Executive Summary

ES.1 INTRODUCTION

New Jersey Transit Corporation (NJ TRANSIT[1]) proposes to design and construct the NJ TRANSITGRID TRACTION POWER SYSTEM (proposed Project), a first-of-its-kind "microgrid" designed to provide highly reliable power to support limited service in a core segment of NJ TRANSIT's and Amtrak's[2] critical service territory. As defined by the US Department of Energy (DOE), a microgrid is a local energy grid with "control capability," which means it can disconnect from the commercial power grid and operate autonomously (DOE 2014a).

The Federal Transit Administration (FTA) selected the NJ TRANSITGRID TRACTION POWER SYSTEM as one element of the "NJ TRANSITGRID" project, a Public Transportation Resilience Project in response to Superstorm Sandy. FTA's selection of the proposed Project makes it potentially eligible for funds made available under the Disaster Relief Appropriations Act of 2013 (Pub. L. 113-2). FTA's selection of the NJ TRANSITGRID project was published in Federal Register Notice Vol. 79, No. 214, 65762-65765 on Wednesday, November 5, 2014 (Table 1, Funding ID D2013-RESL-009 "NJ TRANSITGRID").

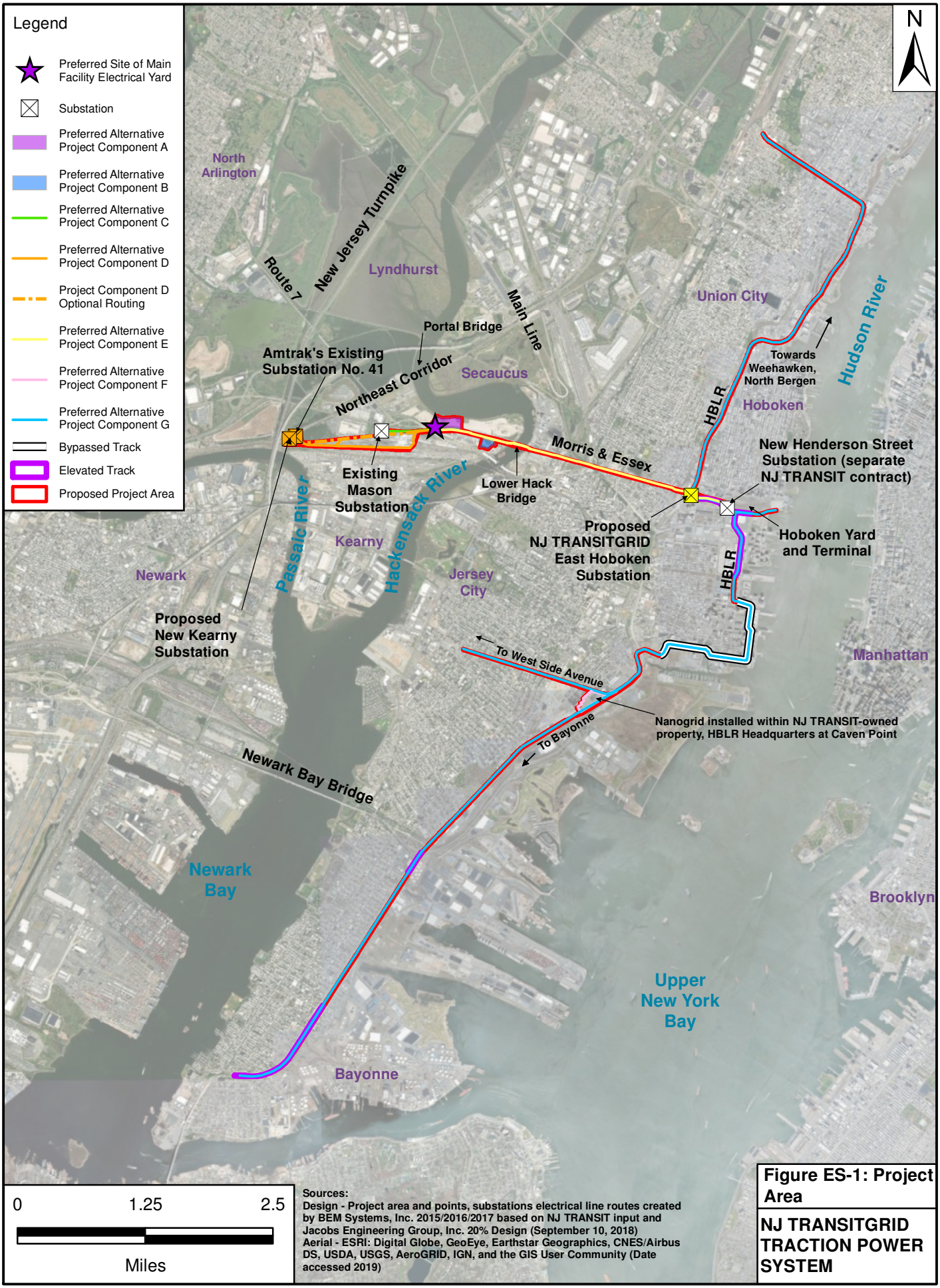
The proposed NJ TRANSITGRID Project selected by FTA consists of two elements.

1. NJ TRANSITGRID TRACTION POWER SYSTEM – The proposed Project would include a natural gas-fired electric power generating plant (referred to as the Main Facility), and the electrical lines, substations and other emergency generators to distribute the power to required areas (see Figure ES-1). The Main Facility would utilize combined-cycle technology resulting in power generation capacity of approximately 104 to 140 megawatts (MW). The preferred site for the Main Facility is in Kearny, Hudson County, New Jersey (see Figure ES-2).

2. NJ TRANSITGRID DISTRIBUTED GENERATION SOLUTIONS that would provide power to certain train stations, bus garages and other transportation infrastructure in northeastern New Jersey.

[1] NJ TRANSIT is a state-owned public transportation system that serves the State of New Jersey, along with portions of New York State and Pennsylvania. It operates bus, light rail, and commuter rail services throughout its service area, connecting major commercial and employment centers both within the state and in the adjacent major cities of New York City and Philadelphia. Covering a service area of 5,325 square miles, NJ TRANSIT is the largest statewide public transit system and the third-largest provider of bus, rail, and light rail transit by ridership in the United States.

[2] Amtrak, the National Railroad Passenger Corporation, is a passenger railroad service that provides medium- and long-distance intercity service in the contiguous United States and to three Canadian cities. In New Jersey, Amtrak operates approximately 110 trains daily. Under joint benefit and agreements, NJ TRANSIT operates more than 400 weekday trains along Amtrak's Northeast Corridor.



