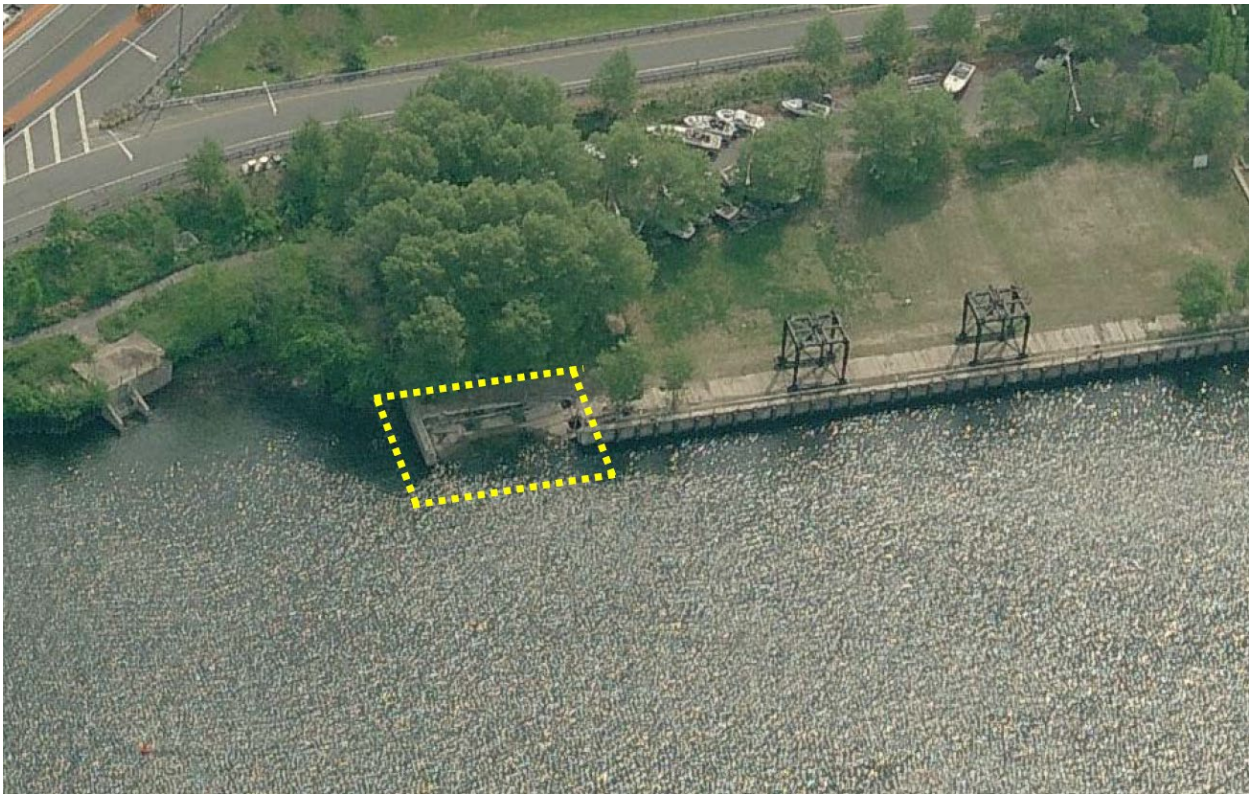
TRENTON MARINE TERMINAL
CITY OF TRENTON, MERCER COUNTY
NEW JERSEY

STREAM BANK AND SHORELINE EROSION PROTECTION
DRAFT ENVIRONMENTAL ASSESSMENT



April 2019

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1.0 PURPOSE AND NEED OF THE PROPOSED ACTION

1.1 PROPERTY LOCATION

The project site is located on the left bank of the Delaware River near the junction of State Highway 29 (John Fitch Highway) and State Highway 129 on the south side of the City of Trenton, Mercer County, New Jersey. The Terminal is in the proximity of the navigable upstream limit of the Delaware River (Figures 1-1 and 1-2).

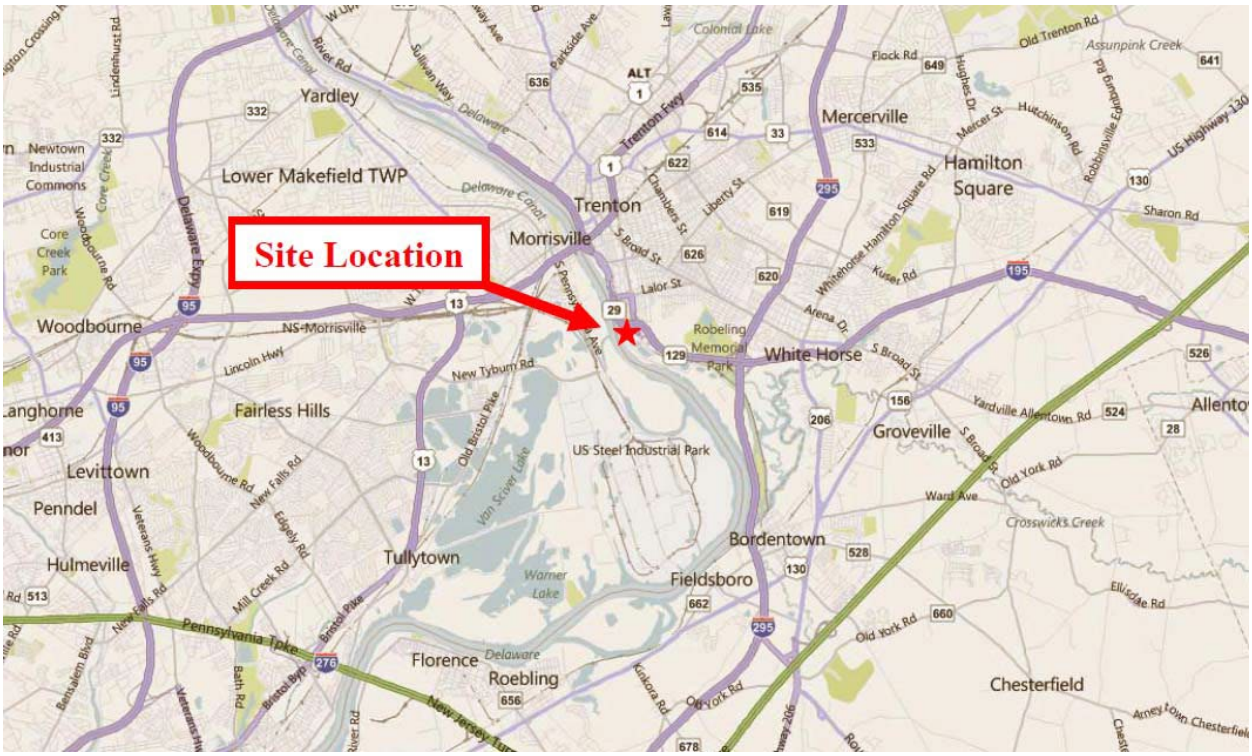

Figure 1-1: Site Location Map for the Trenton Marine Terminal, City of Trenton, NJ.

Figure 1-2: Aerial photograph of Trenton Marine Terminal on the Delaware River, City of Trenton, NJ.

1.2 NEED FOR ACTION

The Terminal was originally constructed in 1931 for the purpose of shipping goods in and out of the City of Trenton on the Delaware River. The gantry cranes that are located on the site were brought from the Hog Island Shipyard in Philadelphia to unload rail cars and ships (Figure 1-3). The Terminal currently exists as a public park and is listed on the National Register of Historic Places.

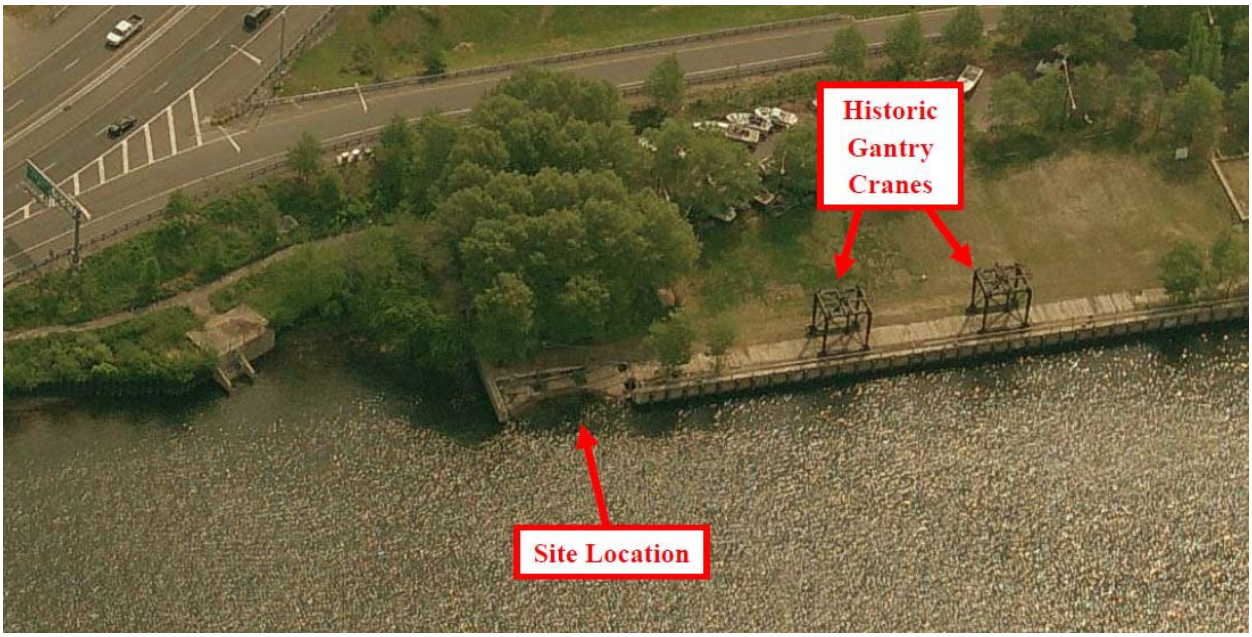

Figure 1-3: Aerial view of the project area and historic Gantry Cranes.

The existing pier structure at the Terminal is an open wharf type, also known as a "quay" structure. It is constructed of wood piles driven below the channel bottom with a top deck that is a reinforced concrete slab and a lower deck constructed of wood sheeting on wood frame members attached to the wood piles. The area between the two decks contains backfill material and the area below the lower deck is open to water and tidal action. A concrete gravity wall is located on the water side of the structure between the upper deck and lower deck.

The collapsed section at the northern most end of the pier is approximately 76 feet long (north/south) by 28 feet wide (east/west). The section has failed and the concrete top deck has dropped and fractured but remains in a suspended position hanging from the attached rail lines. It appears as though the timber piles supporting the structure failed due to their age and the wood rot that normally results from the alternate wet and dry cycles within the tidal range (Figures 1-4 and 1-5).

Figure 1-4: View of the project area looking north.

Figure 1-5: View of the project area looking south.

The sandy soils that lie underneath the collapsed section of the pier continue to erode with the daily tides of the Delaware River and, more significantly, with high storm flows. Seasonal damage from ice floating down the river also causes additional damage. If the pier is not repaired, the erosion that is occurring will continue to move east, into the public park, and south, behind the existing intact pier. If the soils behind the intact pier were to continue to erode away, the concrete decking and walkway in these areas would likely collapse as they did in the northern section. The following infrastructure would be threatened by this continual erosion:

- A public park that is listed on the National Register of Historic Places that provides rare, river-front, green space within Trenton's primarily urban setting.
- Two locomotive gantry cranes that were historically used to unload ships and are located approximately 80 feet south of the collapsed section. These cranes are also listed on the National Register of Historic Places and are also known as the Hog Island Cranes.
- A 60-inch diameter outfall pipe that discharges treated waste water from the Trenton sewage treatment plant into the river. The pipe is located within the pier and is approximately 500 feet south of the collapsed section. This pipe is the main outfall for the treatment plant and is the only one that allows discharge to the river. If the erosion behind the pier eventually

reaches the location of this pipe, and the pipe is blocked by a collapse, the sewage treatment plant would be forced to discharge raw sewage into the river through an emergency overflow pipe.

2.0. DESCRIPTION OF THE PROPOSED ACTION

2.1 PROJECT AUTHORITY

Authority to design and implement this Continuing Authority Program (CAP) project is provided under Section 14 of the 1946 Flood Control Act (33 U.S.C. 701r), as amended. The purpose of the Section 14 authority is to protect public works and non-profit public facilities from streambank and shoreline erosion. Facilities that are eligible for protection include "known historic properties whose significance has been demonstrated by a determination of eligibility for listing on, or actual listing on, the National Register of Historic Places" (ER 1105-2-100, Appendix F, Section III, F-23, b.) Federal funding for each Section 14 project is limited to $5,000,000 (as amended by Section 2023 of the Water Resources Development Act of 2007, P.L. 110-114). The City of Trenton is the non-Federal sponsor and will provide cost-share funds for the design and implementation.

2.2 PROJECT PURPOSE

The purpose of the project is to protect the public infrastructure at the Trenton Marine Terminal from imminent damage and the possibility of eventual collapse. The infrastructure is located in a public park that is listed on the National Register of Historic Places. The collapsed pier should be rebuilt in the same dimensions and appearance as the formerly existing one, except for the use of steel piles rather than timber piles to significantly increase the stability of the structure; with the objective to rebuild the pier in a manner that would preserve the historic character of the park while minimizing impacts to the river bottom substrate.

2.3 NATIONAL ENVIRONMENTAL POLICY ACT DOCUMENTATION

This Environmental Assessment (EA) was prepared in accordance with National Environmental Policy Act (NEPA) regulations. This EA assesses conditions in the vicinity of the proposed project area and evaluates the potential impacts of the proposed work on existing resources in the immediate and surrounding areas to include: physical, chemical, and biological characteristics of the aquatic and terrestrial ecosystem; endangered and threatened species; hazardous and toxic materials; aesthetics and recreation; cultural resources; and the general needs and welfare of the public. Both individual (direct and indirect) and cumulative environmental effects were considered for this action. Preparation of this EA will include coordination with appropriate Federal and state resource agencies. A Section 404(b)(l) evaluation has been prepared and is included in Appendix A. This evaluation concludes that the proposed action would not result in any significant environmental impacts relative to the areas of concern under Section 404 of the Clean Water Act.

2.4 ENVIRONMENTAL PERMITS AND REGULATORY COMPLIANCE

Compliance with environmental quality protection statutes will be met with the distribution of a draft Environmental Assessment for review and comment and signing of a Finding of No Significant Impact. A Section 401 Water Quality Certificate and a Coastal Zone Consistency Determination have been requested from the New Jersey Department of Environmental

Protection. In compliance with the New Jersey Coastal Zone Management Program, as required by Section 307 of the Federal Coastal Zone Management Act (16 USC 1451 *et seq.*), the U.S. Army Corps of Engineers will request a Federal consistency determination from the New Jersey Department of Environmental Protection. Table 2-1 summarized applicable environmental quality protection statutes and review requirements.

