of known roost structures during the dormant season. Impacts to bats would be temporary and minor after implementing such measures.

Marine Mammals

Impacts to marine mammals are not anticipated based on their unlikely occurrence within the study area. Only temporary, insignificant disturbances to marine mammals would be anticipated to occur from disturbance related impacts. No harassment to marine mammals would be anticipated at either Level A (injury) or Level B (disturbance).

3.11.5.2 Conclusion

Based on the preceding assessment, the Proposed Project will have impacts to natural resources; however, the measures outlined below will reduce any impacts to the maximum extent practicable. The Proposed Project will have measurable impacts on water quality, but measures would be implemented to ensure that pollutant concentrations would be below applicable standards, regulations, and guidelines, and within existing conditions or designated uses. Pursuant to the CZMA, the Proposed Project will have no reasonably foreseeable effects on coastal uses and resources. Pursuant to the Marine Mammal Protection Act, the Proposed Project is not likely to or will not result in takes of marine mammals. Pursuant to the Magnuson-Stevens Act, the Proposed Project will have no effect to EFH or Habitat Areas of Concern. Pursuant to the Migratory Bird Treaty Act, the Proposed Project will not result in take of migratory birds or the parts, nests, or eggs of such bird. Pursuant to the BGEPA, the Proposed Project will not result in take of Bald or Golden Eagles or the parts, nests, or eggs of such bird.

<u>Geology and Soils</u>

To minimize the potential for soil loss during storm events, soil erosion and sediment control measures will be implemented. These measures would be specified in an SESC plan that complies with the Standards for Soil

Erosion and Sediment Control in New Jersey at N.J.A.C. 2:90 (New Jersey State Soil Conservation Committee 2017). Soils stockpiled on site would be situated so as not to obstruct natural drainage or cause off-site environmental damage. In addition, the construction specifications will require that all soil erosion and sediment control structures are installed prior to any construction and that they must be maintained for the duration of the Proposed Project. Additional best management practices that would be followed include:

- Low-ground-pressure construction vehicles will be used whenever possible to perform construction in wetlands. Skid rigs will only be used when wooden planks or snow fencing is laid down to minimize disturbance of the ground surface.

- The area used for access to the construction location will be minimized to the maximum extent practicable. Matting or track equipment will be used when the ground is soft to avoid soil compaction. All access roads will be maintained within the limit of disturbance, which will receive permanent revegetation upon project completion.

- Disturbance/removal of trees for access to the construction site will be minimized to the maximum extent practicable. Whenever trees must be removed, selective removal of trees less than four inches in diameter is preferred in lieu of removal of larger trees.

- Temporarily disturbed areas will be restored to pre-existing conditions. Planting of disturbed areas will occur as soon as possible to minimize the possibility of erosion.

- Excavation and filling activities will be conducted in a manner to minimize turbidity and sedimentation into wetlands and open waters. Placement of embankments (filling) will be conducted in such a manner as to contain sediment at the fill areas. All construction activities will be performed in accordance with an approved Soil Erosion and Sediment Control Plan.

- The limits of disturbance, as indicated on the permit plans for a Section 404 Nationwide General Permit #15, are the maximum necessary for the construction. The limit of encroachment will also be posted with signage to prevent intrusion by construction vehicles.

- Staging and temporary roads or soil stockpiles will not be permitted in wetland areas that are not needed for actual construction, except as indicated on Permit Plans.

- Proper soil erosion and sediment control measures will be utilized in the vicinity of any construction activities.

With implementation of these measures, no further mitigation is necessary.

Although drilling into bedrock will occur, blasting of bedrock is not anticipated for the Proposed Project. Final engineering of the new bridges would consider seismic potential and assess foundation needs to satisfy seismic demands. Additionally, techniques to mitigate liquefaction effects, including stone columns, compaction grouting, jet grouting, and deep cement mixing, will be considered during the final design of the bridge.

Water Resources

Groundwater

Groundwater would be encountered during excavation for the construction and demolition of pier footings for the viaducts and bridges. Based on previous monitoring of several properties in the study area, groundwater encountered may be considered contaminated. A pre-construction sampling plan will be developed during final design to identify locations of contaminated groundwater that may need to be managed during construction.

