railroad became the critical link in both local and regional rail systems, enabling the PRR to secure a dominant place in the nation's busiest port and establishing itself as the country's largest railroad during the twentieth century. The railroad's period of significance extends from 1889, when the two predecessor railroads received their corporate charters, to 1945, when the railroad completed the last transfer bridge (Transfer Bridge No. 9) at the contributing Greenville Yard Piers in Greenville Yard, Jersey City, Hudson County, New Jersey. The boundaries of the eligible historic district are limited to the historic ROW and extend in two branches from Waverly Yard, Newark to the Passaic River and from Waverly Yard in Newark to Greenville Yard, Jersey City. The railroad is currently operated by the Consolidated Rail Corporation (Conrail) for freight service.

Essex Generating Station (NJHPO Opinion: 3/23/2015)
The Essex Generating Station (NJHPO Opinion: 3/23/2015) is a historic district eligible for listing in the NJR and NR under Criterion A. The property is significant as one of three facilities that provided electricity during a period of population growth and increased manufacturing in Newark and the surrounding area. Construction by PSE&G began in 1914, and by the end of the decade the station's output had quadrupled. Expansions of the Essex Generating Station continued through the 1930s. The district consists of five remaining elements, the most prominent of which is the large 1915 Classical Revival Switch House. The period of significance for the Essex Generating Station is 1915-1963. The district is also eligible as a contributing resource within the PSE&G Kearny-Essex-Marion Interconnection Historic District (Saunders 2015b).

Public Service Electric and Gas Company (PSE&G) Kearny-Essex-Marion Interconnection Historic District (NJHPO Opinion: 12/31/2013)
The PSE&G Kearny-Essex-Marion Interconnection (NJHPO Opinion: 12/31/2013) is eligible individually for listing in the NJR and NR under Criterion A in the areas of Engineering, Industry, and Commerce and under Criterion C as a significant and distinguishable entity (see Plates 4.1, 4.2, 4.29). The NJHPO Opinion does not identify a period of significance, but the survey that led to the opinion recommends the period of significance to extend from 1923 to 1964. The PSE&G Kearny-Essex-Marion Interconnection represents the utility's first successful application of high-tension transmission at 132,000 volts over steel lattice towers. The Interconnection enabled the utilities' three generating stations to work in parallel operation to supply and supplement the company's chief load centers around Newark and Jersey City. It also gave PSE&G the wherewithal to distribute high-voltage power over great distances through the company's new network of similar 132,000-volt transmission lines, creating a means to back-up and supplement power to the utility's internal system of generation and radial distribution networks and allow interconnection with neighboring utilities.

While the NJHPO Opinion does not identify contributing resources to the Kearny-Essex-Marion Interconnection, the survey form of the Interconnection completed for the New Jersey Historic Preservation Office that led to the NJHPO Opinion recommends that all original steel lattice transmission towers built within the period of significance be included. Additionally, because the design and construction of the identified historic property is integral to the construction of the NR-eligible PSE&G Kearny Generating Station (NJHPO Opinion: 5/3/2002), the latter is recommended as a key contributing resource to the PSE&G Kearny-Essex-Marion Interconnection Historic District.

Jersey City Water Works Historic District (NJHPO Opinion: 1/20/2003)
The Jersey City Water Works Historic District extends from the Boonton Reservoir to Jersey City and includes pipelines, reservoirs, meter houses, and other related resources (see Plates 4.2, 4.30, 4.31). These resources are located primarily underground. The district is nationally significant under Criterion A for its associations with public health and public works and under Criterion C in the area of Engineering. Because many of the associated resources are belowground, the Jersey City Water Works Historic District is eligible under Criterion D in the area of Archaeology. Its period of significance begins in 1851 and ends in 1925 (The RBA Group, Inc. 2002).

Hackensack River Lift Bridges Historic District (NJHPO Opinion: 5/3/2002)
The Hackensack River Lift Bridges Historic District includes four individually eligible bridges: Lower

Hack Bridge, Wittpenn Bridge (NJHPO Opinion: 2/7/2001), Pennsylvania Harsimus Branch Bridge (NJHPO Opinion: 5/3/2002), and Pennsylvania Railroad Bridge (NJHPO Opinion: 5/3/2002) (see Plates 4.2, 4.10). All four are post-World War I vertical lift bridges which are eligible under NR Criteria A and C in the areas of Transportation and Engineering (NJHPO Opinion: 5/3/2002). The district represents largely unaltered, operable, and increasingly rare examples of historically and technologically significant bridge types. The district's period of significance is 1928-1930 (Richard Grubb & Associates, Inc. 2002).

People's Gas Light Company/PSE&G Marion Office Historic District (NJHPO Opinion: 3/10/1999)
The People's Gas Light Company/PSE&G Marion Office Historic District is comprised of two buildings: the PSE&G Garage (c. 1924) and the People's Gas Light Company/PSE&G Office/Meter Shop (c. 1870) (see Plates 4.7, 4.32). The Office/Meter Shop was expanded and altered multiple times through the 1960s, giving the property its current configuration. Both the Office/Meter Shop and the Garage are constructed of brick. The district is eligible for the NJR and NR at the local level under Criteria A in the area of Industry. The two buildings on this property are the only extant remnants "what was at one time one of the most thriving industries within the Marion section of Jersey City" (The RBA Group 1999). The NJHPO Opinion does not indicate a period of significance.

Delaware, Lackawanna and Western Railroad Boonton Line Historic District (NJHPO Opinion: 9/18/2008)
The Delaware, Lackawanna & Western Railroad (DL&WRR) Boonton Branch Historic District (a.k.a. NJ TRANSIT Main Line) is eligible for listing in the NJR and NR under Criteria A and C for its associations with freight and passenger service, and for spurring the growth and development of industries and residences along the alignment (Saunders 2008) (see Plate 4.33). The DL&WRR leased the Morris & Essex Railroad (M&ERR) in 1868, then constructed and opened the so-called Boonton Cut-off in 1869-1870 to channel coal and freight traffic off the old M&ERR main line between Boonton and Hoboken. The Boonton Branch was built to the highest engineering standards of the day with gentle grades, long tangents, and generous curves for the efficient movement of freight. Construction and operation of the branch helped to solve problems with freight congestion and geographic impediments on the former M&ERR main line.

US Route 1 Extension [Pulaski Skyway] Historic District (NJR: 6/13/2005; NR: 8/12/2005)
The US Route 1 Extension is the 5-mile long eastern section of the 13.2-mile-long, limited access, four-lane approach road to the Holland Tunnel (see Plates 4.1, 4.29). The extension is composed of a series of five structures, designed between 1923 and 1932, that are linked by short sections of at-grade roadway (Lichtenstein Consulting Engineers 2003). The five structures located within the extension are the 12th Street Viaduct, Hoboken Avenue Viaduct, Conrail Viaduct, JFK Boulevard over Route 1 Extension, and the Pulaski Skyway. The US Route 1 Extension is listed on the NJR and NR under Criteria A and C for its historical and technological significance as an intact section of America's first superhighway (NJR: 6/13/2005; NR: 8/12/2005). The period of significance is defined as between 1923 and 1932. This section of the roadway was commissioned between 1923 and 1932 in order to alleviate the high volume of traffic associated with the Holland Tunnel (Lichtenstein Consulting Engineers 2003). The nomination included all road-related structures within the ROW that are associated with the highway's original design from the west side of Jersey Avenue in Jersey City through the Pulaski Skyway to a point where that viaduct transitions into a surface roadway (Lichtenstein Consulting Engineers 2003).

US Routes 1 & 9 Historic District (NJHPO Opinion: 3/8/1996)
The US Routes 1 & 9 Historic District received a formal opinion of eligibility from the NJHPO on June 3, 1991 (Guzzo 1996b). In 1992, the original NJHPO Opinion was rescinded due to administrative concerns raised by the NJDOT (Guzzo 1996b) (see Plates 4.1, 4.29). On March 8, 1996, the US Routes 1 & 9 Historic District was determined eligible for listing on NR under Criteria A and C in the areas of Transportation and Engineering. Completed in 1932, the district was the first example of a highway where the basic concepts of predictive formulae for assessing future traffic loads was applied (Guzzo 1996b). The district was also one of the first roadways to be specifically designed to accommodate high speed automobile and heavy commercial truck use. The eligible historic district

measures 6.25 miles in length and extends from the mouth of the Holland Tunnel to Station 351+35 and includes all associated features.

New Jersey Midland Railway/New York, Susquehanna and Western Railroad Historic District (NJHPO Opinion: 4/25/2006 and 1/30/2015)

The New York, Susquehanna and Western (NYS&W) Railroad Historic District first received an opinion of eligibility from the NJHPO for listing in the NJR and NR in 2006 (Guzzo 2006b). The NJHPO Opinion was limited to the portion of the railroad ROW that had been surveyed at that time, located in North Bergen Township, to the north of the APE (A-F) for the current project. The district is eligible under Criterion A for its association with important patterns of history, and Criterion C for its Engineering significance. The NYS&W was one of three railroads to carry passengers and freight through the mountainous Highlands Region of northern New Jersey, and remains an intact and well-preserved example of a mid-nineteenth century railroad (NJTRANSIT 2006: 167-168).

As an extension of the NYS&W Railroad Historic District, the newly-titled New Jersey Midland Railway / New York, Susquehanna and Western Railroad Historic District received an updated opinion of eligibility from the NJHPO in 2015. The opinion extended the eligible resource south to Jersey City, within the APE (A-F) for the current project. The district is still eligible for listing under Criteria A and C. The opinion letter also notes that the district has the potential to be eligible under Criterion D as well, depending on future archaeological survey findings. This southern portion of the district is significant as a reflection of the importance of the railroad industry as the nineteenth century drew to a close, due to the many consolidated railroad companies that are associated with the line during its initial construction in the 1870s. The period of significance for the New Jersey Midland Railway / New York, Susquehanna and Western Railroad Historic District is from 1873 to 1953, reflecting eight decades of rapid railroad corridor development (Saunders 2015a).

Erie Railroad Main Line Historic District (NJHPO Opinion: 2/20/2003)

The Erie Railroad Main Line Historic District (NJHPO Opinion: 2/20/2003) was first identified in 1999 and determined eligible under the name of the Erie Railroad Main Line Historic District (former NJHPO Opinion: 3/10/1999) (see Plate 4.34). The Erie Railroad Main Line Historic District is eligible for listing on the NJR and NR under Criteria A and C in the areas of Transportation and Engineering (Guzzo 1999c, 2006; Payne 2003). The recommended period of significance for the district extends from 1831, with the incorporation of the predecessor Paterson & Hudson River Railroad (P&HRRR), to 1960 and the merger of the ERR with the DL&WRR to form the Erie-Lackawanna Railroad (ELRR). The historic district's identified boundary begins at the eastern end of the Erie Bergen Hill Tunnel and the Bergen Arches in Jersey City and extends westward along the railroad's historic ROW to an undetermined point. A subsequent update to the NJHPO Opinion (3/7/2006) expanded the district boundary to include the NJ TRANSIT Bergen County Line, which departs the Erie Main Line Historic District at Rutherford Junction, Bergen County and rejoins the Main Line at Ridgewood Junction, Bergen County (Guzzo 2006a). Both the Erie Railroad Bergen Hill Tunnel (NJHPO Opinion: 4/27/2000) and the Erie Railroad Bergen Archways Historic District (NJHPO Opinion: 4/27/2000) are key contributing resources to the Erie Railroad Main Line Historic District.

The eligible historic district comprises two segments. The eastern segment extends from its connection with the former DL&WRR Main Line in Jersey City, Hudson County northwestward to the City of Paterson in Passaic County and comprises part of NJ TRANSIT's present day Main Line. The western segment of the district extends from its connection with the former DL&WRR Main Line in Denville, Morris County southeastward to Totowa in Passaic County. Between Totowa and Paterson, railroad tracks have been removed and the former railroad ROW is now occupied by Interstate 80. This boundary description reflects an extension of the original historic district established by the NJHPO Opinion dated September 18, 2008. Neither the original NJHPO Opinion nor the current one identifies the district's period of significance. A likely period of significance would extend from 1868, when the M&ERR purchased the charter for the Boonton Branch's predecessor railroad, to 1960 when the DL&WRR merged with the Erie Railroad (ERR) to form the Erie-Lackawanna Railroad (ELRR).

The NJHPO Opinion lists all key contributing and contributing resources associated with the historic district. This list is based largely on a 2009 survey of the entire historic district completed by the RBA Group (2009).