Table 2-1: Compliance with Environmental Quality Protection Statutes and Other Environmental Review Requirements

Federal Statute	**Proposed Plan**
Clean Air Act, as amended	Full Compliance
Clean Water Act of 1977	Pending
Coastal Zone Management Act of 1972, as amended	Pending
Endangered Species Act of 1973, as amended	Full Compliance
Estuary Protection Act	Full Compliance
Federal Water Project Recreation Act, as amended	N/A
Fish and Wildlife Coordination Act	Pending
Land and Water Conservation Fund Act, as amended	Full Compliance
Marine Protection, Research and Sanctuaries Act	N/A
National Historic Preservation Act, as amended	Pending
River and Harbor Act	Full Compliance
Watershed Protection and Flood Prevention Act	N/A
Wild and Scenic Rivers Act, as amended	N/A
Executive Orders	
E.O. 11988 Floodplain Management	Full Compliance
E.O. 11990 Protection of Wetlands	Full Compliance
E.O. 12114 Environmental Effects of Major Federal Actions	Full Compliance

N/A: Regulation is not applicable to the proposed plan.

3.0 ALTERNATIVES CONSIDERED

This section considers the no action plan and several potential alternatives to stabilize the existing structure and/or replace the failed portion of the structure. The no-action alternative would result in continued erosion and imminent collapse of other sections of the existing pier structure. The 76-foot long section on the northern end that has already collapsed remains in a suspended position hanging from the attached rail lines. Bottom sediments beneath the structure continue to erode and will likely result in more of the concrete decking and walkway to collapse, thereby further threatening the infrastructure that is listed on the National Register of Historic Places as well as undermine the support of two locomotive gantry cranes and a treated wastewater discharge outfall pipe.

3.1 ALTERNATIVE 1

No Action: This alternative would allow the continued deterioration of the pier structure. As the deterioration continues toward the east and the south, the following infrastructure would be threatened:

- Approximately 1,400 linear feet of the intact pier structure located south of the project site.
- River-front park space that is listed on the National Register of Historic Places.
- Historically significant structures (gantry cranes).
- The main outfall pipe from the Trenton sewage treatment plant.

In addition, the deterioration of the pier will create a public safety hazard for park users and water craft on the river.

3.2 ALTERNATIVE 2

Riprap Protection: The pier would be stabilized to prevent shoreline erosion by placing riprap on the existing river bottom on the west side up to the existing ground line on the east side. To accomplish this stabilization, the 76 foot long by 28 foot wide failed section of the existing concrete deck would have to be removed. Additionally, the existing low wood deck would have to be removed and the existing timber piles would have to be cut off at the mud line. Riprap would be placed on geotextile on the existing bottom within the failed area. The slope of the surface of the riprap would be 2H: 1V. Due to the steep slope of the existing bottom within the failed area, the proposed riprap toe would be located approximately 33 feet beyond the face of the pier and would wrap around the north end and south end of the existing structure. The rip rap would be constructed in lifts beginning at the riverward toe.

On the southern and eastern sides, composite sheeting would be constructed behind the existing piles between the lower deck and the concrete deck to prevent the existing ground from eroding and creating a void space. The concrete deck could not be replaced in this alternative. The work would be performed using a combination of a marine floating plant and land based equipment.

Given that the slope of the riprap will need to be 2H:1V and that the toe of the slope would be located approximately 33 feet beyond the face of the pier, this alternative would require an excessive amount of riprap (approximately 2,500 cubic yards) and significantly expand the footprint of the existing structure.

3.3 ALTERNATIVE 3

Articulated Concrete Block (ACB) Mat and Steel Sheetpile: The pier would be stabilized by placing a cabled concrete block mat to prevent erosion of the existing bottom in the failed area below the former location of the low wood deck. Steel sheetpile cut-off walls would be constructed to prevent loss of existing fill from behind the east and south side of the remaining pier structure. As in the previous alternative, the fractured concrete and the low wood deck would be removed and the timber piles would be cut off at the mud line before construction was initiated. The concrete deck of the structure would not be replaced and no backfill would be used in this alternative to bring the elevations up to existing grade. The work would be performed using a combination of a marine floating plant and land based equipment.

3.4 ALTERNATIVE 4

Steel Sheetpile Cell without Concrete Deck: The pier would be stabilized by constructing sheetpile on all four sides within the failed area to form a closed "cell" type structure. As in the previous alternatives, the fractured concrete and the low wood deck would be removed and the timber piles would be cut off at the mud line before construction was initiated. The steel sheetpile walls would be constructed to the elevation of the existing concrete deck and backfilled to existing grade, then seeded and mulched. The area behind the sheetpile walls on the eastern and southern sides would also be backfilled, seeded, and mulched. The work would be performed using a combination of a marine floating plant and land based equipment. Stabilization of the pier by constructing a steel sheetpile cell without a concrete deck would also result in backfilling of an open water area.

3.5 ALTERNATIVE 5

Steel Sheetpile Cell with Cast-in- Place Concrete Deck: This alternative is the same as the "Steel Sheetpile without Concrete Deck" alternative except that a reinforced concrete top deck would be constructed on the backfill to match the elevation of the existing adjacent concrete deck located on the southern and eastern sides.

3.6 ALTERNATIVE 6

Steel Piles/Framework with Precast Concrete Deck: The pier would be stabilized using structural steel H-piles and steel framework in the failed area to support a replacement concrete deck with the same dimensions as the formerly existing one. As in the previous alternatives, the fractured concrete of the deck would be removed before construction was initiated. However for this alternative, the existing low wood deck, framing, and timber piles in this section could remain in place. Partial removal or notching of the existing timber frame would be required to install the "H" piles and structural steel. Composite sheeting would be placed on the back side of

the "H" piles to prevent loss of fill from beneath the existing concrete deck. Backfill material would be placed on the existing low deck behind the composite sheeting. Precast (caste-in-place) reinforced concrete panels (slabs) would be used to replace the existing deck that was removed from the failed area. The work would be performed using a combination of a marine floating plant and land based equipment.

This alternative would rebuild the pier to the same dimensions as the formerly existing one and occupy the same footprint within the river. It would have the same appearance that it had before it collapsed and match the existing intact pier. However, the use of steel piles rather than timber piles will significantly increase the stability of the structure. This alternative would not result in the filling of an open water area and it would also retain the historic character of the pier.

3.7 ALTERNATIVE 7

Relocation of Historically Significant Park, Cranes, and Sewer Authority Outfall Pipe:
The relocation of the park and historic cranes to a similar waterfront location would require identification and acquisition of approximately 2 acres of undeveloped property along the river, or a developed property that could be cleared for construction of a park. The relocation of the outfall pipe would require a large construction effort as well as the acquisition of property, easements, and permits.

This alternative to relocate the park's historic structures would require a new river front location within the City of Trenton. The property would then have to be constructed to function as a park. A representative of the City of Trenton Parks Department has indicated that this alternative would likely incur significant costs, given the current value of waterfront real estate in Trenton's urban setting, in addition to the cost of construction. This alternative was not carried forward for further review considering the exorbitant cost. The possible scenarios for the relocation of the outfall pipe are diverse and expensive so they were not carried forward for a detailed evaluation.

3.8 THE SELECTED PLAN

Based on the preliminary costs evaluation presented in the Initial Appraisal Report and in the interest of selecting a proposed design that meets the project objectives while minimizing impacts to the natural environment, Alternatives 1, 2, 3, 4, 5, and 7 were eliminated from further consideration. The Selected Plan is Alternative 6, "Steel Piles/Framework with Precast Concrete Deck". It has the lowest preliminary cost and the least environmental and historic impacts for projected costs of all of the alternatives considered. Preliminary plans for this alternative design were drafted by W. J. Castle, P.E and Associates for the City of Trenton.

The selected plan will restore the pier's functional use for the public while minimizing impacts to the surrounding environment. The collapsed area will be restored to the original footprint of the pier. A new high deck pier structure will be tied into the adjacent existing timber low deck portions. A high deck structure allows much of the existing collapsed structure to remain in place, minimizing both demolition needs and in-water sediment disturbance. Any upper portions that remain intact and will conflict with the proposed decking will be removed, but lower portions may remain substantially undisturbed. Additionally, the remnants of the original pier

will provide added stabilization and protection for the channel bottom and embankments where they are exposed to water flow. Where possible, the remaining portions of the original concrete seawall that have not collapsed and are located along the northern edge will be incorporated into the structural design with additional substructure support elements. The design will ensure the continued stability of the fill within the low deck portions by including a retainage/cutoff wall at the transition between the high/low structure types. In order to maintain the historic aesthetics of the pier and the park, the design will also include façade paneling to blend this transition.