The Proposed Project would follow the NJDEP Linear Construction Technical Guidance to address any contaminated groundwater that is encountered during excavation and prevent the excavation from serving as a conduit for the spread of contaminated water. Coordination with and approvals obtaining required permits from NJDEP will occur prior to the disturbance, handling, and disposal of any contaminated groundwater.

Tidal Waters

Impacts to surface waters have been minimized through elements of the project design and construction methods. For example, the lengths of bridge spans have been maximized to reduce the total number of piers. As described under *Surface Water Impacts* in Section 3.11.5.1, best management practices would be implemented to treat stormwater runoff during construction and afterward from the widened roadway. The Proposed Project would comply with the New Jersey Stormwater Management rules at N.J.A.C. 7:8 and strict adherence to an SESC Plan would avoid adverse water quality impacts from erosion and sediment loading during construction. SESC Plan implementation will be monitored on site. The Proposed Project would comply with all conditions imposed by a Stormwater Management Permit issued by NJDEP. Adverse water quality impacts in Newark Bay would be minimized by restricting in-water work to dry conditions within cofferdams and using turbidity barriers or bubble curtains around drilled shafts, eliminating the release of suspended solids to surrounding water from this activity. The installation of stormwater basins will aid in providing better water quality and lower erosive peak discharges than the existing conditions without stormwater basins. Under N.J.A.C. 7:7A-11, wetland mitigation is required for all wetland and open water impacts identified in an Individual Freshwater Wetlands and Open Water Fill Permit. Because impacts are expected to exceed 1 acre; the permit would require mitigation for permanent impacts as detailed under "Wetlands" below.

Overall, a total of approximately 14.709 acres of permanent impacts is unavoidable and will require compensation. Also, accounting for the compensation of unavoidable long-term temporary impacts (i.e., greater than six month duration) and the restoration of habitats following the removal of the existing bridge, the net acreage requiring off-site compensation is approximately 36.428 acres, as summarized in Table 3.11-10 below. The anticipated off-site mitigation has been calculated based on the impacts of the preliminary design plans, although impacts are expected to be reduced through consultation with USACE and NJDEP as the final design progresses.

Table 3.11-11. Mitigation for Impacts

Wetland Type	Unavoidable Impacts		Mitigation	
	Permanent Impacts	Temporary Impacts (> 6 months)	On-Site Restoration (Bridge Removal)	Net Off-Site Mitigation Requirement*
Tidal Open Water	5.853	15.507	0.840	20.520
Freshwater Wetland (PEM, E2EM)	8.856	7.054	0.002	15.908
Total	14.709	22.561	0.842	36.428

Note: * The net off-site mitigation requirement subtracts the on-site restoration acreages from the permanent impacts to calculate the net mitigation need.

No further mitigation is necessary.

Freshwater Wetlands

Wetlands temporarily disturbed during construction will be restored to their original grade and planted with indigenous wetland vegetation.

Wetland mitigation plans are only developed conceptually at this time but would mitigate for permanent impacts to wetlands as required under state and federal regulations. Mitigation required by the NJDEP for impacts to freshwater wetlands, as described for "Tidal Waters" above, would likely include mitigation bank credits, but could also include restoration, creation, and/or preservation of wetland habitats. The use of a mitigation bank would be accomplished through the purchase of credits in a bank that has established similar or higher wetland values and functions as the area disturbed by the Proposed Project, including similar wildlife habitat, similar vegetative species coverage, and density, equivalent flood water storage capacity, and equivalency of other relevant values or functions. The anticipated mitigation need is primarily for tidal and freshwater wetlands and riparian zone impacts, the majority of which are within WMA 7. There are currently two mitigation banks with available credits that could cover a portion of the project needs. If necessary, the Authority will also pursue permittee-responsible mitigation to provide for the balance of the compensatory requirements not covered by available mitigation credits. While there are no mitigation banks solely located within WMA 7, one bank in WMA 5 includes WMA 7 in its Service Area. For tidal wetland banks, overseen by an Interagency Review Team led by the USACE, a mitigation credit can be sold and applied to a site outside the primary service area of the bank if authorized by the Interagency Review Team and only under special circumstances. Further detail about wetland mitigation will be developed and confirmed as part of the permitting process. These detailed wetland mitigation plans will include a discussion of the mitigation type; watershed needs; site selection narrative; timing of the mitigation; and the amount of compensation being proposed, in comparison to the amount of wetland impacts.