Sources:
Design - Project area and points, substations electrical line routes created by BEM Systems, Inc. 2015/2016/2017 based on NJ TRANSIT input and Jacobs Engineering Group, Inc. 20% Design (September 10, 2018)
Aerial - ESRI: Digital Globe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community (Date accessed 2019)

Figure ES-1: Project Area

NJ TRANSITGRID TRACTION POWER SYSTEM

Path: \\atlas\GISDATA\Projects\NJ_Transit\Tier3\TransitGrid\2019_DraftEIS\Rev0\FigureES_1_ProjectArea.mxd

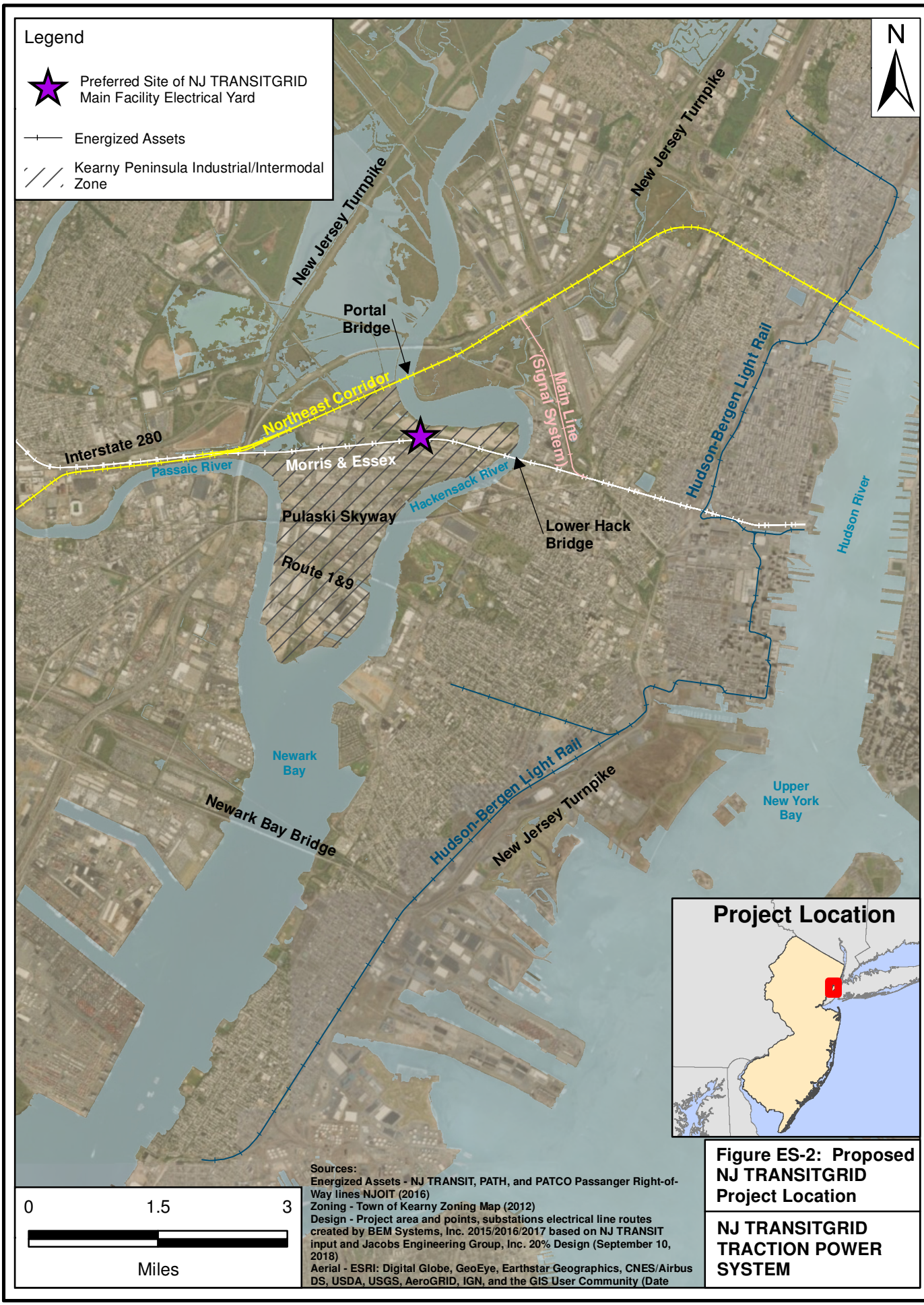


Figure ES-2: Proposed NJ TRANSITGRID Project Location

NJ TRANSITGRID TRACTION POWER SYSTEM

Path: \\atlas\GISDATA\Projects\NJ_Transit\Tier3\TransitGrid\2019_DraftEIS\Rev0\FigureES_2_ProjectLocation.mxd

As the administer of potential federal funds, FTA is therefore the designated federal lead agency responsible for implementing the National Environmental Policy Act of 1970 (NEPA) pursuant to NEPA implementing regulations 40 CFR Part 1500-1508 and US Department of Transportation (DOT) implementing regulations 23 CFR 771. Because of the potential for the proposed NJ TRANSITGRID TRACTION POWER SYSTEM to have significant environmental impacts, FTA has directed the preparation of this Draft Environmental Impact Statement (DEIS) for that element in accordance with 23 CFR 771.123.

The NJ TRANSITGRID DISTRIBUTED GENERATION SOLUTIONS elements would be constructed and function independently from the NJ TRANSITGRID TRACTION POWER SYSTEM project and provide independent utility with regard to mass transit resilience. Therefore, FTA has determined that the NJ TRANSITGRID DISTRIBUTED GENERATION SOLUTIONS elements will undergo separate environmental review pursuant to 23 CFR 771 and are not included in this DEIS.

ES.2 PURPOSE AND NEED FOR THE PROJECT

The purpose of the proposed Project is to enhance the resiliency of the electricity supply to the NJ TRANSIT and Amtrak infrastructure that serves key commuter markets in the New York and New Jersey metropolitan area to minimize public transportation service disruptions. The region's public transportation infrastructure is vulnerable to power outages due to the increasing intensity and frequency of severe weather events which can damage existing power systems. Also, the nature of the current centralized power distribution system creates dependencies on a single power supply and distribution system.

The need for the proposed Project is based on the vulnerability of the commercial power grid that serves NJ TRANSIT's and Amtrak's Northeast Corridor rail service. Over 143,000 commuters use the NJ TRANSIT rail system daily, including those who transfer to other regional public transportation systems. Additionally, in 2016 an average of just under 52,000 daily riders also utilized the NJ TRANSIT operated Hudson-Bergen Light Rail[3] (HBLR). It is also subject to the same power vulnerabilities since it is powered by the commercial electric grid. Reliable electric power is essential to regional mobility because diesel trains are not permitted to operate in the Hudson River rail tunnels due to diesel exhaust, so electric locomotives are required. Electric power is also necessary to operate the signal system to safely route train movements and to power ventilation equipment and pumps in the tunnels. Critical emergency activities require electricity to prepare for and recover from flooding events and damaging winds. Critical emergency facilities including maintenance facilities, pump stations, and emergency operation centers need

Photo showing interior of flooded Hoboken Terminal following Sandy in 2012.

[3] The Hudson–Bergen Light Rail (HBLR) is a light rail system in Hudson County, New Jersey. Owned by NJ TRANSIT and operated by the 21st Century Rail Corporation, it connects the communities of Bayonne, Jersey City, Hoboken, Weehawken, Union City, and North Bergen.

to be energized to pump water from the tunnels and to inspect equipment before returning trains to normal operating service. Despite the use of emergency diesel generators, which offer some degree of resilience (although extended use raises fuel availability concerns and impairs air quality), the region's rail transportation system was largely shut down due to flooding and power outages after Superstorm Sandy in 2012, with enormous economic and societal consequences. The loss of rail service in its entirety for nearly a week challenged all prior expectations of the system's resilience.

Following Superstorm Sandy, the Department of Energy (DOE) partnered with the State of New Jersey to examine the use of microgrids to help supply electricity during future extreme weather events. This proposed Project is a result of that partnership and is designed to meet the objectives of national and state energy goals[4] by contributing to diverse portfolios of cleaner and more resilient energy generation systems.

