LONG SLIP FILL AND RAIL ENHANCEMENT PROJECT

Supplemental Environmental Assessment
Section 4(f) De Minimis Finding

JERSEY CITY, HUDSON COUNTY, NEW JERSEY

PREPARED BY:
FEDERAL TRANSIT ADMINISTRATION
and NEW JERSEY TRANSIT CORPORATION

JUNE 2016
Abstract

New Jersey Transit Corporation (NJ TRANSIT) is proposing to construct the Long Slip Fill and Rail Enhancement Project (hereafter referred to as the “proposed Current Project”), which includes the filling in of a former freight barge channel known as the Long Slip Canal and construction of a resilient train station, including a new approach track structure, six elevated tracks, Americans with Disabilities Act (ADA)-compliant platforms, passenger station/crew facility, and walkway to Hoboken Terminal. The proposed Current Project is located in a portion of NJ TRANSIT’s Hoboken Yard in Jersey City, Hudson County, New Jersey.

The new resilient train station will be used during emergencies, when Hoboken Terminal is taken out of service to prepare for, and recover from, severe weather events or when flooding occurs under full moon/high tide conditions. The new station will also be used to supplement the capability to queue trains at Hoboken Terminal, when service disruptions elsewhere on the system cause trains to be rerouted to Hoboken Terminal. Under normal operating conditions, NJ TRANSIT will use the new electrified tracks for train storage only, on an as needed basis to enable more efficient train movements in the yard.

The Federal Transit Administration (FTA) issued a Finding of No Significant Impact (FONSI) for an earlier version of the proposed Current Project, referred to as the “Original Project” in this document, on June 22, 2000. This Supplemental Environmental Assessment (EA)/Section 4(f) De Minimis impact determination analyzes the proposed Current Project and compares its effects to those of the Original Project evaluated in the Long Slip Canal Habitat Creation Project Environmental Assessment, March 2000. The Original Project included filling in Long Slip Canal and constructing storage tracks on top of the fill to expand the usable area in Hoboken Yard. The need for a resilient train station has emerged in recent years due to the increased frequency of storm events and surges (flooding) in Hoboken Terminal that has disrupted commuter rail service. In addition to comparing the effects of the proposed Current Project to those disclosed in the 2000 EA, the No Action Alternative is carried forward as required by environmental regulations to provide baseline information about conditions in the proposed Current Project area if nothing were done.

This document has been prepared in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA) (42 U.S.C. § 4332) and Section 4(f) of the U.S. Department of Transportation Act of 1966 (Section 4(f)) (49 U.S.C. § 303 and 23 U.S.C. § 138) and FTA’s NEPA and Section 4(f) implementing regulations. Their implemented regulations are found at: 40 CFR Parts 1500-1508 (CEQ NEPA implementing regulations); 23 CFR Part 771 (FTA NEPA implementing regulations); and 23 CFR 774 (Section 4(f) implementing regulations).

This Supplemental EA/Section 4(f) De Minimis Finding is being made available so that agencies and the public can review and comment on the proposed Current Project and its potential impacts. Comments should be posted by July 27, 2016 to: http://njtransitresilienceprogram.com/contact-us/; or sent via email to: longslip@njtransitresilienceprogram.com; or mailed to: NJ TRANSIT Resilience Program, Capital Planning & Programs Department, One Penn Plaza East 8th Floor, Newark, NJ 07105. Following the close of the 30-day comment period, FTA will review and respond to public comments in a Public Comment Report that will be appended to the Supplemental EA. FTA will review the findings of the Supplemental EA, and the comments and responses, and make a formal NEPA and Section 4(f) determination for the proposed Current Project. Public comments will be addressed in FTA’s NEPA finding.
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CHAPTER 1  INTRODUCTION

New Jersey Transit Corporation (NJ TRANSIT) is proposing to construct the Long Slip Fill and Rail Enhancement Project (“proposed Current Project”), which includes the filling in of a former freight barge channel known as the Long Slip Canal and construction of a resilient train station, including a new approach track structure, elevated tracks, ADA-compliant platforms, passenger station/crew facility, and walkway to Hoboken Terminal. The proposed Current Project is located in a portion of NJ TRANSIT’s Hoboken Yard in Jersey City, Hudson County, New Jersey (see Figure 1-1).

The proposed new resilient train station will be used during emergencies, when Hoboken Terminal is taken out of service to prepare for, and recover from, severe weather events or when flooding occurs under full moon/high tide conditions. The new station will also be used to supplement the capability to queue trains at Hoboken Terminal, when service disruptions elsewhere on the system cause trains to be rerouted to Hoboken Terminal. Under normal operating conditions, NJ TRANSIT will use the new electrified tracks for train storage only as needed to enable more efficient train movements in Hoboken Yard.

An Environmental Assessment was prepared in March 2000 for the formerly named Long Slip Canal Habitat Creation Project (“Original Project”) pursuant to the National Environmental Policy Act of 1969 (NEPA). The Federal Transit Administration (FTA) issued a Finding of No Significant Impact (FONSI) for the Original Project on June 22, 2000. The 2000 EA, which is hereby incorporated by reference, evaluated the potential social, economic and environmental impacts of filling in Long Slip and installing railroad tracks on top of the fill to increase the storage capacity of Hoboken Rail Yard. The 2000 EA and FONSI are available for review at: http://njtransitresilienceprogram.com/documents.

The need for the Original Project identified in the 2000 EA revolved around the operational and infrastructure problems in Hoboken Yard, the shortage of train handling and storage space, and the consequent inability to operate trains efficiently. That same need exists today, and is compounded by an additional need to provide a resilient train station in the area of the existing Hoboken Terminal due to the frequency of service outages related to storm events and flooding in recent years.

The proposed Current Project will require the construction of new structures such as retaining walls, platforms, canopies, buildings, railroad and bridges, and catenary support structures within the boundaries of the Old Main Delaware, Lackawanna, and Western Railroad (DL&WRR) Historic District. In 1999, NJ TRANSIT and FTA, in consultation with the New Jersey State Historic Preservation Office (NJ SHPO), completed the Section 106 historic preservation process for the Original Project and implemented measures stipulated in a Memorandum of Agreement (MOA) to mitigate adverse effects to the Old Main DL&WRR Historic District that would have resulted from the filling in of the Long Slip Canal. The mitigation measures identified in the Section 4(f) document
Figure 1-1: Current Project Location
Long Slip Fill and Rail Enhancement Project

Legend
- Current Project Location
- Lautenberg Station
- Rail Lines
- Hoboken City
- Jersey City
- New Jersey Counties
- New Jersey
- New York

Area of Detail

Hudson River
and MOA, which in this case were also related to historic resources, were also fulfilled at that time. During the Section 106 consultation process initiated for the proposed Current Project, a new contributing resource to the Old Main DL&WRR Historic District has been identified. FTA proposes a determination of Section 4(f) de minimis use related to this new resource and a Section 4(f) De Minimis Determination is presented in Chapter 5.

Concurrent with the NEPA process and the FONSI issued in 2000, NJ TRANSIT sought and obtained a Waterfront Development Permit/Water Quality Permit from the NJ Department of Environmental Protection (NJDEP) in 1999 and a Section 404/10 Permit application was obtained in 2000 with the U.S. Army Corps of Engineers Regulatory Branch (USACE). Public participation was solicited through the FTA review process and as part of the permitting/public notice processes followed by the USACE and NJDEP. As described more fully in Section 3.2 below, following issuance of the FONSI, permits and public notice, several of the originally planned project elements were completed, but filling in the canal and constructing rail storage tracks were not due to lack of funds. Permit conditions for the constructed elements were met and those permits were closed out. The proposed Current Project will require new environmental permits and these are identified in this document.

This Supplemental EA analyzes the proposed Current Project and compares its effects to those of the Original Project evaluated in the 2000 EA/Section 4(f) Evaluation. In order to focus this Supplemental EA/Section 4(f) De Minimis determination on impacts specific to the changes to Purpose and Need and design, where the 2000 EA information and analyses are still current and valid, the discussion of potential environmental impacts in Section IV “Environmental Evaluation” in the 2000 EA is incorporated by reference. Where information and analyses are outdated or not included in the 2000 EA, a detailed discussion is included in this Supplemental EA (see Chapter 4). This Supplemental EA/Section 4(f) De Minimis Finding describes:

- Purpose and need for NJ TRANSIT’s proposed Current Project (Chapter 2);
- Proposed Current Project Description (Chapter 3);
- Environmental Consequences (Chapter 4); and
- Section 4(f) De Minimis determination (Chapter 5).
CHAPTER 2

PURPOSE AND NEED

The purpose of the proposed Current Project is to enhance the resilience of NJ TRANSIT’s commuter rail service at Hoboken Terminal leading up to and following severe weather events, and when track flooding occurs due to full moon/high tide conditions. The purpose of the proposed Current Project is also to reduce the frequency of conflicts that is caused by having only one set of throat tracks (tracks that connect the yard to the main rail line) into and out of Hoboken Terminal. The new station will be used during weather-related emergencies to provide a limited amount of service that would otherwise be suspended when Hoboken Terminal is taken out of service. The new station will also be used to supplement the capability of Hoboken Terminal to handle rerouted trains normally bound for Penn Station New York (PSNY), when there are service disruptions at Secaucus Junction or in the Hudson River Tunnels. Under normal operating conditions, NJ TRANSIT will use the new electrified tracks for train storage only, as needed to enable more efficient train movements in Hoboken Yard. The proposed Current Project is located in a portion of NJ TRANSIT’s Hoboken Yard in Jersey City, Hudson County, New Jersey (see Figure 2-1).

2.1 NEED TO ENHANCE RESILIENCE OF SERVICE

Hoboken Terminal, a multi-modal facility located at the Hudson River waterfront, is a critical component of NJ TRANSIT’s system ranking second in passenger traffic among its New Jersey facilities. Nine NJ TRANSIT commuter rail lines terminate in Hoboken and interface with ferry service, the Port Authority Trans-Hudson (PATH) system, NJ TRANSIT’s Hudson-Bergen Light Rail, and NJ TRANSIT bus services.

NJ TRANSIT’s Hoboken Terminal was constructed on a deck over a filled former estuary, at an elevation only slightly above sea level at that time, making it vulnerable to both Hudson River storm surge and groundwater that seeps through the deck during high tide/full moon conditions. Over the course of NJ TRANSIT’s 30+ year history, Hoboken Terminal has been subjected to multiple high water conditions that required the suspension of passenger service. The terminal and much of the yard are below the Federal Emergency Management Agency (FEMA) Base Flood Elevation (BFE), which is the 100-year floodplain (i.e. where the probability of flooding in any given year is one in one hundred or one percent). Surge levels during Superstorm Sandy (Sandy) were roughly five feet deep at the lowest points in the complex.

Following Sandy, NJ TRANSIT performed extensive repairs to damaged equipment and structures. To further protect Hoboken Terminal and Yard from future storm events, NJ TRANSIT continues to undertake resiliency efforts that include raising signal relays and power supplies, evaluation of Terminal and Yard building flood barriers, rerouting of electrical panels and wiring, and relocation of substations to upper floors of buildings.
NJ TRANSIT’s current approach to dealing with future flood risk is addressed in a Storm Preparedness Plan which deals with the means of securing materials, facilities and rolling stock against the impacts of significant wind and flooding. As detailed in that Plan, although signal system wiring, power, and relays can and are being elevated to meet NJ TRANSIT Flood Elevation Design Criteria (2.5’ above BFE for coastal assets), certain assets cannot be raised, as explained below.

Switch heaters and switch motors cannot be elevated because they must remain at track level. Switch heaters are considered to be sacrificial in the Storm Preparedness Plan but switch motors must be removed. To protect the switch motors, all 143 units must be removed and stored in a safe, dry place prior to inundation. This takes approximately four days to complete. Following the removal of the switches from service, only four of the sixteen passenger yard tracks can continue to operate, significantly reducing the available level of service well in advance of the official closing of the yard in anticipation of a storm event. A longer period of time is required for switch reinstallation following the storm to allow for necessary testing; the entire removal, storage and reinstallation process costs an estimated $0.5 million to complete for each storm event.

In addition, the proposed Current Project will block water ingress, significantly reducing storm surge flooding frequency, depth, intensity and duration by filling Long Slip to an elevation well above the FEMA BFE. However, tidal flooding of the tracks in the terminal will not be mitigated by filling Long Slip, so there is a need for additional resiliency improvements. The proposed Current Project will include the construction of ADA-compliant, platforms and tracks elevated above the BFE to permit limited revenue rail service while the switch motors are decommissioned in the existing Yard, and up to the moment that service is suspended for a storm. This will offer approximately four days of additional mobility for commuters during the storm preparation phase. The same advantage will accrue following the storm when revenue trains can be brought back into limited operation within hours.

### 2.2 NEED FOR ADDITIONAL TERMINAL THROAT TRACKS

While the existing Hoboken Yard has an extensive array of inspection and maintenance facilities, the size of the yard and its configuration severely limit its use. There is only one set of throat tracks into and out of the 18-track terminal, which handles about 40 trains per hour during peak periods. This choke point limits operating flexibility and presents numerous opportunities for conflicts. Serious delays occur when overhead catenary wires are down, switch or signal problems occur, or trains derail or experience mechanical failure in this area.

Over the past several years, approximately 20 times per year, problems in the Hudson River Tunnels or at Secaucus Junction require the rerouting of passenger trains to Hoboken Terminal. The constraints imposed by having a single set of approach tracks routinely result in service delays of 40 minutes or more for the rerouted PSNY-bound trains.

The new tracks constructed as part of the proposed Current Project will be contiguous with the existing Hoboken Yard and accessible from the existing electrified throat tracks coming from the
Bergen Tunnels into Hoboken. Having a yard divided into two sections, each with a dedicated connection to the Hoboken Terminal throat tracks will permit parallel movement capability and operational flexibility for all of the Yard’s functions – storage, service and inspections.

2.3 COMPARISON WITH 2000 EA

The purpose of the Original Project as identified in the 2000 EA was to expand the useable rail yard by filling in Long Slip Canal for greater operating flexibility, midday rail car storage and additional maintenance functions. The elevation of the tracks proposed in the 2000 EA did not anticipate the need to meet the new BFE criteria that resulted from analyzing the effects of Sandy or the need for storm surge protection as included under the proposed Current Project. While the maintenance facilities proposed as part of the Original Project have been constructed since 2000 (see Chapter 3), the need for greater operational flexibility has become more pressing, and midday rail car storage capacity under normal operating conditions remains.
CHAPTER 3  PROJECT DESCRIPTION

The proposed Current Project includes construction of new approach tracks at the western end of Hoboken Yard on a new two-track bridge above Marin Boulevard. It will entail filling in approximately 4.3 acres of the existing canal and adjacent land within Hoboken Yard for expansion of train storage and installation of six electrified tracks, high-level platforms, a station/crew facility, and a walkway to Hoboken Terminal (see Figure 3-1).

3.1 CURRENT PROJECT

Specifically, the proposed Current Project consists of the following components:

1. Extension of the Jersey City Combined Sewer Overflow (CSO) discharge point, which currently terminates at the west end of the canal, by approximately 1,800 feet. A cofferdam\(^1\) will be constructed via sheet piling to isolate the Long Slip Canal’s construction activities from the Hudson River to protect the resources of the Hudson River. In addition, two eight-inch pipes, which discharge drainage water from the PATH tunnels via sump pumps, run through the southern bulkhead wall approximately 850 feet from the west end of the Canal. These pipes will be extended and the discharge outfalls will be relocated to the new bulkhead at the east end that will seal off Long Slip from the Hudson River.

2. Filling in Long Slip Canal to create approximately 4.3 acres of new land. The fill will serve to permanently stabilize the existing bulkheads that line the canal and are currently in disrepair. The fill will extend to an elevation of 12 feet (using the North American Vertical Datum of 1988 [NAVD88]) so that the top of proposed rail will be at 14.5 feet, to meet BFE + 2.5 feet (NJ TRANSIT’s Flood Elevation Design Criteria). The volume of permanent fill is estimated to be approximately 190,000 cubic yards. An additional 50,000 cubic yards of fill will be used temporarily as a surcharge load, to compact the soils placed in Long Slip to meet structural requirements.

3. Construction of a new two-track bridge over Marin Boulevard to support track connections to existing Track 199 and Track 4 Main at the approach to the Bergen Tunnels. The alignment requires truncation of four tracks in Pullman Yard and removal of up to three of the four Pullman Yard Concrete Bumpers. Relocations and/or reconfiguration of other tracks, equipment and sheds at the western approach will also be required.

4. Construction of six new tracks with associated catenary supports and wiring, and three high-level ADA-compliant passenger boarding platforms. A three-story station/crew facility (approximately 120 feet long x 90 feet wide x 40 feet high based on a preliminary design)

\(^1\) A cofferdam is an enclosure built within a body of water to allow the enclosed area to be pumped out, creating a dry work environment for the major work to proceed.
Figure 3-1: Current Project - Proposed Track Layout

Long Slip Fill and Rail Enhancement Project

Legend
- 6 Tracks, 3 ADA-Compliant Platforms, and Station/Crew Facility
- Long Slip Canal
- Hoboken Yard

Future Location of Henderson Street Substation
Pulman Yard Concrete Bumpers
Future Location of Pulman Yard
Fuel/Sanding Train Washer
Engine House
Wheel Truing Facility
Proposed Station/Crew Facility
Existing Long Slip Waterfront Walkway
Existing Hudson-Bergen Light Rail Station
Hoboken Terminal
Hoboken Bus Depot
Hoboken Ferry Terminal
Bergen Tunnels
Hoboken Yard
Hoboken Rail Yard
Hudson-Bergen Light Rail
Path: \Atlas\gisdata\Projects\NJ_Transit\Tier3\Hoboken\longslip2015_EA\MXD\Figure3-1_PropTrackLayout.mxd
will be built at the eastern end of the platforms. Stairs, elevators, waiting room space and other passenger amenities, as well as space for transportation and mechanical personnel will be constructed in the facility. A connecting sidewalk linking the new facility and the existing terminal entrance will also be constructed.

3.2 ALTERNATIVES CONSIDERED IN 2000 EA

3.2.1 Original Project

The Original Project, as planned and approved in 2000, consisted of the five elements described below:

1. Upgrading and extending the existing Jersey City CSO that discharges into the west end of the canal by approximately 2,000 feet to a new outfall in deeper water at the east end of the canal. The light rail traverses the canal on a structure, which integrated a section of the CSO within the structure of the HBLR bridge. In addition, the Original Project included relocating the drainage outfalls from the PATH tunnel to the eastern end of the Canal.

2. Filling the Long Slip Canal with dredged sediment or other fill material behind a containment dike to create 4.6 acres of new land within Hoboken Yard to facilitate rail yard expansion and reconfiguration. Seven diesel tracks and four structures – Wheel Truing Facility, Running Repair Shop, Employee Welfare Facility, and Crew Facility – would be built on top of the fill.

3. Elimination of the two Hoboken storm sewers that discharge into the canal by connecting them to a reconstructed outfall located off-site north of the Hoboken Terminal as part of a separate, independent project to be undertaken by the North Hudson Sewer Authority.

4. Constructing and providing access to a segment of the Hudson River Waterfront Walkway by building a pedestrian/bicycle promenade across the canal, connecting with adjoining sections of the Waterfront Walkway.

5. Creating a new aquatic habitat by removing sediments from the canal basin entrance to restore natural water circulation in the basin and adjacent pile field, improving conditions to those more favorable for many fish species.

Although the above described Original Project was not constructed in its entirety, several elements were completed using a combination of FTA and local funding subsequent to 2000. The 100-foot long Hudson River Waterfront Walkway bridge over Long Slip Canal (item 4 above) was completed in 2009, thereby linking the adjoining promenades in Jersey City and Hoboken. This pedestrian bridge was built as a pile-supported structure over open waters to the east of the Hudson-Bergen Light Rail to advance the key missing link of the Hudson River Waterfront Walkway that extends from Bayonne (south of Hoboken) north to the George Washington Bridge.

The wheel truing facility was constructed just north of the Long Slip Canal in 2009; and the services of the Running Repair Shop and Employee Welfare Facility (a portion of item 2 above) were
accommodated by upgrading some NJ TRANSIT facilities. The North Hudson Sewer Authority relocated the Hoboken CSO outlets from their HO and H1 regulators as part of a separate project undertaken to improve the local sewer system north of Hoboken Yard.

The creation of new fish habitat (item 5 above) was never constructed as identified in the Original Project. It is important to note that the habitat creation was not a mitigation requirement in the NJDEP permit for the open water fill in Long Slip Canal. The NYDEP permit required NJ TRANSIT to create 4.6 acres of estuarine wetlands as mitigation for filling in Long Slip Canal. The purpose of the proposed dredging of the habitat creation area was to improve poor water quality associated with the Jersey City CSO discharge in Long Slip Canal. Subsequently, the scope of the project changed to extend the Jersey City CSO to the west of the Hudson River Waterfront Walkway (similar to the proposed Current Project), thereby reducing the need for the dredging for the purposes of water quality improvement. As a result, the Long Slip permit was modified to indicate this change and dredging in this area was performed in 2002 as part of a different project -- the emergency expansion of the Hoboken Ferry Terminal to provide additional trans-Hudson commuter service to downtown Manhattan while the World Trade Center PATH Station was under reconstruction for almost two years after the September 11th terrorist attack. Table 3-1 summarizes the key differences, as applicable, between the Original Project and the proposed Current Project.

3.2.2 Alternatives Screened for Detailed Analysis

In the 2000 EA, five alternatives were developed and evaluated on their ability to satisfy the Original Project objectives while avoiding or minimizing adverse environmental impacts. The alternatives considered were:

1. No Build Alternative
2. Reorganization within the yard
3. Annexation of adjacent property
4. Use of non-contiguous property at a remote location
5. Use of property occupied by Long Slip by: a) bridging the Long Slip Canal or b) filling Long Slip Canal (Original Project)

Only the No Build Alternative and the alternative that included filling in Long Slip Canal (i.e., the Original Project), were carried forward for detailed evaluation in the 2000 EA. None of the alternatives to filling in Long Slip Canal met the Original Project’s objectives. Each of these alternatives was re-examined for the proposed Current Project as alternatives that would avoid the placement of fill in a regulated flood hazard area (see Section 4.8.1) in accordance with the NJDEP Flood Hazard Control Act Rules (N.J.A.C. 7:13) and Coastal Zone Management Rules (N.J.A.C. 7:7). None of the alternatives were found to be reasonable and feasible alternatives for the proposed Current Project.