Riparian Zones

Project elements within the riparian zone would conform to the requirements at N.J.A.C. 7:13, as appropriate. Vegetation lost within the riparian zone due to project construction would be mitigated for under the project's overall mitigation plan. The Proposed Project would convert approximately 0.007 acres of existing impervious area to grass after the removal of the existing piers lying within the riparian zone. However, since the amount of permanent riparian zone disturbance (4.295 acres) is greater than the amount of riparian zone created by the project, additional mitigation measures will be required in accordance with N.J.A.C. 7:13-13. Due to the lack of available areas for onsite mitigation, bank mitigation credits will be purchased. Since no riparian zone mitigation bank is available within WMA 7, a credit purchase from WMA 5 (Oradell Reservoir Riparian Zone Mitigation Bank) is proposed. Riparian zone mitigation will be coordinated NJDEP related to a Flood Hazard Area Individual Permit application.

Floodplains

The Proposed Project would include various mitigation measures to maintain the function and quality of floodplains during construction. The proposed design minimizes floodplain impacts by designing the majority of the NB-HCE roadway on structure rather than on fill. The Proposed Project would be conducted in accordance with NJDEP Flood Hazard Area Control Act Rules (N.J.A.C. 7:13) and NJDEP permit conditions. No further mitigation is necessary.

Coastal Zone and Tidelands

A federal consistency determination would be issued in conjunction with an individual permit from NJDEP and the Proposed Project would comply with all conditions of the permit. No further mitigation is necessary.

Aquatic Biota

Permanent losses of tidal marsh, designated as HAPC for summer flounder, would be mitigated at a 3:1 ratio through the restoration of these habitat types within the watershed. As noted above, the acreage would be identified through additional surveys prior to EFH consultation with NOAA Fisheries Greater Atlantic Regional Fisheries Office. NMFS and NJDEP Fish and Wildlife will likely place restrictions on the scheduling of in-water activities to protect fisheries, which will be determined through coordination with both agencies during permitting of the Proposed Project. Additionally, the Proposed Project would not create a physical barrier to fish movement and will not adversely affect migrating fish. In order to ensure that migrating fish are

not impacted, no construction operations in open water would take place from January 1 to June 30. No further mitigation is necessary.

Terrestrial Vegetation and Wildlife

To avoid impacts from visual, noise, and vibration disturbance, construction activities would be timed to avoid vulnerable bird nesting/fledging periods and reproduction periods for mammals, amphibians, and reptiles. Specific measures would be finalized as the design progresses and would be specified in the permit requirements. Impacts to wetland-dependent plants and animals would be offset by the required wetland mitigation discussed above. No further mitigation is necessary.

Threatened or Endangered Species

No further mitigation is necessary for threatened or endangered species beyond the avoidance and minimization measures discussed in Section 3.11.5.1, except for peregrine falcon. Avoiding adverse impacts to peregrine falcons would involve a 300-foot work restriction zone implemented during the breeding season (February 15 to July 31), as detailed above, or require a staged sequencing of work activities that include temporary nest box placement, protective buffers and work timing restrictions, and permanent nest box installation on the new bridge(s). The nest-box approach would likely follow Slankard et al. (2020) but would be modified based on local conditions. This involves installing new nest boxes a season ahead of construction approximately 300 feet outside of the limits of the construction activities to encourage the falcons to nest away from pending construction activities. The temporary nest box option might need to use the nearby Conrail Upper Bay Bridge, in which case, separate coordination with Conrail would occur. Because the nesting pair presumably does not have a history of using a nest box, the installation of deterrents on all other suitable nesting areas of the bridge would likely be necessary. This would encourage the falcons to become accustomed to using the nest box prior to the start of construction. Once the new westbound bridge is constructed, the nest box would be moved to the new bridge before the existing bridge is demolished. Further coordination with NJDEP Fish and Wildlife will occur as the design progresses regarding work timing restrictions and nest box placement.