The analysis of potential environmental effects is based on NJ TRANSIT's 20% design package for the microgrid, dated September 10, 2018. While the design details of the Main Facility will continue to be refined as engineering stages progress, the environmental analyses in this document evaluate a reasonable worst-case impact scenario of the proposed equipment and footprint identified in the 20% design review package. To provide the most conservative environmental impact analyses, this DEIS assumes the proposed Project would include five natural gas turbines and one steam turbine with a total output of 104MW to 140MW of mechanical power operating at maximum capacity. This accounts for the optional use of excess power generation capacity to stabilize power output fluctuations as load demand (total power required) changes and will accommodate uninterrupted service while allowing for routine maintenance on the power generation equipment. Additionally, the potential installation methods for the electrical lines (e.g., monopoles, duct banks, submarine cable, directional drilling, and attachment to existing transportation infrastructure) are included in the project description for this DEIS.

The overarching premise for the proposed Project is for the microgrid to generate enough independent power in a resilient manner to energize the identified transportation assets during emergencies. The power generated by the microgrid would replace power that NJ TRANSIT would otherwise purchase through the commercial grid. While the operation of the microgrid would require facility maintenance and the purchase of natural gas for power generation, it is expected that these operational costs will be offset by energy savings and sales. More notably, the microgrid would be resilient, making the transportation system substantially less vulnerable to outages, and thereby able to provide reliable and safe service to commuters. In the event of a necessary evacuation or other emergency situation, commuters would have reliable access to transportation out of harm's way and to central meeting and safe shelter locations such as area hospitals, schools and churches. This would protect trans-Hudson and other commuters from being stranded during weather and non-weather-related events that cause outages to the commercial grid.

[4] State energy goals are included in the New Jersey Energy Master Plan, updated in 2015. Some national energy goals are included in the DOE's Strategic Plan for 2014-2018.

ES.3 SITING OF MAIN FACILITY

In 2015, NJ TRANSIT conducted a siting analysis for the selection of the location of the proposed Main Facility. Transmission losses of electricity are proportional to distance. In order to maximize efficiency of the microgrid, it needs to be located in close proximity to Amtrak's Substation No. 41 (servicing the high ridership Northeast Corridor) and NJ TRANSIT's Mason Substation (servicing the Morris & Essex Line) as these two centrally located substations would receive the highest power input from the microgrid via electrical lines that would run from the generation site to the substations. Therefore, the siting analysis focused on screening 21 industrial properties on the Kearny Peninsula (where both substations are located) based on criteria related to land availability and how well each evaluated site would support the purpose and need established for the proposed Project. This siting analysis lead to the selection of the preferred site for the Main Facility in Kearny, Hudson County, New Jersey. The remaining 20 sites were eliminated from consideration due to feasibility of achieving connectivity and site distance to the railroad, existing and planned land uses, potential impacts to wetlands and other natural resources, and existing contamination. The preferred site is part of a large tract of land referred to as the Koppers Koke Site, currently owned by the Hudson County Improvement Authority (HCIA), which lies within the Koppers Coke Redevelopment Area (Redevelopment Area)[5]. The Meadowlands Regional Commission (MRC) (formerly New Jersey Meadowlands Commission [NJMC]), which resides within and is managed by the New Jersey Sports and Exposition Authority[6] (NJSEA), is seeking to encourage brownfield redevelopment on this parcel.

The entire Koppers Koke property is approximately 170 acres. HCIA has prepared approximately 126 acres of the Koppers Koke property for development by significantly elevating the site above the minimum design flood elevation (DFE) criteria to comply with New Jersey's Uniform Construction Code (UCC) and other relevant requirements (5 New Jersey Administrative Code [N.J.A.C.] § 23 [2013]). NJ TRANSIT's DFE for the Main Facility is +12.0 feet relative to the North American Vertical Datum of 1988 (NAVD88). This consists of using the Federal Emergency Management Agency (FEMA) base flood elevation[7] (BFE) of +8.0 feet NAVD88 and adding 2.5 feet to adjust for relative sea level change (SLC) expected over the 50-year Project life at this preferred location. The Sea Level Rise (SLR) calculation was obtained from the National Oceanic and Atmospheric Administration (NOAA) online SLC calculator using the NOAA Intermediate-High scenario, which projects an increase in sea level of 2.5 feet over the next 100 years. To this value a minimum of +1.0 foot was added, as required by the FTA for construction in the coastal zone (Emergency Relief Program, Interim Final Rule), as well as an additional +0.5-foot factor of safety that acknowledges the criticality and cost of the state's railroad infrastructure, for a final DFE of +12 feet

[5] *Koppers Coke Redevelopment Plan, Kearny, New Jersey.* Adopted by the New Jersey Meadowlands Commission (NJMC) Resolution No. 13-07 on February 27, 2013.

[6] NJSEA is the regional planning and zoning agency for the 30.4-square-mile Hackensack Meadowlands District through its absorption of the former New Jersey Meadowlands Commission (NJMC) in 2015, (*http://www.njsea.com/njmc/about/who-we-are.html*).

[7] The computed elevation to which floodwater is anticipated to rise during the base flood (i.e., flood with a 1% annual chance of occurrence). Base Flood Elevations (BFEs) are shown on Flood Insurance Rate Maps (FIRMs) and on the flood profiles. The BFE is the regulatory requirement for the elevation or floodproofing of structures. The relationship between the BFE and a structure's elevation determines the flood insurance premium (*https://www.fema.gov/base-flood-elevation*).

NAVD88. The current ground elevations of the Koppers Koke property are approximately +25 feet NAVD88, so the site complies with the NJ TRANSIT DFE as well as FTA's Emergency Relief Program 49 U.S.C. 5324 section 4.2.3 Floodplain Management. Using this approach will greatly increase the microgrid's storm resiliency and therefore NJ TRANSIT and Amtrak's service resilience to future storm events, such as Superstorm Sandy.

The high vulnerability of the regional commercial power is also documented by the *Overview of New Jersey Power Outages: Risks to the New Jersey Grid,*[8] which indicates a trend of increasing number of outages reported and number of days of power disruption due to hurricane/tropical storms over the past 20 years. This is likely a result of both increased severity of the storms as well as increasing vulnerability of an aging power grid. Using the Hazard Mitigation Cost Effectiveness (HMCE) Tool[9] to determine qualitative benefits from the proposed Project, resilience damages were looked at in terms of recurrence intervals (years). After the proposed Project is complete, flood-induced service interruptions would be reduced from an approximately 1% annual chance of occurrence (equivalent to Superstorm Sandy) to approximately a 0.0009% annual chance of occurrence. In other words, the proposed Project, at the increased elevation of at least 12 feet above the DFE (at approximately +25 feet NAVD88), would provide an extremely high level of protection from coastal flooding.

NJ TRANSIT would use approximately 26 acres within the Redevelopment Area that NJ TRANSIT is acquiring as part of unrelated litigation. The Main Facility (Preferred Alternative Project Component A) would occupy 20 acres within the Koppers Koke Site. A new metering station and connection to existing natural gas pipelines (Preferred Alternative Project Component B) would be installed within a six-acre parcel located south of the Morris & Essex Line (see Figure ES-3).