Erie Railroad Bergen Archways Historic District (NJHPO Opinion: 4/27/2000)
The Erie Railroad Bergen Archways Historic District was determined individually eligible for inclusion in the NJR and NR under Criterion A for its contribution to improving the mobility of commuters of the greater New York region and the nation, and for facilitating communication between the region and nation (see Plates 4.34-4.39). The district also meets Criterion C as a distinctive feature of railroad construction and technology. The historic district is comprised of a 4,400-foot cut, two bridges (SI&A #0951165 and #0951166), and four tunnels (SI&A #0951167, 0951168, #0951159, and #0951170), all of which are contributing resources. The historic district is also a contributing resource to the NR-eligible Erie Railroad Main Line Historic District (NJHPO Opinion: 2/20/2003). The NJHPO Opinion does not indicate a period of significance.

Hudson and Manhattan Railroad Transit System (PATH) Historic District (NJHPO Opinion: 3/4/2002)
The Hudson and Manhattan Railroad Transit System (PATH) Historic District is eligible for the NJR and NR under Criteria A and C for the system's significance as an early twentieth century engineering accomplishment related to the greater urban and commercial development of Jersey City and New York (NJHPO Opinion: 3/4/2002). The system was constructed between 1908 and 1909 using an innovative construction technique, the Greathead Shield method, utilized in the construction of the London tube system. This was the first example of the use of the Greathead Shield method in the United States. Perfected during the construction of the Hudson & Manhattan (H&M) Railroad, the method became the prototype for other tunnel projects in the country. The system is also eligible under Criterion B for its associations with H&M president, William Gibbs McAdoo. McAdoo, who would later serve as Secretary of the Treasury under President Woodrow Wilson, spearheaded the tunnel's construction. The historic district extends in a southerly direction from the Erie-Lackawanna Terminal in Hoboken to Exchange Place in Jersey City, where the track turns east and extends under the Hudson River, providing service to Manhattan. An alternate eastern spur is located just south of the Erie-Lackawanna Terminal, providing a second connection to Manhattan also below the Hudson River. With the exception of station entrances, the entire system is located below ground. The NJHPO Opinion does not indicate a period of significance.

Southern Hoboken Historic District (NJHPO Opinion: 2/28/1991)
The Southern Hoboken Historic District is eligible for listing in the NJR and NR under Criteria A and C (NJHPO Opinion: 1/30/80 and 2/28/1991[extension]) (see Plates 4.16, 4.40, 4.41). The built environment of the district is evocative of Hoboken's history from the mid-nineteenth through the early twentieth centuries, with buildings typical of the most prosperous era of the city's history. The historic district contains excellent examples of commercial and residential buildings along with a unique cohesiveness of the whole created by Hoboken's waterfront combined with the city's historic industrial and transportation needs. The NJHPO Opinion does not indicate a period of significance.

Substation 4 (NJHPO Opinion: 9/12/1994)
Substation 4 is eligible for the NJR and NR under Criteria A and C as a surviving building associated with the electrification of the Pennsylvania Railroad as part of the Manhattan Transfer Project in 1911 (Hall 1994a) (see Plates 4.27, 4.28). Substation 4 is also a contributing resource within the NR-eligible Pennsylvania Railroad New York to Philadelphia Historic District. The substation and its sibling, Substation 3 in North Bergen Township, Hudson County, are surviving components of the Penn Station project. The project was undertaken by the Pennsylvania Railroad in the early twentieth century and provided the railroad company with uninterrupted access to Manhattan. The substation housed electrical components which provided electrical power to motors moving passenger cars between Penn Station New York and the Manhattan Transfer (the western terminus of electrification), utilizing the third rail system of electrification (NJ TRANSIT 1994: 42-46). Substations 3 and 4 were the only substations along this section of the Pennsylvania Railroad, both of which were built in 1910 in

conjunction with the Penn Station project. Equipment in the building converted available AC current to DC current, which was fed directly to third-rail motive power, driving the early DD-1 motors built for the railroad. The resource is representative of the Pennsylvania Railroad's early electrification project, and is a rare surviving element of this significant engineering achievement. Character-defining features of the two-story, steel framed brick substation building include the building's brick walls, arched openings, a corbelled parapet with limestone capping, a sign panel of limestone in the façade with the words "Substation 4 Pennsylvania Railroad" inscribed, and electrical equipment associated with the Pennsylvania Railroad's early electrification project (NJ TRANSIT 2008: 7-23). The NJHPO Opinion does not indicate a period of significance for this historic property.

Edison Battery Company Property (NJHPO Opinion: 4/8/2008)
The Edison Battery Company Property is a complex of five buildings built and designed in the Art Deco style in 1927 (see Plate 4.31). The historic property is eligible for listing in the NJR and NR under Criterion A for its association with Thomas A. Edison and his development of the battery (Karschner 2008). The property is also eligible under Criterion C as an example of the Art Deco style applied to industrial buildings (Karschner 2008). Collectively, the five buildings that comprise the Edison Battery Company Property reflect Edison's belief in "combining research and development with manufacturing" (Karschner 2008). The NJHPO Opinion does not indicate a period of significance.

Jersey City Water Works Pipeline (NJHPO Opinion: 5/7/1999)
The Jersey City Water Works Pipeline received an opinion of eligibility on May 7, 1999 where it was recommended individually eligible for listing in the NJR and NR under Criterion D for its potential to yield important information regarding mid-nineteenth century public works engineering and construction (Guzzo 1999b) (see Plates 4.2, 4.31). The pipeline consists of a 20-inch pipe built in 1854 and a 36-inch pipe built in 1863 from the Passaic River to Jersey City, both of which are original components of the NR-eligible Jersey City Water Works Historic District (NJHPO Opinion: 2/20/2003). The NJHPO Opinion does not indicate a period of significance.

PSE&G Kearny Generating Station (NJHPO Opinion: 5/3/2002)
The PSE&G Kearny Generating Station is a complex of buildings that includes a Power House, Switch House, Service Building, and North Gate House (see Plate 4.29). The buildings have brick exteriors and, with the exception of the North Gate House, were constructed in the Colonial Revival style. The Kearny Generating Station is eligible for the NJR and NR at the state level under Criterion A for its associations with power generation in northern New Jersey. The resource also has significance under Criterion C in the area of Engineering (Guzzo 2002b). The NJHPO Opinion does not indicate a period of significance.

Further, the PSE&G Kearny Generating Station contributes to the significance of the PSE&G Kearny-Essex-Marion Interconnection Historic District (NJHPO Opinion: 12/31/2013). The district is eligible individually for listing in the NJR and NR under Criterion A in the areas of Engineering, Industry, and Commerce and under Criterion C as a significant and distinguishable entity. While the NJHPO Opinion does not identify contributing resources to the Kearny-Essex-Marion Interconnection, the design and construction of the historic district is integral to the construction of the PSE&G Kearny Generating Station. The NJHPO Opinion does not identify a period of significance, but the survey that led to the opinion of eligibility recommends the period of significance to extend from 1923 to 1964.

Lower Hack Draw Bridge (NJHPO Opinion: 9/18/1996)
The Lower Hack Draw Bridge is a vertical lift bridge designed and built in 1927 by internationally-renowned engineer John Alexander Low Waddell (see Plates 4.7-4.9). The bridge carries three railroad lines across Duffield Avenue in Jersey City and the Hackensack River. Both reinforced concrete and steel comprise the structural components of the bridge. In January of 1999, the Lower Hack Draw Bridge was determined individually eligible for listing in the NJR and NR under Criteria A and C (NJHPO Opinion: 9/18/1996; NJHPO Opinion: 1/20/1999). The bridge is also a contributing resource to the NR-eligible Old Main DL&WRR HD (NJHPO Opinion: 9/24/1996). The NJHPO Opinion does not indicate a period of significance.

Wittpenn Bridge [SI&A #0909150] (NJHPO Opinion: 2/7/2001)
The NJ Route 7-Wittpenn Bridge over the Hackensack River was one of six new bridges planned in the 1920s by the State Highway Department to improve highway connections in and around Newark and Jersey City (see Plate 4.10). Completed in 1930, the Wittpenn Bridge measures 2,169 feet long and 63 feet wide and consists of deck plate girder approach spans on concrete piers, two fixed camelback through truss spans, and a modified fixed Pratt through truss. The vertical lift span is a 209-foot long skewed Parker truss. Each tower is 160 feet tall and consists of a Pratt truss with front vertical columns and rear inclined columns. The Wittpenn Bridge shares common piers with the adjacent Pennsylvania Railroad Harsimus Branch Bridge (NJHPO Opinion: 5/3/2002) built at the same time. Both bridges were constructed in response to a requirement to provide a minimum of 35-feet vertical clearance when closed (A.G. Lichtenstein & Associates, Inc. 1994). The Wittpenn Bridge was determined individually eligible for listing in the NJR and NR under Criteria A and C in the areas of Engineering and Transportation in an opinion of eligibility dated February 2, 2001. The Wittpenn Bridge is also a contributing resource to the Hackensack River Lift Bridges Historic District (NJHPO Opinion: 5/3/2002). The NJHPO Opinion does not indicate a period of significance.

Pennsylvania Railroad Harsimus Branch (Conrail/ CSX) Bridge over the Hackensack River (NJHPO Opinion: 5/3/2002)
The Pennsylvania Railroad Harsimus Branch (Conrail/CSX) Bridge over the Hackensack River is a vertical lift bridge built in 1930 as part of a post-World War I regional effort led by the War Department (see Plate 4.10). Internationally-renowned engineer John Alexander Low Waddell designed the bridge. Construction of this bridge allowed for a steady and uninterrupted flow of railroad, vehicular, and marine traffic through and over the navigable waterways within the Port of New York (Guzzo 2002b). The bridge is significant on the state level and is individually eligible for listing in the NJR and NR under Criteria A and C in the areas of Engineering and Transportation. The bridge is also a key contributing resource to the NR-eligible Hackensack River Lift Bridges Historic District (NJHPO Opinion: 5/3/2002) and the NR-eligible New Jersey Railroad Bergen Cut Historic District (NJHPO Opinion: 5/21/1999). The NJHPO Opinion does not indicate a period of significance.

Pennsylvania Railroad (PATH) Bridge over Hackensack River (NJHPO Opinion: 5/3/2002)
The Pennsylvania Railroad (PATH) Bridge over the Hackensack River was determined individually eligible for listing on the NR under Criteria A and C (see Plate 4.10). The bridge was constructed as a part of a World War I regional effort by the War Department to provide a constant flow of railroad, vehicular and marine traffic over the navigable waterways within the Port of New York (Guzzo 2002b). Under Criterion C, the bridge is significant as a distinguished example of a vertical lift bridge and for its association with master designer, John Alexander Low Waddell. The period of significance for the bridge is 1930. The structure is also identified as a contributing resource within the Hackensack River Lift Bridges Historic District and the New Jersey Railroad Bergen Cut Historic District.

St. Peter's Cemetery (NJHPO Opinion: 6/18/1996)
Located in Jersey City adjacent to the west of U.S. Routes 1 & 9, St. Peter's Cemetery is a Roman Catholic burial ground with interments beginning with the cemetery's creation in 1849 (see Plates 4.42-4.43). The cemetery has minimal landscaping and is surrounded by a chain link fence. St. Peter's Cemetery was determined eligible for listing in the NJR and NR at the local level in 1996 under Criterion A as Jersey City's first burial ground dedicated to the Roman Catholic community (Greenhouse Consultants Incorporated 1996). The NJHPO Opinion does not indicate a period of significance.

West End Interlocking Tower (NJHPO Opinion: 1/20/1999)
The West End Interlocking Tower was built in 1909 and was used to control the junction between the Delaware, Lackawanna & Western Railroad Boonton Line and the Morris & Essex Railroad (see Plate 4.5). At present, the tower is used as office and storage space for rail maintenance and no longer functions as an interlocking tower. The West End Interlocking Tower was determined individually eligible for listing in the NJR and NR under Criteria A and C in the areas of Transportation, Engineering, and Architecture (NJHPO Opinion: 1/20/1999). The West End Interlocking Tower is also a contributing resource to the NR-eligible Old Main DL&WRR HD (NJHPO Opinion: 9/24/1996). The NJHPO Opinion does not indicate a period of significance.

West-End Through Truss Bridges (NJHPO Opinion: 3/31/1997)
Built in 1908 for the DL&WRR, the steel West-End Through Truss Bridges at milepost 1.89 on the NJ TRANSIT Morristown Line carry two rail lines at the West End of the Bergen Tunnel and cross the former Erie Railroad tracks that emerge from the Erie Tunnel under Bergen Hill (see Plate 4.34). The West-End Through Truss Bridges are the only trusses surviving on this particular rail line and are technologically significant as an example of heavy trusses used in railroad construction. The truss bridges were determined individually eligible for listing in the NJR and NR under Criteria A and C in the areas of Transportation and Engineering (NJHPO Opinion: 3/31/1997; NJHPO Opinion: 1/20/1999). The West-End Through Truss Bridges are also contributing resources to the NR-eligible Old Main DL&WRR Historic District (NJHPO Opinion: 9/24/1996). The NJHPO Opinion does not indicate a period of significance.