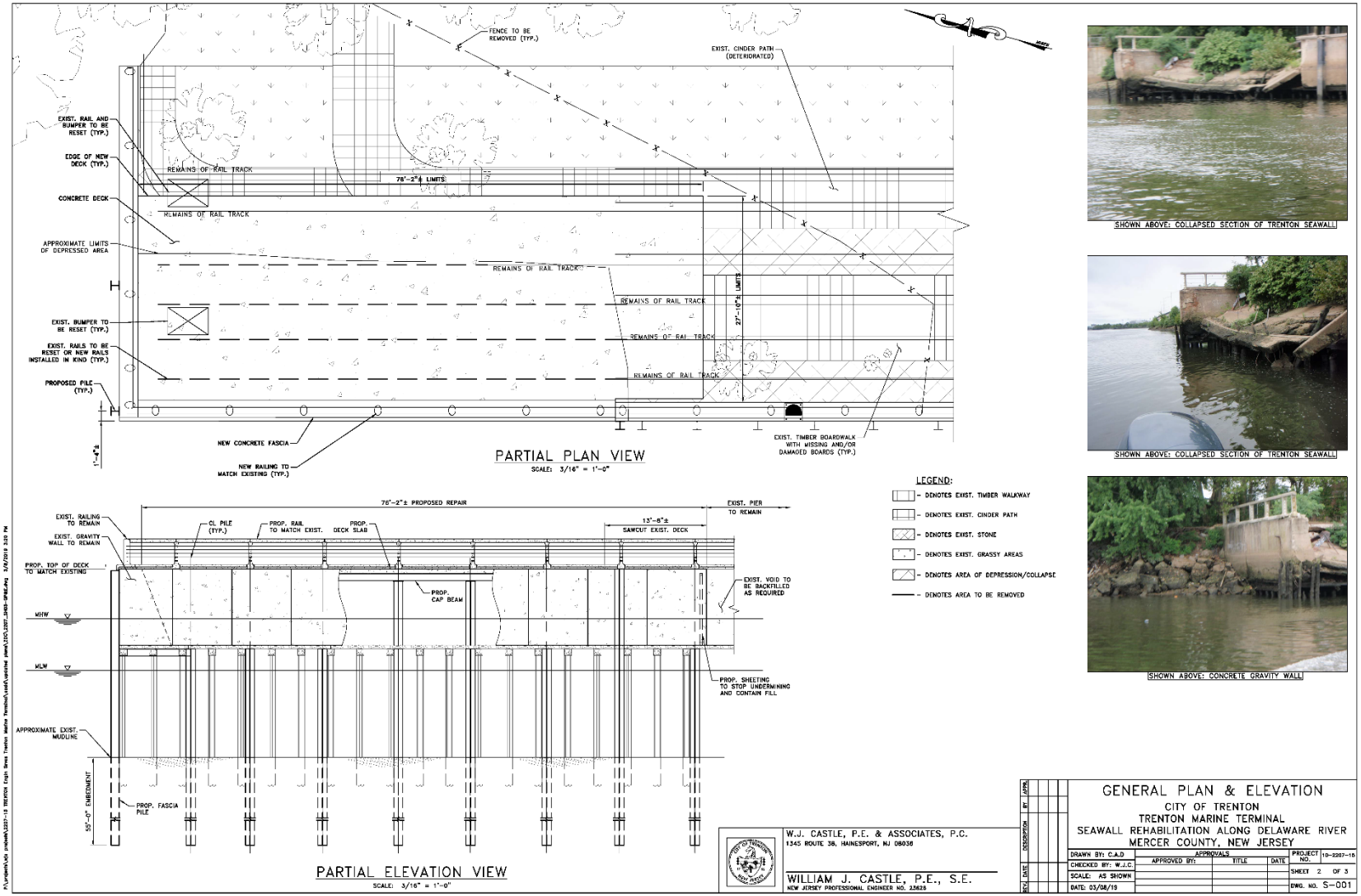

Figure 3-1: Trenton Marine Terminal Rehabilitation-General Plan and Elevation

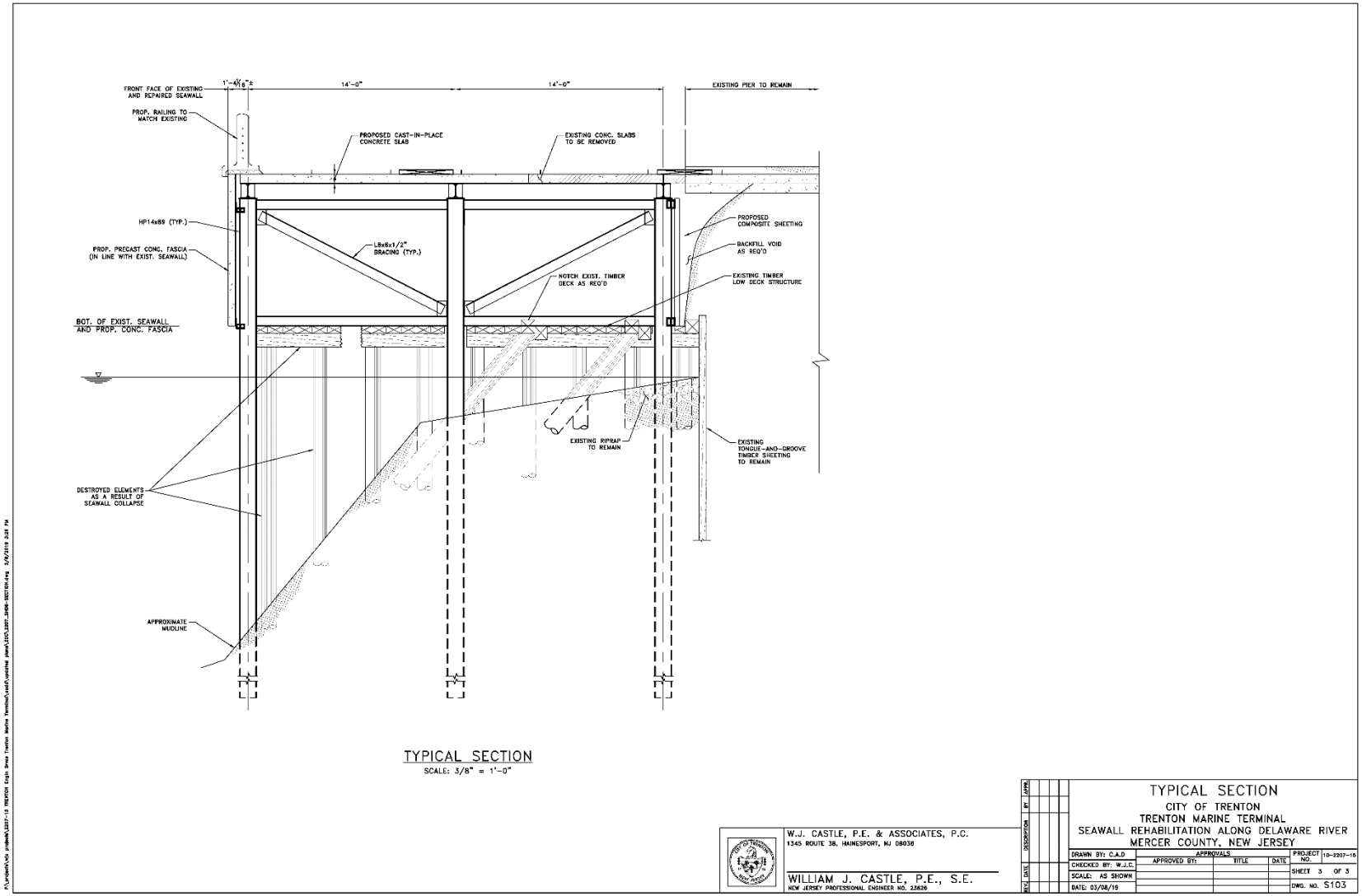

Figure 3-2: Trenton Marine Terminal Rehabilitation-Typical Section

4.0. EXISTING ENVIRONMENT

4.1. PROJECT AREA DESCRIPTION

The project site is located on the east bank of the Delaware River near the junction of State Highway 29 (John Fitch Highway) and State Highway 129 on the south side of the City of Trenton, New Jersey. The Terminal is in the proximity of the navigable upstream limit of the Delaware River. The topography of the Trenton, New Jersey area is relatively flat and low-lying. Elevations in this area range from near sea level to just above 100 feet above sea level. The average elevation of the city itself is approximately 95 feet above sea level.

The Terminal was originally constructed in 1931 for the purpose of shipping goods in and out of the City of Trenton on the Delaware River. The gantry cranes that are located on the site were brought from the Hog Island Shipyard in Philadelphia to unload rail cars and ships. The Terminal currently exists as a public park and is listed on the National Register of Historic Places.

The existing pier structure at the Terminal is an open wharf type, also known as a "quay" structure. It is constructed of wood piles driven below the channel bottom with a top deck that is a reinforced concrete slab and a lower deck constructed of wood sheeting on wood frame members attached to the wood piles. The area between the two decks contains backfill material and the area below the lower deck is open to water and tidal action. A concrete gravity wall is located on the water side of the structure between the upper deck and lower deck.

4.2. CLIMATE

The climate in the region is generally mild, with only a few brief, hot, humid periods in summer and cold windy periods in winter. Conditions change rapidly, with extreme periods lasting only a few days. Prevailing maritime winds (west-southwest) in summer are primarily responsible for the relatively high humidity in the region. Trenton is located in the southern climatic division of New Jersey. National Weather Service data for the area show an annual mean temperature of about 54 degrees F, and a normal annual precipitation of approximately 43 inches. Extended periods of cold weather are relatively rare. Periods of heavy fog are common in the area, and are most likely to occur from December to February.

4.3 AIR QUALITY

Air quality is determined by the number and quantity of air toxics emitted from many types of sources: point, area, and mobile sources. The U.S. Environmental Protection Agency (EPA) prepared a comprehensive list of air toxics emissions for the entire country in 2005: the National-Scale Air Toxics Assessment (NATA). A summary of the emissions inventory for the state of New Jersey, based on the NATA, gives an indication of which may be the most important sources and areas of highest air toxic emissions. Broken down by county, areas in New Jersey with the largest air toxic emissions are generally those with the largest populations in the smallest space. Higher levels of air toxic emissions are directly related to high levels of vehicle use, solvent use, and other population-related types of activities.

NJDEP evaluates EPA's NATA air toxic emissions concentrations to chemical-specific health benchmarks to determine a risk ratio to assess which toxic emissions pose a potential human health problem within the state. If the risk ration for a specific chemical is greater than one, it may be of concern. There are 181 air toxics that EPA included in their 2005 NATA (http://www.state.nj.us/dep/airtoxics/nataest05.htm). One-third of these do not have toxicity values or corresponding health benchmarks. For those that do, NJDEP's state and county average air toxics concentrations indicate that 22 of the pollutants are "of concern", 21 of these are cancer-causing chemicals and one (acrolein) is evaluated as a noncarcinogen. Predicted concentrations of these pollutants vary around the state, depending on the type of sources that emit them. In Mercer County 16 of the 22 pollutants of concern have a risk ratio higher than 1, including some risk ratios based on noncarcinogenic effects (http://www.state.nj.us/dep/airtoxics/merceravg05.htm).

4.3.1 General Conformity Rule

The Clean Air Act, and its subsequent amendments, established the National Ambient Air Quality Standards (NAAQS) for seven common pollutants: particulate matter, ground-level ozone, carbon monoxide, sulfur oxides, nitrogen oxides, and lead. These air pollutants are referred to as "criteria pollutants" by the EPA because they are regulated for permissible levels based on human health and environmentally based guidelines. The General Conformity Rule, under the Clean Air Act, applies to all Federal actions that are taken in designated nonattainment areas, with three exceptions: 1) actions covered by the transportation conformity rule; 2) actions associated with emissions below specified *de minimis* levels, and 3) other actions which are either exempt or presumed to conform.

The states have the primary responsibility to attain and maintain those standards. Through the State Implementation Plan (SIP), the New Jersey Department of Environmental Protection – Division of Air Quality manages and monitors air quality within the state. The goal of the SIP is to meet and enforce the primary and secondary national ambient air quality standards for pollutants. New Jersey air quality has improved significantly over the last 40 years, but exceeds the current standards for ozone (O_3) throughout the state and fine particles (PM_{10} or $PM_{2.5}$) in many urban areas. New Jersey has attained the sulfur dioxide (SO_2) (except for a portion of Warren County), lead (Pb), and nitrogen dioxide (NO_2) and Carbon Monoxide (CO) standards (http://www.state.nj.us/dep/daq)

The Clean Air Act requires that all areas of the country be evaluated and then classified as attainment or non-attainment areas for each of the National Ambient Air Quality Standards. Areas can also be found to be "unclassifiable" under certain circumstances. The 1990 amendments to the act required that areas be further classified based on the severity of non-attainment. The classifications range from "Marginal" to "Extreme" and are based on "design values". The design value is the value that actually determines whether an area meets the standard. For the 8-hour ozone standard for example, the design value is the average of the fourth highest daily maximum 8-hour average concentration recorded each year for three years. Ground-level ozone is created when nitrogen oxides (NOx) and volatile organic compounds (VOCs) react in the presence of sunlight. NOx is primarily emitted by motor vehicles, power

plants, and other sources of combustion. VOCs are emitted from sources such as motor vehicles, chemical plants, factories, consumer and commercial products, and even natural sources such as trees. Ozone and the pollutants that form ozone (precursor pollutants) can also be transported into an area from sources hundreds of miles upwind. The study area falls within the Northern New Jersey/New York City/Long Island Area (New Jersey Portion). The entire state of New Jersey is in non-attainment and is classified as being "Marginal." A "Marginal" classification is applied when an area has a design value of 0.085 ppm up to but not including 0.092 ppm (NJDEP, 2012 Ozone Summary).

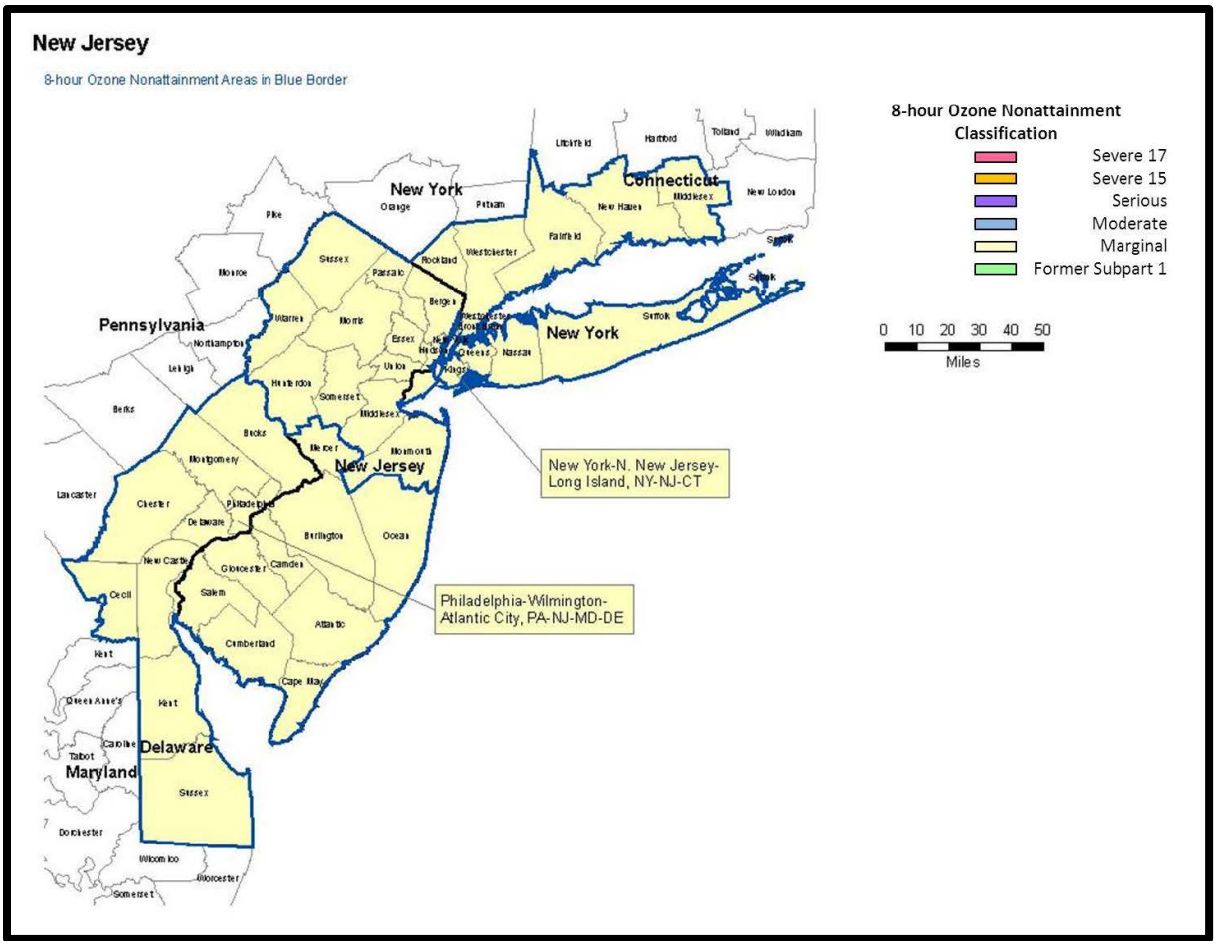

Figure 4-1: Non-Attainment Areas for Ozone

4.4 WATER AND SEDIMENT QUALITY

The Delaware Estuary is one of the largest in the United States (approximately 1,773 km2), only rivaled in size by the Chesapeake Bay and Long Island Sound. It is the longest un-dammed river east of the Mississippi, extending from the confluence of its East and West branches at Hancock, NY to the mouth of the Delaware Bay. Over 15 million people rely on the waters within the Delaware River Basin for drinking, agricultural, and industrial use (DRBC, 2012). The estuary

supports one of the world's largest freshwater ports (Philadelphia Planning Commission, 1982) and has one of the world's greatest concentrations of heavy industry, including oil refining and petrochemical processing. Approximately 70 percent of the oil arriving at the nation's east coast moves through the combined ports of Philadelphia, which include berths in all three states in the region (Delaware, New Jersey, and Pennsylvania) (Albert, 1988).

Pollution in the Delaware River, particularly in the tidal reaches of its urban centers became a recognized problem by the early 18th century and by the 1940s, the Delaware River was considered an open sewer for public and industrial waste. Comprehensive water quality standards and clean-up policies were put in place in the 1960s, followed by the Federal Water Pollution Control Act amendments in 1972 (Clean Water Act). By the 1980s, over a billion dollars had been spent on improving wastewater treatment facilities within the basin. The Delaware River Basin Commission (DRBC) has divided the Delaware River into six water quality zones. The Trenton Marine Terminal is located within Zone 2, which includes the northern portion of the city of Philadelphia up to above the city of Trenton.

As a result of this myriad of pollutants that wind-up in the river, its fish and shellfish can contain chemical contaminants including: PCBs, chlordane, mercury, dioxin and DDT. Fish contaminated with toxics pose numerous hazards for humans. Delaware River states have all issued fish advisories recommending limited or no consumption of contaminated species. Toxics are hazardous to birds of prey, such as the osprey and the peregrine falcon. These birds are high on the food chain so they are especially susceptible to the effects of biomagnification of toxics. Toxics such as DDT are believed to be responsible for the thinning of eggshells, causing lower productivity for many species of birds that are already endangered. The long banned pesticide DDT is still in the river's sediments in some locations. Although nutrient and heavy metal contaminants are still present in some areas of the Delaware River, their input has been greatly reduced.

The DRBC monitors water quality as clean-up efforts of the Delaware River continues. The quality of bottom sediments within the Delaware River is a concern due to the impacts that sediment quality can have on biota of the river as well as its indirect effects to humans. According to a 1992 analysis of the Delaware River, between Trenton, New Jersey and Wilmington, Delaware, there are 39 public wastewater treatment plants and 33 industries that discharge to the river. Chemical contaminants introduced to the aquatic environment tend to bind to suspended sediment particles, and ultimately end up in bottom sediments. The concentrations of these contaminants can increase over time as sediment accumulates on the bottom. The buildup of contaminants in bottom sediments can potentially have long-term impacts on the quality of public water supplies withdrawn from the river, and the health of aquatic biota.

