

RARITAN RIVER BRIDGE REPLACEMENT PROJECT

Environmental Assessment / Draft Section 4(f) Evaluation

PERTH AMBOY AND SOUTH AMBOY
MIDDLESEX COUNTY, NEW JERSEY



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List of Acronyms

| | |
|-------------------|---|
| ACHP | Advisory Council on Historic Preservation |
| ACM | Asbestos containing material |
| APE | Area of Potential Effect |
| AREMA | American Railway Engineering and Maintenance-of-Way Association |
| ARRCS | Administrative Requirements for the Remediation of Contaminated Sites |
| ASTM | American Society of Testing and Materials Standards |
| BG | Block Group |
| BFE | Base Flood Elevation |
| CAA | Clean Air Act |
| CAFRA | Coastal Area Facility Review Act of 1973 |
| C&ARRMLHD | Camden & Amboy Railroad Main Line Historic District |
| CEA | Classification Exception Area |
| CEQ | Council on Environmental Quality |
| CFR | Code of Federal Regulations |
| CHASP | Construction Health and Safety Plan |
| CO | Carbon monoxide |
| CO ₂ | Carbon dioxide |
| CO ₂ e | Carbon dioxide equivalent |
| Conrail | Conrail Shared Assets Operations |
| CRNJ | Central Railroad of New Jersey |
| CT | Census Tract |
| dB | Decibel |
| DOI | Department of the Interior |
| EA | Environmental Assessment |
| EDR | Environmental Data Resources |
| EFH | Essential Fish Habitat |

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| ESC | Erosion and Sediment Control |
| FEMA | Federal Emergency Management Agency |
| FHWA | Federal Highway Administration |
| FONSI | Finding of No Significant Impact |
| FTA | Federal Transit Administration |
| FWW | Freshwater Wetlands |
| GHG | Greenhouse gas |
| GWP | Global warming potential |
| HABS | Historic American Buildings Survey |
| HAER | Historic American Engineering Record |
| Harbor Ops | Harbor Safety Operations and Navigation Committee of the Port of New York and New Jersey |
| HARBS | Historic Architectural Resources Background Survey |
| HAZWOPER | Hazardous Waste Operations and Emergency Response |
| HDD | Horizontal directional drilling |
| HHS | Department of Health and Human Services |
| HVDC | High voltage direct current |
| Hz | Hertz |
| LCP | Linear construction project |
| MBTA | Migratory Bird Treaty Act |
| MGD | Million gallons per day |
| MHW | Mean high water |
| MLLW | Mean Lower Low Water |
| MMP | Materials Management Plan |
| MPO | Metropolitan Planning Organization |
| NAAQS | National Ambient Air Quality Standards |
| NEPA | National Environmental Policy Act of 1969 |
| NJCL | New Jersey Coast Line |
| NJDEP | New Jersey Department of Environmental Protection |
| NJHPO | New Jersey Historic Preservation Office |
| NJPDES | New Jersey Pollutant Discharge Elimination System |
| NJ TRANSIT | New Jersey Transit Corporation |

| | |
|-----------------|--|
| NHPA | National Historic Preservation Act |
| NMFS | National Marine Fisheries Service |
| NO ₂ | Nitrogen oxide |
| NOAA | National Oceanic and Atmospheric Administration |
| NR | National Register of Historic Places |
| NY&LBRR | New York & Long Branch Railroad |
| NY&LBRRHD | New York & Long Branch Railroad Historic District |
| OSHA | Occupational Safety and Health Administration |
| PA | Programmatic Agreement |
| PCB | Polychlorinated biphenyls |
| PCR | Portland cement replacements |
| PM | Particulate Matter |
| RGA | RGA, Inc. |
| RTS | Regional Transmission System |
| SHPO | State Historic Preservation Office |
| SIP | State Implementation Plan |
| SPPP | Stormwater Pollution Prevention Program |
| SRRA | Site Remediation Reform Act |
| SVOC | Semi-volatile compound |
| TIP | Transportation Improvement Program |
| TMDL | Total Maximum Daily Loads |
| Uniform Act | Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 |
| USACE | U.S. Army Corps of Engineers |
| USCG | U.S. Coast Guard |
| USDOT | U.S. Department of Transportation |
| USEPA | U.S. Environmental Protection Agency |
| USFWS | U.S. Fish and Wildlife Service |
| USGS | U.S. Geological Survey |
| VdB | Velocity decibel |
| VOC | Volatile Organic Compound |

Executive Summary

The New Jersey Transit Corporation (NJ TRANSIT) is proposing to replace the Raritan River Drawbridge with a new bridge parallel to the existing bridge's location (the Raritan River Bridge Replacement Project or proposed project). The Raritan River Drawbridge carries NJ TRANSIT's North Jersey Coast Line (NJCL) and freight trains operated by Conrail across the Raritan River between South Amboy and Perth Amboy in Middlesex County, New Jersey. It is a critical rail link for the NJCL to the Northeast Corridor and job centers in Newark, Jersey City, and Manhattan. The Raritan River Drawbridge suffered structural damage during the storm named Sandy in October 2012, when ocean surge moved the approach girder spans out of alignment atop their supporting piers.

NJ TRANSIT is conducting the Raritan River Bridge Replacement Project in accordance with the Federal Transit Administration's (FTA) procedures for new transit projects. As part of those procedures, FTA must make a determination about the proposed project's environmental impacts in accordance with the National Environmental Policy Act of 1969 (NEPA) before it can approve its final design and construction. The analysis in the EA concludes that the proposed project will not result in significant adverse impacts to social, economic or environmental resources.

The existing Raritan River Drawbridge is a historic resource and the proposed project will require its demolition and have an adverse effect on several other railroad-related historic resources. In addition, the proposed project has the potential for adverse effects on archaeological resources, including two small historic boats that are documented as partially submerged in the Perth Amboy beach west of the existing bridge. As a result, the proposed project will result in the use of properties protected by Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966.¹ A Section 4(f) Evaluation, which is being circulated together with the EA, describes the reasons why there are no feasible or prudent alternatives that will avoid use of the historic resources and identifies measures to minimize harm.

S.1 PURPOSE AND NEED

The purpose of the proposed project is to address the vulnerability of the existing Raritan River Drawbridge to major storm events, which will enhance the reliability of the NJCL. The existing bridge is more than 100 years old and suffered damage during Sandy that resulted in the suspension of service across the bridge for three weeks after the storm. The proposed project will improve the reliability of the NJCL and minimize delays to rail and maritime traffic by reducing the risk of bridge failures during storm events and as a result of mechanical failures.

¹ In 1983, Section 4(f) of the USDOT Act was codified as 49 USC §303(c), but this law is still commonly referred to as Section 4(f).

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Protection of the bridge from future storm events is key to ensuring continued public transportation and freight service on the NJCL, which is the third busiest of NJ TRANSIT’s commuter rail lines. Replacement of the Raritan River Drawbridge is therefore a key element of NJ TRANSIT’s resilience program to repair and restore the transit system and make the system more resilient to future storm events.

Based on these needs, as well as its own operational requirements, NJ TRANSIT has developed goals and objectives for the proposed project (listed in **Table S-1**) to guide the development and evaluation of alternatives for the Raritan River Drawbridge Replacement Project.

Table S-1
Raritan River Drawbridge Replacement Project Goals and Objectives

| Goal | Objective |
|--|--|
| Improve resilience of the Raritan River Drawbridge to severe storms | Improve bridge’s resistance to ocean surges |
| | Raise tracks and electrical and mechanical systems above NJ TRANSIT’s Design Flood Elevation (2.5 feet above the Federal Emergency Management Agency’s Base Flood Elevation) to the extent practicable |
| | Design vulnerable components to be better withstand saltwater and ocean surge |
| | Provide adequate structural capacity to comply with current code requirements Minimize loss of service on the NJCL during and following storm events |
| Provide rail improvements that minimize service disruption and optimize operations | Optimize design speeds for trains on the bridge, up to 60 mph |
| | Avoid substantial compromises to existing NJCL timetables |
| | Accommodate heavier freight trains of 286,000 pounds and potentially up to 315,000 pounds |
| | Minimize capital and operating and maintenance costs Implement within a reasonable timeframe |
| | Avoid impacts to NJCL and Conrail operations during construction |
| Maintain and improve marine navigation beneath the bridge | Minimize delays to marine traffic due to bridge malfunctions |
| | Widen channel to minimize the risk of collisions with marine vessels Enable the safer and faster passage of boats beneath the structure |
| | Avoid impacts to marine traffic during construction |
| Minimize adverse impacts on the built and natural environment | Avoid property acquisition to the maximum extent feasible |
| | Avoid, minimize, or mitigate adverse impacts on historic resources |
| | Avoid impacts on parklands, open space, natural features, and coastal waters |
| | Maintain access to nearby residences and businesses during construction |
| | Minimize construction impacts to the extent feasible |

S.2 PROJECT ALTERNATIVES

The alternatives development process, performed in accordance with FTA guidance, includes the identification of potential alternatives, development of screening evaluation criteria based on the goals and objectives established for the proposed project, and screening the potential alternatives/concepts to determine reasonableness by separating those that are unreasonable from those that are reasonable and must be carried forward for detailed study. An alternative that does not meet the proposed project's purpose and need is, by definition, unreasonable and can be eliminated from further consideration. An alternative that does meet the proposed project's purpose and need can still be rejected as unreasonable for further analysis based on other factors, including environmental impacts and engineering considerations.

To identify reasonable alternatives to address the vulnerability of the existing Raritan River Drawbridge to major storm events, NJ TRANSIT identified and evaluated a number of alternatives using evaluation criteria that were based on the proposed project's goals and objectives (see Appendix A).

The alternatives analyzed included the:

- No Action Alternative;
- Rehabilitation Alternative; and
- Bridge replacement alternatives, as follows:
 - Bridge alignment within the footprint of the existing bridge;
 - Fixed span (non-moveable) bridge alignment (to the east or west of existing bridge);
 - Moveable span bridge to the west of the existing alignment;
 - Moveable span bridge to the east of the existing alignment;
 - Moveable span bridge to the west of the existing alignment with center span perpendicular to the navigation channel.

For the bridge replacement alternatives, three options were identified and evaluated for the superstructure:

- Use of steel multi-girders, which generally require relatively small bridge piers located approximately 95 feet apart;
- Use of steel through-girders, which generally require larger bridge piers located approximately 140 feet apart;
- Use of steel through-trusses, which generally require relatively large bridge piers located approximately 190 feet apart.

For the bridge replacement alternatives with moveable spans, three bridge types were identified and evaluated:

- Swing Bridge (similar to the existing bridge);
- Bascule Bridge, with consideration of single and double leaf bascules; and
- Vertical Lift Bridge.

For all of the bridge replacement alternatives, the existing bridge, including the approach and center swing span piers, would be removed following completion of the new bridge.

Based on the alternatives analysis performed for the proposed project, the Preferred Alternative (aka the Build Alternative evaluated in this document) is a vertical lift bridge with a steel multi-girder superstructure located to the west of, and approximately 50 feet from, the existing bridge. The Build Alternative is the only alternative that fully meets the goals and objectives established for the proposed project (see **Appendix A**). It would be designed to meet current structural design standards and NJ TRANSIT's Design Flood Elevation criteria, and would meet the 60 mph operating requirement, and accommodate freight trains with heavier rail cars. The proposed alignment would be between 80 to 210 feet away from the existing center span of the bridge, depending on the moveable span option selected for the center span. River access to the bridge would be from upriver (the inland side of the bridge), which would allow for the movement of construction materials without impact to railroad operations during construction, since the existing swing span would not have to be opened for most of the material and equipment movement. The existing bridge would remain in operation throughout the construction phase of the proposed project, and impacts to rail operations and marine navigation would be relatively minor. Depending on the moveable span option selected, to varying degrees, marine navigation would be maintained and/or improved during construction and operation. The alignment would be primarily within the railroad's right-of-way with minor property acquisition requirements on the north and south shore. The alignment on the South Amboy south of the river would have minor impacts on wetlands, which would be mitigatable. Since this alternative meets all of the criterion established for the proposed project it was retained for detailed analysis in the Environmental Assessment. None of the other alternatives would meet each of the screening evaluation criteria as presented in Appendix A.

The Build Alternative is described below, following the description of the No Action Alternative, which is retained for analysis in the EA to serve as a benchmark against which to compare the effects of the Build Alternative.

S.2.1 NO ACTION ALTERNATIVE

In the No Action Alternative, the existing Raritan River Drawbridge will remain in service as is, with continued maintenance to address conditions as they arise. In this alternative, the navigational channel divides around the bridge's center pier as it passes beneath the bridge in two channels (approximately 125 feet each). The vertical clearance is controlled by aerial cables over the channel with a clearance of 140 feet above MHW when the bridge is open. The track bed will retain its existing elevation, which is only one foot above the Federal Emergency Management Agency (FEMA) Base Flood Elevation (BFE). This means that in a severe storm, the bridge girders will be well below the ocean surface and vulnerable to powerful ocean water surges driven by tides and winds, such as occurred during Sandy. The bridge's operating machinery will remain below the FEMA BFE and subject to continued damage from water infiltration. Prolonged service disruptions will be expected to occur after severe weather events for emergency repairs and inspections.

The current rate of bridge malfunction is due to the advanced age of the bridge and its mechanical equipment will likely increase. In the most recent 10-year period (between January 2006 and April 2015), the drawbridge has malfunctioned and caused delays more than 140

times. These delays typically range from 5 to 30 minutes and are occasionally longer. In addition, there will be no reduction in the number of boats colliding into the bridge, which are attributed to the configuration of the channel in relation to the bridge's main span and the narrow passageway afforded by swing span's center pier.

The No Action Alternative will require trains to be operated at the reduced speed limits that have been in place since Sandy, with passenger trains operating at 30 miles per hour (mph) and freight trains operating at 20 mph.

S.2.2 BUILD ALTERNATIVE

S.2.2.1 DESCRIPTION OF NEW BRIDGE

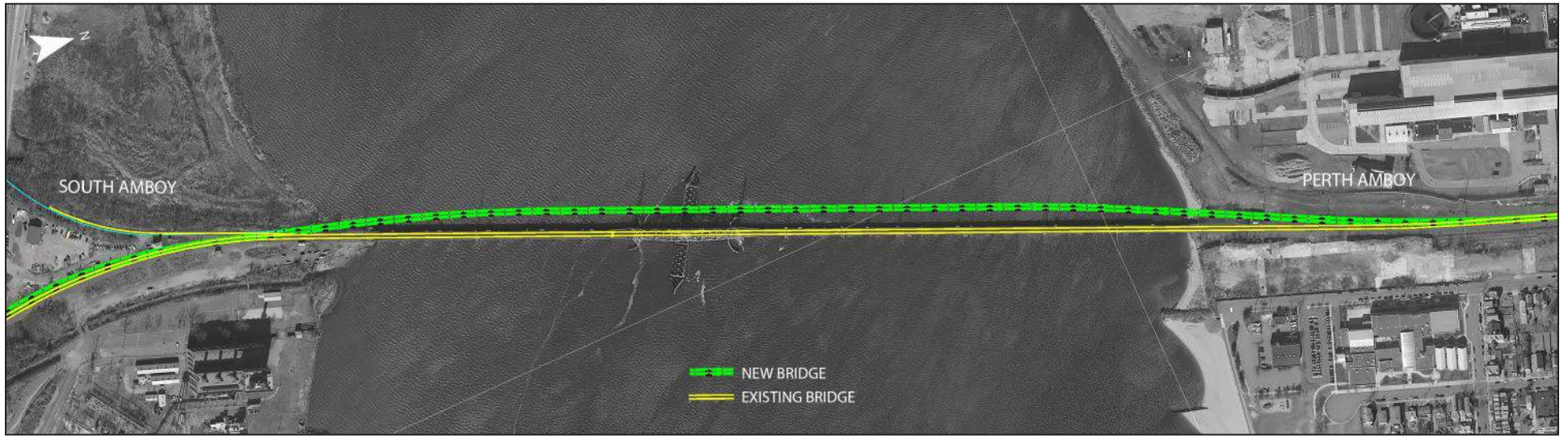
The new bridge will consist of a steel multi-girder superstructure, with bridge pier spacing similar to that of the existing bridge at approximately 95 feet apart². The new bridge piers will consist of long narrow caissons with concrete caps at the top. The main span will be a vertical lift to permit the passage of boats beneath the structure. The new bridge will be approximately 37 feet wide (an increase from the existing 22-foot width), to allow space for two tracks that are at least 14 feet apart, measured center line to center line, and two 4-foot-wide maintenance walkways on either side. The approach track and the fixed spans of the bridge will have continuous welded rail on a ballasted deck.

The proposed new bridge will be parallel to and west of the existing bridge (see **Figure S-1**). The alignment will be close to the existing bridge, to minimize the upland areas affected by the landside approach tracks. Based on conceptual design information, the new alignment is approximately 50 feet from the existing bridge measured from edge to edge, depending on further engineering. This allows construction almost entirely within NJ TRANSIT's existing right-of-way for the NJCL.

One of the key goals for the proposed project is to raise the bridge deck above the NJ TRANSIT Design Flood Elevation criterion to the extent practicable, to increase resilience to flooding. The new bridge deck will be approximately ten feet higher than the existing bridge deck (18 feet higher than mean high water), which will raise the track bed to higher than the NJ TRANSIT Design Flood Elevation, which is 2.5 feet above the FEMA BFE.

Vertical lift bridges operate by moving a center span vertically to allow the passage of vessels underneath (see **Figure S-2**). The center span operates along two towers that house the counterweights required to raise and lower the moveable span. The mechanical equipment will be located on the towers and the moveable span will be well above the FEMA BFE. With the new bridge, the navigation channel in the Raritan River will remain in its existing location and no river bottom dredging will be required. Currently, the navigation channel at the existing bridge is bifurcated into two narrow channels due to the swing span that revolves around a center pier. The vertical lift span will allow boats to pass beneath the bridge within an

² The existing bridge piers are masonry structures that, in total, occupy approximately 35,000 square feet at the river bottom (mudline). The new bridge will be supported on deep foundations, which will occupy about 6,000 square feet at the mudline.





Closed Position



Open Position

unimpeded area of approximately 300 feet, which is the full width of the navigation channel. The vertical lift span will provide for a vertical clearance of 110 feet³.

The new bridge will have new overhead catenary wires and traction power cables, supported on independent monopoles approximately as high as the bridge towers.

S.2.2.2 TRACK WORK

The proposed track alignment will converge with the main tracks near Market Street in Perth Amboy and just north of the South Amboy Station in South Amboy. Maintenance-type track work on the existing tracks could extend as far north as New Brunswick Avenue in Perth Amboy and the South Amboy Station area in South Amboy. New interlockings (to permit the movement of trains from one track to another) will be installed, one near the south shore at a new connection to Conrail's "Essay Running Track" and the other on the north shore in Perth Amboy. In South Amboy, the proposed track alignment will require the demolition of Essay Tower and a substation, and a landward shift in Conrail's Essay Running Track. On both approaches to the Raritan River, fill will be brought to the site to create an embankment within the railroad right-of-way to meet the NJ TRANSIT Design Flood Elevation criteria and the vertical profile of the new bridge. Up to approximately 15 feet of fill will be required directly behind the new bridge abutments on both sides of the bridge. On the Perth Amboy side, the fill area is expected to be approximately 900 feet long. On the South Amboy side, the fill area is expected to be approximately 300 feet long along the main track and 200 feet long along the freight line. Retaining walls may be required to provide grade separation and to minimize private property acquisition.

S.2.2.3 OPERATIONAL ASPECTS

With the new bridge, the design speed for passenger trains will be 60 mph. Taking into account the curve in the tracks just south of the bridge in South Amboy, and the presence of the Perth Amboy and South Amboy rail stations on either end, the operating speed on the bridge will be 40 mph for passenger trains, an increase from the existing 30 mph and the speed prior to Sandy of 35 mph. Freight rail operating speeds will increase to 30 mph from the existing 20 mph (both pre-and post-Sandy).

The Build Alternative will not result in an increase in rail traffic and therefore will not impact the frequency of bridge openings. As the proposed new bridge will operate more reliably than the existing bridge, the number and severity of delays related to bridge malfunction will be reduced. Most recreational boats will be able to pass beneath the new bridge without opening the lift span, since it will be approximately ten feet higher than the existing bridge (16 feet higher than mean high water), eliminating the wait time altogether. For larger vessels, the proposed new bridge can be opened more quickly (within three minutes as compared to 3.5 minutes under existing conditions), reducing wait times.

Additionally, the new bridge will accommodate freight trains with rail cars that carry more weight, up to 315,000 pounds per rail car. The existing bridge cannot accommodate the current weight standard for rail freight cars, which is 286,000 pounds, and upgrading the weight

³ This is the same vertical clearance provided at the adjacent Victory Bridge, which carries Route 35 over the Raritan River upstream from the Raritan River Drawbridge.

capacity of the bridge to allow 286,000-pound cars has been identified as a critical need in the *New Jersey State Rail Plan*.⁴

S.2.2.4 CONSTRUCTION METHODS

As two AT&T fiber optic underground cables are in conflict with the proposed construction, they will be relocated outside of the construction zone. Prior to construction activities for the bridge, the two cables with conduits to the west of the existing bridge would be relocated to the east of the existing bridge, using horizontal directional drilling (HDD). The cables under the Raritan River will be approximately 3,241 linear feet in length and installed to a depth of up to ten feet below the river bed beneath the navigational channel.

The new replacement bridge will be constructed alongside the existing bridge. When it is complete and connecting tracks have been tied in to the existing NJCL, train traffic will be shifted to the new bridge and the old bridge and its connecting tracks will be removed. The in-water construction methods for the new bridge will be similar to those used for construction of the Victory Bridge in 2002-2003, the highway bridge that carries Route 35 over the Raritan River upstream of the Raritan River Drawbridge.

From the Perth Amboy shoreline, a trestle will extend along the construction zone for approximately 600 feet; from the South Amboy shoreline, a trestle will extend approximately 1,000 feet. It is anticipated that the trestles will be approximately 40 feet wide and may have “finger” piers extending toward the construction zone (with finger piers an estimated 30 feet long) to allow equipment to easily reach the construction site. The trestles will likely be constructed working from the deep water and extending to the shoreline.

Most of the required staging and equipment storage can occur using the trestles and barges. Some limited land areas will also be needed for construction staging or contractor support space. This activity can occur within NJ TRANSIT’s existing rail right-of-way, as well as within limited adjacent areas as available. For example, in Perth Amboy, an existing Conrail siding on the west side of the right-of-way may be used; in South Amboy, some of the undeveloped area in the immediate vicinity of the NJCL and Conrail tracks, including the parking area near Essay Tower, may be used.

Floating barges will be used as construction staging platforms in deeper parts of the river. The barges will not be placed within the navigation channel. These barges will be used for material storage and for construction equipment, such as cranes. The construction barges will be anchored in place using spud piles.

The bridges foundation will be constructed using drilled shafts and/or large diameter steel pipe piles depending on the depth to bedrock and the condition of the rock, which will be determined via a geological boring program. Once the piers have been installed, the steel spans

⁴ As indicated in the NJ TRANSIT and New Jersey State Department of Transportation, *New Jersey State Rail Plan*, April 2015, p. 5-27. <http://www.njtransit.com/pdf/NJStateRailPlan.pdf>, while exceptions exist, as a general policy, the movement of 286K railcars on right of way owned and maintained by NJ TRANSIT and Amtrak is not currently permitted. These restrictions are based upon the increased maintenance costs that would be required by the passenger rail operators due to additional wear and maintenance requirements associated with heavier railcars.

will be installed. Cranes on the temporary trestle and floating barges will be used to install the spans. For sections in deeper water, the spans could be preassembled on the barges and then floated to the site and erected by a crane.

The moveable span of the new bridge will be assembled off-site and floated into place when it is complete. The bridge span can be floated into place and connected to the approach spans within a 36-hour period, during which the navigation channel will be closed. Once in place, the new bridge will be left in the “open” position; the existing bridge will continue to open and close as needed to accommodate maritime traffic.

After the approach spans have been completed, ballast and tracks will be laid across the bridge. In addition to the bridge itself, landside approach tracks must be constructed to connect the new bridge to the mainline tracks of the NJCL as well as the Conrail tracks that break off from the NJCL in South Amboy.

Once rail operations have been shifted to the new bridge, the existing bridge superstructure will be removed span-by-span using a barge and crane and then transported to and disassembled in a staging area. An excavator will pull out the pier footings and the timber piles will be cut off below the mud line. Typically, the United States Coast Guard (USCG) requires piers outside of the navigation channel to be removed to two feet below the mudline, and piers within the navigation channel removed five feet below the mudline. Either mechanical or controlled-drill-and-blast methods will be used to remove the bridge piers. All work will be performed in accordance with the New Jersey Department of Environmental Protection (NJDEP) and Army Corps of Engineers (USACE) permit conditions, which will likely require containment of debris through the use of turbidity barriers and sheet piling around the piers to minimize adverse effects to water quality.

Construction activities will be timed to minimize adverse effects to terrestrial and aquatic resources, in accordance with any permit requirements developed with federal and state permitting agencies. As described in Section 4.2.8 “Natural Resources” of this EA, the National Oceanic and Atmospheric Administration (NOAA) recommends that in-water work within the lower Raritan River be avoided from March 1 to June 30 of each year in order to minimize impacts to alewife and blueback herring, as well as other species migrating up and down river to spawn. In addition, the U.S. Fish and Wildlife Service (USFWS) may recommend timing restrictions for tree and shrub clearing to minimize potential impacts to migratory birds, which will become part of NJDEP permit conditions.

Construction activities will generally occur during daylight hours, although certain activities—including installation of the moveable span—may need to occur overnight. If any lighting is required during construction, it will be limited to the minimum number of lights and wattage necessary to perform such activities, and down-shielded lights will be used to direct the light only to the area needed and minimize spill.

Most construction activities will occur on weekdays, but weekend work may be required for time-sensitive tasks and to avoid disruption to existing train operations. For example, connections between the new tracks and existing tracks will likely be made over several weekends and the moveable span will be installed over a single weekend.

The navigation channel will remain operational throughout construction, except for a short period (i.e., less than 48 hours) when the new moveable span is being installed. When both bridges are in place before the old bridge has been demolished, the bridge that is not carrying train traffic can be left in the open position without interfering with the operation of the other bridge's moveable span.

S.2.2.5 CONSTRUCTION SCHEDULE

Construction of the new bridge, including its landside tracks and railroad systems, is anticipated to last approximately 3.5 years, after which the new bridge will be in operation. After that, demolition of the existing bridge will occur over an additional six months.

S.3 ENVIRONMENTAL CONSIDERATIONS

The EA evaluated the potential social, economic, and environmental consequences of the Build Alternative consistent with the requirements of NEPA, FTA rules, regulations and guidance documents, and other related federal rules and regulations. The No Action Alternative served as a benchmark against which to compare the effects of the Build Alternative. The analysis in this EA concludes that the Build Alternative will not result in significant adverse impacts on the built and natural environment. **Table S-2** summarizes the potential long-term effects of the Build Alternative for each technical area of study. **Table S-3** summarizes the temporary construction impacts of the Build Alternative.

S.4 SECTION 106 COORDINATION

The proposed project is subject to Section 106 of the National Historic Preservation Act (NHPA; 36 CFR Part 800), which requires federal agencies to: 1) take into account the effects of their undertakings on historic properties that are listed in, or meet the eligibility criteria for listing in, the National Register of Historic Places; and 2) afford the Advisory Council on Historic Preservation (ACHP) and the New Jersey Historic Preservation Office (NJHPO) a reasonable opportunity to comment. Section 106 also requires that agency officials work with the NJHPO to identify parties to participate in the Section 106 process ("Consulting Parties"). Consulting Parties may include local governments, federally recognized Native American tribes and individuals and organizations with a demonstrated interest in a project.

FTA, as lead federal agency for the proposed project, extended invitations to local preservation groups, local planning agencies, property owners, and Native American tribes to participate as Section 106 Consulting Parties. To date, the following organizations have agreed to be Consulting Parties for the proposed project's Section 106 Consultation process: NJHPO, USACE, the USCG, Middlesex County, the City of Perth Amboy, the City of South Amboy, the Delaware Nation, the Delaware Tribe Historic Preservation Office, the Eastern Shawnee Tribe of Oklahoma, and the Shawnee Tribe of Oklahoma. Public involvement activities may identify additional consulting parties and resource organizations. No additional cooperating parties have been identified through public involvement to date. As discussed in this EA, a Programmatic Agreement (PA) has been drafted (see Appendix B), which commits NJ TRANSIT, in coordination with FTA, to carry out measures to mitigate adverse effects on historic properties and to consult with the NJHPO during the construction of the proposed project.

S.5 ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), requires federal agencies to involve the public on project issues related to human health and the environment. The U.S. Department of Transportation's guidance indicates that project sponsors should elicit public involvement opportunities, including soliciting input from affected minority and low-income populations in considering project alternatives. As described in Chapter 4, "Environmental Justice," based on U.S. Census Bureau data and relevant guidance, the entire Perth Amboy study area can be considered an environmental justice community. No census block groups in the South Amboy study area are considered potential environmental justice communities.

The proposed project will not result in disproportionately high and adverse impacts to the environmental justice community in Perth Amboy. Nevertheless, building on the public outreach efforts already conducted for the proposed project (see Chapter 7 "Agency Coordination and Public Participation"), FTA and NJ TRANSIT have engaged and will continue to engage residents of the Perth Amboy study area through the project website and e-mail communications. NJ TRANSIT will also continue to issue public notices in Spanish and provide translation services for these communities, as necessary, to engage their participation in public involvement activities.

S.6 SECTION 4(f) EVALUATION

The proposed project will use Section 4(f) properties, specifically removal of properties that are contributing elements to the New York and Long Branch Railroad Historic District, including: Raritan River Drawbridge, which is also an individually listed historic resource; Essay Tower; and, a substation. Additional 4(f) properties that will require alteration or removal include the railroad catenary system in the project area, a contributing resource to the Pennsylvania Railroad Overhead Contact System Historic District; and a signal bridge that is a contributing resource to the Perth Amboy & Elizabethport Branch of the Central Railroad of New Jersey Historic District. In addition, the proposed project will adversely affect the remains of two small boats that are buried within the sandy beach at the river's edge. The proposed project will not affect a historic box culvert, a contributing resource to the New York and Long Branch Railroad Historic District, or several other historic resources, which are located within the project area but will not be adversely affected by the Build Alternative. While a temporary easement at the Coppers Work site will be needed for construction access, this activity does not constitute use under Section 4(f) regulations.

Although the Perth Amboy Sadowski Parkway Waterfront Park and future 2nd Street Community Park are adjacent to the right-of-way, the proposed project will not result in the use of these parklands and recreational facilities. It will not require any physical occupation of these resources during construction or operation and will not adversely affect them so as to result in a constructive use. Therefore, Section 4(f) does not apply to these parklands and recreational facilities.

For reasons detailed in Chapter 6, there are no feasible and prudent alternatives to the use of the above historic Section 4(f) properties and, as documented in the Section 106 PA included in Appendix B, all possible planning to minimize harm has been identified as mitigation measures

and/or incorporated into the proposed project's design. FTA will make a Section 4(f) determination for the proposed project, and the U.S. Department of Interior must concur with the finding prior to the proposed project's use of Section 4(f) properties.

S.7 CONTACT INFORMATION

For further information regarding this study, please visit the project website at www.NJTRANSITResilienceProgram.com/contact-us or you may contact:

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Table S-2

Summary of Potential Long-Term Adverse Effects and Mitigation

| Technical Discipline | Potential Effects | Mitigation/Commitment |
|--|--|--|
| <i>Land Use</i> | None | NA |
| <i>Zoning/Redevelopment</i> | None | NA |
| <i>Parks and Recreational Resources</i> | None | NA |
| <i>Socioeconomic Conditions</i> | None | NA |
| <i>Property Acquisition and Displacement</i> | None. | NA |
| <i>Visual Resources</i> | None | NA |
| <i>Archaeological Resources</i> | The Build Alternative will have an adverse effect on archaeological resources, including two buried historic vessels, and will traverse a portion of the Raritan River with high sensitivity for marine archaeological resources. | Underwater archaeological investigations of the buried resources and coordination with the NJHPO will occur in order to develop appropriate mitigation measures for the adverse effect. |
| <i>Architectural Resources</i> | The proposed project will have an adverse effect on several railroad-related historic resources, including the historic Raritan River Drawbridge, which must be removed for construction of the new bridge. | Documentation of the Raritan River Drawbridge and other historic railroad-related features in accordance with the standards of the Historic American Engineering Record (HAER); education and interpretive materials related to the bridge; design review by NJHPO; salvage of a pair of terrestrial catenary poles for display at the proposed South Amboy ferry terminal; and adherence to the measures outlined in the draft PA (see Appendix B). |
| <i>Transportation</i> | The Build Alternative will result in significant benefits to commuter and freight rail services on the NJCL due to a more reliable and resilient bridge. Maritime traffic will benefit from improved navigation due to the unimpeded 300-foot horizontal clearance provided by the lift span and fewer delays caused by bridge malfunction. The protective fender system installed at the main span's piers will improve safety and fewer boat collisions will occur as a result of the wider channel clearance afforded by the lift span. Most recreational boats will be able to pass beneath the bridge without opening the lift span since it will be approximately ten feet higher than the existing bridge. The lift can open quickly (within a few minutes), reducing wait times for the larger vessels. The minimum vertical clearance of the lift span in the open position would be reduced from 140 to 110 feet. | Prepare a Navigation Impact Report. |
| <i>Air Quality</i> | None | NA |

Table S-2 (Cont'd)
Summary of Potential Long-Term Adverse Effects and Mitigation

| Technical Discipline | Potential Effects | Mitigation/Commitment |
|--|--|--|
| <i>Greenhouse Gas (GHG) Emissions</i> | No change to the number of daily trains that cross the bridge are proposed as a result of the Build Alternative. Since passenger and freight transportation by rail are substantially more efficient than on-road or in-water transportation, the long-term effect of the proposed project will be lower energy use and GHG emissions due to the resiliency improvements. | NA |
| <i>Noise and Vibration</i> | None | NA |
| <i>Wetlands</i> | Approximately 0.4 acres of NJDEP-mapped freshwater wetlands in South Amboy and 2 acres of NJDEP saline coastal tidal marsh in Perth Amboy will be potentially affected. | Avoidance and minimization of impacts to the maximum extent practicable, acquisition and adherence to applicable permit conditions, and compensatory mitigation at an anticipated 2:1 ratio (as per NJDEP and USACE requirements), which could include purchasing credits from an approved wetland mitigation bank, or on-site mitigation activities. |
| <i>Flood Zones</i> | The Build Alternative will result in the placement of fill within the 100-year floodplain (approximately 0.3 acres on land plus approximately 0.8 acres in water) and 500-year floodplain (approximately 0.4 acres). Because this portion of the Raritan River is tidal and is affected by coastal flooding rather than riverine flooding, it will not lose storage capacity under normal conditions or during severe storms as a result of the placement of these materials. The Build Alternative will result in the clearing of vegetation in regulated "riparian zones." | Mitigation measures for disturbance within the 150-foot riparian zone will include re-vegetation within disturbed areas after removal of the existing bridge and approach tracks, other areas within the railroad right-of-way that could be re-vegetated, and opportunities available in the vicinity of the project site to reach the required mitigation ratio (anticipated to be at least 2:1) |
| <i>Water Quality</i> | None | Awaiting final permit conditions, authorization and/or certification |
| <i>Terrestrial Natural Resources</i> | None | Awaiting final permit conditions, authorization and/or certification |
| <i>Aquatic Resources</i> | While the new bridge deck will be wider than the existing bridge deck, the new bridge will be higher and river shading is not expected to appreciably increase. The Build Alternative will result in a net increase of approximately 28,000 square feet of bottom habitat due to a different type of bridge pier that will be installed. | Awaiting final permit conditions, authorization and/or certification |
| <i>Essential Fish Habitat</i> | None | Awaiting final permit conditions, authorization and/or certification |
| <i>Threatened and Endangered Species</i> | None | Awaiting final permit conditions, authorization and/or certification |
| <i>Coastal Zones</i> | The Build Alternative is located within the NJ Coastal Zone | Acquisition of Waterfront Development and Coastal Wetlands permits and adherence to permit conditions |
| <i>Indirect and Cumulative Effects</i> | None | NA |
| <i>Environmental Justice</i> | The proposed project will be located within an area that is an environmental justice community. | Public participation initiatives are being conducted for this project in accordance with the requirements of NEPA. |

Table S-3

Summary of Temporary Construction-Period Effects and Mitigation

| Technical Discipline | Potential for Adverse Effects | Mitigation/Commitment |
|---|--|--|
| <i>Land Use/Zoning</i> | None | NA |
| <i>Zoning/Redevelopment</i> | None | NA |
| <i>Parks and Recreational Resources</i> | None | NA |
| <i>Socioeconomic Conditions</i> | None | NA |
| <i>Property Acquisition</i> | A total about three acres for seven temporary easements of undeveloped commercial and/or industrial land may be required. | Property owners will be compensated under the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the Uniform Act) and established equitable land acquisition procedures. |
| <i>Transportation</i> | Conrail Essay Running Track will be taken out of service for a period of approximately four to eight weeks and Conrail will need to use an alternate route to connect to the Northeast Corridor. Maritime traffic will be affected during the installation of the vertical lift span, for a period of approximately 48 hours. The navigation channel may be reduced sporadically to allow for construction barge access. | Coordination with Conrail on staged construction activities will occur and maritime users will be kept apprised of the proposed project's construction schedule. Coordination with USCG Waterways Management Branch, Sector NY. |
| <i>Air Quality</i> | Increased dust related to site preparation and exhaust emissions from material truck deliveries and construction equipment. | Best practices measures will be employed including: limiting idling times to less than 3 minutes on diesel and gasoline powered engines; use of dust control measures; and other measures. |
| <i>GHG Emissions</i> | Total GHG emissions associated with the construction of the Build Alternative are estimated to be on the order of 15,000 metric tons CO ₂ e (annualized at 300 metric tons CO ₂ e over the 50-year lifetime of the bridge). These would be offset by implementing measures to minimize GHG during construction and, over the lifetime of the proposed project, by the increased efficiencies in moving freight, with newer equipment that meets more stringent emissions requirements than the locomotives currently operating on the NJCL, and a reduction of emissions due to improving the passage of boats beneath the bridge. | The contractor will be encouraged to: use biodiesel fuel; concrete with high slag and fly ash content, where appropriate; re-use on-site aggregate; and use recycled concrete and steel. NJ TRANSIT will evaluate the use of composite plastic ties. |
| <i>Noise and Vibration</i> | None | NA |
| <i>Wetlands</i> | The Build Alternative will require construction activities to occur in and near wetlands. | NJDEP-approved Stormwater Pollution Prevention Plan (SPPP) and Erosion and Sediment Control (ESC) plans will be drafted identifying measures (i.e., silt fencing, hay bales) that will be followed to protect adjacent wetlands outside of the area of disturbance from stormwater runoff during construction. |
| <i>Flood Zones</i> | Staging areas and construction trestles may be temporarily located in the flood zones. Since construction-related water volume displacement resulting from the additional fill will be to the Raritan Bay and the larger Atlantic Ocean, which has the ability to absorb flood waters, no adverse floodplain effects will occur. | Awaiting final permit conditions, authorization and/or certification |

Table S-3 (Cont'd)
Summary of Temporary Construction-Period Effects and Mitigation

| Technical Discipline | Potential for Adverse Effects | Mitigation/Commitment |
|---|--|---|
| <i>Water Quality</i> | The Build Alternative requires the installation of steel bridge piers and abutments and demolition of the existing bridge with piers removed to approximately two feet below the mudline outside of the navigation channel and five feet below mudline within the navigation channel, either by mechanical or drill-and-blast methods. | As indicated above in Section S.2.2.3 all work will be performed in accordance with the NJDEP and USACE permit conditions, which will likely require containment of debris through the use of turbidity barriers and sheet piling around the existing piers during demolition. Construction barges will be located in waters of sufficient depth to minimize bottom disturbance. |
| <i>Aquatic and terrestrial natural resources including Threatened and Endangered Species and Essential Fish Habitat</i> | <p>Birds protected under the Migratory Bird Treaty Act could potentially nest in the project area.</p> <p>Sea turtles and Atlantic sturgeon have the potential to occur in the project area as transients (i.e., not for breeding/spawning).</p> <p>Construction equipment and temporary trestles will result in increased shading, which could adversely affect aquatic habitat, or loss of water area and disturbance to the river bottom, which provides habitat.</p> <p>Underwater noise produced during impact pile driving has the potential to cause behavioral avoidance, injury, or mortality to fishes and sea turtles in the vicinity of pile driving activities.</p> | <p>Consultation with USFWS on construction activities and schedule may require imposition of timing restrictions on vegetation clearing to minimize potential impacts to migratory/nesting birds, which will be monitored in accordance with NJDEP and USACE permits requirements.</p> <p>As recommended by NOAA in-water work will not occur between March 1 and June 30 to minimize impacts to alewife and blueback herring and other transient species.</p> <p>Temporary trestles will be designed to reduce shading.</p> <p>Low-speed vibratory drilling will be used wherever practicable,</p> <p>The spatial extent of underwater noise could be minimized through the use of noise attenuation methods including wooden cushion blocks, dewatered cofferdams, or bubble curtains. Pile tapping would be used prior to the start of pile driving to deter fish and sea turtles from the vicinity of pile driving.</p> |
| <i>Coastal Zones</i> | The Build Alternative is located within the NJ Coastal Zone | Acquisition of Waterfront Development and Coastal Wetlands permits and adherence to permit conditions |
| <i>Contaminated Materials</i> | Contaminated materials are expected to be encountered during construction. | Proposed project will be enrolled as a linear construction project as per NJDEP. Construction Health and Safety Plan will be prepared and contaminated materials will be handled, stored, transported and disposed of in accordance with all applicable laws and regulation and following best practices methods. A Materials Management Plan and Fill Use Plan will be developed and fill used on site will meet applicable Federal, State and local standards for clean or alternative fill. |
| <i>Utilities</i> | Bridge construction will require relocation of AT&T cable spanning Raritan River. | Coordination with AT&T, acquisition of Section 10/404 permits for cable installation and adherence to permit conditions. |

1.1 PURPOSE OF THE PROJECT

The Raritan River Drawbridge carries New Jersey Transit Corporation's (NJ TRANSIT) North Jersey Coast Line (NJCL) and freight trains operated by Conrail across the Raritan River between South Amboy and Perth Amboy, New Jersey, and is a critical rail link for the NJCL to the Northeast Corridor and job centers in Newark, Jersey City, and Manhattan. The Raritan River Drawbridge suffered structural damage during the storm named Sandy in October 2012, when ocean surge moved the approach girder spans out of alignment atop their supporting piers.

NJ TRANSIT is proposing to replace the Raritan River Drawbridge with a new bridge parallel to the existing bridge's location (the Raritan River Drawbridge Replacement Project or proposed project). The purpose of the proposed project is to address the vulnerability of the existing Raritan River Drawbridge to major storm events, which will enhance the reliability of the NJCL. The existing bridge is more than 100 years old and suffered damage during Sandy that resulted in the suspension of service across the bridge for three weeks after the storm. The proposed project will improve the reliability of the NJCL and minimize delays to rail and maritime traffic by reducing the risk of bridge failures during storm events and as a result of mechanical failures.

Protection of the bridge from future storm events is key to ensuring continued public transportation and freight service on the NJCL, which is the third busiest of NJ TRANSIT's commuter rail lines. Replacement of the Raritan River Drawbridge is therefore a key element of NJ TRANSIT's resilience program to repair and restore the transit system and make the system more resilient to future storm events.

1.2 BACKGROUND

The Raritan River Drawbridge is a moveable "swing span" rail bridge constructed in 1908 that spans the Raritan River between Perth Amboy and South Amboy in Middlesex County, New Jersey (see **Figure 1-1**). The bridge is a two-track, open deck structure that consists of 28 approach spans and a moveable swing span over the navigable channel. The swing portion of the bridge is 327 feet long; including the two approaches on either side, the total span across the river is 2,920 feet long. When closed, the bridge is 8 feet above mean high water and 13 feet above mean low water. Two 140-foot-tall towers flank the center portion of the bridge and support high-voltage cables that supply electricity to the overhead catenary wires that power the trains.

The Raritan River is tidal and navigable as it passes beneath the bridge. The center, swing portion of the bridge rotates on a central pivot so the bridge deck can open to allow marine traffic to pass using two channels—one on either side of the center swing portion in its open position.



RARITAN RIVER BRIDGE REPLACEMENT

Project Location Figure 1-1

During Sandy in October 2012, significant damage occurred to the Raritan River Drawbridge. Sandy struck New Jersey with sustained winds of almost 85 miles per hour and a 13-foot tidal surge that flooded coastal communities throughout the state. The Raritan River Drawbridge sustained damages due to wave action from the Sandy storm surge. To repair the damage, service across the bridge was suspended for three weeks after the storm while the structure was repositioned and the tracks reset to support train operations. While the bridge is now safe, trains must operate at reduced speeds across the bridge because of the damage that occurred.

1.3 NEED FOR THE PROJECT

1.3.1 NEED TO MAINTAIN CRITICAL ELEMENT OF THE REGION'S TRANSPORTATION INFRASTRUCTURE

The Raritan River Drawbridge is a vital link in northern New Jersey's transportation infrastructure and the potential loss of both passenger and freight service on the NJCL will have significant implications for daily mobility among Jersey shore communities and local businesses. Loss of the NJCL service will impose traffic congestion, higher costs of travel, and longer travel times. It is therefore critical that the NJCL remain in service, safely and reliably.

The NJCL, which runs from Penn Station New York at its northern terminus to Bay Head, New Jersey at the New Jersey shore at its southern terminus, is NJ TRANSIT's third most heavily used line (of 10 lines), carrying some 26,500 daily commuters on weekdays. The Raritan River Drawbridge is located between Perth Amboy and South Amboy stations. The bridge carries 44 eastbound trains in passenger service and 43 westbound trains on weekdays, and 20 revenue trains in each direction on weekends (and 24 trains in each direction on summer weekends). It is the only rail link that connects the shore area to major job centers in Newark and Jersey City, New Jersey, and to the Manhattan central business district.

The bridge is also used by Conrail Shared Assets Operations (a rail freight operator that is jointly owned by Norfolk Southern and CSX) for approximately two freight trains each day, for a total of 2 million tons of freight annually. The bridge is also part of the rail access route to the U.S. Navy base Naval Weapons Station Earle in Colts Neck, New Jersey, and the joint base McGuire-Dix-Lakehurst southeast of Trenton.

The bridge spans the navigable channel in the Raritan River, which is used by maritime traffic including commercial waterway users, emergency service providers (e.g., the U.S. Coast Guard and state police), and some recreational users. The primary commercial users are a gasoline marine terminal owned by Buckeye Global Marine (formerly owned by Hess Corporation) that receives and sends shipments by barge and tanker, Cornucopia Cruise Line, and the Sayreville Marina located upstream of the bridge. The drawbridge opens an average of four to five times per day (with a daily maximum of about 14 openings per day during busy summer months) for both recreational and commercial marine traffic.

1.3.2 NEED TO PROVIDE STORM RESILIENCE

Located a half mile from the mouth of the Raritan River where the river meets Raritan Bay and the Atlantic Ocean, the bridge does not have natural coastal protection, making it susceptible to ocean surges and a high flood risk, as evidenced by the damage sustained during Sandy. To repair the damage sustained during Sandy, NJCL service was suspended and the bridge was

closed for three weeks following the storm. As severe weather conditions increase in both frequency and intensity, the risk of future bridge failures increases.

At the time of the peak storm surge during Sandy, the bridge's superstructure was fully submerged and below the trough of waves, so that it was subjected to the lateral force of the ocean surging shoreward. The continuous pressure of the storm's water surge against the bridge, along with any debris caught up in the surge itself, caused the bridge's superstructure to shift on its piers, and several of the pier capstones that support the approach span girder were dislodged or broken. Inspections showed that the track rails along the Perth Amboy approach of the bridge were bent laterally at several locations. At some locations, the girders on the approach spans were moved more than 0.5 feet out of alignment atop the supporting piers. The displaced rails prevented trains from using the bridge and required emergency repairs. Additionally, there was damage to the piers themselves, which also prevented the use of the bridge. While the damage was repaired to allow the bridge to operate safely, the piers are still compromised and will be less resilient to a severe storm in the future.

The motors used to operate the swing span were also damaged during Sandy. The machinery that operates the swing span is located in a machine room on top of the bridge's superstructure and on platforms attached to the structure below the tracks. These motors were submerged during the storm. Following the storm, six motors were removed, cleaned, and dried out and then reinstalled on the bridge.

In addition, the current bridge structure, including its unreinforced concrete piers, does not comply with the latest standards established by the American Railway Engineering and Maintenance-of-Way Association (AREMA) for loads such as will be caused by storm surge, seismic events (i.e., earthquakes), vessel collision, or train braking. Since the time of the construction of the bridge in 1908, code-specified design loads have increased. In addition, the bridge also has a moderate to significant potential for significant erosion ("scour"¹) problems at the bridge abutments from water passing with moderate to fast velocity along the river banks.

Moreover, the bridge is beyond its expected service life of 75 to 100 years. Following Sandy, the repairs necessary to bring the bridge to safe working order were made, but additional reconstruction will be required for the long term to address corrosion and other existing damage to the bridge's superstructure and piers as well as ongoing mechanical problems in the swing span machinery that periodically result in the bridge's failure to open and close properly. These service outages result in delays to trains and/or maritime traffic. In the most recent 10-year period (between January 2006 and April 2015), the drawbridge has malfunctioned and caused delays more than 140 times. These delays typically range from 5 to 30 minutes and are occasionally longer.

1.4 NJ TRANSIT RESILIENCE PROGRAM

To reduce the impact of future storms, NJ TRANSIT is undertaking a system-wide resilience program to harden infrastructure, focusing on elements that will allow NJ TRANSIT to restore

¹ Bridge scour is the removal of sediment such as sand and rocks from around bridge abutments and piers, caused by swiftly moving water, which compromises the integrity of the structure.

critical service as soon as possible after a storm event. This resilience program includes: elevating electrical substations and signal structures to prevent future damage and/or service disruption; protecting assets in flood-prone areas against future storms by raising electrical, signal and interlocking apparatus; and replacing wooden catenary poles with steel structures less vulnerable to damage from wind and falling trees.

NJ TRANSIT's resilience program includes five key projects that will enhance service reliability and allow NJ TRANSIT to restore service quickly after a major storm:

- Raritan River Drawbridge Replacement, which will address the vulnerability of the existing bridge to major storm events and enhance the reliability of the NJCL service.
- Delco Lead Storage and Inspection Facility, a new electric rail storage yard, service and inspection facility, and track system that will be used to store rail cars and locomotives in a centrally located inland area that is not susceptible to flooding or tree fall, to facilitate the rapid resumption of service after storms have passed.
- NJ TRANSITGRID, a new electrical microgrid that includes a natural gas generation plant (primarily to supply power to operate trains) and distributed generation solutions (i.e., fuel cells, combined heat and power plants, and photovoltaic panels) to provide power to rail and bus stations and other NJ TRANSIT infrastructure in northeastern New Jersey. This project will enhance the resiliency of the electrical supply to the NJ TRANSIT and Amtrak infrastructure that serves key commuter markets in New York and New Jersey, to minimize public transportation service disruptions when the commercial power grid is compromised.
- Long Slip Fill and Rail Enhancement Project, which will build a resilient train station and fill a canal (known as Long Slip) that extends into Hoboken Rail Yard and acted as a conduit for storm surge waters from the Hudson River. The new station will be built on top of the filled area to enable the operation of commuter service even while the yard itself is being shut in preparation for a significant storm event or returned to service after storm-related or ocean-surge flooding.
- Train Controls Resilience, which will harden signal and communication systems and other infrastructure on the Hudson-Bergen Light Rail system and four commuter rail lines – the Main and Bergen County Lines, Pascack Valley Line, Raritan Valley Line, and Morris and Essex (Morristown) Line.

These five initiatives have been selected by the FTA for funding through FTA's Emergency Relief Program because of their critical importance to enhancing resiliency to the transit system in the region. While these projects together will greatly improve the transit system's resiliency, they each have independent utility and are being developed separately, with separate environmental reviews in accordance with NEPA.