Old and New Bergen Tunnels (NJHPO Opinion: 5/8/1998)
The Old and New Bergen Tunnels are parallel tunnels that cut through the trap rock of Bergen Hill that each carries two rail lines (see Plate 4.12). Built in 1876 by the DL&WRR, the Old Bergen Tunnel measures 4,278 feet in length, 27 feet in width, and 19 feet in height. The New Bergen Tunnel was built in 1908 and measures 4,281 feet in length, 30 feet in width, and 23 feet in height. The old tunnel carries two westbound tracks for the NJ TRANSIT Morristown line while the new tunnel carries two eastbound tracks. Both tunnels are technologically significant for their association with the development of transportation and commerce in the late nineteenth century (Old Bergen Tunnel), and for the innovative use of concrete in response to an increase in railroad freight operations during the early twentieth century (New Bergen Tunnel). The Old and New Bergen Tunnels were determined eligible for listing in the NJR and NR under Criteria A and C in the areas of Transportation and Engineering (NJHPO Opinion: 5/8/1998). The tunnels are also contributing resources to the NR-eligible Old Main DL&WRR HD (NJHPO Opinion: 9/24/1996). The NJHPO Opinion does not indicate a period of significance.

JFK Boulevard Bridge [SI&A # 0951170] (NJHPO Opinion: 4/27/2000)
Measuring 60 feet in length and 200 feet in width, the JFK Boulevard Bridge carries the former Bergen Archways route under an arterial street in Jersey City. The structure received an opinion of eligibility from the NJHPO on April 27, 2000 (Guzzo 2000) (see Plates 4.34-4.35). The bridge is individually eligible for listing in the NJR and NR under Criteria A and C in the areas of Transportation, Architecture, and Engineering. The JFK Boulevard Bridge is also a contributing resource to the NR-eligible Erie Railroad Bergen Archways Historic District (NJHPO Opinion: 4/27/2000). The concrete-lined tunnel was built between 1907 and 1910 by the Erie Railroad and is one of four tunnels on the Bergen Archways route. Construction of the JFK Boulevard Bridge and the other three tunnels represents a significant engineering achievement for cutting through Bergen Hill for a length of 4,400 feet which resulted in the largest amount of rock removed for any such project up to that time. Upon completion, the Bergen Archways route resulted in an open cut four-track route with four tunnels under major streets and intersection (A.G. Lichtenstein & Associates, Inc. 1994). The historic rail line proved an innovative solution for building a railroad corridor amid an urban area to accommodate a high volume of passenger traffic (A.G. Lichtenstein & Associates, Inc. 1994).

Erie Railroad Bergen Hill Tunnel [aka Long Dock Tunnel] (NJHPO Opinion: 4/27/2000
The Erie Railroad (ERR) Bergen Hill Tunnel was previously surveyed at the intensive level in 1980 and again in 1997 and recommended individually eligible on both occasions (Historic Sites Research 1980; Frederic R. Harris, Inc. 2000) (see Plate 4.34). The ERR Bergen Hill Tunnel received an opinion of eligibility from the NJHPO on April 27, 2000 (Guzzo 2000). It is eligible for inclusion in the NJR and NR under Criteria A and C in the Areas of Transportation, Architecture, and Engineering. Built under the auspices of the Long Dock Company between 1856 and 1861 and modified during the late nineteenth and early twentieth centuries, the ERR Bergen Hill Tunnel was the first bore of its kind through Bergen Hill and a pioneering technological and engineering achievement of its age. Although the NJHPO Opinion did not provide a formal period of significance for the resource, recent cultural resources investigations (Richard Grubb & Associates, Inc. 2008) recommended a period of significance between 1856 when construction began, and 1960 when the ERR merged with the

DL&WRR to form the E-LRR. The historic property's recommended boundaries and contributing features include the tunnel footprint, the east and west portals, interior arches, and all shaft structures (both above and below ground). The ERR Bergen Hill Tunnel is also a key contributing resource to the Erie Main Line Historic District (NJHPO Opinion: 2/20/2003).

Palisade Avenue Bridge [SI&A # 0951165] (NJHPO Opinion: 4/27/2000)
Built in 1910 in Jersey City, the Palisade Avenue Bridge is a two-span, reinforced concrete bridge constructed as part of the historically significant Erie Railroad Bergen Archways route (see Plate 4.39). Both the Palisade Avenue Bridge and nearby Baldwin Avenue Bridge utilize reinforced concrete which consists of a grid of steel rods akin to the type of reinforcement pioneered by Joseph Monier. Both bridges are considered ambitious early concrete arches built in the country and mark the Erie Railroad's transition away from steel. The south arch of the Palisade Avenue Bridge spans a former trolley line that ran parallel to the Bergen Archways route. Stairs lead from deck level to the trolley grade suggesting the bridge served as shelter for a trolley stop (A.G. Lichtenstein & Associates, Inc. 1994). The Palisade Avenue Bridge meets Criteria A and C of the NJR and NR to be individually eligible for listing and is significant in the areas of Transportation and Engineering (NJHPO Opinion: 4/27/2000). The bridge is also a contributing resource to the NR-eligible Erie Railroad Bergen Archways Historic District (NJHPO Opinion: 4/27/2000). The NJHPO Opinion does not indicate a period of significance.

Jersey City High School [William Dickinson High School] (NJR: 12/31/1981; NR: 6/1/1982)
Jersey City High School was built in 1906 and expanded in 1911 and is Jersey City's oldest secondary school that continues to serve as a community public high school (see Plate 4.44). Situated along the brow of Jersey City's highest elevation, the Beaux Arts-styled building was designed by John T. Rowland. Rowland was the leading architect in Jersey City throughout the first half of the twentieth century and is responsible for many of the city's private and public buildings. Following its completion, the school was celebrated for its modern facilities. The design included a 2,000-seat auditorium which was used over the years to host figures of national and international prominence amid myriad public events. Moreover, during World War I, Jersey City High School was used as an army training post given the school's unique industrial department and associated facilities (Petrick 1981). Jersey City High School was listed in the NJR and NR in 1981 under Criteria A and C and is significant in the areas of Architecture, Education, and Politics/Government.

Holbrook Manufacturing Company (NJHPO Opinion: 2/28/1991)
The Holbrook Manufacturing Company is a large industrial building built circa 1926 at the foot of the Palisades and seated amid a commercial/industrial area of Jersey City (see Plates 4.45, 4.47). The building is characterized by its massive, blocky concrete form and uninterrupted vertical piers. The windows have been filled in but were originally multi-paned casement windows. The Holbrook Manufacturing Company is a good example of an industrial building using vernacular forms of classical architectural vocabulary to emphasize the building's bigger scale in contrast to its late-nineteenth-century predecessors. The historic resource was determined eligible for listing in the NJR and NR under Criteria B and C as part of an NR theme nomination of waterfront commercial/industrial buildings built between 1910 and 1930 (NJHPO Opinion: 2/28/1991).

Continental Can Company Complex (NJHPO Opinion: 5/30/1997)
The former Continental Can Company Complex was determined eligible for listing on the NRHP under Criteria B and C (see Plates 4.46, 4.47). The resource is associated with a significant period of development in Jersey City, when the area emerged as a major port and terminal region during the early twentieth century. Large manufacturing plants and warehouses were built in the region during the boom periods and changed the visual, social and economic landscape of Jersey City (Fekete 1997). Connected to a local network of railroads, the resource was an essential element in the regional transportation and commercial network in the early twentieth century (Mary B. Dierickx Architectural Preservation Consultants 1997). The complex is eligible under Criterion C, as an excellent example of the early-twentieth century utilitarian industrial style, which was considered to have influenced the European Modernist movement (Fekete 1997).

Lackawanna Warehouse and Viaduct (NJHPO Opinion: 5/16/1995)
The Lackawanna Warehouse and Viaduct is individually eligible for listing in the NJR and NR under Criteria A, B, and C as an "excellent example of an intact railroad terminal warehouse and an associated viaduct representative of the major role that railroads played in the development of the Jersey City waterfront, and for its association with Jersey City powerbroker Mayor Hague" (Hall 1995) (see Plates 4.13, 4.48-4.51). Built in 1930, the brick warehouse proved an unsuccessful attempt by Mayor Hague to spur development in Jersey City. The building is a typical example of warehouse architecture built in the 1930s, with large bands of multi-paned windows and blocky proportions, but is ornamented with brick piers and stone stringcourses. The NJHPO Opinion does not indicate the resource's period of significance.

Grove Street Bridge (NJHPO Opinion: 1/20/1999)
Built in 1896 by the DL&WRR, the Grove Street Bridge is a single-span, through plate girder and floorbeam bridge that carries seven tracks of the NJ TRANSIT Morristown Line over Grove Street in Jersey City (see Plates 4.14, 4.51-4.52). The Grove Street Bridge is one of several through plate girder bridges found on the rail line which were used due to their increased rigidity versus truss bridges, and were more economical for shorter spans (DeLeuw, Cather and Company 1991). The bridge was determined individually eligible for listing in the NJR and NR under Criteria A and C in the areas of Transportation and Engineering, and is a contributing resource to the NR-eligible Old Main DL&WRR Historic District (NJHPO Opinion: 1/20/1999; NJHPO Opinion: 9/24/1996). The NJHPO Opinion does not indicate the bridge's period of significance.

Engine Company #3, Truck #2 Firehouse (NJR: 2/9/1984; NR: 3/30/1984)
The Engine Company #3, Truck #2 Firehouse was designed by Hoboken architect Charles Fall and built in 1892 (see Plates 4.53-4.54). When built, the two-story, brick Romanesque Revival-style building was the largest, most ornate firehouse in Hoboken. The character-defining features of the building include its use of rectangular and circular towers at the corners on the south façade, and its prominent corner location that orients the building laterally to allow for maximum accessibility to all locations in the city. The firehouse was listed in the NJR and NR in 1984 under Criteria A and C and is significant in the areas of Architecture and Community Planning and Development (NJR: 2/9/1984; NR: 3/30/1984).

Erie-Lackawanna Terminal (NJR: 12/7/2004; NR: 2/17/2005)
The Erie-Lackawanna Terminal is listed in the NJR and NR under Criteria A and C in the areas of Architecture, Commerce, Community Planning and Development, Engineering, and Transportation (NJR: 12/7/2004; NR: 2/17/2005) (see Plates 4.16-4.17). At its time of completion in 1907, the Erie-Lackawanna Terminal was one of the best in the country, serving those traveling to many large northeastern cities, and played a key role in the early twentieth century development of Hoboken. The terminal is significant for its associations with the development of rail and ferry transportation in the United States and as a rare and well-preserved example of early twentieth century terminal design by Kenneth Murchison, architect, and Lincoln Bush, civil engineer. The period of significance for the terminal is 1907-1951 (Carmelich and Spies 2004).

The two newly-identified resources recommended eligible for listing in the NJR and NR as a result of the intensive-level survey are as follows:

Belvedere Court (RGA25)
Belvedere Court has been recommended eligible for listing in the NR under Criterion A for its association with the development of the Heights section of Jersey City in the early twentieth century and under Criterion C in the area of Architecture (see Plate 4.55). Built in the early twentieth century, Belvedere Court is significant as a well-preserved, extant example of an early luxury apartment building in the Heights section of Jersey City. Designed by prominent local architectural firm, William Neumann, the multi-family residence reflects the housing transition to high-rise "modern" apartment buildings in burgeoning residential neighborhoods. Architecturally, Belvedere Court is also important as a strong example of eclectic architecture, with an emphasis on Spanish Colonial Revival and a unique range of

various stylistic decorative elements. Its distinctive architectural features are enhanced by the U-plan foundation surrounding a central garden court. Referred to as "Garden" apartments, this specific type of housing reflected the Garden City movement – a larger cultural crusade aimed at the beautification and promotion of moral virtue within cities by incorporating green spaces into urban planning. The period of significance for the apartment building is 1914, the date of construction, to 1966.

R. Neumann & Co. Factory Complex (RGA48)
The R. Neumann & Co. Factory Complex has been recommended eligible for listing in the NR under Criterion A for its association with the early industrial development of Hoboken and under Criterion C in the area of Architecture (see Plates 4.56-4.57). Constructed in the late nineteenth century, the factory was established during one of the Hoboken's most significant periods of growth, as it emerged as a burgeoning center of innovative technology and manufacturing. The complex, with its numerous extant historic elements, effectively fuse the city's industrial past with the present urban landscape. Having been continuously owned and operated by descendants of the Neumann Family, the complex continues to serve as a center of the industrial arts for the community and conveys its historic importance as a manufacturing anchor of Hoboken. The period of significance for the complex is circa 1885 to 1966.