The USACE, Philadelphia District has been collecting bottom sediment and river water samples from the Delaware River in the area approximately 3.5 to 9 miles south of the Trenton Marine Terminal for decades. The most recent chemical analyses conducted, prior to Delaware River maintenance dredging operations, were completed in July 2017 for the purpose of evaluating the chemical constituents' specific to the sediments to be removed from the adjacent reach of the main navigation channel (Tetratech, 2017). The testing program was coordinated and approved

by the Pennsylvania Department of Environmental Protection (PADEP). An environmental concern of hydraulic dredging operations is the potential for chemical contaminants trapped within river sediments to be released and mobilized to the water column which in turn exposes biota to chemical contaminants. Twelve sediment cores and one surface water sample were collected. The sampling method and analyses followed the recommended field and analytical methods summarized in *The Management and Regulation of Dredging Activities and Dredged Material in New Jersey's Tidal Waters, October, 1997*.

Sediment samples were evaluated using the toxicity characteristic leaching procedure (TCLP), bulk sediment testing, grain size, TOC, and elutriate water analyses. Results of the TCLP tests were compared to the Federal TCLP criteria. None of the values exceeded listed TCLP criteria. Total and dissolved elutriate results were compared to Delaware River Basin Commission (DRBC, 2013) freshwater acute objectives for the protection of aquatic life for inorganics, pesticides, semivolatiles, and PCB congeners. Freshwater aquatic life objectives were used because salinity in this portion of the river is consistently below 5 parts per thousand (ppt). Acute objectives were evaluated because of the short-term nature of a dredged material disposal operation. Hardness dependent objectives were calculated assuming a conservative hardness of 74 mg/L.

Total unfiltered elutriate results for aluminum exceeded the DRBC acute objectives in 10 of the 12 samples. According to Dr. R. Greene (Greene, 2010), the aluminum objective is dated and fails to properly account for the effect of pH on solubility and toxicity. Greene conducted geochemical speciation modeling that indicated for the range of pH values observed in the Delaware Estuary, the majority of the aluminum exists in the solid, non-toxic form. Greene's analysis suggested that only 4 percent of the total aluminum observed in the estuary exists in the toxic form of the metal. As such, the detected concentrations of aluminum in the elutriate samples do not indicate potential detrimental effects to aquatic life in the Delaware River system as a result of dredged material disposal operations.

DRBC regulations (DRBC, 2013) indicate that stream water quality objectives for cadmium, chromium, copper, lead, nickel, silver and zinc are expressed as the dissolved form of the metal. For this reason, it is appropriate to evaluate the filtered elutriate results with respect to aquatic life objectives. All of the filtered elutriate water sample results were below the DRBC regulations (DRBC, 2013) for cadmium, chromium, copper, lead, nickel, silver, and zinc (dissolved form) with the exception of the sample obtained from the Keystone Range for cadmium, copper, lead, and zinc. The Keystone Range is located approximately 5 miles from the Trenton marine terminal. These exceedances were slight and mostly in the same order of magnitude as the aquatic life objectives. Accordingly, the averaged values for the filtered elutriate results (metals averaged for all 12 samples) were below the aquatic life objectives. There were no exceedances of DRBC acute objectives for pesticides, semivolatiles, and PCB congeners. The analysis results of the background Delaware River sample did not show any exceedances of DRBC acute objectives.

Bulk sediment results were compared to PADEP general permit guidelines for beneficial use of dredged material (WMGR085). The samples were analyzed for inorganics, pesticides, PCBs (as congeners), volatile organics, semivolatile organics, dioxin/furans, cyanide, sulfide, TOC, and

radionuclides. There were no exceedances of the PADEP general permit guidelines. Based on the results of these analyses, it was concluded that dredging the shoaled bottom sediments would not pose any adverse effects on aquatic life in the river in the vicinity of the upland confined disposal facility water discharge.

4.5 AQUATIC RESOURCES

In general, the project area has been significantly disturbed as a result of historical land uses, including both industrial and residential development. Water quality improvements, as a result of clean-up activities, have significantly improved the conditions for fisheries resources in the estuary near the project site (Maurice *et al.,* 1987). The Delaware River and its tributaries provide significant habitat for a variety of finfish resources. Anadromous fish migrate through the estuary during the early spring on their way to freshwater spawning grounds. For most of the anadromous fish of the Delaware Bay, this occurs upstream of Burlington, New Jersey, although some spawning does occur in freshwater tributaries (Breder and Rosen 1966). Anadromous fish, such as American shad (*Alosa sapidissima*), blueback herring (*Alosa pseudoharengus*), alewife (*Alosa aestivalis*), and striped bass (*Morone saxatilis*), currently use the upper Delaware River as a spawning and nursery ground; resident species include white perch (*Morone americana*), sunfish (*Lepomis* sp.), and suckers (*Catostomus* sp.) (Weisberg and Burton, 1993). Recent improvements in water quality have increased the spawning runs for alosids (*i.e*. alewife, blueback herring and American shad) and striped bass. The American shad (*Alosa sapidissima*), the largest member of the herring family is a prized sport fish in the Delaware River. The species spend 3-6 years in the ocean and then return upriver in spring to spawn (NJDEP, 2017: www.nj.gov/dep/fgw/fish_shad.htm). *Alosa* species (*i.e*. American shad, alewife and blueback herring) are important prey for federally-managed saltwater species such as windowpane flounder, summer flounder, and bluefish.

The New Jersey Department of Environmental Protection (NJDEP), Division of Fish and Wildlife samples the river using beach seines. The survey area is divided into three regions and have been sampled for 37 consecutive years. Region 3 is the northernmost sampling area. It is a freshwater area extending from Philadelphia to the fall line at Trenton. The number of fish species collected in the upper region of the Delaware River between Philadelphia, PA and Trenton, NJ has increased from 20 in the early part of the 90s to over 30 in subsequent years (Weisberg *et al.,* l996). A total of 34 species representing 16 families were found in the beach seine collection conducted north of Philadelphia. Among the beach seine collections taken in the upper portion of the river during the period between 1991 and 1993, alewife was the most abundant species, representing approximately 35% of the total catch. By 2016, seine sampling yielded a total of 52 fish species (all 3 sampling regions combined) with the five most abundant species: bay anchovy (*Anchoa mitchilli*), banded killifish (*Fundulus disphanus*), Atlantic silverside (*Menidia menidia*), white perch (*M. americana*) and Eastern silvery minnows (*Hybognathus regius*).

One fish species of particular concern is the American eel (*Anguilla rostrata*), the only catadromous species in North America. The species makes a lengthy journey from its birthplace in the Sargasso Sea (northern Caribbean Sea-Bermuda region) to the upper Delaware River. Populations of eels in East Coast rivers have declined precipitously in polluted and dammed

rivers. The eel plays a critical role in the reproduction of the largest freshwater mussel population in the Delaware River (*Elliptio companata*). The larval stage of the mussel needs to live for a period of time on a fish host before it drops off and begins to grow on its own. Freshwater mussels have enormous filtration capacity, benefitting the river's water quality.

Two sturgeon species are known to occur in the tidal freshwater region of the Delaware Estuary. The shortnose sturgeon (*Acipenser brevirostrum*) and the Atlantic sturgeon (*Acipenser oxyrinnchus oxyrinchus*) are Federally-listed endangered species. Refer to Section 4.8 and 5.6 for more detailed discussion on threatened and endangered species.

Essential Fish Habitat. Under the Magnuson-Stevens Fishery Conservation and Management Act, Federal agencies must coordinate with the National Marine Fisheries Service (NMFS) if they authorize, fund or conduct activities that "may adversely affect" essential fish habitat (EFH) and develop measures to minimize damage to EFH. EFH is broadly defined to include "those waters and substrate necessary to fish for spawning, breeding, feeding or growth and maturity." NMFS provides recommendations to Federal action agencies on measures to avoid, minimize, mitigate, or otherwise offset adverse effects to EFH. No EFH has been designated for managed species within the Delaware River where the proposed project is located. Prey species of managed species utilize the river in the vicinity of the project area. Appropriate seasonal restrictions for construction and utilization of a turbidity curtain will be employed to minimize impacts to these species.

4.6 VEGETATION

There are no wetlands within the immediate project area; located within a city park with upland mowed lawn, mature trees, paved parking lot, and access road along a developed river shoreline of bulkheads, concrete wall, and an adjacent small sandy riverbank to the north. Vegetation in these areas is primarily herbaceous; however, some mature trees occur down to the high water line of the river. Trees observed included silver maple (*Acer saccharinum*), black willow (*Salix nigra*), river birch (*Betula nigra*), sycamore (*Platanus occidentalis*), and Eastern cottonwood (*Populus deltoides*).

4.7 WILDLIFE

The proposed project area is highly developed. The park encompasses a small area in between roadways and the Delaware River and is approximately 2-3 acres. Wildlife species that occur in the area are those typical of urban environments that utilize open grass fields and trees as well as the river's edge for foraging.

Reptiles and Amphibians. Species typical in riparian fringing vegetated areas in this reach of the Delaware River may include the box turtle *(Terrapene Carolina)* and Fowler's toad *(Bufo woodhouse fow/eri),* northern water snake *(Nerodia sipedon sipedon),* bullfrog *(Rana catesbeiana*), green frog *(Rana clamitans melanota),* and northern leopard frog *(Rana pipiens).*

Birds. Over 300 species of birds are known to inhabit or utilize the Delaware River area. Money Island and Biles Island, two open areas located on the opposite shore and just south of the project

site, have been used as placement sites for dredged material. The sites are also utilized as stopping-over points for migratory birds and were the location of a biological field survey in May 1996 (Harriott *et al*., 1997). Neotropical songbirds also migrate in and out of the area in the spring and fall. Fifty-two species of songbirds and shorebirds were observed at Money Island during the May 1996 field survey.

Federal agencies have a responsibility under various Federal statutes and Executive Orders to protect, conserve, and manage migratory birds. Migratory birds are a Federal trust resource responsibility and are protected pursuant to the Migratory Bird Treaty Act (MBTA). Hamilton-Trenton Marsh, located immediately south of the project site, supports more than 230 species of birds. During spring and fall migration seasons, the lake and marsh are a regular resting place for waterfowl. In spring and summer, approximately 104 species use these areas for nesting (USFWS, 2011). The USFWS recommends that the Corps avoid tree and vegetation removal whenever possible and include a time restriction for any tree and vegetation removal to minimize migratory bird impacts (typically April 15 to September 30). In addition, any post-construction vegetation planting and landscaping should include only native plant species.

Mammals. Several species of mammals or their signs (footprints, scat, dens, etc.) were observed at the Money Island placement site during the May 1996 field survey (Harriott *et al.,* 1997). These include groundhog (*Marmota monax*), white-tailed deer (*Odocoileus virginianus*), muskrat (*Ondatra zibethicus*), raccoon (*Procyon lotor*), eastern cottontail (*Sylvilagus floridanus*), gray squirrel (*Sciurus arizonensis*), and mink (*Mustela vison*).

4.8 THREATENED AND ENDANGERED SPECIES

Mercer County is within the potential summer range of the endangered Indiana bat (*Myotis sodalis*) and the recently listed threatened northern long-eared bat (*Myotis septentrionalis*). Indiana bats occur over most of the eastern half of the U.S. and typically hibernate in caves in southern Indiana. Indiana bats were listed in 1967 due to episodes of people disturbing hibernating bats in caves during winter, resulting in the death of large numbers of bats. During the summer they roost under the peeling bark of dead and dying trees. They eat a variety of flying insects found along rivers, lakes, and in uplands. The northern long-eared bat was listed in 2015. Like the Indiana bat, northern long-eared bats spend winters hibernating in caves and mines and roost under bark, in cavities or in crevices of both live and dead trees. Both species have been impacted by white-nose syndrome, an illness that was first discovered in 2006 and has killed over a million bats since that time. Northern long-eared bat numbers has been particularly impacted by white-nose syndrome. The species requires trees for roosting during summer and is found in forested areas along most of the East Coast states, including New Jersey.

The Delaware River supports bald eagle (*Haliaeetus leucocephalus*) and peregrain falcon (*Falco* peregrines) foraging areas. Both species are known to occur in the vicinity of the project site. Although the bald eagle (*Haliaeetus leucocephalus*) and the peregrine falcon (*Falco* peregrines) have been removed from the Federal endangered species list, these raptors maintain protected status. The bald eagle is still protected under the Bald and Golden Eagle Protection Act and both birds are protected under the Migratory Bird Treaty Act. The bald eagle also remains a State-listed species under the New Jersey Endangered and Nongame Species Conservation Act

(N.J.S.A. 23:2A *et seq*.), which carries protections under the State Land Use Regulation Program. In the 1980s, there was only a single pair of nesting bald eagles in New Jersey. The ban of DDT, in combination with restoration efforts, the population had increased to 185 pairs in 2018. In 2018, 37 peregrine falcon nests were monitored in New Jersey (www.state.nj.us). The falcons utilize towers, buildings, cliffs, and bridges for nesting.

The USFWS noted in their coordination letter that the great blue heron (*Ardea herodias*) is a state species of concern and occurs in the general area. The species is expected to temporarily avoid the immediate area of construction.

The dwarf wedge mussel (*Alasmidonta heterodon*) is a small freshwater filter-feeder that spends most of their life buried in river bottom sediments. The species is both federally and state-listed as endangered. Historic past occurrence of dwarf wedge mussel is documented in the Delaware River and tributary streams within the vicinity of the City of Trenton (Silldorff and Schwartz, 2014). The Delaware River was historically known to have over a dozen species of freshwater bivalves and nearly all were thought to be significantly reduced in numbers, threatened or locally extinct. Water pollution and degraded habitats are thought to be the most common reasons for their decline. Currently, the dwarf wedge mussel has only been found above the water gap. However, in 2010, seven species were discovered living in dense communities near Philadelphia (delawareestuary.org): two species that were thought to be extinct: the alewife floater (*Anodonta implicata*), the tidewater mucket (*Leptodea ochracea*); two species considered critically imperiled: the pond mussel (*Ligumia nasuta*) and the yellow lampmussel (*Lampsilis cariosa*); two species considered vulnerable: the creeper (*Strophitus undulates*) and the eastern floater (*Pyganodon cataracta*); and one common species: the eastern elliptio (*Elliptio complanata*) (ANC, 2010). Other than the dwarf wedge mussel, New Jersey lists two endangered species: the brook floater (*Alasmidonta varicosa*) and green floater (*Lasmigona subviridis*), and five threatened species: triangle floater (*Alasmidonta undulate*), eastern lampmussel (*Lampsilis radiata*), yellow lampmussel, tidewater mucket, and eastern pond mussel (*Ligumia nasuta*). The Academy of Natural Sciences has established a hatchery and relocation program along with Cheyney University, the U.S. Fish and Wildlife Service, and the U.S. Geological Survey to evaluate different methods (The Freshwater Mussel Recovery Program) for re-establishment.