The conditions of an individual permit issued by NJDEP would further ensure that threatened or endangered species are protected by appropriate measures. This would include in-water construction timing restrictions for Atlantic sturgeon and shortnose sturgeon, as imposed by ESA Section 7 consultation with NMFS. Impacts to foraging habitat for these species would be offset by the required wetland mitigation discussed above. No further mitigation is necessary.

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4 Summary of Required Permits and Approvals

Various permits and approvals will be required to implement the Proposed Project. Decisions on applications for federal permits are subject to review under NEPA to ensure that federal agencies consider the environmental impacts of their actions in the decision-making process. In addition to review of the applications for federal permits and review of the Proposed Project under NEPA, several other regulatory requirements must be met before the federal permits are issued. For the most part, applications for the state and local permits required to implement the Proposed Project will be made by the Authority after the federal permits are issued and the NEPA process is completed. A summary of all required permits and approvals is detailed below.

4.1 Applicable Permits and Approvals Required Under State Laws and Regulations

The Authority submitted a Permit Readiness Checklist to NJDEP's Office of Permitting and Project Navigation (OPPN) on April 16, 2021, for the NB-HCE Program. OPPN's reply on May 14, 2021, described the anticipated permits, approvals, and other NJDEP requirements, which are detailed in the following sections.

4.1.1 Executive Order No. 215– New Jersey Department of Environmental Protection

The State of New Jersey Executive Order No. 215 (EO 215) of 1989 requires departments, agencies, and authorities of the State to prepare and submit to the NJDEP an Environmental Assessment or Environmental Impact Statement (EIS) in support of major construction projects. Under EO 215, the Proposed Project is categorized as a "Level 2" project requiring the preparation of an EO 215 EIS. This document is the EO 215 EIS.

4.1.2 Land Resource Protection Permits – New Jersey Department of Environmental Protection

NJDEP's Division of Land Resource Protection regulates land use activities through a permit process in accordance with the rules promulgated in support of the following statutes that apply to the Proposed Project: Freshwater Wetlands Protection Act (FWPA), Flood Hazard Area Control Act, Wetlands Act of 1970, Waterfront Development Law, Tidelands Act, and Water Pollution Control Act. Permits are issued jointly for a particular project whenever possible.

Through the FWPA, New Jersey is one of three states nationally that has assumed the Section 404 program under the CWA. The wetland management program is implemented by NJDEP in conjunction with the Coastal Zone Management Program and the Flood Hazard Area Program.

The FWPA provides a comprehensive permitting program that regulates all activities in freshwater wetlands, as well as in "transition areas," upland buffers adjacent to the wetlands, and satisfies both state and federal requirements. The CWA provides that the USACE retains permitting authority in certain tidal waters and other specified waters currently related to the transport of interstate or foreign commerce.

The Wetlands Act of 1970 requires permits for activities proposed within tidal and estuarine wetlands in New Jersey. All wetlands to be protected are shown on regulatory maps. Unmapped wetland areas are regulated by the FWPA.

The State's Coastal Zone Management Rules, among other things, implements the Waterfront Development Law to regulate activities within the regulated waterfront area, including tidal waterways and lands lying thereunder, up to and including the MHWL and adjacent areas within 100 feet of the MHWL. For properties

within 100 feet of the MHWL that extend inland beyond 100 feet from the MHWL, the regulated waterfront area extends inland 500 feet or to the first paved public road, railroad, or surveyable property line that existed on September 26, 1980, and generally parallels the waterway. Approval of activities within the regulated waterfront area is through Waterfront Development Permits.

A pre-application meeting for the various permits was held with NJDEP on June 13, 2022. It is anticipated that applications related to the Proposed Project will be submitted to NJDEP through a multi-permit application during the Proposed Project's final design, as follows: Inland and Upland Waterfront Development Permit, Freshwater Wetlands Individual and Open Water Fill Permits, Water Quality Certificate, Coastal Zone Consistency Determination, and Flood Hazard Area (FHA) Permit. Any work proposed within the regulated flood hazard area and/or riparian zones outside of the waterfront development area will require a Flood Hazard Area permit under N.J.A.C. 7:13. No separate FHA permit will be required for FHAs that overlap with areas regulated under the Coastal Zone Management rules; however, compliance with the Flood Hazard Area Control Act Rules must be demonstrated.