4.4 Effects Assessment

Table 4.3 summarizes the historic architectural resources within the APE (A-F) and lays out the effects assessment. The majority of resources identified within the APE (A-F) would be contextually, but not directly, impacted by the project as proposed. More specifically, most contextual impacts would be produced by the installation of proposed monopoles throughout the project area, which is the preferred installation option along the majority of the proposed electrical lines. Where monopoles are installed they will have limited impacts on the character-defining elements that render these resources eligible for listing in the NR. Despite the proposed 240-foot height of monopoles in Kearny, the monopoles will be compatible with the industrial character of this area of Kearny and will not significantly alter the context and surroundings of the existing historic resources. To the east of the Hackensack River, proposed monopoles will be no more than 65 feet in height. Though the proposed 65-foot-tall monopoles would be visible from many resources within the APE (A-F), they would not noticeably alter the existing environment to a degree that could constitute an adverse impact on these resources. All scenarios for potential direct and indirect impacts based on the proposed project elements as outlined in Sections 1.2 and 1.3 above have been explored in detail below. See Figures 4.3a-b for the locations of the resources.

The Old Main Delaware, Lackawanna and Western Railroad Historic District
The project as proposed will have no adverse effect on the Old Main DL&WRR Historic District. The proposed electrical line directly impacts an approximately 4.5-mile section of the district. Multiple contributing resources are located within this stretch of the railroad ROW and have the potential to be directly impacted by the electrical line, including the Lower Hack Draw Bridge, the West End Interlocking Tower, the West-End Through Truss Bridges, the Old and New Bergen Tunnels, and the Grove Street Bridge, discussed in further detail below. As plans for the electrical line installation are refined, care will be taken in the design and placement of any monopoles, duct banks, and mounted electrical lines to avoid direct impacts to resources and elements that directly contribute to the historic district's significance and integrity. So long as the installation is designed in a way that is sensitive to the historic industrial railroad character of the Old Main DL&WRR Historic District and avoids direct impacts where possible, there will be no adverse effect on this historic resource.

Pennsylvania Railroad New York to Philadelphia Historic District
The NR-eligible PRRHD is significant for its "distinctive and characteristic array of surviving cuts, embankments, grade separations, overgrade and undergrade bridges and culverts, stations, interlocking towers, and overhead catenary system" (Guzzo 2007). The project will have a direct impact on the historic district because of the proposed project improvements to Amtrak's Substation No. 41 in

Table 4.3: Summary of historic architectural resources within the APE (A-F) and effects assessment.

Resource ID	Property Name/Address	Municipality	NR Current Status	Effects Assessment
1	Old Main Delaware, Lackawanna and Western Railroad Historic District	Multiple	Eligible (NJHPO Opinion: 9/24/1996)	No adverse effect
2	Pennsylvania Railroad New York to Philadelphia Historic District	Multiple	Eligible (NJHPO Opinion: 10/2/2002)	No adverse effect
3	Pennsylvania Railroad New York Bay Branch Historic District	City of Newark	Eligible (NJHPO Opinion: 4/22/2005)	No adverse effect
4	Essex Generating Station	Town of Kearny; City of Newark	Eligible (SHPO Opinion: 3/23/2015)	No adverse effect
5	Public Service Electric and Gas Company (PSE&G) Kearny-Essex-Marion Interconnection Historic District	Town of Kearny; City of Jersey City	Eligible (NJHPO Opinion: 12/31/2013)	No adverse effect
6	Jersey City Water Works Historic District	Multiple	Eligible (NJHPO Opinion: 1/20/2003)	No effect
7	Hackensack River Lift Bridges Historic District	Town of Kearny; City of Jersey City	Eligible (NJHPO Opinion: 5/3/2002)	No adverse effect
8	People's Gas Light Company/PSE&G Marion Office Historic District	City of Jersey City	Eligible (NJHPO Opinion: 3/10/1999)	No adverse effect
9	Delaware, Lackawanna and Western Railroad Boonton Line Historic District	Multiple	Eligible (NJHPO Opinion: 9/18/2008)	No adverse effect
10	US Route 1 Extension [Pulaski Skyway] Historic District	Multiple	Listed (NJR: 6/13/2005; NR: 8/12/2005)	No adverse effect
11	US Routes 1 & 9 Historic District	Multiple	Eligible (NJHPO Opinion: 3/8/1996)	No adverse effect
12	New Jersey Midland Railway/New York, Susquehanna and Western Railroad Historic District	Multiple	Eligible (SHPO Opinion: 4/25/2006 & 1/30/2015)	No adverse effect
13	Erie Railroad Main Line Historic District	Multiple	Eligible (NJHPO Opinion: 2/20/2003)	No adverse effect
14	Erie Railroad Bergen Archways Historic District	City of Jersey City	Eligible (NJHPO Opinion: 4/27/2000)	No effect
15	Hudson and Manhattan Railroad Transit System (PATH) Historic District	Multiple	Eligible (NJHPO Opinion: 3/4/2002)	No effect
16	Southern Hoboken Historic District	City of Hoboken	Eligible (NJHPO Opinion: 2/28/1991)	No effect
17	Substation 4	Town of Kearny	Eligible (NJHPO Opinion: 9/12/1994)	No adverse effect
18	Edison Battery Company Property	Town of Kearny	Eligible (NJHPO Opinion: 4/8/2008)	No adverse effect
19	Jersey City Water Works Pipeline	City of Jersey City	Eligible (NJHPO Opinion: 5/7/1999)	No effect
20	PSE&G Kearny Generating Station	Town of Kearny	Eligible (SHPO Opinion: 5/3/2002)	No adverse effect
21	Lower Hack Draw Bridge	Town of Kearny; City of Jersey City	Eligible (NJHPO Opinion: 9/18/1996)	No adverse effect

Table 4.3; cont.

Resource ID	Property Name/Address	Municipality	NR Current Status	Effects Assessment
22	Wittpenn Bridge [SI&A #0909150]	Town of Kearny; City of Jersey City	Eligible (NJHPO Opinion: 2/7/2001)	No effect
23	Pennsylvania Railroad Harsimus Branch (Conrail/CSX) Bridge over the Hackensack River	Town of Kearny; City of Jersey City	Eligible (NJHPO Opinion: 5/3/2002)	No effect
24	Pennsylvania Railroad (PATH) Bridge over Hackensack River	Town of Kearny; City of Jersey City	Eligible (NJHPO Opinion: 5/3/2002)	No effect
25	St. Peter's Cemetery	City of Jersey City	Eligible (NJHPO Opinion: 6/18/1996)	No adverse effect
26	West End Interlocking Tower	City of Jersey City	Eligible (NJHPO Opinion: 1/20/1999)	No adverse effect
27	West-End Through Truss Bridges	City of Jersey City	Eligible (NJHPO Opinion: 3/31/1997)	No adverse effect
28	Old and New Bergen Tunnels	City of Jersey City	Eligible (NJHPO Opinion: 5/8/1998)	No adverse effect
29	JFK Boulevard Bridge [SI&A # 0951170]	City of Jersey City	Eligible (NJHPO Opinion: 4/27/2000)	No effect
30	Erie Railroad Bergen Hill Tunnel [aka Long Dock Tunnel]	City of Jersey City	Eligible (NJHPO Opinion: 4/27/2000)	No adverse effect
31	Palisade Avenue Bridge [SI&A # 0951165]	City of Jersey City	Eligible (NJHPO Opinion: 4/27/2000)	No effect
32	Jersey City High School [William Dickinson High School]	City of Jersey City	Listed (NJR: 12/23/1981; NR: 6/1/1982)	No adverse effect
33	Holbrook Manufacturing Company	City of Jersey City	Eligible (NJHPO Opinion: 2/28/1991)	No adverse effect
34	Continental Can Company Complex	City of Jersey City	Eligible (NJHPO Opinion: 5/30/1997)	No adverse effect
35	Lackawanna Warehouse and Viaduct	City of Jersey City	Eligible (NJHPO Opinion: 5/16/1995)	No adverse effect
36	Grove Street Bridge	City of Jersey City	Eligible (NJHPO Opinion: 1/20/1999)	No adverse effect
37	Engine Company #3, Truck #2 Firehouse	City of Jersey City	Listed (NJR: 2/9/1984; NR: 3/30/1984)	No adverse effect
38	Erie-Lackawanna Terminal	City of Hoboken	Listed (NJR: 12/7/2004; NR: 2/17/2005)	No adverse effect
39	Belvedere Court	City of Jersey City	Recommended Eligible (RGA25)	No adverse effect
40	R. Neumann & Co. Factory Complex	City of Hoboken	Recommended Eligible (RGA48)	No adverse effect

NR: National Register of Historic Places
NJR: New Jersey Register of Historic Places
NJHPO: State Historic Preservation Office

the Town of Kearny (see Plates 4.19-4.28). Substation No. 41 was constructed in 1931/1932 by the Pennsylvania Railroad in connection with its electrification of its lines between New York City and Washington, D.C. The substation provides electrical power to a segment of the railroad's overhead catenary system extending between Newark and Hackensack. The project will involve the construction of the new Kearny Substation, which will replace Substation 41, on an adjacent parcel, after which point the original substation will be taken out of service.

In 1928, the Board of Directors of the Pennsylvania Railroad authorized the comprehensive electrification of freight and passenger service on its line between New York City and Wilmington, Delaware utilizing alternating current (AC). Prior to that date, the PRR had already begun experimenting with piecemeal electrification of segments of its system. The territory between the Manhattan Transfer Station in Harrison, New Jersey and Pennsylvania Station in New York City was electrified using direct "third rail" current (DC) between 1910 and 1911. In 1915 and 1918, respectively, the PRR electrified the Paoli and Chestnut Hill lines in the suburbs of Philadelphia utilizing AC power. But the resolution of 1928 (which was soon expanded to include the full electrification of the PRR's line south to Washington, D.C. and westward to Harrisburg, Pennsylvania), represented a much broader and more important decision. Constructed at a cost of over $250 million, the PRR electrification project represented the largest capital improvement program undertaken by a railroad up until that date (Bezilla 1980:143). This comprehensive and irreversible step called for the transition of America's largest railroad to a new form of motive power and effectively heralded the end of America's "Age of Steam."

In order to facilitate this change, the PRR erected a catenary system that extended the entire length of its rail corridor between the nation's economic and political capitols. To power the system, new substations were built at intervals of between eight and ten miles along the entire length of the tracks. Substation No. 41 in Kearny was built in 1931/32 and, in part, replaced the neighboring Substation 4, which had been erected to support the 1910 DC third rail effort. Of the eight substations erected between 1931 and 1933 in New Jersey in connection with the effort, Substations 41 and 42 were the first to be constructed.

The primary purpose of these substations was to step down the 132kV system power to the 11kV "trolley wires" suspended from the catenary. In the 1970s, the 132kV/11kV system was changed to a 138kV/12kV system. Because of the short interval spacing, trains moving along the tracks were never more than five miles from a substation. This minimized voltage loss and allowed a train to draw power from the substation immediately behind it as well as from the next substation down the line. The PRR's switch to electric power went beyond just a change in motive power; it involved the wholesale adoption of electric signaling. New electric signaling equipment was also installed within these substation compounds.

At each substation, power was drawn from the primary transmission lines to "motor-operated, remotely controlled air-break disconnecting switches" (Duer 1930: 103). These switches, the 132kV transmission lines and 11kV buses were carried at each substation by galvanized steel support structures mounted on concrete footings. Period accounts suggest that early catenary and substation structures primarily were bolted rather than riveted together, although limited experiments apparently were made with riveted construction (Duer 1930: 103). Multiple transformers undertook the actual power step down process. Each transformer was connected through an oil circuit breaker to the 11kV bus. Different parts of each bus could be isolated by bus-tie oil circuit breakers. The buses were then linked to the catenary through "high-speed" trolley breakers. These "trolley breakers" would disconnect the substation from the catenary wires in one twenty-fifth of a second in the event of a ground fault or short circuit (Ludwig 1934:13 and 16; Figure 4.4). Most substation compounds also included a control house. Typically single story buildings of concrete block construction with concrete roofs and floors, these structures housed switch control equipment and signal controls and signal motor generator sets.

According to New Jersey Transit Corporation's "Cultural Resources Supplemental Report of the Northeast Corridor For the Secaucus Transfer Project" (1994:43), the list of major equipment that was originally contained within the Substation No. 41 compound included six oil circuit breakers, 12 750-watt air blast transformers, the 75-kilowatt starting transformers, and two Signal Motor generators.