In Morrisville Yard, the Meadows Maintenance Complex, and Hoboken Terminal Yard B Pedestal Pit.
Table 3-1: Summary of Key Changes in the Project Description

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<td>Fill Acreage</td>
<td>Approximately 4.6 acres</td>
<td>Approximately 4.3 acres Area is reduced due to construction of the Hudson-Bergen Light Rail tracks and Hudson River Waterfront Walkway at the eastern end of the canal.</td>
</tr>
<tr>
<td>Extent of Fill</td>
<td>100’ X 2100’</td>
<td>100’ X 1800’ Area is reduced due to construction of the Hudson-Bergen Light Rail tracks at the eastern end of the canal.</td>
</tr>
<tr>
<td>Fill Elevation</td>
<td>Approximately 6 feet (NAVD88)</td>
<td>Approximately 12 feet (NAVD88), since top of rail is required to meet 14.5 feet (NAVD88) as per NJ TRANSIT Flood Elevation Design Criteria.</td>
</tr>
<tr>
<td>Fill Amount</td>
<td>190,000 cubic yards</td>
<td>190,000 cubic yards</td>
</tr>
<tr>
<td>Dredge</td>
<td>24.1 acres (canal entrance basin)</td>
<td>Not applicable; this work was completed for the emergency ferry expansion project.</td>
</tr>
<tr>
<td>Walkway</td>
<td>Pedestrian Waterfront Walkway – Newport to Hoboken Terminal</td>
<td>Not applicable; element completed 2009.</td>
</tr>
<tr>
<td>Infrastructure on Fill</td>
<td>Seven diesel storage tracks, wheel truing facility, running repair shop, employee welfare facility, crew facility and employee parking</td>
<td>Six electric storage tracks, three high-level ADA-compliant passenger platforms, crew/station facility, walkway to the existing terminal entrance. Note that the wheel truing facility was constructed just north of the Long Slip Canal in 2009; and the running repair shop and employee welfare facility were located in off-site NJ TRANSIT facilities. No public parking facilities are proposed.</td>
</tr>
<tr>
<td>Track Work</td>
<td>Seven storage tracks converging to five; approximately 13,260 linear feet of track in total.</td>
<td>Two approaching tracks diverging into six commuter tracks; approximately 8,200 linear feet in total. Track work will require installation of new catenary structures, a new two-track bridge over Marin Boulevard, and relocation/reconfiguration of existing tracks, sheds and equipment at the western approach.</td>
</tr>
<tr>
<td>Jersey City CSO (18th Street Storm Sewer)/PATH outfalls</td>
<td>Extend sewer approximately 2000' and permit the Jersey City Municipal Utilities Authority (JCMUA) to install a floatables and solids netting chamber east of pedestrian waterfront walkway. Extend PATH outfalls.</td>
<td>Extend sewer approximately 1,800' and continue to utilize a floatable and solids control netting chamber installed by JCMUA west of Long Slip or permit the JCMUA to install a floatables and solids netting chamber west of the pedestrian waterfront walkway and east of the existing Hudson-Bergen Light Rail bridge3. Extend PATH outfalls.</td>
</tr>
<tr>
<td>Hoboken Storm Sewers</td>
<td>Reroute Hoboken storm sewers to H1/Observer Highway CSO</td>
<td>Not applicable; element completed in 2010 by local utility.</td>
</tr>
</tbody>
</table>

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3 JCMUA may in the future advance installation of a netting chamber or other NJDEP acceptable solids/floatable treatment system in this area. JCMUA must continue to comply with the solids/floatables treatment requirement at this outfall and will have to address reducing or eliminating discharges from this CSO outfall as part of their Long Term Control Plan currently under development. Any relocation of the outfall will require all necessary NJDEP permits and approvals, including but not limited to: the New Jersey Pollution Discharge Elimination System (NPDES), Treatment Works Approval (TWA), Land Use Regulation Program (LURP), Water Quality Management Plan (WQMP), and Office of Water Resource Management Coordination (OWRMC). NJ TRANSIT will work with NJDEP, JCMUA, and PATH managers to ensure that the combined sewer overflow and PATH discharge meets all permit requirements during construction of the extensions and their final placement.
CHAPTER 4 ENVIRONMENTAL CONSEQUENCES

The chapter analyzes the proposed Current Project and compares its effects to the Original Project as described in Section 3.2.1 and evaluated in the 2000 EA. The analyses in this chapter assess whether there will be any new environmental impacts associated with the proposed Current Project’s construction or operation that were not identified in the 2000 EA, by identifying:

- Changes in the study area that have occurred since the year 2000;
- New and revised laws and regulations that have been issued since approval of the 2000 EA that affect the proposed Current Project; and
- The effects of the proposed Current Project as compared to those of the Original Project that were identified in the 2000 EA.

The scope of the environmental analyses contained in this chapter focuses on those impact categories where new information or design modifications have the potential to cause a change in the determination of impacts from what was described in the 2000 EA. As a result, the following environmental impact categories are analyzed in detail:

- Land Use (Section 4.1)
- Aesthetic Conditions (Section 4.2)
- Noise & Vibration (Section 4.3)
- Air Quality (Section 4.4)
- Water Resources (Section 4.5)
- Ecosystems (Section 4.6)
- Floodplains (Section 4.7)
- Cultural Resources (Section 4.8)
- Construction Activities and Effects (Section 4.9)
- Environmental Justice (Section 4.10)
- Cumulative Effects (Section 4.11)
- Permits and Approvals (Section 4.12)

The following environmental impact categories are not analyzed in further detail in this Supplemental EA because there is no potential for a change in the determination of impacts from what was described in the 2000 EA, for the reasons explained below:

- **Acquisitions, Displacements, and Relocations.** Consistent with the alignment evaluated in the 2000 EA, the current alignment is entirely within the existing boundaries of NJ TRANSIT’s Hoboken Yard and railroad right-of-way. The proposed Project will not require property acquisition, displacements or relocations.
• **Transportation.** The proposed Current Project will not increase commuter rail service to Hoboken, generate new vehicular trips, induce traffic on nearby adjacent roadways, or create parking demand at outlying stations. The proposed Current Project will improve NJ TRANSIT’s operational efficiency within Hoboken Yard and enhance the resiliency of NJ TRANSIT service under emergency conditions. The Hudson River Waterfront Walkway, which was constructed in 2009, will remain in place and will not be adversely affected. The same benefits of filling in Long Slip Canal -- namely eliminating the odors and blight associated with the existing canal -- will result under the proposed Current Project and benefit those using the walkway. (The potential for construction-related effects on the walkway are discussed in Section 4.9.)

• **Energy.** The proposed Current Project will not result in notable consumption of natural resources or notable changes in local energy demand. The proposed Current Project’s energy requirements will not be substantially different from what was described in the 2000 EA as neither proposal would result in a significant change in vehicle miles travelled for rail or automobile traffic.

• **Greenhouse Gas Emissions.** The proposed Current Project is consistent with State and federal policies aimed at reducing GHG emissions. Operational GHG emissions will not be appreciably different under the proposed Current Project as compared to today, since the proposed Project will not increase commuter rail service, and no major source of GHG emissions will be built as part of the proposed Current Project. The more efficient operations in Hoboken Yard are expected to have a small but beneficial effect on GHG emissions related to railroad operations. (Construction-related GHG emissions are discussed in Section 4.9.)

• **Soil and Geology.** Geologic conditions and soils in the proposed Current Project area have not changed since the 2000 EA, and the proposed Current Project will not affect soils or geology in the proposed Current Project area.

• **Utilities.** The proposed Current Project’s effects on utilities are limited to the extension of Jersey City CSO, which was also part of the improvements described in the 2000 EA. As indicated in Section 3.3 above, the two Hoboken storm sewers that required relocation under the Original Project were recently relocated by the local utility company.

• **Parklands & Recreation.** The proposed Current Project will not affect existing parkland or recreational land in the study area.

• **Navigable Waterways.** While Long Slip Canal is technically considered a navigable waterway, due to the Hudson-Bergen Light Rail and Hudson River Waterfront Walkway structures, it can no longer be used for transport or commerce. Additionally, no work will occur in the Hudson River (the proposed Current Project area is west of the Hudson River Waterfront Walkway and more than 1,500 feet west of the main channel of the Hudson

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4 The Clean Water Act (33 CFR Part 329 Section 329.4) defines navigable waters of the United States as those waters that are subject to tidal ebb and flow and/or are presently used, or have been used in the past, or may conceivably be used in the future to transport interstate or foreign commerce. A determination of navigability, once made, applies laterally over the entire surface of the waterbody, and is not changed by later actions or events which impede or destroy navigable capacity.
River). Therefore, the proposed Current Project will have no effect on navigation. As indicated in Section 4.13, the proposed Current Project will be permitted via a United States Army Corps of Engineers (USACE) Section 10 Individual Permit, which prohibits the obstruction or alteration of navigable waters of the United States without a permit.

- **Contaminated Materials.** The use of the electrified tracks, platforms and station/crew facility has no potential for long-term impacts related to the generation of contaminated materials or future potential spills. (Construction-related concerns are discussed in Section 4.9.)

- **Indirect Effects.** Indirect effects are reasonably foreseeable and caused by a specific project, but which occur at a different time or place. The proposed Current Project will not involve the potential for induced or indirect impacts to surrounding communities, since no change to rail service, and therefore to parking demand at train stations or traffic congestion on local streets will result. Shifts in population, population growth, public service demands, and a change in economic activity would not result from implementation of the proposed Current Project.

4.1 LAND USE AND ZONING

Between 2000 and 2015, the population of the cities of Hoboken and Jersey City increased considerably, with a continuation of the redevelopment that began in the late 1970’s. With the exception of the Newport Development, however, land use within ¼ mile of Hoboken Yard has remained relatively unchanged (see Figure 4-1). In 1986, construction began on the Newport Development on 600-acres on the banks of the Hudson River to the south of Hoboken Yard. Since 2000, the Newport Development has continued to expand. The neighborhood now has office buildings, apartment towers, hotels, a marina, schools, a retail mall and parks. Within the ¼ mile study area, a 4.5-acre park at the north end of Newport was completed in 2012 and several apartment towers are currently under construction. Site plans have been approved by the Jersey City Planning Board for development of additional apartment towers at the north end of the development area adjacent to Hoboken Yard. Mixed use buildings are planned with retail and parking garages at the lower levels adjacent to the yard and apartments in towers with set-backs (see Figure 4-2). The development site is currently occupied and leased by a temporary cement plant operation.

There are three zoning designations that comprise Hoboken Yard and adjacent areas, which are consistent with the zoning designations in 2000: the southeastern part of the yard is designated as Jersey City Redevelopment Area 1; the southwestern part of the yard is designated Jersey City Redevelopment Area 4; and the northern portion of the yard is designated Hoboken Mixed Use (see Figure 4-3).

Under the proposed Current Project, all project activities will occur within the existing boundaries of Hoboken Yard and railroad right-of-way. No change of land use is proposed as the site has been a rail yard for over 100 years and that use will continue and be enhanced. Land use and zoning in the area are generally compatible with the activities in Hoboken Yard as they have grown up around the
Figure 4-1: Study Area Land Use
Long Slip Fill and Rail Enhancement Project

Legend
- NJDEP Land Use
  - Commercial/Services
  - Industrial
  - Deciduous Brush/Shrubland
  - Industrial and Commercial Complexes
  - Major Roadway
  - Mixed Transportation Corridor Overlap Area
  - Mixed Urban or Built-Up Land
  - Railroads
  - Recreational Land
  - Residential, High Density or Multiple Dwelling
  - Stormwater Basin
  - Stormwater Basins and Stormwater Basins and Other Tidal Waters
  - Mixed Transportation Corridor Overlap Area
  - Mixed Urban or Built-Up Land

Path: Atlas/gisdata/Projects/NJ_Transit/HobokenLongSlip2015_EA/MXD/figure4-1_LandUse.mxd
active rail yard, which provides heavy maintenance functions and accommodates approximately 290 train movements per day into and out of Hoboken Terminal.

As indicated in Sections 4.3 and 4.9, below, significant adverse noise and vibration impacts are not expected to result from implementation of the proposed Current Project at the Newport Development site or other sensitive land uses in the study area.

The proposed Current Project will not adversely affect land use, zoning, or land use trends in the study area. Consistent with the 2000 EA, no mitigation is required for impacts to land use because none are expected to result from implementation of the proposed Current Project.

### 4.2 AESTHETIC RESOURCES

The proposed Current Project includes tracks and catenary at a higher elevation than originally proposed in 2000, and new elements including an approach structure over Marin Boulevard, platforms and a station/crew facility. Hoboken Yard is not a visual or aesthetic resource; therefore, significant adverse impacts are not expected to result from the design modifications. From Newport and other areas to the south, the elevated Hudson-Bergen Light Rail and retaining wall structure will generally mask views of the new infrastructure from street level. Where visible, the elevated tracks and platforms will not be a significant visual element in the context of the existing catenary and yard infrastructure; from the west, the proposed Current Project will appear to be an extension of the rail yard (see Figure 4-4); and the improvements will not be highly visible from the north or east.

The three-story station/crew facility (approximately 120 feet long x 90 feet wide x 40 feet high based on a preliminary design) will be visible from the Hudson River Waterfront Walkway, which is approximately 350 feet to the east; the view will be interrupted by the Hudson-Bergen Light Rail crossing of the canal just west of the walkway, thereby limiting its visibility. The bridge span for the approach tracks will look like an extension of the five existing bridge spans that support the existing commuter and light rail tracks to Hoboken Yard including the Hudson-Bergen Light Rail bridge that was constructed above Marin Boulevard in 2006.

The proposed Current Project will not adversely affect aesthetic resources in the study area. Consistent with the 2000 EA, no mitigation is required for adverse impacts to aesthetic resources because none are expected to result from implementation of the proposed Current Project. As indicated in the 2000 EA, the Jersey City sewer discharge into the canal has resulted in odors, oil sheens, and other undesirable aesthetic conditions. Between 2000 and 2015 conditions in the canal have continued to worsen. These conditions will be remediated via filling in Long Slip Canal.

### 4.3 NOISE & VIBRATION

#### 4.3.1 General Noise Assessment

To identify the potential for operational noise impacts to result from the proposed Current Project, noise-sensitive land use within applicable screening distances were reviewed in accordance with
guidance found in FTA’s *Transit Noise and Vibration Impact Assessment*, May 2006 (FTA Manual). Two properties are located within FTA’s screening distance:

- An existing high-rise residential building - 700 Grove Street Condominiums/Zephyr Lofts (FTA Land Use Category 2) - is within 250 feet (to the north) of the proposed two-track bridge over Marin Boulevard.

- The proposed Newport Development Site, which has received final site plan approval for 790 new luxury condos (FTA Land Use Category 2), is located partially within 250 feet (to the south) of the new resilient train station.

Ambient noise levels were monitored at these locations and a General Noise Assessment was performed assuming a worst-case scenario, where the six new tracks and three new ADA-compliant platforms are used as a commuter rail station (see Figure 4-5). Table 4-1 presents the results of the General Noise Assessment. As shown in the table, noise impacts are not predicted to occur based on the assumptions regarding the usage of the six new tracks as stated herein. A description of the methodology used in the General Noise Assessment and supporting documentation can be found in Appendix B.

Operation of the proposed Current Project will not adversely affect noise levels in the study area. Consistent with the 2000 EA, no mitigation is required for noise impacts because none are expected to result from operation of the proposed Current Project.

**Table 4-1: General Noise Assessment Results**

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Site Location</th>
<th>Existing Noise Exposure (dBA)</th>
<th>Project Noise Exposure (dBA)</th>
<th>Total Noise Exposure (dBA)</th>
<th>Noise Level Increase (dBA)</th>
<th>Allowable Noise Level Increase (dBA)</th>
<th>Impact Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>700 Grove Street Condominiums/Zephyr Lofts</td>
<td>69</td>
<td>38</td>
<td>69</td>
<td>0</td>
<td>1</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>Proposed Newport Development Site</td>
<td>63</td>
<td>42</td>
<td>63</td>
<td>0</td>
<td>2</td>
<td>None</td>
</tr>
</tbody>
</table>


4.3.2 General Vibration Assessment

To identify the potential for operational vibration impacts to result from the proposed Current Project, vibration-sensitive land use within applicable screening distances were reviewed in accordance with guidance found in the FTA Manual.

Two Category 2 properties are located within 200 feet of the proposed Current Project alignment: 1) the 700 Grove Street Condominiums/Zephyr Lofts, and 2) the proposed Newport Development Site. Therefore, a General Vibration Assessment was performed for these two sites assuming a worst-
Legend
- Proposed Monitoring Location
- Noise Study Area
- Long Slip Canal
- Hoboken Yard
- Municipality

Long Slip Fill and Rail Enhancement Project

Target

Newport Rail Yard

Hoboken

Jersey City

Observer Hwy

I-78 SECONDARY

Newark St

Marin Blvd

15th St

Best Buy

Proposed Newport Development

Newport Green Park

Figure 4-5: Noise Monitoring Locations

Path: \Atlas\gisdata\Projects\NJ_Transit\Tier3\HobokenLongSlip\2015_EA\MXD\Figure4-5_NoiseMonitoring_REV2.mxd
case scenario, where the six new tracks and three new ADA-compliant platforms are used as a commuter rail station.

Table 4-2 presents the results of the General Vibration Assessment. As shown in the table, ground borne vibration and ground borne noise impacts are predicted to be below Category 2 land use impact thresholds. Therefore, vibration impacts to the 700 Grove Street Condominiums/Zephyr Lofts and proposed luxury condos at the Newport Development Site are not anticipated. The methodology used in this assessment and all back-up calculations can be found in Appendix B.

Operation of the proposed Current Project will not adversely affect vibration levels in the study area. Consistent with the 2000 EA, no mitigation is required for vibration impacts because none are expected to result from operation of the proposed Current Project.

### Table 4-2: General Vibration Assessment Results

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Site Location</th>
<th>Distance to Track (ft)</th>
<th>Ground-Borne Vibration Level at 50mph (VdB)</th>
<th>Predicted Ground-Borne Vibration Level (VdB)</th>
<th>Predicted Ground-Borne Noise Level (dB)</th>
<th>Ground-Borne Vibration or Noise Impact?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>700 Grove Street Condominiums/Zephyr Lofts</td>
<td>120</td>
<td>77</td>
<td>68</td>
<td>33</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>Proposed Newport Development Site</td>
<td>65</td>
<td>83</td>
<td>74</td>
<td>39</td>
<td>NO</td>
</tr>
</tbody>
</table>

Notes:

1. Determined from the Locomotive Powered Passenger or Freight curve in Figure 10-1 of the FTA’s *Transit Noise and Vibration Impact Assessment*, May 2006.
2. Resultant level after applying adjustment factors to value read from Figure 10-1. Adjustment factors incorporated for this analysis include: speed, jointed track, efficient propagation in soil, coupling loss for large masonry buildings on piles, and amplification due to resonances of floors, walls, and ceilings.
3. Predicted ground-borne vibration and noise levels were compared to Category 2 land use criteria for “Infrequent Events.”


### 4.4 AIR QUALITY

Since 2000, the U.S. Environmental Protection Agency (EPA) promulgated additional National Ambient Air Quality Standards for ozone (O₃) and adopted new 24-hour and annual standards for particulate matter that is two and one half microns or less in width (PM₂.₅) which are shown in Table 4-3 along with the standards for other criteria pollutants. Section 107 of the 1970 Clean Air Act
Amendments requires EPA to identify areas that do not meet the NAAQS. An area which does not meet a standard is referred to as a nonattainment area.

### Table 4-3: EPA National Air Quality Standards

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Averaging Period</th>
<th>National Primary</th>
<th>National Secondary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Monoxide</td>
<td>1 hour</td>
<td>35 ppm</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>8 hour</td>
<td>9 ppm</td>
<td>-</td>
</tr>
<tr>
<td>Ozone</td>
<td>8 hour</td>
<td>0.070 ppm</td>
<td>0.075 ppm</td>
</tr>
<tr>
<td>Nitrogen Dioxide</td>
<td>Annual</td>
<td>53 ppb</td>
<td>53 ppb</td>
</tr>
<tr>
<td></td>
<td>1 hour</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 ppb</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lead</td>
<td>Rolling 3 month Average</td>
<td>0.15 µg/m³</td>
<td>0.15 µg/m³</td>
</tr>
<tr>
<td>Sulfur Dioxide</td>
<td>3 hour</td>
<td>-</td>
<td>0.5 ppb</td>
</tr>
<tr>
<td></td>
<td>1 hour</td>
<td>75 ppb</td>
<td>-</td>
</tr>
<tr>
<td>Inhalable Particulates (PM₁₀)</td>
<td>24 hour</td>
<td>150 µg/m³</td>
<td>150 µg/m³</td>
</tr>
<tr>
<td>Fine Particulates (PM₂.₅)</td>
<td>24 hour</td>
<td>35 µg/m³</td>
<td>35 µg/m³</td>
</tr>
<tr>
<td></td>
<td>Annual</td>
<td>12 µg/m³</td>
<td>15 µg/m³</td>
</tr>
</tbody>
</table>


#### 4.4.1 Pollutant of Concern for Public Transportation Projects

The entire state of New Jersey is classified as in O₃ nonattainment, including Hudson County. Naturally occurring O₃ in the upper atmosphere protects the population from harmful ultraviolet rays. Ground-level O₃ is created when nitrogen oxides (NOₓ) and volatile organic compounds (VOC) react in the presence of sunlight and heat. Ground-level O₃ can cause serious adverse health effects by damaging cells that line our airways.

In 2013, EPA re-designated Hudson County along with twelve other New Jersey counties to PM₂.₅ attainment. Hudson County is therefore in PM₂.₅ maintenance and is subject to the same requirements as a PM₂.₅ nonattainment area. These requirements include being held to a strict maintenance plan. Particulate matter includes very small liquid and solid particles suspended within the lower atmosphere. Particulate matter irritates the membranes of the respiratory system and therefore may affect sensitive groups including the elderly, individuals with cardiopulmonary disease such as asthma, and children. EPA is concerned with inhalable particulate matter which is not filtered by the nose and throat like larger particulates and can reach deep in the lungs causing lung disease, emphysema or lung cancer. Fine particulate matter smaller than 2.5 micrometers in diameter is created from chemical reactions in the atmosphere and through fuel combustion by sources such as motor vehicles and power generation. The NAAQS was revised in 2012 to provide a more stringent annual PM₂.₅ standard.

After many years of demonstrating CO attainment, Hudson County was re-designated to attainment status in 2004. Hudson County is therefore in CO maintenance and is subject to the same requirements as a CO nonattainment area. A CO maintenance area must maintain the NAAQS for 20 years by following two sequential 10-year plans. The incomplete combustion of fossil fuel creates a
spectrum of pollutant by-products. CO by volume is the most prominent, when compared to other mobile-source pollutants for typical passenger vehicles. CO is colorless/odorless poisonous gas that is generally found adjacent to intersections or congested roadways. Acceleration/decelerating and idling vehicles emit higher emissions than steady-state speed vehicles.

4.4.2 Potential for Air Quality Impacts

Under current regulations for transportation conformity, detailed within 40 CFR 93.116, FTA federally funded projects must not cause or contribute any new NAAQS violations, increase the frequency or severity of any NAAQS violations, or delay timely attainment of any NAAQS or any required interim emission reductions or other milestones in nonattainment and/or maintenance areas. As detailed within, the project is located within Hudson County which is in O3 nonattainment as well as PM_{2.5} and CO maintenance.

Ozone (O3) – Transportation projects receiving federal funding and/or considered regionally significant are reviewed by the governing Metropolitan Planning Organization (MPO) and must be included within the Transportation Improvement Program (TIP). Precursors of O3, including NOx and VOC emissions, are estimated by the North Jersey Transportation Planning Authority (NJTPA) in order to develop the regional TIP. The proposed Current Project is included within the approved NJTPA FY 2016 – 2019 TIP (Project ID: T908), which was federally certified on November 20, 2015. Air emission estimates, as a result of the approved TIP projects, result in a net positive impact on air quality and allow the region to maintain air quality goals established and included within the New Jersey State Implementation Plan (SIP). Since the project air emissions are estimated and included within the conforming TIP, a microscale or project-level O3 analysis is not necessary.