Based on comments received during the scoping process in early 2016 for this DEIS, alternative sites, outside of Kearny, NJ, were identified and evaluated for their ability to meet the goals and objectives established for the proposed Project. Three sites were selected for further analysis, one in Harrison, NJ, and two in Jersey City, NJ. However, as detailed in Chapter 2, "Project Alternatives," the three sites outside of Kearny were eliminated from further consideration because they did not meet all aspects of the siting criteria and did not offer any advantage over the use of the selected Kearny site. The primary reasons for elimination of the three sites outside of Kearny were as follows: the sites were located at greater distances from NJ TRANSIT's Mason Substation and Amtrak's Substation No. 41 resulting in increased length of electrical lines, thereby decreasing capacity and efficiency of the electrical lines; required property acquisition; and required environmental investigations and potential remediation to enable use of said sites.

ES.4 PROJECT ALTERNATIVES

The project alternatives analyzed in detail in the DEIS include the No Action Alternative and one Build Alternative. NEPA requires consideration of the No Action Alternative to allow decision makers to

[8] *Overview of New Jersey Power Outages: Risks to the New Jersey Grid*. Rutgers University Center for Energy, Economic & Environmental Policy. March 6, 2014.

[9] *U.S. Department of Transportation, Federal Transit Administration 2014.*

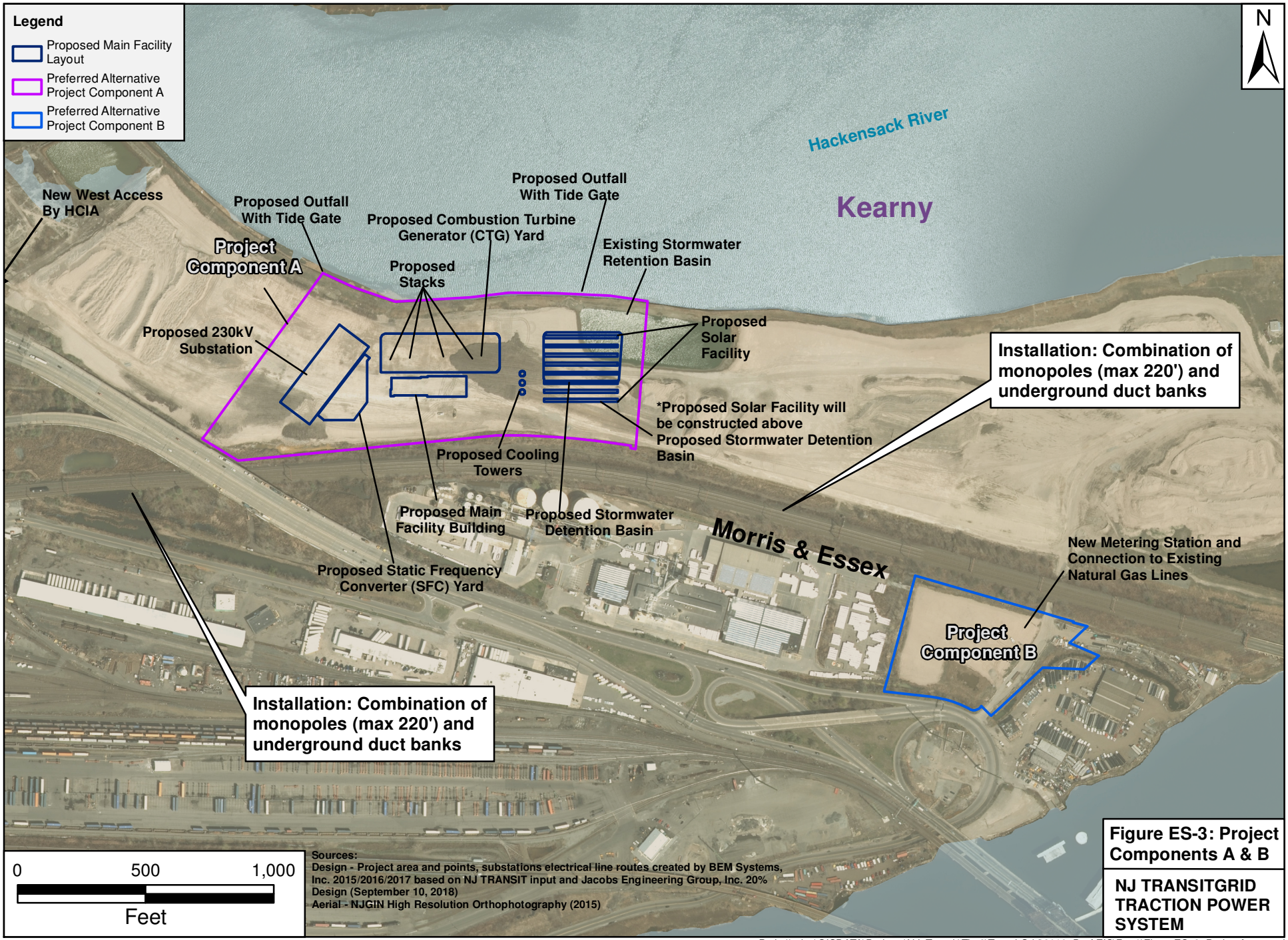


Figure ES-3: Project Components A & B

NJ TRANSITGRID TRACTION POWER SYSTEM

Path: \\atlas\GISDATA\Projects\NJ_Transit\Tier3\TransitGrid\2019_DraftEIS\Rev0\FigureES_3_ProjectArea.mxd

compare the impacts of approving the proposed Project with the impacts of not approving the proposed Project. The two alternatives for the proposed Project are described below.

ES.4.1 No Action Alternative

Under the No Action Alternative, the proposed Project would not be constructed, and NJ TRANSIT and Amtrak would both continue to be served by the existing commercial grid. Without the microgrid, commuter and intercity rail service in Amtrak's and NJ TRANSIT's core service territory would remain vulnerable to power outages. The regional power grid is operated by a local grid operator. That operator is known as PJM (Pennsylvania Jersey Maryland, LLC). PJM extends the reach of NJ-based utilities to a larger geographic area covering 13 northeast and mid-Atlantic states and the District of Columbia serving 61 million people. PJM can also accept independent power providers who initiate their own power generation concepts with an intention of selling surplus power to the regional grid. The commercial grid is vulnerable, however, to local power disruptions in that it must then manage distribution of remaining regional power in such a way that critical needs are met without overloading the remaining providers. As was demonstrated during Superstorm Sandy and other storms, the local commercial utility power system in New Jersey is vulnerable to weather-related outages. These power outages could leave NJ TRANSIT's service disrupted and incapable to operate for several days, if not longer, due to the dependency of the rail system on the existing commercial grid.

During a future storm event equivalent to a 100-year storm event (i.e., a storm with a 1% annual chance of occurrence), there may be system outages as seen during Superstorm Sandy that would leave NJ TRANSIT's service disrupted and incapable to operate for several days, if not longer, due to the dependency of the rail system on the existing commercial grid. These storms are expected to become more frequent in the future. Under the No Action Alternative, other planned and programmed transportation improvements for which funding and commitment have been identified would take place by 2021, independent of the Build Alternative, but these would not improve the resiliency of NJ TRANSIT's traction power. These include projects in NJ TRANSIT's Resilience Program, Amtrak initiatives that will affect operations on the Northeast Corridor, and HCIA plans for warehousing development on portions of the Koppers Koke property. However, during future widespread power outages, the benefits of NJ TRANSIT possessing a reliable power source to move commuters between Manhattan and other destinations in northern New Jersey would not be realized. There would be a missed opportunity to increase commuter safety and security in future widespread power outages.