The eight New Jersey substations that were constructed as part of this important historic engineering effort certainly possess sufficient historic significance under NR Criteria A and C to be considered contributing resources within the PRRHD. However a number of these substations, including Substation No. 41, have been extensively modernized in order to meet the demands for current day

rail functions. Substation No. 41's integrity was further compromised as a result of fire. According to Eric F. Hornung, Acting Deputy Chief Engineer of Amtrak:

> On July 11, 1991, a catastrophic fire occurred in the original control house structure and quickly spread throughout much of the adjacent equipment and structures. The entire damaged infrastructure was removed and replaced with a modern modular control house and all related equipment upgraded to industry and National Electric Code standards. More recently, in 2012, Hurricane Sandy flooded the entire substation footprint which resulted in the destruction of most of the major components. The damaged equipment was replaced in order to bring the substation back to operational capacity. In addition, to provide 60 Hz power to the new signal motor generator sets, PSE&G erected a facility on the northeast corner of the substation property consisting of a 10 foot square concrete pad, transformer, and a shed roof enclosure to house their metering equipment (Hornung to Suriano, September 8, 2016).

In order to assess whether or not Substation No. 41 retains sufficient historic integrity to be considered a contributing resource within the PRRHD consideration was given to identifying the principal character defining features of PRR substations that were constructed in New Jersey during the railroad's initial (1928-1933) AC electrification effort. Five primary character defining features were identified:

1) Integrity of Setting. In the case of substations, this aspect of integrity principally involves a direct visual connection to the existing NEC tracks. Modern intrusions into the landscape or other changes to the surrounding environment would not constitute a degradation in integrity as long as the basic physical and conceptual tie to the adjacent railroad corridor is maintained.

2) Profile and Originality of Substation Superstructure. Because of safety and security issues, substations cannot be visited by the general public, however, they can readily be observed within the landscape of the railroad corridor due to the height and nature of their superstructures. Due to this fact, the superstructure is the most important character defining feature of these substations. Significant changes to the profile and appearance of a substation's superstructure or the replacement of its original fabric would constitute a significant loss of integrity.

3) Survival of Control Houses. Most substation compounds included a concrete control house that contained switching controls and signaling mechanisms. The absence of a control house at facilities that originally included them represents a diminishment of integrity.

4) Survival of Original Equipment. The significance of these substations is directly tied to the importance of the electrification of the Pennsylvania Railroad within the large themes of engineering innovation and the American railroad and transportation history. Surviving examples of electrical and signal infrastructure and equipment dating to the original phase of the Pennsylvania Railroad's AC electrification program are historically significant and increasingly rare. Loss of this equipment represents an important diminishment of integrity, particularly considering that so much of the historic significance of these potential contributing resources is founded on the technological and engineering advances that they represent.

5) Continuity of Function. Continuing function is a factor of integrity.

Based on this review of character defining features, Substation No. 41 does not appear to retain sufficient integrity to qualify as a contributing resource within the NR-eligible PRRHD. The substation's integrity of location and function does remain intact and its original superstructure does appear to survive. However, the catastrophic fire at Substation No. 41 destroyed its original control house and required the replacement of most of the Substation's equipment. The only original yard equipment extant at Substation No. 41 appears to be limited to four transformers, one pair of "service transformers" and

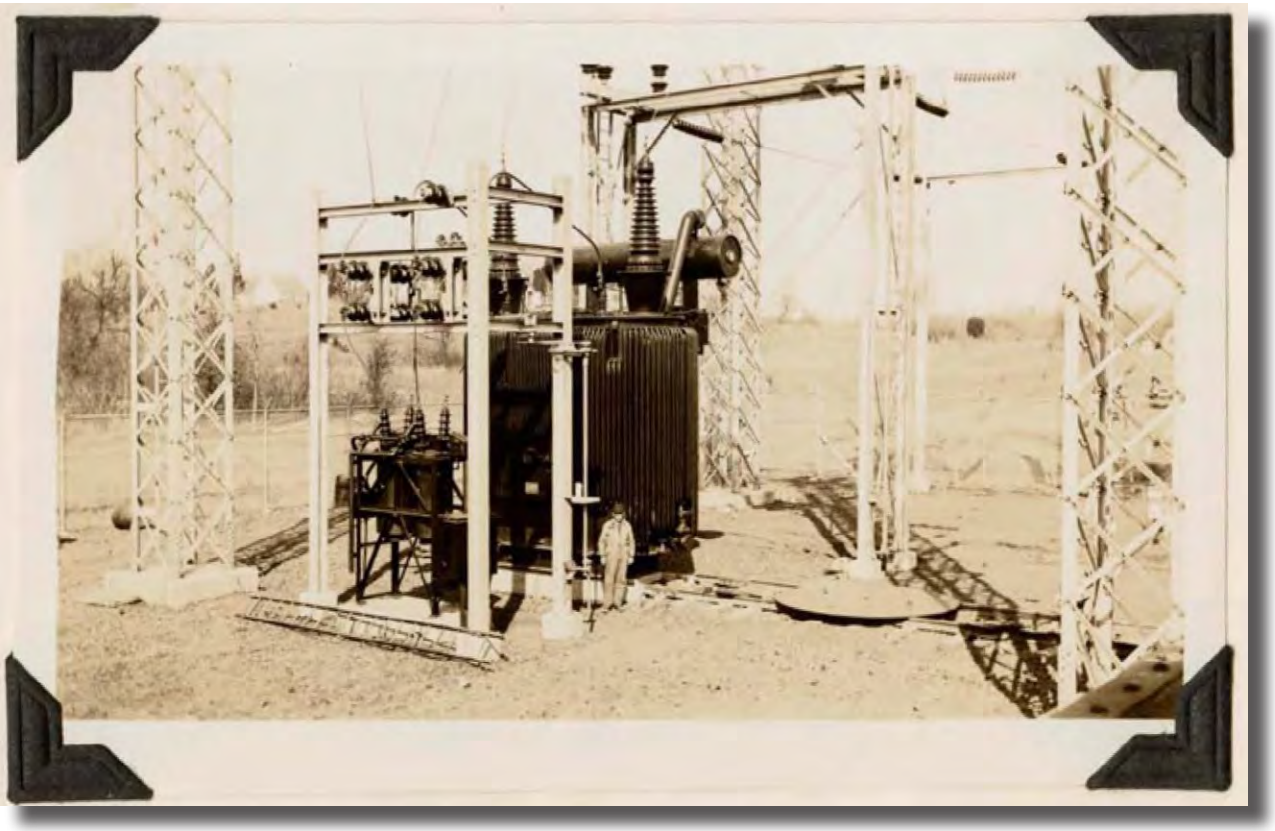

Figure 4.4: 1935 photograph of a G.E. transformer #1 with breaker in the substation in Landover, Maryland
(Flagg 1935:30).

one pair of "potential transformers," mounted on the superstructure. For a complete analysis of the integrity of the New Jersey PRR substations, see the context submitted to the NJHPO by RGA under a separate cover, which more fully documents and analyzes the extant historic fabric at each of the substations.

As the substation does not appear to be a contributing resource within the PRRHD, the project as proposed will not directly affect the NR-eligible historic district. Further, the project as proposed will not result in any indirect adverse impacts on the PRRHD. Though the proposed 240-foot monopoles would be visible from a section at the northeast end of the district, the setting of the district is not a character-defining feature and the resource's setting has always been industrial in nature where it passes through Kearny. As such, the proposed monopoles would not alter the industrial character of the surrounding area and would not adversely affect the PRRHD.

Pennsylvania Railroad New York Bay Branch Historic District

The project as proposed will have no adverse effect on the NR-eligible PRR New York Bay Branch Historic District. The proposed 240-foot monopoles would be visible from the north end of the historic district. However, the setting of the district is not a character-defining feature, which is significant for its collection of well-preserved engineering elements and its contribution to New Jersey's industrial, commercial, and urban expansion. Further, the resource's setting has always been industrial in nature where it passes through Kearny. As such, the proposed monopoles would not alter the industrial character of the surrounding area.

Essex Generating Station

The project would have no adverse effect on the NR-eligible Essex Generating Station historic district. The proposed 240-foot monopoles would be visible from the district. However, the proposed monopoles would be compatible with the industrial character of the surrounding area and thus would not represent a visual intrusion on the historic district. As a result, the proposed project would have no adverse effect on the Essex Generating Station.

Public Serve Electric and Gas Company (PSE&G) Kearny-Essex-Marion Interconnection Historic District

The project as proposed will have no adverse effect on the NR-eligible PSE&G Kearny-Essex-Marion Interconnection Historic District. The proposed 240-foot monopoles, as well as the Main Facility site, would be visible from various vantage points throughout the historic district. However, the setting of the district is not a character-defining feature. The district is significant as PSE&G's first successful application of high-tension transmission at 132,000 volts over steel lattice towers, creating a means for the utility to also back up and supplement power, allowing for interconnection with neighboring utilities. Further, the resource's setting has always been industrial in nature where it passes through Kearny and the proposed monopoles would be compatible with the industrial character of the surrounding area.

Jersey City Water Works Historic District

The project as proposed will have no effect on the NR-eligible Jersey City Water Works Historic District. Although the resource passes directly beneath the proposed location of the Main Facility site, project plans for the Main Facility will not directly impact the portions of the site through which the historic district extends. Further, the only above-ground element of the resource in proximity to the APE (A-F) is the Jersey City Reservoir 2 & 3 Complex (NJHPO Opinion: 10/15/1991; NJR: 4/10/2002; NR: 8/27/2012). As the above-ground resource's boundaries do not extend into the APE (A-F), there will be no visual or contextual effects upon the historic district. The resource is a rare surviving example of early American public works and has the potential to yield important information regarding mid-nineteenth century engineering and construction for the public good. As project plans are refined and finalized, care will be taken to avoid direct impacts to the historic district. Avoidance will be achieved through project design so that no ground disturbance activities, including trenching and shaft drilling, are undertaken within the mapped route of the Jersey City Water Works Historic District.

Hackensack River Lift Bridges Historic District
The project as proposed will have no adverse effect on the Hackensack River Lift Bridges Historic District. The district includes four bridges that together represent largely unaltered, operable, and increasingly rare examples of historically and technologically significant bridge types. The Lower Hack Draw Bridge, a contributing resource within the district, has the potential to be adversely impacted by the proposed electrical line installation. The bridge was designed at a time when movable bridge construction was still dominated by swing bridges, and the intact movable suspended span is a well-preserved example of this innovative bridge design and construction. At present, project plans call for the replacement of one of the existing electrical lines that currently crosses the bridge. As plans for the electrical line installation are refined, care will be taken in the design and placement of any necessary mounted elements to avoid direct impacts to this historic resource. So long as the electrical line is installed in a way that is sensitive to the late nineteenth century historic character and contributing design details of the Lower Hack Draw Bridge and the Hackensack River Lift Bridges Historic District, there will be no adverse effect on this historic resource

People's Gas Light Company/PSE&G Marion Office Historic District
The project as proposed will have no adverse effect on the NR-eligible PSE&G Marion Office Historic District. The proposed 65-foot monopoles would be intermittently visible from the historic district. However, the setting of the district is not a character-defining feature. The resource is significant as it contains the only surviving late nineteenth and early twentieth century People's Gas Light Company/ PSE&G buildings in the Marion section of Jersey City. The construction of monopoles to the north of the historic district will not detract from the resource's association with this thriving and important late nineteenth and twentieth century industry.

Delaware, Lackawanna and Western Railroad Boonton Line Historic District
The project as proposed will have no adverse effect on the NR-eligible DL&WRR Boonton Line Historic District. The proposed 65-foot monopoles would be intermittently visible from the southernmost end of the historic district. However, the setting of the district is not a character-defining feature, which is significant for its associations with freight and passenger service, and for spurring the growth and development of industries and residences along the alignment.

US Route 1 Extension [Pulaski Skyway] Historic District
The project as proposed will have no adverse effect on the NR-listed US Route 1 Extension Historic District. The proposed 240-foot monopoles would be visible from numerous vantage points within the historic district. However, the setting of the district is not a character-defining feature of the roadway, which is significant for its historical and technological associations and as an intact section of America's first superhighway. Further, the resource's setting has always been industrial in nature where it passes through Kearny, which is also where the proposed monopoles would be most highly visible at 240 feet in height. The proposed monopoles, if constructed, would therefore not represent a visual intrusion on the historic district, and the proposed project would have no adverse effect.

US Routes 1 & 9 Historic District
The project as proposed will have no adverse effect on the NR-eligible US Routes 1 & 9 Historic District. The proposed 240-foot monopoles would be visible from numerous vantage points within the historic district. However, the setting of the district is not a character-defining feature of the roadway, which is significant for its transportation and engineering associations as an early roadway designed to accommodate high speeds and heavy traffic use. As there will not be any direct impacts to the historic district, the project would not adversely affect any character-defining features such as key design features of the roadway itself. Further, the proposed monopoles would be most highly visible where the historic district passes through Kearny, as those monopoles are proposed to be 240 feet in height. As Kearny has always been industrial in nature since the construction of U.S. Routes 1 & 9, the monopoles would not create a visual intrusion on the historic district.