Carbon Monoxide (CO) – Procedures to determine microscale (localized) CO concentrations are provided within 40 CFR 93.123(a). Since the proposed Current Project is located within a CO maintenance area, it must be reviewed to ensure no localized CO impact may result by reviewing project-affected locations or intersections in areas of increased traffic volumes. The proposed Current Project will not increase ridership. Therefore the proposed Current Project will not result in an increase in passenger vehicles traveling to/from the station. Therefore, no CO microscale modeling is required and no change in CO levels is expected due to the proposed Current Project.

Particulate Matter Smaller than 2.5 Micrometers (PM_{2.5}) - Procedures to determine microscale (localized) PM_{2.5} concentrations are provided within 40 CFR 93.123(b). Based on USPEA’s Transportation Conformity Guidance for Quantitative Hot-spot Analyses in PM_{2.5} and PM_{10} Nonattainment and Maintenance Areas, dated December 2010, each project located within PM_{2.5} and PM_{10} nonattainment and maintenance areas should be reviewed to determine whether the project has the potential to be a local air quality concern. Based on 40 CFR 93.123(b)(iv), expanded rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location’ would require PM_{2.5} hot-spot analyses. However, there will be no overall change in corridor diesel-powered train volumes under any of the operating scenarios. As a result, PM_{2.5} concentrations will not be affected by the proposed Current Project.
In conclusion, $O_3$, CO and PM$_{2.5}$ concentrations are not expected to create any new violations, nor increase the frequency or severity of any existing violations of the National Ambient Air Quality Standards. Therefore, the proposed Current Project will comply with the Clean Air Act. No significant impacts to air quality are expected to result under the proposed Current Project; therefore no mitigation is required.

### 4.4.3 Project-Level Air Quality Conformity

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

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

Projects that are funded and approved by the FTA are subject to the transportation conformity regulations at Subpart A of 40 CFR Part 93. As indicated above, the proposed Current Project is included within the approved NJTPA FY 2016 - 2019 TIP (Project ID: T908), which was federally certified on November 20, 2015 as in conformance with the New Jersey State Implementation Plan (SIP).

A General Conformity applicability analysis is required under Section 176(c) of the Clean Air Act as part of the ACOE Section 404 permit process. An applicability analysis is the process of determining whether a Federal action must be supported by a conformity determination. As described in 40 CFR 93.153, the applicability analysis may find that a conformity determination is not required if, among other things, the Federal action: 1. is part of a continuing response to an emergency or disaster; 2. is covered by an existing transportation conformity determination; 3. would result in no emissions increase or an increase in emissions that is clearly *de minimis*; 4. is presumed to conform; or 5. results in total direct and indirect emissions of the criteria pollutants or precursors that is less than the *de minimis* rates contained in 40 CFR 93.153(b) and shown in Table 4-4 below.

As noted above, the proposed Current Project will not increase ridership, or diesel or electric train trips, or automobile trips. The new platform and passenger/crew facility will be used for passenger service when other facilities are closed for emergencies and repairs. Thus, operation of the proposed Current Project will not increase NAAQS pollutant levels; no new violations of the NAAQS will result, nor will existing violations worsen. Air quality emissions will result from construction of the proposed Current Project over a 3.5 year periods. Construction-related air emissions are quantified in Section 4.10.2. Total emissions related to construction activities over the 3.5-year period will be well below the *de minimis* criteria for a single year for each criteria pollutant (see Table 4-5 in Section 4.10.2). The *de minimis* criteria allow for recurring emissions related to a
project’s operational effects. There will be no recurring emissions on an annual basis due to the proposed Current Project’s operation.

### TABLE 4-4
General Conformity Applicability Thresholds

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Area Type</th>
<th>Tons/Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ozone (NO₂)</td>
<td>Non-Serious/Severe/Extreme nonattainment areas inside an ozone transport region</td>
<td>100</td>
</tr>
<tr>
<td>Ozone (VOC)</td>
<td>Non-Serious/Severe/Extreme nonattainment areas inside an ozone transport region</td>
<td>50</td>
</tr>
<tr>
<td>CO</td>
<td>All maintenance areas</td>
<td>100</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>All nonattainment areas-direct emissions</td>
<td>100</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>All nonattainment areas - NOₓ (significant precursor)</td>
<td>100</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>All nonattainment areas - VOC (significant precursor)</td>
<td>100</td>
</tr>
</tbody>
</table>


### 4.5 WATER QUALITY

The Original Project included several elements to improve water quality in the Hudson River, including:

1. Re-routing and decommissioning Hoboken stormwater discharges to the canal;
2. Upgrading and extending the Jersey City CSO from the west to east end of the canal with a floatables collection system at its end point to reduce sedimentation;
3. Removal of 80,000 cubic yards of sediment at the mouth of the canal to improve circulation in the entrance, and water quality for adjacent pile field to create 26.1 acres of fish habitat area.

While the Hoboken storm sewers were relocated, the extension of the CSO was not completed. As a result, since the 2000 EA, the water quality in the canal has further degraded with the continued deposition of urban runoff from the CSO in its present location. Dredging in the mouth of Long Slip to provide the emergency ferry service after September 11 was completed under a modification of the permit for transportation purposes and incidentally improved the fish habitat area that was envisioned in the original plan.

The Hudson-Bergen Light Rail and Hudson River Waterfront Walkway were completed after the 2000 EA, which involved placing structures in the canal. The Hudson-Bergen Light Rail bridge
structure includes a permanent cofferdam (with a box culvert cut-out for the CSO extension). This structure effectively cuts off approximately ¾ of the width of the canal at the eastern end (see Figure 4-6).

Currently, the canal bottom is concave, gently sloping down from the westernmost portion, and sloping up again towards the Hudson-Bergen Light Rail bridge structure. This area’s elevation deviates from the constant downgrade of the rest of the canal due to sediment settling and being trapped within the canal. Previous studies on the canal water quality bottom composition found that sediments along the bottom of the canal were black and viscous with a pliable consistency as a result of the sanitary waste and fine particles contained in the combined sewage discharges. The black coloration is due to high sulfide concentrations, which relates to the anaerobic and anoxic oxygen conditions within the canal and the sediment deposits. This increasing sedimentation and lack of circulation leaves a ‘methane blanket’ biohazard within the canal that reduces its viability to support baseline food sources for fish and requires filling to eliminate further build up and risk to adjoining habitat. Sediment sampling performed in the canal in 1994, 2001 and 2015 indicates the extent of the decrease in water quality and sedimentation that has occurred (see Figure 4-7). The data indicates that if the canal is left in its current state, it will eventually fill in.

Under the proposed Current Project, the CSO extension will discharge to the Hudson River, which will provide greater diffusion and increased circulation and minimize concentrated loads in any given area. The tidally influenced Hudson River waters are constantly flowing, mixing and refreshing oxygen levels. The CSO extension will not change the quality or quantity of discharge from the existing JCMUA outfall. The existing netting chamber west of the project site near 18th Street in Jersey City will not be affected by the proposed Current Project. NJ TRANSIT will work with both the NJDEP and JCMUA to ensure that the combined sewer overflow meets all permit requirements during the extension construction and final placement.

Similarly, the extension of the PATH drainage system to the eastern limits of the fill area will not change the quality or quantity of discharge from the PATH tunnel. NJ TRANSIT will work with both NJDEP and PATH managers to ensure that the tunnel discharge meets all permit requirements during the extension construction and final placement.

No long-term adverse effects on water quality are expected under the proposed Current Project. Filling in the portion of the canal that is west of the Hudson-River Waterfront Walkway will eliminate the blighted conditions and the CSO extension will further improve water quality at the mouth of the canal and in the Hudson River. The potential for short-term effects on water quality related to construction activities is addressed in Section 4.9, below.

4.6 WETLANDS

Similar to the Original Project, the proposed Current Project will eliminate approximately 4.3 acres of sub tidal wetlands due to filling in Long Slip Canal. The USACE regulates activities within tidal and sub tidal “waters of the U.S.” up to the mean high water line and NJDEP regulates state open waters and adjacent land above the mean high water line. Filling in Long Slip Canal will require an USACE
Water Flow into the Canal Restricted to Two 10-foot Openings
Canal Length (to HBLR substructure): ~1,425'

Canal Width: ~100'

Legend
- YU & Associates Sediment Samples (2001)
- BEM Sediment Samples (2015)
- 2001 Boring
- 2015 Boring
- Top of North Bulkhead (+5' NAVD88)
- Water Flow Restricted
- Substrate
- Canal Sidewall

Existing combined sewer overflow direct discharge to canal

Approximate Utility Line Layout By Provider
- JCMUA Sewer
- NHSA Sewer

Figure 4-7: Canal Substrate and Elevations
Long Slip Fill and Rail Enhancement Project

Horizontal Scale: 1" = 150'
Vertical Scale: 1" = 10'
Section 10/404 Individual Permit, a NJDEP Waterfront Development Permit, and Compensatory Mitigation, which is coordinated with USACE and subject to review by NJDEP. An USACE Jurisdictional Determination will be sought to verify regulated wetland/waters of the U.S. limits.

The objective of Compensatory Mitigation is to offset environmental losses resulting from unavoidable impacts to regulated natural resources. There are three mechanisms for providing compensatory mitigation:

- Mitigation banks, where credits are purchased from a Federal- and State-approved mitigation bank servicing the Long Slip watershed area;

- Ecological restoration completed by the permittee, which could include restoration, creation or enhancement of wetland areas within the watershed area of the proposed Current Project, which is primarily the Hackensack Meadowlands District (HMDC). The Meadowlands Interagency Mitigation Advisory Committee (MIMAC), which is comprised of the Meadowlands Regional Commission, USACE, NJDEP, USFWS, NOAA-NMFS, and EPA reviews all ecological restoration projects within the HMDC. If the candidate site is not within the HMDC, then only USACE and NJDEP will review the proposed compensatory mitigation; and

- In-lieu fee mitigation, which is a monetary contribution and requires an appraisal report and estimates for the costs of property and creating and/or enhancing wetlands.

Based on Federal and State guidelines, a project’s adverse impacts to wetlands must be avoided to the maximum extent practicable and compensated by replacing the same wetland functions and values that will be taken in advance of, or concurrently with the project’s construction.

Measures to mitigate the adverse wetlands impacts associated with the proposed Current Project are consistent with those identified in the 2000 EA and will include adherence to conditions of the USACE Section 10/404 and NJDEP Waterfront Development permits, which will be obtained for the proposed Current Project, and Compensatory Mitigation, which will be carried out via coordination with USACE, NJDEP and/or other MIMAC members, as appropriate.

Based on recent coordination with USACE, NJDEP and other MIMAC members, NJ TRANSIT is proposing to purchase wetland mitigation credits at a ratio of 1:1 through an approved wetland mitigation bank.

4.7 ECOSYSTEMS (VEGETATION & WILDLIFE HABITAT)

No sub-aqueous vegetative growth was observed in the canal in a recent survey. Further, no aquatic species are anticipated to be impacted in the canal, as confirmed by research done in association with NOAA’s Northeast Fisheries Science Center that surveyed the canal during summer months and documented the absence of any species (fish, clams, worms and algae) in the canal and the areas just beyond the canal. The canal does not provide habitat for wildlife and left as is the canal could actually serve as an attractive nuisance to migratory species; should they make their way into these degraded waters, they would have difficulty surviving and finding their way out.
In contrast, the dredging completed by NJ TRANSIT was an improvement to adjoining waters and has resulted in functional and viable fisheries, and benthic organism (baseline food source) habitat. The adjoining Hudson River Estuary and New York Bight has been a documented migration corridor for a variety of diadromous species from 2000 to date. Most recent consultation with the Natural Heritage Program indicated the Federal and State Endangered Shortnose Sturgeon (*Acipenser brevirostrum*) utilizes this adjoining migratory corridor (see Figure 4-8).

A US Fish and a Wildlife Service threatened and endangered species habitat review did not identify any threatened and endangered species in the adjoining Hudson River Estuary. The National Marine Fisheries Service (NMFS) was consulted in August 2015 for further guidance as to the presence or absence of the Shortnose sturgeon within adjoining estuary. Their determination indicates that the proposed Current Project is not likely to adversely affect any species listed by NMFS as threatened or endangered under the ESA of 1973 (see correspondence dated November 6, 2015 from NOAA-NMFS in Appendix C). NMFS recommends completing the project as proposed and abiding by seasonal restrictions on pile driving to minimize the potential for impacts to migrating shortnose sturgeon (see Section 4.10).

No long-term adverse effects on essential fish habitat or ecosystems in the canal will result from implementation of the proposed Current Project since there is no vegetation or wildlife habitat in the canal; as a result no mitigation is required. The ‘methane blanket’ and water quality is not conducive to support baseline food sources for aquatic species survival, foraging or breeding activities.
Habitat Area that benefited from dredging and water quality improvements completed by NJ TRANSIT.

NJDEN Threatened & Endangered Species, Rank 5

Long Slip Canal

Habitat Area that benefited from dredging and water quality improvements completed by NJ TRANSIT.

Threatened & Endangered Species not present in Long Slip Canal Footprint

Common Name | Feature Type | Protection Status
---|---|---
Shortnose Sturgeon | Migration Corridor - Adult Sighting | Federal Listed & State Endangered Species

Path: \Atlas\gisdata\Projects\NJ_Transit\Tier3\HobokenLongSlip\2015_EA\MXD\Figure4-8_T&ESpecies.mxd
No long-term adverse effects on essential fish habitat or ecosystems in the adjoining Hudson River Estuary will result from implementation of the proposed Current Project. The area to be filled is smaller than what was proposed in the 2000 EA, and does not extend into the Hudson River. The fill will be contained to the west of the Hudson-River Waterfront Walkway. The potential for construction-related effects are addressed in Section 4.9.

4.8 FLOODPLAINS

Federal Executive Order 11988 “Floodplain Management”, as amended, directs Federal agencies to “take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains.”

U.S. Department of Transportation (U.S. DOT) Order 5650.2 “Floodplain Management and Protection” contains policies and procedures for implementing Executive Order 11988. The Federal Emergency Management Agency (FEMA) has procedures under 44 CFR Part 9 “Floodplain Management and Protection of Wetlands, which are administered at a State level under the New Jersey Administrative Code (N.J.A.C. 7:13 Flood Hazard Area Control Act Rules). These policies require an analysis to identify and quantify impacts on natural and beneficial floodplain values, and the subsequent preservation or restoration of the natural floodplain and its beneficial values as affected by a project. Under DOT Order 5650.2, an impact is characterized as a significant encroachment if it would involve: a considerable probability of loss of human life; likely future damage associated with the encroachment that could be substantial in cost or extent, including interruption of service or loss of a vital transportation facility; or a notable adverse impact on natural and beneficial floodplain values.

4.8.1 Flood Hazard Area

In response to Sandy, FEMA released a Preliminary Flood Insurance Rate Map (FIRM) in January 2015, which encompasses Hoboken Yard. The 2015 Preliminary FIRM has updated flood zones and elevations which now supersede the previously effective 2006 FIRM and the information presented in the 2000 EA. Currently, portions of the site are located within flood zones designated as VE and AE on the Preliminary FIRM (see Figure 4-9). The AE and VE zones indicate that the area is within the 100-year floodplain; and the VE zone also indicates an area that is subject to high velocity wave actions. In the VE Zone, the elevation to which floodwater is anticipated to rise during a flood event is 16 feet (NAVD88). In the AE Zone, the elevation to which floodwaters is anticipated to rise during a flood event is between 11 and 12 feet (NAVD88).

The NJDEP Flood Hazard Control Act Rules (N.J.A.C. 7:13) and Coastal Zone Management Rules (N.J.A.C. 7:7), which regulate Waterfront Development and proposed development within AE and VE

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5 FEMA FIRM Nos. 34017C0106E and 34017C0107E
Figure 4-9: Flood Hazard Areas
Long Slip Fill and Rail Enhancement Project
zones. NJDEP regulates activities within two specific areas under the Flood Hazard Area Control Act Rules (N.J.A.C. 7:13):

1. Flood Hazard Area, which exists along every regulated water body that has a drainage area of 50 acres or more. Under NJAC 7:13-2.3 (a) 1 waters of the Long Slip Canal fall under the designation of “the Atlantic Ocean and other non-linear tidal waters such as bays and inlets, which do not have a floodway.” The entire flood hazard area along the Hudson River and Long Slip Canal is considered to be a flood fringe, which is influenced by the fluctuating tidal rise and fall of daily tide cycles; and

2. Riparian Zone, the land and vegetation within and adjacent to a regulated water, except the Atlantic Ocean, any man made lagoon, stormwater management basin, or oceanfront barrier island, spit or peninsula. The Current Project will require the removal of approximately 0.2 acres of vegetation within the riparian zone adjoining Long Slip Canal.

NJDEP’s Coastal Zone Management rules (N.J.A.C. 7:7) govern project activities since Long Slip Canal is within a regulated Up-Land and In-Water Waterfront Development Zone. The Coastal Zone Management rules contain requirements pertaining to flood hazard areas (N.J.A.C. 7:7-9.25). Lastly, the United States Army Corps of Engineers (USACE) maintains regulatory jurisdiction over any activities below the mean high water line of the Hudson River and Long Slip Canal and a USACE Section 10/404 Individual Permit will be required for the proposed work that will occur below the mean high water line.

Structures built in VE zones must meet certain criteria to withstand wave action. Placing fill in VE zones is prohibited unless a variance is sought demonstrating that there are no avoidance alternatives and no susceptibility to erosion, scouring, and structural instability. The 2000 EA evaluated four main build alternatives to filling in the canal and concluded that none would effectively satisfy the goals and objectives established for the project. While the purpose and need for the proposed Current Project is different than what was established for the Original Project, the reasons for eliminating the avoidance alternatives are reinforced by the proposed Current Project, as follows:

Reorganization within the Yard without Expansion. Under this alternative, two schemes were developed and both were found to offer only partial solutions to the existing problems. Given the development of the Hudson-Bergen Light Rail and construction of the wheel truing facility in the yard since 2000, and several other projects that are ongoing related to Sandy Recovery efforts, space is even more constrained today than it was in 2000. Furthermore, the resilient train station requires more than four acres of contiguous property, which is not available in the yard.

Annexation of Adjacent Properties. Under this alternative, the Newport Development site, a portion of 18th Street, and several retail establishments would be acquired. It was eliminated from consideration due to the high costs and negative impacts to properties in Jersey City. The approved site development plan for Newport Development would make this option even more costly and disruptive today.
New Satellite Storage Yard. An alternative providing for remote storage of trains was examined by reviewing suitably sized parcels in the Hackensack Meadowlands Development District. No available sites were identified and remote storage was found to be operationally infeasible. The resilient station also must be near Hoboken Terminal, to replace commuter rail service when the terminal floods, and provide connection to the ferry, PATH and bus depot.

Decking over the Canal. Decking Long Slip Canal with a continuous impervious metal plate or concrete cover was found unreasonable since the penetration of sunlight to the water surface would be blocked. The result would be an enclosed waterway accessible to fish and other aquatic life but severely degraded by the continued discharge of a combined sewer outfall and relatively turgid flows leaving a dark and generally unsupportive as well as non-navigable estuarine environment. The same reasons hold true today and are exacerbated by the deteriorated conditions in the canal.

Any alternative that relies on pile-supported structures will further impede flow and confine the water in the canal, and pose health and safety concerns, such as mosquito breeding grounds, methane gas explosion hazards, and contaminated stagnant water. While construction of infrastructure on pile-supported structure would minimize the proposed Current Project’s footprint in the mapped preliminary FEMA VE zone Flood Hazard boundary, the function (high velocity wave action) of the VE zone is already seriously compromised by the Hudson-Bergen Light Rail bridge structure and the Hudson River Waterfront Walkway. Both structures were built with abutments and caisson piers that extend approximately 100 feet below grade to bedrock to meet load requirements and seismic criteria, further impeding flow of waters in and out of the canal. As a result, the risks associated with a pile-supported alternative clearly outweigh any benefit related to conforming to a preliminary flood designation.

- The proposed Current Project will not result in a significant floodplain encroachment since it would not involve: a considerable probability of loss of human life; likely future damage associated with the encroachment that could be substantial in cost or extent, including interruption of service on or loss of a vital transportation facility; or a notable adverse impact on natural and beneficial floodplain values.
- As indicated in Section 4.12, the proposed Current Project will be permitted via a USACE Section 10/404 Individual Permit, which prohibits the discharge of dredged or fill material into waters of the United States without a permit; and the NJDEP Waterfront Development/Flood Hazard Area Individual Permit, which is required for excavation or filling in the regulated waterfront development zone and FEMA designated flood hazard areas. Permit conditions will likely require demonstration that the structural components of the proposed Current Project are designed to withstand storm events, and wind and tidal forces. No mitigation is anticipated to be required for filling in the flood hazard area.

4.8.2 Effects on Adjacent Properties

The Current Project is expected to have overall beneficial impacts on study area flooding that are caused by severe weather events. During Super Storm Sandy, Long Slip Canal was one of the entry
points of storm surge into Hoboken and the northwest portion of Jersey City. Filling the canal will restrict entry of storm surge and eliminate a vector that facilitates study area flooding.

Furthermore, the project is not expected to cause significant localized adverse impacts in adjacent or nearby areas since project-related water volume displacement resulting from filling in Long Slip Canal will be displaced to the Hudson River and the larger Atlantic Ocean basin, which has infinite volume capacity and ability to absorb flood waters. As noted under N.J.A.C. 7:13-1.2, in a tidal flood hazard area, flood hazard area design flood elevation is governed by tidal flooding from the Atlantic Ocean. Flooding in a tidal flood hazard area may be contributed to or influenced by stormwater runoff from inland areas, but the depth of flooding generated by the tidal rise and fall of the Atlantic Ocean is greater than flooding from any fluvial sources. The Hudson River and associated Atlantic Oceanic basin will not be impacted or lose storage capacity as the project and adjoining area is tidal and not hydrologically restricted.

NJDEP regulates a project’s impact on adjacent areas if a decrease in the site’s flood storage volume capacity would force flood waters onto adjacent areas, effectively increasing flood elevations on adjacent parcels. However, the NJDEP exempts projects that are located within a tidal flood hazard area (N.J.A.C. 7:13-10.4(d) 1) from such regulation, since tidal areas fluctuate in elevation with tidal cycles and have an unrestricted capacity to retain water. Therefore, under the NJDEP rules the project is not subject to flood storage volume displacement limits.

Since the proposed Current Project will not adversely affect flooding in the study area, consistent with the 2000 EA, no mitigation is required for floodplain impacts because none are expected to result from implementation of the proposed Current Project. As the Current Project is located within FEMA designated AE and VE zones and tidal flood hazard area, it will be designed to comply with the Flood Hazard Control Act Rules (N.J.A.C. 7:13) and compliance with these rules will be demonstrated as part of the permit application submitted to the NJDEP for Up-Land and In-Water Waterfront Development authorization, in accordance with N.J.A.C. 7:7. Permit conditions will require 2:1 compensation for the proposed vegetative riparian area clearance under N.J.A.C. 7:13-10.2(t).

4.9 CULTURAL RESOURCES

4.9.1 Historic Architectural Resources

The proposed Current Project will require the construction of new structures such as retaining walls, platforms, canopies, buildings, railroad and bridges, and catenary support structures within the boundaries of the Old Main Delaware, Lackawanna, and Western Railroad (DL&WRR) Historic District. It will require filling in Long Slip Canal, which is a contributing resource to the historic district, and demolition of some of the Pullman Yard Concrete Bumpers, which is also a contributing resource to the historic district.