The federally listed endangered shortnose sturgeon (*Acipenser brevirostrum*) and Atlantic sturgeon (*Acipenser oxyrhinchus oxyrinchus*) occur within the Delaware River. Principal responsibility for sturgeon is vested with the National Marine Fisheries Service (NMFS). Sturgeon are anadromous, spending a majority of their adult life phase in marine waters, migrating upriver to spawn in freshwater reaches of the Delaware River, then migrating to lower estuarine brackish areas during juvenile growth phases. Adults migrate along the ocean coast of New Jersey and Delaware. A large portion of the Delaware River's shortnose sturgeon population overwinters in the river between Roebling and Trenton from December to March. Adults move upstream to spawn between late March and early May from Trenton Falls to Scudder Falls. Once shortnose sturgeon have spawned, they move downstream to the Philadelphia area where they typically stay throughout May and then return upstream to their overwintering grounds, summer and winter.

The Atlantic sturgeon is the larger of the two sturgeon species that occur in the Delaware River. In 2012**,** the National Marine Fisheries Service (NMFS) issued rulings listing five Distinct Population Segments (DPSs) of Atlantic sturgeon as threatened or endangered under the Endangered Species Act (ESA). All five of these DPSs may occur within waters of the Delaware Estuary. Atlantic sturgeon capture records between 1958 to 1980 (Brundage and Meadows, 1982) indicated that the fish are most abundant in Delaware Bay in early spring, and move up to the lower tidal river during summer, utilizing different regions of the river and bay depending on season and life history stage. Juvenile Atlantic sturgeon are believed to overwinter in deeper waters of the lower estuary, as numbers increased in September. Spawning is believed to occur in flowing water between the salt line and fall line of rivers, typically between April and May in the mid-Atlantic region. In the Delaware River, spawning is suspected of occurring as far upstream as Bordentown. Larvae are bottom-dwelling and move downstream to nursery grounds. Juveniles stay in estuarine waters for a few months to several years. The stretch of Delaware River between Marcus Hook and the mouth of the Schuylkill River, PA is a known concentration areas for Atlantic sturgeon less than 2 years old. Once they reach approximately 30-36 inches, the subadults may move to coastal waters.

An IPaC Trust Resource evaluation of the project site and vicinity was conducted on the USFWS website (http://www.fws.gov/northeast/njfieldoffice/endangered/consultation.html). The project site entails 76 linear feet of waterfront within a 2.7 acre city park. The online search encompassed the entire park and surrounding areas north and south as well as the Delaware River for a total of approximately 10 acres. The USFWS report indicated that no endangered species and no critical habitat are identified for the search area. The report identified 23 bird species of conservation concern that may occur in the area. As birds are protected by the Migratory Bird Treaty Act (MBTA) and the Bald and Golden Eagle Protection Act, appropriate conservation measures will be taken to ensure that no birds are unintentionally killed or injured.

The 23 bird species identified in the USFWS IPaC report (birds of conservation concern) are:

American Oystercatcher Haematopus palliates-Year-round
American Bittern Botaurus lentiginosus-Season: Breeding
Bald Eagle Haliaeetus leucocephalus-Year-round
Black-billed Cuckoo Coccyzus erythropthalmus-Season: Breeding
Blue-winged Warbler Vermivora pinus-Season: Breeding
Canada Warbler Wilsonia Canadensis-Season: Breeding
Fox Sparrow Passerella iliaca-Season: Wintering
Gull-billed Tern Gelochelidon nilotica-Season: Breeding
Kentucky Warbler Oporornis formosus-Season: Breeding
Least Bittern Ixobrychus exilis-Season: Breeding
Loggerhead Shrike Lanius ludovicianus-Year-round
Peregrine Falcon Falco peregrinus-Season: Wintering
Pied-billed Grebe Podilymbus podiceps-Year-round
Prairie Warbler Dendroica discolor-Season: Breeding
Purple Sandpiper Calidris maritime-Season: Wintering
Red Knot Calidris canutus rufa-Season: Wintering
Rusty Blackbird Euphagus carolinus-Season: Wintering

Short-eared Owl Asio flammeus-Season: Wintering
Snowy Egret Egretta thula-Season: Breeding
Upland Sandpiper Bartramia longicauda-Season: Breeding
Willow Flycatcher Empidonax traillii-Season: Breeding
Wood Thrush Hylocichla mustelina-Season: Breeding
Worm Eating Warbler Helmitheros vermivorum-Season: Breeding

4.9 CULTURAL RESOURCES

The Hog Island Cranes at the Trenton Marine Terminal in Mercer County, New Jersey were listed on the National Register of Historic Places (NRHP) in June of 1980. The Hog Island Cranes represent an important era of heavy hoisting equipment and played a major role in 20th century waterfront technology, in addition to aiding in the American efforts during World War I.

During World War I the United States began a massive shipbuilding effort, with one of the largest yards located on Hog Island just south of Philadelphia. The McMyler-Interstate Company of Cleveland Ohio constructed twenty-eight locomotive steam gantry cranes for the Hog Island Shipyard in 1917, where they were in continual use until excessed in 1930.

In 1932 the Delaware River channel was dredged to 20-feet depth, allowing Trenton to develop a port for sea-going vessels. Two of the Hog Island cranes were sold to the city of Trenton in 1930, and were installed at the Trenton Marine Terminal in 1932 where they continued to be used into the 1950s as a part of Trenton's seaport efforts.

4.10 HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES (HTRW)

In accordance with ER 1165-2-132, entitled *Hazardous, Toxic and Radioactive Wastes (HTRW) Guidance for Civil Works Projects,* dated 26 June 1992, investigations must be conducted to assess the existence, nature and extent of HTRW within a project impact area (Comprehensive Environmental Response, Compensation, and Liability Act [CERCLA], 42.U.S.C. 9601 *et seq.,* as amended). Hazardous substances that are regulated under CERCLA include "hazardous wastes" under Section 3001 of the Resource Conservation and Recovery Act [RCRA], (2 U.S.C. 6921 *et* seq.),"hazardous substances" identified under Section 311 of the Clean Water Act; "toxic pollutants", designated under Section 112 of the Clean Air Act, (42 U.S.C. 7412); and "imminently hazardous chemical substances or mixtures", upon which USEPA has taken action under Section 7 of the Toxic Substances Control Act (15 U.S.C. 2606).

The Trenton Marine Terminal project team contracted with Environmental Data Resource, Inc. (EDR) to produce an environmental database, including mapping and aerial photograph searches for the project area. Database searches were conducted for reports within a one mile radius of the project address located in the approximate center of the project location. Out of 57 database returns, there are 38 environmental sites, ten USGS water wells, and nine sensitive receptors (such as child care centers). There are seven listed environmental sites within approximately 0.25 miles of the target property; Trenton City of Trenton Water Works– SE, Trenton City of Trenton Water Works – TR, Joe-Vanna LLC, Consumers Oil Corp, Regional Sludge MGMT, Robinson Transport, and Duck Island Terminal.

Review of mapping and aerial photography showed that the water treatment facility was constructed sometime between 1958 and 1961. Aerial photographs were provided for years 1931, 1938, 1940, 1946, 1951, 1958, 1961, 1964, 1970, 1974, 1983, 1989, 1992, 1995, 1999, 2005, 2006, 2008, and 2010. Historical topo maps were provided years 1888, 1890, 1904, 1906, 1942, 1955, 1957, 1970, 1981, 1995, and 2014. There are no Sanborn maps associated with this location.

4.11 SOCIOECONOMIC RESOURCES

Trenton is located approximately 65 miles southwest of New York City, 35 miles northeast of Philadelphia, and 90 miles northwest of Atlantic City. The Trenton Marine Terminal is in south Trenton and is a small public open space located in a large urbanized area. Trenton has a population of 84,559 people with a median age of 33.7 and a median household income of $34,412. Between 2015 and 2016 the population of Trenton declined from 84,632 to 84,559, a 0.09% decrease and its median household income grew from $34,257 to $34,412, a 0.45% increase. The population of Trenton is 48.3% Black, 35.5% Hispanic, and 13.6% White. The median property value in Trenton is $100,000, and the homeownership rate is 36.8% (https://datausa.io/profile/geo/trenton-nj).

Environmental Justice. Communities of color and low-income communities are exposed to a disproportionate amount of industrial pollution and other environmental hazards. In 1994, citizens gained the right to address environmental injustices under Executive Order 12898 entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. E.O. 12898 institutionalizes a mechanism whereby actions involving federal funding must pro-actively address environmental concerns to ensure that minority and low-income communities are not disproportionately impacted by environmental hazards. Environmental Justice is the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and environmental laws, regulations, and policies.

5.0. ENVIRONMENTAL EFFECTS

5.1. ALTERNATIVES COMPARISON EVALUATION

Alternative 1: Under the No-action alternative the sandy soils that lie underneath the collapsed section of the pier will continue to erode with the daily tides of the Delaware River and, more significantly, with high storm flows. Seasonal damage from ice floating down the river is likely to cause additional damage. If the pier is not repaired, the erosion that is occurring will continue to move east, into the public park, and south, behind the existing intact pier. If the soils behind the intact pier were to continue to erode away, the concrete decking and walkway in these areas would likely collapse as they did in the northern section, resulting in further loss of historically significant features of a public park. Additionally, further destruction of the waterfront structure could potentially undermine the main outfall pipe for the adjacent water treatment plant. If further sections of the pier are lost due to collapse, the outfall pipe could become blocked, forcing the sewage treatment plant to discharge raw sewage into the river through an emergency overflow pipe. The collapsed pier poses a safety hazard for park users.

Alternative 2: Riprap Protection would provide stabilization to prevent shoreline erosion but due to the steep slope of the existing bottom within the failed area, the proposed riprap toe would need to be located approximately 33 feet beyond the existing face of the pier, thereby increasing the extent of adverse impact to the river bottom. This alternative would require a large quantity of riprap (approximately 2,500 cubic yards) at a higher cost than the preferred plan and would disturb more river bottom. Finally, this alternative would require the removal of 76 feet of existing concrete deck, which would not include preservation or matching of historical materials. Therefore, this alternative would not accomplish the intended goal to preserve historically significant features of a park included on the National Register of Historic Places.

Alternative 3: The installation of Articulated Concrete Block Mat and Steel Sheetpile would serve to stabilize the pier to prevent further erosion of the bottom. As with Alternative 2, the fractured concrete pad and low wood deck would be removed, thereby not meeting the intended goal to minimize disturbance to the river bottom nor preserve or match historical materials of the structure. The construction of steel sheetpile cut-off walls to prevent loss of existing fill from behind the east and south sides of the remaining pier structure would entail additional environmental impacts to river bottom and a higher cost, similar to Alternative 2.

Alternative 4: The installation of steel sheetpile on all four sides within the failed area would stabilize the remaining pier. As with the previous alternatives, this alternative also entails removal of the fractured concrete pad and low wood deck without replacement. Although it would restore the square footage of park space that was lost due to the pier collapse, it would not reconstruct the pier in a way that retains the historic character of the structure. Additional river bottom would be impacted through the installation of the sheetpile and backfilling open water to existing grade. This alternative is also more costly than the selected plan.

Alternative 5: The installation of steel sheetpile with a reinforced concrete top decks installed on the backfill to match the elevation of the existing adjacent intact concrete deck would meet the intended goal to maintain the historic character of the pier but would entail the same

environmental impacts to additional river bottom substrate as Alternative 4. It is also the most expensive alternative design plan.

Alternative 6: The installation of steel H-piles with a precast concrete deck is the preferred plan (Figures 3-1 and 3-2). It would rebuild the collapsed section of pier to the same dimensions as the formerly existing pier section and have the same appearance, and match up visually with the existing pier to the south. The steel piles would replace the former timber ones within the same project footprint and would not entail filling of any open water area or loss of riverine benthic habitat. This alternative retains the historic character of the pier and is the least cost of all of the structural alternatives. A high deck structure allows much of the existing collapsed structure to remain in place, minimizing both demolition needs and soil disturbance. Impacts of the selected plan are discussed in further detail in the following sections.

Alternative 7: Relocation of the historically significant park, cranes, and sewer authority outfall pipe would require identification and acquisition of approximately 2 acres of property that exists elsewhere along the riverfront of the City of Trenton at a significantly high and unrealistic cost, considering the appraised value of waterfront real estate in Trenton's urban setting.

From a historical significance standpoint, this alternative would have a major adverse effect. The Terminal is considered to be a significant location along the river because of the historical shipping activities that took place on the pier using the gantry cranes. If the gantry cranes were moved to a different location and separated from the pier, the historical significance of Trenton's waterborne commerce would be diminished. Likewise, if the gantry cranes remained in place on the pier, but the site was closed as a public park for safety reasons. This alternative would eliminate public access to a historical resource. Lastly, given the high cost, alternative locations for the treatment plan outfall pipe were not considered in detail for this project.

5.2 PHYSICAL ENVIRONMENT

The No Action Alternative would result in continued erosion of the underlying substrate contributing to water turbidity and further collapse of the dilapidated pier section's structural supports. The No Action Alternative leaves the collapsed pier an eyesore and does not remedy the safety hazard in a public park. The collapse section of pier also poses a potential concern for the stability of the remaining intact pier sections.

All of the structural alternatives would remove the (above water) unsightly collapsed section of pier and remove the safety hazard and all of the structural alternatives would require temporary disturbance within the footprint of the original structure. Disturbance would occur above and below the water line (on the river substrate) to remove any necessary collapsed pieces of the former pier. The pre-collapse structure sat on timber piles which had minimal footprint impacts on the benthic substrate below the pier. When constructed, structural alternatives 2, 3, 4, and 5 would eliminate this benthic habitat that existed within the footprint of the original structure through the filling of open water. However, structural alternative 6 would be pile-supported and mimic the construction of the original structure, minimizing any new impacts to benthic habitat. This alternative retains the historic character of the pier. Likewise, Alternative 7 (relocation) would have an adverse effect by removing the historic significance of the location's prior use as

a shipping terminal and with a significantly higher cost than all of the alternatives. With the exception of Alternative 5, these alternatives do not meet the goal of preserving the historic character of the pier. Alternative 5 retains the historic character of the pier but at a significantly higher cost. Alternative 6, the Selected Plan, requires installation of 27 steel H-piles in place of the former timber ones and would not pose impacts to additional river bottom beyond a partial section of the existing low deck structure.