New Jersey Midland Railway/New York, Susquehanna and Western Railroad Historic District
The project as proposed will have no adverse effect on the NR-eligible New Jersey Midland Railway/ New York, Susquehanna and Western Railroad Historic District. New 65-foot monopoles and duct

banks have the potential to directly impact the resource where the proposed electrical line crosses through the historic district. As plans for the electrical line installation are refined, care will be taken in the design and placement of any monopoles and duct banks to avoid direct impacts to this historic resource. Though the proposed 65-foot monopoles would be visible from a few vantage points, setting is not a character-defining feature and the resource's setting has always been dominated by railroad-related infrastructure where it crosses the Morris & Essex Line. As such, the proposed monopoles would not alter the industrial character of the immediate surroundings. So long as the electrical line is designed to minimize impacts, there will be no adverse effect on this historic resource.

Erie Railroad Main Line Historic District

The project as proposed will have no adverse effect on the NR-eligible Erie Railroad Main Line Historic District. The proposed electrical line route crosses the district. As such, new 65-foot monopoles and duct banks have the potential to directly and visually affect the historic district. As project plans are refined, care will be taken to design and install this section of the electrical line in a way that avoids direct impacts to the district wherever feasible. Though the proposed 65-foot monopoles would be visible from a few vantage points, setting is not a character-defining feature and the resource's setting has always been dominated by railroad-related infrastructure where it crosses the Morris & Essex Line. As such, the proposed monopoles would not alter the industrial character of the immediate surroundings. So long as the electrical line is designed to minimize impacts, there will be no adverse effect on the Erie Railroad Main Line Historic District.

Erie Railroad Bergen Archways Historic District

The project as proposed will have no effect on the Erie Railroad Bergen Archways Historic District. If installed, the proposed 65-foot monopoles would only be intermittently visible from a few vantage points within the historic district. This will not alter the characteristics that render the property eligible for listing in the NR, namely its association with the improvement of commuter mobility and communication in the greater New York region and the nation, as well as for its distinctive railroad construction methods and technology.

Hudson and Manhattan Railroad Transit System (PATH) Historic District

The project as proposed will have no effect on the historic property. Although the resource passes directly beneath the project area, it is located entirely underground in the vicinity of the project area and well beyond the reach of project impacts.

Southern Hoboken Historic District

The project as proposed will have no effect on the NR-eligible Southern Hoboken Historic District. The Southern Hoboken Historic District is comprised of dense urban nineteenth century fabric with limited modern intrusions to the north and the Erie-Lackawanna Terminal and railroad ROW to the south, displaying "a clear sense of architectural and historic cohesiveness created by the unique combination of Hoboken's waterfront, industrial, and transportation needs" (Guzzo 1999). Though project plans include the installation of new monopoles, the proposed monopoles would be located approximately 1,700 feet west of the historic district. At this distance, the new monopoles will not alter the district's viewscape. Existing catenary support structures, generally the tallest and most highly visible structures within the southern portion of the district, stand at a height of approximately 35 feet. At the proposed height of 65 feet, new monopoles would be visible from certain locations within the southwest portion of the district. However, due to the distance between the eastern end of the proposed electrical line and the southwest portion of the historic district, the proposed monopoles would not detract from the architectural and historic cohesiveness that is a defining feature of the district's character and significance.

Substation 4

The project as proposed will have no adverse effect on the NR-eligible Substation 4 building. As currently proposed, the proposed new Kearny Substation is to be sited east of the brick building within the Cedar Creek Marsh. Though the proposed substation will be visible from Substation 4, the new railroad infrastructure would be compatible with the industrial character of the surrounding area

and thus would not alter the setting of Substation 4 in a way that would detract from its significance of setting. As a result, the proposed project would have no adverse effect on Substation 4.

Edison Battery Company Property
The project as proposed will have no adverse effect on the NR-eligible Edison Battery Company Property. The proposed Main Facility will likely be visible from the resource. However, the setting of the Edison Battery Company is not a character-defining feature of the historic property, which is significant for its associations with Edison's development of the battery, as well as its industrial Art Deco design. Further, the resource's setting has always been industrial in nature and has been altered over time by ongoing industrial development and decline in this area of Kearny.

Jersey City Water Works Pipeline
The project as proposed will have no effect on the NR-eligible Jersey City Water Works Pipeline. The resource bisects the proposed electrical line at the Newark-Jersey City Turnpike. It is a rare surviving example of early American public works and has the potential to yield important information regarding mid-nineteenth century engineering and construction for the public good. As project plans are refined and finalized, care will be taken to avoid direct impacts to the historic district. Avoidance will be achieved through project design so that no ground disturbance activities, including trenching and shaft drilling, are undertaken within the mapped route of the Jersey City Water Works Pipeline.

PSE&G Kearny Generating Station
The project would have no adverse effect on the Kearny Generating Station. Though visible from the historic resource if installed, the proposed 240-foot monopoles would be compatible with the industrial character of the surrounding area. Thus the monopoles would not represent a visual intrusion. As a result, the proposed project would have no adverse effect on the Kearny Generating Station.

Lower Hack Draw Bridge
The project as proposed will have no adverse effect on the Lower Hack Draw Bridge. The bridge is significant as an increasingly rare and intact example of a vertical lift bridge designed and built in 1927 by internationally-renowned engineer John Alexander Low Waddell, carrying three railroad lines across the Hackensack River. The bridge was designed at a time when movable bridge construction was still dominated by swing bridges, and the intact movable suspended span is a well-preserved example of this innovative bridge design and construction. The proposed electrical line has the potential to directly impact the resource if it is installed in using methods that would degrade important historic design elements of the bridge, those which continue to represent the structure's innovative engineering and construction. At present, project plans call for the replacement of one of the existing electrical lines that currently crosses the bridge. As plans for the electrical line installation are refined, care will be taken in the design and placement of any necessary mounted elements to avoid direct impacts to this historic resource, and designs should be sensitive to the historic late nineteenth century design and engineering of the bridge. So long as the electrical line is installed in a way that is sensitive to the historic character of the Lower Hack Draw Bridge, there will be no adverse effect on this historic resource.

Wittpenn Bridge [SI&A #0909150]
The project as proposed will have no effect on the NR-eligible Wittpenn Bridge. The proposed 240-foot monopoles will only be intermittently visible from a few vantage points on the bridge. This will not alter the characteristics that render the property eligible for listing in the NR, namely its association with advances in engineering and transportation as one of six bridges planned simultaneously to improve local highway connections and providing a required 35-foot minimum vertical clearance over the Hackensack River when closed. Further, the resource's setting has always been industrial in nature.

Pennsylvania Railroad Harsimus Branch (Conrail/CSX) Bridge over the Hackensack River
The project as proposed will have no effect on the NR-eligible Harsimus Branch Bridge. The proposed 240-foot monopoles will only be intermittently visible from a few vantage points on the bridge. This will not alter the characteristics that render the property eligible for listing in the NR, namely its

association with advances in engineering and transportation, specifically with master engineer John Alexander Low Waddell, who designed the bridge to improve local highway connections and create an uninterrupted flow of railroad, vehicular, and marine traffic through and over the Hackensack River. Further, the resource's setting has been industrial in nature since the bridge's construction. As such, the project as proposed would not constitute a visual or contextual intrusion on the resource.

Pennsylvania Railroad (PATH) Bridge over Hackensack River

The project as proposed will have no effect on the NR-eligible Pennsylvania Railroad Bridge. The proposed 240-foot monopoles will only be intermittently visible from a few vantage points on the bridge. This will not alter the characteristics that render the property eligible for listing in the NR, namely its association with advances in engineering and transportation, specifically with master engineer John Alexander Low Waddell, who designed the bridge to improve local highway connections and create an uninterrupted flow of railroad, vehicular, and marine traffic through and over the Hackensack River. As the setting of the resource has been industrial in nature since its date of construction, the project as proposed would not significantly alter the bridge's context and would therefore not constitute a visual intrusion.

St. Peter's Cemetery

The project as proposed will have no adverse effect on the NR-eligible St. Peter's Cemetery, though the proposed electrical line will be visible from the resource. St. Peter's Cemetery is significant for its associations with Jersey City's Roman Catholic community beginning in the mid-nineteenth century and as the first Roman Catholic cemetery in Jersey City. The cemetery's setting has changed over time by the ongoing growth and development Jersey City, specifically in the construction and expansion over time of U.S. Routes 1 & 9 to the south and east. Any visible monopoles will not adversely impact the characteristics that render the resource eligible for listing in the NR.

West End Interlocking Tower

The project as proposed will have no adverse effect on the NR-eligible West End Interlocking Tower. The tower is significant in the areas of transportation, engineering, and architecture, built in 1909 to control the junction of the DL&WRR Boonton Line and the M&ERR. Depending on their placement and design, new 65-foot monopoles and/or duct banks have the potential to directly impact the resource. As plans for the electrical line installation are refined, care will be taken in the design and placement of any monopoles and duct banks to avoid direct impacts to this historic resource. So long as the monopoles or duct banks are positioned so that they do not directly impact the West End Interlocking Tower, there will be no adverse effect on this historic resource. Further, as the resource's setting has always been dominated by railroad-related infrastructure, the project as proposed would not significantly alter the interlocking tower's context and would therefore not constitute a visual intrusion.

West-End Through Truss Bridges

The project as proposed will have no adverse effect on the NR-eligible West-End Through Truss Bridges. The bridges are significant in the areas of transportation and engineering, and are the only surviving intact truss bridges in this section of the historic DL&WRR. New 65-foot monopoles and duct banks have the potential to directly impact the resource. As plans for the electrical line installation are refined, care will be taken in the design and placement of any monopoles and duct banks to avoid direct impacts to this historic resource. So long as the monopoles or duct banks are positioned so that they do not directly impact the West-End Through Truss Bridges, there will be no adverse effect on this historic resource. Further, the resource's setting has always been dominated by railroad-related infrastructure. As such, the project as proposed would not significantly alter the bridge's surroundings and would therefore not constitute a visual intrusion.

Old and New Bergen Tunnels

The project as proposed will have no adverse effect on the NR-eligible Old and New Bergen Tunnels. The tunnels are significant for their association with late nineteenth and early twentieth century technological advances in transportation and engineering. The extent of the impacts on the tunnel

and the historic district depend on the proposed method of installation. As currently proposed, direct effects would be limited to the New Bergen Tunnel (the south tunnel). The electrical line would be installed within a precast duct bank at grade between the northernmost track and the north wall of the tunnel. As proposed, the installation would not result in an adverse effect. The proposed duct banks will not directly alter the tunnel and do not have the potential to degrade important historic design elements of the tunnel. As project plans are finalized, care will be taken to design and install this section of the electrical line in a way that minimally impacts the historic fabric of the tunnels.

JFK Boulevard Bridge [SI&A # 0951170]
The project as proposed will have no effect on the JFK Boulevard Bridge. The proposed 65-foot monopoles will only be intermittently visible from a few vantage points around the bridge. This will not alter the characteristics that render the property eligible for listing in the NR, namely its association with transportation, architecture, and engineering as one of five bridges and tunnels that were placed as a part of the construction of the Bergen Archways route, which supplemented the earlier Bergen Hill Tunnel in the early twentieth century, carrying increased commuter traffic through Bergen Hill.

Erie Railroad Bergen Hill Tunnel [aka Long Dock Tunnel]
The project as proposed will have no adverse effect on the NR-eligible Erie Railroad Bergen Hill Tunnel. The tunnel is significant for its pioneering technological and as an engineering achievement of its age, the first bore of its kind through Bergen Hill. Proposed 65-foot monopoles will only be intermittently visible from the tunnel's east and west portals. This will not alter the characteristics that render the tunnel eligible for listing in the NR.

Palisade Avenue Bridge [SI&A # 0951165]
The project as proposed will have no effect on the Palisade Avenue Bridge. The proposed 65-foot monopoles will only be intermittently visible from a few vantage points on the bridge. This will not alter the characteristics that render the property eligible for listing in the NR, namely its association with transportation, architecture, and engineering as an ambitious early concrete arch built in the United States as a part of the construction of the Bergen Archways route, which supplemented the earlier Bergen Hill Tunnel in the early twentieth century, carrying increased commuter traffic through Bergen Hill.

Jersey City High School [William Dickinson High School]
The project as proposed will have no adverse effect on the NR-listed Jersey City High School. The building is significant in the areas of architecture, engineering, and politics and government. Built in 1906 in the Beaux Arts style by John T. Rowland, it is the oldest secondary school in Jersey City. Proposed 65-foot monopoles would be sited to the northeast of the school along the New Jersey Turnpike, east of the Palisades. As the high school is located at the top of the Palisades along the ridge, the proposed monopoles would be intermittently visible from a few vantage points around the school. This will not alter the characteristics that render the property eligible for listing in the NR, its architectural style and associations with Jersey City's educational and political history.