For the Original Project, NJ TRANSIT and FTA, in consultation with the New Jersey State Historic Preservation Office (NJ SHPO), completed the Section 106 historic preservation process and
measures stipulated in a Memorandum of Agreement (MOA) to mitigate adverse effects to the Old Main DL&WRR Historic District. As part of the Original Project, measures to mitigate the adverse effects caused by the filling in of the Long Slip Canal, as addressed in the 1999 MOA, included: 1) the preparation of specific written and photographic documentation relating to the history and function of the Long Slip Canal for inclusion in documentation of Hoboken Yard according to the standards of the Historic American Buildings Survey (HABS)/Historic American Engineering Record (HAER); and 2) installation of an interpretive panel describing the history and significance of the Long Slip Canal and the adjacent DL&WRR passenger and freight yards.

Subsequent to the execution of the 1999 MOA, NJ TRANSIT completed all of its stipulations to mitigate adverse effects to the Old Main DL&WRR Historic District related to the filling in of Long Slip Canal. The NJ SHPO, in correspondence with NJ TRANSIT dated February 9, 2015 acknowledged and confirmed that the mitigation measures had been fully satisfied (see Appendix A).

During the Section 106 consultation process initiated for the proposed Current Project, a new contributing resource to the Old Main DL&WRR Historic District was identified. Pursuant to Section 106 of the National Historic Preservation Act, NJ TRANSIT, in consultation with FTA and NJ SHPO, delineated an Area of Potential Effect (APE) for the proposed Current Project and identified historic properties listed in or eligible for listing in the NRHP. In addition to filling in Long Slip Canal, the proposed Current Project will require the removal of three of the four Pullman Yard Concrete Bumpers, a newly identified historic resource, which is also a contributing resource to the historic district.

The Pullman Yard Concrete Bumpers are monolithic blocks of poured concrete, installed in the early twentieth century as part of a new yard and office building for the Pullman Company’s fleet of luxury passenger coaches. The Bumpers served to stop rail cars from running off the stub tracks into the adjoining Marin Boulevard (formerly Henderson Street). A signature material pioneered by the DL&WRR for use in railroad applications, reinforced concrete proved both versatile and durable.

The most ambitious uses of the material included the DL&WRR’s numerous stations, retaining walls, and bridges, especially its major viaducts along the New Jersey Cutoff and elsewhere on the system. The bumpers belong to a long tradition of similar utilitarian concrete structures installed within the boundaries of the NRHP-eligible Old Main DL&WRR Historic District. They were constructed during the district’s Period of Significance, and retain their integrity of location, design, and workmanship. The Pullman Yard Concrete Bumpers do not meet the threshold for individual eligibility under NRHP Criteria, but are contributing resources to the larger Old Main DL&WRR Historic District.

Based on consultation with the NJ SHPO (see correspondence dated October 9, 2015, signed by NJ SHPO on October 21, 2015, in Appendix A), and after reviewing the potential effects of the proposed

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6 The Section 106 review process conducted for the Current Project is documented in the Supplemental Phase 1A Archaeological Survey and Historic Architectural Resources Background Study (HARBS) and Effects Assessment, NJ TRANSIT Long Slip Fill Project, RGA Cultural Resources Consultant, March 2015.
Current Project on the Pullman Yard Concrete Bumpers, which entails demolition of three of the four Concrete Bumpers, the proposed Current Project will result in no adverse effect if certain conditions are implemented as part of the project. The conditions, which NJ TRANSIT commits to fulfill, are:

- Retention in place of one of the four Concrete Bumpers;
- Photo documentation of the Concrete Bumpers in place prior to removal of the three blocks;
- A narrative description and statement of significance for the blocks;
- A letter report on the Concrete Bumpers for the NJ SHPO resource files; and
- The exteriors of all new structures (retaining walls, station structures, facades, bridge structures) will utilize a context-sensitive design treatment consistent with the character-defining features of the Old Main DL&WRR Historic District and design submittals will be made to the NJ SHPO for review and concurrence.
Historic properties are also protected under Section 4(f) of the Department of Transportation Act of 1966. In March 2000, a Final Section 4(f) determination was made for the Original Project, which acknowledged that sufficient analyses were performed, there were no feasible and prudent alternatives to filling in the Canal, and that all possible planning to minimize harm to the environment was completed. FTA proposes a 4(f) de minimis determination related to the demolition of three of the four Pullman Yard Concrete Bumpers and construction of the new structures within the boundaries of the historic district. A de minimis impact for historic resources is one that, after taking into account any measures to minimize harm (such as avoidance, minimization, mitigation or enhancement measures), results in a Section 106 finding of no adverse effect on a historic property, and the NJ SHPO concurs with this finding. A Section 4(f) de minimis determination is presented in Chapter 5 and documentation of NJ SHPO concurrence is presented in Appendix A.

4.9.2 Archaeological Resources

Consistent with the findings of the 2000 EA, the supplemental archaeological survey performed for the proposed Current Project confirmed the lack of potential for archaeological resources in the revised APE-archaeology, which includes all areas that would be directly affected by ground disturbances during construction. The NJ SHPO concurred with this determination. Therefore, no mitigation is required for potential impacts to archaeological resources because no known archaeological resources are present in the APE-archaeology.
NJ TRANSIT will initiate the following procedures in the event of unanticipated discoveries of human skeletal remains and historic/pre-historic archaeological resources:

- If human skeletal remains are encountered anywhere on the project site, NJ TRANSIT will cease construction, and as soon as possible, consult with the NJ SHPO, FTA, and appropriate legal officials over the applicability and implementation of relevant procedures under the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 25 U.S.C. 3001 (43 CFR Part 10). FTA will notify Tribal representatives. All human skeletal remains will be treated in accordance with the current guidelines of the NJ SHPO, and with the applicable provisions of the New Jersey Cemetery Act, 2003. Construction will not resume until such time as the significance and disposition of said discoveries can be determined.

- All unanticipated historic and/or pre-historic archaeological discoveries resulting from proposed Current Project activities made anywhere on the project site will be treated in accordance with the procedures outlined in 36 CFR 800.11 and 36 CFR 800.13. In the event that unanticipated discoveries of cultural Native American archaeological resources are made during execution of the proposed Current Project, NJ TRANSIT will cease construction and FTA will notify Tribal representatives. Construction will not resume within 50 feet of the discovery until such time as the significance and disposition of said discoveries can be determined.

4.10 CONSTRUCTION ACTIVITIES AND EFFECTS

This section describes the construction activities that will be required for the proposed Current Project and highlights the different assumptions used to evaluate the Original Project in the 2000 EA. It then considers the potential temporary effects of proposed Current Project construction focusing principally on the effects of the proposed design modifications, changes in the study area that have occurred since the year 2000, and new laws and regulations that affect the construction of the proposed Current Project.

4.10.1 Construction Activities

Based on early construction planning estimates, the construction of the proposed Current Project is expected to occur within a 3.5 year period. Several stages will be required:

Stage 1 – Jersey City CSO extension

A bypass will be constructed to divert the flow of the existing Jersey City CSO into the southern side of the canal prior to construction of its extension along the north side. Once the flow is diverted, sheet piling will be installed using a vibratory pile driver to create a cofferdam, a watertight enclosure that will be pumped dry prior to construction of a concrete shell to contain the CSO. The cofferdam will be built within the northern 20 foot section of the 100-foot-wide canal, extending for the length of the canal to just west of the Hudson -Bergen Light Rail bridge structure. Transverse sheeting installed at the Hudson River Waterfront Walkway structure will be used to segregate the work from the Hudson River. The cofferdam sheeting will form 24 cells; as each cell is dewatered, the cofferdam will be excavated down to the glacial till to provide structural support for the CSO extension and the excavated material will be used as fill in the southern section of the canal. Once
the full cofferdam is completed, a concrete base will be constructed to house the CSO extension (see Figure 4-10). This stage is expected to last approximately 15 months, with the sheet pile installation estimated to occur over a three month period.

This stage of work for the proposed Current Project is identical to that of the Original Project in the 2000 EA. The Hudson-Bergen Light Rail bridge structure was built in the interim, and was designed to accommodate the future installation of the CSO extension. The CSO will extend about 1800 feet under the proposed Current Project, whereas the extension was approximately 2000 feet under the previously identified Original Alternative.

Stage 2 – Filling in Long Slip

Approximately 190,000 cubic yards of regulated fill material will be needed to fill in the canal and provide a surcharge to compact the soil that will remain in place (up to the top of the bulkhead at about elevation 5 feet above sea level (NAVD88). Once the surcharge is removed, foam concrete will be poured to elevate the site to about 12 feet (NAVD88). Modular retaining walls will be constructed to contain approximately two feet of ballast (so that top of rail will meet the 14.5 feet (NAVD88) NJ TRANSIT flood elevation design criteria). This stage is expected to last approximately two years.

The 2000 EA assumed that approximately 190,000 cubic yards of regulated fill material (the same amount as anticipated under the proposed Current Project) would be transported via barge. In contrast, under the proposed Current Project, dump trucks are expected to be used to transport the fill.

Stage 3 – Bridge Span over Marin Boulevard

Concurrent with either Stage 1 or 2, the bridge span over Marin Boulevard will require pile driving and excavation for the construction of the bridge abutments and installation of the full-span plate girders that will support the new railroad infrastructure. A similar effort was performed for the construction of the bridge that carries the Hudson-Bergen Light Rail line over Marin Boulevard in 2006. This stage of work is expected to last approximately six months, with impact pile driving expected to occur over a one month period.

The design of the Original Project in the 2000 EA did not include construction of a new approach structure above Marin Boulevard.

Stage 4 – Installation of Railroad Infrastructure

The final stage will include construction of tracks, catenary, signals, platforms, station/crew facility and walkway to Hoboken Terminal. Constructing from west to east once Stage 3 is completed, this stage is estimated to be completed within an approximate eight month time frame and may overlap with Stage 2. Impact pile driving is estimated to occur over a one month period.
Legend
- 24 Cofferdam Sheeting Cells

Name
- JCMUA Street CSO Cofferdam
- Floating Deck Netting System
- Existing CSO Extension
- Long Slip Canal
- Hoboken Yard

Figure 4-10: Stage One Construction
Long Slip Fill and Rail Enhancement Project
The design of the Original Project evaluated in the 2000 EA did not include construction of electrified tracks, platforms, station/crew facility or the walkway.

4.10.2 Construction Effects

Transportation

Approximately four trucks per hour, 60 per day, will be needed for concrete deliveries and to bring fill and other material to and from the site, operating between the hours of 6 AM and 10 PM, over an approximate two year period. From I-78, trucks will either travel on Jersey Avenue to 18th Street or head east on Route 139 to Marin Boulevard and 18th Street to access the site. Leaving the site, trucks will travel south on Marin Boulevard and make a right on Route 139 to head west on I-78 (see Figure 4-11). All of the roadways along the truck routes are busy urban arterials, with Average Annual Daily Traffic exceeding 8000 vehicles. The 60 trucks per day, or 120 truck trips per day, will represent an increase in traffic of less than two percent on each of these roadways. This level of increase is not expected to cause significant adverse traffic impacts.

Construction of the bridge span is not expected to significantly impact traffic on Marin Boulevard. The bridge abutments can be constructed without land closures. During installation of the full-span plate girders, closure of the roadway will be required over a period of a few days for several hours at a time. Road closures will be scheduled during off peak hours.

Construction of the bridge span is also not expected to significantly impact light rail or commuter rail operations. Short-term track outages will be required to tie commuter rail into Track 199 and Track 4 Main. These outages will be scheduled during off peak hours. No light rail outages are expected.

Noise and Vibration

Heavy operations are anticipated during each construction stage, therefore, based on guidance found in the FTA’s Transit Noise and Vibration Impact Assessment, May 2006 (FTA Manual), a General Noise Assessment was performed for each of the four main stages of construction. Noise levels are not predicted to exceed FTA’s daytime noise impact criteria for any land use type during the day. Noise levels are predicted to exceed FTA’s nighttime 1-hour leq criterion of 80 dBA at the proposed Newport Development site and 700 Grove Street condominiums/Zephyr Lofts as a result of Stage 1 sheet driving and Stage 3 and 4 impact pile driving. To preclude impacts to these residential sites, pile driving will be prohibited between the hours of 10 PM and 7 AM (see Appendix B).

The potential for increases in noise levels related to construction-related truck traffic was evaluated for residential properties along the proposed truck routes, including the Holland Gardens apartments and a multi-family residential structure under construction on Jersey Avenue, the Holland Hotel on I-78/Route 139 eastbound, and residences located along 1-78/Route 139 westbound at Manila Avenue. Due to the high volume of trucks that currently use these routes, the construction-related increase in truck traffic is not expected to result in a noticeable increase in noise levels at the residential properties (see Appendix B).
Figure 4-11: Construction Truck Routes
Long Slip Fill and Rail Enhancement Project

Legend
- Route 1 - Jersey Avenue & 18th Street
- Route 2 - I-78E/Rt. 139 & Marin Blvd
- Offsite Route - Marin Blvd & I-78W/Rt. 139/Rt 1&9

- Hoboken Yard
- Long Slip Canal
- Census Tract
In accordance with the FTA Manual, construction-induced vibration was quantitatively assessed based on structural damage and annoyance thresholds for impact pile driving and installation of the sheeting. Vibration-induced structure damage is not anticipated at any property during any of the stages of construction. However, sheet driving and impact pile driving during Stages 1, 3 and 4 have the potential to result in vibration-induced annoyance at the proposed Newport Development site (if developed) and 700 Grove Street Condominiums/Zephyr Lofts. To minimize annoyance to residents during sheet driving and impact pile driving operations, the contractor will develop and implement a Vibration Control and Monitoring Plan, which will document expected vibration levels during these operations and identify methods to control vibration (see Appendix B).

**Air Quality**

Construction-related effects will be short-term, over an approximate 3.5 year period, and include the potential for increased fugitive dust (from on-site movement of equipment, and transportation of construction materials), as well as exhaust emissions from material delivery and hauling trucks, construction equipment, and worker’s private vehicles. Projected increases in truck traffic are detailed above. Dust emissions typically occur during dry weather and periods of high wind conditions. Table 4-5 presents the estimated emissions related to construction of the proposed Current Project in tons per year, for the year that yields the highest level during the 3.5 year construction period. Conservative assumptions related to type of equipment, hours of operation and the simultaneous operation of equipment were used to estimate construction emissions. As indicated in Table 4-5, air emissions related to construction activities will be well below the general conformity applicability thresholds (see Section 4.4.3 for a discussion on project-level conformity and Appendix D, Construction Air Quality Analysis).

**TABLE 4-5**

*Predicted Construction Emissions Compared to *De Minimis* Thresholds (tons per year)*

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>General Conformity Applicability Thresholds</th>
<th>Current Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ozone (NO₂)</td>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>Ozone (VOC)</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>CO</td>
<td>100</td>
<td>16</td>
</tr>
<tr>
<td>PM₁₀</td>
<td>100</td>
<td>13</td>
</tr>
<tr>
<td>PM₂.₅</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>SO₂</td>
<td>100</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Construction work will be planned and executed in a manner that will minimize air emissions and will be accomplished in light of the site’s proximity to users of the surrounding environment. Air quality control measures that will be implemented include:

1. use of ultra-low-sulfur diesel fuel to power construction equipment;
2. limiting idling times to less than three minutes on diesel powered engines. Signs will be posted at the site to remind contractors to comply with the idling limits;
3. Non-road diesel equipment greater than 100 horsepower shall meet EPA Tier 4 engine emission standards or be equipped with EPA or CARB-verified emission controls to reduce particulate matter and NO\textsubscript{x} emissions; locating diesel powered exhausts away from local residential or building air intakes;
4. limiting on-site equipment to operating speeds of 5 mph to reduce dust and particulate pollutants from tires and brakes;
5. spraying water or a suppressing agent on any dust pile;
6. utilizing water or appropriate liquids for dust control during demolition, land clearing, filling, grading, and on material stockpiles or surfaces;
7. covering open-body trucks when transporting materials;
8. Haul trucks will use designated truck routes designed to minimize impacts on sensitive receptors; and
9. removing surface materials promptly.

**Greenhouse Gas Emissions**

A temporary increase in GHG emissions will result from the proposed Current Project’s construction. GHG emissions generated during construction will be short-term, resulting from on-site non-road construction engines, on-road trucks supporting construction; and, indirect emissions from extracting, producing, and transporting construction materials and fuels. As per CEQ’s *Revised Draft Guidance for GHG Emissions and Climate Change Impacts*, December 18, 2014, detailed quantified analysis for disclosure of a project’s emissions is not warranted if 25,000 metric tons of carbon dioxide equivalents (CO\textsubscript{2}e) emitted annually would not be exceeded.

GHG Emissions associated with the proposed Current Project’s construction are expected to be well below 25,000 metric tons of CO\textsubscript{2}e emitted annually. GHG emissions from non-road construction engines were estimated using a method common to estimating energy expenditure, which relies on the cost of construction. Based on the North Jersey Transportation Planning Authority’s GHG Inventory\textsuperscript{7} 109,483 metric tons CO\textsubscript{2}e were emitted in the 13-county region in 2006.\textsuperscript{8} The latest construction expenditure data available from the U.S. Census Bureau is the 2007 Survey of Business

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\textsuperscript{7} *NJTPA Regional Greenhouse Gas Emissions Inventory and Forecast—Final Report*, June 2011.

\textsuperscript{8} Detailed data for the construction sector extracted from detailed files prepared by AKRF for NJTPA.
Owners. Based on this data, the construction expenditure in the NJTPA region in 2007 was 37,789 million dollars, resulting in an estimated emissions intensity of 2.897 metric tons CO$_2$e per million dollars. Assuming this intensity, the emissions over the roughly 3.5 year construction duration would be approximately 565 metric tons CO$_2$e for the $195 Million Long Slip project. For the on road trips, the precise origin of the material for fill has not yet been determined and the distance that concrete and other delivery trucks will travel is not known. As a rough, conservatively high estimate a distance of 100 miles per truck trip was assumed, for a round trip of 200 miles per truck. A conservative estimate for the number of trucks needed assumes 60 trucks per workday over a two year period or 31,200 trucks (190,000 cubic yards of fill will require less than 16,000 trucks). Applying an estimated emission factor of 1,738 grams per mile, the trips will result in the emission of less than 11,000 metric tons of CO$_2$e over the two year period or an average of about 5,500 metric tons per year. At this time, there is no consistent and standardized method for calculating the indirect emissions from extracting and producing construction materials. The project does not include substantial foundations, superstructures, or large infrastructure that requires large quantities of cement and steel. For these reasons, indirect GHG emissions have been excluded from this calculation. Efforts will be made to reduce GHG emissions during construction by encouraging use of biodiesel for diesel non-road engines (the majority of construction engines are all diesel powered).

Water Quality/Ecosystems (Vegetation and Wildlife Habitat)/T&E Species

Short-term effects related to the proposed Current Project’s construction are not anticipated in the waters of the Hudson River due to the construction methods chosen. The construction area for the proposed Current Project is smaller than that for the Original Project and does not extend into the Hudson River.

As indicated above, the construction of the CSO extension will be accomplished through dry methods only to reduce the potential for sedimentation in the Hudson River. Transverse sheeting will be installed at the Hudson-Bergen Light Rail structure to isolate the fill area from the Hudson River. A secondary temporary measure in the form of a silt curtain will be provided during construction to prevent settlement displacement into the Hudson River.

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10 While very minor growth was projected in emissions from the relevant sectors from 2006 to 2007, the specific data for construction is not readily available. However, this is expected to represent a very small change.
11 This emission factor was taken from EPA MOVES model runs prepared for New York City’s CEQR Technical Manual, and represent emissions for refuse trucks (equivalent to dump truck emissions) at an average speed of 30 miles per hour. These factors were produced using an older version of MOVES run for 2010 and adjusted to 2019 using the projected Corporate Average Fuel Economy (CAFÉ) standards available for the on-road fleet at the time, and are therefore conservative because current standards will result in lower emissions for 2019. Note that CO$_2$ emissions are not heavily affected by location and meteorology as is the case for other pollutants. Direct emission would include a negligible contribution of methane, not included here.
To minimize any potential in-water noise impacts on aquatic wildlife and avoid potential impacts to migrating shortnose sturgeon, NJ TRANSIT will adhere to the seasonal restrictions on pile driving activities as recommended by NMFS (Appendix C) and will utilize the least intrusive sheet pile installation method for in-water work. No bedrock or other obstructions are anticipated to be encountered during the sheet piling. The sheet pile installation will be completed by a vibratory driver that clamps onto the pile and forces vertical vibrations to loosen the soil and allows the pile to be pushed into the ground using its own weight and the weight of the driver. This method produces substantially fewer sound waves through the soils where the sheet pile is being installed.

**Contaminated Materials**

Hoboken Yard has a history of contamination from its historic use as a rail yard and from the non-hazardous sewer discharge that contaminates the canal. The site is underlain by historic fill material and the area west of the Long Slip Canal has been impacted by historic spills.

NJ TRANSIT has recently conducted investigations and identified several areas of concern (AOC) for contaminated materials. Petroleum-contaminated soils and contaminated groundwater may be encountered during construction. These areas will be delineated and soils will be removed, transported and disposed of at regulated facilities in accordance with all applicable federal and state laws and regulations.

NJ TRANSIT will develop contract specifications that will be followed if unknown/unanticipated soil or groundwater contamination is encountered during construction. NJ TRANSIT will perform on-site monitoring to ensure that removal of contaminated soil or groundwater is performed in accordance with the contract specifications and all applicable NJDEP regulations. On-site temporary storage areas for stockpiling contaminated soil, where necessary, will be designated in advance as will the identification of licensed disposal facilities and transporters. A Health and Safety Plan will be developed to ensure that all workers are protected during handling and disposal of contaminated soil and groundwater. With the implementation of the measures discussed above to characterize potential areas of concern, and the protocols that will be followed for the handling, storage, transport and disposal of contaminated materials, the proposed Current Project will not result in adverse impacts related to contaminated materials.

### 4.11 ENVIRONMENTAL JUSTICE

The study area for environmental justice encompasses census tracts within a 1/4 mile radius of Long Slip Canal, which is the area most likely to be affected by the operation and construction of the proposed Current Project, including the increase in construction-related truck traffic. Based on the 2010 Census, Hudson County has a minority population of 42% and a median household income of $58,442. All Hoboken census tracts located in within ¼ mile of the Long Slip Canal have relatively low percentages of minorities (between about 11 and 16 percent) and relatively high median

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12 2009-2013 American Community Survey 5-Year Estimates
incomes (between about $82,000 and $163,000). Census Tract 77 in Jersey City, which includes the Newport Development, has a large minority population (Asian 62.5%) with an income level at $142,788. However, the buildings within the ¼ mile study area in Census Tract 77 are currently under construction and are unoccupied. Census Tract 78, which is west of the Newport Development, is approximately 53% percent minority with a median household income of $16,179 (see Table 4-6 and Figure 4-11).

The majority of Census Tract 78 is commercial with the exception of residential properties in the block bounded by Jersey Avenue to the west, 16th Street to the north, the I-78 collector roadway to the south, and Marin Boulevard to the east. Hudson County Holland Gardens, a Jersey City Housing Authority public housing complex consisting of 189 dwellings, is located within this block. While these residences are located approximately ¼ mile or more away from Long Slip Canal, the truck routes pass by this Environmental Justice community.