1.5 GOALS AND OBJECTIVES

The goals and objectives listed in **Table 1-1** were developed by NJ TRANSIT to guide the development and evaluation of alternatives for the Raritan River Drawbridge Replacement Project. The results of the evaluation of the Preferred Alternative, No Build Alternative and other alternatives against these goals and objectives are detailed in Appendix A.

Table 1-1
Raritan River Drawbridge Replacement Project Goals and Objectives

| Goal | Objective |
|--|--|
| Improve resilience of the Raritan River Drawbridge to severe storms | Improve bridge's resistance to ocean surges |
| | Raise tracks and electrical and mechanical systems above NJ TRANSIT's Design Flood Elevation (2.5 feet above the Federal Emergency Management Agency's Base Flood Elevation) to the extent practicable |
| | Design vulnerable components to better withstand saltwater and ocean surge |
| | Provide adequate structural capacity to comply with current code |
| | Minimize loss of service on the NJCL during and following storm events |
| Provide rail improvements that minimize service disruption and optimize operations | Optimize design speeds for trains on the bridge, up to 60 mph |
| | Avoid substantial compromises to existing NJCL timetables |
| | Accommodate heavier freight trains of 286,000 pounds and potentially up to 315,000 pounds |
| | Minimize capital and operating and maintenance costs |
| Maintain and improve marine navigation beneath the bridge | Implement within a reasonable timeframe |
| | Avoid impacts to NJCL and Conrail operations during construction |
| | Minimize delays to marine traffic due to bridge malfunctions |
| | Widen channel to minimize the risk of collisions with marine vessels |
| Minimize adverse impacts on the built and natural environment | Enable the safer and faster passage of boats beneath the structure |
| | Avoid impacts to marine traffic during construction |
| | Avoid property acquisition to the maximum extent feasible |
| | Avoid, minimize, or mitigate adverse impacts on historic resources |
| | Avoid impacts on parklands, open space, natural features, and coastal waters |
| | Maintain access to nearby residences and businesses during construction |
| | Minimize construction impacts to the extent feasible |



2.1 INTRODUCTION

This chapter summarizes the results of the alternatives screening that was conducted during development of the proposed project and describes the No Action Alternative and Build Alternative that are evaluated in this Environmental Assessment (EA).

2.2 ALTERNATIVES EVALUATION AND SCREENING

To identify reasonable alternatives to address the vulnerability of the existing Raritan River Drawbridge to major storm events, NJ TRANSIT identified and evaluated a number of alternatives using evaluation criteria that were based on the proposed project's goals and objectives (see **Appendix A**).

The alternatives analyzed included the:

- No Action Alternative;
- Rehabilitation Alternative; and
- Bridge replacement alternatives, as follows:
 - Bridge alignment within the footprint of the existing bridge;
 - Fixed span (non-moveable) bridge alignment (to the east or west of existing bridge);
 - Moveable span bridge to the west of the existing alignment;
 - Moveable span bridge to the east of the existing alignment;
 - Moveable span bridge to the west of the existing alignment with center span perpendicular to the navigation channel.

For the bridge replacement alternatives, three options were identified and evaluated for the superstructure:

- Use of steel multi-girders, which generally require relatively small bridge piers located approximately 95 feet apart;
- Use of steel through-girders, which generally require larger bridge piers located approximately 140 feet apart;
- Use of steel through-trusses, which generally require relatively large bridge piers located approximately 190 feet apart.

For the bridge replacement alternatives with moveable spans, three bridge types were identified and evaluated:

- Swing Bridge (similar to the existing bridge);
- Bascule Bridge, with consideration of single and double leaf bascules; and

- Vertical Lift Bridge.

Based on the alternatives analysis performed for the proposed project, the Preferred Alternative (i.e., the Build Alternative evaluated in this document) is a new replacement bridge west of the existing bridge. This alternative is a vertical lift bridge with a steel multi-girder superstructure approximately 50 feet west of the existing bridge. The Build Alternative is the only alternative that fully meets the goals and objectives established for the proposed project.

2.3 NO ACTION ALTERNATIVE

In the No Action Alternative, the existing Raritan River Drawbridge will remain in service as is, with continued maintenance to address conditions as they arise. In this alternative, the navigational channel divides around the bridge's center pier as it passes beneath the bridge in two channels (approximately 125 feet each). The vertical clearance is controlled by aerial cables over the channel with a clearance of 140 feet above MHW when the bridge is open. The track bed will retain its existing elevation (8 feet above mean high water and 13 feet above mean low water). In this alternative, the elevation of the tracks at top of rail is 19 feet, only 1 foot above the Federal Emergency Management Agency (FEMA) Base Flood Elevation (BFE).¹ This means that in a severe storm, the bridge girders will be well below the ocean surface and vulnerable to powerful ocean water surges driven by tides and winds, such as occurred during Sandy. The bridge's operating machinery will remain below the BFE and subject to continued damage from water infiltration. Prolonged service disruptions will be expected to occur after severe weather events for emergency repairs and inspections.

The No Action Alternative will require continued operation of trains at the reduced speed limits that have been in place since Sandy, with passenger trains operating at 30 miles per hour (mph) and freight trains operating at 20 mph. Prior to Sandy, train operating speeds on the bridge were 35 mph.

2.4 BUILD ALTERNATIVE

The proposed project involves the complete replacement of the existing two-track Raritan River Drawbridge with a new two-track moveable bridge. To allow train operations to continue without interruption as the bridge is being constructed, the bridge will be parallel to the existing bridge. This shift in the bridge from its existing location will also require a corresponding realignment of the railroad as it approaches the crossing from the north and south. New approach tracks will transition over to connections with the existing tracks of the NJCL within approximately 1,000 feet from the river's edge.

Upon completion of the new bridge, the existing Raritan River Drawbridge (including the approach and center swing span piers) and its landside approach tracks within the first 1,000 feet of the river's edge to both the north and south of the old bridge will be removed. The construction activities related to building the new bridge and demolishing the existing bridge are described in detail in Chapter 4 "Construction Methods and Effects."

¹ Based on preliminary flood information released by FEMA following Sandy, the BFE at the bridge location is 18 feet (using the North American Vertical Datum of 1988 [NAVD88]).

NJ TRANSIT and its design consultant are currently developing the design for the bridge. The information presented in this chapter and evaluated in the EA is based on conceptual information developed to date, and is intended to present conservative (i.e., reasonable worst case) assumptions about the proposed project in terms of environmental impacts.

2.4.1 DESCRIPTION OF NEW BRIDGE

2.4.1.1 STRUCTURE AND ALIGNMENT

The new bridge's approach spans will consist of a steel multi-girder superstructure with bridge pier spacing similar to that of the existing bridge at approximately 95 feet apart². The new bridge piers will likely consist of long narrow caissons with concrete caps at the waterline. Compared to the bulkier masonry bridge piers of the existing bridge, the new bridge piers will occupy much less area at the mudline (6,000 square feet compared to the current 35,000 square feet). The new bridge will be approximately 37 feet wide (an increase from the existing 22-foot width), to allow space for two tracks that are at least 14 feet apart, measured center line to center line, and two 4-foot-wide maintenance walkways on either side. The approach track and the fixed spans of the bridge will have continuous welded rail on a ballasted deck. Steel through trusses will be used for the flanking spans adjacent to the moveable span. The new bridge will be parallel to and west of the existing bridge (see **Figure 2-1**). The alignment will be close to the existing bridge, to minimize the upland areas affected by the landside approach tracks. Based on conceptual design information, the new alignment is approximately 50 feet from the existing bridge measured from edge to edge, depending on further engineering. This allows construction almost entirely within NJ TRANSIT's existing right-of-way for the NJCL.

2.4.1.2 VERTICAL LIFT SPAN

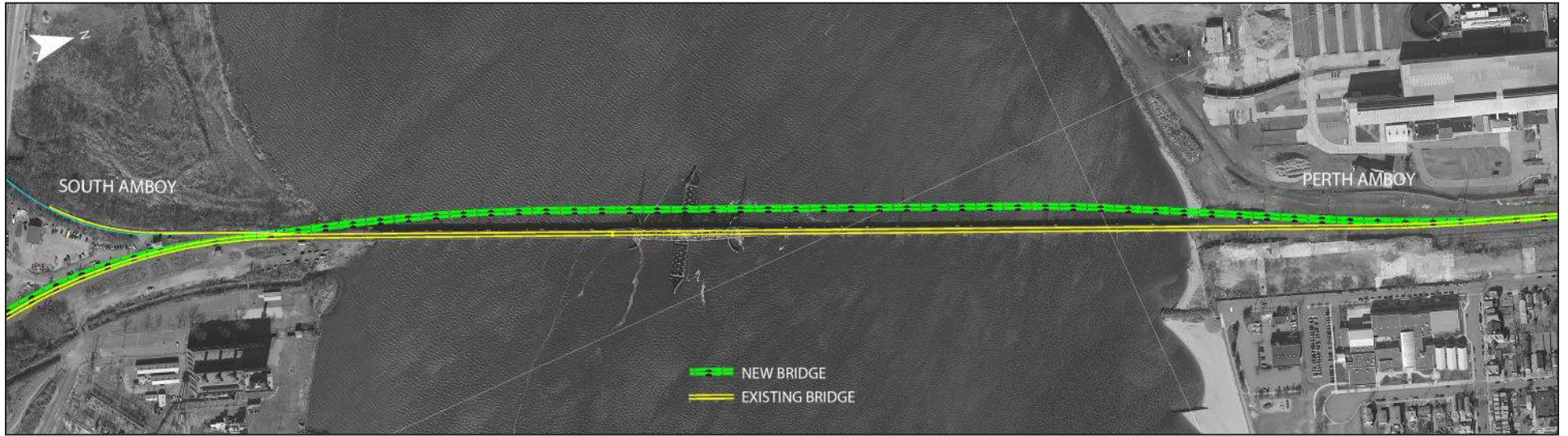
The main span will be a vertical lift to permit the passage of boats beneath the structure at the navigation channel (see **Figure 2-2**). A vertical lift span consists of a moveable span that is raised and lowered along two towers that house the counterweights required to raise and lower moveable span. A bridge operator's house will be located on either side of the lift span on the lift piers by each tower. With the new bridge, the navigation channel in the Raritan River will remain in its existing location and no river bottom dredging will be required. The new bridge piers and associated fenders will be placed outside the channel, which will allow a wider area for ship passage than with the existing bridge. The vertical lift span will provide for a vertical clearance of 110 feet³ and an unimpeded navigation channel, with a width of approximately 300 feet.

2.4.1.3 RESILIENT DESIGN

One of the key goals for the proposed project is to raise the bridge deck above the NJ TRANSIT Design Flood Elevation criterion to the extent practicable, to increase resilience to flooding. The

² The existing bridge piers are masonry structures that, in total, occupy approximately 35,000 square feet at the river bottom (mudline). The new bridge will be supported on deep foundations, which will occupy less than 3,000 square feet at the mudline.

³ The same vertical clearance as at the nearest upstream bridge, Victory Bridge, which carries Route 35 over the Raritan River upstream from the Raritan River Drawbridge.





Closed Position



Open Position

new bridge deck will be approximately ten feet higher than the existing bridge deck (18 feet above mean high water), which will raise the track bed to higher than the NJ TRANSIT Design Flood Elevation, which is 2.5 feet above the FEMA BFE. The mechanical equipment that operates the vertical lift will be located on the towers and the moveable span well above the FEMA BFE. All bridge components, including the superstructure and mechanical and electrical equipment, will be resilient to ocean surges and saltwater.

2.4.2 OVERHEAD CATENARY SYSTEM AND TRACTION POWER

The proposed bridge will have regularly spaced catenary support poles carrying the overhead catenary wire that provides power for electric trains. The new bridge will have new overhead catenary wires and traction power cables, supported on independent monopoles with a minimum vertical clearance of 110 feet.

2.4.3 TRACK WORK

The proposed track alignment for the approach tracks leading from the new bridge will converge with the existing NJCL tracks near Market Street in Perth Amboy and just north of the South Amboy Station in South Amboy. As part of the Build Alternative, maintenance-type track work on the existing tracks could extend as far north as New Brunswick Avenue in Perth Amboy and the South Amboy Station area in South Amboy. New interlockings (to permit the movement of trains from one track to another) will be installed within the new track approaches, including one near the South Amboy shoreline at a new connection to Conrail's "Essay Running Track." The proposed track alignment will require the demolition of Essay Tower and a landward shift in Conrail's Essay Running Track in South Amboy.

On the approaches to the Raritan River on either side, fill will be brought to the site to create an embankment within the railroad right-of-way to meet the Design Flood Elevation criteria and vertical profile of the new bridge. Up to approximately 15 feet of fill will be required directly behind the new bridge abutments on both sides of the bridge. On the Perth Amboy side, the fill area is expected to be approximately 900 feet long. On the South Amboy side, the fill area is expected to be approximately 300 feet long along the main track and 200 feet long along the freight line. Retaining walls may be required to provide grade separation and to minimize private property acquisition

2.4.4 COMMUNICATIONS INFRASTRUCTURE

Fiber optic cables owned Verizon and a high-voltage electric transmission line owned by the Neptune Regional Transmission System run alongside the navigation channel on the river bottom and cross beneath the Raritan River Drawbridge parallel to the channel. These will be maintained in place with the new bridge. Two additional fiber optic cables owned by AT&T run parallel to the west of the existing bridge. These underground cables will be relocated east of the existing bridge outside of the construction zone.

As the new bridge will require additional power supply, a new electrical utility drop on the east side of the bridge will be installed to support the new Perth Amboy interlocking. In addition, the existing electrical service on the west side of the bridge may need to be upgraded to support the bridge lighting and equipment.

A portion of a six-inch water main in South Amboy (STA 98 MP 1.1) will be relocated by Middlesex Water Company prior to the start of construction activities for the bridge.

2.4.5 PROPERTY ACQUISITION

The Build Alternative will require partial acquisitions of two parcels of undeveloped land—.2 acres owned by Perth Amboy Redevelopment in Perth Amboy and 1.1 acres of undeveloped NJDOT property in South Amboy. Property will also need to be temporarily acquired during construction (see Section 3.4, “Property Acquisition and Displacement”).

2.4.6 OPERATIONAL ASPECTS

With the new bridge, the design speed for passenger trains will be 60 mph. Taking into account the curve in the tracks just south of the bridge in South Amboy, and the presence of the Perth Amboy and South Amboy rail stations on either end, the operating speed on the bridge will be 40 mph for passenger trains, an increase from the existing 30 mph and the speed prior to Sandy of 35 mph. Freight rail operating speeds will increase to 30 mph from the existing 20 mph (both pre-and post-Sandy). No change in the number of daily trains is planned as a result of the proposed project. Therefore, the proposed project will not affect the frequency of bridge openings. As the new lift will operate more reliably than the existing bridge, the number and severity of delays related to bridge malfunction will be reduced. Most recreational boats will be able to pass beneath the new bridge without opening the lift span, since it will be approximately ten feet higher than the existing bridge (18 feet higher than mean high water), eliminating the wait time altogether. For the larger vessels, the lift can be opened quickly (within three minutes as compared to 3.5 minutes under existing conditions), reducing wait times.

Additionally, the new bridge will accommodate freight trains with rail cars that carry more weight, up to 315,000 pounds per rail car. The existing bridge cannot accommodate the current weight standard for rail freight cars, which is 286,000 pounds, and upgrading the weight capacity of the bridge to allow 286,000-pound cars has been identified as a critical need in the *New Jersey State Rail Plan*.⁴ This allows freight railroads to carry the same amount of freight with fewer cars. Moreover, *New Jersey Statewide Freight Rail Strategic Plan (2014)*⁵ includes a recommendation that future renovations and upgrades include capacity for 315,000 pounds to accommodate long-term industry trends, and Conrail has requested that the bridge be improved to accommodate this higher weight limit. ■

⁴ NJ TRANSIT and New Jersey State Department of Transportation, *New Jersey State Rail Plan*, April 2015, p. 5-27. <http://www.njtransit.com/pdf/NJStateRailPlan.pdf>.

⁵ New Jersey Department of Transportation, *New Jersey Statewide Freight Rail Strategic Plan, Moving New Jersey Forward*, June 2014, p. A-158. <http://www.state.nj.us/transportation/freight/plan/pdf/FRSP.pdf>.

This chapter examines the potential social, economic, and environmental consequences of the Build Alternative. A No Action Alternative is also presented to serve as a benchmark against which to compare the effects of the Build Alternative.

For purposes of this analysis, a “project site” was defined that encompasses the area where the new bridge will be located, the area of new approach tracks leading to the bridge, and the area where construction activities for the proposed project may occur (see **Figure 3-1**). This area is intended to be large enough to account for any potential impacts that might occur and therefore is larger than the actual site that will be occupied by the proposed project once complete. The information evaluated in the EA is based on conceptual information developed to date, and is intended to present conservative (i.e., reasonable worst case) assumptions about the Build Alternative in terms of environmental impacts. NJ TRANSIT and its design consultant are currently developing the design for the bridge, and as the design is developed, potential impacts are likely to be reduced.

Each technical analysis provided below considers this project site and also evaluates existing conditions and the impacts of the proposed project for a specific study area that varies by analysis, to reflect the concerns addressed in that technical area. The sections below assess the long-term effects of the proposed project. Construction-period effects are discussed in Chapter 4 “Construction Methods and Effects,” which includes a general description of construction activities and the probable construction methods that will be used to construct the Build Alternative.

3.1 LAND USE, ZONING, AND PUBLIC POLICY

This analysis considers the effects of the Build Alternative on land use, community facilities, and services, zoning, and public policy. A study area encompassing approximately ¼ mile of the project site was evaluated. This is the area close enough to the project site to have the potential for land use to be affected by construction or operation of the Build Alternative. The northern half of the study area is located in the City of Perth Amboy, and the southern half of the study area is located in the City of South Amboy, both in Middlesex County, New Jersey. **Figure 3.1-1** and **Figure 3.1-2** illustrate the locations of the two portions of the study area.

3.1.1 AFFECTED ENVIRONMENT

3.1.1.1 LAND USE

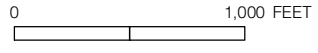
Perth Amboy

Land uses in the portion of the study area in the City of Perth Amboy are shown on **Figure 3.1-1**. In general, the east side of the railroad right-of-way south of Market Street is a neighborhood of single- and multi-family, low-scale residential development on small lots, with some schools and



 Project Site

Note: Maintenance-type track work may extend beyond project site boundaries to New Brunswick Avenue in Perth Amboy and the South Amboy Station in South Amboy.

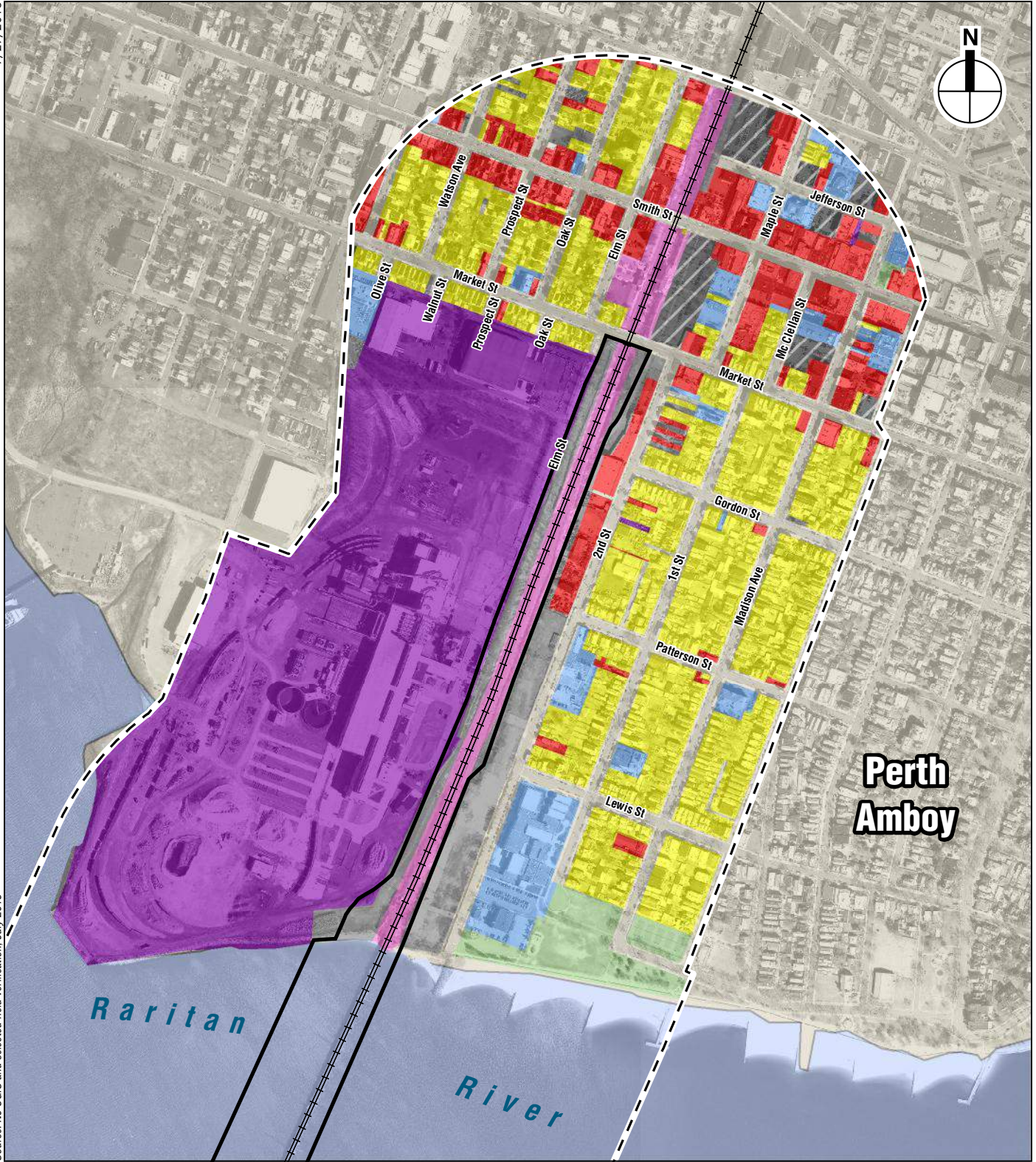


RARITAN RIVER BRIDGE REPLACEMENT

Project Site
Figure 3-1

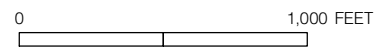
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Source: NJ OGIS and selected field verification, July 2015



**Perth
Amboy**

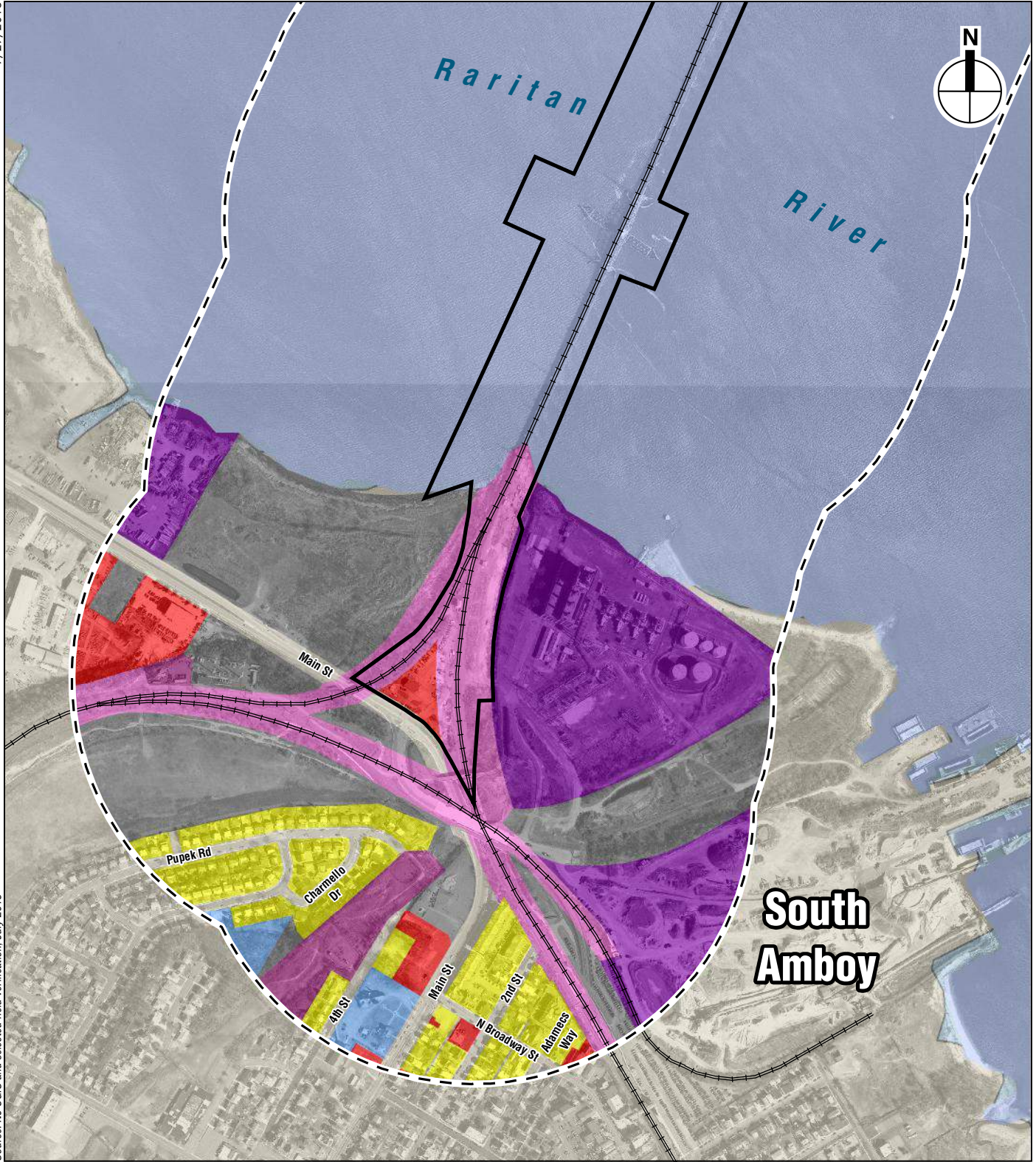
- | | |
|--|-------------|
| Project Site | Park |
| Study Area (Quarter-Mile Radius) | Parking |
| Public/Community Facilities and Institutions | Rail |
| Commercial | Residential |
| Industrial | Vacant |



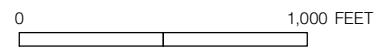
Note: Maintenance-type track work may extend beyond project site boundaries to New Brunswick Avenue in Perth Amboy and the South Amboy Station in South Amboy.

RARITAN RIVER BRIDGE REPLACEMENT

Perth Amboy Land Use
Figure 3.1-1



- Project Site
- Study Area (Quarter-Mile Radius)
- Public/Community Facilities and Institutions
- Commercial
- Industrial
- Rail
- Residential
- Utility
- Vacant



Note: Maintenance-type track work may extend beyond project site boundaries to New Brunswick Avenue in Perth Amboy and the South Amboy Station in South Amboy.

RARITAN RIVER BRIDGE REPLACEMENT

South Amboy Land Use
Figure 3.1-2

small neighborhood-oriented retail uses. The northern part of the study area, generally along and north of Market Street, is a downtown area with a mix of residential, commercial, retail, and restaurant uses. The Perth Amboy NJ TRANSIT rail station is on the north side of Market Street, with the station parking accessible from Market Street directly across from the project site.

The study area on the east side of the railroad right-of-way consists of low-scale residential uses and some commercial uses along the east side of 2nd Street and a mix of commercial and auto-related uses (north of Patterson Street) and vacant land. Two community facilities—the Robert N. Wilentz Elementary School and a head start early learning center—are also located on the east side of 2nd Street across from the project site. The Sadowski Parkway Waterfront Park runs along the Raritan River waterfront, including tennis courts providing active recreational opportunities. Near the Sadowski Parkway Waterfront Park, a City of Perth Amboy Department of Public Works municipal facility is located on 2nd Street.

The City of Perth Amboy is proposing to redevelop the vacant land adjacent to the railroad right-of-way from the riverfront to Patterson Street as a park, the 2nd Street Community Park (see discussion below in Section 3.2, “Parks and Recreational Resources”).

The west side of the Perth Amboy study area is dominated by a large-scale industrial use, Gerdau Ameristeel, which occupies a large property south of Market Street extending to the riverfront. A major development project is planned for the Gerdau Ameristeel property to construct two warehouses with numerous loading docks and trailer stalls, as well as a portion of the property as waterfront open space. North of the steel facility is another industrial use, a refrigerated warehouse business operated by Preferred Freezer Services. Both of these businesses are accessed via Elm Street. Elm Street separates the railroad right-of-way and project site from the Gerdau facility. The land within the project site adjacent to the North Jersey Coast Line (NJCL) is vacant.

South Amboy

Land uses in the City of South Amboy study area are shown on **Figure 3.1-2**. Immediately to the west of the project site, the study area is undeveloped. Immediately to the east, most of the study area is occupied by the Werner Generator Station, a power plant. A former aggregate material processing facility is located at the terminus of Lower Main Street along the southeastern boundary of the study area. Industrial uses also exist along the waterfront in the western portion of the study area.

The project site is separated from other areas of South Amboy by these large properties on the west and east and by a number of major linear infrastructure elements on the south. These include a major roadway (Route 684), including an overpass structure that provides access to the power plant from Route 684; the railroad tracks of the North Jersey Coast Line and Conrail; and the right-of-way for high-tension power lines extending from the power plant. Past the roadway and tracks, the mixed commercial, retail, restaurant, and residential uses of downtown South Amboy, as well as the South Amboy NJ TRANSIT rail station, are located outside the study area. Within the study area, land uses include single-family residences along Pukek Road, Barkalow Street, and Charmello Drive in a residential subdivision behind Route 684 and the Conrail tracks, and a townhouse complex on the east side of Main Street at North Broadway. A church, the Christ Episcopal Church, is located on the west side of Main Street

near North Broadway. Farther west, a mix of commercial uses and vacant land is located along Main Street.

In South Amboy, a number of waterfront revitalization projects are in various stages of development. A major new development on the former aggregate material processing facility site at the eastern edge of the study area has been approved by the City Council. This development, known as the Manhattan Beach Club, will have approximately 1,800 residential units as well as a marina, public park, and waterfront walkway. In June 2016, South Amboy received Federal Highway Aid for the construction of a ferry terminal. The project includes site remediation and construction of a 500-space parking lot and ferry terminal building on Ferry Road (formerly Radford Road).

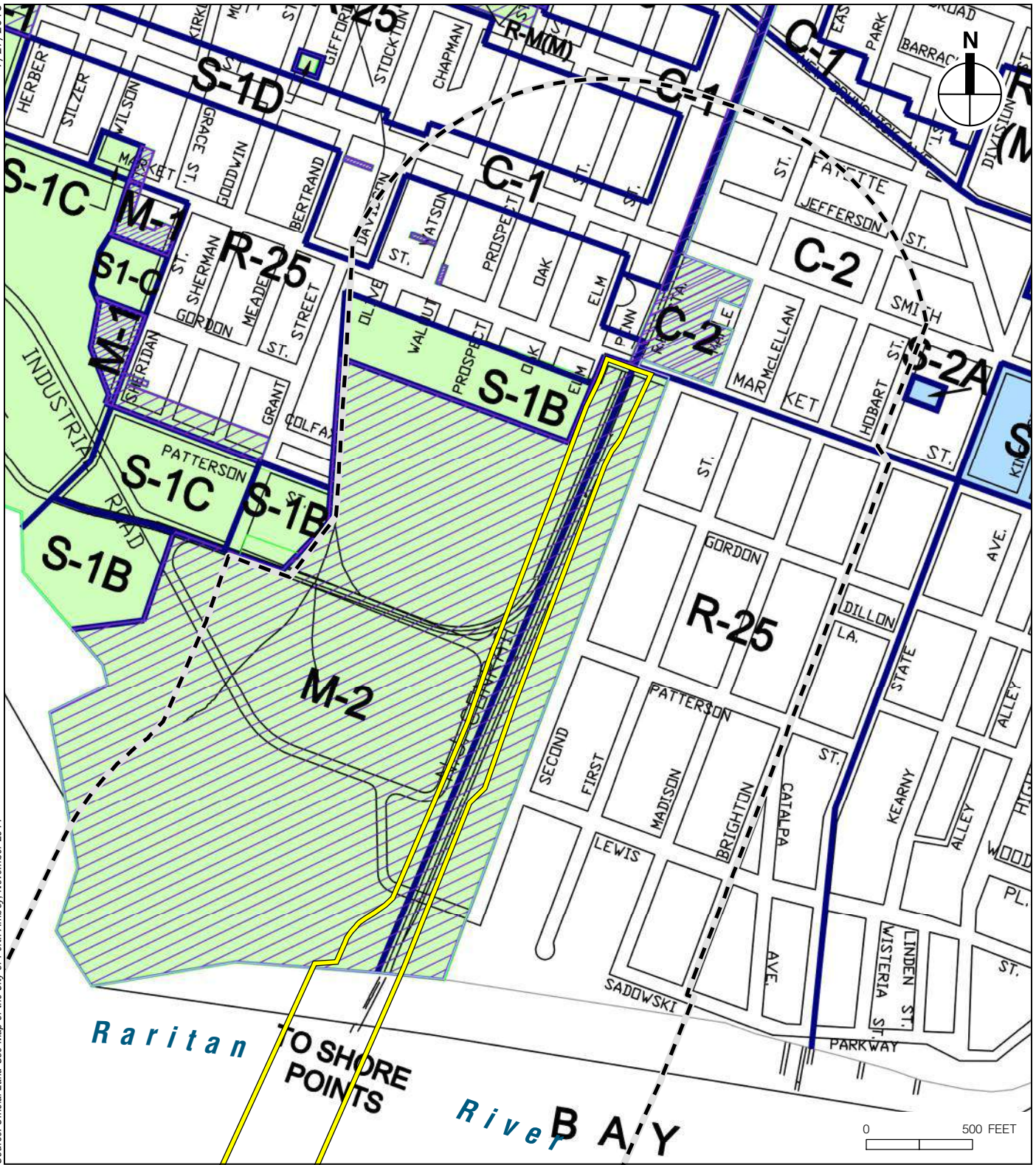
3.1.1.2 ZONING AND REDEVELOPMENT PLANNING




Perth Amboy

The City of Perth Amboy regulates land development through its zoning code, set forth in Chapter 430 of the City Code. **Figure 3.1-3** shows the City of Perth Amboy's zoning designations. As shown on the map, the NJCL railroad tracks, including the project site, mark the boundary between an R-25 and an M-2 zoning district, and therefore half of the project site is zoned for industrial use (which permits railroad uses) and the other half for residential (which does not).

In addition to zoning, the City of Perth Amboy also regulates land development through an adopted Redevelopment Plan, known as Focus 2000, which sets forth the City's long-term redevelopment goals for three designated Redevelopment Areas. As shown in **Figure 3.1-3**, the project site is part of the area designated as Redevelopment Area 1. This area also includes the adjacent M-2 zone to the west, much of the Raritan River waterfront west of the bridge, and the NJCL and Perth Amboy station. No special districts are mapped directly on the project site. The Redevelopment Plan designates the area around the Perth Amboy rail station as a "Transit Village" where transit-oriented, pedestrian-friendly development should occur. Immediately south of the rail station, the area between 2nd Street and the railroad tracks is designated for redevelopment as a "waterfront village" with approximately 30 townhouses. In addition, the Redevelopment Plan envisions a pedestrian path along the riverfront area, part of which has already been constructed.

Perth Amboy also has a Master Plan. The 2013 Recreation Element of the Master Plan of the City of Perth Amboy emphasizes the goals of improving existing parks, developing new parks, pursuing additional funding opportunities for park improvements, and promoting the use of recreational programs and facilities. Among the plan's recommendations and goals are permitting swimming at the city's beaches (which has not been allowed because of water quality concerns) and providing a continuous walkway/bikeway along the waterfront, including filling the "missing link" along the Gerdau steel plant property's waterfront and connecting to the Sadowski Parkway Waterfront Park. Support for this proposed plan was expressed during the proposed project's public information session held in Perth Amboy, as summarized in Appendix F. The existing railroad and its embankment currently impede the connection of the path between the Gerdau steel plant and the Sadowski Parkway Waterfront Park. In order for the connection to be made, a tunnel underpass of the existing railroad tracks would need to be constructed. In fall 2013, NJ TRANSIT launched a Local Demonstration Project with the City of



-  Project Site
-  Study Area (Quarter Mile Radius)
-  Zoning Designation with Boundary

Note: Maintenance-type track work may extend beyond project site boundaries to New Brunswick Avenue in Perth Amboy and the South Amboy Station in South Amboy.

- R-60 - 1 Family Residential
- R-50 - 1 Family Residential
- R-25 - 1 & 2 Family Residential
- R-M (M) - Mid Rise Residential
- R-M (MF)(PUD) - Multi Family Residential/Planned Unit Option
- R-M(H) - High Rise Tower
- H - Hospital
- C-1 - Neighborhood Business
- C-2 - Central Business
- C-2 - Highway Business
- M-1 - Light Industrial
- M-2 - Medium Industrial
- M-3 - Heavy Industrial
- S-1A - Special Use
- S-1B - Special Use
- S-1C - Special Use
- S-1D - Special Use
- S-2A - Special Use
- S-2B - Special Use
- S-2C - Special Use
- S-3A - Special Use
- S-3B - Special Use
- S-3C - Special Use
- S-3D - Special Use

| REDEVELOPMENT OVERLAY LEGEND | |
|--|--|
| REDEVELOPMENT AREA WITH PRIOR ZONE DESIGNATION | REDEVELOPMENT AREA WITH SPECIAL ZONE DESIGNATION |
| AREA 1  | AREA 1  |
| AREA 2  | AREA 2  |
| AREA 3  | AREA 3  |

RARITAN RIVER BRIDGE REPLACEMENT

Perth Amboy Zoning
Figure 3.1-3

Perth Amboy, as part of a larger “Together North Jersey” regional planning effort funded by the U.S. Department of Housing and Urban Development. The goal of this project, the Perth Amboy Bay City Transit District Strategy, which built on a previous Perth Amboy Economic Growth Strategy completed in 2012, was to develop a Station Area Plan for the area within ½ mile of the Perth Amboy rail station. The resulting plan, documented in *The Perth Amboy Bay City Transit District Strategy: A Local Demonstration Project, December 2013*, focuses on the transit-oriented development near the rail station, but also calls for improved connections between the station and the waterfront, including along 2nd Street extending to the waterfront.

South Amboy

The existing railroad right-of-way in South Amboy is located within an M-2 heavy industrial district that also incorporates the properties to the east and west, and extends past the shoreline to the official U.S. pierhead line. The railroad right-of-way is also within a Riparian Zone Overlay. **Figure 3.1-4** shows the zoning in the study area.

In addition to zoning, the City of South Amboy regulates land development through adopted Redevelopment Plans. As shown in **Figure 3.1-4**, the NJ TRANSIT rail right-of-way in the study area is mapped as part of the Broadway / Main Street Redevelopment, which is intended to enhance downtown Broadway. Most of the industrial and vacant land adjacent to the project site and rail right-of-way is part of South Amboy’s Northern Redevelopment Area. This area was designated, and a plan for the area adopted, in 1995.

Raritan River

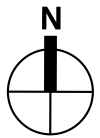
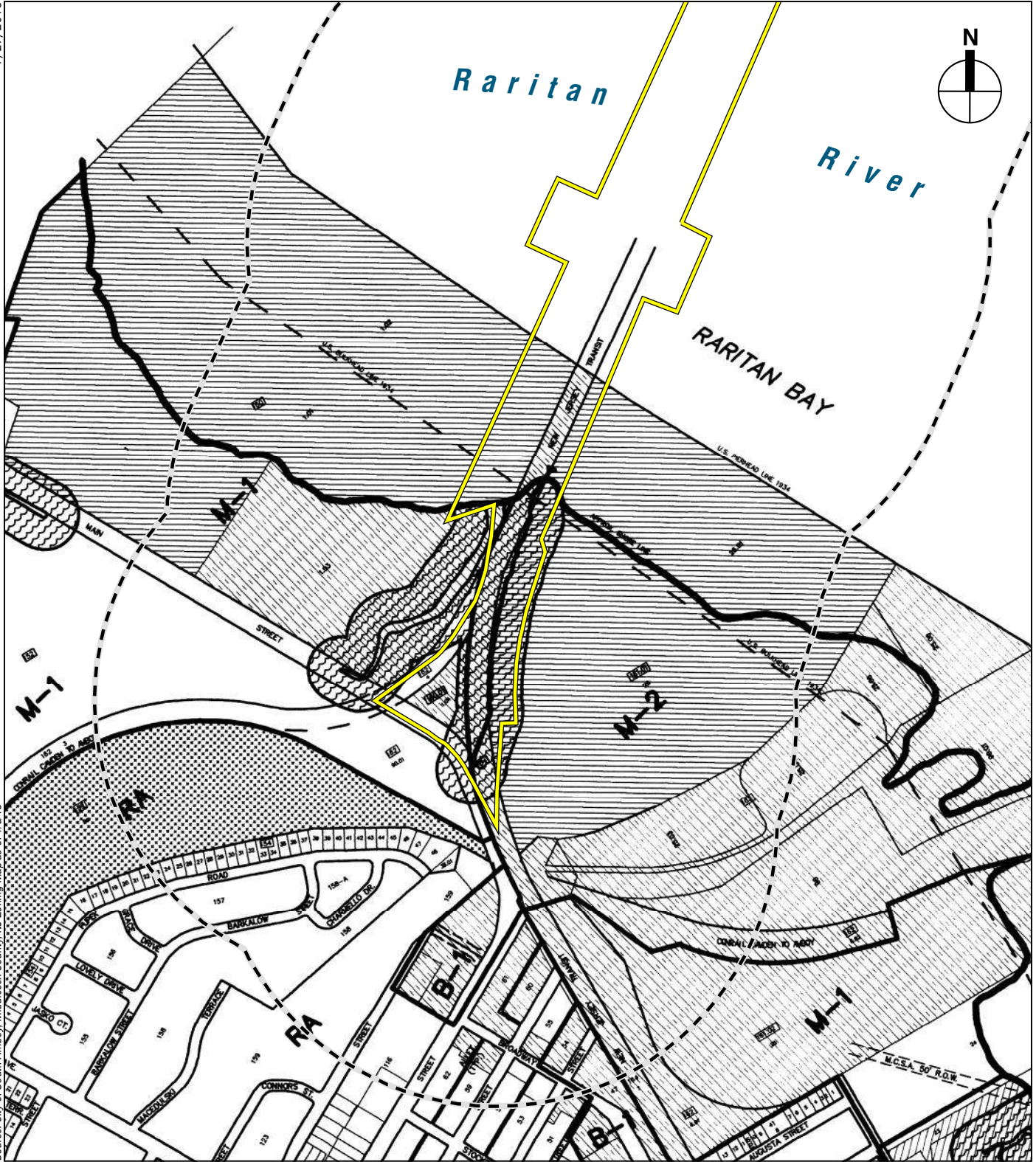
The Sustainable Raritan River Action Plan, completed in December 2009 by the Raritan River Collaborative, a group of government entities, environmental organizations, businesses, and organizations within Rutgers University, presents an action agenda to restore and preserve the Raritan River and its tributaries. It sets forth goals of upgrading and improving public access to the river, protecting and preserving habitats, maintaining and managing preserved open spaces, remediating contaminated sites in the river basin, and preventing future pollution and reducing stormwater runoff.

3.1.2 NO ACTION ALTERNATIVE

The No Action Alternative will not affect current land use, community facilities and services, zoning, and public policy in the study area. As noted, several land use changes are anticipated in the future. In Perth Amboy, a new public park, the 2nd Street Community Park, is planned adjacent to the project site and other changes may occur as a result of the transit village initiative centered on the Perth Amboy rail station. In South Amboy, the 1,800-unit Manhattan Beach Club development may be completed along the Raritan Bay waterfront near the South Amboy rail station.

3.1.3 BUILD ALTERNATIVE

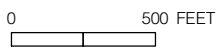
The Build Alternative will be consistent with current land use, zoning, and public policy and will not affect community facilities or community services in the study area. The proposed project will result in a westward shift of the railroad tracks in Perth Amboy, beginning approximately 1,000 feet from the shoreline between Lewis and Patterson Streets. This will increase the distance between the railroad tracks and the nearby residential neighborhood, day care center,



- Project Site
- Study Area (Quarter Mile Radius)

Note: Maintenance-type track work may extend beyond project site boundaries to New Brunswick Avenue in Perth Amboy and the South Amboy Station in South Amboy.

| LEGEND | |
|--------|--|
| | RA SINGLE FAMILY RESIDENTIAL |
| | RM MEDIUM DENSITY RESIDENTIAL |
| | B-1 GENERAL BUSINESS |
| | B-2 HIGHWAY COMMERCIAL |
| | M-1 LIGHT INDUSTRIAL |
| | M-2 HEAVY INDUSTRIAL |
| | NORTHERN WATERFRONT REDEVELOPMENT AREA |
| | SOUTHERN WATERFRONT REDEVELOPMENT AREA |
| | BROADWAY/MAIN STREET REDEVELOPMENT AREA (BLOCK CONTAINING DESIGNATED LOTS) |
| | MOCCO REDEVELOPMENT AREA |
| | MEMORIAL MEDICAL CENTER REDEVELOPMENT AREA |
| | ROUTE 35 SB REDEVELOPMENT AREA |
| | ROUTE 35 NB REDEVELOPMENT AREA |
| | RIPARIAN ZONE OVERLAY |



RARITAN RIVER BRIDGE REPLACEMENT

South Amboy Zoning
Figure 3.1-4

school, and park. The increased buffer will be a positive change with respect to land use. In South Amboy, the project site is generally within an industrial area and therefore the Build Alternative will not affect nearby land uses.

In terms of public policy, NJ TRANSIT is not subject to local zoning or other local public policies, but the Build Alternative nonetheless is consistent with local land use policies. By enhancing the resilience of the transit service, the Build Alternative will support the transit village initiative under way in Perth Amboy and support the new redevelopment plans in South Amboy.

The Build Alternative will facilitate the construction of the proposed bikeway/walkway connection between the Gerdau steel plant property and the Sadowski Parkway Waterfront Park in Perth Amboy. If the existing bridge were left in place, an underpass of the railroad tracks via tunneling through the railroad embankment would need to be constructed. Under the Build Alternative, the bridge abutment of the proposed bridge will be located upland from the existing abutment and at a greater distance from the water's edge. There will be enough room to accommodate a waterfront walkway/bikeway beneath the bridge along the shoreline and outside of tidal fluctuations. The height of the proposed bridge will allow adequate vertical clearance for bicyclists.

The Build Alternative is also consistent with the goals of the Sustainable Raritan River Action Plan since it will not adversely affect water quality or public access to the river.

3.1.4 MITIGATION

No adverse effect will occur related to land use, zoning, and public policy as a result of the Build Alternative, and no mitigation is required.

3.2 PARKS AND RECREATIONAL RESOURCES

The analysis of parks and recreational resources considers the effects of the Build Alternative on parks and open space located within the same ¼-mile study area as used for the land use analysis. It also considers whether the Build Alternative may have any effect on park space protected under the New Jersey Department of Environmental Protection's (NJDEP) Green Acres regulations and listed in the state's Recreation and Open Space Inventory (ROSI).

3.2.1 AFFECTED ENVIRONMENT

A large public park is located within the study area in Perth Amboy close to the project site. This park, Sadowski Parkway Waterfront Park, extends along the Raritan River on the south side of Sadowski Parkway from 2nd Street to Raritan Bay, outside the study area (see **Figure 3.1-1** above). This 30-acre park consists of a public beach, a waterfront walkway, and a fishing pier.¹ Several festivals are held at the Sadowski Parkway Waterfront Park throughout the year, attracting residents to the area. To the north of Sadowski Parkway, the Sadowski Parkway Tennis Courts have eight tennis courts for an additional 3.5 acres of park space. Both the Sadowski Parkway Waterfront Park and Tennis Courts are listed on the ROSI by Perth

¹ The City of Perth Amboy Planning Board, City of Perth Amboy, Middlesex County, New Jersey: Master Plan Recreation Element, 2013.

Amboy. Closest to the project site, Sadowski Parkway Waterfront Park consists of a paved waterfront walkway and beach along the Raritan River.

As mentioned in Section 3.1.1.2, the 2013 Master Plan of the City of Perth Amboy emphasizes the goals of improving existing parks and filling the “missing link” of the waterfront walkway/bikeway along the Gerdau steel plant property’s waterfront. Support for this proposed plan was expressed during the project public information session held in Perth Amboy, as summarized in Appendix F. The existing railroad and its embankment currently impede the connection of the path between the Gerdau steel plant and Sadowski Parkway Waterfront Park. In order for the connection to be made, a tunnel underpass of the existing railroad tracks would need to be constructed. In addition, a new public park, 2nd Street Community Park, is planned adjacent to the east side of the railroad right-of-way between Patterson Street and the Raritan River waterfront (see **Figure 3.2-1**). The City of Perth Amboy acquired the six-acre property to remediate contamination and redevelop it as a recreational use for the community. Through partnerships between the City of Perth Amboy, Middlesex County Improvement Authority, Rutgers, and U.S. Environmental Protection Agency’s Brownfields program, the park design process was developed through the review of past studies, interviews with city and county officials, and extensive public outreach. The final design for the park, completed in 2015, includes waterfront uses near the river including a boat launch and pier; “passive” open spaces in the southern half of the park such as a picnic area with a refreshment kiosk; and more “active” recreation spaces in the northern half of the park, including a playground, community garden, and areas for soccer, baseball, handball, and basketball that can be converted for outdoor movies or music festivals. Trees, plantings, and murals will be installed as a barrier between the recreational uses and the railroad tracks.

As shown on **Figure 3.1-2**, the South Amboy portion of the study area does not include any park space. A small playground area is located in the residential neighborhood across Main Street from the project site, but this playground is fully buffered from the railroad tracks. The Raritan Bay Waterfront Park is located approximately one mile south of the project site along the Raritan River in South Amboy. This 136-acre park includes active and recreational features, and limited views of the Raritan River Drawbridge from some locations. In addition, the new Manhattan Beach Club development in South Amboy will bring a new public park and waterfront walkway to the South Amboy portion of the study area, approximately ½ mile south of the project site.

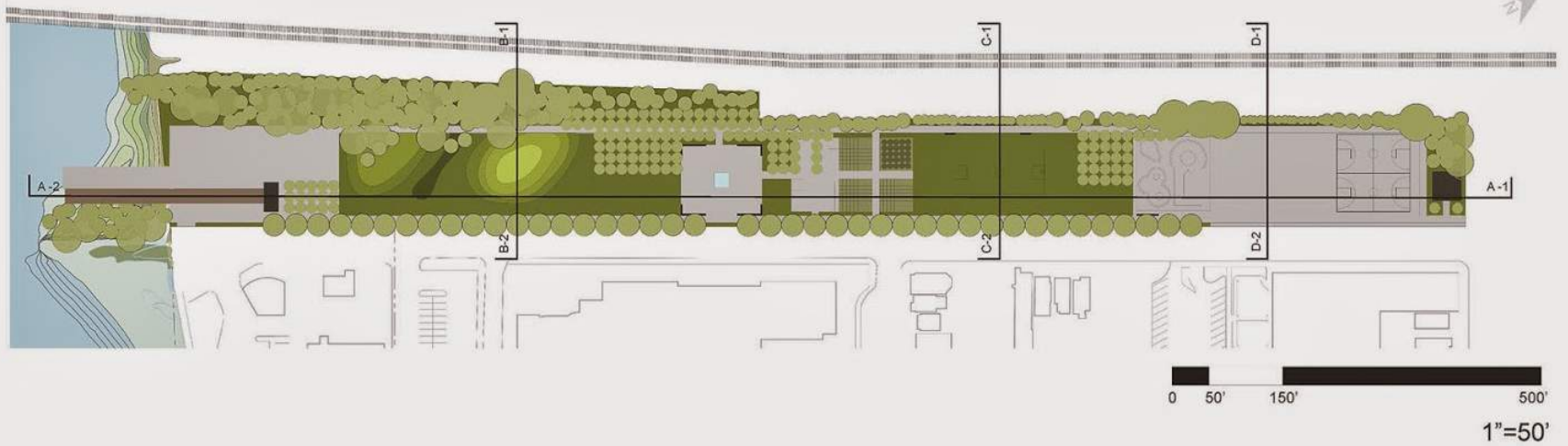
3.2.2 NO ACTION ALTERNATIVE

The No Action Alternative will not affect parks and recreational resources. As noted above, the area adjacent to the project site in Perth Amboy is planned for redevelopment as the 2nd Street Community Park. The specific timeframe for development of this new park depends on the availability of funding, which has not yet been determined. In addition, the new Manhattan Beach Club development will introduce a new waterfront walkway and park space in South Amboy with views toward the project site.