Holbrook Manufacturing Company
The project as proposed will have no adverse effect on the NR-eligible Holbrook Manufacturing Company. The proposed electrical line and Hoboken East Substation will be visible from the resource. However, the setting of the Holbrook Manufacturing Company is not a character-defining feature of the historic property, which is significant for its massive, blocky concrete form and uninterrupted vertical piers that render it a strong example of an industrial building utilizing vernacular forms of classical architectural vocabulary to emphasize the building's scale. Further, the resource's setting has been highly compromised over time by the ongoing growth and development Jersey City, specifically in the alteration and loss of multiple historic industrial buildings and complexes formerly located to the south and east. For these reasons there will be no adverse effect on the NR-eligible resource.

Continental Can Company Complex
The project as proposed will have no adverse effect on the NR-eligible Continental Can Company Complex. New 65-foot monopoles will be visible from the resource and the proposed Hoboken

East Substation will be visible from certain vantage points; however, the setting of the Continental Can Company Complex is not a character-defining feature of the historic property. The resource is significant for its excellent early-twentieth century utilitarian industrial style design. Further, the resource's setting has been highly compromised over time by the ongoing growth and development Jersey City, specifically in the alteration and loss of multiple surrounding historic industrial buildings and complexes. As the proposed monopoles and substation would be located adjacent to existing utility poles and other existing railroad-related infrastructure, the project as proposed would not constitute a contextual intrusion on the resource.

Lackawanna Warehouse and Viaduct

The project as proposed will have no adverse effect on the NR-eligible Lackawanna Warehouse and Viaduct. The resource is significant for its association with railroad development of the Jersey City waterfront and as an excellent example of railroad terminal warehouse architecture with an intact associated viaduct (Hall 1995). New 65-foot monopoles will be visible from the resource, and the Hoboken East Substation will be visible from certain vantage points. At present, there is a strong extant visual continuity between the Lackawanna Warehouse and the Old Main DL&WRR Historic District, and the warehouse stands as a noticeable backdrop to the railroad ROW from various vantage points looking south from Hoboken to Jersey City. As the proposed monopoles and substation would be located adjacent to existing utility poles and other existing railroad-related infrastructure, the project as proposed will not have a noticeable impact upon the visual cohesion that contributes to the resource's significance.

Grove Street Bridge

The project as proposed will have no adverse effect on the Grove Street Bridge. The bridge is significant as one of several through plate girder bridges built along the Old Main DL&WRR at the turn of the century, selected at that time as an economical and highly rigid bridge design. New 65-foot monopoles and duct banks have the potential to directly impact the resource. As plans for the electrical line installation are refined, care will be taken in the design and placement of any monopoles and duct banks to avoid direct impacts to this historic resource. So long as the monopoles or duct banks are positioned so that they do not directly impact the Grove Street Bridge, there will be no adverse effect on this historic resource.

Engine Company #3, Truck #2 Firehouse

The project as proposed will have no adverse effect on the NJR and NR-listed Engine Company #3, Truck #2 Firehouse. If new 65-foot monopoles are installed, the proposed electrical line could be visible from certain vantage points along the south side of the firehouse depending on the placement of monopoles, but the impact would be limited. Character-defining features of the historic property include its use of rectangular and circular towers at the corners on the south façade, and its prominent corner location which orients the building laterally, allowing for maximum accessibility to all locations in the city. The proposed monopoles would not significantly alter the view of the railroad ROW from the resource, a view that was historically interrupted by industrial properties, some of which have been demolished.

Erie-Lackawanna Terminal

The project as proposed will have no adverse effect on the NJR and NR-listed Erie-Lackawanna Terminal. The Erie-Lackawanna Terminal is significant at the national level for its association with the development of rail and ferry transportation and as an exceptional example of early twentieth century rail and ferry terminal construction (Carmelich and Spies 2004). The resource is also significant as a contributing resource within the Old Main DL&WRR Historic District. If new 65-foot monopoles are installed, the proposed electrical line will be visible from the western end of the terminal. As the proposed monopoles would be located adjacent to existing utility poles of a similar height, the electrical line, though visible, will not have a noticeable impact upon the Erie-Lackawanna Terminal.

Belvedere Court

The project as proposed will have no adverse effect on the NR-eligible Belvedere Court. If new monopoles are installed, the proposed electrical line will likely be visible from the resource. Belvedere

Court is significant for its associations with the early twentieth century growth and increased density of Jersey City, as well as its numerous extant architectural details and historic elements that are reflective of the Garden City Movement. The proposed 65-foot monopoles will only be visible from intermittent vantage points toward the southeast corner of the building. Further, the monopoles will be located below the bluff in an existing industrial setting and will not alter the landscape to any significant degree from the vantage point of Belvedere Court.

R. Neumann & Co. Factory Complex
The project as proposed will have no adverse effect on the NR-eligible R. Neumann & Co. Factory Complex. If new 65-foot monopoles are installed, the proposed electrical line will likely be visible from the resource. The R. Neumann & Co. Factory Complex is significant for its associations with the early industrial development of Hoboken and its numerous extant architectural details and historic elements that effectively fuse the city's industrial past with the surrounding landscape. The resource's immediate setting has been somewhat compromised over time by the ongoing growth and development of Hoboken, especially by the recent construction of multiple large apartment and condominium complexes throughout the surrounding blocks to the east, north, and west. The proposed monopoles would be intermittently visible from the south side of the resource, within the railroad ROW. They would not significantly alter the visual and contextual relationship between the railroad and the R. Neumann & Co. Factory Complex, as they are similar in size and scale to the existing railroad catenary and other utility poles from the vantage of the resource.

4.5 Resolution of Adverse Effects

The Project as proposed will not adversely affect any identified NR-listed or eligible historic architectural resources provided that the conditions contained herein are met. As project plans are refined and options finalized, ongoing communication with the NJHPO will be necessary to assess any potential effects on historic resources that may arise from details of the project plans that could not be anticipated from the existing project scope and description. This includes the utilization of context-sensitive design and installation methods on the NR-eligible Lower Hack Bridge and in the New Bergen Tunnels, as well as measures to minimize and avoid direct impacts to the NR-eligible Old Main DL&WRR Historic District, Jersey City Waterworks Historic District, Hackensack River Lift Bridges Historic District, New Jersey Midland Railway/New York, Susquehanna and Western Railroad Historic District, Erie Railroad Main Line Historic District, West End Interlocking Tower, and Grove Street Bridge.

5.0 HISTORIC ARCHITECTURAL RESOURCES BACKGROUND STUDY AND EFFECTS ASSESSMENT – PROJECT COMPONENT G

Due to the different survey methodologies employed for Project Components A through F as compared with Project Component G, the HARBS and EA report has been divided into multiple sections. Section 5 of the report covers Project Component G. Though the APE encompasses all project components, figures in this section will only depict the G component of the APE [APE (G)] (see Figure 2.2). Research and analysis related to Project Components A through F can be found in Section 4 above. For a more detailed explanation of the methodologies employed for this HARBS and EA report, see Section 2.3.

5.1 Summary of Prior Architectural Investigations

Known Historic Properties

Background research conducted at the NJHPO indicated that 59 previously identified historic resources are located within the APE (G). Of the 59 previously identified resources, 13 have been demolished. These no longer extant resources are identified in Table 5.1. The locations of the demolished resources are shown on Figures 5.1a-d, and Plates 5.1 through 5.13 depict these sites as they currently exist. The remaining 46 resources, including 13 historic districts, two historic streetscapes, and 31 historic properties, are identified in Table 5.2 below and are discussed in detail in Section 5.3. Figures 5.2a-b show the locations of the 46 previously identified resources within the APE (G).

Previous Cultural Resources Surveys

Background research for Project Component G was limited to a review of previously-conducted historic architectural surveys on file at the NJHPO that encompassed the HBLR within the APE (G). Of the 88 cultural resources survey reports reviewed for this report, 58 reports (referenced below) identified historic architectural resources within the APE (G). All of the historic architectural resources within the current APE (G) that were inventoried by these reports and evaluated as being "potentially eligible" for listing in the NR or eligible for listing or listed in the NR are identified below and discussed in further detail in Section 5.3.

The NJR- and NR-listed Erie-Lackawanna Terminal is located within the APE (A-F) and the APE (G). As was true in Section 4.1 above, many of the cultural resources surveys within the APE (G) focused on the continued study of the history, preservation, and ongoing restoration and upkeep of the Erie-Lackawanna Terminal (CRMS 1978; Richard Grubb & Associates, Inc. 2009; Ford Farewell Mills and Gatsch 1994; Beyer Blinder Belle Architects & Planners 2002, 2005; Hayles & Howe, Inc. 2004; Lynn Drobbin & Associates 1997a, 2001; TAMS Consultants, Inc. 1993; JHPA 1990; and Marshall 1981). In addition, several surveys identified historic properties and districts in the vicinity of the Erie-Lackawanna Terminal. These include the NR-eligible Southern Hoboken Historic District, Old Main DL&WRR Historic District, and PATH Historic District (Heritage Studies 1982; Kraft 1978, 1979; Dolan Research, Inc. 1997; Geismar 1998; ARCH2 2001a, 2002b, 2002c, 2002d; Louis Berger & Associates, Inc. 1983; Richard Grubb & Associates, Inc. 2003, 2006a, 2009; RGA, Inc. 2015; Lynn Drobbin & Associates 1995a, 1995b, 1998, 2001; CRCG 2003; Parsons Brinkerhoff 1992).

A number of pertinent studies were conducted in relation to the Access to the Region's Core project (Transit Link Consultants 2006, 2008). The 2006 report also surveyed the Jefferson / Madison Streets Streetscape, which is located within the APE (G). As the streetscape was recommended not eligible for listing in the NR and the NJHPO concurred with this finding, the resource was not studied further as a part of this report (Transit Link Consultants 2006). The NR-eligible North (Hudson) River Tunnels were also identified in Transit Link Consultants' 2006 report. An earlier report examining the Lincoln Harbor Development Site in Weehawken and Hoboken also identified the Tunnels as NR-eligible resources (Raber Associates 1986).

Table 5.1: Demolished historic resources.

Resource Name	Municipality	NR Current Status	Appendix
Central Railroad of New Jersey Passenger Depot	City of Bayonne	Eligible (NJHPO Opinion: 9/11/1975)	G.1
Gates Avenue Bridge (SI&A# 82003274)	City of Bayonne	Eligible (NJHPO Opinion: 12/9/1994)	F.1; G.2
Roundhouse for the Central Railroad of New Jersey	City of Jersey City	Eligible (NJHPO Opinion: 10/1/1975)	F.2
Central Railroad Bridge	City of Jersey City	Eligible (NJHPO Opinion: 2/28/1991)	F.3
Conrail Bridge	City of Jersey City	Eligible (NJHPO Opinion: 5/16/1995)	F.4; G.3
Schiavone-Bonomo Corporation	City of Jersey City	Eligible (NJHPO Opinion: 5/16/1995)	F.4; G.4
Engine Company Number 8 Firehouse	City of Jersey City	Eligible (NJHPO Opinion: 6/12/1980)	F.5
Firehouse Number 12	City of Jersey City	Eligible (NJHPO Opinion: 5/16/1995)	F.4; G.5
Rogers-Pyatt Shellac Company/S.A. Wald Marine Cargo Salvors Warehouse	City of Jersey City	Eligible (NJHPO Opinion: 2/17/1995)	F.4; G.6
PATH Exchange Place Station Entrance	City of Jersey City	Eligible (NJHPO Opinion: 2/28/1991)	F.3; G.7
Erie Terminal Station of the Hudson and Manhattan Railroad Company ("Erie Station/Path Pavonia Station")	City of Jersey City	Eligible (DOE: 6/26/1984; NJHPO Opinion: 11/23/1983)	F.7; G.8
14th Street Viaduct	Multiple	Eligible (NJHPO Opinion: 10/16/1998)	F.6; G.9
Doric Temple	City of Union City	Eligible (NJHPO Opinion: 10/18/1995)	F.8; G.10

NR: National Register of Historic Places
NJHPO: State Historic Preservation Office
DOE: Determination of Eligibility

The NJR- and NR-listed Morris Canal, which crosses Project Component G in four separate locations, was also identified in numerous cultural resources surveys within the APE (G) (HCI 1977, 1978a; Frederic R. Harris, Inc. 1989; Lynn Drobbin and Associates 1995a, 1995b; URS Greiner, Inc. 1997). The surveys focused on the construction of the HBLR and various projects in Liberty State Park. Other reports related to Liberty State Park identified and documented the Greenville Yard, a contributing resource within the NR-eligible Pennsylvania Railroad New York Bay Branch Historic District (Historic Sites Research 1978, 1979, 1983a, 1983b).