With the exception of a temporary increase in truck traffic, neither the proposed Current Project’s construction nor operation will be noticeable to the residents in Census Tract 78. Approximately four trucks per hour will operate in the area between the hours of 6AM and 10 PM over a two year period. Noise levels at the residential properties on the truck routes are not expected to increase significantly due to the high volume of truck traffic that currently operates on the adjacent roadways (see Appendix B).

Overall the proposed Current Project will not result in a disproportionately high and adverse impact to the Environmental Justice communities in the study area since no significant adverse impacts are expected to occur. The adjacent communities will benefit from the more resilient train service that will result from implementation of the proposed Current Project.

The environmental justice process requires federal agencies to ensure public participation by communities with substantial minority or low-income populations who may be affected by a project. Notice of availability of this document is being distributed widely in Spanish and English. The notice includes information on where to view the document and how to provide comments during the public comment period. The distribution of the notice of availability includes:

- Newspaper advertisements in: El Especialito, a Spanish publication in Hudson County; Hudson Reporter (Hoboken and Jersey City editions); and Jersey Journal;
- Coordination with Jersey City Housing Authority, Hoboken Housing Authority, and Holland Gardens public housing complex to ensure Spanish and English notices are posted in visible locations frequented by residents;
- Email notifications to project stakeholders;
- Letter notification to local municipalities, and county and elected officials serving in Congressional District 8, and New Jersey’s Legislative District 31, 32 and 33;
- Notification via phone and email transmission of notice to local public libraries, schools/universities, and government and community facilities for posting; and
### Table 4-6: Population and Economic Characteristics in the Study Area

<table>
<thead>
<tr>
<th>Area</th>
<th>Population</th>
<th>Economic Profile</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Race And Ethnicity%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>White</td>
</tr>
<tr>
<td>State of New Jersey</td>
<td>8,791,894</td>
<td>68.6%</td>
</tr>
<tr>
<td>Hudson County</td>
<td>634,266</td>
<td>54.0%</td>
</tr>
<tr>
<td>Jersey City</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Census Tract 77</td>
<td>9,618</td>
<td>23.0%</td>
</tr>
<tr>
<td>Census Tract 78</td>
<td>1,360</td>
<td>34.2%</td>
</tr>
<tr>
<td>Hoboken</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Census Tract 183.01</td>
<td>1,802</td>
<td>84.7%</td>
</tr>
<tr>
<td>Census Tract 188</td>
<td>3,258</td>
<td>85.9%</td>
</tr>
<tr>
<td>Census Tract 191</td>
<td>3,392</td>
<td>81.0%</td>
</tr>
<tr>
<td>Census Tract 192</td>
<td>3,928</td>
<td>81.5%</td>
</tr>
<tr>
<td>Census Tract 193</td>
<td>2,813</td>
<td>84.9%</td>
</tr>
<tr>
<td>Census Tract 194</td>
<td>2,845</td>
<td>86.6%</td>
</tr>
</tbody>
</table>

**Notes:**

1. Race: The 'White, Black / African American, American Indian / Alaska Native, Asian, Native Hawaiian and Other Pacific Islander and Other' categories include people who identified themselves under 'One Race'. This category is independent of Ethnicity (please see note #3).
2. Minorities include - Black / African American, American Indian / Alaska Native, Asian, Native Hawaiian and Other Pacific Islander and Other (One Race)
3. This category lists people who identified themselves as 'Hispanic or Latino'
4. Census Tract 77 in Jersey City includes the Newport Waterfront Area, with a high-income Asian population.

**Source:**

4.12 INDIRECT EFFECTS AND CUMULATIVE IMPACTS

This section assesses the potential for the proposed Current Project to result in indirect effects and cumulative impacts. Potential indirect effects are generally defined as those induced or “caused by an action and are later in time or farther removed in distance, but are still reasonably foreseeable” (40 CFR § 1508.8(b)). Potential cumulative impacts may result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions (40 CFR § 1508.7).

The proposed Current Project will not result in an increase in train frequency, capacity or rail ridership. It also will not induce development nor will it result in population or employment growth. As a result, adverse indirect effects related to the proposed Current Project’s implementation are not expected to occur.

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

- Construction of the Hudson River Waterfront Walkway, which altered the navigable channel;
- Construction of the HBLR bridge spanning Long Slip Canal, which significantly impeded water flow into and out of the Canal, and obstructed the navigable channel;
- The Emergency Ferry Expansion Project, which included dredging at the mouth of the canal and created functional fisheries and benthic organism (baseline food source) habitat.

The cumulative effects of the proposed Current Project in combination with these past actions include elimination of the blighted conditions that currently exist in Long Slip Canal and further improvement of water quality at the mouth of the canal and in the Hudson River as a result of the CSO extension.

In terms of future actions, the New Jersey Department of Environmental Protection (NJDEP) is leading a Rebuild by Design effort to protect Hoboken, Weehawken and Jersey City from flooding. This project is in the early planning stages and could include construction of sea walls and use of greenways as barriers against flooding and rainwater storage sites.

The proposed Current Project will complement the efforts of the Rebuild by Design team since filling the Slip eliminates a vector for storm surges and significantly reduces the area of inundation in Hoboken and Jersey City. Any type of seawall or tide-gate installation built in this area would also require an extension of the CSO. The canal would need to be filled so that the seawall or tide-gate wouldn’t further confine the stagnant water and create the risk of environmental hazards associated with a polluted water body. The proposed Current Project will not preclude the future installation of a seawall and NJ TRANSIT is committed to coordinating with Rebuild by Design and others who are planning projects in the area to reduce the potential for flooding in Hoboken and Jersey City.

The proposed Current Project will have no cumulative adverse effects in combination with other future projects, including those that will affect the Hudson River (e.g., Hudson River Tunnel Project...
or the regular dredging of the navigational channel) and nearby planned commercial and residential developments in the Jersey City Redevelopment areas. It will, however, support new development by providing for resilient, reliable trains service. The proposed Current Project in combination with the other components of NJ TRANSIT’s resilience program will enhance service reliability and allow NJ TRANSIT to restore service quickly after a major storm.

### 4.13 PERMITS AND APPROVALS

The environmental permits and land use regulatory approvals required to construct and operate the proposed Current Project are described below. NJ TRANSIT is exempt from municipal site plan approval requirements.

**Federal**

1. United States Army Corps of Engineers (USACE) Jurisdictional Determination, to verify regulated wetland limits;
2. USACE Section 10 Individual Permit, which prohibits the obstruction or alteration of navigable waters of the United States without a permit; and
3. USACE Section 404 Individual Permit, which prohibits the discharge of dredged or fill material into waters of the United States without a permit from the Corps of Engineers.

**State**

1. New Jersey Department of Environmental Protection (NJDEP) Flood Hazard Area (FHA) Individual Permit or FHA rules compliance which is required for excavation or filling in regulated flood hazard areas, riparian zones, and construction methods and materials used in these zones;
2. NJDEP Waterfront Development Permit, which is required for all activities occurring in areas including tidal waterways of the State and all lands lying thereunder, up to and including the Mean High Water (MHW) line and adjacent upland areas extending landward from the MHW line to the first paved public road, railroad, or surveyable property line provided that the landward boundary of the upland area shall be no less than 100 feet and no more than 500 feet from the MHW line;
3. NJDEP Tidelands Instrument (License, Grant), which requires written permission from the state and payment of a fee to use these lands;
4. NJDEP Beneficial Use Determination/Acceptable Use Determination, for importing dredge as fill material or suitable medium;
5. New Jersey Pollution Discharge Elimination System (NJPDES) for stormwater management, in which NJPDES Stormwater Phase II Program in conjunction with NJDEP Division of Water Quality, Stormwater Discharge Permits are issued limiting the maximum daily discharge of fine sediment and/or concentration of pollutants which may be discharged into ground water, streams, rivers, and the ocean.
6. Compensatory Mitigation, which is coordinated with ACOE but subject to NJDEP review for compensatory Mitigation for Losses of Aquatic Resources, Wetlands, Riparian Areas; and
7. NJDEP Soil Erosion and Sediment Control Certification, which is required for any disturbance greater than 5,000 square feet.
Local

1. Hudson Essex Passaic (HEP) Soil Erosion Sediment Control Certification, which is issued by the Hudson Essex Passaic Soil Conservation District and required for any disturbance greater than 5,000 square feet.

4.14 SUMMARY OF CURRENT PROJECT EFFECTS

The proposed Current Project will not result in any significant adverse impacts or new adverse impacts to the environment, or change the determination of impacts that was presented in the 2000 EA. The new train station will enhance the resiliency of NJ TRANSIT’s commuter rail service at Hoboken Terminal. The lengthy service disruptions that are currently experienced leading up to and following a storm to decommission and re-commission Hoboken Terminal will be eliminated. Delays related to perturbed railroad operations, when trains are routed to Hoboken Terminal to avoid problems elsewhere in the system, will be significantly reduced. The proposed Current Project will restore to full transportation use a currently unusable and undesirable portion of the yard. The fill will eliminate what is currently an entry point for floodwaters into Hoboken and the northwest portion of Jersey City. The fill will also stabilize the failingbulkhead in the canal, and save significant rehabilitation costs related to its repair.

NJ TRANSIT will work with both the NJDEP and JCMUA to ensure that the combined sewer overflow meets all permit requirements during the extension construction and final placement. Similarly, NJ TRANSIT will work with both NJDEP and PATH managers to ensure that the PATH tunnel discharge meets all permit requirements during the extension construction and final placement.

Similar to the Original Project, the proposed Current Project will eliminate approximately 4.3 acres of subtidal wetlands/waters of the U.S due to filling in Long Slip Canal. Mitigation for this impact will include adherence to the conditions of the USACE Section 10/404 and NJDEP Waterfront Development permits, and Compensatory Mitigation will be identified and carried out via coordination with USACE, NJDEP and/or other MIMAC members, as appropriate. Based on recent coordination with USACE, NJDEP and other MIMAC members, NJ TRANSIT proposes to purchase wetland mitigation credits at a ratio of 1:1 through an approved wetland mitigation bank.

To compensate for impacts to the Pullman Yard Concrete Bumpers and the Old Main DL&WRR Historic District one of the four Pullman Yard Concrete Bumpers will remain in place and photo documentation of all four Concrete Bumpers will be completed prior to the demolition of the other three. A narrative description and statement of significance for the blocks and a letter report for the NJ SHPO resource files will be prepared. In addition, the exteriors of all new structures (retaining walls, station structures, facades, bridge structures) will utilize a context-sensitive design treatment consistent with the character-defining features of the Old Main DL&WRR Historic District and design submittals will be made to the NJ SHPO for review and concurrence.

To mitigate the potential effects of construction activities to the greatest extent practicable, best practices will be implemented and monitored in the field and the proposed Current Project will be
constructed in accordance with all applicable laws, regulations and permit conditions. To address the potential for short-term adverse noise and vibration impacts to result from the proposed Current Project’s construction the following will be implemented:

- To preclude the potential for noise impacts to residential properties, impact pile driving will be prohibited between the hours of 10 PM and 7 AM;
- To minimize annoyance to residents during sheet driving and impact pile driving operations, the contractor will develop and implement a Vibration Control and Monitoring Plan, which will document expected vibration levels during these operations and identify methods to control vibration.
- To minimize any potential in-water noise impacts on aquatic wildlife and avoid potential impacts to migrating shortnose sturgeon, NJ TRANSIT will adhere to seasonal restrictions as recommended by NMFS (Appendix C) and will utilize the least intrusive sheet pile installation method for in-water work.
CHAPTER 5  SECTION 4(f) DE MINIMIS DETERMINATION

5.1  INTRODUCTION

NJ TRANSIT proposes to complete the Long Slip Fill and Rail Enhancement Project (“Current Project”), which includes filling in of a former freight barge channel known as the Long Slip Canal and construction of a resilient train station, including a new approach track structure, elevated tracks, ADA-compliant platforms, passenger station/crew facility, and walkway to Hoboken Terminal on top of the fill. The new station will be used during floods and other emergencies, when trains need to be rerouted to Hoboken Terminal due to problems elsewhere in the system and, under normal operating conditions, for rail car storage. The proposed Current Project is located in a portion of NJ TRANSIT’s Hoboken Yard in Jersey City, Hudson County, New Jersey (see Figure 5-1 and Figure 5-2).

The proposed Current Project will be built within the boundaries of the Old Main Delaware, Lackawanna, and Western Railroad (DL&WRR) Historic District, which is eligible for listing on the National Register of Historic Places (NRHP). In March 2000, a Final Section 4(f) Evaluation was completed for an earlier version of the proposed Current Project (called the NJ TRANSIT Long Slip Habitat Creation Project or “Original Project”) that also required the filling in of Long Slip Canal, which is a contributing resource to the Old Main DL&WRR Historic District. The Final Section 4(f) Evaluation included mitigation measures that were stipulated in a June 1999 Memorandum of Agreement (MOA) between the Federal Transit Administration (FTA), New Jersey Transit Corporation (NJ TRANSIT), the New Jersey State Historic Preservation Officer (NJ SHPO), and the U.S. Army Corps of Engineers (USACE). The stipulations to mitigate the adverse effects caused by the filling in of the Long Slip Canal, at that time, included: 1) the preparation of specific written and photographic documentation relating to the history and function of the Long Slip Canal for inclusion in documentation of Hoboken Yard according to the standards of the Historic American Building Survey (HABS)/Historic American Engineering Record (HAER); and 2) installation of an interpretive panel describing the history and significance of the Long Slip Canal and the adjacent DL&WRR passenger and freight yards.

While the Original Project was not completed due to funding constraints, subsequent to the 1999 MOA and 2000 Final Section 4(f) Evaluation, NJ TRANSIT completed all of the stipulations contained in the 1999 MOA to mitigate adverse effects to the Old Main DL&WRR Historic District related to the filling in of Long Slip Canal. The NJ SHPO, in correspondence with NJ TRANSIT dated April 22, 2015 acknowledged and confirmed that the mitigation measures had been fully satisfied (see Appendix A). Therefore, the mitigation stipulations from the 1999 MOA have been fulfilled and are not applicable to the proposed Current Project.
Figure 5-1: Current Project Location

Long Slip Fill and Rail Enhancement Project

Legend
- Current Project Location
- Lautenberg Station
- Rail Lines
- Hoboken City
- Jersey City
- New Jersey Counties
- New Jersey
- New York

Path: \Atlas\gisdata\Projects\NJ_Transit\Tier3\HobokenLongSlip\2015_EAMX0D\Figure5-1_ProjectLocation.mxd
Figure 5-2: Project Vicinity
Long Slip Fill and Rail Enhancement Project

Path: %Atlas\gisdata\Projects\NJ_Transit\Tier3\HobokenLongSlip\2015_EA\MXD\Figure5-2_ProjectVicinity.mxd
The proposed Current Project incorporates design changes to the Original Project that reflect the need to enhance the resilience of NJ TRANSIT service leading up to and following severe weather events. Sandy and other recent storms have underscored the need to reduce the risk of flooding within the Hoboken Rail Yard and provide a resilient train station for use during emergencies. Pursuant to Section 106 regulations, NJ TRANSIT, in consultation with FTA and NJ SHPO, delineated an Area of Potential Effect (APE) for the proposed Current Project and identified the historic properties listed in or eligible for listing in the NRHP. In addition to the filling in of the Long Slip Canal, the proposed Current Project will require the removal of three of the four Pullman Yard Concrete Bumpers, a newly identified historic resource, which is a contributing resource to the historic district. The proposed Current Project will also require construction of new structures such as retaining walls, platforms, canopies, buildings, railroad bridges, signal bridges, and catenary support structures within the boundaries of the historic district.

FTA proposes a Section 4(f) de minimis impact determination related to the demolition of three of the four Pullman Yard Concrete Bumpers and construction of the new structures within the boundaries of the historic district. A de minimis impact for historic sites is one that after taking into account any measures to minimize harm (such as avoidance, minimization, mitigation or enhancement measures), the project will have no adverse effect on the historic property, and the NJ SHPO concurs with this finding.

5.2 REGULATORY CONTEXT

Section 4(f) of the Department of Transportation (U.S. DOT) Act of 1966, codified in federal law at 49 U.S.C. § 303, declares that “it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites.” Section 4(f) specifies that the Secretary of Transportation may approve a transportation program or project requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if:

- there is no prudent and feasible alternative to using that land; and
- the program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use; or
  - the use results in a de minimis impact on the resource (23 CFR 774.4).

A determination of de minimis impact on a historic site may be made when the following criteria are satisfied:
1. The consulting parties identified in accordance with 36 CFR part 800 must be consulted; and
2. FTA must receive written concurrence from the pertinent State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Officer (THPO), and from the Advisory Council on Historic Preservation (ACHP) if participating in the consultation process, in a finding of “no adverse effect” or “no historic properties affected” in accordance with 36 CFR Part 800. The FTA shall
inform these officials of its intent to make a de minimis impact determination based on their concurrence in the finding of “no adverse effect” or “no historic properties affected.” (23 CFR 774.5(b))

5.3 CURRENT PROJECT DESCRIPTION

The proposed Current Project includes construction of new approach tracks at the western end of Hoboken Yard on a new two-track bridge above Marin Boulevard (formerly Henderson Street). It will entail filling in approximately 4.3 acres of the canal and adjacent land within Hoboken Yard for expansion of train storage and installation of six electrified tracks, high-level platforms, a station/crew facility, and a walkway to Hoboken Terminal (see Figure 5-3).

Specifically, the proposed Current Project consists of the following components:

1. Extension of the Jersey City Combined Sewer Overflow (CSO) discharge point, which currently terminates at the west end of the canal, by approximately 1800 feet. A cofferdam\(^{13}\) will be constructed via sheet piling to isolate the Long Slip Canal’s construction activities from the Hudson River to protect the resources of the Hudson River.

\(^{13}\) A cofferdam is an enclosure built within a body of water to allow the enclosed area to be pumped out, creating a dry work environment for the major work to proceed.
Figure 5-3: Current Project - Proposed Track Layout

Long Slip Fill and Rail Enhancement Project

Legend
- 6 Tracks, 3 ADA-Compliant Platforms, and Station/Crew Facility
- Long Slip Canal
- Hoboken Yard

Hoboken Rail Yard

Bergen Tunnels

Hoboken Terminal

Hoboken Ferry Terminal

Hoboken Bus Depot

Newark St

Observer Hwy

16th St

Main Blvd

15th St

Grove St

18th St

Engine House

Proposed Station/Crew Facility

Wheel Truing Facility

Hudson-Bergen Light Rail

Pulman Yard Bumpers

Fuel/Sanding Train Washer

Pulman Yard

Future Location of Henderson Street Substation

Existing Hudson-Bergen Light Rail Station

Existing Long Slip Waterfront Walkway

Figure 5-3: Current Project - Proposed Track Layout
2. Filling in Long Slip Canal to create approximately 4.3 acres of new land. The fill will serve to permanently stabilize the existing bulkheads that line the canal and are currently in disrepair. The fill will extend to an elevation of 12 feet (using the North American Vertical Datum of 1988 [NAVD88]) so that the top of rail will be at 14.5 feet, to meet NJ TRANSIT’s flood risk management criteria. The volume of permanent fill is estimated to be approximately 190,000 cubic yards. An additional 50,000 cubic yards of fill will be used temporarily as a surcharge load, to compact the soils placed in Long Slip to meet structural requirements.

3. Construction of a new two-track bridge over Marin Boulevard to support track connections to existing Track 199 and Track 4 Main at the approach to the Bergen Tunnels. The alignment requires removal of three of the four Pullman Yard Concrete Bumpers and truncation of four tracks in Pullman Yard. Relocations and/or reconfiguration of other tracks, equipment and sheds at the western approach will also be required.

4. Construction of six new tracks with associated catenary supports and wiring, and three high-level ADA-compliant passenger boarding platforms. A three-story station/crew facility (approximately 120 feet long x 90 feet wide x 40 feet high) will be built at the eastern end of the platforms. Stairs, elevators, waiting room space and other passenger amenities, as well as space for transportation and mechanical personnel will be constructed in the facility. A connecting sidewalk linking the new facility and the existing terminal entrance will also be constructed (see Figure 5-4).

5.4 DESCRIPTION AND USE OF SECTION 4(f) PROPERTY

The proposed Current Project will not result in the “use” of any public park, recreational land, or wildlife or waterfowl refuge.

The Old Main DL&WRR Historic District is eligible for listing in the NRHP for its association with suburbanization, transportation (commuter, passenger, and freight traffic), engineering and architecture. The period of significance of the historic district dates from the mid-1850s to the mid-1930s.

The district boundaries extend from its eastern terminus in Hoboken and Jersey City known as the Erie Lackawanna Railroad and Ferry Terminal and Yard (including Long Slip), to the Township of Washington, NJ.

The Pullman Yard Concrete Bumpers are monolithic blocks of poured concrete, installed in the early twentieth century as part of a new yard and office building for the Pullman Company’s fleet of luxury passenger coaches. The Bumpers served to stop rail cars from running off the stub tracks into the adjoining Marin Boulevard. A signature material pioneered by the DL&WRR for use in railroad applications, reinforced concrete proved both versatile and durable. The most ambitious uses of the material included the DL&WRR’s numerous stations, retaining walls, and bridges, especially its major viaducts along the New Jersey Cutoff and elsewhere on the system. The bumpers belong to a long
tradition of similar utilitarian concrete structures installed within the boundaries of the NRHP-eligible Old Main DL&WRR Historic District. They were constructed during the district’s Period of Significance, and retain their integrity of location, design, and workmanship. The Pullman Yard Concrete Bumpers do not meet the threshold for individual eligibility under NRHP Criteria, but are recommended as contributing resources to the larger Old Main DL&WRR Historic District.

The proposed Current Project will require “use” of Section 4(f) property since it requires removal of three of the four Pullman Yard Concrete Bumpers. The proposed Current Project will also require construction of new structures such as retaining walls, platforms, canopies, buildings, railroad bridges, signal bridges, and catenary support structures within the boundaries of the historic district.

5.5 Basis for De Minimis Impact Determination

After consideration of impact avoidance, minimization, and mitigation or enhancement measures undertaken as part of its coordination with NJ SHPO, FTA has determined that the proposed Current Project would not result in an adverse impact on historic Section 4(f) properties, subject to mitigation commitments made by NJ TRANSIT. NJ SHPO has concurred (see October 9, 2015 correspondence, signed by NJ SHPO on October 21, 2015, in Appendix A) with the no adverse impact determination for the proposed Current Project conditional upon the implementation of the following mitigation commitments:

- Retention in place of one of the four Concrete Bumpers;
- Photo-documentation of the Concrete Bumpers in place prior to removal of the three blocks;
- Narrative description and statement of significance for the Concrete Blocks in letter report format provided for the NJ SHPO resource files;
- Context sensitive design for the exterior elements of all new structures in accordance with the standards, guidance and recommended practices contained in the Secretary of the Interior’s Standards for the Treatment of Historic Properties; and
  - Submission of 30%, 60% and final design level documents for NJ SHPO review and approval.

5.6 De Minimis Section 4(f) Coordination

The proposed Current Project has been coordinated with NJ SHPO, the Advisory Council on Historic Preservation (ACHP), and consulting and interested parties. The record of consultation is provided in Appendix A and includes:

- Correspondence dated February 9, 2015 from NJ SHPO (D. Saunders) to NJ TRANSIT (D. Callender) concurring on the list of consulting parties and the Area of Potential Effect (APE) for the proposed Current Project.
- Correspondence stamped March 2, 2015 from NJTRANSIT (S. Santoro) to FTA (M. Shazor) identifying consulting parties for the proposed Current Project.
• Correspondence dated March 2, 2015 from FTA (M. Shazor) to NJTRANSIT (S. Santoro) concurring on the list of consulting parties for the proposed Current Project.