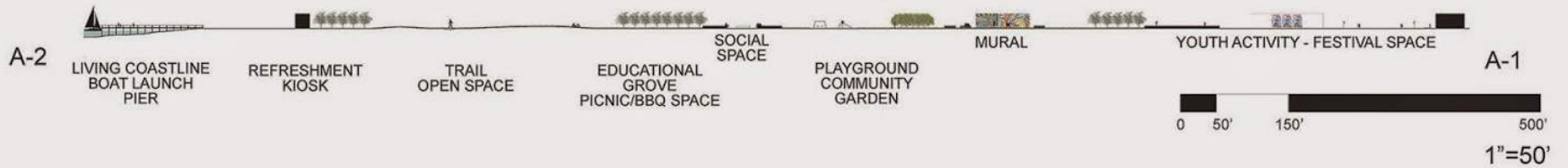
3.2.3 BUILD ALTERNATIVE

As noted above, the planned 2nd Street Community Park in Perth Amboy has been designed in anticipation of its location adjacent to active railroad tracks, and includes a landscaped buffer and wall between the recreational uses and the tracks. The Build Alternative’s westward shift

Conceptual Design



Section A



Conceptual Programming



Source: <http://2ndstreetpark.blogspot.com/p/blog-page.html>



of the NJCL railroad tracks in Perth Amboy will increase the buffer area between railroad and the new 2nd Street Community Park, which will be a benefit to the park. Similarly, the westward shift of the tracks and the proposed vegetated buffer area will benefit users of the nearby Sadowski Parkway Waterfront Park, which is to the east of the proposed 2nd Street Community Park location.

As discussed above in Section 3.1, “Land Use, Zoning, and Public Policy”, the Build Alternative will facilitate the future construction of a pathway along the shoreline (by others) to connect a proposed future path from the Gerdau steel plant to the Sadowski Parkway Waterfront Park path in Perth Amboy. In South Amboy, the Build Alternative will have no effect on the existing or future waterfront parks, other than slight changes in views from those parks.

3.2.4 MITIGATION

No adverse effect will occur on parks and recreational resources as a result of the Build Alternative and no mitigation is required. See also Section 4.2.2, “Parks and Recreational Resources” in Chapter 4, “Construction Methods and Effects.”

3.3 SOCIOECONOMIC CONDITIONS

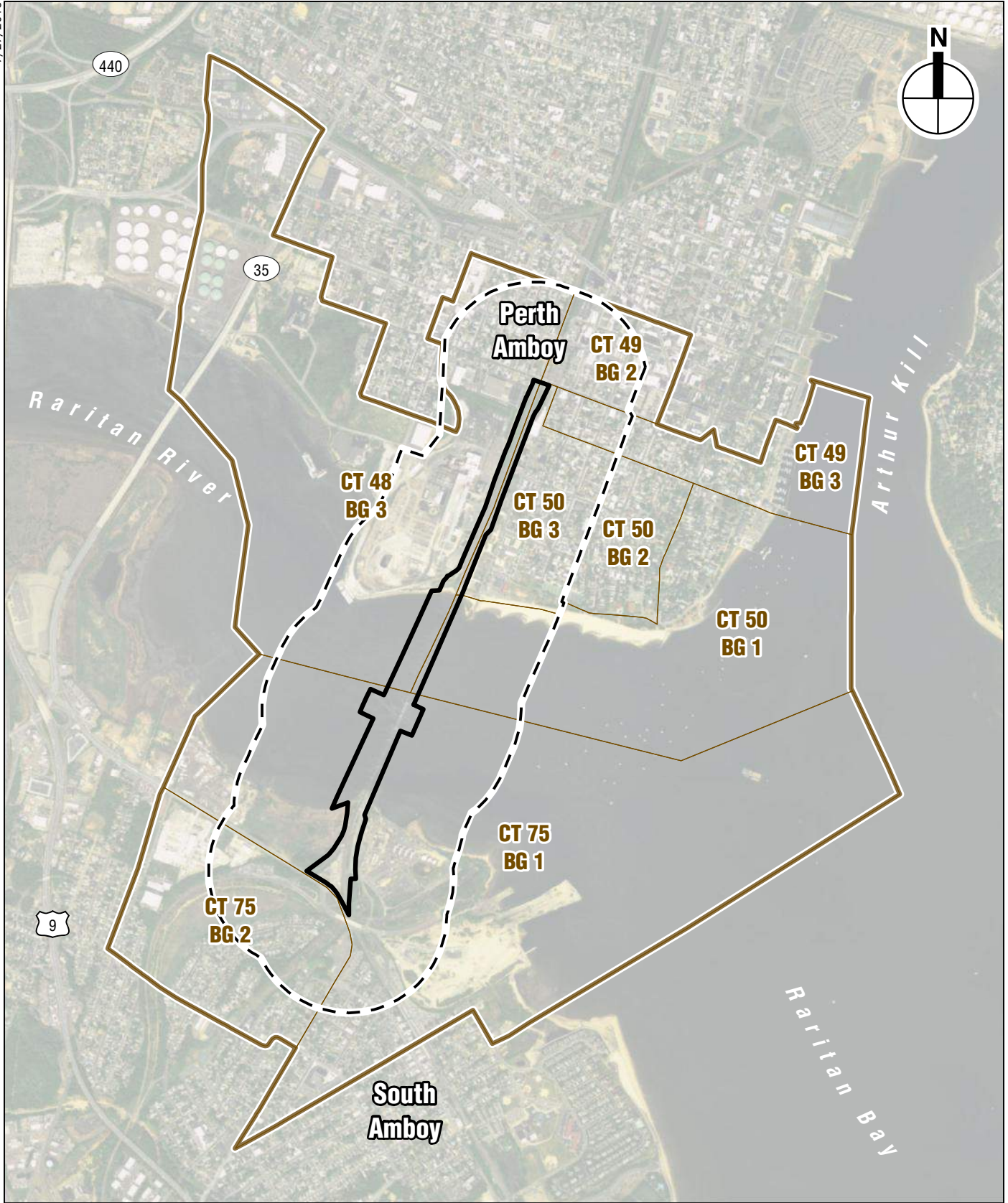
This section evaluates the potential effects of the Build Alternative on socioeconomic conditions, including population and housing characteristics and economic activities. The analysis considers the same ¼-mile study area as the discussions of land use and parks above. It presents demographic data for the eight census block groups that fall within the ¼-mile study area, six in Perth Amboy and two in South Amboy (see **Figure 3.3-1**). As shown in the figure, some of these block groups—particularly in South Amboy—are only partially located within the ¼-mile study area; for purposes of this analysis, these block groups were evaluated as if they are fully within the study area.²




3.3.1 AFFECTED ENVIRONMENT

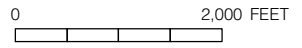
3.3.1.1 POPULATION AND HOUSEHOLDS

The total populations and numbers of households for each census block group within the Perth Amboy and South Amboy sections of the study area are presented in **Table 3.3-1**.

² Population, household, race and ethnicity are reported from the U.S. Census Bureau 2010 Census. Employment information is from Esri, a national provider of geographic planning data.



-  Project Site
-  Quarter-Mile Study Area
-  Census Block Group Boundary



**Table 3.3-1
Population and Households**

| Geographic Area | Population | Households |
|--|---------------|---------------|
| Perth Amboy Study Area | | |
| Census Tract 48, Block Group 3 | 2,775 | 691 |
| Census Tract 49, Block Group 2 | 999 | 298 |
| Census Tract 49, Block Group 3 | 1,909 | 549 |
| Census Tract 50, Block Group 1 | 632 | 271 |
| Census Tract 50, Block Group 2 | 2,090 | 520 |
| Census Tract 50, Block Group 3 | 2,557 | 670 |
| Total Perth Amboy Study Area | 10,962 | 2,999 |
| Total, City of Perth Amboy | 50,814 | 15,419 |
| South Amboy Study Area | | |
| Census Tract 75, Block Group 1 | 1,130 | 453 |
| Census Tract 75, Block Group 2 | 794 | 291 |
| Total South Amboy Study Area | 1,924 | 744 |
| Total, City of South Amboy | 8,631 | 3,372 |
| Source: U.S. Census Bureau, 2010 Census. All census tracts are in Middlesex County. | | |

The total population of the Perth Amboy study area is 10,962 residents, representing approximately 22 percent of the city’s total population of 50,814 residents. There are approximately 3,000 households in the study area, 19 percent of the 15,419 total households in the city. The total population of the South Amboy portion of the study area is 1,924 residents (although the great majority of this population lives outside the boundaries of the study area). This represents approximately 22 percent of the city’s total population of 8,631. These residents live in 744 households.

Chapter 4 of this EA, “Environmental Justice,” presents information on low-income and minority populations in the study area and considers the Build Alternative with respect to Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. As described in Chapter 4, the Perth Amboy study area is an environmental justice community.

3.3.1.2 EMPLOYMENT

Approximately 560 businesses with an estimated 4,290 employees are located in the Perth Amboy portion of the study area. This represents about 23 percent of the city’s total employment. An estimated 125 businesses with some 1,185 total employees are located in the South Amboy study area, approximately 41 percent of the City of South Amboy’s total employment.

The west side of the Perth Amboy study area is dominated by a large-scale industrial use, Gerdau Ameristeel, which occupies a large parcel south of Market Street extending to the riverfront. The Perth Amboy plant is used for fabrication of steel rebar, including the rebar being used for construction of the new Tappan Zee Bridge. It also includes a recycling and scrap metal processing facility. On the east side of the study area, the area immediate to the railroad tracks north of approximately Patterson Street is lined with auto-related businesses, as well as a wholesaler and a junkyard, along the west side of 2nd Street. In South Amboy, the closest business activities to the project site are industrial in nature, but are separated from the project site by undeveloped land.

3.3.2 NO ACTION ALTERNATIVE

The No Action Alternative will not affect socioeconomic conditions, including population and housing characteristics and economic activities in the study area.

3.3.3 BUILD ALTERNATIVE

By providing a resilient Raritan River crossing for the NJCL, the Build Alternative will enhance the reliability of the NJCL, which is important to the region's economy in terms of both the regional workforce and the movement of goods via freight rail. This will result in a permanent, long-term benefit to the local communities. The Build Alternative will also improve the bridge's reliability in terms of maritime traffic, which will benefit local businesses that rely on maritime vessels, such as the oil storage terminal upstream of the bridge in Perth Amboy.

The Build Alternative will not adversely affect socioeconomic conditions, including population and housing characteristics or economic activities in the study area. As described below in Section 3.4, "Property Acquisition and Displacement," the limited acquisition of private property that will be required for the proposed project will not require the displacement of any active uses, including residences or businesses. The Build Alternative will shift the railroad tracks westward in both Perth Amboy and South Amboy, which will increase the area between the railroad tracks and nearby active businesses and residential areas in Perth Amboy.

3.3.4 MITIGATION

The Build Alternative will not result in any adverse effects on socioeconomic conditions and no mitigation is required.

3.4 PROPERTY ACQUISITION AND DISPLACEMENT

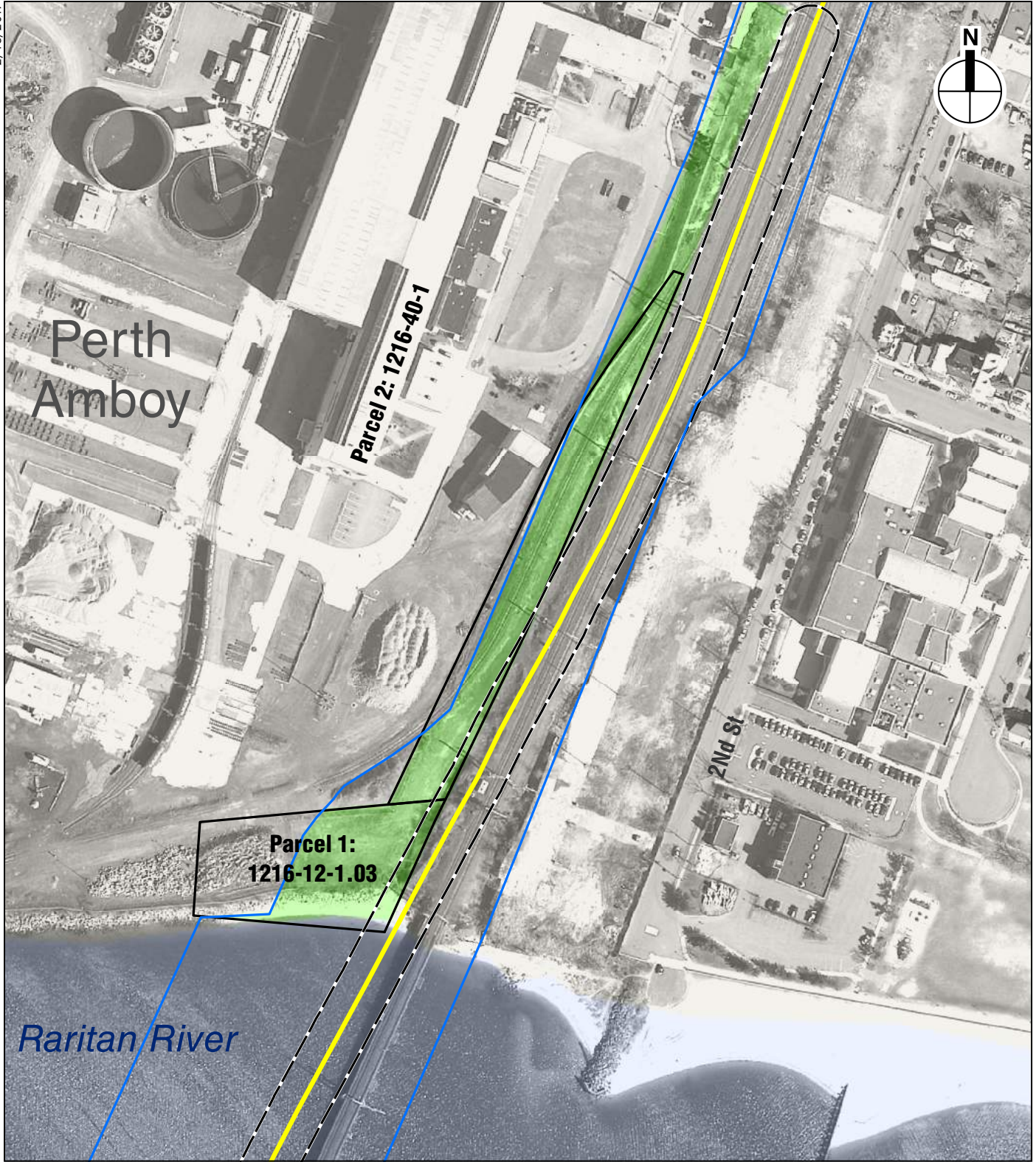
3.4.1 NO ACTION ALTERNATIVE

The No Action Alternative will not involve the acquisition of any public or private properties nor will it require any permanent easements on private or public property.

3.4.2 BUILD ALTERNATIVE

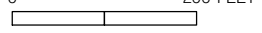
With the Build Alternative, the new bridge and approach tracks will be constructed entirely within the existing rail right-of-way; permanent property acquisition will not be required. As shown below in **Table 3.4-1** and attached in **Figures 3.4-1 and 3.4-2**, a total of approximately three acres of property may need to be acquired to accommodate seven temporary easements during construction. The properties identified for temporary acquisition beyond the railroad right-of-way are undeveloped portions of larger parcels. These laydown areas and construction access routes have been identified to assess the likely effects of construction activities; however, the contractor may develop plans that differ in location and size to what is currently anticipated.

2/16/2017

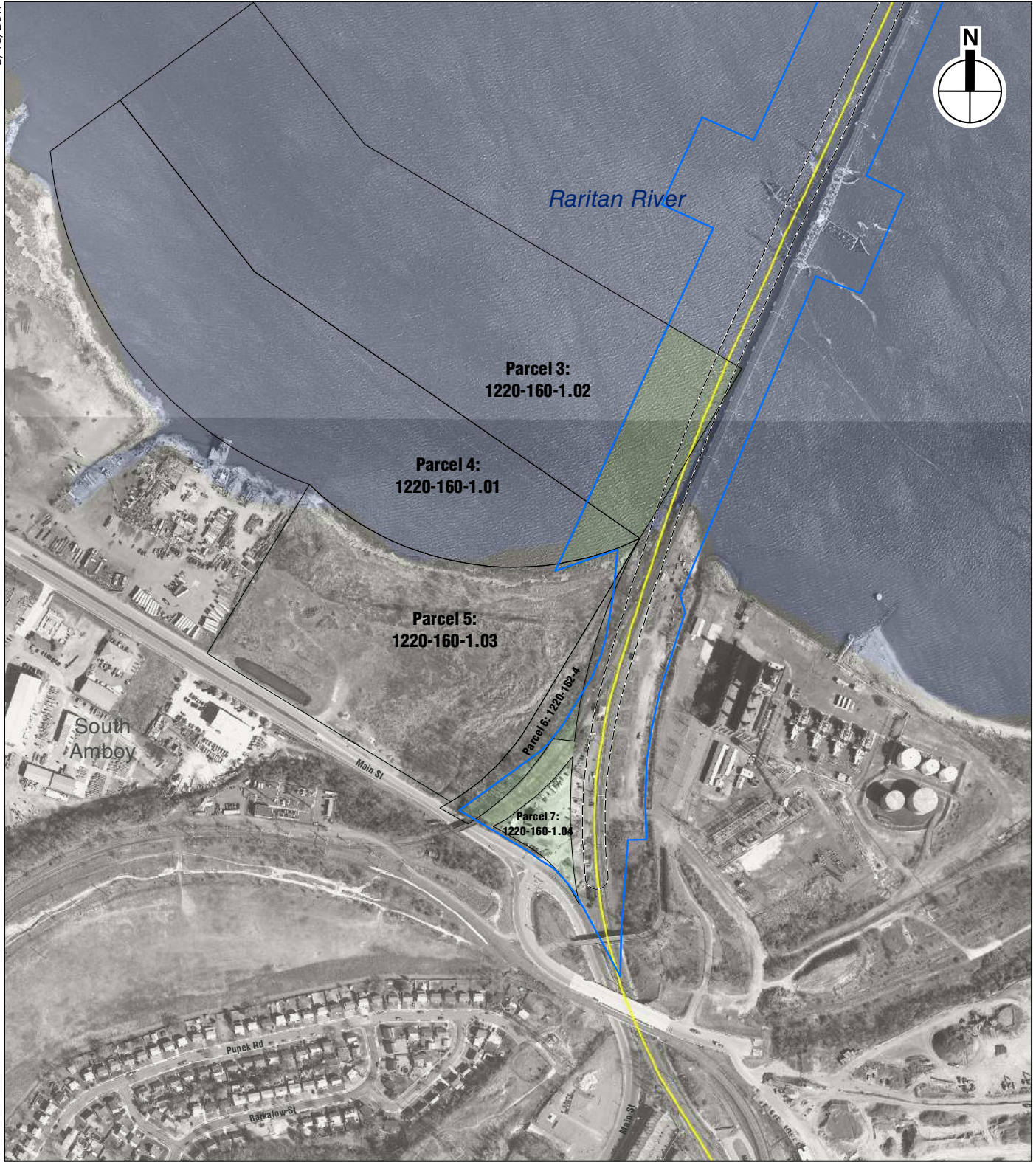


-  Project Site
-  Proposed Project Alternative
-  Area of Potential Property Impacts
-  Potential Temporary Impacts

0 200 FEET



2/16/2017



- Project Site
- Proposed Project Alternative
- Area of Potential Property Impacts
- Potential Temporary Impacts

0 200 FEET

Table 3.4-1

Potential Temporary Property Acquisition Required for the Build Alternative

| Parcel No. ⁽¹⁾ | Parcel Tax Lot ID | Location | Size of Affected Area ⁽²⁾ | Owner of Parcel | Current Use | Potential Project Use |
|--|-------------------|-------------|--------------------------------------|---|--------------------------|---|
| 1 | 1216-12-1.03 | Perth Amboy | 0.1 acre | City of Perth Amboy / Perth Amboy Redevelopment | Undeveloped | Construction of adjacent alignment |
| 2 | 1216-40-1 | Perth Amboy | 0.3 acre | R.R. Steel c/o Gerdau Ameristeel | Undeveloped | Construction access route |
| 3 | 1220-160-1.02 | South Amboy | 0.3 acre | NJDOT | Undeveloped | Construction of adjacent alignment |
| 4 | 1220-160-1.01 | South Amboy | 0.1 acre | State of New Jersey / NJDOT | Undeveloped | Construction of adjacent alignment |
| 5 | 1220-160-1.03 | South Amboy | 0.1 acre | New South Amboy Development Co., LLC | Undeveloped | Construction of adjacent alignment |
| 6 | 1220-162-4 | South Amboy | 0.1 acre | Consolidated Rail Corp. | Undeveloped | Construction of adjacent alignment |
| 7 | 1220-160-1.04 | South Amboy | 2.02 acres ⁽³⁾ | J&R McKeon | Undeveloped / Commercial | Construction of adjacent alignment and laydown area |
| Approximate Total | | | 3.0 acres | | | |
| Notes: | | | | | | |
| (1) See Figures 3.4-1 and 3.4-2. | | | | | | |
| (2) Sizes are approximately and may change as engineering advances. | | | | | | |
| (3) Temporary easements for worker parking and/or construction staging may be needed on parts of this parcel. Business relocation is not anticipated to be required. | | | | | | |
| Source: NJ Composite of Parcel Data & MOD- IV Tax List Search Database (April 2015). | | | | | | |

The abovementioned Gerdau Ameristeel property is listed as a contaminated site (see Section 3.12.1.2, “Potential Contamination from Adjacent Uses”). A paved roadway within the site may be used for construction access. No unpaved surface or subsurface disturbance will result from the proposed project’s use of the property; therefore, use of the access roadway will not disturb contaminated materials that may be located on site.

3.4.3 MITIGATION

Private property owners will be compensated under the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the Uniform Act). The acquisition of public property will follow equitable land acquisition procedures in conformance with Federal Transit Administration (FTA) requirements for federally funded projects. Following an appraisal of the property, a fair and equitable offer will be made, and an agreement will be reached between the property owners and NJ TRANSIT.

3.5 VISUAL RESOURCES

This section of the EA considers the effects of the Build Alternative on the visual character and aesthetic conditions of the surrounding area. Consistent with federal guidance on preparation of visual resources analyses, it considers views from and to the Raritan River Drawbridge for the various viewer groups who could be affected, taking into consideration the duration and sensitivity of views. The analysis focuses on views of the Raritan River Drawbridge, since the Build Alternative will replace the bridge with a new bridge that has a different appearance. The

Build Alternative will also result in a westward shift to the rail alignment on land in Perth Amboy and South Amboy, but the areas where that shift will occur are not readily visible from the surrounding area because they are not publicly accessible and they are blocked from view by fencing and vegetation. No change to the overall visual character of the surrounding area will occur, and therefore visual character is discussed in this section only as it pertains to views of the bridge and rail right-of-way.

The study area for this analysis was defined to include publicly accessible areas from which the existing bridge is visible, and from which the Build Alternative will also be visible. This consists of the waterfront areas in Perth Amboy along the Raritan River—including Riverview Drive, Sadowski Parkway, Juan Pablo Duarte International Park, the public beach and boardwalks, and the fishing piers that extend out into Raritan River—and the areas fronting the river in South Amboy, including the Lighthouse Bay and Harbor Village beach and boardwalk (see **Figure 3.5-1**).

3.5.1 AFFECTED ENVIRONMENT

3.5.1.1 VISUAL SETTING AND VISUAL RESOURCES

Raritan River Viewshed

Within the study area, the Raritan River viewshed is the primary visual resource. This includes the combination of its associated visual features such as the coastal areas of Perth Amboy and South Amboy, the Raritan River, Raritan Bay, and river crossings. The Raritan River viewshed is characterized by a mix of industrial/commercial uses and public greenspace along the waterfront, expansive views out toward the bay and Staten Island, and heavy recreational use for fishing and boating.

Within that viewshed, the Raritan River Drawbridge appears as a low, flat, long, steel structure with taller towers supporting electric lines. The Raritan River Drawbridge is one of four river crossings within the immediate vicinity. Located within the study area and west (upriver) of the Raritan River Drawbridge, the Victory Bridge is a twin-structure, pre-cast concrete bridge with metal guardrails that carries New Jersey Route 35 across the river. It is a fixed bridge that rises approximately 110 feet above the river outside of, but visible from, the study area. Beyond the study area, tall bridges that carry the Garden State Parkway and Route 9 also visible from the study area.

The Raritan River Drawbridge crosses the Raritan River near its mouth to the Raritan Bay and just before a sharp curve in the river. While it is a prominent visual feature from the Perth Amboy waterfront, the bridge is not prominently visible from the South Amboy coastal areas due to its low profile, the curve of the shoreline, and the visual juxtaposition of the bridge with the industrial features and land mass behind it.

Perth Amboy

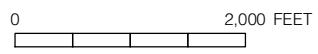
Viewed from the Perth Amboy side of the river, the Raritan River viewshed is industrial in nature. Its size and close-to-the-water construction make the bridge a visual barrier, blocking off much of the view west of it other than treetops (see **Figure 3.5-2**, photo 1). In Perth Amboy, views of the Raritan River Drawbridge and Raritan River viewshed are most readily available from the Sadowski Parkway Waterfront Park, which extends from the foot of 2nd Street close

9/13/2016



-  Project Site
-  Study Area Boundary

Note: Maintenance-type track work may extend beyond project site boundaries to New Brunswick Avenue in Perth Amboy and the South Amboy Station in South Amboy.



-  Photo View Direction and Reference Number

RARITAN RIVER BRIDGE REPLACEMENT

Visual Resources Study Area
Photo Locations
Figure 3.5-1



The Raritan River Drawbridge, as seen from the Sadowski Parkway Waterfront Park, looking west. Industrial sites are visible to the southeast but beyond the bridge to the southwest, only trees are visible **1**



The Sadowski Parkway Waterfront Park with fishing piers, boardwalk, and greenspace, looking southwest. The Raritan River Drawbridge is visible in the background **2**

Views of the Visual Resources
Study Area, Perth Amboy
Figure 3.5-2

to the project site eastward along the riverfront to Raritan Bay (see **Figure 3.5-2**, photo 2). The park also contains historic markers along the boardwalk that combine historic images with information about the Raritan River, the Raritan River Drawbridge, and the role both played in the history of Perth Amboy. Juan Pablo Duarte International Park, near the eastern boundary of the study area in Perth Amboy, also has views of the bay and river although it is not located at the water's edge. Between the Raritan River Drawbridge and the Victory Bridge, the Cornucopia Cruise Line site includes a publicly accessible dock and greenspace along the river with views of the Raritan River Drawbridge.

Inland from the bridge, views of the project site are blocked by views of the vegetation and trees along the railroad cut when seen from the industrial area to the west of the tracks and from the residential area to the east. Just west of the Raritan River Drawbridge and railroad right-of-way in Perth Amboy, the large industrial site housing Gerdau Ameristeel, also referred to as the former Raritan Copper Works site, contains several small brick buildings; newer, larger metal clad buildings; a large parking lot; and a flat, sandy area by the river. Views toward the water and the bridge from Elm Street are blocked by the buildings on this site (see **Figure 3.5-3**, photo 3). The railroad tracks in the northern portion of the study area in Perth Amboy, across from the Gerdau Ameristeel site, are bordered by trees and heavy vegetation. This creates a green-wall effect that screens the railroad tracks and industrial site from view, particularly south of Gordon Street along 2nd Street. On Elm Street the trees and brush come up to the curb line with no fencing (see **Figure 3.5-3**, photo 4).

On the west side of 2nd Street in the predominantly residential portion of the study area there are several low-scale concrete buildings, no more than two stories tall, and paved and gravel parking lots. These are enclosed behind chain-link or tall, wooden fences that block views of the railroad tracks. Where there are no buildings, the area is heavily vegetated with no views of the railroad right-of-way (see **Figure 3.5-4**, photo 5).

South Amboy

From South Amboy, the Raritan River viewshed focuses more on the Raritan Bay, the boaters, and the Great Beds lighthouse and Outerbridge Crossing, located outside of the study area but is visually prominent from South Amboy. Views northwest from the South Amboy waterfront include the buildings at the Gerdau Ameristeel site and the fuel storage tanks of the Buckeye Raritan Bay Terminal, located just west of the study area. The Raritan River Drawbridge is part of this viewshed, but it blends in with the industrial surroundings and is less visually prominent from South Amboy (see **Figure 3.5-5**, photo 6). Views of the vegetation and trees along the railroad tracks are visible from the South Amboy waterfront.

While the waterfront in the South Amboy study area is generally more industrial than that of Perth Amboy, there is a boardwalk and beach, primarily for the residents of Lighthouse Bay and Harbor Village, and a publicly accessible beach and parking area with an adjoining park, called Raritan Bay Waterfront Park, at the eastern edge of the study area. The Raritan River Drawbridge is visible in the distance from some locations in this park. Views in this area are generally dominated by the open water and Outerbridge Crossing (see **Figure 3.5-5**, photo 7).



View south from Elm Street at the Gerdau Ameristeel site 3



Looking north along Elm Street in Perth Amboy, the train tracks are screened from view by heavy vegetation 4

Views of the Visual Resources Study Area, Perth Amboy
Figure 3.5-3



View looking north along 2nd Street between Lewis Street and Patterson Street 5



The Raritan River Drawbridge as seen from the boardwalk in South Amboy, looking northwest 6



View north from South Amboy Boardwalk focuses on the open bay and the Outerbridge Crossing 7

3.5.1.2 VIEWER GROUPS AND VIEW DURATIONS

Viewer groups in the area consist of pedestrians and/or park users, residents, boaters, commercial or industrial workers, motorists, and rail passengers. Each group has a different sensitivity level depending on the exposure to the visual resources and how they are experiencing the resource.

Pedestrians and Park Users

Parks and recreation areas are generally recognized as sensitive locations, although sensitivity depends on the viewer's activities and view duration. Bicyclists and pedestrians have a transient perspective; however, viewers in this group include those out for recreational purposes who will, therefore, be more sensitive to their surroundings with moderate viewer sensitivity. People using the fishing piers and beach will have increased sensitivity as their views can be stationary.

In Perth Amboy, the majority of pedestrians and recreational users are those at the Sadowski Parkway Waterfront Park, who have uninterrupted views of the Raritan River Drawbridge from the beach, boardwalk, fishing piers and park. They also have wide views of other Raritan River viewshed elements, the bay and the Great Beds Lighthouse. Some views are also available of the bridge from recreational users at Juan Pablo International Park, the Sadowski Parkway tennis courts and tennis courts at the Brighton Avenue Community Center, and the playground at Robert N. Wilentz Elementary School, and the river walk at the western end of the study area in Perth Amboy. Within the South Amboy portion of the study area, the only pedestrians with visual access to the water are those using the boardwalk by Lighthouse Bay or the beach at Raritan Bay Waterfront Park, where the bridge is visible but blends in with its surroundings and is not a visually dominant feature in the viewshed.

Residents

A limited number of residents in both Perth Amboy and South Amboy have clear views of the Raritan River viewshed. This is an important viewer group since they live within close proximity to the visual resources and have high viewer sensitivity due to prolonged stationary views.

Boaters

Boaters, including those on the water for both commercial and recreational purposes, have a high viewer sensitivity because of the long duration of their views of the bridge within the Raritan River viewshed. With several marinas and boat launches located in or very near the study area, recreational boaters are a significant viewer group in the study area. Boaters traveling on Raritan Bay, the more heavily used body of water within the study area, have expansive views of the bay and the Raritan River Drawbridge.

Commercial/Industrial Workers

Some commercial and industrial workers within the study area have uninterrupted views out to the water. However, their viewer sensitivity is considered low since employees are presumed to be engaged with business activities. These include workers at the Gerdau Ameristeel site in Perth Amboy and workers at the industrial sites near the project site in South Amboy.

Motorists

Motorists traveling on the local streets in the study area close to the waterfront also have views to the bridge and Raritan Bay. Views are most prominent from Sadowski Parkway, which runs along the water in Perth Amboy, with only greenspace and beach between it and the water. In South Amboy, views to the north from any of the nearby roads are obstructed by vegetation, fencing, or buildings. Limited views of the project site are available from the Victory Bridge and Garden State Parkway, but these are limited by guardwalls and the high speed of motorists on these roads.

Rail Passengers

Passengers on NJ TRANSIT commuter trains crossing the Raritan River Drawbridge have unobstructed panoramic views of the Raritan River viewshed. However, rail travelers can be occupied with other tasks on the train, such as reading and working. Therefore, these viewers are assumed to have a moderate sensitivity overall. Rail passengers do not have views of the Raritan River Drawbridge itself, other than the superstructure of the lift span as the train passes through it.

3.5.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, no changes to the aesthetic character of the study area or to visually sensitive resources are anticipated. As noted earlier, two new parks are planned in the proposed project vicinity that will introduce new viewers to the study area: the 2nd Street Community Park in Perth Amboy, adjacent to the rail right-of-way and with clear views of the water and bridge, and the Manhattan Beach Club development in South Amboy, which will have a waterfront walkway along Raritan Bay about ½ mile south of the project site.

3.5.3 BUILD ALTERNATIVE

3.5.3.1 VISUAL SETTING AND VISUAL RESOURCES

With the Build Alternative, views in the Raritan River viewshed will change because of the replacement of the existing bridge with a new span. As discussed in Chapter 2 of this EA, "Project Alternatives," the new bridge, like the existing bridge, will consist of two long approach spans and a center, moveable span. The new vertical lift span will be designed to be visually consistent with the existing bridge in terms of overall aesthetic character. Like the existing bridge, it is anticipated that the new bridge will have an arched steel span, painted the same or a similar color to the existing bridge. In addition, the new bridge will also have tall steel towers to support the traction power cables that run above the bridge, as well as shorter catenary poles. Overall, therefore, while the new bridge will be slightly west of the existing bridge and will not be exactly the same as the old bridge, views in the Raritan River viewshed will not be greatly changed by the Build Alternative.

From Perth Amboy, the new vertical lift bridge will continue to act as a visual barrier, with the treetops beyond the industrial area still visible above the bridge. Because the bridge will be aligned to the west of the current bridge and thus slightly farther from publicly accessible vantage points, views from South Amboy of the Raritan River viewshed will be minimally affected by the Build Alternative.

3.5.3.2 VIEWER GROUPS AND VIEW DURATIONS

The extent to which the various viewer groups identified above will perceive the change caused by the Build Alternative varies. Rail passengers are not expected to perceive the change in the visual character of the bridge since their view of the bridge is limited and of short duration. Rail passengers' views to other aspects of the Raritan River viewshed, such as the Raritan Bay and Great Beds Lighthouse, will not change. Motorists traveling on the Victory Bridge and the multiple roads that pass through the study area experience expansive but brief views of the Raritan River viewshed and Raritan River Drawbridge. As the alignment, height, and dimensions of the new bridge will likely not differ substantially from the existing bridge, views to the Raritan River Drawbridge as a whole will not be substantially changed and the change in design of the new bridge will be minimally perceptible. Views to other aspects of the Raritan River viewshed will not be blocked or substantially changed.

The viewer groups that currently experience the longest duration and closest range views of the Raritan River viewshed are boaters in the immediate vicinity of the bridge; pedestrian and park users in Sadowski Parkway Waterfront Park in Perth Amboy and the boardwalk by Lighthouse Bay in South Amboy; and a limited number of residents in Perth Amboy and South Amboy. These viewer groups will likely notice the change in bridge design and alignment more than any other viewer group due to their proximity to the project site. However, the use and overall character and location of the feature will not change.

3.5.4 MITIGATION

In summary, the Build Alternative will not substantially alter the visual character of the study area or block important views to visually sensitive resources. Therefore, the Build Alternative will not result in adverse impacts on visual character and visually sensitive resources in the study area. No mitigation is required.

3.6 HISTORIC RESOURCES

3.6.1 AFFECTED ENVIRONMENT

Section 106 of the National Historic Preservation Act of 1966, as implemented by federal regulations at 36 CFR Part 800, mandates that federal agencies consider the effect of their actions on any properties listed on or determined eligible for listing on the National Register of Historic Places (NR). It also calls for consultation with parties with an interest in the historic resources that may be affected, including the New Jersey Historic Preservation Office (NJHPO) as well as other interested organizations. This section of the EA describes the Build Alternative's effects on historic properties and the consultation that has occurred with interested parties related to these effects on historic properties.

To identify historic properties that could be affected by the Build Alternative, a Phase 1A Archaeological Survey and Historic Architectural Resources Background Survey (HARBS) and

Effects Assessment report was prepared by RGA, Inc. (RGA).³ This document evaluates the potential for the presence or absence of pre-historic and historic archaeological resources, surveys and evaluates all above-ground resources more than 50 years of age for possible eligibility for listing in the NR, and assesses the effects of the Build Alternative on any NR-listed or eligible properties. The results of that evaluation are summarized in this section of the EA.

The evaluation was conducted for an Area of Potential Effect (APE) established in consultation with the NJHPO based on the area where the Build Alternative could have impacts to archaeological resources (the APE-Archaeology) or to architectural resources (the APE-Architecture) (see **Figures 3.6-1 and 3.6-2**). The APE-Archaeology includes the area that could be directly impacted by ground disturbances related to construction of the Build Alternative. The APE-Architecture includes the geographic area in which the Build Alternative may directly or indirectly cause changes in the character or use of any historic properties in the APE. The APE-Architecture was delineated using current tax parcel data to determine the survey boundaries. This ensures that the full contents of each parcel are properly identified, documented, and evaluated.

The evaluation described in this section of the EA has been conducted in consultation with the NJHPO and other Consulting Parties in accordance with Section 106. Copies of correspondence with the NJHPO and Consulting Parties are included in **Appendix B** of this EA.

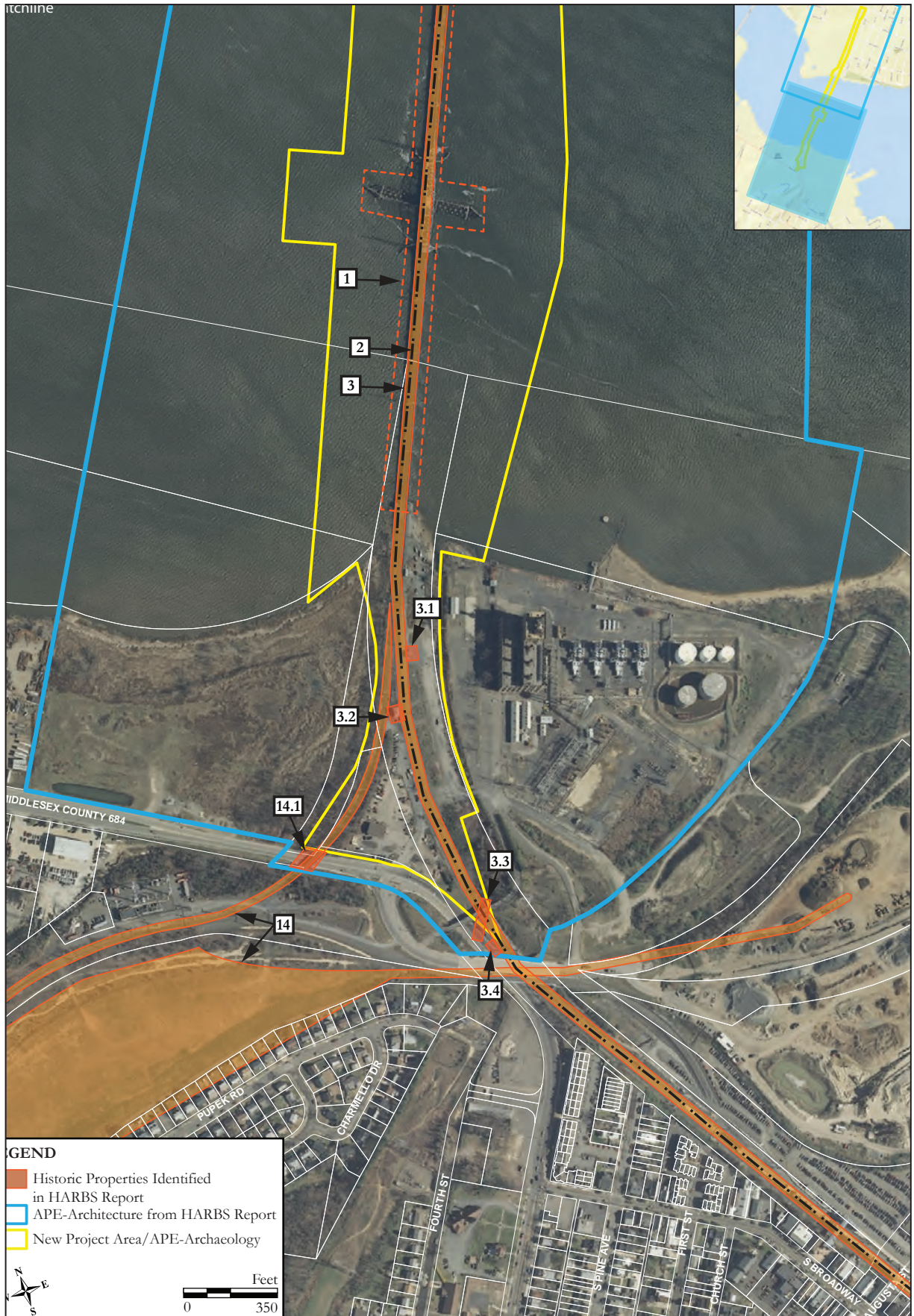
3.6.1.1 ARCHAEOLOGICAL RESOURCES

The Phase 1A Archaeological Survey includes an assessment of archaeological sensitivity, background research, and a reconnaissance of the project site. The APE-Archaeology includes land adjacent to the Raritan River as well as submerged areas within the riverbed that could be affected by construction of the Build Alternative. The survey concluded that the terrestrial portion of the APE-Archaeology has been subjected to extensive prior ground disturbance, and is assessed with low sensitivity for prehistoric archaeological resources (i.e., resources associated with Native American activities). However, in a March 23, 2016 “Continuing Consultation Comments Letter”, the NJHPO requested consideration of “the potential for deeply buried [archaeological resources] below the former tidal marsh complex” along the APE’s shoreline. The terrestrial portion of the APE-Archaeology was assessed as having low sensitivity for historic-period archaeological resources (i.e., resources associated with activities after approximately 1600 A.D., when European colonists first made contact with Native Americans).

The remains of two small boats are buried within the sandy beach at the river’s edge west of the existing railroad right-of-way, within the APE-Archaeology. These boats, referred to as **Vessels 98 and 99**, have also been determined eligible for listing on the NR. These resources are believed to be possible transitional/smaller canal barges that were placed in their current locations in the late 1950s and abandoned ca. 1961.

³ RGA, Inc., NJ TRANSIT North Jersey Coast Line Raritan River Drawbridge Replacement Project Phase 1A Archaeological Survey and Historic Architectural Resources Background Survey (HARBS)/Effects Assessment Report, January 2016; Addendum to the Phase 1A Archaeological Survey and HARBS/ Effects Assessment Report, November 4, 2016.





In addition to these known archaeological resources, the portions of the APE-Archaeology within the river and the immediate shoreline (i.e., beach area) on the Perth Amboy side of the APE-Archaeology are considered to have high historic archaeological sensitivity for potential marine resources (i.e., shipwrecks). This is based on the identification of shipwrecks in other portions of the river during prior archaeological surveys and the proximity of the APE-Archaeology to land that contained early settlement and is near historic ports and historic ferry lines. Based on further consultation with NJHPO, the potential for a buried Precontact landform in the vicinity of the Perth Amboy and South Amboy shorelines should also be evaluated.

3.6.1.2 ARCHITECTURAL RESOURCES

The HARBS report identified 14 historic properties in the APE-Architecture, including the two archaeological resources (remains of two boats), previously determined eligible for listing on the NR or recommended as eligible for listing on the NR based on the research conducted for the HARBS study (see Table 3.6-1 and Figures 3.6-1 and 3.6-2).

**Table 3.6-1
Historic Resources in the Area of Potential Effect**

| Map ID | Property Name/Address | Municipality | NR Current Status | Assessment of Effects |
|--------|---|-----------------------------|--|--|
| 1 | Raritan River Swing Span Draw Bridge | Perth Amboy; South Amboy | Eligible (SHPO Opinion: 6/25/1991) | Adverse Effect |
| 2 | Overhead Contact System, Pennsylvania Railroad Company | Perth Amboy; South Amboy | Eligible (SHPO Opinion: 4/26/2002) | Adverse Effect |
| 3 | New York & Long Branch Railroad (NY&LBRR) Historic District | Perth Amboy; South Amboy | Eligible (SHPO Opinion: 8/20/2004) | Adverse Effect |
| 3.1 | New York & Long Branch Railroad Electric Substation | South Amboy | Previously un-surveyed | Contributing Resource; Adverse Effect to NY&LBRRHD |
| 3.2 | NJ TRANSIT Essay Tower | South Amboy | Contributing (SHPO Opinion: 8/20/2004); Previously un-surveyed | Adverse Effect to NY&LBRRHD |
| 3.3 | Concrete Box Culvert, NJ TRANSIT | South Amboy | Previously un-surveyed | Contributing Resource; No Effect to NY&LBRRHD |
| 3.4 | Pennsylvania Railroad Bridge 60.84 Remains | South Amboy | Previously un-surveyed | Non-Contributing Resource; No Effect |
| 4 | Perth Amboy & Elizabethport Branch of the Central Railroad of New Jersey Historic District | Perth Amboy | Eligible (SHPO Opinion: 8/30/2000) | Adverse Effect |
| 4.1 | Perth Amboy & Elizabethport Branch of the Central Railroad of New Jersey Railroad Signal Bridge | Perth Amboy | Previously un-surveyed | Contributing Resource of the CRNJ Perth Amboy & Elizabethport Branch; Adverse Effect |
| 5 | Raritan Copper Works (Former Anaconda Copper Works) | Perth Amboy | New Jersey Register listed; Eligible (SHPO Opinion: 12/23/1977; DOE: 3/7/1978; SR: 11/27/1998) | No Effect |
| 6 | Vessel 98, Traditional Small Barge/Canal Boat | Perth Amboy | Eligible (SHPO Opinion: 7/23/1998) | Adverse Effect |
| 7 | Vessel 99, Traditional Small Barge/Canal Boat | Perth Amboy | Eligible (SHPO Opinion: 7/23/1998) | Adverse Effect |
| 8 | Perth Amboy Pump Station, 2 Second Street | Perth Amboy | Previously un-surveyed | Not Eligible; No Effect |
| 9 | 52 First Street | Perth Amboy | Previously un-surveyed | Not Eligible; No Effect |
| 10 | 51 Madison Avenue | Perth Amboy | Previously un-surveyed | Not Eligible; No Effect |
| 11 | 125 Second Street | Perth Amboy | Previously un-surveyed | Not Eligible; No Effect |
| 12 | 147 Second Street | Perth Amboy | Previously un-surveyed | Not Eligible; No Effect |
| 13 | 261 Market Street | Perth Amboy | Previously un-surveyed | Not Eligible; No Effect |
| 14 | Camden & Amboy Railroad Main Line Historic District (C&ARRMLHD) | South Amboy | SHPO Opinion: 3/23/2016 (revised SHPO Opinion; boundary clarified SHPO Opinion: 10/4/1991) | Adverse Effect |
| 14.1 | Pennsylvania Railroad Bridge over Main Street (No. 60.71) | South Amboy | Previously un-surveyed | Contributing Resource to Camden & Amboy RR Main Line HD; No Effect |

Note: See Figures 3.6-1 and 3.6-2.

The **Raritan River Drawbridge** (referred to as the Raritan River Swing Span Draw Bridge) has been formally identified as being individually eligible for listing in the NR. The bridge is important in terms of its design, engineering, and its transportation role. The bridge was constructed in 1906-1908 by the New York and Long Branch Railroad (NY&LBRR). It is significant as an intact late example of its type constructed in larger proportions than other examples in the State of New Jersey.

In addition to its individual eligibility, the bridge has also been previously identified as a contributing resource to the **New York and Long Branch Railroad Historic District**, a district that is eligible for the NR. The New York and Long Branch Railroad Historic District encompasses the NJCL from Perth Amboy to its terminus in Bay Head, Ocean County, and includes an extensive list of key and contributing resources, generally consisting of railroad stations, structures, and infrastructure. Completion of the New York and Long Branch Railroad in 1875 established the first all-weather, all-rail transportation link between New York and the New Jersey coast, attracting a previously unprecedented number of seasonal vacationers and year-round residents to the area and encouraging development along its route.

Within the APE-Architecture, the New York and Long Branch Railroad Historic District also includes three other sites that are contributing resources to the historic district:

- **Essay Tower** (an interlocking tower in the South Amboy portion of the project site). Constructed during the period of significance of the historic district, the building retains sufficient integrity to convey its associations with the railroad and contributes to the significance of the historic district.
- **Railroad electric substation** (contributing resource to the NY&LBRRHD). Constructed during the period of significance of the historic district, the building contributes to the significance and character of the historic district and is recommended as a contributing resource.
- **Concrete box culvert** (contributing resource to the historic district). The culvert dates to no later than 1943 and falls within the period of significance for the historic district.

Additionally, the railroad catenary system that extends across the bridge, referred to as the **Pennsylvania Railroad Overhead Contact System Historic District**, has been found to be eligible for listing in the NR. The boundaries of this district extend along the NJCL from Rahway (Union County) to South Amboy (Middlesex County). The electrification of this branch was a part of the Pennsylvania Railroad's major electrification program of its Main Line from New York to Philadelphia during the 1930s.

Also located in the APE-Architecture, the **Perth Amboy & Elizabethport Branch of the Central Railroad of New Jersey Historic District** extends from Elizabethport in Union County to the Raritan River. This railroad is important because of its role in the transport of passengers to vacation and excursion destinations, including passengers traveling to Atlantic City and commuters to Newark and New York from Monmouth and Ocean Counties; as well as the transport of labor from Elizabethport to southern New Jersey. In addition, one contributing resource to the historic district is located within the APE-Architecture: a **signal bridge** just north

of the Perth Amboy shoreline. The signal bridge was built within the period of significance for the historic district and is a contributing resource to the historic district.

In South Amboy, the APE-Architecture includes several resources related to the Camden & Amboy Railroad Main Line Historic District. The Camden & Amboy Railroad was New Jersey's first railroad and the nation's third, and it provided an important transportation link between Philadelphia in New York. It is significant as one of the first railroads in America, as the railroad that set the standards for modern railroading, and for its role in the industrialization and suburbanization of New Jersey. The historic district extends from Camden to South Amboy, through 31 municipalities and four counties. The current boundaries of the Camden & Amboy Railroad Main Line Historic District are south of the project site, but an **extension to the Camden & Amboy Railroad Main Line Historic District** occupies the Conrail tracks in South Amboy that connect to the North Jersey Coast Line just south of the existing Raritan River Drawbridge.

In addition, within the proposed extension, one contributing resource was identified: Pennsylvania Railroad Bridge 60.71 (contributing resource to the **Camden & Amboy Railroad Main Line Historic District**). The bridge retains integrity of location, materials and setting and continues to function for rail purposes in an area of the Camden & Amboy Railroad Main Line Historic District where there has been a loss of railroad-related facilities and infrastructure associated with the Camden & Amboy Railroad.

In addition to the many railroad-related historic resources in the APE-Architecture, the area also includes a historic architectural site to the west of the railroad right-of-way: the large industrial property that extends from close to Market Street to the waterfront along the west side of the tracks and currently houses the Gerdau Ameristeel plant. This property is the former **Raritan Copper Works** site, which is listed on the New Jersey State Register of Historic Places and has been determined eligible for listing on the NR. The Raritan Copper Works was among the first of the larger industries to be located in Perth Amboy at the turn of the 20th century and played an important role in the economic and industrial development of the area.