4.1.3 Fish and Wildlife Coordination– New Jersey Department of Environmental Protection

Several Coastal Zone Management Rules administered by the Marine Fisheries Administration relevant to marine fisheries apply to the Proposed Project. In addition, Species Occurrence Area and Landscape mapping indicates habitats valued for, and possible occurrences of, threatened and endangered and "Species of Concern" within the expected area of impact of the Proposed Project. Coordination with New Jersey Fish and Wildlife, part of NJDEP, will be conducted through the EO 215 EIS review and during the Division of Land Resource Protection multi-permit review.

4.1.4 Freshwater Wetlands Letter of Interpretation – New Jersey Department of Environmental Protection

To determine land that meets the definition of a wetland in New Jersey, NJDEP issues an LOI under the FWPA, which includes the following items: indication of the presence or absence of wetlands, State open waters, or transition areas; verification or delineation of the boundaries of freshwater wetlands, State open waters, and/or transition areas; and assignment of a wetland resource value classification. A request for LOI was submitted to NJDEP for the Proposed Project on January 27, 2022, and deemed administratively complete by NJDEP on February 16, 2022. The request for LOI is under review by NJDEP.

4.1.5 Stormwater Management – New Jersey Department of Environmental Protection

NJDEP's Stormwater Management Rules apply to the Proposed Project because it would increase impervious surface by greater than 0.25 acre and cause more than one acre of land disturbance. Once a project triggers review under the Stormwater Management Rules, it must meet certain minimum design and performance standards, as applicable, for Erosion Control, Stormwater Runoff Quality, Stormwater Runoff Quantity, and Groundwater Recharge; and must meet certain Maintenance Requirements for stormwater infrastructure.

4.1.6 Historic and Cultural Resources – New Jersey Historic Preservation Office

New Jersey's Historic Preservation Office (HPO) is housed with NJDEP. HPO's concurrence will be needed on the following items related to the Proposed Project: (1) areas of potential effect (APEs) for archaeology and historic architecture; (2) determinations of eligibility for those archaeological and historic architectural resources within the APE for which national and state register eligibility determinations have not already been issued; (3) concurrence with determinations of effect of the Proposed Project on register-eligible or listed resources; and (4) mitigations of effects, through a Memorandum of Agreement between the Authority, HPO, and USCG. Review will occur through the NHPA Section 106 process described in Section 4.1.8. State-level review of the

Proposed Project will also occur through the EO 215 EIS review process. Based on coordination with HPO to date, the Authority has submitted two intensive-level historic architectural surveys: one for the NBB and one for the entire NB-HCE corridor, so that specific areas of sensitivity and areas requiring additional archaeological and geotechnical investigations can be identified.

4.1.7 New Jersey Register Review – New Jersey Historic Preservation Office

The Register of Historic Places Act allows historic properties to be nominated and entered in the New Jersey Register of Historic Places, which is maintained by HPO. Once a property is listed in the New Jersey Register, any public undertaking that would "encroach upon, damage or destroy" the registered historic property must by reviewed pursuant to this law and receive prior authorization from the NJDEP Commissioner.

As the Proposed Project will encroach on a New Jersey Register listed property, the route of the Morris Canal, the Authority will prepare an Application for Project Authorization to HPO and to the gubernatorially appointed Historic Site Council for review during final design.

4.1.8 Tidelands License – New Jersey Department of Environmental Protection

Conveyances of tidelands, which are held in public trust in New Jersey, are governed by the New Jersey Tidelands Act. The permanent use by the Proposed Project of tidal waters not previously conveyed necessitates a tidelands conveyance through a license or grant. The Authority will coordinate the Proposed Project's use of tidelands/lands underwater with the NJDEP Bureau of Tidelands Management and submit a Tideland application during the Proposed Project's final design.

4.1.9 State-owned Lands

The Authority will coordinate with NJDOT and NJDEP on needed conveyances of State-owned lands, as appropriate, during the Proposed Project's final design.