• Correspondence dated April 7, 2015 from FTA to Tribal Historic Preservation Officers of the Delaware Nation, the Delaware Tribe, the Eastern Shawnee Tribe of Oklahoma, and the Shawnee Tribe notifying them of the project.

• Correspondence dated May 22, 2015 from the Delaware Tribe Historic Preservation Representative (B. Fink) to the FTA stating in part “Our review indicates that there are no religious or culturally significant sites within the selected project area and we have no objection to the proposed project. We defer further comment to your office.” FTA received no replies from the other notified Tribal SHPOs.

• Correspondence dated October 6, 2015 from the ACHP (L. Johnson) to FTA (N. Danzig) indicating that ACHP chose not to participate in the Section 106 consultation process.

• Correspondence dated October 9, 2015 between NJ TRANSIT (D. Callender) and NJ SHPO (D. Saunders) requesting concurrence that plans to preserve one Concrete Bumper will result in a conditional no adverse effect determination and NJ SHPO concurrence dated October 21, 2015.

• Correspondence dated January 20, 2016 from FTA (M. Shazor) to NJ SHPO (D. Saunders) proposing to use the “no adverse effect” finding to support a de minimis Section 4(f) determination for the proposed Current Project. FTA included stipulations requested by the Delaware Tribe Historic Preservation Representative regarding treatment of human skeletal remains and unanticipated discoveries of tribal archaeological resources as an additional condition of the proposed Section 4(f) de minimis determination. NJ SHPO concurred with the proposed 4(f) de minimis determination in an email dated January 26, 2016.

• FTA and NJ TRANSIT notified the project consulting parties of the availability of the EA including the proposed 4(f) de minimis determination prior to the public comment period and requested that any comments regarding the proposed Section 4(f) de minimis determination be made during the same period.

5.7 CONCLUSION

The proposed Current Project will have no adverse effect on Section 4(f) resources conditioned upon the implementation of the measures that were agreed to by NJ SHPO, FTA and NJ TRANSIT in correspondence dated October 9, 2015, signed by NJ SHPO on October 21, 2015 (see Appendix A). As a result, FTA is making a Section 4(f) de minimis determination for the proposed Current Project.
CHAPTER 6

LIST OF PREPARERS

FEDERAL TRANSIT ADMINISTRATION

Nancy Danzig, Director, Office of Planning and Program Development, Region II. EA/Section 4(f) Evaluation review and approval.

Dan Moser, Community Planner, Region II. EA/Section 4(f) Evaluation review and approval.

Helen Serassio, Attorney Advisor. EA/Section 4(f) Evaluation review and approval, legal sufficiency.

NJ TRANSIT

Nick Valente, Manager, Environmental Compliance, Environmental Services Unit; project manager.

Jeremy Colangelo-Bryan, Chief Planner, Capital Planning & Programs Department. Planning, environmental analysis, and Section 106 oversight and coordination.

Dara Callender, P.E., Manager, Environmental Compliance, Environmental Services Unit; project manager and Section 106 oversight and coordination.

John Geitner, CHMM, Senior Director, Environmental Services Unit; program manager.

CONSULTANTS

Harold Olarte, BEM Systems, Inc. Project Manager and Natural Resources Task Leader.

Audrey Heffernan, LEED AP, BEM Systems, Inc. NEPA and Section 4(f) Evaluation Lead.

Laura Sliker, BEM Systems, Inc. Land Use, Socioeconomics and Environmental Justice Task Leader.


Sandra Peterson, BEM Systems, Inc. Technical Editor and Graphics Design.

Adam Mastro, BEM Systems, Inc. GIS Support.


Paul McEachen, Richard Grubb and Associates, Principal Archaeologist, Section 106 Consultation.

Phil Hayden, Richard Grubb and Associates, Principal Investigator, Architectural Historian, Section 106 Consultation.
Damon Tvaryanas, Richard Grubb and Associates, Historic Architectural and Archaeological Resources and Section 106 Consultation.

Sharon Paul Carpenter, Paul Carpenter Associates, Inc. Air Quality Assessment.


Chitra Radin, Radin Consulting Inc. Support for Environmental Justice Analysis.

Krupti Kalbag, Radin Consulting Inc. Support for Environmental Justice Analysis.
Appendix A: Section 106 and Section 4(f) Consultation
February 9, 2015

Dara Callender, P.E.
Supervising Compliance Specialist
Environmental Services Unit
NJ Transit
One Penn Plaza East
Newark, NJ 07105-2246

Dear Ms. Callender:

As Deputy State Historic Preservation Officer for New Jersey, in accordance with 36 CFR 800: Protection of Historic Properties, as published in the Federal Register on December 12, 2000 (65 FR 77698-77739) and amended on July 6, 2004 (FR 40544-40555), I am providing Initial Consultation Comments for the following proposed project:

City of Hoboken and City of Jersey City
Hudson County
NJ Transit Long Slip Fill Project
NJ Transit
Federal Transit Administration (FTA)

The proposed project consists of filling in the Long Slip around an extension of the Jersey City combined sewer discharge and outflow, and construction six (6) new yard tracks on top of the fill. The fill will be deposited and elevated within solid retaining walls 6 - 8' above the existing grade. Additionally, three (3) 20' high-level platforms, including canopies etc., and a three story building at the east end of the platforms, including stairs and elevators that will include waiting room space and space for transportation and mechanical personnel, will be constructed. Other project elements include a new sidewalk and new catenary structures. Existing yard track and equipment will be relocated, a new two-track under grade bridge over Marin Blvd. (Hendrickson Street) will be constructed, and miscellaneous existing yard track and equipment sheds will be reconfigured.

I note that the basic project element of filling in the Long Slip was previously submitted by NJ Transit, and in 1999, the FTA, NJ Transit, and the Army Corps of Engineers, executed a Memorandum of Agreement (MOA) with this office. NJ Transit subsequently completed the stipulations of the MOA to mitigate adverse effects to historic resources. Because of financial constraints, the project was never begun. Following Superstorm Sandy, and the inundation of the rail yard by the storm surge, the project...
was revived with a number of significant project additions and has been re-submitted as a new project. As designed, the current project will protect the new components of the yard from future flooding and will help limit water ingress in the yard and surrounding City of Hoboken.

800.3 Initiation of the Section 106 Process

I agree that the Federal Transit Administration (FTA), the New Jersey Historic Preservation Office (HPO), NJ Transit, the Army Corps of Engineers, Hudson County, the City of Hoboken, the City of Jersey City, the Delaware Nation, the Delaware Tribe, the Eastern Shawnee Tribe of Oklahoma and the Shawnee Tribe, are the appropriate parties for the initiation of consultation. Public involvement activities may identify additional consulting parties and resource organizations. As described in the submitted materials, the Public Involvement Plan for the proposed project consists of contacting consulting parties and interested parties via letter including the project description, location map and preliminary information regarding historic properties within the project’s Area of Potential Effects (APE). Subsequent cultural resources documentation will be provided to the consulting and interested parties. In the event of an Adverse Effect determination, the consulting and interested parties will be consulted and comments on a draft Memorandum of Agreement (MOA) will be solicited. The HPO agrees with the public involvement plan.

800.4 Identification of Historic Properties

I agree with the Area of Potential Effects (APE) for historic architecture and archaeology as delineated on the submitted map. The proposed APE appears to include all the properties that would be physically or visually impacted by the proposed project.

I also agree that the Hudson County Cultural Affairs and Tourism Office, the Jersey City Historic Preservation Commission, the Hoboken Historic Preservation Commission, the Hoboken Historical Museum, the Anthracite Railroads Historical Society, Inc., the Erie-Lackawanna Historical Society, the Tri-State Chapter National Railway Historical Society, the Roebling Chapter Society for Industrial Archaeology and the Archaeological Society of New Jersey, are organizations with a potential interest in and knowledge of historic properties and would be considered information resources for the pending cultural resources evaluation.

Archaeology

Based upon the documentation submitted, as well a previous archaeological survey within the project’s Area of Potential Effects (APE), the project has low potential to affect significant archaeological resources eligible for listing in the New Jersey and National Registers of Historic Places.

The HPO looks forward to continued consultation on the above project. If you have any questions regarding historic architecture, please contact Patty Chrisman of my staff at (609) 984-0850 or at Patty.Chrisman@dep.nj.gov. For questions regarding archaeology, please contact Vincent Maresca at (609) 633-2395 or at Vincent.Maresca@dep.nj.gov. Please refer to project number 14-3233 in any future emails, telephone calls or written correspondence in order to expedite our review and response.

Sincerely,

Daniel D. Saunders
Deputy State Historic Preservation Officer
C: Anthony Carr, FTA
   Nicholas Valente, NJ Transit
   Harold Olarte, BEM Systems, Inc.
   Philip Hayden, RGA
Ms. Marilyn G. Shazor
Regional Administrator, Region 2
Federal Transit Administration
One Bowling Green
Room 429
New York, NY 10004-1451

Re: Hoboken Long Slip Fill Project (Superstorm Sandy Project - Tier III)

Dear Ms. Shazor:

NJ TRANSIT requests your approval of the attached list of consulting parties, prepared pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and associated implementing regulations 36 CFR 800, for the referenced project.

NJ TRANSIT intends to fill the Long Slip canal in the Hoboken Rail Yard and construct new yard tracks, platforms and a station building on the filled and elevated area to permit continued operation of commuter rail services to and from the yard and its associated light rail, PATH and ferry services, while the main rail yard infrastructure and equipment are taken out of service in the event of an impending storm, or being restored following a storm event. The project is subject to Section 106 of the National Historic Preservation Act. In compliance with CFR Part 800.3, NJ TRANSIT prepared a list of consulting parties and resource organizations (interested parties) for review, with which the New Jersey State Historic Preservation Office concurred in a letter, dated February 9, 2015. A copy of that correspondence and the list of consulting parties are attached for your use.

NJ TRANSIT appreciates your attention in this matter. Should you require any additional information, feel free to contact Millicent Donero, at 973-491-7831.

Sincerely,

[Signature]

Steven H. Santoro
Assistant Executive Director
Capital Planning and Programs
Attachments

cc:  L. Thompson, NJ TRANSIT  J. Susino, FTA
    D. Callender, NJ TRANSIT  D. Moser, FTA
    N. Valente, NJ TRANSIT  N. Danzig, FTA
    J. CoAngelo, NJ TRANSIT  S. Goodman, FTA
    M. Dondero, NJTRANSIT  K. Nordstrom, FTA
    E. Daleo, NJ TRANSIT
    D. Blazina, NJ TRANSIT
Long Slip Fill Project - Section 106 Consulting Parties

NJ TRANSIT

New Jersey Historic Preservation Office

Army Corps of Engineers

Thomas A. Degise
Hudson County Executive
Hudson County Court House
583 Newark Avenue
Jersey City, NJ 07306

Honorable Dawn Zimmer
Mayor, City of Hoboken
Hoboken City Hall
94 Washington Street
Hoboken, NJ 07030

Honorable Steven M. Fulop
Mayor, City of Jersey City
City Hall
280 Grove Street
Jersey City, NJ 07302

Tamara Francis-Fourkiller
Cultural Preservation Director
Delaware Nation
Cultural Preservation Office
PO Box 825, 31064 State Hwy 281
Anadarko, OK 73005

Delaware Tribe Historic Preservation Office
c/o Blair Fink
Temple University
Department of Anthropology
Gladfelter Hall, Rm 207
1115 W. Poletti Walk
Philadelphia, PA 19122

Rebecca Hawkins, Archaeologist
Eastern Shawnee Tribe of Oklahoma
70500 East 128 Road
Wyandotte, OK 74370

Kim Jumper
Tribal Historic Preservation Officer
Shawnee Tribe of Oklahoma
PO Box 189, 29 South Hwy 69A
Miami, OK 74355
March 2, 2015

Mr. Steven Santoro
Executive Director Capital
New Jersey Transit Corporation
One Penn Plaza East
Newark, NJ 07105-2204

SUBJECT: New Jersey Transit Hoboken Long-Slip Project Resilience Project Section 106 Process

Dear Mr. Santoro:

The Federal Transit Administration concurs with New Jersey Transit’s recommendation regarding consulting parties for the Hoboken Long-Slip Hurricane Sandy Resilience Project pursuant to Section 106 of the National Historic Preservation Act of 1966, as amended, and associated implementation regulations in 36 CFR 800.3.

Should you require any additional information, please contact Dan Moser, Community Planner, (212) 668-2326, daniel.moser@dot.gov.

Sincerely,

Marilyn G. Shazor
Regional Administrator

CC:
D. Saunders, NJ SHPO
K. Schrempf, NJ TRANSIT
N. Calazza, NJ TRANSIT
D. Callender, NJ TRANSIT
J. Colangelo, NJ TRANSIT
M. Dondero, NJ TRANSIT
K. Nordstrom, FTA
D. Moser, FTA
April 7, 2015

Tamara Francis-Fourkiller
Cultural Preservation Director
Delaware Nation
ATTN: Cultural Preservation Department
PO Box 825, 31064 State Hwy 281
Anadarko, OK 73005

RE:  Supplemental Phase IA Archaeological Survey and Historic Architectural Resources Background Survey (HARBS) and Effects Assessment
NJ TRANSIT Long Slip Fill and Rail Enhancement Project
City of Hoboken and City of Jersey City, Hudson County, New Jersey
HPO Project No. 14-3233

Dear Ms. Francis-Fourkiller:

New Jersey Transit Corporation (NJ TRANSIT), using funds provided through the Federal Transit Administration (FTA), plans to amend and enhance the original Long Slip Fill Project located in the City of Hoboken and City of Jersey City, Hudson County, New Jersey. In 1999, the FTA, NJ TRANSIT, the Army Corps of Engineers (ACOE) and the New Jersey State Historic Preservation Officer (NJSHPO) signed a Memorandum of Agreement (MOA) with other consulting parties pursuant to Section 106 of the National Historic Preservation Act, as amended, and subsequently completed the required stipulations to mitigate adverse effects to the National Register of Historic Places (NR)-eligible Old Main Delaware Lackawanna & Western Railroad (DL&WRR) Historic District (SHPO Opinion: 9/24/1996). Financial constraints delayed completion of the project. In 2010, the NJSHPO confirmed that the last of the original project conditions had been satisfied.

When the rail yard and adjacent areas of the Terminal were inundated in October 2012 by Superstorm Sandy, the Long Slip contributed to the impact by providing an additional pathway for storm surge. The proposed changes to the original Long Slip Fill Project are in direct response to the effects of Superstorm Sandy and are designed both to reduce the potential of flooding of the new yard installation and to help limit water ingress elsewhere in the yard and surrounding rail facility. The addition of new elevated tracks and platforms will directly address the cause of the previous service interruption by enabling the facility to provide continued passenger service while rail operations elsewhere in Hoboken Terminal Yard, which will remain at its current low level, may be temporarily suspended just prior to and immediately following a future flooding event.
Together with completing the original 1999 plan, which calls for filling in the Long Slip around an extension of the Jersey City combined sewer discharge and outflow and constructing yard tracks on top of the newly deposited fill, the project includes the following elements: 1) elevation of the newly deposited Long Slip fill within solid retaining walls to be constructed several feet beyond the north and south bulkheads of the present Long Slip to an elevation of between 6 and 8 feet above the existing yard grade; 2) six new yard tracks serving three center-island high-level platforms on top of the fill, including canopies and platform-mounted amenities; 3) a three-story building at the eastern end of the platforms containing stairs, elevators, and waiting room space, as well as space for transportation and mechanical personnel; 4) a connecting sidewalk linking the new facility with the existing terminal; 5) new catenary structures; 6) relocation of existing yard tracks and equipment at the western approach to the new yard; 7) a new two-track undergrade bridge over Marin Boulevard [Henderson Street], at the western yard throat; and 8) miscellaneous reconfigurations of existing yard track and equipment sheds.

In advance of the proposed improvements, NJ TRANSIT consultant, RGA Inc., (RGA) delineated a new Area of Potential Effect (APE) and prepared the enclosed cultural resources report entitled Supplemental Phase IA Archaeological Survey and Historic Architectural Resources Background Study (HARBS) and Effects Assessment, NJ TRANSIT Long Slip Fill Project, SSRRP Tier III Cultural Resources Consultant Support, Contract No. 13-002B, March 11, 2015.

The supplemental Phase IA archaeological survey concluded that the APE-Archaeology has a low potential for both prehistoric and historic cultural resources based on the presence of late nineteenth century fill contexts, the degree of twentieth century disturbance, and the limited proposed below-ground impacts. The survey recommended no further archaeological survey.

The supplemental HARBS identified two historic properties eligible for listing in the NR inside the APE-Architecture, including the Old Main DL&WRR Historic District (SHPO Opinion: 9/24/1996) and the Hudson & Manhattan Railroad (H&MRR) Transit System (PATH) (SHPO Opinion: 3/4/2002). The survey also identified five contributing resources to the Old Main, DL&WRR Historic District, including the Long Slip; the Morristown Line Bridge (MP 0.57) over Henderson Street (a.k.a. Marin Boulevard); the Pullman Yard Concrete Bumpers; Signal Bridges; and Catenary Support Structures.

The supplemental HARBS concluded that the revised undertaking would have an adverse effect on the Long Slip and on the Pullman Yard Concrete Bumpers, all contributing resource to the Old Main DL&WRR Historic District. Under the original 1999 MOA referenced above, the FTA through NJ TRANSIT completed the required stipulations to mitigate adverse effects on the contributing Long Slip. In order to advance the Long Slip Project to its final implementation, RGA recommends that the FTA and NJ TRANSIT amend the original 1999 MOA in order to resolve newly identified adverse effects to the Pullman Yard Concrete Bumpers and to correct certain technical defects in the original MOA. Recommended stipulations to resolve adverse
effects and conclude the Section 106 process include recordation, context sensitive designs, and a program of consultation, review and approval through the NJSHPO.

As a consulting party to the undertaking, the enclosed copy of the report is for your review and file. A paper copy of the report is also available upon request. If you are aware of any religious or culturally significant archaeological sites that may be affected by the project, or have any information regarding the project area, please respond within 30 days of the receipt of this letter. Should you have any questions or require additional information feel free to contact Daniel Moser (212) 668-2326 or by email at daniel.moser@dot.gov.

Very truly yours,

Marilyn G. Shazor
Regional Administrator
Federal Transit Administration

Enclosure: CD ROM

cc: Dara Callender, NJ TRANSIT (w/o attachments)
    Daniel Saunders, NJDEP-HPO (w/o attachments)
April 7, 2015

Blair Fink
Delaware Tribe Historic Preservation Office
Temple University, Department of Anthropology
Gladfelter Hall Room 207
1115 W. Polett Walk
Philadelphia, PA 19122

RE: Supplemental Phase IA Archaeological Survey and Historic Architectural Resources Background Survey (HARBS) and Effects Assessment NJ TRANSIT Long Slip Fill and Rail Enhancement Project City of Hoboken and City of Jersey City, Hudson County, New Jersey HPO Project No. 14-3233

Dear Ms. Fink:

New Jersey Transit Corporation (NJ TRANSIT), using funds provided through the Federal Transit Administration (FTA), plans to amend and enhance the original Long Slip Fill Project located in the City of Hoboken and City of Jersey City, Hudson County, New Jersey. In 1999, the FTA, NJ TRANSIT, the Army Corps of Engineers (ACOE) and the New Jersey State Historic Preservation Officer (NJSHPO) signed a Memorandum of Agreement (MOA) with other consulting parties pursuant to Section 106 of the National Historic Preservation Act, as amended, and subsequently completed the required stipulations to mitigate adverse effects to the National Register of Historic Places (NR)-eligible Old Main Delaware Lackawanna & Western Railroad (DL&WRR) Historic District (SHPO Opinion: 9/24/1996). Financial constraints delayed completion of the project. In 2010, the NJSHPO confirmed that the last of the original project conditions had been satisfied.

When the rail yard and adjacent areas of the Terminal were inundated in October 2012 by Superstorm Sandy, the Long Slip contributed to the impact by providing an additional pathway for storm surge. The proposed changes to the original Long Slip Fill Project are in direct response to the effects of Superstorm Sandy and are designed both to reduce the potential of flooding of the new yard installation and to help limit water ingress elsewhere in the yard and surrounding rail facility. The addition of new elevated tracks and platforms will directly address the cause of the previous service interruption by enabling the facility to provide continued passenger service while rail operations elsewhere in Hoboken Terminal Yard, which will remain at its current low level, may be temporarily suspended just prior to and immediately following a future flooding event.
Together with completing the original 1999 plan, which calls for filling in the Long Slip around an extension of the Jersey City combined sewer discharge and outflow and constructing yard tracks on top of the newly deposited fill, the project includes the following elements: 1) elevation of the newly deposited Long Slip fill within solid retaining walls to be constructed several feet beyond the north and south bulkheads of the present Long Slip to an elevation of between 6 and 8 feet above the existing yard grade; 2) six new yard tracks serving three center-island high-level platforms on top of the fill, including canopies and platform-mounted amenities; 3) a three-story building at the eastern end of the platforms containing stairs, elevators, and waiting room space, as well as space for transportation and mechanical personnel; 4) a connecting sidewalk linking the new facility with the existing terminal; 5) new catenary structures; 6) relocation of existing yard tracks and equipment at the western approach to the new yard; 7) a new two-track under-grade bridge over Marin Boulevard [Henderson Street], at the western yard throat; and 8) miscellaneous reconfigurations of existing yard track and equipment sheds.

In advance of the proposed improvements, NJ TRANSIT consultant, RGA Inc., (RGA) delineated a new Area of Potential Effect (APE) and prepared the enclosed cultural resources report entitled Supplemental Phase IA Archaeological Survey and Historic Architectural Resources Background Study (HARBs) and Effects Assessment, NJ TRANSIT Long Slip Fill Project, SRRSP Tier III Cultural Resources Consultant Support, Contract No. 13-002B, March 11, 2015.

The supplemental Phase IA archaeological survey concluded that the APE-Archaeology has a low potential for both prehistoric and historic cultural resources based on the presence of late nineteenth century fill contexts, the degree of twentieth century disturbance, and the limited proposed below-ground impacts. The survey recommended no further archaeological survey.

The supplemental HARBS identified two historic properties eligible for listing in the NR inside the APE-Architecture, including the Old Main DL&WRR Historic District (SHPO Opinion: 9/24/1996) and the Hudson & Manhattan Railroad (H&MRR) Transit System (PATH) (SHPO Opinion: 3/4/2002). The survey also identified five contributing resources to the Old Main, DL&WRR Historic District, including the Long Slip; the Morristown Line Bridge (MP 0.57) over Henderson Street (a.k.a. Marin Boulevard); the Pullman Yard Concrete Bumpers; Signal Bridges; and Catenary Support Structures.

The supplemental HARBS concluded that the revised undertaking would have an adverse effect on the Long Slip and on the Pullman Yard Concrete Bumpers, all contributing resource to the Old Main DL&WRR Historic District. Under the original 1999 MOA referenced above, the FTA through NJ TRANSIT completed the required stipulations to mitigate adverse effects on the contributing Long Slip. In order to advance the Long Slip Project to its final implementation, RGA recommends that the FTA and NJ TRANSIT amend the original 1999 MOA in order to resolve newly identified adverse effects to the Pullman Yard Concrete Bumpers and to correct certain technical defects in the original MOA. Recommended stipulations to resolve adverse
effects and conclude the Section 106 process include recordation, context sensitive designs, and a program of consultation, review and approval through the NJSHPO.