3.6.2 NO ACTION ALTERNATIVE

The No Action Alternative will involve the continued operation of the existing Raritan River Drawbridge. There will be no adverse effects to either archaeological or historic resources.

3.6.3 BUILD ALTERNATIVE

3.6.3.1 ARCHAEOLOGICAL RESOURCES

Coastal and submerged land adjacent to the Perth Amboy and South Amboy shorelines within the APE-Archaeology are assessed with high historic archaeological sensitivity based on the presence of two NRHP-eligible historic vessels and potential for other maritime resources in the riverbed. The Build Alternative will have an adverse effect on the two buried vessels in the shoreline (Vessels 98 and 99). Therefore, on-site evaluation will be undertaken by a qualified underwater archaeologist to assess and document the integrity and physical characteristics of Vessels 98 and 99. A data recovery plan shall be prepared with data recovery and documentation of Vessels 98 and 99 undertaken, or alternative mitigation implemented, if excavation is not feasible. Mitigation shall be developed and implemented in consultation with NJHPO.

The APE-Archaeology crosses a portion of the Raritan River with high sensitivity for marine archaeological resources. A marine archaeological survey of the offshore portions of the APE-Archaeology will be undertaken to determine the presence or absence of marine archaeological resources. The marine archaeological survey and other previously collected survey data shall be reviewed by a qualified underwater archaeologist with the information reviewed in consultation with NJHPO to determine if further underwater archaeological investigation is required to determine the presence of potential eligible shipwrecks.

Further evaluation shall be undertaken to assess the potential for a deeply buried Precontact landform in the vicinity of the Perth Amboy and South Amboy shorelines. This will include the review of soil boring samples and soil boring logs by a qualified archaeological geomorphologist. Based upon the review of the borings and potential for a Precontact landform and in consultation with NJHPO, the geomorphologist may also monitor future soil borings to inspect the portion of the soil column to determine if cultural bearing deposits are present.

The above mitigation measures are intended to address the Build Alternative's potential adverse effects and are included in the draft Programmatic Agreement (PA) in accordance with Section 106 of the National Historic Preservation Act, to be executed among the FTA, NJHPO, and NJ TRANSIT following completion of this EA. A draft PA is included in **Appendix B** of this EA.

3.6.3.2 ARCHITECTURAL RESOURCES

The Build Alternative will have an adverse effect on several railroad-related historic resources that must be removed for construction of the new bridge. These include the following:

- Raritan River Drawbridge, which is individually eligible and a contributing resource to the New York and Long Branch Railroad Historic District;
- The New York and Long Branch Railroad Historic District and three other contributing resources to the district: Essay Tower, and a substation,;
- One contributing resource to the Pennsylvania Railroad Overhead Contact System Historic District: the railroad catenary system that extends across the bridge and along the upland approach tracks;
- The Perth Amboy & Elizabethport Branch of the Central Railroad of New Jersey Historic District and a contributing resource to the district, a signal bridge;
- A 450-foot-long section of track that is part of the proposed extension to the Camden & Amboy Railroad Main Line Historic District.

One railroad-related resource within the APE-Architecture will not have adverse effects as a result of the Build Alternative: Pennsylvania Railroad Bridge 60.71, which is recommended as a contributing resource to the Camden & Amboy Railroad Main Line Historic District.

Mitigation to address these adverse effects will include the following:

- Documentation of the Raritan River Drawbridge and other historic railroad-related features in accordance with the standards of the Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER).
- Educational and interpretive display related to such potential themes as the affected historic railroad historic districts, the Raritan River Drawbridge and movable bridge technology, and maritime traffic on the Raritan River. The display will be installed along the affected North Jersey Coast Line or at another location mutually acceptable to NJ TRANSIT and NJHPO.
- Potential salvage for interpretive purposes of two Pennsylvania Railroad Catenary Poles and possibly associated wiring from the Raritan River Drawbridge or its approaches for installation at an interpretive exhibit to be located at the proposed South Amboy ferry terminal, as well as potential salvage of the Perth Amboy & Elizabethport Branch Signal Bridge and preservation in an interpretive setting.
- Design review of the Build Alternative with NJHPO as the design is advanced, to ensure that the design of the proposed project adheres to recommended approaches as per the Secretary of the Interior's Standards and Treatments for Historic Properties and is compatible with the character defining features of historic resources with the APE.

Mitigation measures are set forth in the draft Section 106 PA among the FTA, NJHPO, and NJ TRANSIT that will be executed following completion of this EA. A draft PA is included in **Appendix B** of this EA.

Although a temporary construction easement will be required for work within the boundaries of the NR eligible Raritan Copper Works site, those impacts will not constitute an adverse effect on the resource because they will not directly or indirectly alter characteristics of Raritan Copper Works that qualify it for inclusion in the NR. The resource was determined to be eligible because of "its importance in industrial architecture and design." The proposed improvements will not directly impact surviving Raritan Copper Works buildings or structures, will not compromise the layout and characteristics of the site which demonstrate its historic function and use and will not substantively alter the resource's historic setting. However, because the Raritan Copper Works has been listed on the New Jersey Register of Historic Places and because the temporary construction easement will be required for work within the boundaries of the New Jersey Register of Historic Places listed resource, an Application for Project Authorization will be required in compliance with the New Jersey Register of Historic Places Act (N.J.S.A. 13:1B-15.128 et seq.).

3.6.4 MITIGATION

As described above, the Build Alternative will result in adverse effects to archaeological and historic resources. Mitigation measures are set forth in the draft Section 106 PA among the FTA, NJHPO, and NJ TRANSIT that will be executed following completion of this EA. A draft PA is included in **Appendix B** of this EA. Mitigation measures and commitments outlined in the PA will be adhered to and include: further evaluation, data recovery, and recordation of archaeological resources as discussed above; HABS/HAER documentation of the Raritan River Drawbridge and other historic railroad-related features; potential salvage of a pair of terrestrial catenary poles for display at the proposed South Amboy ferry terminal and potential salvage

for interpretive display of a signal bridge associated with the Perth Amboy & Elizabethport Branch; education and interpretive display; and design review by NJHPO.

3.6.4.1 RECORDATION

The HABS/HAER documentation will include printed, graphic, and photographic information regarding the Raritan River Drawbridge and associated railroad infrastructure. Archival copies of the final recordation document will be provided to the NJHPO, the New Jersey State Library, the Rutgers University Special Collections and University Archives, and the Perth Amboy and South Amboy Public Libraries.

3.6.4.2 INTERPRETIVE DISPLAYS

NJ TRANSIT will develop plans for the preparation and installation of an interpretive display along the affected NJCL or possibly at NJ TRANSIT's South Amboy and Perth Amboy Stations. The content of these displays will be developed in consultation with the NJSHPO and draw upon the research and documentation conducted for the recordation and archaeology stipulations in the PA. Possible themes may include, but are not limited to, the Camden & Amboy Railroad, maritime traffic on the Raritan River, movable bridge technology, New York & Long Branch Railroad, and the Central Railroad of New Jersey Perth Amboy & Elizabethport Branch.

3.6.4.3 SALVAGE OF MATERIALS

NJ TRANSIT will develop a plan for the potential salvage and possible reuse for interpretive purposes two Pennsylvania Railroad Catenary Poles (and possibly associated wiring) from the existing bridge or its approaches, as well as the Perth Amboy & Elizabethport Branch Signal Bridge. The structures will be made available in "as-is" condition, to include any permanent or temporary damage or disassembly necessitated by demolition.

3.6.4.4 ADDITIONAL ARCHAEOLOGICAL INVESTIGATIONS

As discussed above, on-site evaluation and data recovery plan will be undertaken to document physical characteristics of Vessels 98 and 99. Alternative mitigation will be implemented, if excavation is not feasible.

A marine archaeological survey will be undertaken to determine the presence or absence of marine archaeological resources, and to help determine if further underwater archaeological investigation is required to determine the presence of potential eligible shipwrecks.

Further evaluation will be undertaken to assess the potential for a deeply buried Precontact landform in the vicinity of the Perth Amboy and South Amboy shorelines. This will include the review of soil boring samples and soil boring logs by a qualified archaeological geomorphologist.

3.7 TRANSPORTATION

The purpose of the proposed project is to address the vulnerability of the existing Raritan River Drawbridge to major storm events, which will enhance the reliability of the NJCL. Thus, the Build Alternative will have an overall benefit on transportation in the study area and throughout the region. This analysis considers the effects of the Build Alternative on transportation, including commuter railroad, freight railroad, maritime, and vehicular traffic in

the study area. No public parking is available on the project site and therefore the Build Alternative will not affect parking, so no analysis is provided of parking impacts.

3.7.1 AFFECTED ENVIRONMENT

3.7.1.1 COMMUTER RAILROAD OPERATIONS

The Raritan River Drawbridge carries NJ TRANSIT's NJCL, which runs from Bay Head, New Jersey at the New Jersey shore at its southern terminus and connects to the Northeast Corridor in Rahway, New Jersey. The North Jersey Coast Line is NJ TRANSIT's third most heavily used line (of 10 lines), carrying some 26,500 daily commuters on weekdays. The bridge carries 44 eastbound trains in passenger service (referred to as "revenue" trains) and 43 westbound trains on weekdays, and 20 revenue trains in each direction on weekends (and 24 trains in each direction on summer weekends).

3.7.1.2 FREIGHT RAILROAD OPERATIONS

The bridge is used by Conrail Shared Assets Operations (a rail freight operator that is jointly owned by Norfolk Southern and CSX) for freight operations to move 2 million tons of freight over the bridge annually. Conrail operates approximately two trains a day across the bridge, between its Oak Island Yard in Newark and Browns Yard in Sayreville, from which connections are made to industries in central New Jersey.

NJ TRANSIT is unaware of any Conrail plans to increase service in the project study area. According to the New Jersey State Rail Plan⁴, the railroads serving New Jersey have been hesitant to expand freight rail service into areas, such as Middlesex County, because their primary focus is the movement of goods to and from major ports in North and South Jersey. High traffic density operations are their major source of revenue and profits.

The New Jersey State Rail Plan also indicates that there are restrictions on the use of heavier freight cars related to increased maintenance that would be required by the passenger rail operators due to concerns about additional wear and maintenance requirements associated with heavier railcars. In addition, while most of the mainline rail routes in New Jersey are capable of accommodating doublestack rail cars, at numerous locations along secondary lines and short lines, tunnels and overhead bridges represent constraints to running larger freight cars. A single vertical constraint can severely restrict the use of an entire rail corridor. So while the new bridge will accommodate heavier rail cars, additional actions will be required before heavier freight trains could be operated on the NJCL.

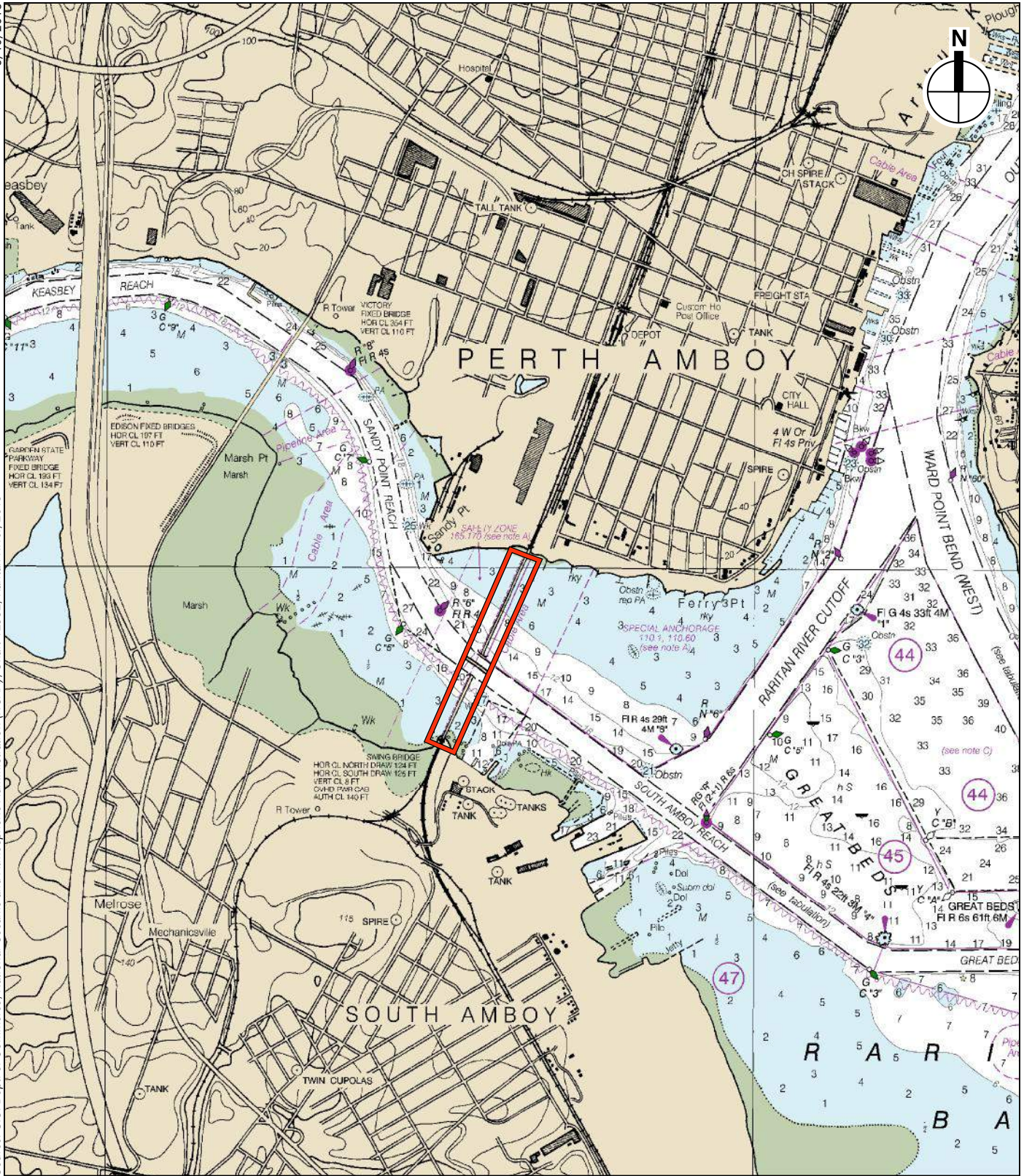
3.7.1.3 MARITIME TRAFFIC

The navigable channel known as South Amboy Reach passes beneath the bridge. As noted on the navigational chart for the area prepared by the U.S. Department of Commerce, National Oceanic and Atmospheric Administration (NOAA), the South Amboy Reach is 300 feet wide (see **Figure 3.7-1**). As it passes beneath the bridge, the channel divides around the bridge's center pier (i.e., the location of the swing span when the bridge is open), creating two narrow

⁴ NJ TRANSIT and New Jersey State Department of Transportation, *New Jersey State Rail Plan*, April 2015, p. 5-27. <http://www.njtransit.com/pdf/NJStateRailPlan.pdf>.

8/10/2016

Source: U.S. Dept. of Commerce, National Oceanic and Atmospheric Administration (NOAA), Chart 12332, Raritan River, 2015



 Raritan River Drawbridge

0 2,000 FEET

RARITAN RIVER BRIDGE REPLACEMENT

Raritan River Navigational Channel
Figure 3.7-1

channels: a 124-foot-wide north channel and a 125-foot-wide south channel. In accordance with federal regulations, the Raritan River Drawbridge is opened by a bridge operator when required to allow marine traffic to pass, except during rush hour. The vertical clearance is controlled by aerial cables over the channel with a clearance of 140 feet above MHW when the bridge is opened and approximately 8 feet of vertical clearance above MHW when the bridge is closed. Vessel dimensions in the Raritan River are also restricted by the 110-foot vertical clearance of the Victory Bridge, a fixed bridge, located west (upriver) of the Raritan River Drawbridge, as well as the Edison Bridges located further upstream.

According to 33 CFR Section 117.747, "the draw of New Jersey Transit Rail Operations Railroad Bridge at mile 0.5 shall open on signal; except that, from 6 a.m. to 9:30 a.m. and 4:30 p.m. to 7:30 p.m., Monday through Friday, except holidays, the bridge need not open." The bridge opens an average of four to five times per day (with a daily maximum of about 14 openings per day during busy summer months) for both recreational and commercial marine traffic. Marine traffic under the bridge consists primarily of commercial waterway users, as well as emergency service providers (e.g., the U.S. Coast Guard and state police) and some recreational users. The primary commercial users are a gasoline marine terminal owned by Buckeye Global Marine (and formerly owned by Hess Corporation) that receives and sends shipments by barge and tanker, Cornucopia Cruise Line, and the Sayreville Marina located upstream of the bridge.

The fact that the bridge's central support pier for the swing span divides the navigation channel into two narrower channels creates an obstacle for maritime traffic. In addition, the alignment of the bridge is such that the marine channel is slightly skewed in comparison to the bridge's fenders and central pier. The combination of the obstacle created by the center pier, the narrower channels, and this misalignment has contributed to numerous collisions at the bridge channel in which both the bridge and marine vessels have been damaged. Over 60 collisions have been reported in the last 10 years (between January 2006 and April 2015), with some collisions resulting in substantial damage that required the bridge and/or marine channel to be closed for repairs. The impediment created by the center pier also contributes to slower marine passage times beneath the bridge, which in turn can result in delays to rail traffic. In addition, trains and maritime traffic are both delayed during normal operations waiting for the bridge to open and close.

3.7.1.4 VEHICULAR TRAFFIC

The closest roadways to the project site in Perth Amboy are Market Street, Elm Street, and 2nd Street. Market Street is a busy commercial corridor through Perth Amboy's business district and serves the Perth Amboy rail station. Elm Street provides access to two industrial businesses but does not connect to any other roadways. On the east side of the project site, 2nd Street is lined with businesses, residences, and community facilities and provides access to a local park.

In South Amboy, the project site is accessible from Main Street (Route 684), a busy arterial that provides connections between downtown South Amboy and the Garden State Parkway and Routes 9 and 35. Two overpasses span Main Street and the railroad right-of-way that connect to a network of private roads that provide access to the industrial properties on the east side of the study area, including the power plant, adjacent vacant properties, and site of the new ferry terminal.

There are no at-grade railroad crossings of roadways within the proposed project limits. In Perth Amboy, County Road 658 passes over the existing railroad at the approach to Perth Amboy Station. In South Amboy, Main Street runs parallel to the railroad tracks at certain points and does not cross the railroad. The ramp to the proposed Ferry Terminal site crosses the railroad tracks in an overpass.

3.7.1.5 PEDESTRIANS AND CYCLISTS

The rail bridge does not accommodate pedestrian and bicycle traffic, and no designated bike lanes are located in the study area. A bicycle and pedestrian path is located adjacent to the project site along the Sadowski Parkway Waterfront Park in Perth Amboy. There are no at-grade railroad crossings of bike paths or walkways in the study area. As indicated in Section 3.1.1.2, the 2013 Master Plan of the City of Perth Amboy includes filling the “missing link” of the waterfront walkway/bikeway along the Gerdau steel plant property’s waterfront. The existing railroad and its embankment currently impede the connection of the path between the Gerdau steel plant and Sadowski Parkway Waterfront Park. In order for the connection to be made, a tunnel underpass of the existing railroad tracks would need to be constructed.

3.7.2 NO ACTION ALTERNATIVE

The No Action Alternative will not affect vehicular traffic or parking in the study area. Freight and commuter railroad traffic may be affected during required maintenance and rehabilitation. Prolonged service disruptions will be expected to occur after severe weather events for emergency repairs and inspections.

3.7.3 BUILD ALTERNATIVE

Overall, the Build Alternative will improve the reliability and resilience of the commuter and freight rail systems in the study area and the region, while also improving reliability of marine navigation beneath the bridge.

The Build Alternative will improve the resilience of the passenger and freight rail network by addressing the vulnerability of the Raritan River Drawbridge to storm and seismic events and bringing the river crossing to a state of good repair. This is critical to ensuring continued public transportation and freight service on the NJCL. In addition, the Build Alternative will increase operating speeds across the bridge for both passenger and freight trains. The design speed of the new bridge in the Build Alternative will be 60 mph. Taking into account the curve in the tracks just south of the bridge in South Amboy, and the presence of the Perth Amboy and South Amboy rail stations on either end, the operating speed on the bridge will be 40 mph for passenger trains, an increase from the existing 30 mph and 35 mph pre-Sandy conditions. Freight rail operating speeds will increase to 30 mph from the existing 20 mph (both pre-and post-Sandy). No change in the number of daily trains is planned as a result of the Build Alternative.

Additionally, the new bridge will accommodate freight trains with rail cars that carry more weight, up to 315,000 pounds per rail car. The existing bridge cannot accommodate the current weight standard for rail freight cars, which is 286,000 pounds, and upgrading the weight

capacity of the bridge to allow 286,000-pound cars has been identified as a critical need in the *New Jersey State Rail Plan*.⁵ This allows freight railroads to carry the same amount of freight with fewer cars. Moreover, *New Jersey Statewide Freight Rail Strategic Plan (2014)*⁶ includes a recommendation that future renovations and upgrades include capacity for 315,000 pounds to accommodate long-term industry trends, and Conrail has requested that the bridge be improved to accommodate this higher weight limit.

A *Navigation Impact Report*⁷ was prepared for the proposed project, which is a requirement for permit approval from the U.S. Coast Guard (USCG). The report included a formal written survey of waterway users and consideration of the 11 responses that were received; meetings with the USCG, U.S. Army Corps of Engineers (USACE), and the Harbor Safety Operations and Navigation Committee of the Port of New York and New Jersey (Harbor Ops); review of existing drawings and current bridge operation practices; review of bathymetric surveys; review of Master Plans, Redevelopment Plans, and study area zoning; review of upstream and downstream vertical and horizontal clearances; and review of documented Raritan River Tide and Current information. Results of the maritime user survey and the *Navigation Impact Report* are summarized in **Appendix H**. Results of the *Navigation Impact Report* identified a vertical clearance of 110 feet and horizontal clearance of 300 feet as a design criterion for the proposed bridge. The vertical clearance of 110 feet was proposed as it is the same height as the Victory Bridge, a fixed bridge, located west (upriver) of the Raritan River Drawbridge and the Edison Bridges located farther upstream. Based on a review of the survey responses related to vessel height and consideration of the planned developments along the waterfront in Sayreville, South Amboy and Perth Amboy, it does not appear that there will be a future need to accommodate vessels larger than what the existing controlling vertical clearance on the lower Raritan River can accommodate.

A new vertical lift bridge on the NJCL across the Raritan River will improve navigation beneath the bridge. Proper operation of the bridge is essential to the area's maritime traffic, which includes tankers, commercial barges being towed by tugboats, commercial fishing, cruise ships, and recreational vessels. As a vertical lift bridge does not require a center pier dividing the channel like the existing swing bridge, the horizontal navigation clearance with the Build Alternative will widen to an unimpeded 300 feet, which is the full width of the navigation channel. The depth of the existing navigation channel will remain the same and no dredging is required as part of the proposed project. The removal of the center pier impediment will improve the time it takes for marine traffic to pass beneath the bridge and reduce the delays to rail traffic associated with the bridge in open position. The new lift will operate reliably and the number and severity of delays related to bridge malfunction will be reduced. Most recreational boats will be able to pass beneath the new bridge without opening the lift span since it will be

⁵ NJ TRANSIT and New Jersey State Department of Transportation, *New Jersey State Rail Plan*, April 2015, p. 5-27. www.njtransit.com/pdf/NJStateRailPlan.pdf.

⁶ New Jersey Department of Transportation, *New Jersey Statewide Freight Rail Strategic Plan, Moving New Jersey Forward*, June 2014, p. A-158. www.state.nj.us/transportation/freight/plan/pdf/FRSP.pdf.

⁷ Final Raritan River Bridge Replacement Navigation Impact Report, H&H/Gannett Fleming, November 15, 2016.

approximately ten feet higher than the existing bridge (18 feet above mean high water). For the larger vessels, the lift can be opened quickly (within three minutes as compared to 3.5 minutes under existing conditions), reducing wait times. Finally, the risk of boat collisions and the potential for damage related to those collisions will be greatly reduced due to the unimpeded channel width and the provision of bridge fenders at the bridge piers for the main span.

No change in the number of daily trains is planned as a result of the Build Alternative. Therefore, the proposed project will not affect the current schedule of bridge openings per day and there will be no change to anticipated rail passengers as a result of the proposed project or increase in vehicle traffic due to commuters. No roadways or public parking spaces will be affected by the proposed project. Since there are no at-grade railroad crossings of roadways, walkways, or bike paths in the study area, there will be no impacts to vehicular traffic, pedestrians, or cyclists. As indicated in Section 3.1.3, the Build Alternative will facilitate the future construction of a proposed future path from the Gerdau steel plant to the Sadowski Parkway Waterfront Park path in Perth Amboy. If the proposed future continuous path is not constructed, then the detour to the nearest rail crossing will remain unchanged from the existing conditions. Overall, therefore, the Build Alternative will not adversely affect transportation.

3.7.4 MITIGATION

The Build Alternative will not result in adverse impacts to transportation and no mitigation is required.

3.8 AIR QUALITY

This section considers the effects of the Build Alternative on air quality, including any effects that might occur at nearby sensitive locations (e.g., residences, schools, parks). Air quality can be affected by air pollutants produced by moving sources, such as vehicular traffic or diesel locomotives, referred to as “mobile sources,” and by fixed facilities, such as power plants or parking garages, referred to as “stationary sources.” For the Build Alternative, the analysis considers the potential effects on air quality related to diesel emissions from freight locomotives because of changes to location of the bridge alignment, increased speeds of diesel trains crossing the bridge, or increased weight of freight loads being transported across the bridge. Electric trains do not directly emit air pollutants and so are not of concern for this analysis. The analysis also considers the Build Alternative with respect to conformity with relevant State Implementation Plans (SIP), described below.

The Clean Air Act (CAA), as amended in 1990, is the primary basis for regulating air pollutant emissions. As required by the CAA, the United States Environmental Protection Agency (USEPA) promulgated, and revises periodically, regulations which set National Ambient Air Quality Standards (NAAQS) for carbon monoxide (CO), ozone, nitrogen dioxide (NO₂), lead, sulfur dioxide, and particulate matter (PM) regulated in two size categories: respirable PM smaller than 10 micrometers (PM₁₀), and fine respirable PM smaller than 2.5 micrometers (PM_{2.5}). For these “criteria pollutants,” the NAAQS are divided into two types: primary standards define air quality levels intended to protect the public health with an adequate margin of safety, and secondary standards define levels of air quality intended to protect the public welfare from any

known or anticipated adverse effect of a pollutant (e.g., visibility, vegetation damage, material corrosion).

Each criteria pollutant is monitored on a continuous basis at various locations throughout the State of New Jersey by NJDEP. The monitoring is required under the CAA to determine the attainment status of an area and to monitor progress of states under their SIPs, and also provide a warning system for unhealthy pollutant concentrations (both short and long term), and provide data for the assessment of air quality in light of public health and welfare standards and of changes in these pollutant levels.

Section 107 of the Clean Air Act Amendments requires USEPA and states to identify areas not meeting the NAAQS and designate them as “nonattainment areas.” It is the States’ responsibility to attain the standards in those areas via SIPs. After a standard is attained, the SIP remains in effect as a “maintenance” plan to ensure continued attainment.

As a federally funded project, the proposed project must conform to SIPs applicable to the project region. An area’s Metropolitan Planning Organization (MPO), which is an entity responsible for transportation planning, together with the state, is responsible for demonstrating conformity with respect to the SIP on metropolitan long-range transportation plans and Transportation Improvement Programs (TIPs). USEPA must then concur with such conformity determinations. The U.S. Department of Transportation (USDOT) has final approval of conforming plans and TIPs. Conformity of federal actions related to transportation plans, programs, and approval, funding, or implementation of FHWA/FTA projects must be addressed according to the requirements of 40 CFR Part 93 Subpart A (transportation conformity regulations).

3.8.1 AFFECTED ENVIRONMENT

The project site is located in Middlesex County, which is in the New Jersey portion of the New York-Northern New Jersey-Long Island, NY-NJ-CT ozone nonattainment area. As a result of state and federal efforts, measured ozone levels have been decreasing, and although Middlesex County is part of the nonattainment area, concentrations in the county itself have not exceeded the standard in recent years.

The project site is also within the New York-Northern New Jersey-Long Island, NY-NJ-CT PM_{2.5} maintenance area, which attained the standard in 2013, and in the Perth Amboy, NJ maintenance area for CO, which attained the standard in 1996 (maintenance ends 2016). As is the case for the entire US, the area is “unclassifiable/attainment” for the recent 1-hour NO₂ standard, pending additional monitoring data required for classification. The area has never been designated for any other standards.

At the closest ozone monitoring stations to the project site, the most recent data for ozone indicates that the concentrations do not exceed the standard, but may exceed the newly promulgated standard, which has a lower threshold, if current conditions persist. PM

concentrations and ozone concentrations at the closest air quality monitoring locations for those pollutants do not exceed standards.⁸

3.8.2 NO ACTION ALTERNATIVE

The No Action Alternative will not affect air quality in the study area.

3.8.3 BUILD ALTERNATIVE

3.8.3.1 MOBILE SOURCE IMPACTS

The pollutants of concern for the Build Alternative are those related to diesel emissions from freight trains. Electric trains (passenger trains on the NJCL) do not emit air pollutants. Pollutant emissions from diesel combustion contain nitrogen oxides (NO_x, including both nitrogen oxide and nitrogen dioxide, NO₂) and particulate matter (PM) which can potentially affect local concentrations near diesel sources, and volatile organic compounds (VOCs) which combine with NO_x to form ozone and may be of concern on a regional scale. Carbon monoxide (CO) is also emitted directly from diesel combustion and may affect local concentrations. Sulfur dioxide and lead are not of concern from diesel sources.

The Build Alternative will replace an existing rail bridge with a new bridge that is shifted to the west relative to the existing bridge. It will allow an increase in the speed of trains operating across the bridge and will allow freight trains with heavier rail cars. The new bridge will have the same track capacity as the existing bridge, one track in each direction, and no increase in the number of trains each day is planned as a result of the Build Alternative.

These changes will not result in significant changes to air emissions, since there will be no change in overall train operations. Without the speed and weight limitations of the existing bridge, it is expected that trains will operate more efficiently. With a new bridge, freight trains could potentially carry heavier loads, although restrictions on their use currently exist on NJ TRANSIT and Amtrak rail lines, and vertical constraints in certain locations limit the use of doublestack rail cars⁹. Since transporting freight by rail is more efficient and less polluting than truck and barge the long-term effect of the proposed project will be improved air quality.

The new bridge will also improve the efficiency of maritime traffic passing beneath the bridge. No changes in the amount of boat traffic are expected as a result of the Build Alternative, but boats may experience shorter waits for bridge openings, many recreational boats will be able to pass beneath the bridge when the lift is closed, and there will be fewer delays due to bridge malfunction, which could reduce localized diesel emissions from maritime traffic.

⁸ The NJDEP Middlesex ozone monitor is in East Brunswick Township and another ozone monitoring station at Susan Wagner High School in Staten Island, NY, is a similar distance from the project site. The NJDEP PM_{2.5} monitoring station is in North Brunswick Township, NJ. The nearest monitoring station for ozone is in the City of Elizabeth, Union County. Information on the monitoring data at these stations is available at www3.epa.gov/airquality/airdata/.

⁹ NJ TRANSIT and New Jersey State Department of Transportation, *New Jersey State Rail Plan*, April 2015, p. 5-27. <http://www.njtransit.com/pdf/NJStateRailPlan.pdf>.

Overall, therefore, no adverse air quality impacts are predicted. No violations of the NAAQS will result from the proposed project and no existing violations of the NAAQS will be exacerbated. Therefore, the proposed project will comply with the Clean Air Act.

3.8.3.2 PROJECT-LEVEL CONFORMITY

Section 176(c) of the Clean Air Act of 1977, as amended (42 U.S.C. § 7506), forbids any department, agency, or instrumentality of the Federal Government from engaging in, supporting in any way or providing financial assistance for, licensing or permitting, or approving, any activity which does not conform to a State implementation plan (SIP) after the activity has been approved or promulgated. As defined in Section 176(c)(1), conformity to an implementation plan means conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the NAAQS and achieving expeditious attainment of such standards; and that such activities will not:

1. cause or contribute to any new violation of any NAAQS in any area;
2. increase the frequency or severity of any existing violation of any NAAQS in any area; or
3. delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in any area.

Projects that are funded and approved by the FTA are subject to the transportation conformity regulations at Subpart A of 40 CFR Part 93. The North Jersey Transportation Planning Authority (NJTPA) is the MPO for the area where the Build Alternative will be located. The NJ TRANSIT Raritan River Bridge Replacement project is included within the approved NJTPA FY 2016-2019 TIP (Project ID: T909) and FY 2016-2025 Statewide Transportation Improvement Program (STIP). In addition to the on-road emissions included in the TIP, the Build Alternative will not substantially increase locomotive emissions, and emissions from its construction will occur over less than five years and are therefore exempt from conformity hotspot analysis requirements. According to the transportation conformity regulations, the inclusion of a project in a conforming TIP indicates conformity with the SIP, and therefore, a project-level conformity analysis and/or determination is not required with respect to transportation conformity.

In some cases, if construction non-road emissions are considered to not be included in the SIP (transportation conformity covers on-road emissions, and the SIP includes forecast growth for non-road construction engines), general conformity may also apply. A general conformity applicability analysis is required under Section 176(c) of the Clean Air Act since federal permits will be issued for the proposed project by the USACE and USCG. An applicability analysis is the process of determining whether a Federal action (such as issuing a permit) must be supported by a general conformity determination. As described in 40 CFR 93.153, the applicability analysis may find that a conformity determination is not required if, among other things, the Federal action:

- is part of a continuing response to an emergency or disaster;
- is covered by an existing transportation conformity determination;
- will result in no emissions increase or an increase in emissions that is clearly *de minimis*;
- is presumed to conform (e.g., based on comparisons with other projects); or

- will result in total direct and indirect emissions of the criteria pollutants or precursors that is less than the *de minimis* rates contained in 40 CFR 93.153(b). The *de minimis* rates applicable to the study area will be 50 tons of VOC, or 100 tons of NO_x, CO, PM_{2.5}, PM₁₀, or SO₂.

As part of the permitting process, USCG and USACE will determine whether general conformity applies to the proposed project. An applicability analysis has been undertaken for the proposed project's construction by assuming that emissions intensity per expenditure (tons per dollar) for the proposed project will be similar to the average intensity of the construction sector in the Northern New Jersey region (see Appendix G). Based on that analysis, the proposed project's emissions will be *de minimis*, and a conformity determination will therefore not be required.

3.8.4 MITIGATION

The Build Alternative will not result in adverse effects on air quality and no mitigation is required.

3.9 GREENHOUSE GAS EMISSIONS AND RESILIENCE

This section of the EA evaluates the long-term effects of greenhouse gas (GHG) emissions of the proposed project with regard to the following:

- Potential GHG emissions that will be generated by the Build Alternative; and
- Resilience of the Build Alternative (i.e., the ability of the new infrastructure to withstand the effects of future severe weather events).

GHGs are those gaseous constituents of the atmosphere, both natural and manmade, which absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. Water vapor, carbon dioxide (CO₂), nitrous oxide, methane, and ozone are the primary greenhouse gases in the Earth's atmosphere. CO₂ is by far the most abundant and, therefore, the most influential GHG. CO₂ is emitted from any combustion process (both natural and manmade), from some industrial processes such as the manufacture of cement, mineral production, metal production, and the use of petroleum-based products, from volcanic eruptions, and from the decay of organic matter. CO₂ is removed ("sequestered") from the lower atmosphere by natural processes such as photosynthesis and uptake by the oceans. CO₂ is included in any analysis of GHG emissions. The total GHG impact can be measured as CO₂ equivalent (CO₂e) which is a sum of GHG emissions multiplied by a "global warming potential" (GWP)—a factor that weights the warming effectiveness of each pollutant relative to CO₂ (e.g, the GWP of CO₂ is 1, other GHGs have higher GWP).

3.9.1 AFFECTED ENVIRONMENT

The bridge currently induces energy use by passenger and freight locomotives and this energy use results in both direct and indirect GHG emissions. Since passenger and freight transportation by rail are substantially more efficient than on-road or in-water transportation, which are the most common alternatives, the net effect is lower energy use and GHG emissions. However, given the current state of the bridge, train traffic is slowed, somewhat decreasing efficiency.

As described in Chapter 1, “Project Purpose and Need,” Section 1.2, “Need to Provide Storm Resiliency,” the bridge was substantially damaged by the Sandy storm surge in 2012. At peak surge, the superstructure and the swing span motors were fully submerged and subjected to substantial lateral force of the surge and debris carried along with it. On the existing bridge, the top of rail at the highest point at the central area of the bridge is only 18.7 feet, only about a foot above the FEMA BFE (i.e., the flood elevation during a 100-year storm). The bridge is older than its expected service life of 75 to 100 years and is not be able to support resilient rail service during severe weather events.

3.9.2 NO ACTION ALTERNATIVE

In the No Action Alternative, the reduced efficiency described above for the existing conditions will continue and could worsen. The potential for required closure and additional maintenance will increase, resulting in increased emissions from traffic shifted to on-road modes, as well as emissions associated with increased maintenance.

In the No Action condition, potential impacts on the bridge from storm surge and flooding will increase in frequency and magnitude.

3.9.3 BUILD ALTERNATIVE

The Build Alternative will replace the existing bridge with a new, parallel bridge, allowing passenger and freight trains that use the bridge to operate at higher speeds and carry heavier loads which result in more efficient use of energy. Increased speed and reliability on the line may increase passenger usage (not likely to increase the number of passenger trains, but may increase ridership). While the increase in grade and in weight capacity for freight trains will likely result in increased energy use and the associated emissions, the net operational result will be reduced on-road trucking, in-water freight transport by barge, and/or less frequent freight trips by rail, and will therefore represent reduced net energy use and ensuing GHG emissions operationally. Overall the changes associated with the Build Alternative will likely be small.

Note that there will also be emissions associated with construction—both direct emissions from construction activity and indirect emissions associated with materials manufacture such as cement and steel (see Section 4.2.7). As described in Section 4.2.7, construction related emissions were projected at 15,205 metric tons CO₂e (annualized at 303 metric tons CO₂e over the 50-year lifetime of the bridge). However, over the lifetime of the proposed project, these will be offset by the increased efficiencies in moving freight, with newer equipment that meets more stringent emissions requirements than the locomotives currently operating on the NJCL, and a reduction of emissions due to improving the passage of boats beneath the bridge.

The Build Alternative is being designed and will be built to be resilient to severe storm conditions. The top of rail on the new bridge will be above the NJ TRANSIT Design Flood Elevation criteria and approximately six feet higher than the top of rail on the existing bridge. Mechanical equipment that will operate the lift bridge will be well above the NJ TRANSIT Design Flood Elevation criteria and all new infrastructure will be able withstand the effects of flooding and salt water. The new bridge will support resilient rail service on the NJCL in the face of future severe weather events.

3.9.4 MITIGATION

The proposed project will not cause an increase in GHG emissions from either bridge operations or rail operator use of the bridge over the long term. Per the NEPA guidance, while any given project is small in the context of global GHG emissions, projects worldwide have a considerable impact on climate and also an opportunity to reduce emissions via choices made. There is no mitigation option available to further reduce operational emissions. However, since the primary concern is net lifetime emissions from the proposed project, mitigation options for construction were evaluated and will be implemented where practicable (see Section 4.2.7).

3.10 NOISE AND VIBRATION

This section evaluates the potential for the Build Alternative to result in noise or vibration impacts. Changes to noise or vibration could occur because of a shift in the location of the tracks closer to sensitive receptors, because of a change in the speed of trains crossing the bridge as a result of the proposed project, or because of an increase in the weight of freight trains crossing the bridge. The analyses of noise and vibration were conducted in accordance with the methodologies presented in the FTA's guidance manual, *Transit Noise and Vibration Impact Assessment* (FTA-VA-90-1003-06, May 2006).

3.10.1 AIRBORNE NOISE

To evaluate the Build Alternative's effects on airborne noise, a General Noise Assessment was conducted in accordance with the methodologies presented in the FTA guidance manual. This involves conducting a screening assessment to identify whether any "noise-sensitive" locations are present that could be affected by a project, and when such locations are present, conducting the General Noise Assessment to evaluate impacts.

The FTA guidance manual defines noise impact criteria based on the specific type of land use that will be affected, with three noise-sensitive land use categories identified:

- **Noise Land Use Category 1:** Tracts of land where quiet is an essential element of the intended purpose;
- **Noise Land Use Category 2:** Residences and buildings where people normally sleep (where nighttime sensitivity to noise is greatest – e.g., homes, hospitals, and hotels); and
- **Noise Land Use Category 3:** Institutional land uses with daytime and evening use (e.g., schools, libraries, theaters, parks/recreational areas and churches where avoiding speech interference is critical).

In accordance with the FTA guidance manual, evaluation of noise impacts associated with commuter rail projects is warranted when noise-sensitive land uses are located within 750 feet of a commuter rail mainline if no obstructions are present, or within 375 feet of the rail line if obstructions are present. Within the unobstructed screening distance, noise-sensitive uses are present in Perth Amboy. Within the unobstructed screening distance, both FTA Category 2 and Category 3 noise-sensitive land uses were identified in Perth Amboy and one FTA Category 2 noise-sensitive land use was identified within the screening distance in South Amboy.

Six noise receiver locations were selected that are representative of the closest noise-sensitive uses, four in Perth Amboy and two in South Amboy, within the unobstructed screening distances. These locations are listed in **Table 3.10-1** and shown on **Figure 3.10-1**.

**Table 3.10-1
Operational Noise Analysis Sites**

| Analysis Receiver Number | Receiver Location | Municipality | FTA Land Use Category | Distance to Proposed Alignment (Feet) * |
|---|---|--------------|-----------------------|---|
| 1 | Future Site of the 2nd St. Community Park | Perth Amboy | 3 | 55 |
| 2 | Robert N. Wilentz Elementary School | Perth Amboy | 3 | 305 |
| 3 | Sadowski Parkway Waterfront Park | Perth Amboy | 3 | 620 |
| 4 | 224 Lewis Street | Perth Amboy | 2 | 260 |
| 5 | 96 Pupek Road | South Amboy | 2 | 345 |
| 6 | Beacon Pointe Condos | South Amboy | 2 | 70 |
| Note: * Closest distance between the receiver and center of the Build Alternative alignment within the tie-in points. | | | | |

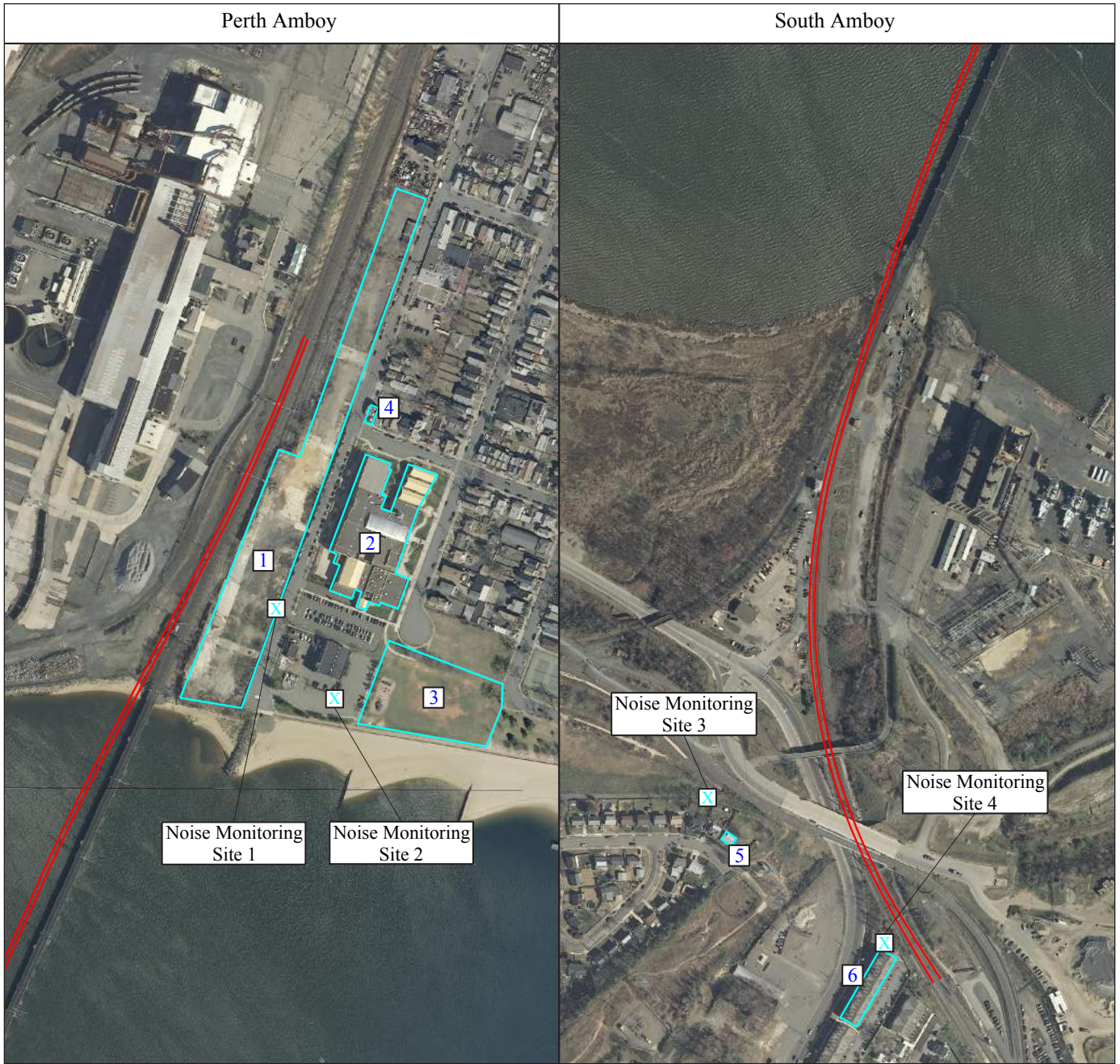
In accordance with FTA guidelines, the noise metric used to characterize noise exposure at Category 2 land uses, where nighttime noise sensitivity is of concern, is the L_{dn} . This is a 24-hour day/night noise descriptor, which weights nighttime noise levels by adding a 10 dBA (A-weighted sound level) penalty during nighttime hours (10PM–7AM) to account for this noise sensitivity.

For Land Use Category 3, the noise metric used is the hourly L_{eq} , or $L_{eq(h)}$. This hourly metric should represent the hour of noisiest transit activity during hours of noise sensitivity. For Sites 1 and 3 (the future site of the 2nd Street Community Park and Sadowski Parkway Waterfront Park), hours of sensitivity were assumed to be from sunrise to sunset (5:30 AM to 8:30 PM) during peak summer months. For Site 2, the Robert N. Wilentz Elementary School, sensitive hours were determined to be from 8:30 AM until 3:00 PM, when the school is in operation.

3.10.2 AFFECTED ENVIRONMENT

To determine existing noise levels at the four analysis locations, noise measurements were performed at four locations (see **Figure 3.10-1**). Noise monitoring was performed during two periods: May 13, 2015 to May 18, 2015 and from June 12, 2015 to June 22, 2015. Noise monitoring was performed at an additional site in South Amboy from October 28, 2016 to November 3, 2016. Type I noise level meters were utilized to perform all noise measurements. The measurements taken during June represent the summer period when additional weekend train service operates. Monitoring data collected during inappropriate weather conditions (e.g., high winds, high relative humidity, or any form of precipitation) were filtered from the data set based on review of nearest meteorological data.

Table 3.10-2 summarizes the existing noise exposure levels at each analysis location and the noise monitoring site from which the existing noise exposure level was identified.



Analysis Location and Site Number

X Noise Monitoring Location

— Proposed Improvements

Table 3.10-2
Existing Noise Exposure at Noise Analysis Sites

| Analysis Receiver Number | Analysis Location | FTA Land Use Category | Applicable Noise Metric | Weekday Existing Noise Exposure Level (dBA) | Applicable Noise Monitoring Site | Weekend Existing Noise Exposure Level (dBA) | Dominant Noise Source |
|--------------------------|---------------------------------------|-----------------------|-------------------------|---|----------------------------------|---|-----------------------|
| 1 | Future Site of 2nd St. Community Park | 3 | $L_{eq(h)}$ | 58 | 1 | 58 | Rail |
| 2 | Robert N. Wilentz Elementary School | 3 | $L_{eq(h)}$ | 56 | 1 | N/A | Rail |
| 3 | Sadowski Parkway Waterfront Park | 3 | $L_{eq(h)}$ | 64 | 2 | 64 | Rail / Auto |
| 4 | 224 Lewis Street | 2 | L_{dn} | 60 | 1 | 59 | Rail / Auto |
| 5 | 96 Pupek Road | 2 | L_{dn} | 59 | 3 | 56 | Rail |
| 6 | Beacon Pointe Condos | 2 | L_{dn} | 68 | 4 | 65 | Rail/Auto |

Note: N/A – No noise site sensitivity during this period.

The FTA guidance manual identifies 65 dBA as the upper limit for acceptable noise levels for Category 1 and 2 land uses. For Category 3 land uses, which are considered to be less sensitive to noise, the upper limit for acceptable noise levels is identified as 70 dBA. As shown in the table, existing noise levels at the four receiver sites are within the levels defined in FTA's guidelines as acceptable noise levels.

3.10.3 NO ACTION ALTERNATIVE

Under the No Action Alternative, train speeds will remain at post-Sandy conditions (i.e., 30 miles per hour for commuter rail and 20 miles per hour for freight rail) through the study area. Therefore, noise exposure will be expected to remain the same as under the 2015 (i.e., post-Sandy) existing condition.

3.10.4 BUILD ALTERNATIVE

The Build Alternative will not result in a change in train volumes relative to the existing condition, but will shift the alignment westward, away from noise-sensitive land uses, and will increase operating speeds for both passenger and freight trains and allow for heavier trains to operate on the bridge. To assess the potential noise impacts associated with these changes, the FTA methodology was used to assess noise impacts by estimating project-related noise and comparing it to existing noise to determine anticipated levels of noise increase. The Federal Railroad Administration's CREATE Rail Noise Model was used to estimate noise associated with freight trains in the computation of project noise exposure.

For passenger trains, the number of eastbound and westbound trains on weekdays and weekends during daytime (7 AM–10 PM) and nighttime (10 PM–7 AM) hours were assumed to be the same as on the summer 2015 NJCL train schedule. Approximately two freight trains cross the bridge per day, typically after the morning rush hour, and return by 3 PM. However, occasional runs also occur between 10 PM and 1 AM. Therefore, it was assumed that an average of 0.1 freight rail passbys occur per hour in a 24-hour period. As a conservative, worst-case assumption, all commuter rail trains were assumed to have 10 rail cars and assumed to operate in diesel mode and each freight train was assumed to have 12 freight rail cars, with each rail car approximately 55 feet in length.

The Build Alternative will shift the existing alignment to the west. In both Perth Amboy and South Amboy, this shift mostly results in the alignment moving away from noise-sensitive receivers. There is an approximate 3-foot shift closer to residences on Pupek Road in South Amboy. Although the Build Alternative will not result in a change in train volumes, relative to the 2015 existing condition, passenger rail operating speeds will increase from 35 mph pre-Sandy and 30 mph post-Sandy to 40 mph with the Build Alternative. Similarly, freight rail speeds will increase from 20 mph pre- and post-Sandy to 30 mph with the Build Alternative.

Since the assessment was performed for the closest, unobstructed noise-sensitive receivers to the proposed alignment, intervening buildings or barriers were not included within the model. Further, the track type was assumed to be continuous welded rail, and adjustments for embedded or jointed track were not selected in the model. Conservative distances to the proposed alignment were used to more accurately compare project-related noise levels to existing noise exposure. **Table 3.10-3** presents the results of the General Noise Assessment.