Multiple studies have been conducted in relation to proposed wireless communications projects within the APE (G), several of which also identified the Erie-Lackawanna Terminal, the Southern Hoboken Historic District, and the Old Main DL&WRR Historic District (ARCH2 2002a, 2002b, 2002c, 2002d; A&HC 2004a). These surveys also examined the NR-eligible Lackawanna Warehouse and Viaduct (ARCH2 2002a; A&HC 2004a). Two wireless communications reports identified the NR-eligible West Shore Railroad Tunnel (A&HC 2004b; ARCH2 2001b). A 2002 report by ARCH2 identified the Bayonne Trust Company Building and the Mechanics Trust Company Building, and a 2003 report by IVI International, Inc. identified Public School Number 5 (ARCH2 2002e; IVI International, Inc. 2003). All of these resources are discussed in further detail in Section 5.3.

Three wireless communications reports identified above-ground resources more than 50 years of age within the APE (G) which had not been previously identified eligible for listing in the NR (A&HC 2004a; ARCH2 2002a; IVI International, Inc. 2003). Five of these resources (the R. Neumann & Co. Manufactory at 300 Observer Highway, the former Caulfield Association Building at 3-5 Henderson Street, the commercial building at 497-499 Observer Highway (now the Fields Development Group

Figure 5.1a: Aerial photograph depicting previously-identified historic resources within the APE (G) that have been demolished (NJGIS Digital Orthographic Imagery, 2012).

Figure 5.1b: Aerial photograph depicting previously-identified historic resources within the APE (G) that have been demolished (NJGIS Digital Orthographic Imagery, 2012).

Figure 5.1c: Aerial photograph depicting previously-identified historic resources within the APE (G) that have been demolished (NJGIS Digital Orthographic Imagery, 2012).

Figure 5.1d: Aerial photograph depicting previously-identified historic resources within the APE (G) that have been demolished (NJGIS Digital Orthographic Imagery, 2012).

Table 5.2: Previously identified historic resources.

Resource ID	Property Name/Address	Municipality	NR Current Status
40	Mechanic's Trust Company	City of Bayonne	Eligible (NJHPO Opinion: 12/9/1994)
41	Bayonne Trust Company	City of Bayonne	Listed (NJHPO Opinion: 12/9/1994; NR: 8/8/2006; NJR: 4/20/2006; COE: 1/30/2002)
42	East 17th Street Apartment Buildings Streetscape	City of Bayonne	Eligible (NJHPO Opinion: 12/9/1994)
43	Maidenform Brassiere Company	City of Bayonne	Eligible (NJHPO Opinion: 12/9/1994)
44	East 19th Street Streetscape	City of Bayonne	Eligible (NJHPO Opinion: 12/9/1994)
45	Mount Carmel Historic District	City of Bayonne	Eligible (NJHPO Opinion: 2/28/1991)
46	YMCA of Bayonne	City of Bayonne	Eligible (NJHPO Opinion: 5/5/1997)
47	Public School Number 5	City of Bayonne	Eligible (NJHPO Opinion: 2/28/1991)
48	Morris Canal	Multiple	Listed (NR: 10/1/1974; NJR: 11/26/1973; NJHPO Opinion: 5/27/2004)
49	Lehigh Valley Railroad Historic District	Multiple	Eligible (NJHPO Opinion:: 3/15/2002)
50	Pennsylvania Railroad New York Bay Branch Historic District	Multiple	Eligible (NJHPO Opinion: 9/10/2014)
51	Hanover National Bank Repository	City of Jersey City	Eligible (COE: 5/18/2006)
52	Communipaw-Lafayette Historic District	City of Jersey City	Eligible (NJHPO Opinion: 2/17/1995)
53	Ocean Avenue Bridge (SI&A #0950163)	City of Jersey City	Eligible (NJHPO Opinion: 5/16/1995)
54	Bergen Avenue Bridge (SI&A #0900011)	City of Jersey City	Eligible (NJHPO Opinion: 5/16/1995)
55	Former Candy Factory	City of Jersey City	Eligible (NJHPO Opinion: 2/28/1991)
56	Paulus Hook Historic District	City of Jersey City	Listed (NR: 6/21/1982; NJR: 8/7/1981)
57	Van Vorst Park Historic District	City of Jersey City	Listed (NR: 10/11/1984; NJR: 8/21/1984)
58	One Exchange Place (Bank Building)	City of Jersey City	Eligible (NJHPO Opinion: 2/28/1991)
59	Commercial Trust Company Bank	City of Jersey City	Eligible (NJHPO Opinion: 5/16/1995)
60	Hudson and Manhattan Railroad Powerhouse	City of Jersey City	Listed (NR: 11/23/2001; COE: 10/7/1999)
61	Warehouse Historic District	City of Jersey City	Eligible (NJHPO Opinion: 2/28/1991)
62	Great Atlantic and Pacific Tea Company Warehouse	City of Jersey City	Listed (NHL 6/2/1978; NR: 6/2/1978; NJR: 6/2/1978)
63	Butler Brothers Warehouse	City of Jersey City	Listed (NJR: 10/26/2015; NJHPO Opinion: 9/5/2013)
64	Holland Tunnel	City of Jersey City	Listed (NHL 11/3/1993; NR: 11/4/1993; NJR: 10/13/1995)

Table 5.2; cont.

Resource ID	Property Name/Address	Municipality	NR Current Status
65	L.O. Koven & Brothers Sheet Iron and Plate Steel Works	City of Jersey City	Eligible (NJHPO Opinion: 2/28/1991)
66	Pohlmann's Hall	City of Jersey City	Listed (NR: 9/5/1985; NJR: 7/5/1985)
67	269-271 Ogden Avenue	City of Jersey City	Eligible (NJHPO Opinion: 2/28/1991)
68	268-272 Ogden Avenue	City of Jersey City	Eligible (NJHPO Opinion: 2/28/1991)
69	Ferguson Brothers Manufacturing Company	City of Hoboken	Eligible (NJHPO Opinion: 10/16/1998)
70	Old Hillside Road Trolley Horseshoe Curve	Multiple	Eligible (NJHPO Opinion: 5/21/1999)
71	North (Hudson) River Tunnels	Multiple	Eligible (NJHPO Opinion: 11/12/1998)
72	NJ Route 3 (NJ 495) Highway Approach to Lincoln Tunnel Historic District	Weehawken Township	Eligible (NJHPO Opinion: 11/17/1999)
73	NJ Route 495 Viaduct (SI&A 3800031)	Weehawken Township	Eligible (NJHPO Opinion: 5/16/1995)
74	Lincoln Tunnel Entrance and Ventilation Buildings	Weehawken Township	Eligible (NJHPO Opinion: 2/28/1991)
75	Lincoln Tunnel	Weehawken Township	Eligible (NJHPO Opinion: 2/25/2003)
76	King's Bluff Historic District	Weehawken Township	Eligible (NJHPO Opinion: 5/16/1995)
77	West Shore Railroad Tunnel	Multiple	Eligible (NJHPO Opinion: 2/28/1991)
The following resources are located within the APE (A-F) and the APE (G):			
1	Old Main Delaware, Lackawanna and Western Railroad Historic District	City of Jersey City	Eligible (NJHPO Opinion: 6/7/2000)
2	Pennsylvania Railroad New York to Philadelphia Historic District	Multiple	Eligible (NJHPO Opinion: 10/2/2002)
15	Hudson and Manhattan Railroad Transit System (PATH)	City of Jersey City	Eligible (NJHPO Opinion: 3/4/2002)
16	Southern Hoboken Historic District	City of Hoboken	Eligible (DOE: 4/25/1980; NJHPO Opinion: 2/28/1991)
33	Holbrook Manufacturing Company	City of Jersey City	Eligible (NJHPO Opinion: 2/28/1991)
35	Lackawanna Warehouse and Viaduct	City of Jersey City	Eligible (NJHPO Opinion: 5/16/1995)
36	Grove Street Bridge	City of Jersey City	Eligible (NJHPO Opinion: 1/20/1999)
38	Erie-Lackawanna Terminal	City of Hoboken	Listed (NR: 2/17/2005; NJR: 12/7/2004)

NR: National Register of Historic Places
NJR: New Jersey Register of Historic Places
NJHPO: State Historic Preservation Office
NHL: National Historic Landmark
DOE: Determination of Eligibility
COE: Certification of Eligibility

Figure 5.2a: Aerial photograph depicting previously-identified historic resources within the APE (G) (NJGIS Digital Orthographic Imagery, 2012).

Figure 5.2b: Aerial photograph depicting previously-identified historic resources within the APE (G) (NJGIS Digital Orthographic Imagery, 2012).

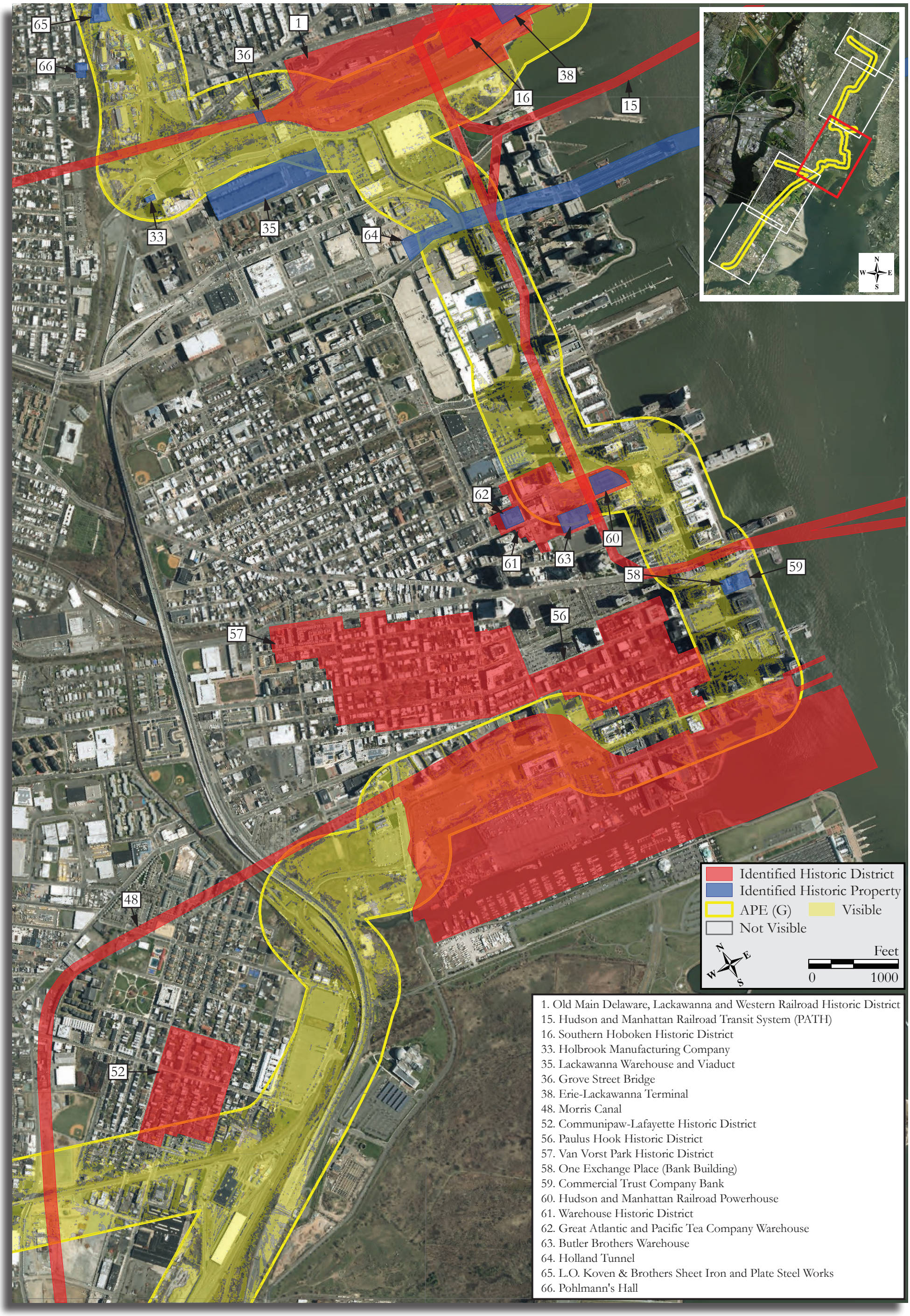

Figure 5.2c: Aerial photograph depicting previously-identified historic resources within the APE (G) (NJGIS Digital Orthographic Imagery, 2012).