As a consulting party to the undertaking, the enclosed copy of the report is for your review and file. A paper copy of the report is also available upon request. If you are aware of any religious or culturally significant archaeological sites that may be affected by the project, or have any information regarding the project area, please respond within 30 days of the receipt of this letter. Should you have any questions or require additional information feel free to contact Daniel Moser (212) 668-2326 or by email at daniel.moser@dot.gov.

Very truly yours,

[Signature]

Marilyn G. Shay
Regional Administrator
Federal Transit Administration

Enclosure: CD ROM

cc: Dara Callender, NJ TRANSIT (w/o attachments)
Daniel Saunders, NJDEP-HPO (w/o attachments)
April 7, 2015

Rebecca Hawkins
Archaeologist
Eastern Shawnee Tribe of Oklahoma
70500 East 128 Road
Wyandotte, OK 74370

RE: Supplemental Phase IA Archaeological Survey and Historic Architectural Resources Background Survey (HARBS) and Effects Assessment NJ TRANSIT Long Slip Fill and Rail Enhancement Project City of Hoboken and City of Jersey City, Hudson County, New Jersey HPO Project No. 14-3233

Dear Ms. Hawkins:

New Jersey Transit Corporation (NJ TRANSIT), using funds provided through the Federal Transit Administration (FTA), plans to amend and enhance the original Long Slip Fill Project located in the City of Hoboken and City of Jersey City, Hudson County, New Jersey. In 1999, the FTA, NJ TRANSIT, the Army Corps of Engineers (ACOE) and the New Jersey State Historic Preservation Officer (NJSHPO) signed a Memorandum of Agreement (MOA) with other consulting parties pursuant to Section 106 of the National Historic Preservation Act, as amended, and subsequently completed the required stipulations to mitigate adverse effects to the National Register of Historic Places (NR)-eligible Old Main Delaware Lackawanna & Western Railroad (DL&WRR) Historic District (SHPO Opinion: 9/24/1996). Financial constraints delayed completion of the project. In 2010, the NJSHPO confirmed that the last of the original project conditions had been satisfied.

When the rail yard and adjacent areas of the Terminal were inundated in October 2012 by Superstorm Sandy, the Long Slip contributed to the impact by providing an additional pathway for storm surge. The proposed changes to the original Long Slip Fill Project are in direct response to the effects of Superstorm Sandy and are designed both to reduce the potential of flooding of the new yard installation and to help limit water ingress elsewhere in the yard and surrounding rail facility. The addition of new elevated tracks and platforms will directly address the cause of the previous service interruption by enabling the facility to provide continued passenger service while rail operations elsewhere in Hoboken Terminal Yard, which will remain at its current low level, may be temporarily suspended just prior to and immediately following a future flooding event.

Together with completing the original 1999 plan, which calls for filling in the Long Slip around an extension of the Jersey City combined sewer discharge and outflow and constructing yard...
tracks on top of the newly deposited fill, the project includes the following elements: 1) elevation of the newly deposited Long Slip fill within solid retaining walls to be constructed several feet beyond the north and south bulkheads of the present Long Slip to an elevation of between 6 and 8 feet above the existing yard grade; 2) six new yard tracks serving three center-island high-level platforms on top of the fill, including canopies and platform-mounted amenities; 3) a three-story building at the eastern end of the platforms containing stairs, elevators, and waiting room space, as well as space for transportation and mechanical personnel; 4) a connecting sidewalk linking the new facility with the existing terminal; 5) new catenary structures; 6) relocation of existing yard tracks and equipment at the western approach to the new yard; 7) a new two-track undergrade bridge over Marin Boulevard [Henderson Street], at the western yard throat; and 8) miscellaneous reconfigurations of existing yard track and equipment sheds.

In advance of the proposed improvements, NJ TRANSIT consultant, RGA Inc., (RGA) delineated a new Area of Potential Effect (APE) and prepared the enclosed cultural resources report entitled Supplemental Phase IA Archaeological Survey and Historic Architectural Resources Background Study (HARBS) and Effects Assessment, NJ TRANSIT Long Slip Fill Project, SRRP Tier III Cultural Resources Consultant Support, Contract No. 13-002B, March 11, 2015.

The supplemental Phase IA archaeological survey concluded that the APE-Archaeology has a low potential for both prehistoric and historic cultural resources based on the presence of late nineteenth century fill contexts, the degree of twentieth century disturbance, and the limited proposed below-ground impacts. The survey recommended no further archaeological survey.

The supplemental HARBS identified two historic properties eligible for listing in the NR inside the APE-Architecture, including the Old Main DL&WRR Historic District (SHPO Opinion: 9/24/1996) and the Hudson & Manhattan Railroad (H&MRR) Transit System (PATH) (SHPO Opinion: 3/4/2002). The survey also identified five contributing resources to the Old Main, DL&WRR Historic District, including the Long Slip; the Morristown Line Bridge (MP 0.57) over Henderson Street (a.k.a. Marin Boulevard); the Pullman Yard Concrete Bumpers; Signal Bridges; and Catenary Support Structures.

The supplemental HARBS concluded that the revised undertaking would have an adverse effect on the Long Slip and on the Pullman Yard Concrete Bumpers, all contributing resource to the Old Main DL&WRR Historic District. Under the original 1999 MOA referenced above, the FTA through NJ TRANSIT completed the required stipulations to mitigate adverse effects on the contributing Long Slip. In order to advance the Long Slip Project to its final implementation, RGA recommends that the FTA and NJ TRANSIT amend the original 1999 MOA in order to resolve newly identified adverse effects to the Pullman Yard Concrete Bumpers and to correct certain technical defects in the original MOA. Recommended stipulations to resolve adverse effects and conclude the Section 106 process include recordation, context sensitive designs, and a program of consultation, review and approval through the NJSHPO.
As a consulting party to the undertaking, the enclosed copy of the report is for your review and file. A paper copy of the report is also available upon request. If you are aware of any religious or culturally significant archaeological sites that may be affected by the project, or have any information regarding the project area, please respond within 30 days of the receipt of this letter. Should you have any questions or require additional information feel free to contact Daniel Moser (212) 668-2326 or by email at daniel.moser@dot.gov.

Very truly yours,

[Signature]

Marilyn G. Shazor
Regional Administrator
Federal Transit Administration

Enclosure: CD-ROM

cc: Dara Callender, NJ TRANSIT (w/o attachments)
Daniel Saunders, NJDEP-HPO (w/o attachments)
April 7, 2015

Kim Jumper
Tribal Historic Preservation Officer
Shawnee Tribe of Oklahoma
PO Box 189, 29 South Highway 69A
Miami, OK 74355

RE: Supplemental Phase IA Archaeological Survey and Historic Architectural Resources Background Survey (HARBS) and Effects Assessment
NJ TRANSIT Long Slip Fill and Rail Enhancement Project
City of Hoboken and City of Jersey City, Hudson County, New Jersey
HPO Project No. 14-3233

Dear Ms. Jumper:

New Jersey Transit Corporation (NJ TRANSIT), using funds provided through the Federal Transit Administration (FTA), plans to amend and enhance the original Long Slip Fill Project located in the City of Hoboken and City of Jersey City, Hudson County, New Jersey. In 1999, the FTA, NJ TRANSIT, the Army Corps of Engineers (ACOE) and the New Jersey State Historic Preservation Officer (NJSHPO) signed a Memorandum of Agreement (MOA) with other consulting parties pursuant to Section 106 of the National Historic Preservation Act, as amended, and subsequently completed the required stipulations to mitigate adverse effects to the National Register of Historic Places (NR)-eligible Old Main Delaware Lackawanna & Western Railroad (DL&WRR) Historic District (SHPO Opinion: 9/24/1996). Financial constraints delayed completion of the project. In 2010, the NJSHPO confirmed that the last of the original project conditions had been satisfied.

When the rail yard and adjacent areas of the Terminal were inundated in October 2012 by Superstorm Sandy, the Long Slip contributed to the impact by providing an additional pathway for storm surge. The proposed changes to the original Long Slip Fill Project are in direct response to the effects of Superstorm Sandy and are designed both to reduce the potential of flooding of the new yard installation and to help limit water ingress elsewhere in the yard and surrounding rail facility. The addition of new elevated tracks and platforms will directly address the cause of the previous service interruption by enabling the facility to provide continued passenger service while rail operations elsewhere in Hoboken Terminal Yard, which will remain at its current low level, may be temporarily suspended just prior to and immediately following a future flooding event.
Together with completing the original 1999 plan, which calls for filling in the Long Slip around an extension of the Jersey City combined sewer discharge and outflow and constructing yard tracks on top of the newly deposited fill, the project includes the following elements: 1) elevation of the newly deposited Long Slip fill within solid retaining walls to be constructed several feet beyond the north and south bulkheads of the present Long Slip to an elevation of between 6 and 8 feet above the existing yard grade; 2) six new yard tracks serving three center-island high-level platforms on top of the fill, including canopies and platform-mounted amenities; 3) a three-story building at the eastern end of the platforms containing stairs, elevators, and waiting room space, as well as space for transportation and mechanical personnel; 4) a connecting sidewalk linking the new facility with the existing terminal; 5) new catenary structures; 6) relocation of existing yard tracks and equipment at the western approach to the new yard; 7) a new two-track under-grade bridge over Marin Boulevard [Henderson Street], at the western yard throat; and 8) miscellaneous reconfigurations of existing yard track and equipment sheds.

In advance of the proposed improvements, NJ TRANSIT consultant, RGA Inc., (RGA) delineated a new Area of Potential Effect (APE) and prepared the enclosed cultural resources report entitled *Supplemental Phase IA Archaeological Survey and Historic Architectural Resources Background Study (HARBS) and Effects Assessment, NJ TRANSIT Long Slip Fill Project, SSRRP Tier III Cultural Resources Consultant Support, Contract No. 13-002B, March 11, 2015.*

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effects and conclude the Section 106 process include recordation, context sensitive designs, and a program of consultation, review and approval through the NJSHPO.

As a consulting party to the undertaking, the enclosed copy of the report is for your review and file. A paper copy of the report is also available upon request. If you are aware of any religious or culturally significant archaeological sites that may be affected by the project, or have any information regarding the project area, please respond within 30 days of the receipt of this letter. Should you have any questions or require additional information feel free to contact Daniel Moser (212) 668-2326 or by email at daniel.moser@dot.gov.

Very truly yours,

Marilyn G. Shaor
Regional Administrator
Federal Transit Administration

Enclosure: CD ROM

cc: Dara Callender, NJ TRANSIT (w/o attachments)
   Daniel Saunders, NJDEP-HPO (w/o attachments)
May 22, 2015

Dear Daniel Moser,

Thank you for notifying the Delaware Tribe of the plans for the above referenced project. Our review indicates that there are no religious or culturally significant sites within the selected project area and we have no objection to the proposed project. We defer further comment to your office.

We ask that if any archaeological remains (artifacts, subsurface features, etc.) are discovered during the construction process that construction be halted until an archaeologist can view and assess the finds. Furthermore, we ask that if any human remains are accidentally unearthed during the course of the project that you cease development immediately and inform the Delaware Tribe of Indians of the inadvertent discovery. If you have any questions, feel free to contact this office by phone at (609) 220-1047 or by e-mail at temple@delawaretribe.org.

Sincerely,

Blair Fink
Delaware Tribe Historic Preservation Representatives
Department of Anthropology
Gladfelter Hall
Temple University
1115 W. Polett Walk
Philadelphia, PA 19122
October 6, 2015

Ms. Nancy Danzig  
Director of Planning and Program Development  
Federal Transit Administration-Region II  
One Bowling Green, Room 429  
New York, NY 10004-1415

Ref:  Proposed Hoboken Long Slip Fill & Rail Enhancement Project  
      City of Hoboken and City of Jersey City, Hudson County, New Jersey

Dear Ms. Danzig:

The Advisory Council on Historic Preservation (ACHP) has received your notification and supporting documentation regarding the adverse effects of the referenced undertaking on a property or properties listed or eligible for listing in the National Register of Historic Places. Based upon the information provided, we have concluded that Appendix A, Criteria for Council Involvement in Reviewing Individual Section 106 Cases, of our regulations, “Protection of Historic Properties” (36 CFR Part 800), does not apply to this undertaking. Accordingly, we do not believe that our participation in the consultation to resolve adverse effects is needed. However, if we receive a request for participation from the State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), affected Indian tribe, a consulting party, or other party, we may reconsider this decision. Additionally, should circumstances change, and it is determined that our participation is needed to conclude the consultation process, please notify us.

Pursuant to 36 CFR §800.6(b)(1)(iv), you will need to file the final Memorandum of Agreement (MOA), developed in consultation with the New Jersey State Historic Preservation Office (SHPO), and any other consulting parties, and related documentation with the ACHP at the conclusion of the consultation process. The filing of the MOA, and supporting documentation with the ACHP is required in order to complete the requirements of Section 106 of the National Historic Preservation Act.

Thank you for providing us with the notification of adverse effect. If you have any questions or require further assistance, please contact Mr. Christopher Wilson at 202-517-0229 or at cwilson@achp.gov.

Sincerely,

LaShavio Johnson  
Historic Preservation Technician  
Office of Federal Agency Programs
Dear Mr. Saunders:

As was discussed with you during our September 15, 2015 conference call with the Federal Transit Administration, NJ TRANSIT has continued to advance preliminary engineering for the referenced project subsequent to the submission of materials provided in satisfaction of Section 106 of the National Historic Preservation Act. The design team has determined that, rather than having to remove all four of the Pullman Yard Concrete Bumpers (that are contributing elements to the National Register (NR) eligible Old Main DL&W Railroad Historic District), it will be possible to construct the project elements in this location of the yard while avoiding the removal of one of the bumper blocks. NJ TRANSIT proposes to:

- Photo-document the Concrete Bumpers in place prior to removal of the three blocks;
- Write a narrative description and statement of significance for the blocks; and
- Provide the above information in letter report format for the Historic Preservation Office (HPO) resource files as part of the project.

NJ TRANSIT believes that the retention of one of the bumper blocks combined with the preparation of the historic report represents minimization of impacts to this NR-eligible resource to the maximum extent practicable and requests your concurrence that, with this project condition and design revision, the Long Slip Fill and Rail Enhancement Project will represent a Conditional No Adverse Effect to listed and eligible historic resources within the Area of Potential Effect. As was discussed in the previously submitted Section 106 documentation, NJ TRANSIT will still adhere to the other conditions associated with the project:

- Context sensitive design for the exterior elements of all new project structures in accordance with the guidance contained in the Secretary of the Interior’s “Standards;” and
- Submission of 30%, 60% and final design level documents for Historic Preservation Office review and approval.
A concur line is provided below for your response to this request. Should you have any questions or require additional information feel free to contact me at DCallender@njtransit.com or 973-491-7205.

Very truly yours,

Dara Callender
Dara Callender
Environmental Services Unit

cc: Daniel Moser, FTA

I concur that, with the project revision noted above (i.e., the retention of one of the Pullman Yard Concrete Bumpers), and the conditions listed (the historic letter report regarding the bumpers, the submission of 30%, 60% and final design documents for HPO review and approval, and the context sensitive design of the new project structures), the **Long Slip Fill and Rail Enhancement Project** will result in **No Adverse Effect** to listed and eligible historic resources within the Area of Potential Effect pursuant to 36 CFR 800.5.

I concur:

Daniel Saunders, NJDEP-HPO

Date

I do not concur for the following reasons:
January 20, 2016

Daniel Saunders
Deputy State Historic Preservation Officer
Mail Code 501-04B
NJ Department of Environmental Protection
PO Box 420
Trenton, NJ 08625-0420

Re: NJTRANSIT Hoboken Long Slip Flood Protection Project
City of Hoboken and City of Jersey City, Hudson County New Jersey
New Jersey HPO Project No.14233
Proposed Section 4(f) De Minimis Impact Determination

Dear Mr. Saunders:

The Federal Transit Administration (FTA) has determined that, in accordance with 36 CFR Part 800 Protection of Historic Properties that the Hoboken Long Slip Flood Protection Project (the project) will have No Adverse Effects on listed and eligible historic properties within the projects Area of Potential Effect. FTA intends to use this finding to support a Section 4(f) De Minimis Impact determination.

The FTA finding of No Adverse Impact and proposed 4(f) De Minimis determination is based on NJTRANSIT’s proposed measures to minimize and mitigate effects as detailed NJ TRANSIT’s letter to NJ SHPO dated October 9, 2015 and approved by NJ HPO on October 21, 2015 (see attached NJ HPO document #HPO-J2015-228).

The FTA finding is further based on the following stipulations regarding the unanticipated discovery of human skeletal remains or other archaeological finds:

- **Discover of Human Skeletal Remains**
  If human skeletal remains are encountered anywhere on the Project site, NJ Transit will cease construction, and as soon as possible, consult with the NJ SHPO, the FTA, and appropriate legal officials over the applicability and implementation of relevant procedures under the Native American Graves Protection and Repatriation Act (NAGPRA) of 1990 25 U.S.C. 3001 (43 CFR Part 10). FTA will notify Tribal representatives. All human skeletal remains will also be treated in accordance with the current guidelines of the NJ SHPO, and with the applicable provisions of the New Jersey Cemetery Act, 2003. Construction will not resume until such time as the significance and disposition of said discoveries can be determined.
• **Unanticipated Discoveries**
  All unanticipated historic and/or prehistoric archaeological discoveries resulting from Project activities made anywhere on the Project site will be treated in accordance with the procedures outlined in 36 CFR 800.11 and 36 CFR 800.13. In the event that unanticipated discoveries of cultural Native American archaeological resources are made during execution of the Project, NJ TRANSIT will cease construction and FTA will notify Tribal representatives. Construction will not resume within 50 feet of the discovery until such time as the significance and disposition of said discoveries can be determined.

All measures to mitigate and minimize harm noted in the above correspondence will be included in the project 4(f) evaluation, Environmental Assessment and FONSI.

If you have any questions or require additional information please feel free to contact Dan Moser, FTA Community Planner, at daniel.moser@dot.gov or (212) 668-2326.

Thank you,

Marilyn G. Shazor
Regional Administrator

Attachments: NJ HPO Document HPO-J2015-228

cc: Linda Di Giovanni, NJ TRANSIT
    Nick Valente, NJ TRANSIT
    Dara Callender, NJ TRANSIT
    Jeremy Colangelo-Bryan, NJTRANSIT
    Daniel Moser, FTA
From: Saunders, Dan [mailto:Dan.Saunders@dep.nj.gov]
Sent: Monday, January 25, 2016 9:27 AM
To: daniel.moser@dot.gov
Cc: Colangelo-Bryan, Jeremy C. (CPLNJCB); Callender, Dara (CEDCDXC); Digiovanni, Linda J. (CCAPLJD); Valente, Nick (CEDCNXV); Nancy.Danzig@dot.gov
Subject: RE: NJ TRANSIT Hoboken Long Slip Project 4(f) De Minimis Determination

Dan,
I concur with your assessment.
Dan

Daniel D. Saunders, Administrator &
Deputy State Historic Preservation Officer
New Jersey Historic Preservation Office
Mail Code 501-04B
New Jersey Department of Environmental Protection
PO Box 420
Trenton, New Jersey 08625-0420
Phone (609) 633-2397
Fax (609) 984-0578

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From: daniel.moser@dot.gov [mailto:daniel.moser@dot.gov]
Sent: Friday, January 22, 2016 5:01 PM
To: Saunders, Dan
Cc: JColangelo-bryan@njtransit.com; DCallender@njtransit.com; LDigiovanni@njtransit.com; NValente@njtransit.com; Nancy.Danzig@dot.gov
Subject: NJ TRANSIT Hoboken Long Slip Project 4(f) De Minimis Determination

Mr. Saunders

Attached is the FTA letter confirming our intent to make a 4(f) De Minimis determination for the above project, based on the mitigation conditions approved by NJ SHPO in coordination with NJ TRANSIT.

You will also be receiving a hard copy of this letter.

Please let us know if you have any concerns or questions.

Thank you,
Appendix B: Noise and Vibration
Appendix B-1: Operational Noise and Vibration Impact Analysis
Appendix B-1 Operational Noise and Vibration

The Current Project is comprised of four main elements:

1. Construction of a new two-track bridge over Marin Boulevard to support track connections to existing Track 199 and Track 4 Main. Relocations and/or reconfigurations of other tracks at the western approach will be required to accommodate these new tracks.
2. Creation of a fill area in the Long Slip Canal to create 4.1 new acres of land at an elevation, which meets NJ TRANSIT’s flood risk management criteria.
3. Extension of the Jersey City CSO discharge point to just east of the Hudson River Waterfront Walkway.
4. Construction of six new tracks and three high-level ADA-compliant passenger boarding platforms as well as a three-story station/crew facility at the eastern end of the platforms. A connecting sidewalk will be constructed to link the new facility and the existing Terminal entrance.

The purpose of the Current Project is to enhance the resilience of NJ TRANSIT commuter rail service operating into and out of Hoboken Terminal leading up to and following severe weather events. Further, when service disruptions occur elsewhere along the system (e.g. in the Hudson River Tunnels or at Secaucus Junction), approximately 20 times per year, delays are caused due to train queues at the single set of throat tracks into and out of the Terminal. Therefore, during emergency situations or when such service disruptions occur, the six new elevated tracks and platforms will serve as a commuter rail station stop. The new passenger station will not be used when the NJ TRANSIT commuter rail system is operating smoothly, as the new station will provide a less convenient transfer to the PATH, bus and ferry compared to existing Hoboken Terminal. As such, train service to and from Hoboken will not increase as part of the Current Project. However, on a daily basis, NJ TRANSIT will utilize the new tracks for midday storage. The increased storage capacity will not result in an increase in the number of trains that receive service and inspection at Hoboken Terminal’s existing facilities.

Since the Current Project adds new tracks that will be utilized daily for midday storage and a station stop intended for use during emergencies and service disruptions, the FTA’s noise screening procedure for a commuter rail station was applied, as identified in the FTA Transit Noise and Vibration Impact Assessment, May 2006 (FTA Manual). Trains do not currently blow their horns as they pull into Hoboken Terminal and will not in the future when utilizing the new tracks as a station stop or when moved around for storage; therefore, the appropriate screening distance was utilized to identify noise-sensitive receivers for a General Assessment of operational noise impacts. Similarly
Operational Noise and Vibration Impact Assessment

for operational vibration, the FTA’s screening procedure for conventional commuter railroad projects was applied.

B-1.1 NOISE SCREENING RESULTS

To identify the potential for impact as a result of the new two-track bridge over Marin Boulevard as well as the six new elevated tracks and three passenger platforms, noise-sensitive land use within applicable screening distances of a commuter rail station were reviewed.

In Table 3-2 of the FTA Manual, three categories of noise-sensitive land use are defined, which include:

- **Noise Category 1** – tracts of land where quiet is an essential element of the intended purpose;
- **Noise Category 2** – residences and buildings where people normally sleep where nighttime sensitivity is greatest (e.g. homes, hospitals, and hotels); and
- **Noise Category 3** – institutional land uses with daytime and evening use (e.g. schools, libraries, theaters, churches, parks, and recreational facilities where avoiding speech interference is critical).