**Table 3.10-3
General Noise Assessment Results**

| Analysis Receiver Number | Analysis Location | Applicable Noise Metric | Time Period | Existing Noise Exposure Level (dBA) | Predicted Project Noise Exposure Level (dBA) ¹ | Noise Level Increase (dBA) | Weekend Allowable Noise Level Increase (dBA) | Impact Level |
|--------------------------|---------------------------------------|-------------------------|-------------|-------------------------------------|---|----------------------------|--|--------------|
| 1 | Future Site of 2nd St. Community Park | L _{eq(h)} | Weekday | 58 | 59 | 1 | 5 | NONE |
| | | | Weekend | 58 | 54 | 0 | 5 | NONE |
| 2 | Robert N. Wilentz Elementary School | L _{eq(h)} | Weekday | 56 | 56 | 0 | 6 | NONE |
| 3 | Sadowski Parkway Waterfront Park | L _{eq(h)} | Weekday | 64 | 53 | 0 | 4 | NONE |
| | | | Weekend | 64 | 49 | 0 | 4 | NONE |
| 4 | 224 Lewis Street | L _{dn} | Weekday | 60 | 60 | 0 | 2 | NONE |
| | | | Weekend | 59 | 58 | 0 | 2 | NONE |
| 5 | 96 Pupek Road | L _{dn} | WD | 59 | 59 | 0 | 2 | NONE |
| | | | WE | 56 | 58 | 2 | 3 | NONE |
| 6 | Beacon Pointe Condos | L _{dn} | WD | 68 | 68 | 0 | 1 | NONE |
| | | | WE | 65 | 65 | 0 | 1 | NONE |

Note: * Project noise exposure levels representative noise from project activities alone, not a cumulative future condition.

Based on the results of the General Noise Assessment, project-related noise levels are anticipated to increase (by 1 dB) at the future site of the 2nd Street Community Park in Perth Amboy during the weekday peak transit activity hour and by 2 dB on weekends at 96 Pupek Road. At all other sites, project-related noise levels are not expected to increase existing noise exposure levels. Therefore, a Detailed Noise Assessment is not warranted, and no mitigation is required.

3.10.5 GROUNDBORNE NOISE AND VIBRATION

To examine potential impacts during operation, the FTA guidance document (similar to the approach for assessing airborne noise) lays out a three-step approach for the analysis of vibration and groundborne noise: a screening procedure to identify whether any sensitive uses are located within a distance that could be affected by the proposed project, a general

assessment methodology to identify locations with the potential for impacts, and, where appropriate, a detailed analysis methodology.

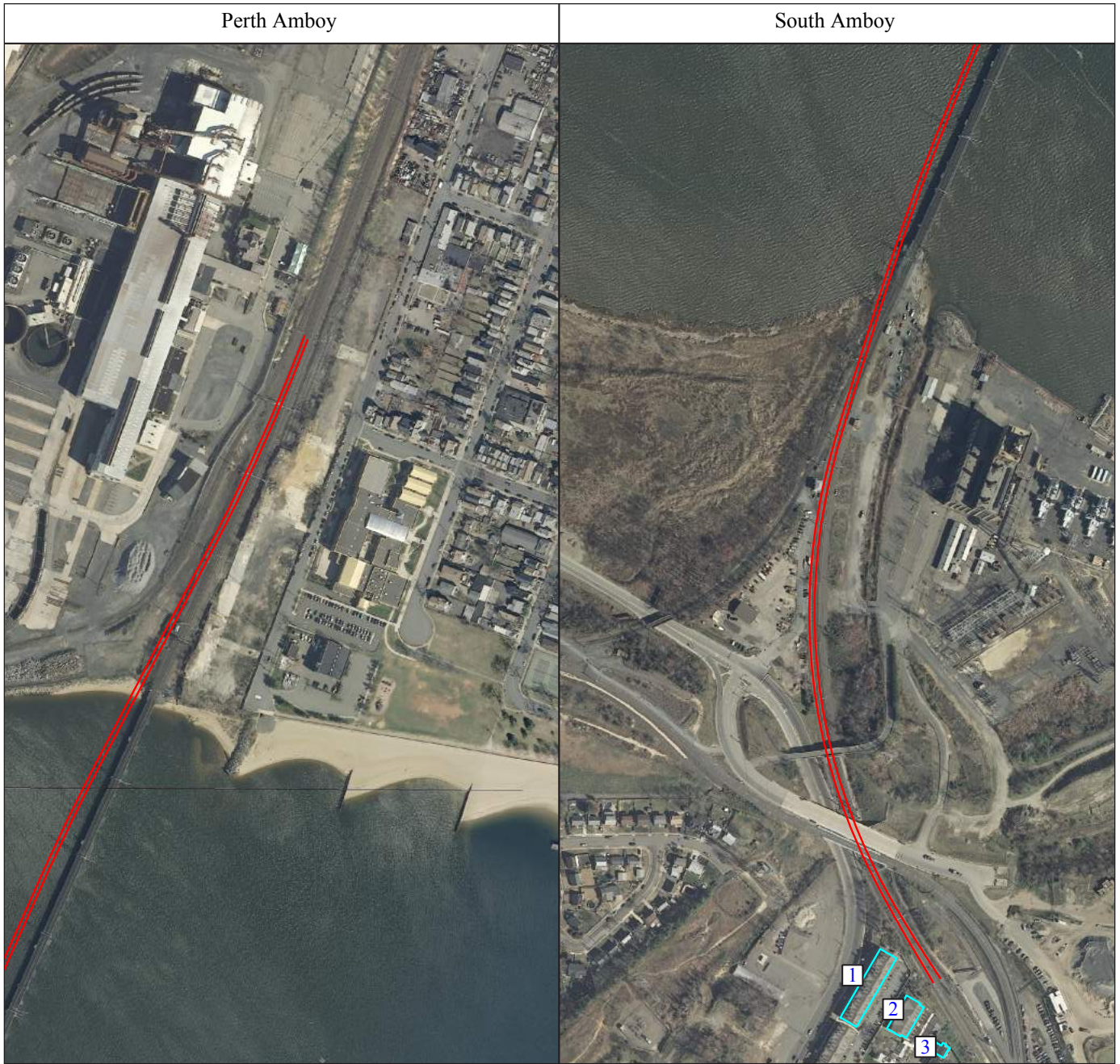
Three types of sensitive land uses are identified for an analysis of groundborne noise and vibration:

- **Vibration Land Use Category 1: High Sensitivity**—Buildings where low ambient vibration is essential for the operations within the building, which may be well below levels associated with human annoyance. Typical land uses are vibration-sensitive research and manufacturing, hospitals, and university research operations.
- **Vibration Land Use Category 2: Residential**—This category covers all residential land uses and any buildings where people sleep, such as hotels and hospitals.
- **Vibration Land Use Category 3: Institutional**—This category includes schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference.

In accordance with the FTA guidance document for the analysis of vibration and ground-borne noise, a screening analysis was performed to identify whether any sensitive uses are located within a distance that could be affected by the proposed project. Screening distances from the right-of-way are 600 feet, 200 feet, and 120 feet, for Vibration Land Use Categories 1, 2, and 3, respectively. No vibration-sensitive land uses are located within the applicable screening distances in Perth Amboy. In South Amboy, the Beacon Pointe Condos and two multi-family residential structures at 134 and 147 2nd Street are all classified as Vibration Land Use Category 2 and within the 200-foot vibration screening distance. Therefore, a General Vibration Assessment was performed for the three sites identified in South Amboy.

Impacts to vibration-sensitive land use are typically evaluated based on ground-borne vibration and ground-borne noise criteria and depend on the number of events of the same source per day. Ground-borne vibration is expressed in terms of vibration velocity levels in units of VdB, while ground-borne noise is expressed in terms of decibels (dB). The FTA vibration criteria are not based on existing vibrations given that, in most cases, ‘the existing environment does not include a significant number of perceptible ground-borne vibration or noise events,’ as discussed within the FTA guidance manual. However, when a project will be located within an existing rail corridor or one shared by freight trains, the pre-existing vibration must be identified.

Adjacent to the vibration-sensitive receivers shown in **Figure 3.10-2** that were identified within the 200-foot vibration screening distance (Beacon Pointe Condos and two multi-family residential structures at 134 and 147 2nd Street), the proposed tracks will tie into the existing tracks, resulting in a minor shift away from these residences (less than 1 foot). However, operable speeds for commuter and freight rail will increase by 10 mph, relative to post-Sandy speeds, as a result of the Build Alternative. Given the proximity of the vibration-sensitive receivers to the existing tracks (approximately 58 feet to nearest track centerline), existing vibration-velocity levels are assumed to be above the FTA criteria; however, since the track shift is minor and away from the receivers and the only other change associated with the Build Alternative is the increased speed, future vibration velocity levels are not anticipated to increase by more than 5 VdB. Therefore, alternative criteria were utilized for assessing impact.



Analysis Location and Site Number

— Proposed Improvements

Based on review of NJ TRANSIT's NJCL summer train schedule, approximately 85 total trains (eastbound and westbound) pass through South Amboy station per day (in a 24-hour period) on weekdays and approximately 48 total trains per day pass through the station on weekends and holidays. In accordance with FTA's guidance manual, this rail corridor will be considered 'heavily used,' as it is used by more than 12 trains per day. In this case, if the existing vibrations exceed impact criteria, the proposed project will only cause additional impact if it 'significantly' increases the number of vibration events, whereby FTA defines 'significant' to be an approximate doubling. As indicated above, train volumes will not increase as a result of the Build Alternative. Therefore, additional impact will occur only if the project vibration increases existing vibration by 3 VdB or more. Vibration impact was therefore assessed based on this criterion, assuming existing vibrations already exceed the standard impact criteria.

As indicated within FTA's May 2006 guidance document, the General Vibration Assessment is an extension of the vibration screening procedure. The analysis estimates project vibration levels based on ground surface vibration curves as a function of distance to track as illustrated within Figure 10-1 of the FTA's guidance document. Adjustment factors related to the vibration source, path, and receiver are applied to values obtained from the curves. In order to more accurately assess the project-related increase in vibration velocity relative to existing, the existing vibration velocity levels were also calculated utilizing this methodology, as opposed to field-monitored.

Based on FTA's guidance, the locomotive powered passenger or freight curve should be utilized for any commuter rail system powered by either diesel or electric locomotives. This curve is also utilized for freight rail. The distances between the proposed tracks and the vibration-sensitive receivers (Beacon Pointe Condos and two multi-family residential structures at 134 and 147 2nd Street) were determined, and preliminary vibration velocity levels at a speed of 50 mph were obtained from Figure 10-1 in FTA's guidance manual. Subsequently, equation (1) was utilized to adjust the vibration velocity levels at each site for the existing (post-Sandy) and proposed operable train speeds. Conservatively, since both commuter and freight rail pass by these receivers, the higher speed associated with the commuter rail was utilized (30 mph post-Sandy and 40 mph proposed operable speed, consistent with the General Noise Assessment).

After adjusting for the appropriate train speeds, other source, path, and receiver adjustment factors were identified to compute ground-borne vibration velocity and noise levels. All adjustment factors (aside from the speed adjustment) were assumed to be identical between existing and future conditions. Reduction factors for track treatments and configurations were not incorporated. This assumption is conservative, given that track conditions will likely improve in the future with installation of new track. Without detailed information on site geologic conditions, the analysis assumes a worst-case vibration propagation condition, and therefore a factor of 10 dB was added for efficient propagation through the soil between source and receiver. A coupling loss factor of -5 dB was assumed for wood frame houses for the three sensitive receivers, and a 6 dB increase for amplification due to resonances of floors, walls and ceilings was added.

Existing and future ground-borne vibration levels, incorporating all described adjustment factors, were subsequently converted to ground-borne noise levels, assuming the peak

frequency of vibration is typical (peak 30 to 60 Hz), and thereby subtracting a factor of 35 dB. Results of the General Vibration Assessment are presented in **Table 3.10-4** and **Table 3.10-5**.

**Table 3.10-4
General Vibration Assessment Results
Ground-Borne Vibration**

| Receiver No. | Receiver Location | Existing Ground-Borne Vibration Level (VdB) | Future Ground-Borne Vibration Level (VdB) | Ground-Borne Vibration Level Increase (VdB) | Allowable Ground-Borne Vibration Level Increase (VdB) | Impact? |
|--------------|----------------------|---|---|---|---|---------|
| 1 | Beacon Pointe Condos | 90 | 92 | 2 | 3 | NO |
| 2 | 134 2nd Street | 90 | 92 | 2 | 3 | NO |
| 3 | 147 2nd Street | 90 | 92 | 2 | 3 | NO |

**Table 3.10-5
General Vibration Assessment Results
Ground-Borne Noise**

| Receiver No. | Receiver Location | Existing Ground-Borne Noise Level (dBA) | Future Ground-Borne Noise Level (dBA) | Ground-Borne Noise Level Increase (dBA) | Allowable Ground-Borne Noise Level Increase (dBA) | Impact? |
|--------------|----------------------|---|---------------------------------------|---|---|---------|
| 1 | Beacon Pointe Condos | 55 | 57 | 2 | 3 | NO |
| 2 | 134 2nd Street | 55 | 57 | 2 | 3 | NO |
| 3 | 147 2nd Street | 55 | 57 | 2 | 3 | NO |

3.10.6 MITIGATION

As no significant adverse impacts related to airborne noise, groundborne noise, or vibration will occur as a result of the Build Alternative, no mitigation is required.

3.11 NATURAL RESOURCES

This section characterizes the natural resources on the project site and in the immediate area and evaluates the Build Alternative’s impacts on those resources. These include inland fresh and emergent tidal wetlands, floodplains, riparian areas, water quality, terrestrial ecological communities and wildlife, aquatic biota, federal and state designated threatened and endangered species, and protected coastal zone management areas. The study area for wetlands and terrestrial resources comprises the project site itself and immediately adjacent areas. For aquatic resources, the study area consists of the Lower Raritan River.

Existing conditions in the study area were characterized on the basis of existing information available from federal and state resources and the results of a field reconnaissance of the study area conducted on July 1, 2015.

3.11.1 AFFECTED ENVIRONMENT

3.11.1.1 WETLANDS

The New Jersey Department of Environmental Protection (NJDEP) regulates wetlands under both the Freshwater Wetlands (FWW) Protection Act Rules (N.J.A.C. 7:7A) and the Wetlands Act of 1970 (N.J.A.C. 7:7 et. seq.). The U.S. Environmental Protection Agency (USEPA) delegated to the State of New Jersey approval to operate the State Freshwater Wetlands Protection Act program as part of Section 404 of the Clean Water Act program. Freshwater wetlands are determined by field delineations using the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, published in 1989 by the EPA, U.S. Army Corps of Engineers (USACE), U.S. Fish and Wildlife Service, and the U.S. Department of Agriculture's Natural Resources Conservation Service (formerly the Soil Conservation Service), as amended and/or supplemented. Coastal wetlands (as regulated under the Wetlands Act of 1970) have been mapped and delineated by NJDEP as incorporated in N.J.A.C. 7:7, Appendix D.

The USACE regulates, through their standard permitting process, dredging and filling activities within tidal wetlands influenced by tidal ebb and flow under Section 404 of the Clean Water Act, which prohibits the discharge of dredged or fill material into waters of the United States without a permit from the USACE. Section 10 of the Rivers and Harbors Act of 1899 prohibits the obstruction or alteration of navigable waters of the United States without a permit from the USACE. The "waters of the United States" include navigable waters and certain non-navigable waterbodies, perennial and intermittent streams, wetlands, mudflats, and ponds. The USACE jurisdiction extends to wetlands located within 1,000 feet of the mean high tide elevation.

NJDEP also regulates areas adjacent to both freshwater and coastal wetlands through review of transition areas. Freshwater wetlands have transition areas ranging from 0 to 150 feet based on the type of wetland as defined below:

- Ordinary resource value wetlands—commonly includes ditches, swales, stormwater detention facilities, and certain isolated wetlands. These wetlands are not subject to a transition area requirement.
- Exceptional resource value wetlands—includes freshwater wetlands that discharge into FW1 waters and FW2-TP (trout production) waters or which are documented habitats for endangered or threatened species (N.J.A.C. 7:7A-2.5). For these wetlands, a 150-foot-wide transition area is regulated by NJDEP.
- Intermediate resource value wetlands—wetlands that do not fit either of the above classifications are defined as intermediate resource value. For these wetlands, NJDEP regulates a 50-foot standard transition area.

Coastal wetlands are subject to transition areas up to 300 feet.

Disturbances to freshwater wetlands and/or freshwater wetland transition areas require permits from the NJDEP under the Freshwater Protection Act (FWPA) Rules and Section 401 of the Clean Water Act ("Water Quality Certification"). Depending on the nature and extent of impacts to freshwater wetlands and transition areas, Freshwater Wetlands General Permits (FWW GPs) may be acceptable for a project's activities. If disturbances to wetlands exceed the allowable thresholds of FWW GPs, then a Freshwater Wetlands Individual Permit (FWW IP)

pursuant to N.J.A.C. 7:7A. Under the FWPA Rules, permanent disturbances to freshwater wetlands and state open waters that exceed 0.10 acre and are authorized under FWW GPs require compensatory wetland mitigation. If an FWW IP is required, all impacts to freshwater wetlands are subject to compensatory mitigation.

Activities affecting tidal wetlands/waters of the U.S. within 1,000 feet of tidal waters will require permits from the USACE under Section 404 of the Clean Water Act, and Section 10 of the Rivers and Harbors Act. Depending on the extent of impacts, Section 404 and Section 10 permits may qualify under the Nationwide Permit program implemented by the USACE. Executive Order (EO) 11990, "Protection of Wetlands," prohibits any federally aided construction project from occurring in wetlands unless there are no practicable alternatives to construction in the wetlands and all practicable measures to minimize harm to the wetland have been included in the project. The purpose of EO 11990 is to "minimize the destruction, loss or degradation of wetlands and to preserve and enhance the natural and beneficial values of wetlands." To meet these objectives, EO 11990 requires federal agencies, in planning their actions, to consider alternatives to wetland sites and limit potential damage if an activity affecting a wetland cannot be avoided. In accordance with Section 5 of EO 11990, each agency shall consider factors relevant to a proposal's effect on the survival and quality of the wetlands, including:

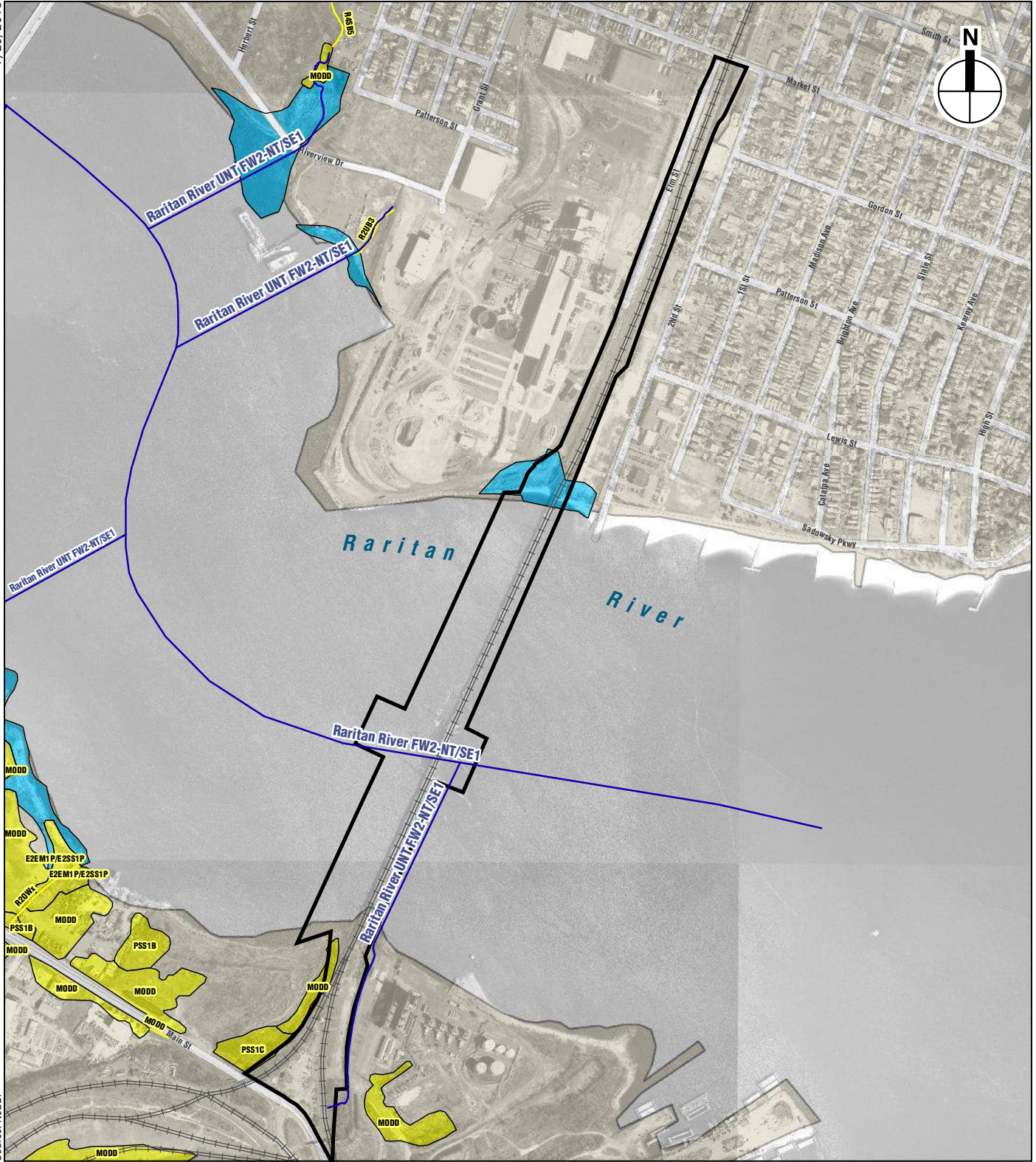
- Public health, safety, and welfare, including water supply, quality, recharge and discharge; pollution; flood and storm hazards; and sediment and erosion;
- Maintenance of natural systems, including conservation and long term productivity of existing flora and fauna, species and habitat diversity and stability, hydrologic utility, fish, wildlife, timber, and food and fiber resources; and
- Other uses of wetlands in the public interest, including recreational, scientific, and cultural uses.

The study area for the Raritan River Bridge Replacement project includes tidal, coastal, and freshwater wetlands (see **Figure 3.11-1**). These include areas mapped by NJDEP under coastal wetland jurisdiction along the northern shore of the Raritan River in Perth Amboy and the southern shore in South Amboy, and freshwater wetland areas mapped as Disturbed Wetland Area and Palustrine, Scrub-Shrub Wetland along the west side of the railroad right-of-way in South Amboy.


During a field survey conducted on July 1, 2015, additional freshwater wetland areas not mapped by NJDEP were also identified. These included wetland ditches along the eastern and western sides of the railroad right-of-way in the Perth Amboy portion of the study area that are more than 1,000 feet from the Raritan River and therefore outside USACE jurisdiction and areas of emergent freshwater tidal wetlands to the east and west of the railroad right-of-way along the southern shore of the Raritan River in South Amboy.

Based on the presence of foraging habitat for the state-threatened osprey (*Pandion haliaetus*) in proximity to identified wetlands areas (see Section 3.11.1.7, "Threatened and Endangered Species," below), some wetland areas may be considered as "exceptional resource value wetlands" according to NJDEP's wetlands classifications. However, within the study area, the transition areas are adjacent to active rail and are heavily disturbed areas. It is likely that NJDEP will re-evaluate the classification based upon the level of disturbance. Other freshwater

9/28/2016



Source: NJDEP

-  Project Site
-  NJDEP Freshwater Wetlands
-  NJDEP Saline Wetlands
-  NJDEP Linear Wetlands
-  Streams with Water Quality

0 1,000 FEET



Note: Maintenance-type track work may extend beyond project site boundaries to New Brunswick Avenue in Perth Amboy and the South Amboy Station in South Amboy.

RARITAN RIVER BRIDGE REPLACEMENT

NJDEP Wetlands and Streams Map
Figure 3.11-1

wetlands in the study area, including the wetland ditches along the railroad right-of-way in Perth Amboy, are likely to be considered as either of intermediate or ordinary value. The NJDEP, Division of Land Use Regulation will make the final determination on the resource value of wetlands within the study area, through a formal request to the NJDEP for a Letter of Interpretation (LOI).

3.11.1.2 FLOOD ZONES

Federal Executive Order 11988, “Floodplain Management,” as amended, requires 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 and indirect support of floodplain development wherever there is a practicable alternative. Under EO 11988, if an agency has determined to, or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains. If the head of the agency finds that the only practicable alternative consistent with the law and with the policy set forth in EO 11988 requires sitting in a floodplain, the agency shall, prior to taking action, (1) design or modify its action in order to minimize potential harm to or within the floodplain, consistent with regulations issued in accord with Section 2(d) of this EO 11988, and (2) prepare and circulate a notice containing an explanation of why the action is proposed to be located in the floodplain.

USDOT Order 5650.2, “Floodplain Management and Protection,” contains policies and procedures for implementing Executive Order 11988. For actions with a significant encroachment in the floodplain, the USDOT Order requires FTA to make a finding that the proposed action is the only practicable alternative and that an evaluation was conducted to identify whether other alternatives are available to avoid or reduce adverse impacts on the floodplain.

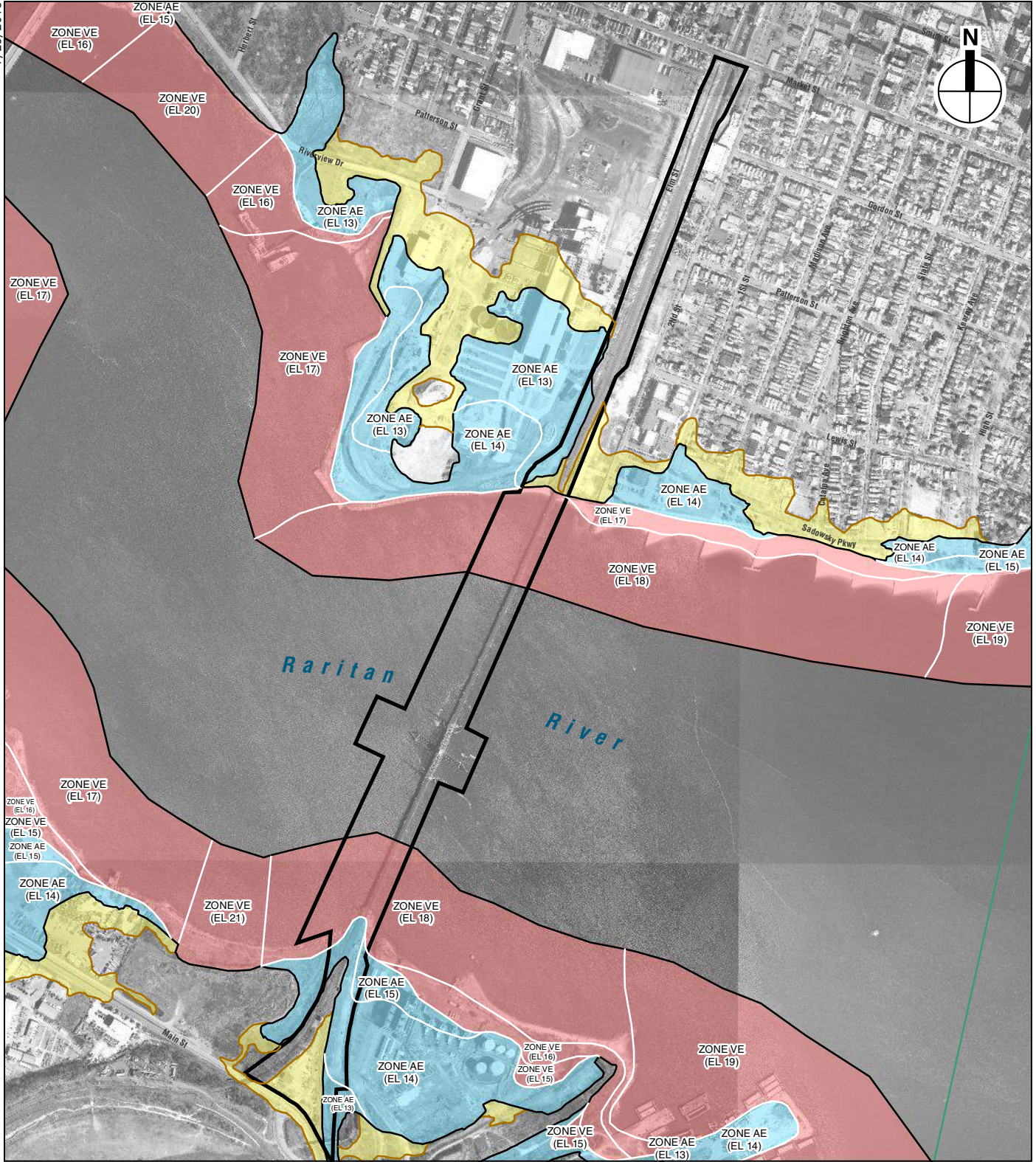
At the state level, activities in the flood hazard area are regulated under the NJDEP Flood Hazard Area Control Act (FHA) Rules (N.J.A.C. 7:13) and generally require formal permit authorization for activities within a floodplain or flood hazard area. Additionally, under the FHA Rules, regulated waters are subject to buffer areas known as “riparian zones”—i.e., shoreline areas at the water’s edge. Certain activities in these areas, such as grading, the placement of fill, the cutting or clearing of vegetation, the creation of impervious surface, are subject to regulation.

Generally, activities within regulated flood hazard areas or riparian zones require separate FHA permits for authorization of these activities. However, portions of the study area may be subject to regulation under the NJDEP Waterfront Development Law (N.J.A.C. 7:7) and by rule, compliance with the FHA Rules can take place within the context of a Waterfront Development Permit and a separate FHA Permit will not be required.

According to the Preliminary Flood Insurance Rate Map (FIRM) released by the Federal Emergency Management Agency (FEMA) on January 30, 2015 (see **Figure 3.11-2**), the northern and southern shorelines of the Raritan River within the study area are located within the 100-year floodplain (1 percent annual-chance flood event).

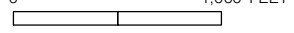
On the northern shoreline, the 100-year floodplain comprises four flood hazard zones:

9/28/2016



-  Project Site
-  Zone VE
-  Zone AE
-  Zone X - 0.2 PCT ANNUAL CHANCE FLOOD HAZARD

0 1,000 FEET



Note: Maintenance-type track work may extend beyond project site boundaries to New Brunswick Avenue in Perth Amboy and the South Amboy Station in South Amboy.

RARITAN RIVER BRIDGE REPLACEMENT

FEMA Preliminary
Flood Hazard Areas
Figure 3.11-2

- **Zone VE**, with a flood hazard elevation of 18 feet using the North American Vertical Datum 1988 (NAVD88) and a small area with a flood hazard elevation of 17 feet NAVD 88—these two flood hazard zones occur along the shoreline, including within the project site. The VE designation indicates that these areas have a high flood risk subject to inundation by the 100-year flood event, with additional hazards due to storm-induced velocity wave action (a 3-foot or higher breaking wave).
- **Zone AE**, with a flood hazard elevation of 14 feet NAVD88 and with a flood hazard elevation of 13 feet NAVD88—this flood hazard zone occurs within the project site and immediate area on the western side of the existing bridge. The AE designation indicates that this area is subject to inundation by the 100-year flood.

On the southern shoreline, the 100-year floodplain comprises four flood hazard zones:

- **Zone VE**, with a flood hazard elevation of 18 feet NAVD88 and a small area with a flood hazard elevation of 16 feet NAVD88—these two flood hazard zones occur along the shoreline, including within the project site.
- **Zone AE**, with flood hazard elevation of 14 feet NAVD88 and 15 feet NAVD88—these two flood hazard zones occur inland of the VE zone, including within the project site.

A portion of the study area on the north and south shores of the Raritan River, including a portion of the project site in Perth Amboy, is located within the 500-year floodplain (0.2 percent annual chance flood event).

In addition to the flood zones, the Raritan River shoreline within and adjacent to the project site as well as the small tributary that extends along the east side of the rail right-of-way in South Amboy may be considered as regulated “riparian zone,” because of the presence of acid-producing soils there, depending on a final determination made by NJDEP during the permitting process.

3.11.1.3 WATER QUALITY

Surface Water Quality Standards for New Jersey Waters (N.J.A.C. 7:9B) establish the designated uses to be achieved, provide management guidelines, and specify the water quality criteria necessary to protect the state's waters. Designated uses include potable water, propagation of fish and wildlife, recreation, agricultural and industrial supplies, and navigation. These are reflected in use classifications assigned to specific waters.

Under Section 303(d) of the Clean Water Act, states are required to develop lists of impaired waters. These are waters for which technology-based regulations and other required controls are not stringent enough to meet the water quality standards set by states. The law requires that each state establish priority rankings for waters on the lists and develop Total Maximum Daily Loads (TMDLs), for these waters. A TMDL is a calculation of the maximum amount of a pollutant that a water body can receive and still safely meet water quality standards.

The project site is located along the lower reach of the Raritan River near its confluence with Raritan Bay. Within the study area, the Raritan River is tidal, discharging to Raritan Bay about 2,700 feet downriver from the study area. A 300-foot-wide federal Navigation Channel runs down the center of river within the study area. Water depths within the federal Navigation Channel range from approximately 9 to 25 feet at Mean Lower Low Water (MLLW). Outside the

navigation channel the river is shallow, with depths ranging from 0.5 to 6 feet at MLLW. The navigation chart for the study area is shown above in **Figure 3.7-1**.¹⁰

The existing Raritan River Drawbridge has a moderate to significant potential for significant erosion (“scour”) problems at the bridge abutments from water passing with moderate to fast velocity along the river banks. Bridge scour is the removal of sediment such as sand and rocks from around bridge abutments and piers, caused by swiftly moving water, which ultimately can compromise the integrity of the structure.

NJDEP classifies this portion of the Raritan River as freshwater non-trout, saline estuarine waters (FW2-NT/SE1) by the NJDEP Surface Water Quality Standards (see **Figure 3.11-1**), indicating that the study area is within the portion of the Raritan River where more saline water from the Raritan Bay mixes with freshwater from upstream, resulting in an estuarine/brackish environment. A small, unnamed tributary to the Raritan River has also been mapped on the east side of the railroad right-of-way in South Amboy. The designated uses for those water classifications are shown in **Table 3.11-1**.

**Table 3.11-1
Designated Uses for Lower Raritan River,
As Defined in NJDEP Surface Water Quality Standards**

| Water Classification | Designated Uses |
|-------------------------------|--|
| FW2-NT: Freshwater Non-Trout | <ul style="list-style-type: none"> • Maintenance, migration, and propagation of the natural and established biota; • Primary and secondary contact recreation; • Industrial and agricultural water supply; • Public potable water supply after conventional filtration treatment (a series of processes including filtration, flocculation, coagulation, and sedimentation, resulting in substantial particulate removal but no consistent removal of chemical constituents) and disinfection; and • Any other reasonable uses. |
| SE1: Saline Estuarine | <ul style="list-style-type: none"> • Shellfish harvesting in accordance with N.J.A.C. 7:12; • Maintenance, migration and propagation of the natural and established biota; • Primary contact recreation; and • Any other reasonable uses. |
| Source: N.J.A.C. 7:9B. | |

The lower Raritan River within the study area is in attainment for the general water quality standards but is on the New Jersey 2012 list of impaired waters according to Section 303(d) of the Clean Water Act list of impaired waters for certain pollutants.¹¹

3.11.1.4 TERRESTRIAL NATURAL RESOURCES

Typical vegetation and wildlife in the study area are described below. The likelihood of threatened and endangered species occurring in the study area is discussed in Section 3.11.1.7.

¹⁰ NOAA Navigation Chart 12332; available at www.charts.noaa.gov/PDFs/12332.pdf.

¹¹ http://iaspub.epa.gov/tmdl_waters10/attains_wb_history.control?p_listed_water_id=NJ02030105160100-01&p_cycle=2010.

Vegetation

Vegetation observed within tidal wetlands during the July 2015 reconnaissance included saltmarsh cordgrass (*Spartina alterniflora*) at the edge of tidal waters, and common reed (*Phragmites australis*) dominating wetlands adjacent to the saltmarsh cordgrass tidal wetland areas and also within inland freshwater wetlands in the project study area. The shrub layer was dominated by eastern false willow (*Baccharis halimifolia*) with interspersed maritime marsh-elder (*Iva frutescens*) at the tidal/freshwater wetlands interface.

The upland portions of the study area contained vegetation generally associated with disturbed areas, including black cherry (*Prunus serotina*), black locust (*Robinia pseudoacacia*) and princess tree (*Paulownia tomentosa*) as tree and sapling species; multiflora rose (*Rosa multiflora*) and sumacs (*Rhus* sp.) in the shrub layer; Oriental bittersweet (*Celastrus orbiculatus*) as a vine; and Japanese knotweed (*Fallopia japonica*), mugwort (*Artemisia vulgaris*), pokeweed (*Phytolacca americana*), poison ivy (*Toxicodendron radicans*), seaside goldenrod (*Solidago sempervirens*), and spotted knapweed (*Centaurea stoebe*).

Wildlife

Birds

The Atlantic Flyway, a major migratory pathway for waterfowl and other groups of birds, passes along the coastline of New Jersey and through Raritan Bay – Sandy Hook Bay Complex. Habitats along the flyway provide important resting and feeding sites during the spring and fall migration periods. The Migratory Bird Treaty Act (MBTA) of 1918 (16 USC §§ 703 to 712) makes it illegal for anyone to take, possess, import, export, transport, sell, purchase, barter, or offer for sale, purchase, or barter, any migratory bird, or the parts, nests, or eggs of such a bird except under the terms of a valid permit issued pursuant to Federal regulations. The Act, which is typically enforced by the United States Fish and Wildlife Service (USFWS), is designed to prevent the “take” of migratory birds and additional items as listed above.

Major groups of birds that are typically found within and around the New Jersey coastline and Raritan Bay area include the following:

- Waterfowl. According to the Significant Habitats and Habitat Complexes of the New York Bight Watershed (USFWS 1997), waterfowl use the waters of Raritan Bay during fall migration and during the winter. Common migratory species of waterfowl found in the area during autumn include brant (*Branta bernicla*), American black duck (*Anas rubripes*), and Canada goose (*Branta canadensis*) being the most prevalent. Common overwintering waterfowl include brant, greater scaup (*Aythya marila*), American black duck, and bufflehead (*Bucephala albeola*) (USFWS 1997). Common waterfowl breeding in the New York-New Jersey Harbor Estuary include mallard, wood duck (*Aix sponsa*), American black duck, and Canada goose (*Branta canadensis*). Within the regional study area, waterfowl are particularly concentrated along the Raritan Bay shoreline and within the wetlands, uplands and nearshore waters of the bayshore complex (USFWS 1997).
- Shorebirds. Nearly 30 species of shorebirds regularly utilize the marine and freshwater habitats and adjacent uplands in the Raritan Bay Complex for breeding, wintering, northward (spring) migration, or southward (autumn) migration (USFWS 1997). Shorebirds that commonly stop-over in the area during migration include semi-palmated sandpiper

(*Calidris pusilla*), sanderling (*Calidris alba*), ruddy turnstone (*Arenaria interpres*), and least sandpiper (*Calidris minutilla*). Spotted sandpiper (*Actitis macularius*), upland sandpiper (*Bartramia longicauda*), willet (*Tringa semipalmata*), killdeer (*Charadrius vociferous*), piping plover (*Charadrius melodus*), American oystercatcher (*Haematopus palliatus*), least tern (*Sternula antillarum*), and clapper rail (*Rallus longirostris*); piping plover, killdeer, American oystercatcher, spotted sandpiper, upland sandpiper are listed as breeding within the bay complex area (USFWS 1997).

- Wading Birds/Colonial Waterbirds. Great blue heron (*Ardea herodias*), little blue heron (*Egretta caerulea*), tricolored heron (*Egretta tricolor*), snowy egret (*Egretta thula*), glossy ibis (*Plegadis falcinellus*), great egret (*Ardea alba*), and double-crested cormorants (*Phalacrocorax auritus*) are waterbirds that breed in the Raritan Bay Complex (USFWS 1997).
- Raptors. Many species of raptors are known to occur in the coastal areas of New Jersey and within the Raritan Bay Complex, particularly during fall and spring migratory periods. Common raptor species that will be expected within the Raritan Bay Complex area will include red-tailed hawk (*Buteo jamaicensis*), American kestrels (*Falco sparverius*), peregrine falcon (*Falco peregrines*), northern harrier (*Circus cyaneus*), screech owl (*Otus asio*), great-horned owl (*Bubo virginianus*), and osprey (*Pandion haliaetus*). Species that commonly overwinter in the area include red-tailed hawk, northern harrier, American kestrel, and peregrine falcon. The species most commonly occurring during migration include sharp-shinned hawk (*Accipiter striatus*), Cooper's hawk (*Accipiter cooperii*), and broad-winged hawk (*Buteo platypterus*) are common (Fowle and Kerlinger 2001).
- Songbirds. All species of migratory songbirds that are native to eastern North America are known to pass through the study region during spring and/or autumn. Species that commonly stop-over in terrestrial habitats in the area to rest and refuel during their migration include American redstart (*Setophaga ruticilla*), black and white warbler (*Mniotilta varia*), black-throated blue warbler (*Dendroica caerulescens*), common yellowthroat (*Geothlypis trichas*), magnolia warbler (*Dendroica magnolia*), northern parula (*Parula americana*), ruby-crowned kinglet (*Regulus calendula*), golden-crowned kinglet (*Regulus satrapa*), Swainson's thrush (*Catharus ustulatus*), white-throated sparrow (*Zonotrichia albicollis*), wood thrush (*Hylocichla mustelina*), and yellow-rumped warbler (*Dendroica coronate*). Far fewer songbird species nest or overwinter in the area. Common breeding species include American robin (*Turdus migratorius*), Baltimore oriole (*Icterus galbula*), blue jay (*Cyanocitta cristata*), gray catbird (*Dumetella carolinensis*), northern cardinal (*Cardinalis cardinalis*), red-eyed vireo (*Vireo olivaceus*), northern mockingbird (*Mimus polyglottos*), song sparrow (*Melospiza melodia*), yellow warbler (*Dendroica petechia*), red-winged blackbird (*Agelaius phoeniceus*), American goldfinch (*Carduelis tristis*), and tufted titmouse (*Baeolophus bicolor*) (USFWS 1997, Fowle and Kerlinger 2001). American goldfinch, black-capped chickadee (*Poecile atricapillus*), blue jay, house finch (*Carpodacus mexicanus*), northern cardinal, and tufted titmouse are among the common overwintering songbird species.
- Other. Many species belonging to other groups of birds commonly occur in the Raritan Bay Complex area, such as woodpeckers (e.g., red-bellied woodpecker [*Melanerpes carolinus*], game birds (e.g., wild turkey [*Meleagris gallopavo*], ring-necked pheasant [*Phasianus*

colchicus]), and gulls and other seabirds (e.g., ring-billed gull [*Larus delawarensis*], common tern [*Sterna hirundo*]).

Amphibians and Reptiles

A number of amphibians and reptiles could be expected to occur within the general vicinity of the limits for the proposed project. These species are expected to be somewhat disturbance-tolerant, generalist species that are able to inhabit isolated fragments of remaining terrestrial and freshwater habitats such as exist within and adjacent to the project limits. Turtle species that may be expected to exist within the study area include common snapping turtle (*Chelydra serpentina*), eastern box turtle (*Terrapene c. carolina*), and eastern mud turtle (*Kinosternon s. subrubrum*). Snakes that may be expected to exist within the study area include eastern garter snake (*Thamnophis s. sirtalis*), northern ringneck snake (*Diadophis punctatus edwardsii*), and northern water snake (*Nerodia s. sipedon*). Frogs and toads that may be expected to exist within the study area include American toad (*Bufo americanus*), bullfrog (*Rana catesbeiana*), Fowler's toad (*Bufo woodhousii fowleri*), and northern spring peeper (*Pseudacris c. crucifer*). Given the disturbed and degraded nature of the freshwater and upland terrestrial habitats, no species of salamander is expected to exist within the project study area. Species information for this section was obtained from the New Jersey Division of Fish and Wildlife's Online Field Guide for Reptiles and Amphibians (NJDEP 2016).

Mammals

Areas on and within the immediate vicinity of the project study limits are highly disturbed and developed, and it is anticipated that terrestrial mammals found in this area will be limited primarily to disturbance-tolerant, urban-adapted species such as eastern gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), Norway rat (*Rattus norvegicus*), eastern cottontail (*Sylvilagus floridanus*), groundhog (*Marmota monax*), white-footed mouse (*Peromyscus leucopus*), white-tailed deer (*Odocoileus virginianus*), and potentially red fox (*Vulpes vulpes*). Multiple species of bats are known in New Jersey and include both year-round residents (little brown bat [*Myotis lucifugus*], big brown bat [*Eptesicus fuscus*], northern long-eared bat [*Myotis septentrionalis*], Indiana bat [*Myotis sodalis*], eastern small-footed bat [*Myotis leibii*], and eastern pipistrelle [*Perimyotis subflavus*]) as well as part-time residents (hoary bat [*Lasiurus cinereus*], red bat [*Lasiurus borealis*], and silver haired bat [*Lasionycteris noctivagans*]). Northern long-eared bat and Indiana bat, both of which are endangered, do not occur in Middlesex County.¹² Marine mammals, although identified in the easternmost reaches of the Raritan Bay Complex and in the area of Sandy Hook, are not anticipated to be found on or within the immediate vicinity of the study area.

3.11.1.5 AQUATIC NATURAL RESOURCES

The Raritan River in the study area provides migratory passage and habitat for estuarine fish species that are present year round at different life stages (see **Table 3.11-2**), as well as fish migrating upriver to spawn (e.g., American shad, striped bass, alewife, and blueback herring) or

¹² USFWS New Jersey Field Office: <https://www.fws.gov/northeast/njfieldoffice/pdf/battowns.pdf>

using this portion of the river on a seasonal basis, given the migratory pathway and spawning, nursery, and forage area that the river provides (see **Table 3.11-3**). Due to drastic declines in populations of alewife and blueback herring throughout much of their range since the mid-1960s, NOAA has designated them as Species of Concern. To minimize impacts to these species, as well as other species migrating up and down river to spawn, NOAA and USFWS both recommend that in-water work within the lower Raritan River be avoided from March 1 to June 30 of each year for the protection of migrating and/or spawning herring and shad species.

**Table 3.11-2
Residential Fish Species Common
in the Lower Raritan River**

| Common Name | Scientific Name |
|---|--------------------------------------|
| American eel | <i>Anguilla rostrata</i> |
| Atlantic herring | <i>Clupea harengus</i> |
| Atlantic menhaden | <i>Brevoortia tyrannus</i> |
| Bay anchovy | <i>Anchoa mitchilli</i> |
| Banded killifish | <i>Fundulus diaphanus</i> |
| Silversides | <i>Menidia menidia</i> |
| Winter flounder | <i>Pseudopleuronectes americanus</i> |
| Sources: NOAA, Environmental Sensitivity Index: New York – New Jersey Metropolitan Region. Environmental Sensitivity Index Map: ESINY07 and ESINY09. October 2001. | |

**Table 3.11-3
Seasonal Fish Species Common in the Lower Raritan River**

| Common Name | Scientific Name | Occurrence | Spawning | Larvae | Juvenile | Adult |
|---|------------------------------|--------------|----------|--------|----------|-------|
| Striped bass | <i>Morone saxatilis</i> | March – Sept | x | x | X | x |
| Alewife* | <i>Alosa pseudoharengus</i> | March – Nov | x | x | x | x |
| American shad | <i>Alosa sapidissima</i> | March – Dec | x | x | x | x |
| Blueback herring* | <i>Alosa aestivalis</i> | March – Nov | x | x | x | x |
| Black sea bass | <i>Centropristis striata</i> | Apr – Nov | | | x | x |
| Weakfish | <i>Cynoscion regalis</i> | May – Sept | x | x | x | x |
| Scup (porgy) | <i>Stenotomus chrysops</i> | May – Oct | | | x | x |
| Summer flounder | <i>Paralichthys dentatus</i> | May – Oct | | | x | x |
| Tautog | <i>Tautoga onitis</i> | May – Oct | | | x | x |
| Atlantic sturgeon | <i>Acipenser oxyrhynchus</i> | May - Oct | | | x | x |
| Bluefish | <i>Pomatomus saltatrix</i> | June - Oct | | | x | x |
| Note: * "Species of Concern" NOAA (2015). | | | | | | |
| Sources: NOAA, Environmental Sensitivity Index: New York – New Jersey Metropolitan Region. Environmental Sensitivity Index Map: ESINY07 and ESINY09. October 2001. | | | | | | |

Benthic macroinvertebrates—the species found within the river bottom, which provide a food source for the other aquatic species in the river—in the study area are expected to include those typical for the muddy sediments characteristic of the western Raritan Bay, including: tube building amphipod (*Ampelisca* sp.), the tube building polychaete (*Streblospio benedicti*), the dwarf surf clam (*Mulinia lateralis*), the snail (*Ilyanassa trivittata*), the aquatic worms (Class

Polychaeta, *Glycera americana*, *Heteromastus filiformis*, *Pectinaria gouldii*, and *Nereis succinea*); the mollusk (*Tellina agilis*), soft-shelled clam (*Mya arenaria*) and the hard clam (*Mercentaria mercenaria*) (Cerrato 2006). Blue crab (*Callinectes sapidus*) and American lobster (*Homarus americanus*) also occur in Raritan Bay (NOAA 2001).

3.11.1.6 ESSENTIAL FISH HABITAT

Section 305(b)(2)-(4) of the Magnuson-Stevens Act (16 USC §§ 1801 to 1883) outlines the process for the National Marine Fisheries Service (NMFS) and the Regional Fishery Management Councils (in this case, the Mid-Atlantic Fishery Management Council) to comment on activities proposed by federal agencies (issuing permits or funding projects) that may adversely impact areas designated as Essential Fish Habitat (EFH). EFH is defined as those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (16 USC §1802[10]). Adverse impacts to EFH, as defined in 50 CFR 600.910(A), include any impact that reduces the quality and/or quantity of EFH. Adverse impacts may include:

- Direct impacts such as physical disruption or the release of contaminants;
- Indirect impacts such as the loss of prey or reduction in the fecundity (number of offspring produced) of a managed species; and
- Site-specific or habitat-wide impacts that may include individual, cumulative, or synergetic consequences of a Federal action.

The Raritan River within the study area has been designated as EFH for certain species, indicating that it provides the habitat necessary to fish for spawning, breeding, feeding, or growth to maturity. **Table 3.11-4** lists the species for which EFH has been designated within the study area. FTA has initiated EFH consultation with NMFS to evaluate the potential impacts of the project on any habitat for these species.

Table 3.11-4

Essential Fish Habitat Designated Species in the Vicinity of the Project

| Species | Eggs | Larvae | Juveniles | Adults |
|--|------|------------------|-----------|------------------|
| Red hake (<i>Urophycis chuss</i>) | | X | X | X |
| Winter flounder (<i>Pseudopleuronectes americanus</i>) | X | X | X | X |
| Windowpane flounder (<i>Scophthalmus aquosus</i>) | X | X | X | X |
| Atlantic sea herring (<i>Clupea harengus</i>) | | X | X | X |
| Bluefish (<i>Pomatomus saltatrix</i>) | | | X | X |
| Long finned squid (<i>Loligo pealeii</i>) | n/a | n/a | | |
| Short finned squid (<i>Illex illecebrosus</i>) | n/a | n/a | | |
| Atlantic butterfish (<i>Peprilus triacanthus</i>) | | X | X | X |
| Atlantic mackerel (<i>Scomber scombrus</i>) | | | X | X |
| Summer flounder (<i>Paralichthys dentatus</i>) | | X | X | X |
| Scup (<i>Stenotomus chrysops</i>) | X | X | X | X |
| Black sea bass (<i>Centropristis striata</i>) | n/a | | X | X |
| King mackerel (<i>Scomberomorus cavalla</i>) | X | X | X | X |
| Spanish mackerel (<i>Scomberomorus maculatus</i>) | X | X | X | X |
| Cobia (<i>Rachycentron canadum</i>) | X | X | X | X |
| Clearnose skate (<i>Raja eglanteria</i>) | | | X | X |
| Little skate (<i>Leucoraja erinacea</i>) | | | X | X |
| Winter skate (<i>Leucoraja ocellata</i>) | | | X | X |
| Sandbar shark (<i>Carcharhinus plumbeus</i>) | | X ⁽¹⁾ | | X ⁽¹⁾ |

Notes: n/a – insufficient data for this life stage exists and no EFH designation has been made.