In the absence of the proposed Project, Amtrak has plans to completely replace and rebuild Substation No. 41. Amtrak is currently proceeding with reconstruction of certain elements of Substation No. 42, which is located east of the Project area at the entrance to the North River Tunnels in Weehawken, NJ, including the installation of a new Control House. Under the No Action Alternative, NJ TRANSIT intends to acquire the 20-acre parcel on the Koppers Koke Site as well as the six-acre parcel from HCIA. This acquisition is currently moving forward under a Settlement Term Sheet agreed to by NJ TRANSIT and HCIA, as discussed in Chapter 2, "Project Alternatives." In the absence of the proposed Project, it is likely these portions of the Koppers Koke Site would be used for other NJ TRANSIT transportation purposes consistent with local zoning and redevelopment plans.

ES.4.2 Build Alternative

NJ TRANSIT is considering one Build Alternative, which would include a Main Facility with a potential power output between 104MW and 140MW, the installation of up to 19.6 miles of new electrical lines, the construction of two new electrical substations, and the installation of emergency generators (the "nanogrid"[10]) at HBLR Headquarters. The primary fixed facilities (including Project Components A and B) would be built within the Redevelopment Area on a 20-acre footprint (for the Main Facility) and a separate 6-acre area (for new metering stations and pipeline connections). All construction activities would take place within transportation rights-of-way or within existing easements, as noted in Chapter 3 "Land Use, Zoning and Public Policy." The NJ TRANSITGRID TRACTION POWER SYSTEM Project Components A through G are integrated and contingent and cannot operate independently of each other without compromising the overall microgrid's purpose and need in servicing the daily commuter ridership (as shown in Figures ES-1 and ES-3):

- Preferred Alternative Project Component A: Construction of a power generating plant, project substations, transformers, frequency converters, and other equipment on the 20-acre site within the Redevelopment Area. The power generating equipment for the Build Alternative consists of:
    - Five gas turbines (21MW to 25MW each);
        - Two of these will be connected to heat recovery steam generators (HRSG)
    - One steam turbine (14MW to 18MW);
    - Two emergency "black start[11]" reciprocating engines (not to exceed 2.5MW each); and
    - A solar facility generating approximately 0.6MW occupying approximately four acres on the Main Facility site.

The Main Facility building would include approximately 32,000 square feet of working and office space. Four of the 20 acres would be utilized for construction of a solar facility generating approximately 0.6MW, built above a stormwater detention basin. Preferred Alternative Project Component A also includes installation of a new stormwater collection, detention and discharge system and the installation of new water supply and sewer connections to existing municipal water and sewer systems. In the early design stages, NJ TRANSIT has proposed a driveway for access to the Main Facility site. The driveway would be connected to westbound lanes of Route 7 and would provide access along the southwest boundary of the Koppers Koke site to the Main Facility footprint.

[10] The nanogrid consists of two natural gas-fired emergency generators capable of producing the necessary power (approximately 2MW each) for the southern segment of the HBLR, which is in addition to the 104MW to 140MW that would be produced by the microgrid. It would include some measure of stored energy in the form of batteries or flywheels to smooth the instantaneous load profile of the HBLR traction loads. The term "nanogrid" refers to small microgrids that typically serve a single building or a single load. For the proposed Project, during commercial power outages, the nanogrid would serve the southern segment of the HBLR from Essex Street Station in Jersey City to 8th Street Station in Bayonne. The West Side Avenue segment in Jersey City will also be powered by the nanogrid when the commercial power grid is down.

[11] A "black start" is the process of restoring an electric power station or a part of an electric grid to operation without relying on the external electrical transmission network. Normally, the electric power use within the plant is provided from the plant's own generators.

- Preferred Alternative Project Component B: Construction of a new pipeline interconnection and new natural gas metering stations on the six-acre parcel located south of the Morris & Essex Line, within the Redevelopment Area.
- Preferred Alternative Project Component C: Installation of approximately 0.7 miles of new electrical lines from the Main Facility to NJ TRANSIT's existing Mason Substation. Electrical lines would be installed through combination of monopoles (maximum 220 feet tall) and underground duct banks (maximum six feet deep) within transportation right-of-way along the Morris & Essex Line.
- Project Component D: Installation of electrical lines from the Main Facility to Amtrak's existing Substation No. 41 and the new Kearny Substation. The Preferred Alternative for the electrical line from the Main Facility to the new Kearny Substation would be routed through the existing rail line and through the rail yard in the area of the Meadowlands Maintenance Complex (MMC) and the Morris & Essex Line. The Morris & Essex Line in this area is a highly congested utility corridor. To avoid the existing utilities, under the preferred routing, the electrical line for Project Component D would depart from the Morris & Essex Line east of the Mason Substation and travel south around the MMC buildings and west along the MMC access rail toward Cedar Creek Marsh South (total of 1.47 miles). Once it reaches Cedar Creek Marsh South, the electrical line would continue to the existing Amtrak Substation No. 41 gantry and on to the location of the new Kearny Substation, within NJ TRANSIT and Amtrak rights-of-way. As an optional routing, the electrical line could travel along the Morris & Essex right-of-way until it reaches Cedar Creek Marsh South (total of 1.35 miles). Due to a number of factors, including access, existing local utilities and geology, the electrical line to the new Kearny Substation could travel south briefly from the Morris & Essex Line before reaching the marsh (total of 1.39 miles). Electrical lines would be installed through combination of monopoles (maximum 220 feet tall) and underground duct banks (maximum six feet deep) within existing transportation right-of-way. Preferred Alternative Project Component D would also include construction of the new Kearny Substation in Cedar Creek Marsh South on Amtrak property. A new Kearny Substation would be located adjacent to the existing Substation No. 41 to accommodate the new connections from the Main Facility to the Northeast Corridor, replacing the function of the existing Substation No. 41. Project Component D would also include decommissioning and removal of existing Substation No. 41 equipment, leaving the existing pad and lattice structures in place to be used for routing of new electrical lines.
- Preferred Alternative Project Component E: Installation of approximately three miles of new electrical lines from the Main Facility to a new NJ TRANSITGRID East Hoboken Substation, with electrical lines continuing to Henderson Street Substation. Electrical lines would be installed through combination of monopoles (maximum 220 feet tall from the Main Facility to the Hackensack River and maximum 65 feet tall from the Hackensack River to the Henderson Street Substation in Jersey City) and underground duct banks (maximum six feet deep) within transportation right-of-way. The Preferred Alternative for the Hackensack River crossing is via aerial crossing (maximum 220 feet tall) approximately 50 feet north of the Lower Hack Bridge, but optional crossings via submarine cable or by directional drilling were also evaluated. Preferred Alternative Project Component E also includes installation of a segment of the electrical line

through an existing NJ TRANSIT-owned tunnel (south tube of the Bergen Tunnels), as well as construction of the new NJ TRANSITGRID East Hoboken Substation. Where the electrical line travels from the new NJ TRANSITGRID East Hoboken Substation, the electrical line would also be attached to NJ TRANSIT-owned structures (i.e., HBLR bridge).