4.1.10 Linear Construction Project – New Jersey Department of Environmental Protection

The NJDEP LCP rules, associated with the implementation of the 2009 Site Remediation Reform Act, outline the requirements for remediating suspected or known contamination when constructing LCPs. The analysis summarized in Section 3.10.5 above identified areas where construction would likely encounter contaminated soil and/or groundwater. It is anticipated that an LSRP will be engaged and the Proposed Project will be enrolled as an LCP under the NJDEP (2012b) Linear Construction Technical Guidance. If necessary, the Proposed Project will also be conducted in full compliance with the Technical Requirements for Site Remediation. Coordination with NJDEP for this approval will occur during EO 215 EIS review and during the Proposed Project's final design.

4.1.11 New Jersey No Net Loss Reforestation Act

The Authority, as an entity of the State of New Jersey, is required by the New Jersey No Net Loss Reforestation Act (N.J.S.A. 13:1L-14.1 et seq.) to develop a plan to provide compensatory reforestation to address the impacts of deforestation resulting from the construction. The reforestation plan for this project must be approved by the NJDEP Division of Parks and Forestry after review and comment by the New Jersey Community Forestry Council.

4.1.12 Soil Erosion and Sediment Control – Hudson Essex Passaic Soil Conservation District and New Jersey Department of Environmental Protection

New Jersey requires the management of soil erosion and stormwater from virtually all non-agriculture, construction-based soil disturbances through adoption of the Soil Erosion and Sediment Control Act.

Implemented by the New Jersey Department of Agriculture and the state's soil conservation districts, the Act requires all construction activities greater than 5,000 square feet to be developed in accordance with a plan to control erosion during construction. The plan must also ensure that erosion will not occur once construction is completed. In addition, soil conservation districts also administer the New Jersey Pollutant Discharge Elimination System Phase II program in conjunction with NJDEP Division of Water Quality. The Stormwater Discharger Permit Program requires construction activities including clearing, grading, and excavating that disturb one acre or more obtain authorization of a construction general permit. This permit must be acquired in addition to a Soil Erosion and Sediment Control Plan certification through the local soil conservation district.

Coordination on Soil Erosion and Sediment Control Plans for the Proposed Project will occur with the Hudson Essex Passaic Soil Conservation District during final design.

4.1.13 Surface Water General Permit – New Jersey Department of Environmental Protection

The NJDEP Bureau of Surface Water and Pretreatment Permitting (BSWPP) regulates facilities discharging domestic and industrial wastewater directly into surface waters of the state as part of the New Jersey Pollutant Discharge Elimination System (NJPDES) program. In addition, the BSWPP also implements the States's Pretreatment Program which is intended to protect local agency sewage treatment plants from non-domestic wastewater which may interfere with treatment processes, contaminate sewage sludge, or pass through sewage treatment plants. Prior to undertaking dewatering activities that would discharge groundwater to a surface water or combined sewer overflow system, the contractor will prepare and submit the appropriate form and related documentation (Application Completeness Checklist or Request for Authorization) required to obtain this General Permit.

4.2 Applicable Permits and Approvals Required by Federal Laws and Regulations

4.2.1 Bridge Permit – U.S. Coast Guard

Federal law prohibits the construction of any bridge across the navigable waters of the United States unless first authorized by the USCG. The USCG permits the location and plans of bridges and causeways and imposes any necessary conditions relating to the construction, maintenance, and operation of these bridges in the interest of public navigation. A bridge permit is the written approval of the location and plans of the bridge or causeway to be constructed or modified across a navigable waterway of the United States.

The USCG approves bridge location and plans under the authority of several Acts pertaining to bridges. These Acts include Section 9 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946. The purpose of these Acts is to preserve the public right of navigation and to prevent interference with interstate and foreign commerce. The General Bridge Act of 1946, as amended, the Rivers and Harbors Act of 1899, as amended, and the Act of March 23, 1906, as amended, all require the location and plans of bridges and causeways across the navigable waters of the United States be submitted to and approved by the Secretary of Homeland Security prior to construction. The Secretary of Homeland Security has delegated this authority to the Commandant, USCG. The General Bridge Act of 1946 is cited as the legislative authority for bridge construction in most cases.

A bridge permit is required from the USCG for the following activities:

- Construction of the two bridges that will replace the existing NBB.
- Demolition of the existing NBB.
- Construction of temporary bridges (trestle structures) in Newark Bay for construction access.