⁽¹⁾ These species do not have a free-swimming larval stage; rather they are live bearers that give birth to fully formed juveniles. For the purposes of this table, “larvae” for sand tiger, dusky, and sandbar sharks refers to neonates and early juveniles.

Sources:
 National Marine Fisheries Service. “Summary of Essential Fish Habitat (EFH) Designation” posted at https://www.greateratlantic.fisheries.noaa.gov/hcd/STATES4/new_jersey/40207410.html and <http://www.nero.noaa.gov/hcd/skateefhmaps.htm>
 National Marine Fisheries Service EFH Mapper accessed online at <http://www.habitat.noaa.gov/protection/efh/habitatmapper.html>

3.11.1.7 THREATENED AND ENDANGERED SPECIES

The Endangered Species Act (ESA) of 1973 (16 USC §§ 1531 to 1544) recognizes that endangered species of wildlife and plants are of aesthetic, ecological, educational, historical, recreational, and scientific value to the nation and its people. The ESA forbids any government agency, corporation, or citizen from taking (i.e., harming or killing) endangered animals without a permit. Once a species is listed as threatened or endangered, the ESA requires that “critical habitat” be designated for that species, including areas necessary for the recovery of the species. Federal agencies are forbidden from authorizing, funding, or carrying out any action which “destroys or adversely modifies” critical habitat.

According to the New Jersey Landscape Project Data (Version 3.1) as shown in **Figure 3.11-3** and New Jersey Natural Heritage Database letters dated June 15, 2015 and January 5, 2017 (provided in **Appendix C**), the study area contains mapped nest and foraging habitat for the state threatened cattle egret (*Bubulcus ibis*) and osprey (*Pandion haliaetus*), and nest and



- Project Site
- Rank 1: Suitable habitat - Meets habitat-specific suitability requirements but no confirmed occurrences of threatened, endangered, or special concern species
- Rank 2: Species of Special Concern - Glossy ibis (foraging); Little blue heron (foraging); Snowy egret (foraging); Least bittern (breeding, sighting-confirmed); Wood thrush (breeding, sighting)
- Rank 3: State Threatened - Cattle egret (foraging); Osprey (foraging, nest); Black-crowned night-heron (foraging)
- Rank 4: State Endangered - Peregrine falcon (urban nest)
- Rank 5 Marine Habitat: Federal Threatened or Endangered - Atlantic loggerhead (occupied marine habitat)

Note: Maintenance-type track work may extend beyond project site boundaries to New Brunswick Avenue in Perth Amboy and the South Amboy Station in South Amboy.

Threatened, Endangered, and Special Concern Species Habitat provided by NJDEP Natural Heritage Program
Figure 3.11-3

foraging habitat for the state endangered peregrine falcon (*Falco peregrinus*) (see also **Table 3.11-5**). The USFWS Information for Planning and Conservation (IPaC) system was also consulted for the presence of endangered species and critical habitat within or near the project site. The IPaC data did not identify the presence of habitat for any federally listed endangered species, including Indiana bat and northern long-eared bat, nor did it identify any critical habitat within or near the project site (see **Appendix C** of this EA). Additionally, Middlesex County, NJ, is not identified by USFWS as a New Jersey municipality with hibernation or maternity occurrence of Indiana bat.¹³ The IPaC data report did identify birds of conservation concern protected under the MBTA which have the potential to occur within the study area. Appendix C, Table 1 lists these species in addition to the information provided by the New Jersey Natural Heritage Program, their seasonal presence and which species have the potential to breed within the study area on the basis of the existing habitats. No significant natural communities, as mapped by NJDEP, are located within the study area.

The peregrine falcon nest identified by the New Jersey Natural Heritage Database is at least one mile from the project site (NJDEP 2017¹⁴) The New Jersey Natural Heritage Database identified osprey nests as being within the project area. According to data available from the New Jersey Osprey Project,¹⁵ five osprey nests active in 2016 are located near the project site, two of which are within 1,500 feet of the study area. :

- Nest #4407: This nest is located within 500 feet of the project site on the Perth Amboy shore. It has been established on top of a light post between the water line and the existing rail tracks.
- Nest #2919: This nest is located on piling in the water offshore from the JCP&L Generating Station, about 1,000-1,500 feet east of the project on the South Amboy shore.
- Nest #3543: This nest is located on top of a partially submerged tug boat in the river approximately 2,000 feet west of the project site.
- Nest #3540: This nest is located on a channel marker in open water at the mouth of the Raritan River. It is near the center of the river and approximately 3,000-3,500 feet west of the project site.
- Nest #6568: This nest is located on a piling cluster in the river about 1.3 miles west of the project site.

Correspondence from the National Marine Fisheries Service (NMFS) dated September 28, 2015 and April 20, 2017 identifies the potential for threatened and endangered sea turtles as well as the endangered Atlantic sturgeon (*Acipenser oxyrinchus*) to occur in the project site. **Table 3.11-5** lists the threatened and endangered sea turtles under the jurisdiction of NOAA/NMFS with the potential to occur in the study area. **Appendix C** of this EA provides the correspondence from NMFS. No critical habitat for any of the listed species of sea turtles exists in the study area. NMFS has proposed critical habitat for all distinct population segments (DPS)

¹³ USFWS New Jersey Field Office: <https://www.fws.gov/northeast/njfieldoffice/pdf/battowns.pdf>

¹⁴ John Heilferty, NJDEP Division of Fish and Wildlife, personal communication with AKRF, dated April 6, 2017.

¹⁵ www.osprey-watch.org/monitoring_groups/3

of Atlantic sturgeon, but this designation has not yet been finalized; critical habitat under this proposed designation does not exist in the study area. Therefore, no critical habitat will be adversely affected by the project, under the proposed designation. If the Raritan River is included as critical habitat in the final designation, additional evaluation would be needed to determine if project activities would affect critical habitat. FTA has initiated ESA Section 7 consultation with NMFS to evaluate the potential impacts of the project on Atlantic sturgeon and sea turtles. If NMFS determines that the project is likely to cause incidental take of any of these listed species, a Biological Opinion would be issued as part of the consultation process. The consultation would include the proposed avoidance, minimization, and mitigation of Aquatic Resource impacts described in Sections 3.11.4. Section 4.2.9 analyzes potential construction impacts on protected natural resources and proposes measures to avoid, minimize and mitigate these impacts.

**Table 3.11-5
Threatened or Endangered Species
with the Potential to Occur in the Study Area**

| Common Name | Scientific Name | Status |
|----------------------|---|--|
| Cattle egret | <i>Bubulcus ibis</i> | State: Threatened |
| Osprey | <i>Pandion haliaetus</i> | State: Threatened |
| Peregrine falcon | <i>Falco peregrinus</i> | State: Endangered |
| Atlantic sturgeon | <i>Acipenser oxyrinchus</i> | Federal: Endangered |
| Sea turtles: | | |
| Loggerhead turtle | <i>Caretta caretta</i> | Federal: Threatened (Northwest Atlantic DPS) |
| Green turtle | <i>Chelonia mydas</i> | Federal: Threatened (North Atlantic DPS) |
| Leatherback turtle | <i>Dermochelys coriacea</i> | Federal: Endangered |
| Kemp's ridley turtle | <i>Lepidochelys kempii</i> | Federal: Endangered |
| Source: | NOAA/NMFS Correspondence dated September 28, 2015 and April 20, 2017 and New Jersey Natural Heritage Database letter dated June 15, 2015 and January 5, 2017. | |

Generally, the listed species of sea turtles occur in the bays and other sheltered areas along the coast of Long Island (Standora et al. 1989, Morreale and Standora 1998); however, there have been anecdotal reports of occasional transient sea turtles in Raritan Bay. NMFS (2017) indicated that sea turtles typically occur along the New York coast from May to mid-November, with peak occurrence in June through October. Sea turtles neither nest nor reside year-round in the waters of New York Bight, which encompasses the lower Raritan River. They are only expected to occur in the project site for foraging as occasional transient individuals; the site does not provide nesting habitat for these species.

Atlantic sturgeon from the New York Bight DPS spawn in freshwater sections of the Hudson River, but there is no known spawning population in the Raritan River. Atlantic sturgeon adults and subadults will only occur in the project site as transients passing through New York Harbor between Hudson River breeding grounds and Atlantic Ocean overwintering areas. Occurrence will likely be brief, as non-spawning Atlantic sturgeons are generally found in more open, marine waters and at greater depths (Hatin et al. 2002, 2007; Savoy and Pacileo 2003, Dunton et al. 2010). Atlantic sturgeon subadults and adults will occur in the study area as transients

during spring and fall migrations between overwintering areas in the Atlantic Ocean and spawning and foraging areas in the Hudson River; however the Raritan River adjacent to the migratory route and sturgeon will not need to pass through the study area to reach spawning and foraging areas in the Hudson River. Sturgeon are most likely to occur in May/June as they migrate through the Raritan estuary and in September/October as they migrate back to overwintering habitat in the Atlantic Ocean (Dunton et al. 2010, 2015). Foraging subadult Atlantic sturgeon are most likely to use the study area at the mouth of the Raritan River. Non-spawning adult Atlantic sturgeon are less likely to occur in the study area, while spawning adults are least likely to occur there. Shortnose sturgeon and early life stages of Atlantic sturgeon will not occur in the study area.

In addition to the listed threatened and endangered species, several species of “special concern” were identified by the New Jersey Natural Heritage Database letters (**Appendix C**) as having the potential to occur in or near the project site. Glossy ibis (*Plegadis falcinellus*), little blue heron (*Egretta caerulea*), and snowy egret (*Egretta thula*) are the three species listed as species of special concern at the project site. The species identified as occurring within one mile of the study area are the state-threatened black-crowned night-heron (*Nycticorax nycticorax*) and two additional species of special concern: least bittern (*Ixobrychus exilis*) and wood thrush (*Hylocichla mustelina*).

3.11.1.8 COASTAL ZONES

The Coastal Zone Management Act of 1972 (16 USC §§ 1451 to 1465) established a voluntary participation program to encourage coastal states to manage development within the state’s designated coastal areas, reducing conflicts between coastal development and protection of resources within the coastal area. The Coastal Zone Management Act requires that federal activities within a state’s coastal zone be consistent with that state’s federally approved coastal zone management plan. New Jersey has a federally approved coastal zone management program, which is administered by NJDEP through the Coastal Zone Management Rules (N.J.A.C. 7:7).

The Raritan River within the vicinity of the project site is within New Jersey’s regulated Coastal Zone. It is not, however, within regulated coastal waters of the State of New Jersey or the area subject to the state’s Coastal Area Facility Review Act of 1973 (CAFRA).

3.11.1.9 SOLE SOURCE AQUIFERS

The Sole Source Aquifer Protection Program is authorized by Section 1424(e) of the Safe Drinking Water Act of 1974 (Public Law 93-523, 42 U.S.C. 300 et. seq), which states that no commitment for federal financial assistance may be entered into for any project that may contaminate an area that has been determined to be a sole source aquifer and would create a significant hazard to public health. USEPA defines a sole source aquifer as “one which supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer.” USEPA also stipulates that these areas can have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water.

The project site overlays the Coastal Plain sole-source aquifer (i.e., the New Jersey Coastal Plain aquifer system), which was designated by the USEPA as a sole source aquifer on June 24, 1988

(NJDEP 1999). Recharge of the Coastal Plain aquifer is through stream flow and infiltration from the New Jersey Coastal Plain physiographic province, including all upstream portions of the Delaware River watershed in New Jersey, Pennsylvania, and New York (NJDEP 1999). The project site is located within the Potomac-Raritan-Magothy aquifer system of the Coastal Plain. The Potomac-Raritan-Magothy aquifer is a confined aquifer¹⁶, characterized by alternating layers of sand, gravel, silt, and clay. Groundwater wells in the Potomac-Raritan-Magothy aquifer range from 50 to 1,800 feet in depth (USGS 2013). Withdrawals from the Coastal Plain aquifer system (e.g., via shallow domestic, public supply, industrial, and irrigation wells) total about 243 million gallons per day (MGD) (USGS 2013). Withdrawals from the deeper confined aquifers in the Coastal Plain, primarily from public supply wells, total about 230 MGD (Buxton 1995).

3.11.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, natural resources will be unchanged from the existing condition.

3.11.3 BUILD ALTERNATIVE

The analysis in this section considers the potential impacts of the Build Alternative assuming a superstructure for the approach spans with similar spacing to the existing bridge. As noted in Chapter 2, "Project Alternatives," the piers will be wider at the top but occupy considerably less space at the river bottom. The overall effects of the proposed project on natural resources are described below.

3.11.3.1 WETLANDS

Utilizing the conservative limits of disturbance designation as a basis for assessing impacts, approximately 0.43 acres of field verified NJDEP-mapped freshwater wetland within the study area in South Amboy may be permanently or temporarily affected by the Build Alternative (see **Figure 3.11-4**). Any associated wetland transition area will also be adversely affected by the Build Alternative. Activities that impact this wetland will require a Section 404 permit from the USACE and a FWW permit from NJDEP. In addition, the four linear freshwater wetland areas (0.62 acres) in the Perth Amboy section of the project have the potential to be temporarily or permanently affected by the Build Alternative. Given the conservative nature of the limits of disturbance as a basis for impacts, it is expected that total wetland impacts will be equal to or less than the impacts defined herein. As design progresses, the freshwater wetland impacts will be refined.

For areas regulated by New Jersey's coastal wetland regulations, approximately 0.62 acres occur within the limits of disturbance in Perth Amboy and 0.28 acres within the limits of disturbance in South Amboy for a total coastal wetland impact of 0.91 acres.

While the four freshwater wetlands in the Perth Amboy section of the study area are more than 1,000 feet from the Raritan River and likely not subject to USACE 404/10 permitting, when

¹⁶ A confined aquifer is an aquifer below the land surface that is saturated with water that is contained within layers of impermeable material above and below it.



included with the freshwater wetlands in the South Amboy portion of the study area, approximately 1.06 acres of wetlands will be impacted by the Build Alternative. Mitigation for a conservative total of 1.97 acres of wetland impacts may include wetland creation, wetland mitigation bank credit from an approved wetland mitigation bank, or on-site mitigation activities to support ecological/wetland restoration efforts within the Raritan River watershed. Mitigation will likely be required by both NJDEP and the USACE. Compensatory mitigation ratios for wetland creation or wetland mitigation bank credits will likely be 2:1 (2 acres of compensatory mitigation required for every 1 acre of impact, conservatively totaling approximately 4 acres). Options being considered include purchasing credits from an authorized wetland mitigation bank and/or on-site mitigation. A decision will be determined by the regulatory agencies based on the site specific impacts and conformance with requirements at 33 CFR Part 332: Compensatory Mitigation for Losses of Aquatic Resources.

3.11.3.2 FLOOD ZONES

As noted above, for projects that will have a significant encroachment into the floodplain, USDOT Order 5650.2, "Floodplain Management and Protection," requires FTA to make a finding that the proposed action is the only practicable alternative and that an evaluation was conducted to identify whether other alternatives are available to avoid or reduce adverse impacts on the floodplain. A significant encroachment is defined as one that will result in a considerable probability of loss of human life; likely future damage associated with the encroachment that could be substantial in cost or extent, inducing interruption of service on or loss of a vital transportation facility; and a notable adverse impact on natural and beneficial floodplain values. Additionally, Executive Order 11988 requires federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

The Build Alternative will result in the placement of material within the 100-year floodplain (approximately 0.3 acres on land plus approximately 0.8 acres in-water) and 500-year floodplain (approximately 0.4 acres). Approximately 216 six-foot diameter steel pipe piles will be driven for the 29 bridge piers, including the east and west abutments. The area of Raritan River occupied by the replacement bridge piers (approximately 2,460 square feet) will result in a more than 90 percent reduction when compared to the existing piers, which occupy approximately 31,200 square feet. Because this portion of the Raritan River is tidal and is affected by coastal flooding rather than riverine flooding, it will not lose storage capacity under normal conditions or during severe storms as a result of the placement of these materials. Additionally, the area is within a tidal flood hazard area, thereby exempting the Build Alternative from the NJDEP rules on adjacent area flood storage volume displacement limits at N.J.A.C. 7:13-11.4. Very localized changes in water circulation around bridge piers will occur, but will not impact flooding or floodplain storage, as flooding is influenced by tidal surge emanating from the Atlantic Ocean through Raritan Bay. Given, the minor modifications to the floodplain that will result from the Build Alternative, 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 design of the Build Alternative will ensure that all elements adhere to the Flood Hazard Area Design Standards, Uniform Construction Code Standards, and the NJ TRANSIT Design Flood Elevation.

The Build Alternative will place new trackbed and new bridge piers within the floodplain in a similar location to the existing bridge, but unlike the existing bridge, the Build Alternative will be designed to be resilient to severe storms. The trackbed will be well above NJ TRANSIT's Design Flood Elevation, which is 2.5 feet above the FEMA BFE. Where feasible, mechanical and electrical equipment will also be above the Design Flood Elevation. All bridge components, including the superstructure and mechanical and electrical equipment, will 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 Build Alternative and will not result in a substantial impact to floodplain values. Therefore, the Build Alternative will not constitute a significant encroachment in the floodplain and will be consistent with the USDOT floodplain order.

In addition, the Build Alternative will affect the Raritan River shorelines within the project site as well as a small tributary along the east side of the railroad right-of-way on the South Amboy side of the river, where vegetation will be cleared for the placement of the Build Alternative. As noted earlier, these may be considered regulated "riparian zones." The 150-foot riparian zone established at N.J.A.C. 7:13-4.1 applies because acid-producing soils in the Raritan Formation have been identified within the project study area. Generally, activities within regulated flood hazard areas or riparian zones require separate FHA permits for authorization of these activities. However, portions of the project study area may be subject to regulation under the NJDEP Waterfront Law and by rule, compliance with the FHA Rules could take place within the context of a Waterfront Development Permit and a separate FHA Permit will not be required. Mitigation measures for disturbance within the 150-foot riparian zone will include re-vegetation within disturbed areas after removal of the existing bridge and approach tracks, other areas within the railroad right-of-way that could be re-vegetated, and opportunities available in the vicinity of the project site to reach the required mitigation ratio (anticipated to be at least 2:1). With these mitigation measures implemented, the Build Alternative will not adversely impact the 150-foot riparian zone.

3.11.3.3 WATER QUALITY

While areas of scouring and sedimentation will initially shift due to the new location of piers for the replacement bridge, the spacing of the piers for the Build Alternative will be similar to those of the existing bridge, resulting in magnitude of scouring and deposition similar to that of the existing condition. Operation of the trains over the replacement bridge is expected to be similar to the operation over the existing bridge and will not result in adverse impacts to water quality. Potential construction-period impacts to water quality are discussed in Section 4.2.9.4. Terrestrial Natural Resources

3.11.3.4 VEGETATION

Small areas of upland vegetation will be affected by the Build Alternative where the new landside tracks will be constructed. Generally, the upland vegetation habitats on the project site are consistent with highly disturbed urban settings and transportation corridors and contain degraded resources, colonized by numerous invasive species and species common to these disturbed areas. Impacts to or loss of significant upland habitat is not anticipated to result from implementation of the Build Alternative.

3.11.3.5 WILDLIFE

Wildlife within the project study area is generally expected to include species tolerant of highly disturbed and heavily urbanized areas and transportation corridors. The small impacts to vegetation habitats that will occur as a result of the Build Alternative may result in direct impact to wildlife habitat and associated impacts to wildlife species within the project site. Generally, wildlife species exhibit mobility that allows them to relocate to adjacent habitat areas which can help mitigate any potential temporary impact on these species. It is anticipated that the common species identified within the study area will exhibit such mobility and that direct impacts to these species as a result of project implementation will be minimal. If the current railroad right-of-way is serving as a functional wildlife corridor/linkage for terrestrial or avian species, it can continue to do that once the project is complete. As indicated in Section 4.2.8.3, as part of the NJDEP Waterfront Development and Freshwater Wetlands permitting process, the USFWS will be consulted on anticipated construction activities and the construction schedule for the proposed project. To minimize impacts to the birds of conservation concern that are protected under the Migratory Bird Conservation Act and have the potential to breed within the study area, as listed in Appendix C, tree and shrub clearing activities will need to be conducted outside the breeding period of March 15 to September 30. During this same breeding period, a survey will be conducted of any bird breeding activity on the existing bridge prior to conducting maintenance or demolition activities in order to minimize potential impacts to birds protected under the Migratory Bird Conservation Act, as recommended by the USFWS (2017). These conditions will become part of the NJDEP permits that are required for the proposed project's implementation. NJDEP and USFWS are currently being consulted on the potential impacts of the project for Rare Wildlife Species and Wildlife Habitat that exists within the study area, including foraging, breeding, and nesting habitat for the bird species listed in Section 3.11.1.7 above.

3.11.3.6 AQUATIC NATURAL RESOURCES

For bridge projects, aquatic natural resources can be affected by an increase in shading, which adversely affects the aquatic habitat, loss of water area because of the presence of the new structure, and by disturbance to the river bottom, which provides valuable habitat for benthic organisms that support the food chain. Adverse effects can also occur due to changes in water quality (which are not anticipated as a result of the Build Alternative, as discussed above in Section 3.11.4.3). Potential construction-period impacts to aquatic natural resources are discussed in Section 4.2.9.5.

Based on conceptual design information, the Build Alternative will have a superstructure with a deck that is wider than the existing bridge (potentially approximately 37 feet in comparison to 22 feet for the existing bridge). The Build Alternative will have a similar number of piers to the existing bridge, but these will be a different shape and size. The existing bridge has piers that are large masonry blocks that taper as they rise, while the Build Alternative will have pairs of piers topped by a concrete cap at the waterline.

With the Build Alternative, the amount of shading of the river will not increase. While the new bridge will have a wider deck than the existing bridge and will have wide pier caps at the water line that are not present with the existing bridge, the bridge deck will also be approximately 6 feet higher than the existing bridge, which will reduce the amount of shading. Considered

together, the small increase in overwater coverage with the increased elevation above the waterway will not result in a significant increase in aquatic habitat that is affected by shading from the bridge deck. Additionally, the separation between the paired piers will allow light to reach the aquatic habitat beneath the piers over a portion of the day.

For the Build Alternative, the area of bottom habitat occupied by the replacement bridge piers (approximately 2,460 square feet) will result in a more than 90 percent reduction when compared to the existing piers, which occupy approximately 31,200 square feet within the Raritan River. With the demolition of the existing piers, the Build Alternative will result in a net increase of approximately 28,000 square feet of bottom habitat.

3.11.3.5 ESSENTIAL FISH HABITAT

For the reasons identified above, and as described in detail in the EFH assessment included in **Appendix C**, the Build Alternative will not likely result in adverse impacts to water quality, aquatic habitat, or aquatic biota. Therefore, the Build Alternative will not result in adverse impacts to the suitability of the project site for fish species identified by NMFS as having EFH in the lower Raritan River Estuary. EFH consultation with NMFS has been initiated to evaluate the potential impacts of the proposed project on these EFH habitat and species that have been identified to occur within the project site (see Appendix C). The consultation process will be completed prior to the issuance of the project EA Finding of No Significant Impact (FONSI) and permits for the project. All NOAA and USFWS conservation recommendations resulting from these consultations will be included in the project FONSI and as construction permit conditions, as appropriate. Potential project impacts resulting from construction are analyzed in Section 4.2.9.6.

3.11.3.6 THREATENED AND ENDANGERED SPECIES

The NJ Landscape Project Data and a New Jersey Natural Heritage Database Letter have identified mapped nest and foraging habitat for the state threatened cattle egret, state threatened osprey, and the state endangered peregrine falcon within the vicinity of the project site. It is assumed that wetland and water areas within the study area unaffected by direct impacts during construction will continue to provide foraging habitat for these bird species. The potential loss of a small area of freshwater wetland (0.4 acres) and tidal wetland (less than 2 acres) due to the Build Alternative will not be expected to result in significant adverse impacts to these birds due to loss of foraging habitat.

As discussed in Section 3.11.2.7, endangered subadult and adult Atlantic sturgeon and several species of endangered sea turtles have the potential to occur within the project site, but only as occasional transients passing through. Upon completion of the Build Alternative and demolition of the existing bridge and its piers, there will be an increase in benthic habitat of approximately 28,000 square feet in the footprint of the old bridge. This addition of benthic habitat will likely benefit Atlantic sturgeon and sea turtles by providing a larger area of forage habitat. As such, operation of the Build Alternative will not result in adverse impacts to water quality, aquatic habitat, or aquatic biota and will not, therefore, result in adverse impacts to these species.

Consultation with NMFS and USFWS under Section 7 of the Endangered Species Act has been initiated to evaluate the potential impacts of the project on these ESA-listed species (**Appendix**

C). The consultation process will be completed prior to the issuance of the FONSI and permits for the project. Potential construction-period impacts to threatened and endangered species are discussed in Section 4.2.9.7.

3.11.3.7 COASTAL ZONES

The Build Alternative will be located within the New Jersey Coastal Zone and will be subject to the New Jersey Coastal Zone Management Rules. In accordance with these rules, it is anticipated that the project will require permit authorization under Waterfront Development for both in-water and upland activities, and under a Coastal Wetlands Permit for activities within in coastal wetlands delineated and mapped pursuant to the Wetlands Act of 1970. A detailed Coastal Zone Analysis is provided in **Appendix D** of this EA. Additionally, in the State of New Jersey, the USACE has jurisdiction over areas that contain tidal waters including tidal wetlands and freshwater wetlands within 1,000 feet landward of tidal waters. A separate permit authorization will be required from the USACE for activities in regulated wetlands and waters.

Depending on the extent of permanent impacts to wetlands, open waters, and intertidal and subtidal shallows areas resulting from project implementation, compensatory wetland mitigation may need to be provided as conditions of the permit authorizations from the NJDEP and USACE.

3.11.4 MITIGATION

As discussed, the Build Alternative will require a number of permits from the USACE and NJDEP related to natural resources. Those permits will set forth specific measures that must be included in the project to minimize its impacts to natural resources, including wetlands, coastal waters, and threatened and endangered species. Mitigation for the approximately 0.4 acres of NJDEP-mapped freshwater wetlands in South Amboy and 2 acres of NJDEP saline coastal tidal marsh in Perth Amboy that will be affected by the Build Alternative will include avoidance and minimization of impacts to the maximum extent practicable, acquisition and adherence to applicable permit conditions, and compensatory mitigation at a 2:1 ratio, which could include purchasing credits from an approved wetland mitigation bank, or on-site mitigation.

As noted earlier, compliance with the FHA Rules could take place within the context of a Waterfront Development Permit and a separate FHA Permit will not be required. Mitigation measures for disturbance within the 150-foot riparian zone will include re-vegetation within disturbed areas after removal of the existing bridge and approach tracks, other areas within the railroad right-of-way that could be re-vegetated, and opportunities available in the vicinity of the project site to reach the required mitigation ratio. Mitigation measures to be implemented during the proposed project's construction period are described in Chapter 4, "Construction Effects and Methods."

3.12 CONTAMINATED MATERIALS

Contaminated materials are defined as potentially harmful substances that may be present in soil, groundwater, sediment, surface water, containers, or building materials and may pose a threat to human health or the environment. Soil and groundwater can be contaminated as a result of past or present uses on a project site or on neighboring properties and may be

encountered during construction activities. This chapter assesses the potential for the presence of contaminated materials in the project site, the potential for exposure to them during and after the construction of the Build Alternative, and the specific measures that will be employed to protect public health, worker safety, and the environment in the event that contaminated materials are present in the project site.

A contaminated materials site screening was completed for an area within 1,000 feet of the project site. The assessment began with identifying all potential sites of concern via a review of federal and state databases and regulatory records¹⁷, including listings of spills, petroleum storage facilities, and state and federally listed contaminated materials sites, to determine the regulatory status of each site.

3.12.1 AFFECTED ENVIRONMENT

The search of federal and state environmental agency records was performed in accordance with the American Society of Testing and Materials Standards (ASTM) E1527-05. A report summarizing the environmental database search was prepared by Environmental Data Resources (EDR) of Shelton, Connecticut. NJDEP's GeoWeb database was also reviewed. Sites were then categorized as either requiring further investigation or not requiring further investigation based on the nature of the contamination and distance from the project site.

3.12.1.1 POTENTIAL RAILROAD-RELATED CONTAMINATION

Based on the age of the existing bridge, lead-based paint, asbestos-containing materials, and polychlorinated biphenyls (PCB)-containing electrical equipment are likely present on the bridge and within the other bridge-related structures. In addition, the soils within the railroad right-of-way may be contaminated because of rail-related activities. Railroad ties containing creosote or other treatment chemicals may have contaminated surrounding soils. Over time, railroad-related maintenance, train traffic, freight hauling, and related activities could have led to contamination from spills or leaks. Along rail lines, common contaminants include volatile and semi-volatile organic compounds, heavy metals, pesticides, herbicides, and PCBs, which were commonly used as a dielectric fluid in train-mounted or other electrical transformers. Releases from the trains carrying petroleum tanks could also have occurred in the past resulting in contamination along the rail tracks.

3.12.1.2 POTENTIAL CONTAMINATION FROM ADJACENT USES

The regulatory database search identified 55 sites within a 1,000-foot buffer zone around the project site. Of these, three sites require additional investigation due to their proximity to the project site. These sites are shown in **Figure 3.12-1** and described below. These sites were identified in both the EDR report and via the NJDEP GeoWeb review. In addition, a considerable amount of historic fill of unknown origin is located in the study area (see **Figure 3.12-1**). Such fill may contain elevated levels of contaminants such as semi-volatile compounds (SVOCs) and heavy metals.

¹⁷ Raritan River Bridge EDR DataMap Area Study, Environmental Data Resources, Inc., August 6, 2015.



NOTE: Maintenance-type track work may extend beyond project site boundaries to New Brunswick Avenue in Perth Amboy and the South Amboy Station in South Amboy.

- **Gerdau Ameristeel/Raritan River Steel Co.** (Perth Amboy): Records indicate heavy metals, aluminum, lead, mercury, manganese, zinc, polycyclic aromatic compounds, dioxin, and dioxin-like compounds may be present on site.
- **E H Werner Generating Station/Conrail & McKean Property** (South Amboy): The site may have coal operation-related contaminants, including polynuclear aromatic hydrocarbons (PAHs) and metals, and petroleum-related contaminants due to presence of the oil-based generators and fuel oil storage tanks.
- **Pier 7 Development Group** (South Amboy): Records indicate that the site has unknown or uncontrolled discharge to soil and/or groundwater. The site is reported to have historic fill and may contain PAHs and metals contamination. The site has confirmed groundwater contamination and is an established Classification of Exception Area (CEA)¹⁸ for metals.

3.12.2 NO ACTION ALTERNATIVE

Any contaminated materials in the project site will remain unaffected under the No Action Alternative. Additionally, with this alternative, remediation of sites already known to regulatory agencies (i.e., NJDEP) will continue.

3.12.3 BUILD ALTERNATIVE

One of the properties identified above (Gerdau Ameristeel/Raritan River Steel Co.) was also identified in Section 3.4.2 for potential temporary property acquisition. A paved roadway within the site may be used for construction access. No unpaved surface or subsurface disturbance will result from the proposed project's use of the property, therefore, use of the access roadway will not disturb contaminated materials that may be located on site. The Build Alternative will not affect the Pier 7 Development Group or E H Werner Generating Station/Conrail & McKean properties in South Amboy.

3.12.3.1 DEMOLITION

During the construction activities, common railroad contaminants are expected to be encountered. These contaminants include: suspected PCB-containing equipment (transformers, fluorescent light ballast, hydraulic equipment and electrical feeder cables), creosote (railroad ties), spilled or leaked liquids (gasoline, oil, cleaning solvents, etc.), PAHs, and metals. Hazardous Materials Surveys will be conducted for existing bridge structures and any associated buildings that will be impacted during construction activities. The asbestos-containing materials will be removed prior to demolition in accordance with the applicable federal, state, and local requirements. The ACM removal activities will be implemented using appropriate engineering controls (e.g., containment, wetting, and other dust measures) to minimize asbestos exposure. If lead-based paint is present, engineering controls will be implemented during demolition work including higher personal protection equipment standard to minimize exposure. The demolition work will be performed in accordance with the applicable Occupational Safety and Health Administration (OSHA) regulations (OSHA 29 Code of

¹⁸ As set forth in the New Jersey Ground Water Quality Standards (N.J.A.C. 7:9-6), CEAs are designated where groundwater does not or will not meet the Ground Water Quality Standards as a result of certain specific conditions.

Federal Regulations (CFR) 1926.62 – Lead Exposure in Construction). Additionally, removal or relocation of any suspected PCB-containing equipment including transformers, electrical feeder cables, hydraulic equipment, and fluorescent light ballasts will be completed in accordance with applicable federal and state regulations. With implementation of these measures, no adverse impacts related to hazardous materials will result during construction and demolition activities, and after completion of the proposed project.

3.12.3.2 SUBSURFACE DISTURBANCE

Based on the records review and past/current land use, it is anticipated that contaminated materials could be encountered, as a result of contamination from neighboring property and from the historic fill of unknown origin. The Build Alternative will require substantial subsurface disturbance in specific areas such as locations of new bridge supports, new interlockings, and new tracks. Soils will be generated during the drilling and installation of the foundations. Excavations may also be required for catenary and signal support structures, communications towers, and new or relocated utilities. The existing Raritan River Drawbridge will be removed, which involves removing the existing rails, railroad ballasts, and bridge supports.

The proposed project will be enrolled as a linear construction project (LCP) as per NJDEP Linear Construction Technical Guidance. A sampling program will be conducted to identify potentially contaminated/hazardous materials in the project site performed in accordance with the NJDEP Field Sampling Procedure Manual, August 2005. These activities will comply with the Site Remediation Reform Act (SRRA, N.J.S.A. 58:10C-1 et seq.), the Administrative Requirements for the Remediation of Contaminated Sites (ARRCS, N.J.A.C. 7:26C), the NJDEP Technical Requirements for Site Remediation (TRSR, N.J.A.C. 7:26E), May 2012, and applicable NJDEP Technical Guidance documents.

3.12.3.3 CONSTRUCTION HEALTH AND SAFETY MEASURES

A Construction Health and Safety Plan (CHASP) will be prepared to address the contamination issues prior to construction activities for the proposed project. The CHASP will be prepared in accordance with OSHA regulations for Hazardous Waste Operations and Emergency Response (HAZWOPER) (29 CFR 1910.120), OSHA construction safety requirements (29 CFR 1926), and other applicable regulations and guidelines for the field personnel. The CHASP will describe in detail the health and safety procedures to minimize exposure of contaminated materials to workers and the public. The hazards to be evaluated include chemical, biological, hazardous, or contaminated materials, noise, dust, health, and other hazards. The CHASP will include designation and training of appropriate personnel, monitoring for the presence of contamination (e.g., buried tanks, drums or other containers, sludges; or soil which shows evidence of potential contamination, such as discoloration, staining, or odors) and approved response plans. Visual and active monitoring of airborne dust and fugitive emissions, and dust control measures will be implemented during earthwork.

3.12.3.4 MATERIALS MANAGEMENT

Contaminated waste including rail ties, ballast, soil, and other materials will be generated during construction activities. The plans and documents for the Build Alternative will provide procedures for stockpiling, testing, loading, transportation, and proper disposal of the excavated materials requiring off-site disposal.

A total of approximately 40,000 cubic yards of material will be excavated and removed from the upland areas of the project site. No dredging will be required. Excavated material will be characterized to classify the material (e.g., as contaminated waste, petroleum-contaminated wastes, historic fill containing construction and demolition debris, or uncontaminated native soils). Waste characterization sampling will be completed per the requirements of the waste disposal facilities. The waste material will be stored or stockpiled at the site with appropriate soil and sediment control measures and away from the streams and drains to prevent impacts to human health and the environment. Licensed waste haulers or transporters will be used to transport materials to the waste disposal facilities with appropriate permits and in accordance with local, state, and federal regulations. The licensed disposal facility will be selected based on the type of waste (i.e., construction and demolition waste, contaminated soil, or hazardous waste).

A Materials Management Plan (MMP) will be developed to manage any contaminated media encountered during construction. On-site monitoring will ensure that handling, stockpiling, and disposal of contaminated soil, groundwater, or any other media is done in compliance with the MMP and all regulatory requirements. The plan will include methods to minimize/avoid disturbance of contaminated soil, groundwater, or any other media and describe procedures for proper storage, disposal, or re-use of contaminated soil.

A total of approximately 10,000 cubic yards of imported fill is anticipated to be needed for the construction of embankments. Fill brought to the site to build the railroad embankments on the Perth Amboy and South Amboy shores will meet the clean fill or alternative fill requirements as per NJDEP requirements¹⁹. Clean fill material meets all soil remediation standards and does not contain extraneous debris, solid waste, or free liquids. Alternative fill materials contain contaminants present at the receiving site at lesser concentrations. A Fill Use Plan will be prepared to specify the site-specific requirements.

3.12.3.5 GROUNDWATER

Dewatering will be required during deeper excavations for utilities or bridge support structures. Dewatered liquids will be tested prior to discharge and will be discharged to surface water, existing sewers, or to recharge galleries for groundwater infiltration consisting of temporary basins, ditches, or trenches. Dewatering will be conducted in accordance with applicable requirements including NJPDES regulations for discharge to groundwater or surface water, and local and state requirements for sewer discharge.

3.12.4 MITIGATION

With the implementation of the measures discussed above to characterize potential areas of concern in the project site, and the protocols that will be followed for the handling, storage, transport and disposal of contaminated materials, the Build Alternative will not result in adverse impacts related to contaminated materials.

¹⁹ *Fill Material Guidance for SRP Sites*, NJDEP, April 2015.

3.13 UTILITIES AND INFRASTRUCTURE

This section identifies the utilities in the area that could be affected by the Build Alternative. Potential impacts to existing utilities that will result from the Build Alternative's construction and the provisions needed to mitigate any conflicts with local utilities are identified.

3.13.1 AFFECTED ENVIRONMENT

Underground water mains, gas mains, sanitary and stormwater pipes are located in the upland portions of the project site maintained by local public works departments. An overhead catenary system is located along the bridge to supply electricity to the commuter rail lines. A high voltage direct current (HVDC) electric transmission line, operated by Neptune Regional Transmission System (RTS), crosses under the bridge in the Raritan River. The cable is located perpendicular to the bridge and about 160 feet south of the navigation channel. Additional cables are located in the riverbed running parallel to the bridge, including two AT&T fiber optic cables with conduits to the west of the bridge, and ten Verizon cables to the east of the bridge.

3.13.2 NO ACTION ALTERNATIVE

Under the No Action Alternative, no adverse impacts are expected to the existing utilities and infrastructure.

3.13.3 BUILD ALTERNATIVE

The overhead catenary lines will be replaced as part of the Build Alternative. The Build Alternative will require the relocation of the AT&T cables that are located to the west of the existing bridge. These underground cables will be relocated east of the existing bridge outside of the construction zone. As the cables will be installed using horizontal directional drilling (HDD), potential significant impacts associated with this relocation are not anticipated. No impacts to wetlands or the 50-foot wetland buffer are expected due to the installation of the cables, the two permanent manholes, or during the drilling process, which will occur beneath the riverbed without disturbance to the river bottom. Potential impacts during construction are further discussed in Section 4.1.1.

If any additional underground utilities are present that are in conflict with the proposed construction, they will be also relocated, as necessary. Relocations will be conducted in consultation with the owner of the equipment. All required agreements will be executed with the appropriate utility providers to coordinate potential relocations. No adverse impacts are expected to the existing utilities and infrastructure.

3.13.4 MITIGATION

The Build Alternative will not result in adverse impacts to utilities and no mitigation is required. All work related to the relocation of the AT&T cables will be performed in accordance with conditions specified in USACE Section 10/404 and NJDEP Waterfront Development permits, which are required for the removal and installation of cables beneath the Raritan River.

3.14 INDIRECT EFFECTS AND CUMULATIVE IMPACTS

This section assesses the potential for the Build Alternative to result in indirect or cumulative impacts. Potential indirect effects are generally defined as those induced or "caused by an

action and are later in time or farther removed in distance, but are still reasonably foreseeable” (40 CFR § 1508.8(b)). Potential cumulative effects may result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions (40 CFR § 1508.7).

The Build Alternative will not result in an increase in train frequency, capacity or rail ridership. It will not induce development or result in indirect effects related to population or employment increases since none are expected to occur. The Build Alternative will not create permanent jobs. The presence of temporary workers during the construction phase will likely cause a short-term demand for services in the area, including increased demand at restaurants and gas stations. However, the construction phase is temporary and will not contribute to permanent growth-related effects, such as increased air emissions or demand for municipal services, in the area.

The cumulative effects of the Build Alternative with past and present actions have been assessed and described in each technical section above, as appropriate. Past and present actions include:

- The replacement of Victoria Bridge (in 2005)—a swing bridge that opened in 1926 -- with a fixed level bridge at 110 feet above mean high water level by NJDOT. Victoria Bridge is located upstream from the study area; and
- Industrial and railroad use of land that has potentially caused soil and groundwater contamination, and a munitions explosion that occurred decades ago but could present safety concerns during construction.

Reasonably foreseeable future actions that could affect the study area include the:

- Planned 2nd Street Community Park, Transit Village initiative, and bikeway/walkway connections between the Gerdau Ameristeel property and Sadowski Parkway Waterfront Park in Perth Amboy;
- Manhattan Beach development and Ferry Terminal project in South Amboy;
- Projects in NJ TRANSIT’s Resilience Program such as NJ TRANSITGRID, Delco Lead Storage and Inspection Facility, and Long Slip Fill and Rail Enhancement, and Amtrak’s Hudson River Tunnels resiliency project; and
- Agreements that permit the operation of heavier freight equipment on the bridge.

The cumulative effects of the proposed project, in combination with the Victoria Bridge replacement, will result in significant improvement to the operation of maritime traffic in this portion of the Raritan River. No adverse effects on the water quality of the Raritan River are anticipated to occur on an individual or cumulative basis. NJ TRANSIT will adhere to all environmental and safety regulations related to the sampling, handling and disposal of contaminated materials and potential munitions that may remain in the study area and significant impacts are not anticipated to occur.

As a project intended to enhance rail service where it already exists today, the Build Alternative will have no cumulative adverse effects in combination with other projects nearby, such as the planned new 2nd Street Community Park and Transit Village initiative in Perth Amboy or the Manhattan Beach development project in South Amboy. It will, however, support those

initiatives, as well as other local and regional planning efforts, by providing for resilient, reliable trains service for the future. The Build Alternative will facilitate the connection of the bikeway/walkway between the Gerdau Ameristeel property and Sadowski Waterfront Park. The existing bridge abutment and railroad embankment are an impediment to the bikeway/walkway connection. The new bridge will be at a higher elevation and its bridge abutments located further away from the water, allowing enough room for the path and the safe passage of bicyclists beneath the bridge. While the construction period of one or more of these projects could overlap with the proposed project's construction, significant adverse impacts would not be expected to occur. Construction effects will be temporary and the use of barges for construction staging and access for the new bridge will minimize disruption to nearby communities and potential interference with construction activities for the other planned projects. The proposed project is not expected to create significant adverse land use, visual quality, or air quality impacts on an individual or cumulative basis.

Although heavier freight trains are not expected to operate across the bridge as a result of the proposed project without additional actions by commuter and freight railroads (see Section 3.7), the evolution of larger freight cars improves the operating efficiency of railroads and creates opportunities for transportation and material handling efficiencies. Cars with larger weight and/or cubic capacities allow railroads to carry the same amount of freight with fewer cars, thus decreasing the cost per each ton. Thus, carrying more freight on the railroad could divert vehicular and truck traffic from the regions roadways, thereby reducing regional air pollution and vibration levels and noise pollution along truck routes.

The Build Alternative in combination with the other components of NJ TRANSIT's resilience program will enhance service reliability and allow NJ TRANSIT to restore service quickly after a major storm in its core service territory. In combination with other components of the NJ TRANSIT resilience program, the Build Alternative will provide cumulative long term benefits to the regional transportation network in terms of reliability, and both resource and economic efficiency.

3.15 PERMITS, APPROVALS, AND CONSULTATION REQUIRED

The proposed project will require a number of permits and approvals from federal and state agencies with jurisdiction over navigation, water and wetland resources, and coastal development as well as consultation in accordance with regulatory requirements. These are listed below.

- U.S. Army Corps of Engineers: Permit pursuant to Section 404 of the Clean Water Act.
- U.S. Coast Guard: Permit pursuant to Section 9 of the Rivers and Harbors Act of 1899; and General Bridge Act of 1946, 33 U.S.C. 525.
- U.S. Department of the Interior: Consultation pursuant to Section 4(f) of the U.S. Department of Transportation Act.
- U.S. Environmental Protection Agency: Consultation for Section 404 permit.
- U.S. Fish and Wildlife Service: Consultation for Section 10 permit, Section 404 permit.

- National Oceanic and Atmospheric Administration, National Marine Fisheries Service: Consultation for Section 7, Endangered Species Act; Essential Fish Habitat, Magnuson-Stevens Fishery Conservation and Management Act; Section 10 permit, Section 404 permit.
- New Jersey Department of Environmental Protection (NJDEP): Waterfront Development permit (N.J.A.C. 7:7E, Coastal Zone Management Rules); Tidelands instrument (N.J.S.A. 12:3, Tidelands Act); Freshwater Wetlands permit (N.J.A.C. 7:7A, Freshwater Wetlands Protection Act); Coastal Wetlands permit (N.J.A.C. 7:7, Coastal permit program); and New Jersey Pollutant Discharge Elimination System (NJPDES) permit for construction activities and stormwater management (N.J.A.C. 7:8, Stormwater Management).
- New Jersey State Historic Preservation Officer at NJDEP: Concurrence under Section 106 of the National Historic Preservation Act.
- Freehold (Monmouth & Middlesex) Soil Conservation District: Soil Erosion Sediment Control Certification (New Jersey Soil Erosion and Sediment Control Act, Chapter 251, P.L. 1975, N.J.A.C. 2:90-1, NJPDES Stormwater Phase II Program in conjunction with NJDEP Division of Water Quality).



This chapter describes the anticipated construction means and methods and assesses the potential for impacts during construction of the Build Alternative. The assumed construction means and methods are based on current preliminary engineering design and NJ TRANSIT's past experience on similar projects. While the construction techniques ultimately utilized for the proposed project may vary, the potential for environmental impacts and types of mitigation measures described herein will likely be the same.

4.1 CONSTRUCTION METHODS

The new replacement bridge will be constructed alongside the existing bridge. When it is complete and connecting tracks have been tied in to the existing NJCL, train traffic will be shifted to the new bridge and the old bridge and its connecting tracks will be removed. Construction will involve the following activities, discussed below:

- Mobilization and staging;
- Construction of the approach span foundations, substructure, and superstructure (piers and spans);
- Installation of the moveable span;
- Configuration of upland tracks;
- Installation of railroad systems (catenary and signals); and
- Demolition of existing bridge.

The in-water construction methods to be used will be similar to those used to for construction of the Victory Bridge in 2002-2003, the highway bridge that carries Route 35 over the Raritan River upstream of the Raritan River Drawbridge. While the specific construction methods will be further developed as the design for the new bridge is advanced, the general activities and the construction schedule are outlined below.

4.1.1 MOBILIZATION AND STAGING

Prior to construction activities for the bridge, the two AT&T fiber optic cables with conduits in the riverbed, running parallel to the west of the existing bridge will require relocation. These underground cables will be relocated east of the existing bridge. All work related to the relocation of the AT&T cables will be performed within the project limits and in accordance with conditions specified in USACE Section 10/404 and NJDEP Waterfront Development permits. The cables will likely be installed using horizontal directional drilling (HDD). HDD involves a multi-step drilling process, launched from a launch shaft. A second shaft is used as a termination pit, where the boring equipment is removed at the completion of the drilling process. The cables under the Raritan River will be approximately 3,241 linear feet in length and installed to a depth of up to ten feet below the river bed beneath the navigational channel.

The directional bore will be angled at the shoreline to get from approximately 5 feet below grade on the upland portions to the 10 feet below the River. Two permanent manholes will be located at upland bore pit locations for access to the cables. No impacts to wetlands or the 50-foot wetland buffer are proposed. Delineated wetland resources will be protected during construction of the bore pits through implementation of erosion and sediment controls and best management practices. The total duration of construction is approximately three weeks, with one week of drilling beneath the Raritan River. All work related to the relocation of the AT&T cables will be performed within the project limits and in accordance with conditions specified in NJDEP Waterfront Development and USACE Section 10/404 permits. To accommodate construction activities and equipment in the shallow areas and to avoid the need to dredge construction access channels, a temporary trestle will be constructed from each shoreline into the river where water levels are too shallow for barges. From the Perth Amboy shoreline, a north trestle will extend along the construction zone for approximately 1,000 feet; from the South Amboy shoreline, a south trestle will extend approximately 600 feet. It is anticipated that the trestles will be approximately 40 feet wide and may have “finger” piers extending toward the construction zone (with finger piers an estimated 40 feet long) to allow equipment to easily reach the construction site. Both trestles will be constructed using three-foot diameter steel pipe piles, with smaller two-foot diameter steel pipe piles used to construct the finger piers. All piles will be installed by first allowing the pile to sink into the riverbed under self-weight and then by using a vibratory driver to advance the pile to resistance. Impact pile driving will be used to seat the pile into load-bearing strata; it is anticipated that each pile will require approximately 15 to 30 minutes of impact hammering, which will be conducted using a cushion block to provide some noise attenuation. Pile tapping will be conducted just prior to cushioned impact hammering in order to deter fish and sea turtles from the immediate vicinity of the pile. Construction and removal of the temporary trestles and finger piers will be conducted within turbidity curtains. The turbidity curtains will be placed 40 feet from the limits of the trestles and finger piers. The trestles will likely be constructed working from the deep water and extending to the shoreline.

Floating barges will be used as construction staging platforms in deeper parts of the river. The barges will not be placed within the navigation channel. These barges will be used for material storage and for construction equipment, such as cranes. The construction barges will be anchored in place using spud piles.

Most of the required staging and equipment storage can occur using the trestles and barges. Some limited land areas will also be needed for construction staging or contractor support space (see **Figures 4-1 and 4-2**). This activity can occur within NJ TRANSIT’s existing rail right-of-way, as well as within limited adjacent areas as available. For example, in Perth Amboy, an existing Conrail siding on the west side of the right-of-way may be used; in South Amboy, some of the undeveloped area in the immediate vicinity of the NJCL and Conrail tracks, including the parking area near Essay Tower, may be used.

4.1.2 APPROACH SPAN FOUNDATIONS

For the new bridge’s approach spans leading to the moveable span, the bridge piles will be installed by equipment stationed on the temporary trestles and barges. The piles may be installed using large-diameter drilled shafts or steel casings that are put into place by vibratory



hammering or twisting; once those are in place, the piers will be filled with concrete. Alternatively, the bridge piles may be installed using vibratory and impact pile driving. As with the installation of trestle piles, all foundation piles will be installed by first allowing the pile to sink into the riverbed under self-weight and then by using a vibratory driver to advance the pile to resistance. Impact pile driving will be used to seat the pile at the final tip elevation. Approximately 216 six-foot diameter steel pipe piles will be driven for the 29 bridge piers, including the east and west abutments. In order to install these piles, 86 eight-foot diameter shafts will be drilled via low-speed vibratory drilling. The piles will then be placed in the shafts, filled with concrete, and capped. Steel sheetpile cofferdams will be installed around the open water pier sites (Piers 5, 10, 15, 16, 17, 18, 21, and 24) via vibratory hammer prior to drilling, and will be removed by the same method when the piers are in place; cofferdams will not be used for drilling of the shafts for the bridge abutments. Duration of impact driving will be up to 2 hours per pile and approximately 2 to 4 piles will be driven per day. Based on this schedule and assuming 5-day work weeks, approximately 3 to 6 months will be required to install these piles. The contractor may use certain accelerated bridge construction techniques, such as pre-cast concrete pier caps and pre-cast box forms to facilitate concrete pours during pier construction.

Once the piers have been installed, the steel spans will be installed. Cranes on the temporary trestle and floating barges will be used to install the spans. For sections in deeper water, the spans could be preassembled on the barges and then floated to the site and erected by a crane.