- Preferred Alternative Project Component F: For connectivity to the southern portion of HBLR, a smaller "nanogrid" would be installed on NJ TRANSIT-owned property at the HBLR Headquarters on Caven Point Avenue in Jersey City. The nanogrid would consist of two natural gas-fired emergency generators capable of producing approximately 2MW each to power the HBLR south loads (approximately 8.66 miles). Natural gas connections are already in place at HBLR Headquarters and the existing connections will be used for the two natural gas-fired emergency generators. Some measure of stored energy is also anticipated to be required in the form of batteries or flywheels to help smooth out the instantaneous load profile of the HBLR traction loads.
- Preferred Alternative Project Component G: Installation of approximately 14.4 miles of new electrical lines from the new NJ TRANSITGRID East Hoboken Substation to substations along the HBLR to provide power to the entirety of the HBLR. The three routes of the HBLR that would receive power from the proposed Project are Tonnelle Avenue, operating between North Bergen and Hoboken; 8th Street, operating between Bayonne and Hoboken; and West Side Avenue, operating in Jersey City. Electrical lines would be installed on new utility poles (maximum 39 feet tall), in underground duct banks (maximum six feet deep), or attached to existing elevated HBLR structures, all within the HBLR right-of-way.

ES.5 SUMMARY OF POTENTIAL SOCIAL, ECONOMIC, AND ENVIRONMENTAL IMPACTS

Under the No Action Alternative, Amtrak intends to replace the existing Substation No. 41 with a new substation on an elevated concrete pad on piers in Cedar Creek Marsh South. Additionally, the existing lattice towers in the marsh will be replaced with a monopole to carry electrical lines. Therefore, under the No Action Alternative, approximately two acres of Cedar Creek Marsh South will be impacted. These waters are hydrologically restricted from the Hackensack River due to active tide gates and the habitat value is low relative to other more connected portions of Cedar Creek Marsh. Under the Build Alternative, the proposed Project would construct the replacement substation in Cedar Creek Marsh South, so the environmental effects of that construction were evaluated as part of the Build Alternative as well.

The effects of the Build Alternative, including the cumulative effects of each Project Component, on the full range of social, economic, and environmental impacts are presented in Table ES-1. While the Build Alternative would not result in significant adverse effects on social, economic or environmental conditions in the study area that could not be mitigated, there would be some non-significant impacts alleviated by proposed, suitable and commensurate mitigation to the following evaluated environmental categories: Air Quality, Greenhouse Gas (GHG) Emissions, Historic Resources, Traffic and Public Transportation, Natural Resources, and Utilities. Additionally, temporary construction impacts would occur and are

evaluated in this DEIS and would also be reduced with provided mitigation measures. As designed, the Build Alternative is not anticipated to pose any State or Federal regulatory permitting compliance issues[12].

The environmental analyses considered the potential effects in study areas that were defined for each specific environmental topic area. Effects on Air Quality, GHG Emissions, Visual, Historic Resources, and Utilities may differ based on the final Main Facility configuration and connectivity options chosen but the analysis in this DEIS represents potential worst-case effects. The analysis presented describes the effects of normal operating conditions. If the potential effects under emergency operating conditions differ from those of normal operating conditions, those effects are described separately in the appropriate resource chapters.

[12] Anticipated permits include: New Jersey Pollutant Discharge Elimination System (NJPDES) Permit for the discharge of water directly into the Hackensack River channel; New Jersey Department of Environmental Protection (NJDEP) Flood Hazard Area (FHA) Individual Permit and FHA Verification for the proposed fill and development activities within the floodplain associated with the Hackensack River; NJDEP Waterfront Development Upland (WFD) and In-Water Individual Permit for activities located within the WFD Zone and below the mean high water line of the Hackensack River; Water Quality Certificate for the disturbances proposed within waters of the United States and wetlands; Untied States Army Corps of Engineers (USACE) Section 10/404 Individual Permit for the proposed wetland and navigable water disturbances and fill activities; and Title V Air Permit.

Table ES-1 Summary of Potential Impacts and Mitigation for Build Alternative

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
Land Use, Zoning and Public Policy	The Build Alternative is compatible with land use, zoning, and public policy in the study area. The preferred site for the Main Facility is currently a vacant brownfield site. The MRC/NJSEA is seeking redevelopment of brownfield sites in their jurisdiction. The proposed Project would return the property, which has laid dormant for 40 years, to active use.	None. Construction activities would take place within existing transportation rights-of-way or easements. The property acquisition for the 20-acre parcel and the six-acre parcel would be complete prior to commencement of construction.	None	No mitigation is required however, there would be an adverse effect on two acres within Cedar Creek Marsh South, as discussed under Natural Resources. Additionally, the Build Alternative would return a vacant brownfield site to active use, which is a positive net result.	NJ TRANSIT's acquisition of the two parcels (20-acre and six-acre) would proceed as planned without the proposed Project. A new Kearny Substation would still be constructed under the No Action Alternative, therefore some changes to land use would still occur.

[13] Minimization measures to reduce impacts are developed and identified as a result of the environmental analysis in this DEIS. Mitigation commitments are obligations identified for significant impacts to resources that exceed a permitting threshold that NJ TRANSIT will fulfill as part of the project, such as obtaining appropriate wetland mitigation credits (to replace the impacted 2 acres of freshwater wetland resource as required by regulatory agencies) and permits prior to construction and ongoing consultation with regulatory agencies as the project design progresses. As noted in this DEIS, all adverse impacts (including insignificant impacts) have been minimized through project design, and as required will be mitigated for under the permitting process, via credit purchase, or through consultation and direction from the regulatory agencies.

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
Community Facilities	None. No community facilities, parks, or publicly accessible open space, are located directly within the proposed Project's footprint, including electrical line routes, and no services would be adversely affected during operation.	Some temporary/short duration increases in noise levels near some community facilities during construction.	Control Measure and Minimization: Conduct construction during business hours to minimize noise impacts to nearby community facilities.	Under evacuation scenarios, commuters would have access to designated central meeting points, such as schools, hospitals, and safe shelters.	None
Socio-economic Conditions and Environmental Justice	None. No adverse effects on neighborhood cohesiveness or economic conditions would occur as the proposed Project area is entirely within industrial areas and transportation rights-of-way. Approximately 30 full-time jobs will be created for staffing the Main Facility.	Some short-term (48 months) economic benefits from creation of temporary construction jobs. Some temporary/ short duration increases in noise levels near some neighborhoods during construction.	Control Measure and Minimization: Conduct construction during business hours to minimize noise impacts to nearby neighborhoods and residential properties.	Positive net result through creation of approximately 30 full time jobs to operate the Main Facility, and to support commuter travel during commercial power grid outages.	Missed opportunity to increase commuter safety and security in future widespread power outages. No new employment opportunities would be realized.

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
Air Quality	Overall air emissions would increase slightly for Nitrogen Oxide (NOx), Carbon Monoxide (CO) and Hazardous Air Pollutants (HAPs) due to the Main Facility but would be minimized via pollution controls (selective catalytic reduction [SCR] and oxidation catalyst systems) incorporated into the design of the Main Facility. Due to the use of clean burning natural gas, minimal particulates, sulfates, ammonia, or lead will be emitted by the Main Facility. Reduced demand on the commercial grid could partially offset increased emissions in the region.	Potential for increased fugitive dust during construction, and some increased emissions from construction equipment. With mitigation measures, no significant adverse effects on air quality would occur during construction.	Control Measure and Minimization: Consultation with New Jersey Department of Environmental Protection (NJDEP), development of additional measures to reduce pollutant emissions which would be monitored by the Title V permit/ NJDEP, and adherence to Title V permit conditions, including purchase of NO_x credits. During construction, quality control measures to reduce fugitive dust would be implemented. Construction equipment would use Tier 4-compliant engines to reduce emissions.	Net effects: Under 24/7 operations, the Build Alternative would have minimal impact on Air Quality. Modern technology employed would minimize emissions. Those impacts could be partially offset by reduced demand from the commercial power generation plant.	Potential minimal increase in emissions would not be realized. Benefits from solar facility would not be realized. NJ TRANSIT and Amtrak would continue to rely on the commercial grid for traction power in the core service territory, which includes facilities that burn oil and coal.