An application for a Section 9 bridge permit was submitted to the USCG on May 17, 2022, and is under review by the USCG.

4.2.2 Section 10/404 Permit – U.S. Army Corps of Engineers

Section 10 of the Rivers and Harbors Act requires authorization from the USACE for the construction of any structure in or over any navigable water of the United States. It applies to any dredging or disposal of dredged materials, excavation, filling, re-channelization, or any other modification of a navigable water of the U.S.

Regulations implementing Section 404 of the Clean Water Act (CWA) require approval from the USACE prior to discharging dredged or fill material into waters of the United States. Waters of the United States include but are not limited to waters subject to the ebb and flow of the tide. USACE has jurisdiction over all tidal and interstate waters of the United States in New Jersey (known as non-delegable waters). Newark Bay and adjacent tidal wetlands meet the definition of waters of the United States. Implementation of the Proposed Project will include such activities as excavation and filling of navigable waters of the United States and placing fill in waters of the United States. Because these regulated activities are incidental to construction of the bridges to replace the NBB, approval for Section 10 and Section 404 permits will be sought by the Authority under Nationwide General Permit #15, U.S. Coast Guard Approved Bridges. While this permit typically does not require that the permittee submit a pre-construction notification (PCN), notification is required in accordance with Regional General Condition 5 (G-5(a)).

4.2.3 Approved Jurisdictional Determination

An approved jurisdictional determination (JD) is an official document expressing the USACE's view that jurisdictional "waters of the United States" are either present or absent on a particular site. An approved JD identifies the limits of the waters on the project site that the agency views as jurisdictional under Section 404 of the CWA. Materials supporting a request for an Approved JD request for the Proposed Project was submitted on behalf of the Authority to the USACE on May 13, 2022, and is under review by the USACE.

4.2.4 Section 408 Review – U.S. Army Corps of Engineers

The USACE Section 408 program allows another party, such as a local government, company, or individual, to alter a USACE Civil Works project. The Newark Bay Main Channel North Reach which is crossed by the NBB is a USACE Civil Works project. Building a bridge across a navigable waterway maintained and surveyed by USACE, as is the case under the Proposed Project, is one example of a project that needs USACE Section 408 permission. Section 408 permission is also required for the temporary occupation or use of a USACE Civil Works project, for example, to temporarily moor a barge to construct a bridge foundation or pier.

The Section 408 program verifies that changes to authorized USACE Civil Works projects will not be injurious to the public interest and will not impair the usefulness of the project. This requirement was established in Section 14 of the Rivers and Harbors Act of 1899, which has since been amended several times, and is codified at 33 USC 408, the section of USC that gives the program its name.

Section 408 review is undertaken in conjunction with USACE's Section 10/404 permit application review.

4.2.5 National Environmental Policy Act – U.S. Coast Guard

NEPA is a procedural statute intended to ensure federal agencies consider the environmental impacts of their actions in the decision-making process. The purpose and function of NEPA is satisfied if federal agencies have considered relevant environmental information, and the public has been informed regarding the decision-making process. Regulations promulgated by the CEQ at 40 CFR 1500-1508 provide direction to federal agencies to determine what actions are subject to NEPA's procedural requirements and the level of NEPA review. Under the CEQ NEPA regulations, a federal agency acts as a lead agency if more than one federal

agency is involved in the same action. In this case, the USCG is the lead federal agency for implementing the provisions of NEPA for the Proposed Project and the USCG has determined that the level of NEPA review is an environmental assessment. The USCG will prepare a finding of no significant impact if the agency determines, based on the environmental assessment, not to prepare an environmental impact statement because the Proposed Project will not have significant effects.

4.2.6 Section 401 Water Quality Certification – New Jersey Department of Environmental Protection

Under Section 401 of the CWA, a federal agency may not issue a permit or license to conduct any activity that may result in any discharge into waters of the United States unless a Section 401 water quality certification is issued, or certification is waived. States and authorized tribes where the discharge would originate are generally responsible for issuing water quality certifications. Among the major federal licenses and permits subject to Section 401 are Section 404 permits and Rivers and Harbors Act Section 9 and 10 permits.