4.1.3 MOVEABLE SPAN

The moveable span of the new bridge will be assembled off-site and floated into place when it is complete. This approach minimizes the amount of time that the navigation channel will be affected by the span installation. The contractor will have several options to assemble the truss, including the following:

- Assembling directly on the barges with a floating crane; or
- Assembling on land and launching the truss onto the barges on temporary finger piers.

If the truss is assembled on land, a staging site nearby could be used, such as available land at the nearby Gerdau Ameristeel plant or available land at another site nearby with docking facilities.

The bridge span can be floated into place and connected to the approach spans within a 36-hour period, during which the navigation channel will be closed. Once in place, the new bridge will be left in the “open” position; the existing bridge will continue to open and close as needed to accommodate maritime traffic.

4.1.4 TRACK WORK

After the approach spans have been completed, ballast and tracks will be laid across the bridge. In addition to the bridge itself, landside approach tracks must be constructed to connect the new bridge to the mainline tracks of the NJCL as well as the Conrail tracks that break off from the NJCL in South Amboy. It is expected that the Conrail track, known as the Essay Running Track, will be out of service for an estimated four to eight weeks during construction. The new tracks will make the connection to the mainline tracks within approximately 1,500 and 3,000

feet of the river's edge in South Amboy and Perth Amboy, respectively. Maintenance-type track work may extend as far as New Brunswick Avenue in Perth Amboy and to the South Amboy Station in South Amboy. Retaining walls and embankments will be constructed, as necessary to support the new tracks as they gradually slope down from the bridge.

4.1.5 RAILROAD SYSTEMS

Alongside the new rail alignment, a new overhead catenary system, including catenary wires and traction power cables, will also be installed to provide power to the NJCL trains. Train signals and associated infrastructure will also be installed.

After the new bridge, landside approach tracks, and system work is complete, passenger and freight trains will be switched to the new tracks. The connections between the two new tracks and the existing passenger and freight tracks will be made gradually, to minimize the disruptions to rail operations.

4.1.6 EXISTING BRIDGE DEMOLITION

Once rail operations have been shifted to the new bridge, the existing bridge superstructure will be removed span-by-span using a barge and crane and then transported to and disassembled in a staging area. An excavator will pull out the pier footings and the timber piles will be cut off below the mud line. Typically, the U.S. Coast Guard (USCG), which regulates projects that have the potential to affect navigation, requires piers outside of the navigation channel to be removed to two feet below the mudline, and piers within the navigation channel removed five feet below the mudline. Either mechanical or controlled-drill-and-blast methods will be used to remove the bridge piers. Cofferdams encompassing 48,934 square feet will be installed at all existing piers (Piers 1 – 29) via vibratory hammer prior to removal of the pier footings and cutting of the timber piles, and will be removed by the same method once demolition activities are complete.

All work will be performed in accordance with permit conditions imposed by USCG to protect navigation and by the New Jersey Department of Environmental Protection (NJDEP) and U.S. Army Corps of Engineers (USACE) to protect natural resources, which will likely require containment of debris through the use of turbidity barriers and sheet piling around the piers to minimize adverse effects to water quality. As discussed in Section 4.2.9, "Natural Resources," below, construction activities in the water will also be subject to limitations to work "windows" to protect aquatic natural resources.

The landside tracks that lead to the old bridge will also be removed once they are no longer needed. This will most likely be done from track-based equipment, working entirely within the right-of-way.

4.1.7 GENERAL PRACTICES

Construction activities will generally occur during daylight hours, although certain activities—including installation of the moveable span—may need to occur overnight. If any lighting is required during construction, it will be limited to the minimum number of lights and wattage necessary to perform such activities, and down-shielded lights will be used to direct the light only to the area needed and minimize spill.

Most construction activities will occur on weekdays, but weekend work may be required for time-sensitive tasks and to avoid disruption to existing train operations. For example, connections between the new tracks and existing tracks will likely be made over several weekends and the moveable span will be installed over a single weekend.

The navigation channel will remain operational throughout construction, except for a short period (i.e., less than 48 hours) when the new moveable span is being installed. When both bridges are in place before the old bridge has been demolished, the bridge that is not carrying train traffic can be left in the open position without interfering with the operation of the other bridge's moveable span.

In-water construction activities for the new bridge will consist of the installation of the bridge piers either by drilling large-diameter shafts or impact pile driving large-diameter (six-foot) steel pipe piles, and driving small-diameter piles for the temporary trestles, which will cause minimal bottom disturbance.

The barges used to float in the approach and main span trusses will be staged for high tide and barges used for the remainder of the construction will only be staged where water depths are sufficient to minimize bottom disturbance. The use of the temporary trestles and finger piers during construction along the shoreline will minimize sediment disturbance associated with the construction of the approach spans.

Construction activities will be timed to minimize adverse effects to aquatic resources, in accordance with any permit requirements developed with federal or state permitting agencies. As described in Section 3.10 of this EA, the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Fish and Wildlife Service (USFWS) recommend that in-water work within the lower Raritan River be avoided from March 1 to June 30 of each year in order to minimize impacts to alewife and blueback herring, as well as other species migrating up and down river to spawn. In addition, USFWS recommends that tree and shrub clearing be restricted during the March 15 to September 30 breeding period to minimize potential impacts to migratory birds, and that any construction or demolition activities on the bridge be surveyed during this time period to ensure the protection of any nesting birds that may utilize the bridge. These restrictions and conditions will become part of NJDEP permit conditions.

Erosion and sediment control measures will also be implemented during construction to avoid the transfer of silt to the water.

4.1.8 CONSTRUCTION SCHEDULE

Construction of the new bridge, including its landside tracks and railroad systems, is anticipated to last approximately three years, after which the new bridge will be in operation. After that, demolition of the existing bridge will occur over an additional six months.

4.2 CONSTRUCTION IMPACTS

4.2.1 LAND USE, ZONING, AND PUBLIC POLICY

Construction projects are inevitably noisy, which can be disruptive to nearby land uses. For the Build Alternative, the Sadowski Parkway Waterfront Park, planned 2nd Street Community Park, and residences in Perth Amboy on and close to 2nd Street will be the closest sensitive land uses to the construction activities. In South Amboy, the nearest residences or other "sensitive" land

uses are separated from the construction zone by roads and vacant lands and will generally be well buffered from any disruption. As discussed in Chapter 2, most construction activity will occur in the water, where the approach spans and moveable span will be installed. This will limit the potential for disruption to nearby uses in Perth Amboy, since the activities will not be immediately nearby. Some construction staging may occur on the west side of the bridge, which will be buffered from the residential community, school, and parks by distance and the presence of intervening vegetation to block views of the construction. Demolition of the existing approach tracks will be the closest construction activity to the sensitive uses in Perth Amboy, and it will occur over a short time period (less than a month) and, with only limited activity required, will not be intensely disruptive.

4.2.2 PARKS AND RECREATIONAL RESOURCES

The Sadowski Parkway Waterfront Park and the future 2nd Street Community Park are located near the project site in Perth Amboy. As noted above, construction activities will generally be buffered from these parks by distance and the presence of the intervening rail line and bridge and, if constructed, the landscaped buffer and wall that is part of the design of the future 2nd Street Community Park. Neither the existing Sadowski Parkway Waterfront Park nor the future 2nd Street Community Park will be used for construction staging or truck access. All construction activities near the parks will be located within NJ TRANSIT's right-of-way. As indicated below in Section 4.2.8.1, "Construction Noise Assessment," noise levels at the planned 2nd Street Community Park will exceed FTA's construction noise thresholds by a small margin for a period of less than six months. Therefore, this construction noise impact is not considered a significant adverse impact.

4.2.3 SOCIOECONOMIC CONDITIONS

Business operations in the project area are expected to be able to continue during construction, and adverse impacts to local businesses are not anticipated.

4.2.4 PROPERTY ACQUISITION / DISPLACEMENT

As discussed in Section 3.4, seven temporary easements and/or partial acquisitions of commercial and/or industrial vacant properties (approximately 3.0 acres) may be required during construction of the adjacent railroad alignment. Property owners will be compensated under the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (the Uniform Act), which has established equitable land acquisition procedures.

4.2.5 TRANSPORTATION

4.2.5.1 COMMUTER AND FREIGHT RAILROAD

Construction activities and sequencing will be designed to minimize conflicts with rail traffic. Temporary disruptions will occur as connections are made between the new tracks and mainline tracks. In general, this will be staged so that one track will remain in service at all times, to avoid disruption to either passenger or freight rail service. However, Conrail's Essay Running Track will be taken out of service for a period of approximately four to eight weeks and Conrail will need to use available alternate routes to connect to the Northeast Corridor. Conrail will be kept apprised of the construction schedule.

4.2.5.2 MARITIME TRAFFIC

Construction activities and sequencing will be designed to minimize conflicts with navigational traffic. It is expected that one approximately 48-hour closure of all maritime traffic will occur while the bridge span is floated in and erected in place. The navigation channel may be reduced at times to allow for construction barges. Possible temporary inconveniences may occur during construction, but no adverse impacts are expected.

4.2.5.3 VEHICULAR TRAFFIC AND PARKING

No public vehicular traffic or parking is located within the project area. A moderate volume of additional vehicular trips will enter the local network during construction, as a result of construction worker trips and deliveries. An average of 20 trucks per day is anticipated during the construction period. Construction access roads and truck routes have been identified and deemed adequate to handle the anticipated construction activities (see **Figures 4-1 and 4-2**). Most truck traffic in Perth Amboy will travel to and from the construction access roadways via County Roads 658 and 624 to reach the main arterial roadways of Route 440 and the Garden State Parkway, while trucks in South Amboy will likely travel via Main Street to reach the Garden State Parkway. No adverse impacts are expected.

4.2.6 AIR QUALITY

4.2.6.1 EMISSIONS DURING CONSTRUCTION

Construction-related air emissions generally include particulate matter in the form of fugitive dust (from ground clearing and preparation, grading, stockpiling of materials, on-site movement of equipment and transportation of construction materials), as well as exhaust emissions from material delivery trucks, construction equipment and worker's private vehicles. Dust emissions typically occur during dry weather and periods of maximum demolition or construction activities or high wind conditions.

The construction management of the Build Alternative will include general environmental measures imposed on contractors. Construction work will be planned and executed in a manner that will minimize air emissions and will be accomplished in light of the site's proximity to users of the surrounding environment. Air quality control measures imposed on the proposed project will include:

- Limiting idling times to less than three minutes on diesel powered engines and gasoline powered engines pursuant to N.J.A.C. 7:27-14 and N.J.A.C. 7:27-15;
- Locating diesel-powered exhausts away from local residential or building air intakes;
- Limiting on-site equipment to operating speeds of 5 mph to reduce dust and particulate pollutants from tires and brakes;
- Using other dust control measures, including spraying suppressing agent on any dust pile; using water or appropriate liquids for dust control during demolition, land clearing, grading; and on materials stockpile or surface; covering open-body trucks when transporting materials; and removing surface materials promptly;
- Establishing truck haul routes to minimize impact to sensitive receptors such as residential areas, hospitals, schools, daycare facilities, senior citizen housing, and convalescent facilities.

4.2.7 GLOBAL CLIMATE CHANGE

4.2.7.1 GREENHOUSE GAS EMISSIONS

As with any construction project, construction of the Build Alternative will result in greenhouse gas (GHG) emissions that include direct emissions from on-site non-road construction engines; and indirect emissions from on-road trucks and worker vehicles supporting construction. In addition, construction of the Build Alternative will also result in indirect GHG emissions, which are not released by on-site construction activities, but are nonetheless caused by the proposed project, since GHGs are emitted during the production and disposal of materials used for construction. For example, GHGs will be emitted during the extraction, production, and delivery of cement and steel (also known as embodied emissions).

To estimate GHG emissions associated with construction, per guidance received from EPA, the FHWA “Infrastructure Carbon Estimator”¹ spreadsheet was used in accordance with its accompanying documentation. The results of this spreadsheet tool can be assumed to provide an “order of magnitude” estimate for the project,² which is useful for the purposes stated in the CEQ guidance—disclosing emissions estimates and evaluating potential alternatives and mitigation measures using the best available tools.

Based on the FHWA tool, the total GHG emissions associated with the construction of the Build Alternative are estimated to be 15,205 metric tons CO₂e (annualized at 303 metric tons CO₂e over the 50-year lifetime of the bridge). As discussed in Section 3.9.1, over the lifetime of the project, these will be offset by the increased efficiencies in moving freight, with newer equipment that meets more stringent emissions requirements than the locomotives currently operating on the NJCL, and a reduction of emissions due to improving the passage of boats beneath the bridge. Nevertheless, measures to minimize GHG emissions during construction are discussed below. Per the NEPA guidance, while any given project is small in the context of global GHG emissions, projects worldwide have a considerable impact on climate and also an opportunity to reduce emissions via choices made. Therefore, *“When considering GHG emissions and their significance, agencies should use appropriate tools and methodologies for quantifying GHG emissions and comparing GHG quantities across alternative scenarios. Accordingly, a comparison of these alternatives based on GHG emissions and any potential mitigation measures can be useful to advance a reasoned choice among alternatives and*

¹ FHWA. *FHWA Infrastructure Carbon Estimator: Final Report and User’s Guide*. September 2014.

² Note that while the tool in general provides estimates based on broad industry averages, the specific use of the tool for this project may introduce significant error due to two factors: (1) There is no provision for rail bridges in general and for moving span bridges specifically—both differences may introduce substantial error in estimating emissions from materials and energy use; and (2) The estimate for roadway bridges included in the tool is limited to 1,000-foot length or less. Per the model guidance, *“it should be noted that the material and energy factors in the calculations do not apply to bridge projects greater than 1,000 feet in length, due to the different types of materials and construction practices involved in those projects. Energy and GHG impacts for those projects are best captured in separate assessments specific to each individual project.”* Further, the results raise some question which cannot be investigated since the model hides all factors, calculations, and intermediate results. For example, the rail components resulted in 5 times more emissions than the bridge component.

mitigation actions. ... When conducting the analysis, an agency should compare the anticipated levels of GHG emissions from ... mitigation actions to provide information to the public and enable the decision maker to make an informed choice....agencies should consider reasonable mitigation measures and alternatives as provided for under existing CEQ Regulations and take into account relevant agency statutory authorities and policies.”

Reducing GHG from construction could be achieved by using biodiesel in construction engines and by using recycled materials and cement replacements. The extraction, production, and delivery of cement and steel contribute significantly to GHG emissions. Based on the FHWA tool, the maximum mitigation potential is as follows:

- *Switch to biodiesel blend 20 percent (B20)*: If all construction equipment could operate on B20, direct engine emissions could be reduced by 15 percent, representing 3 percent of total emissions. B20 can generally be used without any modification in most diesel engines and is available at a slight cost premium. Some fuel management will be required to ensure fuels are stored properly. NJ TRANSIT will evaluate options for incorporating the use of B20 in construction if practicable, including cost considerations.
- *Switch to pure biodiesel (B100)*: If all construction equipment could operate on B100, direct engine emissions could be reduced by 76 percent, representing 16 percent of total emissions. However, B100 cannot be used in all engines, is available at a larger cost premium, and will require a substantial implementation plan. This approach is not recommended given the difficulties it will introduce.
- *Portland cement replacements (PCR)*: PCRs such as slag or other industrial byproducts, and/or the increased use of interground limestone, could potentially reduce indirect emissions by 13 percent, representing 10 percent of the total emissions. The actual potential amount that could be used will be limited by structural requirements. In contract document, NJ TRANSIT will request that PCR be used to the extent practicable, and require documentation demonstrating the PCR content of all concrete used for the project.
- *Recycled aggregate*: The reuse of on-site aggregate or the use of recycled concrete aggregate as a substitute for base stone could potentially reduce indirect emissions by three percent, representing two percent of the total emissions. In contract documents, NJ TRANSIT will request that on-site aggregate be used to the extent practicable, and where additional aggregate is required, that recycled concrete aggregate be used if found to be practicable, including cost considerations. NJ TRANSIT will require documentation demonstrating the quantities of each aggregate type used for the project.

Overall, the maximum potential mitigation from the above measures will reduce emissions by up to 4,500 metric tons CO₂e (89 tons annualized over a 50-year lifetime), representing 30 percent of total construction emissions.

In addition, there are measures that may provide substantial GHG reduction, which are not quantified by the FHWA tool:

- *Composite ties*. Use of composite plastic railroad ties can offer improved service life as compared with wood or concrete ties. The use of composite plastic railroad ties results in environmental benefits since they are composed of recycled plastic, waste tires, waste fiberglass, and structural mineral fillers, reducing the need to use virgin materials, avoiding

deforestation sometimes associated with the use of wood, and avoiding the substantial GHG emissions associated with cement. The use of recycled plastic ties also reduces other environmental problems by minimizing the leaching of by-products used in the preserving of wood ties. Composite plastic ties have been used successfully for both passenger and freight rail service in recent years. NJ TRANSIT is currently evaluating the use of composite plastic ties (other than on the movable span, where they will not meet structural requirements), and if found to be practicable, including cost considerations, will specify their use in contract documents.

- *Recycled Steel*: ensuring that recycled steel is used where practicable can substantially reduce emissions. While most steel used for construction in the U.S. is from recycled sources, specifying it as a requirement and tracking its use can ensure that less virgin steel is used. New steel rail may include less recycled content due to load requirements, although mainline track can sometimes be reused as sidings and yard track. In contract documents, NJ TRANSIT will request that recycled steel be used to the extent practicable, and require documentation demonstrating the recycled content of all steel used for the project.

4.2.7.2 RESILIENCE TO FUTURE SEVERE WEATHER EVENTS

In the event of a severe storm predicted during construction, the proposed project will take all necessary precautions to prepare the site, secure materials and equipment to the extent practicable so as to avoid both losses to the project and damage to the surroundings from project related debris.

4.2.8 NOISE AND VIBRATION

An assessment was conducted to evaluate the effects of construction noise and vibration on nearby land uses in accordance with FTA guidance. Detailed results of the analysis are included in **Appendix E** of this EA. The main construction stages, activities with the greatest potential to generate noise and/or vibration impacts, and reasonable equipment assumptions and quantities were identified and evaluated in the noise and vibration assessments. The analyses specifically considered the noise and vibration impacts associated with sheet driving/pier installation during foundation installation, steel removal during demolition of the existing structure, and track installation for the new bridge and approaches.

4.2.8.1 CONSTRUCTION NOISE ASSESSMENT

Using the FTA methodology for a General Construction Noise Assessment, construction noise levels were compared to both daytime (7 AM–10 PM) and nighttime (10 PM–7 AM) hourly equivalent noise level ($L_{eq(h)}$) limits established for residential, commercial, and industrial land use. No criteria are established for parks or schools, so to be conservative, both the planned 2nd Street Community Park and the Robert N. Wilentz Elementary School were treated as residential uses.

The analysis concluded that at all but one receiver, no construction noise impact will occur. The one location where a noise impact is predicted is at the planned 2nd Street Community Park during demolition of the closest portions of the bridge to the park. During that time, noise levels will exceed FTA's construction impact thresholds by a small margin. This activity, steel removal, will occur for a period of less than six months, and for most of that time will not be in

close proximity to the new park. Therefore, this construction noise impact is not considered a significant adverse impact.

4.2.8.2 CONSTRUCTION VIBRATION ASSESSMENT

The construction vibration assessment considered the potential vibration impacts, including the potential for structural damage and possible vibration-induced annoyance. The analysis considered the use of impact pile driving to install the bridge's foundation, which is an activity that can result in more vibration than the other planned activities. The analysis concluded that the construction of the Build Alternative will not result in potential structural damage to any nearby structures, and no sensitive land uses are close enough to the sheet driving or pier installation activities to cause notable annoyance.

4.2.9 NATURAL RESOURCES

Project construction will not result in impacts to terrestrial communities, wildlife, federally listed and/or New Jersey-protected species, wetlands, floodplains, or aquatic resources in the study area.

4.2.9.1 WETLANDS

A NJDEP-approved Stormwater Pollution Prevention Plan (SPPP) and Erosion and Sediment Control (ESC) plans will implement measures (i.e., silt fencing, hay bales) to protect adjacent wetlands outside of the area of disturbance from stormwater runoff during construction.

4.2.9.2 FLOOD ZONES

The use of a portion of the 100-year floodplain within the project area for the construction trestles and staging areas will not result in adverse impacts to floodplain resources or result in increased flooding of adjacent areas. Since construction-related water volume displacement resulting from the additional fill is within a tidal system, where flooding is influenced by tidal surge emanating from the Atlantic Ocean through Raritan Bay rather than fluvial sources, no adverse floodplain effects will occur.

4.2.9.3 TERRESTRIAL NATURAL RESOURCES

During construction, clearing and grading activities will remove existing ecological communities that provide wildlife habitat. These activities will result in the relocation of some wildlife from the area but sufficient suitable available habitat should be available nearby to minimize the potential adverse impacts to affected individuals. Potential impacts to wildlife during construction may be avoided through the imposition of timing restrictions for project construction activities during the periods of the year when these species will be most vulnerable to disturbances. To minimize impacts to the birds of conservation concern that are protected under the Migratory Bird Conservation Act and have the potential to breed within the study area, as listed in **Appendix C**, tree and shrub clearing activities will be conducted outside the breeding period of March 15 to September 30. Timing restrictions, if required, will be imposed as a condition of the NJDEP Waterfront Development or Freshwater Wetland Permits anticipated for project implementation. As discussed in Chapter 3, Indiana bat is not expected to occur within the project area, and the proposed project would have no effect on this species.

While peregrine falcon was identified by the New Jersey Natural Heritage Database as nesting in the project vicinity, the nearest nest location is over one mile west of the study area and construction and demolition activities would not be expected to adversely affect nesting success or foraging activity. Osprey nests #4407 and #2919 are both within 1,500 feet of the study area and could be affected by construction of the proposed project. Nest #4407 in Perth Amboy is near the water's edge just south of an active rail line. Nest #2919 in South Amboy is just offshore from a generating station. Both nesting sites are located in areas experiencing vessel traffic within or adjacent to industrial land uses with associated human activity and noise. As such, construction and demolition activities would not be expected to adversely affect use or success of these nests.

4.2.9.4 WATER QUALITY

Construction activities will be conducted so as to minimize any adverse impacts to water quality. In-water construction activities for the bridge superstructure will be limited to drilling large-diameter piles for the replacement bridge and driving small-diameter piles for the temporary trestles, which will cause minimal bottom disturbance. The piers may be installed using large-diameter drilled shafts or steel casings that are put into place by vibratory hammering or twisting; once those are in place, the piers will be filled with concrete, an activity within the casing that will not affect water quality. Alternatively, the bridge piles may be installed by drilling or impact pile driving. In-water construction will only be done during the seasonal work window specified by state and federal regulatory agencies to protect aquatic biota. Turbidity curtains will be used around the construction zones during pile installation to limit the potential for sediment to affect other areas of the river. During demolition of the existing bridge, sheet piling will be used around each pier being demolished to minimize sediment re-suspension. The speed of the current within the Raritan River at the project site ranges from 0.7 to 0.9 knots (NOAA, 2015). Any sediment resuspension that occurs during pile installation and the demolition of the existing bridge will be temporary and localized, and will be expected to dissipate shortly after the sediment-disturbing activity.

Disturbance to water quality from barging activities will also be limited. Construction barges for work in deeper waters will be only staged where water depths are sufficient to minimize bottom disturbance. By using temporary trestles in the shallow portions of the construction area, the Build Alternative will avoid the use of construction barges and tugboats in waters too shallow to allow for their operation without disturbing bottom sediment, and thereby minimize sediment disturbance.

4.2.9.5 AQUATIC NATURAL RESOURCES

For bridge construction projects, aquatic natural resources can be affected by a number of factors, including disturbance of benthic habitat on the river bottom, changes in water quality caused by sediment resuspension (discussed above), elevated levels of underwater noise during impact pile driving and demolition activities, and temporary increases shading of the river bottom by construction barges and work trestles. These potential impacts to aquatic natural resources are discussed in this section.

Potential Impacts from AT&T Cable Relocation

As the AT&T cable relocation will be installed using HDD under the Raritan River, impacts to aquatic natural resources, including sturgeon and sea turtles, are not expected. The directional bore would be angled at the shoreline approximately 5 feet below grade on the upland portions and 10 feet below the River. Furthermore, measures would be taken to avoid and/or minimize discharges into wetlands or waters of the U.S. and avoid impacts on aquatic resources. The drilling process will implement and maintain Best Management Practices (BMPs) in accordance with the "The Standards for Erosion and Sediment Control in New Jersey," 7th Edition, dated January 2014.

Potential Impacts from Construction Staging

During construction, pile-supported temporary trestles and construction barges will be used to accommodate construction equipment. The temporary trestles and finger piers will result in approximately 86,000 square feet of overwater coverage and the temporary loss of 2,000 square feet of benthic habitat where support piles will be installed for the trestles. Benthic invertebrates unable to move away from the pile footprints will be lost during pile and pier installation. The 40-foot-wide temporary trestles will allow some light to penetrate to the shallow water aquatic habitat beneath the trestles during some periods of the day. The area of aquatic habitat adversely affected due to shading from the trestles or the construction barges will be small when compared to the area of shallow aquatic habitat available within the vicinity of the project site and the temporary shading will not result in permanent adverse impacts to aquatic biota. Cofferdams will be installed via vibratory hammer, as recommended by NMFS to minimize underwater noise, and will therefore have minimal effects on aquatic biota. Sediment resuspension during pile and cofferdam installation and removal may result in localized and temporary increases in turbidity, which will be minimized through the use of the turbidity curtain. Any resuspended sediment will dissipate quickly with the tidal currents of the Raritan River.

Potential Impacts from Pile Installation

It is anticipated that the new piers will be installed with low-speed vibratory drilling of 86 eight-foot diameter shafts to hold the approximately 216 six-foot diameter steel pipe piles. Unlike impact hammering, the low-speed vibratory drilling method will not generate impulse noise underwater, so it will not cause physiological impacts to fishes, including Atlantic sturgeon, or any of the sea turtle species that may occur in the vicinity of pile installation. Vibratory drilling is also expected to produce lower levels of underwater noise compared to a vibratory hammer. However, the underwater noise levels produced during low-speed vibratory drilling may still result in behavioral effects that could cause temporary avoidance of the area by fishes and sea turtles.

Construction of the temporary trestle and finger piers and the dolphins/fenders for the new bridge will require pile driving. As recommended by NMFS, a vibratory hammer will be used to the extent feasible, and impact hammering will be conducted using a cushion block to minimize underwater noise impacts. Pile tapping just prior to cushioned impact hammering will deter fish and sea turtles from the immediate vicinity of pile driving. Underwater noise produced during impact pile driving has the potential to cause behavioral avoidance, injury, or mortality to fishes and sea turtles in the vicinity of pile-driving activities. Therefore the spatial extent and

duration of underwater noise thresholds for behavioral avoidance and physiological injury to fishes and sea turtles are evaluated here.

It is anticipated that installation of the piles for the temporary trestles will be conducted primarily with a vibratory hammer, with use of an impact hammer only to drive to the depth needed to meet the load bearing capacity of the piles. The duration of impact pile driving will be minimized through the use of the vibratory driver to the maximum extent practicable. The spatial extent of underwater noise could be minimized through the use of wooden cushion blocks, dewatered cofferdams, or bubble curtains. Pile tapping will be used prior to the start of pile driving to deter fish and sea turtles from the vicinity of pile driving. The turbidity curtain surrounding the trestles and finger piers will provide a physical barrier that will exclude fish from shallow waters in the immediate vicinity of pile driving where noise levels will be greatest. Since underwater noise levels associated with behavioral disturbance, or avoidance, will occur further from the pile than noise levels associated with injury, fish are expected to avoid the ensonified area where noise levels are highest, including in deeper waters where the turbidity curtain will not reach the bottom. It is expected that fish will temporarily avoid the construction area during pile driving in favor of similar habitat in the vicinity, and return once pile driving activities have ceased. To avoid disrupting seasonal migrations of anadromous fishes, no in-water work will be conducted between March 1 and June 30.

Potential Impacts to Aquatic Biota

In-water construction will only be done during the seasonal work window specified by state and federal regulatory agencies to protect aquatic biota. As described, NOAA and USFWS recommend that in-water work within the lower Raritan River be avoided from March 1 to June 30 of each year in order to minimize impacts to alewife and blueback herring, as well as other species, such as Atlantic sturgeon, that may be in the project area as transients (i.e., not to spawn). Should installation of the piles cause any fish to temporarily avoid the portion of the Raritan River in the vicinity of the project site, the extent of the area that will be affected at any one time will be negligible relative to the amount of suitable habitat that will remain available in Raritan Bay and the Arthur Kill. There will be a permanent loss of approximately 2,460 square feet of benthic habitat in the footprint of the new bridge, but there will be a net gain of approximately 28,740 square feet of benthic habitat with the removal of the existing bridge. Benthic macroinvertebrates are expected to recolonize the areas in the footprint of the existing bridge.

Potential Impacts from Construction Lighting

Construction activities will generally occur during daylight hours, although certain activities—including installation of the moveable span—may need to occur overnight. If any lighting is required during construction, lighting will be limited to the minimum number of lights and wattage necessary to perform such activities, and down-shielded lights will be used to direct the light only to the area needed and minimize spill.

4.2.9.6 ESSENTIAL FISH HABITAT

For the reasons described above and the detailed descriptions found in the EFH Worksheet in **Appendix C**, the construction of the Build Alternative will not adversely affect to the suitability of the project site for fish species identified by NMFS as having EFH in the lower Raritan River

Estuary. Sufficient forage or nursery habitat will be available in the vicinity of the project site should individuals with EFH designations avoid portions of the project area due to construction activities.

4.2.9.7 THREATENED AND ENDANGERED SPECIES

Atlantic Sturgeon

As discussed in Section 3.11.1.7, "Threatened and Endangered Species," adult and subadult (i.e., oceanic juvenile) Atlantic sturgeon have the potential to occur within the project area, but only as migratory transients. Construction of the Build Alternative will not have significant adverse effects on water quality or other habitat conditions for fish, including Atlantic sturgeon species. Upon removal of the existing bridge and derelict piers, construction of the Build Alternative will result in a net restoration of approximately 28,000 square feet of benthic habitat on the project site and thereby will potentially benefit sturgeon, which feed on benthic invertebrates, by increasing the amount of potential foraging habitat available in the area.

The extent of underwater noise associated with impact pile driving will depend on the type of noise attenuation measures used. For a two-foot or three-foot diameter steel pipe pile driven with a wooden cushion block, noise levels exceeding 206 dB re: 1 μ Pa SPL_{peak} (i.e., the threshold for recoverable physiological injury to fishes) will not occur beyond a distance of 33 feet from the pile. If a bubble curtain was used, those noise levels will be within a slightly smaller radius from the pile. In both cases, there is the potential for subadult or adult Atlantic sturgeon to be exposed to underwater noise levels that may result in recoverable physiological injury, such as hemorrhaging, hematoma, ruptured swim bladder, etc. However, it is unlikely that Atlantic sturgeon would occur within 33 feet of the pile being driven since, 1) pile tapping prior to impact hammering would deter sturgeon from the immediate vicinity of the pile, and 2) noise levels associated with avoidance would extend further from the pile than those associated with injury.

Piles driven with a wooden cushion block will produce noise levels exceeding 150 dB re: 1 μ Pa SPL_{rms} (i.e., the threshold for behavioral effects to fish) that will extend less than 450 feet from a two-foot diameter pile being driven and less than 300 feet from a three-foot diameter pile. If a bubble curtain was used, those noise levels will extend across slightly smaller distances across the river. In either case Atlantic sturgeon will likely avoid the ensonified area during impact pile driving in favor of suitable habitat in the vicinity.

Foraging Atlantic sturgeon are most likely to occur as transient individuals in the study area during May-June and September-October, although they could occur in the study area at other times of year. During the May-June time period, pile driving will be conducted within cofferdams as required by the in-water work restriction between March 1 and June 30. Depending on the area encompassed by the cofferdams, noise levels outside of the cofferdam may not exceed the physiological threshold for fish, but noise levels may still exceed the behavioral threshold in the river. In that case, behavioral avoidance of the study area may occur for anadromous fish species, including Atlantic sturgeon. During the rest of the year, Atlantic sturgeon and other anadromous fish species are not likely to occur in the study area and will therefore not be exposed to elevated underwater noise levels during impact pile driving. Shortnose sturgeon and egg, larval, and juvenile Atlantic sturgeon will not occur in the study area.

Sea Turtles

Protected sea turtle species that are federally listed as threatened and endangered have the potential to occur within the project area, but only as occasional transients passing through the New York Harbor. Upon removal of the existing bridge and piers, construction of the Build Alternative will result in a net increase of approximately 28,000 square feet of benthic habitat in the project area and could thereby potentially benefit sea turtles, which feed on benthic macroinvertebrates and aquatic plants. Noise levels exceeding 180 dB re: 1 μ Pa SPLrms (i.e., the threshold for physiological effects to sea turtles) will extend up to approximately 100 to 130 feet from a three-foot or two-foot pile, respectively, if a wooden cushion block was used and less than that if a bubble curtain was used. Noise levels exceeding 166 dB re: 1 μ Pa SPLrms (i.e., the threshold for behavioral effects to sea turtles) will extend approximately 190 to 285 feet from a three-foot or two-foot pile, respectively) if a cushion block was used and less than that if a bubble curtain was used. Even with noise attenuation in place (e.g., cushion block, cofferdam, bubble curtain), sea turtles may be exposed to underwater noise levels that will cause physiological injury or behavioral avoidance of the study area. However, since noise levels associated with avoidance would extend further from the pile than those associated with injury, and because pile tapping would be used to deter sea turtles from the area immediately before cushioned impact hammering, sea turtles are not expected to occur in areas where noise thresholds for injury could be met. Additionally, because sea turtles are occasional transients in the Raritan River, their occurrence is unlikely and therefore, it is unlikely that sea turtles will be exposed to elevated underwater noise levels during impact pile driving.

For these reasons, construction of the Build Alternative will have no direct or indirect effects on any sturgeon or sea turtles potentially occurring in the Raritan River.

4.2.9.8 SOLE SOURCE AQUIFERS

The Build Alternative will not adversely affect the Coastal Plain sole-source aquifer. With the demolition of the existing bridge, the proposed project will not result in increased impervious surface and would not have the potential to affect the interaction of the surficial and confined Coastal Plain aquifer. The SPPP and ESC plans will implement best management practices to limit the effects of stormwater runoff during construction. Construction activities would not have the potential to affect groundwater quality of the surficial and deeper aquifer. No underground storage tanks will be used or installed during construction or operation of the proposed project. The proposed project will not generate any liquid or solid waste, and there are no known hazardous waste sites in the project area. Should any contaminated materials be found during construction, standard protocols will be followed for the handling, storage, transport, and disposal of these materials.

The pilings for the replacement bridge will be installed to a maximum depth of approximately 180-feet below the water surface. Excavation for the approach tracks and other landside features will be minimal. Neither pile installation nor landside work will extend to the depth of the Coastal Plain sole-source aquifer. There is a proposed groundwater well, Well #1, to be installed approximately 0.9 miles from the project area. This new well permit was approved in April 2017 under permit # E201703496. This well is a non-potable/drinking water well to be used for industrial use only. The proposed depth of this well is 300 ft would extend into the confined aquifer. Any dewatering that takes place during construction will only extend to the

surficial aquifer, and will have no effect on the deeper sole-source aquifer used for drinking water.

4.2.9.9 *NATURAL RESOURCES AVOIDANCE, MINIMIZATION, AND MITIGATION MEASURES*

As discussed above, there are a number of potential construction- and demolition-related impacts to terrestrial and aquatic natural resources that must be avoided, minimized, or mitigated. These include disturbance of benthic habitat on the river bottom, changes in water quality caused by sediment resuspension, elevated levels of underwater noise during impact pile driving and demolition activities, and temporary increases in shading of the river bottom by construction barges and work trestles, among others. In terms of terrestrial natural resources, potential impacts will be minimized through the use of timing restrictions and will be imposed as a permit condition. For example, tree and shrub clearing activities in the riparian zone along the shoreline will be conducted outside the breeding period for birds, which is March 15 to September 30. Additionally, during this time period, construction and demolition activities on the bridge will be surveyed for the protection of nesting birds that may utilize the bridge. In order to minimize potential impacts to aquatic natural resources, such as discharges to the river, bottom disturbance and sediment resuspension, loss of benthic habitat, and elevated levels of underwater noise, a number of avoidance and minimization measures will be implemented. These measures include the following:

- In-water construction will only be done during the seasonal work window specified by state and federal regulatory agencies to protect aquatic biota. In addition, in-water construction during sensitive time periods (e.g., March 1 to June 30 to minimize impacts to alewife, blueback herring, Atlantic sturgeon, and other anadromous fish species) will be avoided unless adequate minimization measures are implemented. Any in-water construction activities conducted outside of the seasonal work window will use containment (i.e., turbidity curtains, sheet-pile cofferdams) or underwater noise attenuation and minimization measures, described further below.
- Temporary work trestles will be constructed to allow access to shallow-water portions of the construction area, rather than dredging a construction access channel. The use of temporary trestles will greatly minimize the loss of benthic habitat on the river bottom (2,000 square feet) compared to dredging (86,000 square feet) and will also minimize water quality impacts related to resuspension of sediment contaminants and turbidity. Trestles will be removed following completion of construction.
- Bridge foundations will be constructed using methods to minimize impacts related to underwater noise and bottom disturbance. Large-diameter piles that will support the new bridge foundations will be installed using relatively quiet, drilled shafts rather than impact pile driving. Vibratory driving will be used to the maximum extent practical for installation of small-diameter piles for the temporary trestles and dolphins; impact driving will only be used to seat each of the piles at the final elevation. During impact pile driving, a number of sound attenuation measures will be implemented to minimize underwater noise levels, including the use of cushion blocks, dewatered cofferdams, or bubble curtains. Pile tapping (i.e., a series of low-energy hammer strikes) will be used to deter fishes and sea turtles, including threatened and endangered species, from the vicinity of pile driving prior to full-energy impact hammering. To ensure that the measures described here are acceptable to the permitting

agencies and that there are no additional avoidance, minimization, or mitigation measures that could be implemented to further reduce environmental impacts of the proposed project, agency consultations will be completed prior to the issuance of the FONSI and environmental permits for the proposed project. In addition, any conservation measures recommended by the agencies and needed to reach a finding of “May Affect – Not Likely to Adversely Affect” would be specified in both the FONSI and permits, as appropriate.

4.2.10 CONTAMINATED MATERIALS

As discussed in Section 3.12, the proposed project will be enrolled as a linear construction project (LCP) as per NJDEP Linear Construction Technical Guidance. A Construction Health and Safety Plan (CHASP) will be prepared to address the contamination issues prior to construction activities for the proposed project. The CHASP will be prepared in accordance with OSHA regulations for Hazardous Waste Operations and Emergency Response (HAZWOPER) (29 CFR 1910.120), OSHA construction safety requirements (29 CFR 1926), and other applicable regulations and guidelines for the field personnel. With the implementation of the measures discussed above to characterize potential areas of concern in the project area, and the protocols that will be followed for the handling, storage, transport and disposal of contaminated materials, the Build Alternative will not result in adverse impacts related to contaminated materials.



This chapter of the EA considers whether minority populations and/or low-income populations will experience potential environmental or health impacts from the Build Alternative and whether any such impacts will fall disproportionately on those populations. It also discusses the public outreach efforts undertaken to inform and involve minority and low-income populations who may be affected by the Build Alternative.

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (February 11, 1994), requires federal agencies to identify and address disproportionately high and adverse effects of their actions on minority and low-income populations. Executive Order 12898 also requires federal agencies to work to ensure greater public participation in the decision-making process. The federal Council on Environmental Quality (CEQ), which has oversight of the federal government's compliance with Executive Order 12898 and the National Environmental Policy Act (NEPA), has developed guidance to assist federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed (*Environmental Justice Guidance under the National Environmental Policy Act* [December 1997]). Federal agencies are permitted to supplement this guidance with more specific procedures tailored to their particular programs or activities, as the U.S. Department of Transportation (USDOT) has done. This environmental justice analysis was prepared to comply with the guidance and methodologies set forth in the USDOT's Final Environmental Justice Order¹, FTA's environmental justice guidance,² and the federal CEQ environmental justice guidance.³

Consistent with those documents, this analysis involved four basic steps:

1. Identify the area where the Build Alternative may cause adverse impacts (i.e., the study area);
2. Compile race and ethnicity and income data for the census block groups in the study area and identify minority and low-income populations;
3. Identify the Build Alternative's potential adverse impacts on minority and low-income populations; and
4. Evaluate the Build Alternative's potential adverse effects on minority and low-income populations relative to its effects on non-minority and non-low-income populations to

¹ U.S. Department of Transportation, Final Environmental Justice Order 5610.2(a), *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, on May 2, 2012.

² Federal Transit Administration's (FTA) Circular FTA C 4703.1, *Environmental Justice Policy Guidance for Federal Transit Administration Recipients*, August 15, 2012

³ Council on Environmental Quality, *Environmental Justice Guidance under the National Environmental Policy Act*, December 1997.

determine whether it will result in any disproportionately high and adverse effects on minority or low-income populations.

5.1 DELINEATION OF THE STUDY AREA

The study area for environmental justice encompasses the area most likely to be affected by the Build Alternative and considers the area where potential impacts resulting from construction and operation of the Build Alternative could occur. The study area for environmental justice follows the ¼-mile study area used for the analyses of land use and social conditions. As described in Chapter 3 of the EA and shown in Figure 3.3-2 above, the study area for the environmental justice analysis comprises eight census block groups—six census block groups in Perth Amboy and two in South Amboy.

5.2 IDENTIFICATION OF ENVIRONMENTAL JUSTICE POPULATIONS

Data on race and ethnicity were gathered from the U.S. Census Bureau's *Census 2010* for census block groups within the study area, and then aggregated for the Perth Amboy study area and the South Amboy study area. Data on poverty status were gathered from 2009-2013 American Community Survey 5-Year Estimates. For comparison purposes, data for Middlesex County were also compiled. Based on census data on racial and ethnic characteristics and poverty status and the guidance documents described above, potential environmental justice areas were identified as follows:

- *Minority communities:* FTA's Environmental Justice Circular 4703.1 defines minorities to include American Indians or Alaskan Natives, Asian, African Americans or Black persons, Hispanic or Latino persons, and Native Hawaiians or other Pacific Islanders. This environmental justice analysis also considers minority populations to include persons who identified themselves as being either "some other race" or "two or more races" in *Census 2010*. The USDOT does not identify a threshold for determining whether an area's population is considered minority. CEQ guidance defines minorities the same way, and indicates that minority populations should be identified where either: (1) the minority population of the affected area exceeds 50 percent; or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. In Middlesex County, approximately 50.8 percent of the population is minority. Therefore, for this analysis, a threshold of 50 percent was used.
- *Low-income communities:* Low-income is defined by FTA to be people whose median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines. FTA also encourages the use of local poverty threshold or a percentage of median income for the area, provided that the threshold is at least as inclusive as the HHS poverty guidelines. Because HHS data is not available below the state level, this analysis uses instead the information on individuals in households below the poverty level as defined by the U.S. Census. The percent of individuals living below the poverty level in each census block group, as estimated in the 2009-2013 American Community Survey 5-Year Estimates, was used to identify low-income populations. Because the guidance does not specify a threshold for identifying low-income communities, all census block groups with a low-income population percentage that is meaningfully greater than in Middlesex

County—the primary statistical reference area for the Build Alternative—were considered low-income communities. In Middlesex County, approximately 8.5 percent of the total population is living below the federal poverty threshold, any census block group with a low-income population equal to or greater than 8.5 percent was considered a low-income community.

5.3 ENVIRONMENTAL JUSTICE POPULATIONS IN THE STUDY AREA

5.3.1 PERTH AMBOY STUDY AREA

Table 5-1 shows race, ethnicity, and poverty level for the census block groups in the study area. Each census block group in the Perth Amboy study area has a minority population that exceeds the 50 percent threshold, ranging from 63.3 percent to 95.1 percent. In addition, all six census block groups in Perth Amboy have low-income percentages that are greater than in Middlesex County, ranging from 11.5 to 39.2 percent. Overall, minority representation in each census block group in Perth Amboy exceeds the 50 percent threshold and low-income population exceeds the 8.5 percent threshold. Therefore, all six block groups in the Perth Amboy study area are considered potential environmental justice communities.

5.3.2 SOUTH AMBOY STUDY AREA

As shown in **Table 5-1**, neither of the two census block groups in the South Amboy study area have minority populations that exceed the 50 percent threshold. In addition, neither has low-income percentages that are greater than in Middlesex County (see **Table 5-1**; shading denotes environmental justice areas). Overall, minority representation in each census block group in the South Amboy does not exceed the 50 percent minority threshold and the low-income population does not exceed the 8.5 percent threshold. Therefore, no census block groups in the South Amboy study area are considered potential environmental justice communities.

**Table 5-1
Population and Economic Characteristics**

| Geographic Area | Race and Ethnicity* | | | | | | | | | | | | Individuals Below Poverty Level (%) |
|---|---------------------|--------------|-------------|--------------|------------|------------|------------|------------|------------|---------------|-------------|--------------------------|--|
| | 2010 Total | White | | Black | | Asian | | Other | | Hispanic | | Total Minority (%) | |
| | | No. | % | No. | % | No. | % | No. | % | No. | % | | |
| Perth Amboy Study Area | | | | | | | | | | | | | |
| BG 3, CT 48 | 2,775 | 213 | 7.7 | 125 | 4.5 | 51 | 1.8 | 11 | 0.4 | 2,375 | 85.6 | 92.3 | 29.7 |
| BG 2, CT 49 | 999 | 69 | 6.9 | 64 | 6.4 | 5 | 0.5 | 3 | 0.3 | 858 | 85.9 | 93.1 | 32.6 |
| BG 3, CT 49 | 1,909 | 224 | 11.7 | 117 | 6.1 | 24 | 1.3 | 7 | 0.4 | 1,537 | 80.5 | 88.3 | 13.3 |
| BG 1, CT 50 | 632 | 232 | 36.7 | 52 | 8.2 | 11 | 1.7 | 5 | 0.8 | 332 | 52.5 | 63.3 | 11.5 |
| BG 2, CT 50 | 2,090 | 164 | 7.8 | 94 | 4.5 | 1 | 0.0 | 9 | 0.4 | 1,822 | 87.2 | 92.2 | 12.4 |
| BG 3, CT 50 | 2,557 | 125 | 4.9 | 151 | 5.9 | 13 | 0.5 | 8 | 0.3 | 2,260 | 88.4 | 95.1 | 39.2 |
| Total Perth Amboy Study Area | 10,962 | 1,027 | 9.4 | 603 | 5.5 | 105 | 1.0 | 43 | 0.4 | 9,184 | 83.8 | 90.6 | 25.1 |
| Total, City of Perth Amboy | 50,814 | 6,104 | 12.0 | 3,742 | 7.4 | 806 | 1.6 | 477 | 0.9 | 39,685 | 78.1 | 88.0 | 24.4 |
| South Amboy Study Area | | | | | | | | | | | | | |
| BG 1, CT 75 | 1,130 | 778 | 68.8 | 69 | 6.1 | 48 | 4.2 | 22 | 1.9 | 213 | 18.8 | 31.2 | 6.2 |
| BG 2, CT 75 | 794 | 671 | 84.5 | 14 | 1.8 | 7 | 0.9 | 13 | 1.6 | 89 | 11.2 | 15.5 | 2.6 |
| Total South Amboy Study Area | 1,924 | 1,449 | 75.3 | 83 | 4.3 | 55 | 2.9 | 35 | 1.8 | 302 | 15.7 | 24.7 | 4.8 |
| Total, City of South Amboy | 8,631 | 6,638 | 76.9 | 347 | 4.0 | 345 | 4.0 | 143 | 1.7 | 1,158 | 13.4 | 23.1 | 7.5 |
| Middlesex County | | | | | | | | | | | | | |
| Middlesex County | 809,858 | 398,724 | 49.2 | 71,557 | 8.8 | 172,534 | 21.3 | 18,068 | 2.2 | 148,975 | 18.4 | 50.8 | 8.5 |
| Notes: Shading denotes environmental justice areas. CT: Census Tract; BG: Block Group Percentages may not add up to 100 due to rounding. * The race and ethnicity categories provided are further defined as: White (White alone, not Hispanic or Latino); Black (Black or African American alone, not Hispanic or Latino); Asian (Asian alone, not Hispanic or Latino); Other (American Indian and Alaska Native alone, not Hispanic or Latino; Native Hawaiian and Other Pacific Islander alone, not Hispanic or Latino; Some other race alone, not Hispanic or Latino; Two or more races, not Hispanic or Latino); Hispanic (Hispanic or Latino; Persons of Hispanic origin may be of any race). Sources: U.S. Census Bureau, 2010 Census (for race and ethnicity) and 2009-2013 American Community Survey 5-Year Estimates (for poverty level). | | | | | | | | | | | | | |

5.4 IDENTIFICATION OF DISPROPORTIONATE ADVERSE EFFECTS

As defined in FTA’s guidance, based on the USDOT Order, a disproportionately high and adverse effect on an environmental justice population is an adverse effect that is predominantly borne by a minority and/or low-income population, or will be appreciably greater for the minority and/or low-income population than for the non-minority and/or non-low-income population. Effects that may occur as a result of a proposed action may be considered in the context of associated mitigation measures and offsetting benefits when determining whether disproportionately high and adverse effects will occur.

The Build Alternative is located in an area of Perth Amboy that can be considered an environmental justice community, and therefore, any adverse effects from the construction or operation of the Build Alternative in Perth Amboy will occur in an environmental justice community.

As discussed in Chapter 3 of this EA, the Build Alternative will result in an adverse effect to historic resources related to the loss of the bridge itself, as well as the loss of some associated railroad infrastructure that is a contributing element to a railroad-related historic district. The Build Alternative also has the potential to adversely affect certain other water-related resources, such as potential maritime archaeological resources and a small wetland. These

adverse impacts will be addressed through mitigation developed in consultation with the relevant reviewing or permitting agency, as described in Chapter 3. None of these project effects are related to the built environment in Perth Amboy, where the environmental justice community is located, and none will adversely affect the quality of life or public health conditions in Perth Amboy. At the same time, the Build Alternative will provide increased resilience to the NJ TRANSIT rail service for Perth Amboy, which is a permanent, long-term benefit to the local community.

While some localized adverse effects, such as noise and potential dust, will occur in the study area during the proposed project's construction, these effects will be temporary and will end once construction is complete. Moreover, construction will be managed to minimize the potential for adverse effects through the use of best practices measures such as dust control. While construction projects are inevitably disruptive to nearby land uses, the closest sensitive uses to the project site will be buffered from construction by distance and the intervening vegetation, the North Jersey Coast Line tracks, and the existing bridge. As discussed in Chapter 4, "Construction Methods and Effects," most construction activity will occur in the water, where the approach spans and moveable span will be installed. This will limit the potential for disruption to nearby uses in Perth Amboy, since the activities will not be immediately nearby. Some construction staging may occur on the west side of the bridge, which will be buffered from the residential community, school, and parks by distance and the presence of intervening vegetation, which will block views of the construction. Demolition of the existing approach tracks will be the closest construction activity to the sensitive uses in Perth Amboy, and it will occur over a short time period (less than a month) and, with only limited activity required, will not be intensely disruptive.

Adverse effects will occur to historic resources in both South Amboy and Perth Amboy; these adverse effects will not affect the Environmental Justice community in Perth Amboy to a greater degree than the remaining study area population. Similarly, the proposed project's effects on natural resources will occur near both shores and in the river (and mitigated via the permitting process) and will not disproportionately affect the Environmental Justice population in Perth Amboy. The potential for adverse impacts to occur during the proposed project's construction, which will be mitigated via use of best management practices and other construction management techniques, exists equally throughout the project area as the type of construction to be performed is the same in both Perth Amboy and South Amboy. In conclusion, no significant adverse impacts are expected to occur as a result of construction of the new bridge or demolition of the existing bridge, and the Build Alternative will not result in disproportionately high and adverse impacts in the low-income and minority populations living near the bridge.

5.5 PUBLIC PARTICIPATION

As noted in FTA's environmental justice guidance, a key component of environmental justice is engaging environmental justice populations as part of the transportation planning process. This allows project sponsors to understand the needs and priorities of environmental justice populations and to balance the benefits of a proposed project against its adverse effects.