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
Greenhouse Gas Emissions	The estimated amount of GHGs (approximately 576,802 metric tons per year of CO_2e) generated by the worst-case Build Alternative is less than 0.6 percent of the GHGs generated in the state of New Jersey. This assumes all 5 turbines would run continuously (8,760 hours per year). Actual GHG emissions will be lower since all five turbines would not run simultaneously at maximum capacity.	Temporary increase in GHG emissions during construction would result from non-road construction engines and on-road trucks would be limited and short-term. With certain commitments, the temporary GHG emissions from construction would not result in significant adverse effects.	Control Measure and Minimization: Pollution controls incorporated into the design (SCR and oxidation catalyst systems). During construction, contractors would be required to source materials locally when feasible, use biodiesel fuel when possible, design efficient transportation routes and adhere to air quality control measures listed above.	The energized assets of the project will no longer use electricity from the commercial power grid. The reduced commercial demand could offset some emissions. During emergency conditions, the availability of public transportation would reduce the need for less efficient transportation modes, which could result in reduced GHG emissions during that time.	Potential minimal increase in GHG emissions would not occur. During emergencies, public transportation would not be as available, so less-efficient travel modes would be required, as under current conditions.

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
Visual Quality	Most significant viewsheds would not be affected by the proposed Project. New monopoles will be designed to be consistent in color and texture to existing monopoles and existing visual character in the various project areas. The Main Facility will be constructed in an existing industrial area. The new substations and the nanogrid would be consistent with surrounding visual character.	All changes in views would be limited and temporary and would not result in significant adverse impacts to visual and aesthetic resources during construction.	None	The proposed Project would be consistent with the surrounding visual character.	Kearny Peninsula would still be developed with warehouses and the new Kearny Substation would still be constructed in Cedar Creek Marsh South. However, these would not be significant impacts to Visual Quality in the project area.
Historic Resources	There will be an adverse visual effect on the Old Main Delaware, Lackawanna and Western (DL&W) Railroad Historic District, the Bergen Tunnels western portal, the West End Through Truss Bridges, the West End Interlocking Tower, the Hackensack River Lift Bridges Historic District, the Lower Hack Draw Bridge and the DL&W Railroad Boonton Line	The construction-period monitoring and mitigation measures would ensure that no significant adverse impacts to historic or archaeological resources occur during construction. There is the potential to encounter archaeological	Mitigation: Mitigation measures as described in the PA, include ongoing consultation with NJHPO during continued project development, recordation of historic/ architectural resources, preparation and installation of interpretive exhibits that are visible to the public, and having an archaeologist on-site during construction activities in areas designated with archeological resource potential. Any	The opportunity to learn about this specific corridor is not currently available to the general public or current commuters. Recordation and public availability of display signs will provide education to the same individuals that use this Historic District for their daily commutes.	Lost opportunity to educate commuters on the described historic district and contributing resources.

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
	Historic District. With the mitigation measures included in the draft Programmatic Agreement (PA) between FTA, New Jersey State Historic Preservation Office (NJ HPO) and NJ TRANSIT to minimize harm, the proposed Project would not result in a proximity impact that is so severe that the attributes that qualify the property for protection will be substantially impaired.	resources depending on design of supporting infrastructure (e.g., electrical line installation, sanitary sewer connection, pile driving, directional drilling, etc.).	physical alterations to other architectural resources will be designed in accordance with the *Secretary of the Interior's Standards for Rehabilitation.*		

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
Traffic and Transportation	Minimal amount of traffic (approximately 20 trips per each shift, three shifts per day for 30 full time employees) generated by Main Facility would be easily accommodated into the traffic network with little noticeable effect. Positive effects on public transportation in the region would be realized during emergency conditions since limited rail service would be available.	Temporary (non-significant) increase in vehicular traffic during construction from workers traveling to and from the site and equipment deliveries. Some limited, planned train service disruptions may be required to accommodate construction activities, such as installation of electrical lines, deliveries for large pieces of equipment (i.e., the turbines or generators if brought in by rail) and cutover from existing Substation No. 41 to the new Kearny Substation.	Control Measure and Minimization: Planned service disruptions would be infrequent during construction and minimized to avoid impacts to commuters.	During emergency conditions, rail commuters would have access to reliable, although limited, rail service, resulting in a lesser impact to vehicle transportation during emergencies, which is a positive impact.	Traffic in the proposed Project area will increase without the Build Alternative due to planned construction of warehouses on the Kearny Peninsula. Potential for adverse effects (delays and strandings) to commuters during power outages.

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
Noise and Vibration	None. Project would be designed to meet all applicable noise and vibration standards, including those set forth for the Redevelopment Area, during operation.	Limited augering, directional drilling, and other construction activities required for installation of substations, monopoles, electrical lines, and other project elements, as required, could result in nuisance noise for a few weeks in any given location. Pile driving for foundations for the Main Facility, new Kearny Substation, and nanogrid would be temporary, and removed from sensitive receptors.	Control Measure and Minimization: Construction activities will be conducted during normal business hours (no earlier than 7AM and no later than 7PM, where practical) when activities are near residential areas. Noise or vibration impacts related to aquatic habitats will be avoided through construction windows/seasonal restrictions defined in applicable permits.	Once operational, noise from the proposed Project would be minimal in residential or other sensitive areas due to the industrial setting of the Main Facility and distance to sensitive receptors from the new NJ TRANSITGRID East Hoboken Substation and the nanogrid.	None
Natural Resources	Approximately 1.7 acres filling of open water resource in Cedar Creek Marsh South for new Kearny Substation and monopole improvements	All construction effects would be temporary. Pile driving/auger drilling in Cedar Creek Marsh South	Mitigation: Purchase of State and Federal approved compensatory wetland mitigation credits in accordance with mitigation hierarchy. Permit acquisition	Wetland credit purchase is assumed to be an estimated, equivalence of 1 credit = 2.4 acres of restored high value, functional	Approximately 1.7 acres of wetlands (Cedar Creek Marsh South) would be impacted with construction of the new Kearny Substation to

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
	would be required. Minor effects on low-value delineated wetlands near Project Components A, B and E. A total of up to two acres of low resource value isolated wetlands for the Build Alternative would be required. During operation of the proposed Project, migratory and endemic fish such as summer, winter flounder and Atlantic or shortnose sturgeon would resume normal foraging and migratory activities. No operational effects are expected for raptors (birds of prey) that would migrate and forage in the project vicinity, or in proximal waters or tidal marsh.	would affect the water bottom and displace local fish and aquatic fauna to other areas of the marsh; however, the habitat value is low because the marsh is hydrologically restricted by tide gates and drainage pipes. Potential impact/ displacement during in-water work to habitat or passage areas for summer/ winter flounder, Freshwater herring and Atlantic shortnose sturgeon if a submarine cable is used to cross the Hackensack River. Bald Eagle and Osprey migratory pathway impact is minimal or negligible as work	(wetlands, flood hazard), adherence to permit conditions and restoration of any vegetation temporarily altered by construction/ access activities. Observation of construction windows coordinated with National Marine Fisheries Service (NMFS) to avoid negative effects on aquatic species in the Hackensack River (if required).	wetlands. Although up to two acres of low value isolated wetlands will be eliminated by the Build Alternative, through compensatory wetland mitigation the project will support the ecological restoration of up to 5 acres of higher value, functional wetlands within a contiguous tidal marsh and aquatic nursery of the Meadowlands.	replace the existing Substation No. 41. No other Natural Resources would be impacted under the No Action Alternative.