The CWA provides that in making decisions to grant, grant with conditions, or deny certification requests, certifying authorities, which for the Proposed Project is NJDEP, consider whether the federally licensed or permitted activity will comply with applicable water quality standards, effluent limitations, new source performance standards, toxic pollutants restrictions, and other appropriate water quality requirements of state law. In New Jersey, the State's Coastal Zone Management Rules, which are administered by NJDEP, are the standards used for the review of water quality certificates subject to Section 401 of the CWA.

A federal agency may not issue a license or permit for an activity that may result in a discharge into a water of the United States without a water quality certification or waiver.

4.2.7 Section 307 Coastal Zone Consistency Determination – New Jersey Department of Environmental Protection

The CZMA encourages states to take a leading role in the management of their coastal regions. As one incentive for state participation in the federal coastal zone management program, Section 307 of the CZMA requires that various federal activities that are reasonably likely to affect any land or water use or natural resource of the coastal zone be consistent with a state's approved coastal zone management program. Newark Bay and surrounding lands lie within New Jersey's coastal zone. Before certain activities can take place in the coastal zone, federal agencies or applicants for federal approvals or assistance must submit a consistency determination or certification to the state coastal management agency that the activity will be conducted consistent with the state's federally approved coastal management program. Through this process, the state has the opportunity to evaluate those federal activities which affect the state's coastal zone and ensure that the activities meet state coastal management policies. In New Jersey, the State's Coastal Zone Management Rules, which are administered by NJDEP, govern the use and development of coastal resources and are the standards used for the review of federal consistency determinations under Section 307 of the CZMA.

4.2.8 Section 106 of the National Historic Preservation Act – U.S. Coast Guard

Section 106 requires federal agencies to consider the effects of their actions on any historic properties, which includes historic districts, sites, buildings, structures, or other objects listed in or determined eligible for listing in the NRHP. Properties listed in or eligible for the NRHP include archaeological resources and historic architectural resources. Under this provision, the NEPA lead agency, the SHPO, affected Native American tribes, and other "consulting" parties participate in a consultation process regarding the potential effects of the undertaking on historic resources. The Section 106 review process consists of the following four steps: (1) initiation, (2) identification, (3) assessment of adverse effects, and (4) resolution of adverse effects.

4.2.9 Section 7 Endangered Species Act Consultation

The ESA created a regulatory regime to protect imperiled fish, wildlife, and plants from extinction and to promote the recovery of those species and the ecosystems that support them. Section 7 of the ESA requires that federal agencies ensure that none of the activities that it authorizes, funds, or carries out is likely to jeopardize the continued existence of threatened or endangered species, or results in the destruction of designated areas (critical habitats) that are important in conserving those species. The two agencies primarily responsible for administering the ESA are the USFWS and the NMFS. Generally, USFWS has jurisdiction over terrestrial and freshwater species and NMFS is responsible for protecting any endangered or threatened marine species. Under Section 7 of the ESA, any federal agency that is sponsoring or assisting a project must engage in consultation with the USFWS and/or NMFS before taking any action that has the potential to affect listed species or designated critical habitat. Because there is no potential for any ESA-listed terrestrial species in the project area, Section 7 consultation with USFWS is not required.

In 1996, amendments to the Magnuson-Stevens Fishery Conservation and Management Act established EFH provisions to protect and enhance important habitats of federally managed marine and anadromous (fish that migrate up rivers from the sea to breed in freshwater) fish species. Congress defined EFH as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." Similar to the provisions of Section 7 ESA, any federal agency that is sponsoring or assisting a project must consult NMFS before taking any action that has the potential to affect EFH.

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5 Public and Agency Coordination

The Authority has met with numerous agency and public stakeholders throughout the concept plan development and environmental review phases of the project. In some cases, the Authority met on a recurring basis with certain agencies or stakeholders. The following list identifies those agencies or stakeholders with which the Authority met:

- USCG
- USACE
- PANYNJ
- NJDEP
- NJHPO
- NJDOT
- New Jersey Transit
- The Maritime Association of the Port of New York – New Jersey: Harbor Safety, Navigation, and Operations (Harbor Ops) Committee
- Hudson County
- City of Jersey City
- City of Bayonne
- City of Newark
- Global Container Terminal
- Conrail
- PSE&G
- Texas Eastern

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