As outlined in this chapter, the proposed project will be located within an area that is an environmental justice community, and therefore public outreach related to the proposed

project is particularly important. Public participation initiatives are being conducted for this project in accordance with the requirements of NEPA. As detailed in Chapter 7, public information sessions were held in Perth Amboy and South Amboy at Americans with Disabilities Act (ADA)-accessible locations. Notices of the meetings were widely distributed and advertised in a local Portuguese publication, *Luso Americano*, and in a local Spanish publication, *El Especialito*, as well as two English publications, *Amboy Guardian* and *Home News*. English and Spanish notices of the sessions were posted at the Section 8 housing authorities in Perth Amboy and South Amboy and at the Perth Amboy Public Library and the Sadie Pope Dowdell Public Library. At the Public Information Sessions a project fact sheet was available in English and Spanish. Spanish interpretation services were available at the meetings. No objections to the proposed project were expressed at either of the Public Information Sessions or via comments on the project's web page.



This chapter addresses the requirements of Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 (49 USC § 303; 23 CFR § 774).¹ This Section 4(f) Evaluation is being circulated along with the project’s Environmental Assessment (EA) prepared in accordance with the National Environmental Policy Act (NEPA).

The Raritan River Drawbridge Replacement Project (the proposed project) will result in the use of properties protected by Section 4(f). As discussed below, the use of these properties cannot be avoided, and therefore, the Federal Transit Administration (FTA), in coordination with the project sponsor, the New Jersey Transit Corporation (NJ TRANSIT), has identified measures to minimize harm to them.

6.1 REGULATORY CONTEXT

Section 4(f) of the USDOT Act of 1966 declares that the Secretary of Transportation shall not approve any program or project, which requires the use of any publicly owned land from a public park, recreation area, or wildlife and waterfowl refuge of national, State, or local significance as determined by the Federal, State, or local officials having jurisdiction thereof, or any land from a historic site of national, State, or local significance as so determined by such officials unless (1) there is no feasible and prudent alternative to the use of such land, and (2) such program includes all possible planning to minimize harm to such park, recreational area, wildlife and waterfowl refuge, or historic site resulting from such use; or the use of the property, including any measure(s) to minimize harm (such as any avoidance, minimization, mitigation, or enhancement measures), will have a *de minimis* impact.

As set forth in the Section 4(f) regulations, archaeological resources are protected under Section 4(f) only when their importance is derived from their preservation in place.

The Section 4(f) regulations define three types of “use” of Section 4(f) property (23 CFR Part 774.17):

- (1) When land is permanently incorporated into a transportation facility;
- (2) When there is a temporary occupancy of land that is adverse to the preservation purpose of Section 4(f) as determined by the criteria in 23 CFR 774.13(d); and
- (3) When there is a constructive use of a Section 4(f) property, which occurs “when the transportation project does not incorporate land from a Section 4(f) resource, but the proximity impacts are so severe that the protected activities, features, or attributes that qualify a resource for protection under Section 4(f) are substantially impaired” (23 CFR Part 774.15(a)).

¹ In 1983, Section 4(f) of the USDOT Act was codified as 49 USC §303(c), but this law is still commonly referred to as Section 4(f).

The types of Section 4(f) use are further described below.

Permanent Incorporation: The permanent incorporation of land into a transportation facility occurs when land from a Section 4(f) property is purchased outright for a transportation facility, or when a project acquires the property interest that allows permanent access onto a property such as a permanent easement for maintenance. This permanent incorporation is considered a “use” of Section 4(f) property.

Temporary Occupancy: Temporary occupancy results when Section 4(f) property, in whole or in part, is required for project construction-related activities. The property is not permanently incorporated into a transportation facility but the activity is considered to be adverse in terms of the preservation purpose of Section 4(f). Under the provisions of 23 CFR 774.13(d), a temporary occupancy does not constitute a Section 4(f) use if the following conditions are met: 1) The duration is less than the time needed for the project’s construction and there is no change in ownership of land; 2) The scope of work is minor, in that both the nature and magnitude of changes to the 4(f) property are minimal; 3) No permanent, adverse physical impacts are anticipated, and there will be no temporary or permanent interference with the protected activities, features, or attributes of the property; 4) The land is fully restored, and returned to a condition at least as good as that which existed prior to the project; and 5) The agreement of the official(s) with jurisdiction over the Section 4(f) property regarding the above conditions is documented. If one of more of these conditions is not met, there is a use of the Section 4(f) property, even though the duration of construction related activities is temporary.

Constructive Use: A constructive use involves no physical use of the Section 4(f) property via permanent incorporation of land or a temporary occupancy of land into a transportation facility. According to 23 CFR Part 775.15, a constructive use occurs when the project’s proximity impacts are so severe that the protected activities, features or attributes that qualify the property for protection under Section 4(f) are substantially impaired. This includes situations where the projected noise level increase attributable to the project substantially interferes with the use and enjoyment of a noise-sensitive facility of a property protected by Section 4(f). It also includes situations where the proximity of the proposed project substantially impairs esthetic features or attributes of a property protected by Section 4(f), where such features or attributes are considered important contributing elements to the value of the property.

6.2 DESCRIPTION OF PROPOSED PROJECT

The Raritan River Drawbridge carries NJ TRANSIT’s North Jersey Coast Line (NJCL) across the Raritan River between the Cities of Perth Amboy and South Amboy in Middlesex County, NJ. The proposed project involves the complete replacement of the existing two-track Raritan River Drawbridge with a new two-track moveable bridge. To allow train operations to continue without interruption as the bridge is being constructed, the bridge will be parallel to, and west of, the existing bridge (see **Figure 6-1**). The main span will be a vertical lift to permit the passage of boats beneath the structure at the navigation channel (see **Figure 6-2**). The vertical lift span will provide for a vertical clearance of 110 feet and an unimpeded navigation channel, with a width of approximately 300 feet. The proposed bridge will have regularly spaced catenary support poles carrying the overhead catenary wire that provides power for electric trains. The new bridge will have new overhead catenary wires and traction power cables,





Closed Position



Open Position

supported on independent monopoles with a minimum vertical clearance of 110 feet. The proposed track alignment for the approach tracks leading from the new bridge will converge with the existing NJCL tracks near Market Street in Perth Amboy and just north of the South Amboy Station in South Amboy. As part of the Build Alternative, maintenance-type track work on the existing tracks could extend as far north as New Brunswick Avenue in Perth Amboy and the South Amboy Station area in South Amboy. New interlockings (to permit the movement of trains from one track to another) will be installed within the new track approaches, including one near the South Amboy shoreline at a new connection to Conrail's "Essay Running Track." The proposed track alignment will require the demolition of Essay Tower and a landward shift in Conrail's Essay Running Track in South Amboy.

The westward shift in the bridge from its existing location will also require a corresponding realignment of the railroad as it approaches the crossing from the north and south. New approach tracks will transition over to a connection with the existing tracks of the NJCL approximately 1,000 feet from the river's edge. On the approaches to the Raritan River on either side, fill will be brought to the site to create an embankment within the railroad right-of-way to meet the Design Flood Elevation criteria and vertical profile of the new bridge. Up to approximately 15 feet of fill will be required directly behind the new bridge abutments on both sides of the bridge. On the Perth Amboy side, the fill area is expected to be approximately 900 feet long. On the South Amboy side, the fill area is expected to be approximately 300 feet long along the main track and 200 feet long along Conrail's Essay Running Track. Retaining walls may be required to provide grade separation, and to minimize private property acquisition and wetland impacts. Upon completion of the new bridge, the existing Raritan River Drawbridge (including the approach piers and center swing span pier) and its landside approach tracks within the first 1,000 feet of the river's edge will be removed.

6.3 PURPOSE AND NEED FOR THE PROJECT

The purpose of the proposed project is to address the vulnerability of the existing Raritan River Drawbridge to major storm events, which will enhance the reliability of the NJCL. The existing bridge is more than 100 years old and suffered damage during Sandy that resulted in the suspension of service across the bridge for three weeks after the storm. The proposed project will improve the reliability of the NJCL and minimize delays to rail and maritime traffic by reducing the risk of bridge failures during storm events and as a result of mechanical failures.

Protection of the bridge from future storm events is key to ensuring continued public transportation and freight service on the NJCL, which is the third busiest of NJ TRANSIT's 10 commuter rail lines and the only rail link between shore areas and major job centers. Replacement of the Raritan River Drawbridge is a therefore key element of NJ TRANSIT's resilience program being undertaken throughout the state to repair and restore the transit system and make the system more resilient to future storm events.

6.4 APPLICABILITY OF SECTION 4(f) TO THE PROJECT

6.4.1 PARKLANDS, RECREATIONAL FACILITIES, WILDLIFE AND WATERFOWL REFUGES

The proposed project will not result in the use of any parklands and recreational facilities or wildlife and waterfowl refuges. It will not require any physical occupation of such resources and

will not adversely affect such resources so as to result in a constructive use. Although the Perth Amboy Sadowski Parkway Waterfront Park and future 2nd Street Community Park are adjacent to the right-of-way, the proposed project will not result in the use of these parklands and recreational facilities. It will not require any physical occupation of these resources during construction or operation and will not adversely affect them so as to result in a constructive use. Therefore, Section 4(f) does not apply to these parklands and recreational facilities.

6.4.2 HISTORIC RESOURCES

Section 4(f) historic properties were identified through the Section 106 consultation process pursuant to 36 CFR Part 800. The historic properties located within the Area of Potential Effect (APE) of the proposed project, which was developed in consultation with the NJHPO, and other parties invited to consult on the proposed project's Section 106 review, are listed in **Table 6-1** and shown on **Figures 6-3 and 6-4**. As shown in Table 6-1, the Section 106 process identified 14 historic properties in the area of potential effect (APE), including the two archaeological resources (remains of two boats), previously determined eligible for listing on the NR or recommended as eligible for listing on the NR. Applicability of Section 4(f) regulation to these resources is described below.

6.4.2.1 ARCHAEOLOGICAL RESOURCES

The evaluation conducted for the proposed project in accordance with Section 106 of the National Historic Preservation Act identified the potential for buried maritime archaeological resources to be located within the project footprint within the Raritan River riverbed, and recommended further investigation. The archaeological resources (the two barges; Map ID 6 and 7) and potential resources (possible shipwrecks) identified are significant for their research value, rather than their preservation in place, and therefore they are not protected under Section 4(f).

Section 4(f) applies to archeological sites that are on or eligible for the NR and that warrant preservation in place. Section 4(f) does not apply if FTA determines, after consultation with the NJHPO/THPOs, and the ACHP (if participating) that the archaeological resource is important chiefly because of what can be learned by data recovery (even if it is agreed not to recover the resource) and has minimal value for preservation in place, and the SHPO/THPO and ACHP (if participating) does not object to this determination (See 23 CFR 774.13[b]).

FTA has determined after consultation with the NJHPO that the buried vessels, which are eligible for listing on the NR, are important chiefly because of what can be learned by data recovery and they have minimal value for preservation in place. Stipulations for the data recovery plan and documentation of these archaeological resources have been developed in consultation with the NJHPO as part of the Section 106 process and are included in a draft Programmatic Agreement between FTA, NJHPO, and NJ TRANSIT (see Appendix B). The draft Programmatic Agreement also addresses protocols for additional archaeological investigations within the identified archaeologically sensitive area and stipulates other measures to mitigate the proposed project's adverse effect on archaeological resources that may be encountered during construction.



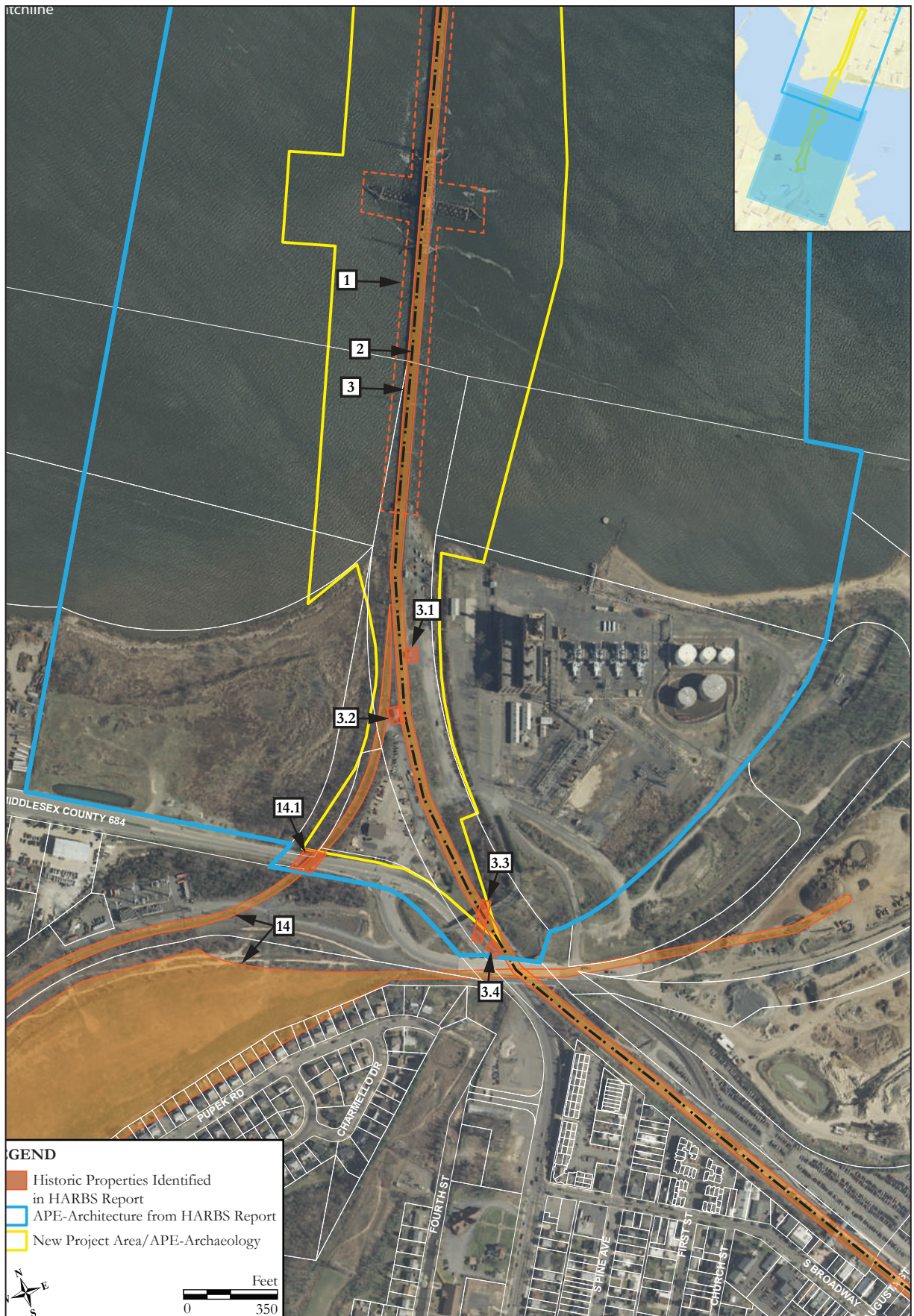


Table 6-1
Identification of Section 4(f) Properties

| Map ID | Property Name/Address | Municipality | NR Current Status/Project Effect | Section 4(f) Use |
|--------|---|--------------------------|--|------------------|
| 1 | Raritan River Swing Span Draw Bridge | Perth Amboy; South Amboy | Eligible (SHPO Opinion: 6/25/1991); Adverse Effect | Use |
| 2 | Overhead Contact System, Pennsylvania Railroad Company | Perth Amboy; South Amboy | Eligible (SHPO Opinion: 4/26/2002); Adverse Effect | Use |
| 3 | New York & Long Branch Railroad (NY&LBRR) Historic District | | | |
| 3.1 | Electric Substation | South Amboy | Previously un-surveyed; Contributing Resource; Adverse Effect to NY&LBRRHD | Use |
| 3.2 | NJ TRANSIT Essay Tower | South Amboy | Contributing (SHPO Opinion: 8/20/2004); Previously un-surveyed; Adverse Effect to NY&LBRRHD | Use |
| 3.3 | Concrete Box Culvert, NJ TRANSIT | South Amboy | Previously un-surveyed; Contributing Resource; No Effect to NY&LBRRHD | No Use |
| 3.4 | Pennsylvania Railroad Bridge 60.84 Remains | South Amboy | Previously un-surveyed; Non-Contributing Resource; No Effect | No Use |
| 4 | Central Railroad of New Jersey Historic District | | | |
| 4.1 | Perth Amboy & Elizabethport Branch Railroad Signal Bridge | Perth Amboy | Previously un-surveyed; Contributing Resource of the CRNJ Perth Amboy & Elizabethport Branch; Adverse Effect | Use |
| 5 | Raritan Copper Works (Former Anaconda Copper Works) | Perth Amboy | New Jersey Register listed; Eligible (SHPO Opinion: 12/23/1977; DOE: 3/7/1978; SR: 11/27/1998); No Effect | No Use |
| 6 | Vessel 98, Traditional Small Barge/Canal Boat | Perth Amboy | Eligible (SHPO Opinion: 7/23/1998); Adverse Effect | No Use |
| 7 | Vessel 99, Traditional Small Barge/Canal Boat | Perth Amboy | Eligible (SHPO Opinion: 7/23/1998); Adverse Effect | No Use |
| 8 | Perth Amboy Pump Station, 2 Second Street | Perth Amboy | Previously un-surveyed; Not Eligible; No Effect | No Use |
| 9 | 52 First Street | Perth Amboy | Previously un-surveyed; Not Eligible; No Effect | No Use |
| 10 | 51 Madison Avenue | Perth Amboy | Previously un-surveyed; Not Eligible; No Effect | No Use |
| 11 | 125 Second Street | Perth Amboy | Previously un-surveyed; Not Eligible; No Effect | No Use |
| 12 | 147 Second Street | Perth Amboy | Previously un-surveyed; Not Eligible; No Effect | No Use |
| 13 | 261 Market Street | Perth Amboy | Previously un-surveyed; Not Eligible; No Effect | No Use |
| 14 | Camden & Amboy Railroad Main Line Historic District (C&ARRMLHD) | | | |
| 14.1 | Pennsylvania Railroad Bridge over Main Street (No. 60.71) | South Amboy | Previously un-surveyed; Contributing Resource to Camden & Amboy RR Main Line HD; No Effect | No Use |

6.4.2.2 ARCHITECTURAL RESOURCES

Six resources (Map ID 8-13) were determined to be ineligible for listing on the NR and the proposed project would not affect these resources; therefore, there will be no Section 4(f) use of these resources. The proposed project will not require the Section 4(f) use of the concrete box culvert (Map ID 3.3), the Pennsylvania Railroad Bridge Remains (MAP ID 3.4), or the Pennsylvania Railroad Bridge over Main Street (MAP ID 14.1), since no adverse effect on these resources will occur.

The proposed project may require the temporary use of a portion of the Raritan Copper Works property (Map ID 5) for construction access; however, as per the provisions of 23 CFR 774.13(d), this temporary occupancy does not constitute a Section 4(f) use since the following conditions are met: 1) The duration of the temporary easement would be less than the proposed project's construction period (the access route would not be needed for the demolition of the existing bridge) and there would be no change in ownership of land; 2) The scope of work would be minor, since the access easement would be on a paved road at the edge of the property; 3) No permanent, adverse physical impacts are anticipated, and there would be no temporary or

permanent interference with the protected activities, features, or attributes of the property; 4) The land would be fully restored, and returned to a condition at least as good as that which existed prior to the proposed project; and 5) The agreement of the official(s) with jurisdiction over the Section 4(f) property regarding the above conditions is documented.

The proposed project will result in the Section 4(f) use of the Raritan River Swing Span Draw Bridge, the catenary system on the bridge and its approach tracks, and several contributing resources to railroad historic districts since it will permanently incorporate these resources into the transportation right-of-way, as described below.

6.5 DESCRIPTION AND USE OF SECTION 4(f) PROPERTIES

The proposed project will have an adverse effect on several railroad-related historic resources that must be removed for construction of the new bridge (see **Figure 6-5**). These include the following:

- Raritan River Drawbridge (MAP ID 1), which is individually eligible and a contributing resource to the New York and Long Branch Railroad Historic District;
- The railroad catenary system, referred to as the “Overhead Contact System” on the Raritan River Draw Bridge and its approach tracks (MAP ID 2);
- An electric substation (MAP ID 3.1), a contributing resource to the New York and Long Branch Railroad Historic District;
- Essay Tower (MAP ID 3.2), a contributing resource to the New York and Long Branch Railroad Historic District; and
- A signal bridge (MAP ID 4.1), a contributing resource to the Perth Amboy & Elizabethport Branch of the Central Railroad of New Jersey Historic District (MAP ID 4).

6.5.1 RARITAN RIVER SWING SPAN DRAW BRIDGE

The Raritan River Swing Span Draw Bridge was constructed in 1906-1908 by the New York and Long Branch Railroad after a joint operating agreement was reached by the Central Railroad of New Jersey and the Pennsylvania Railroad. The Raritan River Swing Span Draw Bridge is significant as an intact late example of its type constructed in larger proportions than other examples in the State of New Jersey.

In addition to its individual eligibility for the NR, the Raritan River Drawbridge has also been identified as a contributing resource to the New York and Long Branch Railroad Historic District (discussed below).

The proposed project involves the removal of the Raritan River Drawbridge, which constitutes a Section 4(f) use of this resource.

6.5.2 OVERHEAD CONTACT SYSTEM

The railroad catenary system that extends across the bridge is part of the Pennsylvania Railroad Overhead Contact System Historic District. The boundaries of the district extend along the NJCL between Rahway, Union County, and South Amboy, Middlesex County. The electrification of this branch was a part of the Pennsylvania Railroad’s major electrification program of its Main Line from New York to Philadelphia during the 1930s.



Raritan River Draw Bridge (Map ID 1) and Overhead Contact System (Map ID 2)



Electric Substation, a contributing resource to the New York and Long Branch Railroad Historic District (Map ID 3.1)



Essay Tower, a contributing resource to the New York and Long Branch Railroad Historic District (Map ID 3.2)



Railroad Signal Bridge, a contributing resource to the Perth Amboy and Elizabethport Branch of the Central Railroad of new Jersey (Map ID 4.1)

The proposed project involves the removal of the Raritan River Drawbridge and its landside approach tracks, and therefore also involves the removal of the associated overhead contact system in this same area. This constitutes a Section 4(f) use of this resource.

6.5.3 NEW YORK AND LONG BRANCH RAILROAD HISTORIC DISTRICT'S ESSAY TOWER AND ELECTRIC SUBSTATION

Completion of the New York and Long Branch Railroad in 1875 established the first all-weather, all-rail transportation link between New York and the New Jersey coast, attracting a previously unprecedented number of seasonal vacationers and year-round residents to the area and encouraging development along its route. The district's period of significance extends from 1872, with the opening of initial service, to 1954, with the opening of the Garden State Parkway at Asbury Avenue. The identified district boundaries extend from Perth Amboy, Middlesex County to Bay Head, Ocean County. The SHPO Opinion of Eligibility included an extensive list of key and contributing resources, which generally consist of, but are not limited to, associated railroad stations, structures and infrastructure. The proposed project will have adverse effects on three contributing resources to this historic district—the Raritan River Drawbridge itself, and two additional resources:

- **Essay Tower (SA Tower)**, an interlocking tower in the South Amboy portion of the project site. Constructed in 1941 during the period of significance of the New York and Long Branch Railroad Historic District, the building retains sufficient integrity to convey its associations with the railroad and contributes to the significance of the historic district.
- **Railroad electric substation**, which has been identified as potentially eligible as a contributing resource. The substation was constructed sometime between 1923 and 1931 at the South Amboy Junction of the New York and Long Branch Railroad. Constructed during the period of significance of the historic district, the building contributes to the significance and character of the historic district and is recommended as a contributing resource.

The proposed project involves the removal of Essay Tower and the electric substation as part of the demolition of the existing bridge and its landside approach tracks. This constitutes a Section 4(f) use of these resources.

6.5.4 CENTRAL RAILROAD OF NEW JERSEY HISTORIC DISTRICT—PERTH AMBOY AND ELIZABETHPORT BRANCH SIGNAL BRIDGE

The Central Railroad of New Jersey's Perth Amboy & Elizabethport Branch Historic District is eligible for listing in the NR because of its role in the transport of passengers to vacation and excursion destinations, including passengers traveling to Atlantic City and commuters to Newark and New York from Monmouth and Ocean Counties; as well as the transport of labor from Elizabethport to southern New Jersey. The district extends from Elizabethport in Union County to the Raritan River. Within this area, a 20th century signal bridge located near the Perth Amboy shore of the Raritan River is recommended for inclusion as a contributing resource to the district. The single-span, Pratt truss bridge was constructed between 1910 and 1931 and carries four sets of triangular pattern color lights (or "tri-lights") over the double track of the NJCL. The resource is a common example of a truss railroad signal bridge installed during the 20th century. Research did not uncover whether the tri-lights currently installed on the

structure are original, but it dates to the period of significance for the historic district and therefore should be considered a contributing resource.

The proposed project involves the removal of the Raritan River Drawbridge and its landside approach tracks, and therefore also involves the removal the signal bridge, which is a contributing resource to the Central Railroad of New Jersey Historic District's Perth Amboy and Elizabethport Branch. This constitutes a Section 4(f) use of this resource.

6.6 AVOIDANCE ALTERNATIVES

Whenever a Section 4(f) property will be used for a transportation project, documentation must be prepared to demonstrate that:

- No feasible and prudent alternative exists to the use of the 4(f) property; and
- The project includes all possible planning to minimize harm to the property.

FTA may not approve the use of a Section 4(f) property if there is a "feasible and prudent" avoidance alternative. Therefore, if any feasible and prudent avoidance alternatives are available, one must be selected. As defined in the regulations (23 CFR § 774.17), an alternative that would not require the use of any Section 4(f) property is an avoidance alternative. Feasible and prudent avoidance alternatives are those that do not cause other severe problems that substantially outweigh the importance of protecting the Section 4(f) property.

As described in 23 CFR § 774.17, an alternative is not feasible if it cannot be built as a matter of sound engineering judgment. An alternative is not prudent if:

- It compromises the project to a degree that it is unreasonable to proceed with the project in light of its stated purpose and need;
- It results in unacceptable safety or operational problems;
- After reasonable mitigation, it still causes:
 - Severe social, economic, or environmental impacts;
 - Severe disruption to established communities;
 - Severe disproportionate impacts to minority or low income populations; or
 - Severe impacts to environmental resources protected under other Federal statutes;
- It results in additional construction, maintenance, or operational costs of an extraordinary magnitude;
- It causes other unique problems or unusual factors; or
- It involves multiple factors of the above, that while individually minor, cumulatively cause unique problems or impacts of extraordinary magnitude.

6.6.1 PROGRAMMATIC REQUIREMENTS

Any replacement bridge alternative must meet certain design requirements and constraints related to its horizontal alignment, vertical alignment, and resilience to storm events. The horizontal alignment should be as straight as practicable, to avoid the need to slow trains for a curve, and should reconnect to the existing main line tracks of the NJCL as soon as practicable, to limit the need for work outside the railroad right-of-way and acquisition of property. Based

on conceptual design information, the new alignment is approximately 50 feet from the existing bridge measured from edge to edge, depending on further engineering. This allows construction almost entirely within NJ TRANSIT's existing right-of-way for the NJCL.

The vertical alignment should be raised as high as practicable, to raise the bridge above flood elevation. However, the maximum elevation that can be achieved is limited by the need to maintain a shallow grade of no more than 1.5 percent to accommodate passenger and freight trains, and the need to reach existing grade to the north and south of the bridge within a short distance. The tracks should meet the existing grade prior to the Perth Amboy and South Amboy rail stations (to the north and south of the bridge, respectively), to avoid the need for modifications to those historic stations. The tracks should also meet the existing grade in South Amboy prior to the roadway overpass near Main Street, to avoid the need for changes of this crossing. The new bridge deck will be approximately ten feet higher than the existing bridge deck (18 feet above mean high water), which will raise the track bed to higher than the NJ TRANSIT Design Flood Elevation, which is 2.5 feet above the FEMA BFE.

6.6.2 AVOIDANCE ALTERNATIVES FOR THE USE OF RAILROAD-RELATED HISTORIC RESOURCES

As shown in **Figures 6-3 and 6-4**, the railroad-related historic resources identified above are all located within the portion of the NJCL that must be replaced as part of the proposed project. Potential avoidance alternatives for each historic resource are discussed below. In finding that an alternative is not feasible or prudent, adverse factors such as environmental impacts, safety, engineering/operational deficiencies, poor transportation service, increased costs, and other factors in addition to the proposed project's programmatic requirements are considered collectively as per Section 4(f) guidance documents. These factors have been considered in determining whether the potential avoidance alternatives are feasible and prudent.

6.6.2.1 RARITAN RIVER DRAW BRIDGE AND OVERHEAD CONTACT SYSTEM

Potential avoidance alternatives for Raritan River Draw Bridge and its overhead contact system are those that do not involve their demolition. These include the No Action Alternative, Rehabilitation Alternative, preservation of the existing bridge and/or its overhead contact system, as discussed below.

No Action Alternative

In the No Action Alternative, the existing Raritan River Drawbridge will remain in service as is, with continued maintenance to address conditions as they arise. In this alternative, the track bed will retain its existing elevation (8 feet above mean high water and 13 feet above mean low water). In this alternative, the elevation for the tracks at top of rail is 19 feet, only 1 foot above the 100-year floodplain. This means that in a severe storm, the bridge girders will be well below the ocean surface and vulnerable to powerful ocean water surges driven by tides and winds, such as occurred during Sandy. The bridge's operating machinery will remain below the 100-year floodplain and subject to continued damage from water infiltration. Prolonged service disruptions will be expected to occur after severe weather events to for emergency repairs and inspections.

The No Action Alternative will require continued operation of trains at the reduced speed limits that have been in place since Sandy, with passenger trains operating at 30 miles per hour (mph) and freight trains operating at 20 mph.

The No Action Alternative will not improve resilience of the Raritan River Drawbridge to severe storms nor address the damage incurred to the bridge during Sandy. Therefore, the No Action Alternative does not meet the project's purpose and need and is not considered a prudent avoidance alternative pursuant to Section 4(f). The No Action Alternative is not prudent since:

- It will compromise the proposed project to a degree such that it is unreasonable to proceed in light of the stated purpose and need;
- It will result in operational problems since prolonged service disruptions are expected to occur after severe weather events for emergency repairs and inspections; train speed restrictions will remain in place; and the condition of the mechanical equipment that operates the swing span will continue to deteriorate and cause delays to waterway users.
- It has the potential to cause severe social and economic impacts, and disruption to established communities, during and following severe weather events; and
- It will result in additional maintenance and operational costs of an extraordinary magnitude since the existing bridge requires regular inspections to ensure its structural integrity and the frequency and severity of future storms is expected to increase.

Rehabilitation Alternative

Rehabilitation or replacement of the existing bridge on the existing alignment, while maintaining train operations across the bridge during construction, is not feasible. While this alternative will avoid removal of the existing structure and the use of the other contributing resources to three NR-eligible railroad historic districts, the bridge itself will be altered substantially. Rehabilitation to address the damage caused by Sandy and to upgrade the bridge to meet current standards and requirements for storm resilience will require extensive retrofitting of substructure and foundation. However, there is inadequate clearance beneath the bridge to drive the required sheetpiles, which means that this alternative is not feasible. Moreover, retrofitting the main span piers will require narrowing the navigation channel and replacing the bridge on its existing alignment will require a complete shutdown of train operations across the river for approximately three years while the new bridge is being constructed, which is not consistent with the project's purpose and need.

An alternative is not feasible if it cannot be built as a matter of sound engineering judgment. Rehabilitation of the existing bridge is not feasible because there is inadequate clearance beneath the bridge to do the necessary work on the substructure and foundation. Therefore, the rehabilitation alternative is not a feasible or prudent avoidance alternative pursuant to Section 4(f).

Preservation of the Existing Bridge Alternative

Construction of a new bridge and preservation of the existing bridge was considered as a potential avoidance alternative. However, the existing bridge is too close to the preferred alignment of the new bridge and the safety clearances of the operating railroad would prohibit public access on the existing bridge. An alignment to the east or west of the existing bridge, at

a distance that would permit use of the existing bridge, would require significant property acquisition on both shores and impact Section 4(f) resources in Perth Amboy (Raritan Copper Works would be affected by a western alignment and the Perth Amboy Sadowski Parkway Waterfront Park and planned 2nd Street Community Park would be affected by an eastern alignment).

Costs to maintain the existing bridge in place would be high and the effects on aquatic habitat would be adverse. For bridge projects, aquatic natural resources can be affected by an increase in shading, which adversely affects the aquatic habitat, and loss of water area because of the presence of the new structure. Preserving the bridge would also adversely affect Perth Amboy's plans for a bikeway/walkway connection between the Geridau Steel property and Sadowski Waterfront Park and reduce the navigational benefits provided by the demolition of the existing bridge.

While this alternative would improve resilience to severe storms, it is not prudent since:

- It would require substantial property acquisition and has the potential to cause significant environmental impacts on aquatic habitat; and
- It will result in additional maintenance and operational costs of an extraordinary magnitude since the existing bridge requires regular inspections to ensure its structural integrity and the frequency and severity of future storms is expected to increase.

Preservation of the Overhead Contact System

Consideration was given to preserving the overhead contact system for use on the new bridge or elsewhere as an avoidance alternative. This catenary system, however, is past its useful life and does not meet the railroad's current electrical standards. Furthermore, it would require extensive retrofitting for use on the new bridge, which will include a vertical lift center span that requires independent monopoles with a minimum vertical clearance of 110 feet. As a result of these considerations, preservation of the overhead contact system is not a feasible and prudent alternative.

6.6.2.2 SOUTH AMBOY HISTORIC RESOURCES

Potential avoidance alternatives for the electric substation and Essay Tower, which are contributing resources to the New York and Long Branch Railroad Historic District in South Amboy include: the No Action Alternative; Rehabilitation Alternative; and Preservation of Existing Bridge Alternative, as described above. As indicated, these alternatives are not feasible and prudent avoidance alternatives.

Since there are no feasible and prudent avoidance alternatives for these resources, shifts in the alignment on the south shore were considered to determine whether demolishing these individual resources could be avoided. The new bridge approach tracks must tie into both the NJCL tracks and Essay Running Track, which requires an adequate turn radius for the operation of freight trains. The horizontal alignment needs to be as straight as practicable, to avoid the need to slow trains for a curve, and should reconnect to the existing main line tracks of the NJCL as soon as practicable, to limit the need for work outside the railroad right-of-way and impacts to wetlands that are located to the west of the existing NJCL tracks. Because the new bridge will be raised 10 feet higher than the existing bridge, the approach tracks must also be

raised to meet the new vertical profile of the bridge. As a result, there will be extensive activity throughout the project area in South Amboy, including filling and grading, installing track drainage, and providing for construction access and staging and laydown areas. This work, which requires the demolition of both the electric substation and Essay Tower, would be necessary under any alignment shift that meets NJ TRANSIT's horizontal profile design criteria. As a result, there are no alignment shifts that would avoid the use of these historic resources.

6.6.2.3 PERTH AMBOY HISTORIC RESOURCES

Potential avoidance alternatives for the railroad signal bridge, which is a contributing resource to the Central Railroad of New Jersey Historic District's Perth Amboy and Elizabethport Branch, and the buried vessels near the shoreline include: the No Action Alternative; Rehabilitation Alternative; and Preservation of Existing Bridge Alternative; as described above. As indicated, these alternatives are not feasible and prudent avoidance alternatives.

Since there are no feasible and prudent avoidance alternatives for these resources, shifts in the alignment on the north shore were considered to determine whether removal of these individual resources could be avoided. Shifting the bridge alignment to the east could potentially avoid the buried vessels located near the shore but would impact the Perth Amboy Sadowski Parkway Waterfront Park and planned 2nd Street Community Park, and still require removal of the signal bridge. Because the new bridge will be raised 10 feet higher than the existing bridge, the approach tracks in this area must also be raised to meet the new vertical profile of the bridge and the signal bridge will need to be removed for this work to occur. As indicated below in Section 6.7, "Measures to Minimize Harm," the potential salvage of the signal bridge is included as a mitigation measure in a draft Section 106 Programmatic Agreement among FTA, NJHPO, and NJ TRANSIT.

6.7 LEAST OVERALL HARM ANALYSIS

Since this Section 4(f) Evaluation concludes that there are no avoidance alternatives that are feasible and prudent, an assessment of "Least Overall Harm" has been undertaken. The assessment of least overall harm involves three activities:

- 1) Explore design modifications to avoid the "use" of each Section 4(f) resource and determine whether these avoidance options are prudent and feasible.
- 2) Examine all possible planning to minimize harm, including reasonable mitigation measures.
- 3) After design modifications have been developed and all possible planning to minimize harm has been incorporated, compare the Section 4(f) uses along with impacts to other environmental resources to determine which option would result in the least overall harm.

6.7.1 DESIGN MODIFICATIONS TO AVOID USE OF SECTION 4(F) RESOURCES

Design modifications to avoid the "use" of each Section 4(f) resource were explored in Section 6.6 "Avoidance Alternatives" and no feasible and prudent options were identified.

6.7.2 MINIMIZATION OF HARM

Through consultation with the NJHPO and other Consulting Parties under Section 106, FTA and NJ TRANSIT have developed measures to mitigate the adverse effect on the NR-eligible Raritan River Swing Span Draw Bridge and other railroad-related historic features. Mitigation measures

are set forth in a draft Section 106 Programmatic Agreement among the FTA, NJHPO, and NJ TRANSIT. Such measures will include:

- Documentation of the bridge and other contributing railroad infrastructure to be removed following Historic American Engineer (HAER) standards.
- Educational and interpretive materials related to the bridge located along the affected NJCL or at NJ TRANSIT's South Amboy and Perth Amboy Station or another acceptable location (such as at the location of interpretive materials being prepared for the South Amboy Intermodal Ferry project).
- Potential salvage of materials and possible reuse for interpretive purposes. These materials include two Pennsylvania Railroad Catenary Poles (and possibly its wiring) from the Raritan River Swing Bridge or its approaches, and the Perth Amboy & Elizabethport Branch Signal Bridge.
- Design review of the proposed project with the NJHPO as the design is advanced, to ensure that design elements of the new bridge are consistent with the historic character of the old bridge, where relevant.

Preserving the existing bridge or part of the bridge was considered as a means of minimizing harm. However, the existing bridge is too close to the alignment of the new bridge and the safety clearances of the operating railroad would prohibit public access. Costs to maintain the existing bridge in place would be high and the effects on aquatic habitat would be adverse. For bridge projects, aquatic natural resources can be affected by an increase in shading, which adversely affects the aquatic habitat, and loss of water area because of the presence of the new structure. Preserving part of the bridge would also adversely affect plans for the bikeway/walkway connection between the Geridau Steel property and Sadowski Waterfront Park.

The feasibility of preserving the electric substation and Essay Tower, by removal during construction of the new bridge and replacement, would be dependent on the structural integrity of each brick building. Regardless of feasibility, this option is not prudent for these contributing resources since public access is prohibited due to proximity to railroad tracks; and these buildings would present attractive nuisances, and create liability hazards, for NJ TRANSIT. Preservation of these structures in a different location is also not prudent, since their historic value relates to their contribution to the railroad's historic district. As indicated above, NJHPO has indicated that documentation of these resources in accordance with HAER standards will mitigate the adverse effects of demolishing these resources.

6.7.3 COMPARISON OF SECTION 4(F) USE OF DIFFERENT OPTIONS

In accordance with the Section 4(f) regulations, if there is no feasible and prudent avoidance alternative, FTA may approve only the alternative that causes the least overall harm in light of the statute's preservation purpose. According to the regulations (23 CFR § 774.3), the "least overall harm" is determined by balancing the following seven factors:

- 1) The ability to mitigate adverse impacts to each Section 4(f) property (including any measures that result in benefits to the property);

- 2) The relative severity of the remaining harm, after mitigation, to the protected activities, attributes, or features that qualify each Section 4(f) property for protection;
- 3) The relative significance of each Section 4(f) property;
- 4) The views of the official(s) with jurisdiction over each Section 4(f) property;
- 5) The degree to which each alternative meets the purpose and need for the project;
- 6) After reasonable mitigation, the magnitude of any adverse impacts to resources not protected by Section 4(f); and
- 7) Substantial differences in costs among the alternatives.

As discussed above, the only alternative that meets the purpose and need for the project is the proposed project itself, and therefore the project constitutes the least overall harm alternative.

6.8 COORDINATION

6.8.1 COORDINATION WITH OFFICIALS WITH JURISDICTION OVER THE SECTION 4(f) RESOURCES

As set forth in the Section 4(f) regulations (23 CFR § 774.5), the Section 4(f) evaluation must be provided for coordination and comment to the officials with jurisdiction over the Section 4(f) resources that will be used by the proposed project, and to the Department of the Interior (DOI). As defined in the regulations (23 CFR § 774.17), for historic sites, the official with jurisdiction is the State Historic Preservation Officer (SHPO), as well as the federal Advisory Council on Historic Preservation (ACHP) if they are participating in the Section 106 review for the Project. For the proposed project, the official with jurisdiction is therefore the NJHPO.

FTA is consulting with the Tribal Historic Preservation Officers of the Delaware Nation, the Delaware Tribe, the Eastern Shawnee Tribe of Oklahoma, and the Shawnee Tribe; and FTA and NJ TRANSIT are consulting with Amtrak, the City of South Amboy, the USCG, and the USACE, regarding the effects of the proposed project on historic resources. The NJHPO is participating in the review of the proposed project being conducted in accordance with Section 106. In addition, this Draft Section 4(f) Evaluation is being provided to the DOI and widely distributed to stakeholders including agencies with jurisdiction over public parklands for review during the public review period on the EA.

6.8.2 PUBLIC INVOLVEMENT

Public outreach has also been conducted as part of the Section 106 consultation process, which is being undertaken pursuant to the National Historic Preservation Act. FTA and NJ TRANSIT have developed measures to minimize harm on the Section 4(f) properties in coordination with NJHPO and consulting parties.

Public information sessions were held in Perth Amboy and South Amboy on September 20, 2016 and September 27, 2016 respectively. No objections to the proposed project were expressed at either of the Public Information Sessions or via comments on the Project web page. A summary of the comments and NJ TRANSIT's responses to those comments are presented in Appendix F, Public Outreach Summary. Some commenters expressed interest in the preservation of a portion of the historic bridge for use as a fishing pier. However, the existing bridge is too close to the alignment of the new bridge and the safety clearances of the

operating railroad would prohibit public access on the pier. One commenter also requested the salvage of the Perth Amboy & Elizabethport Branch Signal Bridge. While FTA and NJ TRANSIT are under no obligation to sponsor or advocate such a proposal, if an appropriate sponsor is identified and required liability agreements can be developed, NJ TRANSIT would coordinate plans for the removal of the Signal Bridge. The salvage of this resource has been listed as a potential mitigation measure in the Programmatic Agreement (see Appendix B).

Public review is also being held concurrently with public review of the EA. The Draft Section 4(f) Evaluation will be made available to the Department of Interior (DOI) and other officials with jurisdiction for comment for a period of 30 days. Any comments received during this review period will be addressed in a Final Section 4(f) Evaluation or in FTA's Finding of No Significant Impact (FONSI), as applicable.



This chapter describes the agency coordination and public participation that is being conducted for the proposed project during its environmental review.

7.1 AGENCY COORDINATION

As discussed in the EA, NJ TRANSIT has consulted with state and federal resource agencies in the preparation of the environmental analysis, including the U.S. Fish and Wildlife Service (USFWS), the National Marine Fisheries Service (NMFS) at the National Oceanic and Atmospheric Administration (NOAA), the New Jersey Department of Environmental Protection (NJDEP) Division of Parks and Forestry Natural Heritage Program (NHP) and the NJDEP State Historic Preservation Office (NJHPO). NJ TRANSIT has held meetings with the U.S. Coast (USCG), U.S. Army Corps of Engineers (USACE), and the Harbor Safety Operations and Navigation Committee of the Port of New York and New Jersey (Harbor Ops) to discuss the proposed project. A summary of the comments on the EA from these resource agencies and NJ TRANSIT's responses to those comments are presented in Appendix F, Agency and Public Coordination.

In addition, the proposed project will include regular coordination with Cooperating and Participating Agencies regarding project progress and any issues of concern related to the project's anticipated permits and approvals. In accordance with the federal Council on Environmental Quality (CEQ) regulations (40 CFR § 1508.5), "Cooperating Agency" means any federal agency, other than a lead agency, that has jurisdiction by law or special expertise with respect to any environmental impact involved in a proposed project or project alternative. A state or local agency of similar qualifications or a tribal government, when the effects are in areas of interest for the purpose of Section 106 consultation under the National Historic Preservation Act with a federally recognized Indian tribe, may, by agreement with the lead agencies, also become a Cooperating Agency. "Participating Agencies" are those federal, state, or local agencies or federally recognized tribal governmental organizations with an interest in the project. See Table 7-1 below for a list of the proposed project's Cooperating and Participating Agencies.

7.2 PUBLIC PARTICIPATION

The public involvement process includes tools and activities for public outreach and engagement, for the purposes of satisfying the public outreach requirements of the National Environmental Policy Act (NEPA) and also of providing information to interested individuals beyond the requirements of NEPA. The tools and deliverables to facilitate this program include, but are not limited to, the following project tasks.

7.2.1 DATABASE

A project outreach database (i.e., mailing list) has been developed and will be maintained throughout the duration of the proposed project. The database includes information on all project stakeholders (elected officials, community groups, maritime users, local businesses, public agencies, affiliated team members, and other interested parties). All issues, correspondence, and feedback received through the NEPA process will be tracked and recorded.

**Table 7-1
Lead, Cooperating, and Participating Agencies**

| Agency | Role | Responsibilities |
|---|---------------------------------------|--|
| Lead Agencies | | |
| Federal Transit Administration (FTA), Region 2 | Federal Lead Agency | Manage environmental review process; prepare EA and decision document; provide opportunity for public and agency involvement; arbitrate and resolve issues |
| NJ TRANSIT | State Lead Agency and Project Sponsor | Manage environmental review process; prepare EA and decision document; provide opportunity for public and agency involvement; arbitrate and resolve issues |
| Federal Agencies | | |
| U.S. Army Corps of Engineers (USACE) | Cooperating Agency | Section 404, Clean Water Act permit Section 10, Rivers and Harbors Act permit |
| U.S. Coast Guard | Cooperating Agency | Section 9, Rivers and Harbors Act permit |
| U.S. Department of Interior | Participating Agency | Consultation related to Section 4(f) of the U.S. Department of Transportation Act |
| U.S. Environmental Protection Agency | Participating Agency | Consultation related to Section 404, Clean Water Act |
| U.S. Fish and Wildlife Service | Participating Agency | Consultation in accordance with Section 7 of the Endangered Species Act |
| NOAA National Marine Fisheries Service | Participating Agency | Consultation in accordance with Section 7, Endangered Species Act; Essential Fish Habitat, Magnuson-Stevens Fishery Conservation and Management Act; Section 10 permit, Section 404 permit |
| Federal Emergency Management Agency, Federal Region II | Participating Agency | Consultation related to resilience and floodplain issues |
| U.S. Department of Homeland Security | Participating Agency | Consultation related to bridge security |
| State Agencies | | |
| New Jersey Department of Environmental Protection (NJDEP) | Participating Agency | Various permits (waterfront development, tidelands instrument, freshwater wetlands, coastal wetlands, New Jersey Pollutant Discharge Elimination System (NJDPDES)) |
| NJDEP, State Historic Preservation Office (NJHPO) | Participating Agency | Consultation under Section 106, National Historic Preservation Act |
| North Jersey Transportation Planning Authority | Participating Agency | Consultation |
| New Jersey Office of Emergency Management | Participating Agency | Consultation |
| New Jersey State Police | Participating Agency | Consultation |
| Local Agencies | | |
| Freehold (Monmouth & Middlesex) Soil Conservation Districts | Participating Agency | NJDPES permit in conjunction with NJDEP |
| Perth Amboy Office of Economic and Community Development | Participating Agency | Consultation |
| South Amboy | Participating Agency | Consultation |
| Middlesex County Division of Planning | Participating Agency | Consultation |

7.2.2 FACT SHEETS

A project fact sheet has been prepared and others will be developed to keep interested parties informed about project developments and key milestones.

7.2.3 WEBSITE

A project website is being maintained to provide information on the project and any upcoming milestones or meetings. The website is accessible through NJ TRANSIT's resilience website (www.njtransitresilienceprogram.com/raritanriveroverview).

7.2.4 TARGETED MEETINGS AND OUTREACH

Targeted meetings with key stakeholders with an interest in the project are being held as needed to identify and address questions and concerns and obtain feedback. Stakeholders include elected officials, neighborhood associations, and local businesses, as well as transportation, environmental and business organizations.

Public outreach conducted to date has included two public information sessions, with targeted outreach to Environmental Justice populations, and a maritime user survey.

7.2.4.1 PUBLIC INFORMATION SESSIONS

Public information sessions were held in Perth Amboy and South Amboy on September 20, 2016 and September 27, 2016, respectively. The Perth Amboy meeting was held in the Community Room of the Alexander F. Jankowski Community Center and the South Amboy meeting was held in the South Amboy Council Chambers. Notices of the meetings were widely distributed and advertised in English-and Spanish-language newspapers. English and Spanish notices of the sessions were posted at the Section 8 housing authorities in Perth Amboy and South Amboy and at the Perth Amboy Public Library and the Sadie Pope Dowdell Public Library. In addition, e-blast notifications and letters were sent to stakeholders in the public outreach database. At the Public Information Sessions a project fact sheet (in English and Spanish) and presentation boards describing the proposed project and NEPA process were available, a short presentation was given, and project team members were available to answer questions. Spanish interpretation services were available at the meetings. No objections to the proposed project were expressed at either of the Public Information Sessions or via comments on the Project web page. A summary of the comments and NJ TRANSIT's responses to those comments are presented in Appendix F, Agency and Public Coordination.

7.2.4.2 WATERWAY USER SURVEY

NJ TRANSIT conducted a Waterway User Survey to gather feedback from the various users of the Raritan River and vicinity. Information on the dimensions of vessels and their official use (commercial or recreational) was obtained. The survey was used to inform the new bridge's vertical and horizontal clearance requirements and the navigation impact report that will support the USCG permit application submitted for the proposed project (see Section 3.7 "Transportation"). A summary of the survey responses is presented in Appendix H, Maritime User Outreach Summary.

7.2.5 SECTION 106 COORDINATION

Section 106 of the National Historic Preservation Act (NHPA; 36 CFR § 800) requires federal agencies to take into account the effects of their undertakings on historic properties that are listed in or meet the eligibility criteria for listing in the National Register of Historic Places (NRHP). Section 106 requires that agency officials work with the New Jersey State Historic Preservation Office (NJHPO) to identify parties to participate in the Section 106 process (“Consulting Parties”). Consulting Parties may include federally recognized Native American tribes (Tribal Government Organizations [TGOs]), local governments, and individuals and organizations with a demonstrated interest in the project due to the nature of their legal or economic relationship to the project or affected historic properties, or their concern with the project’s effects on historic properties. Please see Section 3.6, “Historic and Archaeological Resources,” for additional information on Section 106 outreach coordination.

7.2.6 ENVIRONMENTAL JUSTICE OUTREACH

The environmental justice process requires federal agencies to evaluate and avoid, minimize, and mitigate disproportionately high and adverse human health and environmental impacts to environmental justice communities resulting from federal actions. It also requires federal agencies to ensure public participation by communities with substantial minority or low-income populations who may be affected by a project. The area of Perth Amboy where the proposed project will be built includes environmental justice communities, so outreach efforts were targeted to reach these communities. As indicated above, public information sessions were held in both Perth Amboy and South Amboy. Notices of the meetings were widely distributed and advertised in a local Portuguese publication, *Luso Americano*, and in a local Spanish publication, *El Especialito*, as well as two English publications, *Amboy Guardian* and *Home News*. English and Spanish notices of the sessions were posted at the Section 8 housing authorities in Perth Amboy and South Amboy and at the Perth Amboy Public Library and the Sadie Pope Dowdell Public Library. At the Public Information Sessions a project fact sheet was available in English and Spanish. Spanish interpretation services were available at the meetings. No objections to the proposed project were expressed at either of the Public Information Sessions or via comments on the Project web page. ■

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Raritan River Bridge Replacement EA

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