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
		is within an active rail corridor with minimal foraging resources. Once construction is completed any normal or transient predation activities would resume.			
Soils and Geology	No effects on soils and geology are expected during operations.	Potential for erosion and sedimentation during construction activities.	Control Measure and Minimization: Use of Soil Erosion and Sediment Control (SESC) and use of Best Management Practices (BMPs).	Development of the unvegetated and vacant site will eliminate fugitive dust once the Build Alternative is operational.	None
Contaminated Materials	No effects on existing contaminated materials are expected during operations. Operation of the Main Facility would require the storage and handling of small amounts of fuel and hazardous non-fuel substances (such as aqueous ammonia and industrial cleaners used for regular maintenance). The proposed Project will be designed to meet or exceed all relevant state	Potential to expose historic fill or contaminated soil and/or groundwater during construction due to known contamination onsite.	Control Measure and Minimization: Preparation of pre-construction limited investigation, Health and Safety Plan (HASP), Remedial Action Workplan (RAWP), Materials Management Plan (MMP), Plans and specification including adherence to regulations. Use of double/multi-cased pilings to minimize potential for contaminant transport at Main Facility and locations of monopoles.	Build Alternative would return a vacant brownfield site to active use, which is a positive net result.	None

Analysis Area	Potential Operational Effects	Potential Construction Effects	Control Measures and Minimization/ Mitigation Commitment[13]	Net Result of Build Alternative with Implemented Mitigation	No Action Alternative Effects
	and federal safety standards.				
Utilities	Extensions of sanitary sewer and municipal water service required. Capacity of services expected to be adequate for the Build Alternative.	New utility extensions would be constructed; however, construction of the Build Alternative would not result in significant adverse impacts to existing utilities.	Control Measure and Minimization: Coordination and agreements with utilities. Acquisition of sanitary sewer and water main extension/ connection permits.	Providing reinforced and reliable electrical infrastructure, to support immediate and long-term electrical needs for public transportation in the core service territory.	None
Safety and Security	None. The facility would be designed to meet and exceed regulatory standards.	Construction workers will be required to attend all applicable NJ TRANSIT and/or Amtrak safety training.	Control Measure and Minimization: Safety and security features incorporated into the design. Preparation and implementation of HASP during construction.	Build Alternative would provide improvements to safety of public transportation users during emergency conditions.	Improvements to safety and security in the region (i.e., providing reliable public transportation if New Jersey and New York City job centers need to be evacuated during widespread outages of the commercial grid) would not be realized.

ES.6 SECTION 106 CONSULTATION AND SECTION 4(F) EVALUATION

Section 106 of the National Historic Preservation Act requires Federal agencies to account for 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 4(f) of the DOT Act of 1966, as amended (23 CFR Part § 774-codified in 49 U.S.C. 303) prohibits the Secretary of Transportation from approving any program or project that requires the "use" of: (1) any publicly-owned parkland, recreation area, or wildlife/waterfowl refuge of national, state, or local significance; or (2) any land from a historic site of national, state, or local significance (collectively, "Section 4(f) properties"), unless there is no feasible and prudent alternative to the use of such land and such program and the project includes all possible planning to minimize harm to the park, recreation area, wildlife/waterfowl refuge, or historic site.

Concurrently with the NEPA process, the proposed Project is being reviewed in accordance with Section 106 and evaluated in accordance with Section 4(f). FTA and NJ TRANSIT have consulted with the NJHPO and Consulting Parties pursuant to Section 106 consultation requirements. The Consulting Parties for the project includes the Hoboken Historic Preservation Commission, Jersey City Historic Preservation Commission, and the Town of Kearny. The Bayonne Historic Preservation Commission, the Mayors of Union City and North Bergen, and the Weehawken Historical Commission were invited as additional Consulting Parties. The Union City Museum of History was invited as an additional Interested Party. As part of the Section 106 consultation process, FTA contacted the following tribes/offices: the Delaware Tribe Historic Preservation Office; Tribal Historic Preservation Officer, Delaware Nation; Tribal Historic Preservation Officer, Eastern Shawnee Tribe of Oklahoma; Tribal Historic Preservation Officer, Shawnee Tribe of Oklahoma.

Through the Section 106 consultation process, the NJHPO determined that the Build Alternative would result in an adverse effect to the Old Main DL&W Railroad Historic District, Lower Hack Draw Bridge, the Hackensack River Lift Bridges Historic District, Old and New Bergen Tunnels, West End Through Truss Bridges, West End Interlocking Tower and the DL&W Railroad Boonton Line Historic District. The Build Alternative would also result in the Section 4(f) use of the Old Main DL&W Railroad Historic District. There are no feasible and prudent alternatives to the use of this Section 4(f) property. Measures to avoid, minimize, and mitigate harm to historic properties are included in the stipulations of the draft PA and would be implemented as part of the design and construction of the proposed Project. FTA and NJ TRANSIT will continue to consult with the NJ HPO to execute the PA and will implement measures that reflect all possible planning to minimize harm from the use of the Old Main DL&W Railroad Historic District, as a Section 4(f) property.

ES.7 CONCLUSION

As demonstrated in Table ES-1 above, through the implementation of control measures, minimization and approved mitigation for the proposed minimized environmental effects of the Build Alternative, the public and net benefits derived from the proposed Project substantially outweigh the presented impacts. The proposed Project design is being tailored to minimize all impacts where feasible and mitigation is provided

where there is an unavoidable significant adverse impact. The proposed Project provides a reliable and resilient source of power to allow continuous use of a critical segment of the mass transportation system serving the New Jersey and New York City commuters. The need for the proposed Project is paramount, especially in light of the mounting evidence that extreme weather events are likely to increase in frequency and intensity in future years. The proposed Project will provide resiliency before, during and after future major storm events and during non-weather related commercial power disruptions.

ES.8 NEXT AND FINAL STEPS FOR COMPLETION OF NEPA

This DEIS is being made available so that agencies and the public can review and comment on the proposed Project and its potential impacts. Following the close of the comment period (July 19, 2019), comments will be considered in a Final EIS. Pursuant to Section 1319(b) of Map-21, FTA shall, to the maximum extent practicable, combine a Final EIS and Record of Decision (ROD) unless 1) the Final EIS makes substantial changes to the proposed action that are relevant to environmental or safety concerns; or 2) there are significant new circumstances or information relevant to environmental concerns and that bear on the proposed action or the impacts of the proposed action. The Final EIS and ROD will announce and explain FTA's decision and describe any commitments for mitigating potential social, economic, and environmental impacts.