5.2.1. Water and Sediment Quality

As mentioned in Section 4.4, Delaware River water and sediment samples have been taken in the vicinity of the project site in the past several decades in order to assess potential environmental impacts as a result of dredging and placement operations. Some of the analyses conducted provide evaluations of various chemical constituents that are found in the river sediments and thus, could be released into the water column given disturbance or agitation. Versar, Inc. was contracted to conduct a chemical analysis of channel sediments in the Delaware River from the Kinkora Range to Duck Island, located south of the project site and north of the Fairless Turning Basin (Versar, Inc. 1997, 2001). Tetratech (2017) was contracted to conduct the most recent similar chemical analyses in the same vicinity of the Delaware River (approximately 3.5 to 9 miles south of the Trenton Marine Terminal). Analysis of metal and organic contaminant levels in the bulk sediments taken from these nearby locations revealed none of the inorganic and organic contaminants analyzed exceeded beneficial use criteria if the sediments were to be used for future construction purposes. The 2017 Tetratech study concluded that no adverse effect to aquatic life would occur in the river in the vicinity of the CDF effluent discharge based on the analyses conducted on the dredged sediments and elutriate testing.

Under the No Action Alternative, the dilapidated pier section would likely continue to fail, allowing further erosion of the underlying river bottom substrate and exposed steep bank slope, resulting in elevated water turbidity. Likewise, for the structural alternatives, localized increases in suspended sediment to the Delaware River may occur in the immediate vicinity of the collapsed pier for any necessary removal operations, riprap placement, concrete block mat or sheetpile installation and pile driving. A turbidity barrier will be installed around the immediate construction area for all alternatives. Localized elevated turbidity due to construction activities would cease once the work is completed. Localized turbidity impacts under Alternative 7 (relocation) would be similar to the No Action scenario of continued erosion of the shoreline in the collapsed section of pier.

The selected plan will not significantly affect water quality or the aquatic ecosystem and has been found to be in compliance with Section 404(b)(1) of the Clean Water Act, as amended (see Appendix A).

5.2.2. Air Quality

The No Action alternative would not result in any air quality impacts. All structural alternative plans entail impacts to air quality by emissions from criteria pollutants from operation of construction equipment at the project site. Carbon monoxide and particulate emissions at the project site, during construction, may be considered offensive; but are generally not considered

far-reaching. Exhaust from the construction equipment will have an effect on the immediate air quality around the construction operation but should not impact areas away from the construction area. These emissions will subside upon cessation of operation of heavy equipment. Operation of construction equipment would not require construction and operation of any stationary or permanent sources of air pollution. The proposed plan is anticipated to require approximately 9 to complete. Breezes typical of the riverfront would dissipate construction equipment emissions quickly.

The 1990 Clean Air Act Amendments include the provision of Federal Conformity, which is a regulation that ensures that Federal Actions conform to a nonattainment area's State Implementation Plan (SIP) thus not adversely impacting the area's progress toward attaining the National Ambient Air Quality Standards (NAAQS). Therefore, the total direct and indirect emissions associated with the proposed Trenton Marine Terminal repair must be compared to the General Conformity trigger levels. A General Conformity review for the project was conducted for the preferred plan in November 2018. Total direct and indirect emissions calculated for the project are below the conformity threshold values established at 40 CFR 93.153 (b) for ozone (NOx and VOCs) in a Moderate Nonattainment area. The project is not considered regionally significant under 40 CFR 93.153 (i) (refer to Record of Non-applicability in Appendix B).

5.3 VEGETATION

The project site consists of primarily timber pilings and supports, a concrete pad, and train rails. The surrounding area is predominately mowed lawn, paved street, and parking lot, and to the north, the riverbank vegetated with shrubs and trees. Two trees directly behind the collapsed section and a third tree at the southern end of the collapsed section of pier will be removed to allow for access with construction equipment. A possible fourth tree may need to be removed for vehicular access. A few small shrubs that have grown through the cracks of the collapsed and broken concrete deck will also be removed.

There are several vegetated riverfront areas with promenades to the north of the site that will not be impacted. There are large vegetated areas, approximately 3-4 miles south of the project site on the opposite shoreline, that are used periodically for dredged material placement operations. These upland placement sites were surveyed in 2007 for their environmental resources. The Biles Island site is a sparsely vegetated basin approximately 100 acres in size that is sometimes excavated by Waste Management Inc. (WMI) for beneficial use of dredged material. Money Island, located just south of Biles Island, currently possesses a cell approximately 60 acres in size. Both of these sites possess mature trees and shrubs along their perimeters, providing habitat for area birds and other wildlife and would not be impacted by the proposed project.

Under the No Action Alternative, there would be no direct adverse impact to vegetation, although indirect adverse impacts may result through continued erosion of the river bank in the collapsed pier section. For the structural alternatives, a minor impact to adjacent vegetation would occur as the majority of the construction will be water-based. The structural alternatives, including the Selected Plan, may require the removal of 3-4 trees and 2-3 small shrubs in total. The construction period can be timed to minimize the overlap during the period of time recommended by the USFWS to avoid impacts to seasonal use species (*i.e.* to minimize

migratory bird impacts during April 1 to September 30).

5.4 AQUATIC RESOURCES

For the No Action Alternative minimal impacts to aquatic resources would result. Disturbance and elevated turbidity of the eroding river bank slope due to tidal action will continue to occur.

All of the structural alternatives would pose varying impact to the river bottom within the area of construction activity. Habitat for sessile organisms, such as worms and bivalves (mollusks) currently may occur in and around the collapsed structure, although the collapsed concrete wall displaces sediment substrate on the river bank. The purpose of the project is to fully restore the original footprint of the pier and to connect the restored portion into the existing public facilities. Turbidity in the river in the immediate area may result from demolition and any necessary removal activities. However, the proposed work entails construction of a new high deck pier structure to be tied into the adjacent existing timber low deck portions. The benefit of this design is that it allows much of the existing collapsed structure to remain in place in the river, thereby substantially minimizing both demolition needs and sediment disturbance. The remnants of the original pier will provide additional stabilization as well as protection for the river bottom and embankments where they are exposed to water flows.

A turbidity barrier will be installed (in-water) to wrap around the construction site, as per NJDOT standards. For Alternatives 3, 4, and 5, the installation of steel sheetpile (and backfilling for Alternatives 4 and 5 to existing grade), would also elevate turbidity in the river while also occupying a larger footprint impact area in the river. Alternative 6, the Selected Plan, entails the installation of 27 steel H-piles to replace the original deteriorated timber piles and will impact 37.8 sq. ft. of river bottom. Impacts to water quality due to elevated turbidity in the immediate project area will be localized to the maximum extent by the turbidity barrier and is temporary during the construction period. Pile driving also entails noise impacts and is anticipated to occur for approximately 1 month of the 9 month construction period. Removal of any upper portions for replacement of the proposed decking will not impact the aquatic environment.

The potential impacts of construction activities on fish resources are minimal and indirect under the No Action Plan due to elevated turbidity levels from continued erosion of the river bank. Under the structural Alternatives, temporary impacts will result from elevated turbidity levels temporarily during the construction period. The majority of the repair activities will occur above water levels. Alternatives 2, 3, 4, and 5 will result in a greater aquatic surface area loss of benthic or planktonic food resources for fish by occupying a larger footprint on the river bottom. The benthic community within the immediate project site is not likely to be diverse or prolific. No long-term adverse impacts of significance are anticipated with respect to the minimal disruption to existing benthic organisms and finfish for the selected plan. Alternative 6 does not enlarge the project footprint within the river but like the other structural alternatives, would cause a minor temporary increase in turbidity during demolition, removal, and pile driving activities.

Pile driving produces high sound pressure levels (noise) in the surrounding air and aquatic environments. High intensity sounds generated through pile driving are typically considered above 187 decibels (dB) and can result in an effect on fish behavior (*e.g.* leaving the area) or

physical injury. Potential physical injuries include a temporary change in hearing capacity or damage to the inner ear, destruction of the swim bladder, or potential adverse effects on eggs and larvae. Cumulative stress impacts result from long-term high intensity noise and can cause physiological stress to fish to be more susceptible to infection, predation, possibly slower growth (Barton, 2002; Swan, 2012; Dahl *et al.,* 2015). Pile-driving is expected to take about 1 month. The primary mechanism utilized to avoid adverse noise impacts to fish in riverine systems is to avoid time of year restrictions so that the work does not occur when diadromous fish species that enter the upper portions of the Delaware River. NMFS recommends a March 1 to July 31 moratoria as the Delaware River is a major migratory and spawning river for various species of diadromous fish. This is consistent with recommendations from the Delaware River Basin Fish and Wildlife Management Cooperative. Some overlap will be required for an anticipated 9-month construction period, however all in-water work will be restricted to winter months to minimize potential impacts to fisheries.

A temporary rise in turbidity during construction is not expected to pose water quality concerns by decreasing dissolved oxygen concentrations in the immediate area due to typical water flow velocities in the Delaware River. Increased levels of turbidity can affect finfish in several ways. Reduced visibility may impact the feeding success of sight-dependent feeders. Elevated levels of suspended sediments impede respiration (*i.e.* clogging of gill filaments). Chemical constituents that were previously bound to undisturbed sediment particles may become biologically available when exposed to dissolved oxygen in the water column. These impacts would be more severe on early life stages of fish as they tend to be most sensitive.

Peddicord and McFarland (1978) cited a comprehensive literature review by Stern and Stickle (1978) which concluded that adult fish generally are more sensitive to suspended solids than most invertebrates, and that within a given fish species, juveniles are more sensitive than adults. In addition, fish show an avoidance reaction to irritating stimuli. Therefore, fish are expected to avoid areas of elevated turbidity. Fish larvae, on the other hand, have a weak avoidance potential, and thus, may be affected by suspended sediments. The river is wide (825 feet) in the project area and experiences significant flow velocities that would dissipate turbidity quickly. Any elevated turbidity will be contained within the immediate construction area by the use of a turbidity barrier.

Anadromous fish species that make migratory runs within the Delaware River include the American shad *(Alosa sapidissina),* alewife *(A. pseudoharengus),* blueback herring *(A. aesti va/is),* striped bass *(M. saxatilis)* and shortnose sturgeon *(Acipenser brevirostrum*) and the Atlantic sturgeon (*Acipenser oxyrhynchus*). These species typically migrate upstream in the spring to spawn, and downstream in the fall to reach overwintering habitat. Adverse impacts resulting from the selected plan will be minor and of short duration. Most species that could be in the area are mobile and will be temporarily displaced from the project area during construction activities. Following restoration, it is anticipated that any species displaced during construction activities will return. As noted, the seasonal period for anadromous fish migration (1 March through 31 July) will be avoided for in-water work.

Essential Fish Habitat. As noted in Section 4.5, no EFH has been designated for managed species within the Delaware River where the proposed project is located. Since prey species of

EFH managed species utilize the river in the vicinity of the project area, appropriate seasonal restrictions for in-water construction and utilization of a turbidity curtain will minimize impacts to these prey species. The presence of the collapsed portion of the pier lying on the river substrate minimizes the establishment of infaunal macroinvertebrate prey species.

5.5. TERRESTRIAL RESOURCES

No significant adverse impacts to wildlife are anticipated with respect to either the No Action Alternative or the proposed structural Alternatives. The potential disturbance to terrestrial species would be noise from construction equipment in the vicinity. Terrestrial species would not likely remain in the project area while construction activities are occurring. The structural alternatives will require the removal of 3-4 trees and shrubs growing along the dilapidated structure. Likewise, impacts to terrestrial wildlife species that may occur in surrounding vegetation (*i.e.* displacement) will be minimized by conducting tree removal outside of the spring through early fall reproductive period. Impacts to terrestrial species will be minimal and temporary as species are expected to resume utilizing the park and riverfront area after construction operations cease.

The general vicinity of the project site is primarily residential with an adjacent large cemetery with numerous mature trees and shrubs. Fringing forests along the river borders of nearby upland dredged material placement sites on the opposite river bank also provide wildlife habitat in the area.

5.6. THREATENED AND ENDANGERED SPECIES

Federally listed threatened and endangered species and their habitats are afforded protection under Section 7(a)(2) of the Endangered Species Act (ESA), which requires every Federal agency, in consultation with the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS), to ensure that any action it authorizes, funds, or carries out is not likely to jeopardize the continued existence of any listed species or result in the destruction or adverse modification of critical habitat. An assessment of potential, direct, indirect, and cumulative impacts is required for all Federal actions that may affect listed species.

The Indiana bat (*Myotis sodalist*) and the northern long eared bat (*Myotis septentrionalis*) are federal and New Jersey state-listed endangered species. Bats rely on certain habitats and food resources (*i.e.* insects) which makes them vulnerable to disturbance. Individual bats can consume 3,000-4,500 flying insects each night (conservewildlifenj.org). Bats prefer roosting near open bodies of water in tight crevices such as cracks in rocks, under exfoliating tree bark and awnings of buildings.

It is unlikely that federally listed threatened or endangered species would be adversely impacted by the proposed plan or any of the alternatives. Trees identified for removal within the park will not be removed during roosting season (*i.e.* spring through early fall). The project plan entails removal of a 76-foot long dilapidated section of an existing pier along the river bank and replacing it. The selected plan retains the original footprint of the existing structure while Alternatives 2, 3, 4 and 5 require additional square footage within the footprint of the structure

design, and therefore, impacting additional potential river bottom habitat. The proposed plan also minimizes the extent of in-water work and disruption of the river bottom sediments. The majority of the work is to the upper deck, which is above MHW.

Bald eagle. The bald eagle (*Haliaeetus leucocephalus*) is no longer on the federal Endangered Species list (since 2007) but is still protected by the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act. These laws prohibit killing, selling, or otherwise harming eagles, their nests, or eggs. The breeding population still has endangered species status in New Jersey. In 2017 there were 153 active bald eagle nests in New Jersey, the majority located within 13 miles of the Delaware Estuary.

Peregrine falcon. The peregrine falcon (*Falco peregrinus)* was listed by the U.S. Fish and Wildlife Service as endangered in 1970 and was removed from the Federal list in 1999. The bird is currently listed in Pennsylvania and New Jersey as endangered. In New Jersey, there were 34 known pairs in 2017 (Clark *et al.,* 2017). Four pair nested on bridges spanning the Delaware River between New Jersey and Pennsylvania. Clark *et al.* (2017) have shown that nesting and productivity of peregrine falcons in New Jersey on towers and buildings have been relatively successful and the state population is currently considered stable.

The selected alternative plan is not expected to adversely impact nesting or foraging behaviors for either bird of prey species. Construction activities will occur along just a 76-foot long stretch of the Delaware River bank in an urban area for approximately 9 months. In coordination with the natural resource regulatory agencies, the U.S. Fish and Wildlife Service indicated in their 9 October 2018 letter that no Federally-listed or proposed threatened or endangered flora or fauna under Service jurisdiction are known to occur within or in the vicinity of the proposed project. Therefore, no consultation pursuant to the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*. is required.

Freshwater mussels. Freshwater mussels are patchy and occur in clumps and are not ubiquitous throughout the Delaware River. Mussel surveys by the Academy of Natural Sciences in collaboration with the Partnership for the Delaware Estuary and the U.S. Environmental Protection Agency have been conducted on portions of the river since 2009 on both shorelines between the DE/PA state line and Trenton, NJ. The shorelines 1-2 miles downstream of the proposed project site have been surveyed and this range is considered a rich zone for several freshwater mussel species. The proposed construction entails replacement of a 76-foot long pier whereupon 27 steel-H piles will be driven at the riverbank and replacement of the pier deck in accordance with design requirements as specified by the New Jersey State Historic Preservation Office. The in-water footprint (pile-driving) constitutes 0.048 acre of shallow water river edge. It is unlikely that freshwater mussel species occur in this small area of river edge shallow water due to the presence of the collapsed section of pier (concrete) lying on the river substrate. The only federally-listed species is the dwarf wedgemussel (*Alasmidonta heterodon*), and it is known to exist in only a few locations in the Delaware River in the upper basin (NY/PA border) and is not near the proposed project area (D. Kreeger, pers. comm.). None of the state-listed threatened or endangered freshwater mussel species are anticipated to occur within this small project footprint along the water's edge or within the immediate project vicinity due to the aforementioned collapsed section of concrete wall and pier on the substrate. A turbidity curtain

will be employed around the in-water construction area. Implementation of the selected alternative is not anticipated to have any adverse effects on freshwater mussels that may occur downstream of the project site.

Shortnose sturgeon. The shortnose sturgeon (*Acipenser brevirostrum*) is a federally endangered species of fish in the Delaware River (*i.e*. typically from the Lambertville, NJ area down to the lower bay). Tagging studies by O'Herron *et al*. (1993) found that the most heavily used portion of the river appears to be between river mile 118 below Burlington Island and river mile 137 at the Trenton Rapids within which the Trenton Marine Terminal is located. Sturgeon migrate through the area in early spring and early summer and again in the fall. Spawning and nursery habitat may occur in this portion of the river. Adult shortnose sturgeon are benthic feeders, eating mollusks, insects, crustaceans, and small fish. Juveniles eat crustaceans and insects. O'Herron (pers. comm. 2000) believes that juveniles likely aggregate closer to the downstream portion of this reach in winter when freshwater input is normally greater (in the vicinity of Duck Island and Newbold Island), a stretch of river 3 to 5 miles south of the Trenton Marine Terminal. A population (mark/recapture) study of shortnose sturgeon by ERC Inc. (2006) estimates that the sturgeon population in the Delaware Estuary is stable but not increasing.

It is unlikely that the proposed construction activity along a 76-foot stretch of riverbank shallow water will adversely affect migration, distribution, feeding, spawning, or larval survival within the project area. Fish will likely avoid the area of construction as a result of noise and human activity. Since most of the work will occur above water level, limited if any elevated localized turbidity or disturbance to benthic organisms is expected to occur. The proposed action is expected to have insignificant effects on habitat and forage and will not impact the river in a way that would make additional growth of the population less likely.

Atlantic sturgeon. The Atlantic sturgeon (*Acipenser oxyrhinchus oxyrhinchus*), also a federally-listed endangered species, is a long-lived species (approximately 60 years), late maturing, estuarine-dependent, and anadromous (Bigelow and Schroeder, 1953; Vladykov and Greeley, 1963; Dadswell, 2006; ASSRT, 2007). They can grow to over 14 feet in length and weigh up to 800 pounds (Pikitch *et al*., 2005). Based on best available information, NMFS (2017) cites five Distinct Population Segments (DPS) within the Delaware Estuary at the following frequencies: New York Bight 58%; Chesapeake Bay 18%; South Atlantic 17%; Gulf of Maine 7%; and Carolina 0.5%. It is believed that all early life stages (eggs and larvae), young of the year and juvenile Atlantic sturgeon of the New York Bight DPS originate from the Delaware River.

Spawning areas within the Delaware Estuary are not yet well defined, but believed to occur in deep flowing water above the salt line and below the fall line of the river (Shirey *et al*., 1999). Larvae and young juveniles are believed to remain in the estuary, particularly the upper river reaches. Subadults, and adults are more salt-tolerant and travel to the lower estuary and some leave the Delaware Bay at the mouth to the Atlantic Ocean (Brundage and O'Herron, 2009), typically in late summer and early fall. There is no abundance estimate for the Delaware River population of Atlantic sturgeon. Sampling in 2009 targeted young-of-the-year (YOY) and resulted in the capture of 34 YOY (Fisher, 2009) and 32 YOY in a separate study (Brundage and O'Herron in Calvo *et al*., 2010). Atlantic sturgeon are affected by numerous sources of human induced mortality and habitat disturbance throughout the riverine and marine portions of their

range. However, there is currently not enough information to establish a trend for any life stage or for the DPS as a whole (NMFS, 2017). In the Delaware Estuary, several threats play a role in shaping the current status and trends observed in the Delaware River and Estuary. In-river threats include habitat disturbance from dredging, and impacts from historical pollution and impaired water quality. From Trenton seaward, the river receives significant shipping traffic. Vessel strikes have been identified as a threat to sturgeon within the Delaware River (NMFS, 2009).

The removal of benthic food sources within the immediate submerged area of the collapsed pier is not likely to result in a potential impact to sturgeon. The existing in-water project footprint is not expected to provide forage area due to the presence of the collapsed pier sections on the river edge substrate. Feeding in freshwater is largely confined to periods when water temperatures exceed 10 degrees C (Dadswell, 1979; Marchette and Smiley, 1982) so in general, feeding is heavy immediately after spawning in the spring and during the summer. All in-water work will take place during winter months. As water temperatures decrease, feeding activity becomes lighter. It is also unlikely that the proposed action will affect spawning grounds as minimal disturbance of bottom soils along the riverbank will occur. The extent of river bottom fronting the 76-foot collapsed pier is shallow and is unlikely to be used for spawning habitat (April-June). Larvae and juveniles will migrate downstream and utilize hard bottom such as gravel matrices, as refuges.

Formal consultation with the National Marine Fisheries Service (NMFS), in accordance with Section 7 of the Endangered Species Act, has been undertaken several times (NMFS, 1996, 2014, 2015, 2017, and 2018) to address potential impacts to Atlantic sturgeon, shortnose sturgeon, and sea turtles associated with various Federal actions within the Delaware River to the Delaware Bay including deepening, maintenance dredging, blasting, pile driving, the use of a sound deterrent, and beach nourishment. The Opinions conclude that these actions are likely to adversely affect, but not likely to jeopardize the continued existence of the listed species. Potential sound impacts to sturgeon will minimized by avoiding pile driving between 15 March and 31 July when Atlantic sturgeon and shortnose sturgeon may be present. The New Jersey Division of Fish and Wildlife recommend the same seasonal restriction period for in-water disturbance as the project site is located within the anadromous species migration corridor.

In 2016 NMFS proposed, pursuant to Section 4 of the Endangered Species Act, to designate habitat of the listed Atlantic sturgeon as critical habitat in several east coast rivers, including the Delaware River. Thirty-one units of critical habitat were designated for 5 Distinct Population Segments (DPS) of Atlantic sturgeon. The Delaware River is one of four rivers included as part of the New York Bight DPS. The critical habitat is defined as the full bank width of the main stem river within the upriver and downriver boundaries. Those boundaries are from the crossing of the Trenton-Morrisville Route 1 toll bridge to where the main stem river discharges into Delaware Bay (defined in 1905 by the New Jersey and Delaware legislatures as a line connecting Liston Point, DE to Hope Creek, NJ). The designation as critical habitat may require special management considerations or protections. Coordination with NMFS is ongoing.

5.7. CULTURAL RESOURCES

The proposed project alternatives were presented to, and discussed with, the New Jersey State Historic Preservation Office (NJSHPO) in August of 2018. Since the Trenton Marine Terminal is listed on the NRHP, the only alternative that would not cause an adverse effect to the listed property would be in-kind repair and replacement. Specific conditions were presented by the NJSHPO and were accepted by the USACE in order to reach a conditional *No Adverse Effect* determination. Conditions are as follows:

1) The minimum amount of historic materials will be removed within the collapsed section of the pier and will be reconstructed to the same dimensions that previously existed, with the necessary subsurface structural components to avoid future collapse.
2) The existing rail lines in the collapsed section will be replaced in-kind by the contractor to replicate the pre-collapse condition and match the appearance of the rail lines in the adjacent intact section to closest degree possible.
3) The replaced rail lines will be for aesthetic purposes only and not designed or intended for supporting rail cars or any industrial uses.
4) The two rail car bumper stops will be salvaged intact from the collapsed section prior to demolition. Following the restoration of the collapsed section, the bumper stops will be placed in the same approximate location at the end of the rail lines. The bumper stops will also be replaced for aesthetic purposes only.
5) The color of the surficial concrete that will be placed adjacent to the replaced rails and bumper stops will be coordinated between NJSHPO, the City of Trenton, USACE, and the contractor to match the color of the adjacent intact concrete to the closest degree possible.
6) The safety railing that exists along the perimeter of the terminal is not considered a contributing factor to the significance of the site and will be restored at the discretion of the City of Trenton.

These conditions were presented to the NJSHPO via email in March of 2019. The NJSHPO reviewed the conditions and agreed that, if these conditions are followed, the proposed project will have *No Adverse Effect* to the Trenton Marine Terminal. The NJSHPO will be in continued consultation as the project plans are developed.

5.8. HAZARDOUS, TOXIC, AND RADIOACTIVE WASTES (HTRW)

Readily available federal and state listings concerning hazardous, toxic, and radioactive waste conclude no HTRW sites located within the proposed project area. The facilities and sites reported within the mile radius of the target location by Environmental Data Resource, Inc. are not expected to pose an environmental issue to the planned construction activity as no soils will be removed.

5.9. RECREATIONAL, AESTHETIC, AND SOCIOECONOMIC RESOURCES

The social impacts of implementing the proposed plan are not significantly adverse. Slight increases in noise, resulting from construction activities will occur temporarily for approximately

9 months. Aesthetics in a highly developed, industrialized waterfront locality would be impacted with a temporary increase in turbidity in the immediate vicinity of the construction area. Elevated turbidity will be contained within the immediate area through the use of a turbidity barrier.

The visual and aesthetic impacts on boaters using the Delaware River and waterfront park users would also be minimal as it will occur along a narrow stretch of river bank and only a portion of the entire riverfront park boundary. Some recreational visitors often appreciate viewing construction crews actively working. All in-water work will take place during winter months when boaters are not likely to be in the project area.

Environmental Justice. The Trenton Marine Terminal park is a small public open space located in a large urban developed city. Green spaces provide intrinsic environmental, aesthetic, and recreational benefits to improve the human environment, particularly with the added appeal of the waterfront vistas. The park also supports the preservation of the Delaware River heritage, connecting present-day people with a visual and tangible conservation of cultural identity of the region's past.

Protection of Children. Appropriate measures will be taken to ensure the protection of children by assessing the health and safety risks of the proposed project that could disproportionately affect children. Appropriate safety buffer zones will be established around construction activities with effective fencing and other barriers.

5.10. UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

Unavoidable adverse environmental impacts associated with the proposed pier repairs include a potential minimal loss of benthic organisms in the immediate construction area footprint and temporary water quality impacts in the immediate area that result from the suspension of bottom sediments disturbed during construction activities. These impacts would not result from the No Action alternative or the Relocation alternative, but would from any of the structural alternatives.

5.11. SHORT-TERM USES OF THE ENVIRONMENT AND LONG-TERM PRODUCTIVITY

The proposed selected plan entails a repair to a collapsed and unsightly section of pier along the waterfront of an urban park for its functional use to the public. The Delaware River port complex (Wilmington, DE to Trenton, NJ) is a heavily industrialized stretch and one of the world's busiest freshwater port systems. The Trenton Marine Terminal Park provides aesthetically pleasing green space that includes historical features that acknowledge Trenton's maritime past. It is a site listed on the National Register of Historic Places worthy of preservation and will require a short construction period of 9 months. The proposed pier rehabilitation will provide added safety for park visitors and occupies a small footprint with minimal impact to the river bottom. The selected plan has the least environmental and historic impacts of all of the alternatives considered.

5.12. IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES

Other than the use of fossil fuels for construction equipment, there are no irreversible or irretrievable commitments of resources required for implementation of the proposed plan. The pier repair will occur within the original footprint.

5.13. CUMULATIVE EFFECTS

The impact on the environment, which results from the incremental impact of a proposed plan when added to other past, present, and reasonably foreseeable future actions, can be individually minor but collectively significant over a period of time. These impacts may be ecological (*i.e.* on natural resources), aesthetic, historic, cultural, or economic. The potential for impacts, as a result of the proposed action, were presented individually in the proceeding sections. They are addressed cumulatively, as both direct and indirect impacts in this section.

Other USACE projects that have occurred in the project vicinity include maintenance dredging of the Delaware River and the Fairless Turning Basin. The Philadelphia District USACE maintains the Delaware River main navigation channel depths between Philadelphia and Trenton. The project provides for a channel 40-feet deep and 400-feet wide from Allegheny Avenue in Philadelphia, PA to the upper end of Newbold Island, thence to various depths from 25 feet to 12 feet upstream to the Penn Central Railroad Bridge at Trenton, NJ. Portions of this reach of the river are dredged approximately every other year for maintenance purposes. The Fairless Turning Basin, located approximately 4 miles south of the Trenton Marine Terminal at the entrance to Kinder Morgan, Bucks County, PA-a 100-acre deep water terminal, deepened from 37 feet to 40 feet in 2011.

It is not anticipated that the proposed pier repair will cause any new adverse impacts to the environment nor add to cumulative impacts to the general vicinity of the Delaware River over time. The rehabilitation is a one-time construction project with minimal impact to the river bottom. The majority of the work will occur above the mhw line and take approximately 9 months to complete. Sediment and water quality data collected over the last 15 years in the project vicinity have not indicated significant concerns relative to water quality degradation due to a minor suspension of bottom sediments in the action area. Adverse effects to natural resources are minimized through the application of seasonal window restrictions. All in-water work will occur during winter months. All work will occur outside of the recommended seasonal window of 1 March through 31 July.

One positive cumulative impact of the selected alternative is that restoration of the park pier will add to the aesthetic attraction of the area by improving a greenway within heavily urbanized setting while preserving the historical riverfront features. Trenton has a population majority of nonwhite and low-income residents. Improving an urban park for recreational use addresses environmental justice concerns.

6.0. COORDINATION

Coordination of the proposed project has involved the U.S. Fish and Wildlife Service, the

National Marine Fisheries Service, the U.S. Environmental Protection Agency, and the New Jersey Department of Environmental Protection. Coordination is ongoing and the above-mentioned resource agencies.

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APPENDIX A

SECTION 404 (b) (1) EVALUATION

TRENTON MARINE TERMINAL
CITY OF TRENTON, MERCER COUNTY
NEW JERSEY

STREAM BANK AND SHORELINE EROSION PROTECTION

I. PROJECT DESCRIPTION

A. Location: The project site is located on the left bank of the Delaware River near the junction of State Highway 29 (John Fitch Highway) and State Highway 129 on the south side of the City of Trenton, Mercer County, New Jersey. The Terminal is in the proximity of the navigable upstream limit of the Delaware River.

B. General Description: The Philadelphia District, U.S. Army Corps of Engineers, proposes to restore the Trenton Marine Terminal pier's functional use for the public while minimizing impacts to the surrounding environment and retaining its historical character. The collapsed area will be restored to the original footprint of the pier. A new high deck pier structure will be tied into the adjacent existing timber low deck portions. The pier would be stabilized using structural steel H-piles and steel framework in the failed area to support a replacement concrete deck with the same dimensions as the formerly existing one. The existing low wood deck, framing, and timber piles in this section could remain in place. Partial removal or notching of the existing timber frame would be required to construct the "H" piles and structural steel. Composite sheeting would be placed on the back side of the "H" piles to prevent loss of fill from beneath the existing concrete deck. Backfill material would be placed on the existing low deck behind the composite sheeting. Precast reinforced concrete panels (slabs) would be used to replace the existing deck that was removed from the failed area. The work would be performed using a combination of a marine floating plant and land based equipment.

This plan would rebuild the pier to the same dimensions as the formerly existing one and occupy the same footprint along the river bank. It would have the same appearance that it had before it collapsed and match the existing intact pier. However, the use of steel piles rather than timber piles will significantly increase the stability of the structure. This alternative would not result in the filling of an open water area and it would also retain the historic character of the pier.

C. Authority and Purpose: The Continuing Authority Program (CAP) project under Section 14 of the 1946 Flood Control Act (33 U.S.C. 701r), as amended. The purpose of the Section 14 authority is to protect public works and non-profit public facilities from streambank and shoreline erosion. Facilities that are eligible for protection include "known historic properties whose significance has been demonstrated by a determination of eligibility for listing on, or actual listing on, the National Register of Historic Places" (ER 1105-2-100, Appendix F, Section III, F-23, b.) Federal funding for each Section 14 project is limited to $5,000,000 (as amended by Section 2023 of the Water Resources Development Act of 2007, P.L. 110-114). The City of Trenton is the non-Federal sponsor and will provide cost-share funds for the design and

implementation.

D. General Description of Dredged or Fill Material

No in-water fill. Backfill material to be placed on the existing low deck behind composite sheeting above the mean high water line.

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E. Description of the Proposed Discharge Sites

No dredging discharge will occur.

II. FACTUAL DETERMINATION

A. Physical Substrate Determinations

(1) This plan would rebuild the pier to the same dimensions as the formerly existing one and the new H-piles will occupy the same footprint within the river (37.8 sq ft). It would have the same appearance that it had before it collapsed and match the existing intact pier.

(2) Sediment Type: existing river bottom sediments.

(3) Dredged/Fill Material Movement: No dredged material. Backfill material, as required, placed on the existing low deck behind the composite sheet above mean high water (MHW). There may be temporary increase in turbidity during H-pile driving, which is not expected to require more than 1 month. A turbidity barrier will be employed around the construction area.

(4) Physical Effects on Benthos: Minimal populations of benthos are anticipated to be affected within the project construction area. The majority of the work will occur above MHW.

(5) Action Taken to Minimize Impact: the project alternative selected minimizes impacts to the natural environment and historic value. The collapsed pier will be restored to its original footprint and much of the collapsed structure will remain in place, minimizing both demolition needs and in-water sediment disturbance. Remaining portions of the original concrete wall that have not collapsed and are located along the northern edge will be incorporated into the structural design with additional substructure support elements. The Selected Plan has the lowest preliminary cost and the least environmental and historic impacts of all of the alternatives considered.

The selected plan will restore the pier's functional use for the public while minimizing impacts to the surrounding environment. The collapsed area will be restored to the original footprint of the pier with 27 steel H-piles replacing the old dilapidated timber piles. A new high deck pier

structure will be tied into the adjacent existing timber low deck portions. A high deck structure allows much of the existing collapsed structure to remain in place, minimizing both demolition needs and in-water sediment disturbance. Any upper portions that remain intact and will conflict with the proposed decking will be removed, but lower portions may remain substantially undisturbed. Additionally, the remnants of the original pier will provide added stabilization and protection for the channel bottom and embankments where they are exposed to water flow. The design will ensure the continued stability of the structure within the low deck portions by including a retainage/cutoff wall at the transition between the high/low structure types. In order to maintain the historic aesthetics of the pier and the park, the design will also include façade paneling to blend this transition.

B. Water Circulation, Fluctuation, and Salinity Determinations

(1) Water. Consider effects on:

a. Salinity - No effect.

b. Water chemistry - No significant effect.

c. Clarity - Minor short-term increase in turbidity during construction.

d. Color - Minor short-term effect during construction.

e. Odor - No effect.

f Taste - No effect.

g. Dissolved gas levels - No significant effect.

h. Nutrients - Minor effect.

i. Eutrophication - No effect.

j. Others as appropriate - None.

(2) Current patterns and circulation:

a. Current patterns and flow - No effect.

b. Velocity - No effect.

c. Stratification - No effect.

d. Hydrologic regime. No effect.

(3) Normal water level fluctuations. No effect.

(4) Salinity gradients - No effect.

(5) Actions that will be taken to minimize impacts. The proposed repair will have no effect on water circulation, fluctuation or salinity.

C. Suspended Particulate/Turbidity Determinations

(1) Expected Changes in Suspended Particulates and Turbidity Levels in the Vicinity of the Disposal Sites: minor elevated turbidity in the vicinity of the construction area. River currents are expected to flush turbidity quickly.

(2) Effects (degree and duration) on Chemical and Physical Properties of the Water Column:

a. Light penetration - Short-term, limited reductions would be expected as a result of pile driving in the immediate area of construction.

b. Dissolved oxygen - No significant effects anticipated as a result of the short-term turbidity due to pile driving and strong river currents.

c. Toxic metals and organics - No significant impacts.

d. Pathogens - Pathogenic organisms are not expected to be a problem in the construction area.

e. Aesthetics. No significant impact. The proposed pier will occupy the same footprint and resemble the existing pier portions.

(3) Effects on Biota:

a. Primary production, photosynthesis. No effects.

b. Suspension/filter feeders - No effects.

c. Sight feeders - No effects.

(4) Actions taken to minimize impacts: implementation of erosion and sediment control best management practices. Minimal sediment disturbance and minimal in-water work.

D. Contaminant Determinations

There are no concerns with contaminant issues within the study area.

E. Aquatic Ecosystem and Organism Determinations

(1) Effects on Plankton: No significant effects.

(2) Effects on Benthos: No significant effects, benthic populations within the immediate footprint of the pier pilings are minimal.

(3) Effects on Nekton: Mobile aquatic life will move from area during construction.

(4) Effects on Aquatic Food Web: Effects on aquatic food web would be minor as impacts due to a temporarily elevated turbidity is short-term in an area of strong riverine current and most of the work will occur above MHW.

(5) Effect on Special Aquatic Sites:

a) Sanctuaries and Refuges: Not applicable
(b) Wetlands – no effect.
(c) Mudflats: Not applicable
(d) Vegetated Shallows: Not applicable
(e) Coral Reefs: Not applicable
(f) Riffle and Pool Complexes: No effect. The construction area is a linear section of riverfront (76 linear feet).

(6) Threatened and Endangered Species: Adverse impacts to listed shortnose and Atlantic sturgeon will not occur due to adherence to recommended time-of-year restrictions. The project in-water footprint for the new H-piles is 37.8 sq. feet and the collapsed sections of pier (concrete) preclude benthic and infaunal macroinvertebrate colonization of prey species, including state-listed freshwater mussels. The federally listed dwarf wedge mussel is not known to occur in the river reach of the project site. The proposed action entails the removal of 3-4 trees. Trees will be removed during winter months, outside of the seasonal roosting period for the federally and state-endangered Indiana bat and federally threatened northern long-eared bat. The tree clearing restriction is from 15 April through 30 September.

(7) Other Wildlife: The proposed project area is not anticipated to be valuable habitat for aquatic species. The proposed pier construction site does not provide quality habitat for wildlife. Adjacent parkland may provide limited wildlife habitat. Minor adverse temporal impacts to wildlife will occur as a result of the removal of mature vegetation but will not be removed during the nesting and foraging seasons.

(8) Actions to minimize impacts: a) implementation of erosion and sediment control best management practices; b) adherence to shrub and tree clearing restrictions from 1 April through 30 September to protect federal endangered and threatened bat species as well as migratory bird species; c) adhering to an in-water work restriction from 1 March through 31 July during the sturgeon migratory period.

F. Proposed Disposal Site Determinations

(1) Mixing Zone Determination: not applicable.

a. Depth of water at disposal locations: not applicable.

b. Current velocity, direction, and variability at disposal locations: All fill used during construction will be comprised of clean material from a state-approved and permitted sources and be placed behind the steel sheetpile above MHW.

c. Dredged material characteristics, constituents, amount, and type of material, and settling velocities. Not applicable.

d. Number of discharges per unit of time: Not applicable.

e. Use of confined upland disposal sites with weirs. None.

(2) Determination of compliance with applicable water quality standards: the proposed construction activities will be in compliance with all state and Federal water quality standards. Section 401 Water Quality Certification was provided by the state of New Jersey.

(3) Potential Effects on Human Use Characteristics:

a. Municipal and private water supply. No effects.

b. Recreational and commercial fisheries . No effects.

c. Water related recreation . No significant impacts.

d. Aesthetics . No adverse impacts. The proposed activity will improve aesthetics of the state park and historical character.

e. Parks, national and historic monuments, national seashores, wilderness areas, etc. The proposed activity will improve aesthetics of the state park and historical character.

G. Determination of Cumulative Effects on the Aquatic Ecosystem- None anticipated.

H. Determination of Secondary Effects on the Aquatic Ecosystem – None anticipated.

III. FINDINGS OF COMPLIANCE OR NON-COMPLIANCE WITH THE RESTRICTIONS ON DISCHARGE

A. No significant adaptation of the Section 404(b)(1) Guidelines were made relative to this evaluation.

B. The alternative measures considered for accomplishing the project

objectives are discussed in Section 3 of the Environmental Assessment. The selected plan has the lowest preliminary cost and the least environmental and historic impacts for projected costs of all of the alternatives considered.

C. It is not anticipated that the proposed pier repair would violate any applicable state water quality standards. The operation will not violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

D. The proposed activity is not expected to adversely impact any federally listed threatened/endangered species or their critical habitat. Coordination with the U.S. Fish and Wildlife Service indicates that except for occasional transient species, no federally listed or proposed threatened or endangered species are known to exist in the project impact area. The proposed activity will adhere to seasonal restrictions for in-water work as recommended by the National Marine Fisheries Service.

E. The proposed construction repair activity will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity, and stability, and recreational, aesthetic and economic values will not occur.

F. Appropriate steps to minimize potential adverse impacts of the proposed activity will occur, including implementation of erosion and sediment control best management practices and adherence to a tree clearing restriction from 1 April through 30 September and in-water work between 1 March and 31 July.

G. On the basis of the guidelines, the proposed construction activity to repair a 76 foot length of the Trenton Marine Terminal pier complies with the 404 (b)(l) guidelines with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.

APPENDIX B

CLEAN AIR ACT
Record of Non-applicability (RONA)

TRENTON MARINE TERMINAL
CITY OF TRENTON, MERCER COUNTY
NEW JERSEY

STREAM BANK AND SHORELINE EROSION PROTECTION

Project Name: TRENTON MARINE TERMINAL, CITY OF TRENTON, MERCER COUNTY, NEW JERSEY, STREAM BANK AND SHORELINE EROSION PROTECTION PROJECT

Reference: USACE Flood Control and Coastal Emergencies (FCCE) Project Information Report (PIR) and PIR Addendum.

Project/Action Point of Contact: Barbara Conlin, CENAP-PL-E

Construction: approximately 9 months duration.

1. Project Description:
   Under the authority of the Continuing Authority Program (CAP), the project will be designed and implemented under Section 14 of the 1946 Flood Control Act (33 U.S.C. 701r), as amended. The purpose of the Section 14 authority is to protect public works and non-profit public facilities from streambank and shoreline erosion. Facilities that are eligible for protection include "known historic properties whose significance has been demonstrated by a determination of eligibility for listing on, or actual listing on, the National Register of Historic Places" (ER 1105-2-100, Appendix F, Section III, F-23, b.) Federal funding for each Section 14 project is limited to $5,000,000 (as amended by Section 2023 of the Water Resources Development Act of 2007, P.L. 110-114). The City of Trenton is the non-Federal sponsor and will provide cost-share funds for the design and implementation.

   An emissions estimate was completed to determine the Nitrogen Oxides (NOx) and Volatile Organic Carbon (VOC) emissions (precursors to ozone formation) associated with the proposed design in November 2018. The purpose of the project is to protect the public infrastructure at the Trenton Marine Terminal from imminent damage and the possibility of eventual collapse. The infrastructure is located in a public park that is listed on the National Register of Historic Places. The collapsed pier should be rebuilt in the same dimensions and appearance as the formerly existing one, except for the use of steel piles rather than timber piles to significantly increase the stability of the structure; with the objective to rebuild the pier in a manner that would preserve the historic character of the park while minimizing impacts to the river bottom substrate.

2. The project described above has been evaluated for Section 176 of the Clean Air Act. Project related emissions associated with the federal action were estimated to evaluate the applicability of General Conformity regulations (40CFR§93 Subpart B).

3. The project is located in Mercer County, New Jersey, which has the following nonattainment-related designations with respect to the National Ambient Air Quality Standards (40CFR§81.133): Marginal Nonattainment 2008 8-hour Ozone Standard (primary and secondary).

4. The requirements of this rule do not apply because the total direct and indirect emissions from this project are significantly below the 100 tons trigger level for NO_x for each project year and significantly below the 50 tons trigger level for VOC (40CFR§93.153(b)(1) & (2)), as VOCs, are typically a fraction of total NOx emissions. The estimated NO_x emissions for the project are < 10 tons.

5. The project conforms with the General Conformity requirements (40CFR§93.153(c)(1)), and is exempted from the requirements of 40 CFR §93 Subpart B.

Peter R. Blum P.E.
Chief, Planning Division

APPENDIX C

CORRESPONDENCE