According to Table 4-1 of the FTA Manual, when noise-sensitive land use is unobstructed from a commuter rail station where horns are not utilized and located within 250 feet of the station, further analysis is necessary, requiring a General Noise Assessment. In the event noise-sensitive land use is obstructed from the proposed commuter rail station, then further analysis is needed for noise-sensitive land use within 200 feet.

One existing high-rise residential building (700 Grove Street Condominiums/Zephyr Lofts – FTA Land Use Category 2), is unobstructed and located within 250 feet to the north of the proposed two-track bridge over Marin Boulevard. The proposed Newport Development Site, which has received preliminary and final site plan approval for 790 new luxury condos (FTA Land Use Category 2), is unobstructed and located within 250 feet to the south of the six new proposed tracks and three ADA-compliant platforms. There are no obstructed noise-sensitive land use types located within 200 feet of the Current Project. Therefore, a General Assessment for noise was performed for the existing residential structure to the north and proposed residential structure to the south.

B-1.2 NOISE IMPACT CRITERIA

Impacts to noise-sensitive land use are evaluated based on two criteria, which both depend on the level of existing noise exposure. The first criterion, shown in Figure 3-1 and Table 3-1 of the FTA Manual, allows for increasing project noise levels as existing noise levels increase. The second criterion, shown in Figure 3-2 and Table 3-3 of the FTA Manual evaluates the cumulative noise level (existing + project) increase over the existing noise level and allows for a smaller cumulative noise level increase over existing noise levels as existing noise levels increase. In other words, for an
existing noise level of 42 dBA, a 10 dBA increase in the cumulative noise level is allowable, while only a 1 dBA increase is allowed for an existing noise level of 70 dBA. Based on the FTA Manual, the cumulative form of the noise impact criteria should be used when changes are proposed to an existing transit system as opposed to when a new project is constructed in an area previously without a transit source. Since the Current Project includes modifications and additions to an existing transit facility, the cumulative form of the criteria was used to assess noise impacts.

B-1.3 EXISTING NOISE ENVIRONMENT

In accordance with FTA guidelines, the noise metric used to characterize noise exposure at Category 2 land use, where nighttime noise sensitivity is of concern, is the $L_{dn}$. The $L_{dn}$ is a 24-hour noise level that adds a 10 dBA penalty during nighttime hours (10:00 PM – 7:00 AM) to account for this sensitivity. As such, continuous, 24-hour noise levels were documented at the 700 Grove Street Condominiums/Zephyr Lofts (Site 1) and proposed Newport Development Site (Site 2), shown in Figure B-1.1. Hourly noise levels were used to compute an $L_{dn}$ for each site and thereby determine existing noise exposure.

Noise measurements at both sites were performed from midnight on Tuesday, September 29, 2015 to midnight on Wednesday, September 30, 2015 and staffed during the daytime on Tuesday between approximately 6:00 AM and 4:30 PM. Certified meteorological data was obtained from the National Oceanic and Atmospheric Association (NOAA) for the closest meteorological monitoring station (Newark Liberty International Airport) and utilized to filter measurement data during two hours from 10:00 PM Tuesday to 12:00 AM Wednesday when monitoring locations were unstaffed and weather observations indicated measurable rain. Although earlier hours also indicated trace amounts of precipitation at the airport, field notes indicate dry conditions between 6:00 AM and 4:30 PM.

At Site 1 (700 Grove Street Condominiums/Zephyr Lofts), local roadway utility work on Marin Boulevard was audible after 8:00 AM and throughout most of the day, except during a contractor lunch break approximately between 12:00 PM and 1:00 PM. Due to the extraneous construction noise source at this site affecting documented noise levels for most of the day, the $L_{dn}$ at Site 1 was computed based on the Option 3 methodology within Appendix D of the FTA Manual. Based on this methodology, an hourly $L_{eq}$ noise level during peak hour roadway traffic, during a midday peak traffic hour, and during a late night hour between midnight and 5:00 AM was input into equation (1) provided on page D-3 of Appendix D of the FTA Manual. In this way, hours during which construction activity occurred on Marin Boulevard were excluded from the $L_{dn}$ calculation. Since contractors were on break from 12:00 PM – 1:00 PM, data documented during this hour was utilized to represent the midday peak.

\[
L_{dn} \approx 10 \log \left[ 10^{(3) \times \frac{L_{eq}(peak\ hour)}{10} - 2} + 10^{(12) \times \frac{L_{eq}(midday)}{10} - 2} + 10^{(9) \times \frac{L_{eq}( latenight)}{10}} + 8 \right] - 13.8
\]
Figure B-1.1: Noise Monitoring Locations
Long Slip Fill and Rail Enhancement Project

Legend
- Proposed Monitoring Location
- Proposed Newport Development Site
- Long Slip Canal
- Hoboken Yard

#1
#2
Appendix B-1 Operational Noise and Vibration Impact Assessment

At Site 2 (proposed Newport Development Site), only the two hours from 10:00 PM Tuesday to 12:00 AM Wednesday were filtered from the data set due to rain, and the \( L_{dn} \) was calculated based on the remaining documented hourly \( L_{eq} \) data utilizing equation (2).

\[
(2) \quad L_{dn} = 10 \log \left( \frac{(15) \cdot 10^{\frac{L_{eq}(day)}{10}} + (9) \cdot 10^{\frac{L_{eq}(night)+10}{10}}} {10} \right) - 13.8
\]

where: \( L_{eq}(day) = 10 \log \left( \frac{1}{15} \cdot \sum_{10}^{L_{eq}[h]7AM-10PM} \right) \) and,

\[
L_{eq}(night) = 10 \log \left( \frac{1}{9} \cdot \sum_{10}^{L_{eq}[h]10PM-7AM} \right)
\]

Table B-1.1 summarizes the existing noise exposure computed for each site based on the 24-hour monitoring period.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Site Location</th>
<th>Existing Noise Exposure Level (dBA ( L_{dn} ))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>700 Grove Street Condominiums/Zephyr Lofts</td>
<td>69</td>
</tr>
<tr>
<td>2</td>
<td>Proposed Newport Development Site</td>
<td>63</td>
</tr>
</tbody>
</table>


B-1.4 GENERAL NOISE ASSESSMENT

A worst-case scenario was evaluated, in which the six new tracks and three new ADA-compliant platforms were assumed to be utilized as a commuter rail station where horns are not blown. As described within, the new tracks and platforms would only be utilized as a commuter rail station during emergencies and service disruptions along the line. While the tracks would also be utilized on a daily basis for midday storage, the noise levels were predicted during service disruptions since the number of train movements during service disruptions is expected to be greater than movements associated with storage, according to NJ TRANSIT. During service disruptions, the maximum number of train movements into and out of Hoboken Terminal was assumed to be 12, since service disruptions do not persist throughout the day, but rather for approximately one hour. As service disruptions typically occur during a morning, midday or evening rush hour, the average number of events per hour during nighttime hours (10:00 PM – 7:00 AM) was assumed to be zero. Therefore, 12 train movements in one hour during a daytime (7:00 AM – 10:00 PM) equates to approximately one event per hour. The new tracks can accommodate longer trains, and therefore trains with 10...
cars and one locomotive were assumed for the analysis. The locomotives may either be dual mode or electric, however, according to NJ TRANSIT, the locomotives were assumed to be operating in electric mode in Hoboken Terminal. While tracks are designed for 15 mph speeds, trains pulling into the station were assumed to be traveling much more slowly, at a speed of 5 mph. Further, for a conservative worst-case analysis, tracks were assumed to be jointed, which adds a 5 dBA adjustment to the resultant noise levels.

The FTA’s Noise Impact Assessment Spreadsheet was used to evaluate impacts at Site 1 and Site 2. The assumptions described herein were used as input to the spreadsheet. Table B-1.2 presents the results of the General Noise Assessment. As shown in the table, noise impacts are not predicted to occur based on the assumptions regarding the usage of the six new tracks as stated herein.

**Table B-1.2: General Noise Assessment Results**

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Site Location</th>
<th>Existing Noise Exposure (dBA)</th>
<th>Project Noise Exposure (dBA)</th>
<th>Total Noise Exposure (dBA)</th>
<th>Noise Level Increase (dBA)</th>
<th>Allowable Noise Level Increase (dBA)</th>
<th>Impact Level</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>700 Grove Street Condominiums/Zephyr Lofts</td>
<td>69</td>
<td>38</td>
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<td>Proposed Newport Development Site</td>
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<td>42</td>
<td>63</td>
<td>0</td>
<td>2</td>
<td>None</td>
</tr>
</tbody>
</table>


**B-1.5 VIBRATION SCREENING RESULTS**

Due to the addition of the new two-track bridge over Marin Boulevard as well as the six new elevated tracks and three passenger platforms, the project type for vibration screening was classified as a conventional commuter railroad. Therefore, vibration-sensitive land use in the vicinity of project improvements was reviewed.

Section 8.1.1 of the FTA Manual defines three categories of vibration-sensitive land use:

*Vibration Category 1 – High Sensitivity*: buildings where vibration would interfere with interior operations (e.g. vibration-sensitive research and manufacturing, hospitals with vibration-sensitive equipment, and university research operations);

*Vibration Category 2 – Residential*: residences and buildings where people normally sleep (e.g. homes, hospitals, and hotels); and

*Vibration Category 3 – Institutional*: schools, churches, other institutions, and quiet office spaces that do not have vibration-sensitive equipment, but still have the potential for activity
interference. This category is not intended to include industrial buildings with office space primarily used for industrial purposes.

Table 9-2 within the FTA Manual provides screening distances for conventional commuter railroad projects. According to Table 9-2, a General Vibration Assessment should be performed for Vibration Category 1 land use within 600 feet, Vibration Category 2 land use within 200 feet, and Vibration Category 3 land use within 120 feet of the Current Project. There are no Vibration Category 1 or 3 land use types within applicable screening distances. Two Vibration Category 2 land use types are located within 200 feet of project improvements: 1) the 700 Grove Street Condominiums/Zephyr Lofts (Site 1), and 2) the proposed Newport Development Site (Site 2). Therefore, a General Vibration Assessment was performed for these two sites.

**B-1.6 VIBRATION IMPACT CRITERIA**

Impacts to vibration-sensitive land use are evaluated based on ground-borne vibration and ground-borne noise criteria and depend on the number of events of the same source per day. Ground-borne vibration is expressed in terms of vibration velocity levels in units of VdB, while ground-borne noise is expressed in terms of decibels (dB). Table B-1.3 summarizes the FTA’s ground-borne vibration and noise impact criteria, as found within Table 8-1 of the FTA Manual. Based on the assumption for the General Noise Assessment that there would be a maximum of 12 trains utilizing the six new tracks for approximately an hour during service disruptions, predicted ground-borne vibration and noise levels were compared to criteria for infrequent events (i.e. fewer than 30 vibration events per day). For Category 2 land use and infrequent events, ground-borne vibration and noise levels should not exceed 80 VdB and 43 dB, respectively.

**Table B-1.3: FTA Ground-Borne Vibration (GBV) and Ground-Borne Noise (GBN) Impact Criteria for General Assessment**

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>GBV Impact Levels (VdB re 1 micro-inch/sec)</th>
<th>GBN Impact Levels (dB re 20 micro Pascals)</th>
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<tr>
<td></td>
<td>Frequent Events¹</td>
<td>Occasional Events²</td>
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<td>65</td>
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</tr>
<tr>
<td>3</td>
<td>75</td>
<td>78</td>
</tr>
</tbody>
</table>

Notes:

1. “Frequent Events” is defined as more than 70 vibration events of the same source per day.
2. “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day.
3. “Infrequent Events” is defined as fewer than 30 vibration events of the same kind per day.
4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.
5. Vibration-sensitive equipment is generally not sensitive to ground-borne noise.
B-1.7 GENERAL VIBRATION ASSESSMENT

As indicated within the FTA Manual, the General Vibration Assessment is an extension of the vibration screening procedure. The analysis estimates project vibration levels based on ground surface vibration curves as a function of distance to track as illustrated within Figure 10-1 of the FTA Manual. Adjustment factors related to the vibration source, path and receiver are applied to values obtained from the curves.

Based on FTA’s guidance, the locomotive powered passenger or freight curve should be utilized for any commuter rail system powered by either diesel or electric locomotives. The distances between the proposed tracks and the vibration-sensitive receivers (Site 1 – 700 Grove Street Condominiums/Zephyr Lofts and Site 2 – proposed Newport Development Site) were determined, and preliminary vibration velocity levels at a speed of 50 mph were obtained from Figure 10-1 in the FTA Manual. Subsequently, equation (3) was utilized to adjust the vibration velocity levels at each site for a train speed of 5 mph, consistent with the General Noise Assessment.

\[ \text{adjustment}(dB) = 20 \log \left( \frac{\text{speed}}{\text{speed(ref)}} \right) \]

In addition to adjusting for speed, a factor of 5 dB was added to predicted vibration velocity levels for jointed track to be consistent with the General Noise Assessment. Reduction factors for track treatments and configurations were not incorporated in order to perform a worst-case, conservative assessment. Without detailed information on site geologic conditions, the analysis assumes a worst case vibration propagation condition, and therefore a factor of 10 dB was added for efficient propagation through the soil between source and receiver. A coupling loss factor of -10 dB was assumed for large masonry buildings on piles for the two sensitive receivers, and a 6 dB increase for amplification due to resonances of floors, walls and ceilings was added. Predicted ground-borne vibration levels, incorporating all described adjustment factors, were subsequently converted to ground-borne noise levels, assuming the peak frequency of vibration is typical (peak 30 to 60 Hz), and thereby subtracting a factor of 35 dB. Results of the General Vibration Assessment are presented in Table B-1.4. As shown in the table, ground-borne vibration and noise levels are predicted to be below Category 2 land use impact thresholds for infrequent events. Therefore, vibration impacts to the 700 Grove Street Condominiums/Zephyr Lofts and proposed luxury condos at the Newport Development Site are not anticipated.

<table>
<thead>
<tr>
<th>Site Number</th>
<th>Site Location</th>
<th>Distance to Track (ft)</th>
<th>Ground-Borne Vibration Level at 50mph (VdB) (^1)</th>
<th>Predicted Ground-Borne Vibration Level (VdB) (^2)</th>
<th>Predicted Ground-Borne Noise Level (dB) (^2)</th>
<th>Ground-Borne Vibration or Noise Impact? (^3)</th>
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### Appendix B-1 Operational Noise and Vibration Impact Assessment

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**Notes:**

1. Determined from the Locomotive Powered Passenger or Freight curve in Figure 10-1 of the FTA’s *Transit Noise and Vibration Impact Assessment*, May 2006.
2. Resultant level after applying adjustment factors to value read from Figure 10-1. Adjustment factors incorporated for this analysis include: speed, jointed track, efficient propagation in soil, coupling loss for large masonry buildings on piles, and amplification due to resonances of floors, walls, and ceilings.
3. Predicted ground-borne vibration and noise levels were compared to Category 2 land use criteria for “Infrequent Events.”

Attachment B-1

Operational Analysis Supportive Files
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<td>0:02</td>
<td>11</td>
<td>OVC009</td>
<td>7</td>
<td>75</td>
<td>24</td>
<td>90</td>
<td>8</td>
<td>130</td>
<td>0.13</td>
<td>0</td>
</tr>
<tr>
<td>14734</td>
<td>9/30/2015</td>
<td>0:51</td>
<td>11</td>
<td>BKN007 BKN011 OVC</td>
<td>6</td>
<td>75</td>
<td>23.9</td>
<td>94</td>
<td>8</td>
<td>120</td>
<td>0.13</td>
<td>0</td>
</tr>
</tbody>
</table>
NJ Transit Long Slip Fill and Rail Enhancement Project
Noise Monitoring Photos

Site # 1: 700 Grove Street (View Facing West)

Site # 2: Proposed Newport Development Site (View Facing North)
### Project Results Summary

#### Existing Ldn:
69 dBA

#### Total Project Ldn:
38 dBA

#### Total Noise Exposure:
63 dBA

#### Increase:
0 dB

#### Impact:
None

### Distance to Impact Contours

- **Dist to Mod. Impact Contour (Sources 1+2):** 3 ft
- **Dist to Sev. Impact Contour (Sources 1+2):** 1 ft

### Noise Source Parameters Source 1

- **Source Type:** Fixed Guideway
- **Specific Source:** Electric Locomotive

**Daytime hrs**

- Avg. Number of Locomotives/Train: 1
- Speed (mph): 5
- Avg. Number of Events/hr: 1

**Nighttime hrs**

- Avg. Number of Locomotives/Train: 1
- Speed (mph): 5
- Avg. Number of Events/hr: 0

**Distance**

- Distance from Source to Receiver (ft): 120

**Adjustments**

- Number of Intervening Rows of Buildings: 0

### Noise Source Parameters Source 2

- **Source Type:** Fixed Guideway
- **Specific Source:** Rail Car

**Daytime hrs**

- Avg. Number of Rail Cars/Train: 10
- Speed (mph): 5
- Avg. Number of Events/hr: 1

**Nighttime hrs**

- Avg. Number of Rail Cars/Train: 10
- Speed (mph): 5
- Avg. Number of Events/hr: 0

**Distance**

- Distance from Source to Receiver (ft): 120

**Adjustments**

- Noise Barrier?: No
- Jointed Track?: Yes
- Embedded Track?: No
- Aerial Structure?: No

### Noise Impact Criteria

#### (FTA Manual, Fig 3-1)

- **Moderate Impact**
- **Severe Impact**

- **700 Grove Street**

### Increase in Cumulative Noise Levels Allowed

#### (FTA Manual, Fig 3-2)

- **Moderate Impact**
- **Severe Impact**
- **700 Grove Street**
### Project Results Summary

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Existing Ldn</td>
<td>63 dBA</td>
</tr>
<tr>
<td>Total Project Ldn</td>
<td>42 dBA</td>
</tr>
<tr>
<td>Total Noise Exposure</td>
<td>63 dBA</td>
</tr>
<tr>
<td>Increment</td>
<td>0 dB</td>
</tr>
<tr>
<td>Impact?</td>
<td>None</td>
</tr>
</tbody>
</table>

### Receiver Parameters

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiver</td>
<td>Newport Development Site</td>
</tr>
<tr>
<td>Land Use Category</td>
<td>2: Residential</td>
</tr>
<tr>
<td>Existing Noise (Measured or Generic Value)</td>
<td>63 dBA</td>
</tr>
</tbody>
</table>

### Noise Source Parameters

#### Source 1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Type</td>
<td>Fixed Guideway</td>
</tr>
<tr>
<td>Specific Source</td>
<td>Electric Locomotive</td>
</tr>
<tr>
<td>Daytime hrs Avg. Number of Locos/train</td>
<td>1</td>
</tr>
<tr>
<td>Speed (mph)</td>
<td>5</td>
</tr>
<tr>
<td>Avg. Number of Events/hr</td>
<td>1</td>
</tr>
<tr>
<td>Nighttime hrs Avg. Number of Locos/train</td>
<td>1</td>
</tr>
<tr>
<td>Speed (mph)</td>
<td>5</td>
</tr>
<tr>
<td>Avg. Number of Events/hr</td>
<td>0</td>
</tr>
<tr>
<td>Distance</td>
<td>65 ft</td>
</tr>
<tr>
<td>Number of Intervening Rows of Buildings</td>
<td>0</td>
</tr>
</tbody>
</table>

#### Source 2

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Source Type</td>
<td>Fixed Guideway</td>
</tr>
<tr>
<td>Specific Source</td>
<td>Rail Car</td>
</tr>
<tr>
<td>Daytime hrs Avg. Number of Rail Cars/train</td>
<td>10</td>
</tr>
<tr>
<td>Speed (mph)</td>
<td>5</td>
</tr>
<tr>
<td>Avg. Number of Events/hr</td>
<td>1</td>
</tr>
<tr>
<td>Nighttime hrs Avg. Number of Rail Cars/train</td>
<td>10</td>
</tr>
<tr>
<td>Speed (mph)</td>
<td>5</td>
</tr>
<tr>
<td>Avg. Number of Events/hr</td>
<td>0</td>
</tr>
<tr>
<td>Distance</td>
<td>65 ft</td>
</tr>
<tr>
<td>Number of Intervening Rows of Buildings</td>
<td>0</td>
</tr>
</tbody>
</table>

### Adjustments

- Noise Barrier?: No
- Jointed Track?: Yes
- Embedded Track?: No
- Aerial Structure?: No

### Noise Impact Criteria

- Moderate Impact
- Severe Impact

### Receiver Noise Exposure/Ldn (dBA)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Source</td>
<td>62.7 dBA</td>
</tr>
<tr>
<td>Ldn:</td>
<td>40.7 dBA</td>
</tr>
</tbody>
</table>

### Source 1 Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leq(day):</td>
<td>42.7 dBA</td>
</tr>
<tr>
<td>Leq(night):</td>
<td>0.0 dBA</td>
</tr>
<tr>
<td>Ldn:</td>
<td>40.7 dBA</td>
</tr>
</tbody>
</table>

### Source 2 Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leq(day):</td>
<td>39.7 dBA</td>
</tr>
<tr>
<td>Leq(night):</td>
<td>0.0 dBA</td>
</tr>
<tr>
<td>Ldn:</td>
<td>37.7 dBA</td>
</tr>
<tr>
<td>Incremental Ldn (Src 1-2):</td>
<td>42.4 dBA</td>
</tr>
</tbody>
</table>

### Distance to Impact Contours

<table>
<thead>
<tr>
<th>Distance</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dist to Mod. Impact Contour (Sources 1+2):</td>
<td>5 ft</td>
</tr>
<tr>
<td>Dist to Sever. Impact Contour (Sources 1+2):</td>
<td>2 ft</td>
</tr>
</tbody>
</table>
## Operational General Vibration Assessment

<table>
<thead>
<tr>
<th>Site</th>
<th>Distance to Track (ft)</th>
<th>VdB @ 50 mph (dB)</th>
<th>Speed Adjustment Factor (dB)</th>
<th>Jointed Track Adjustment Factor</th>
<th>Efficient Propagation in Soil Factor</th>
<th>Coupling Loss Factor</th>
<th>Amplification Due to Resonances</th>
<th>Predicted Ground-Borne Vibration Level (VdB)</th>
<th>Ground-Borne Vibration Impact?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>120</td>
<td>77</td>
<td>-20</td>
<td>5</td>
<td>10</td>
<td>-10</td>
<td>6</td>
<td>67</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>65</td>
<td>83</td>
<td>-20</td>
<td>5</td>
<td>10</td>
<td>-10</td>
<td>6</td>
<td>74</td>
<td>NO</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Site</th>
<th>Distance to Track (ft)</th>
<th>VdB @ 50 mph (dB)</th>
<th>Speed Adjustment Factor (dB)</th>
<th>Jointed Track Adjustment Factor</th>
<th>Efficient Propagation in Soil Factor</th>
<th>Coupling Loss Factor</th>
<th>Amplification Due to Resonances</th>
<th>Predicted Ground-Borne Noise Level (VdB)</th>
<th>Ground-Borne Vibration Impact?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>120</td>
<td>77</td>
<td>-20</td>
<td>5</td>
<td>10</td>
<td>-10</td>
<td>6</td>
<td>33</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>65</td>
<td>83</td>
<td>-20</td>
<td>5</td>
<td>10</td>
<td>-10</td>
<td>6</td>
<td>39</td>
<td>NO</td>
</tr>
</tbody>
</table>
Appendix B-2: Construction Noise and Vibration Impact Analysis
Appendix B-2  Construction Noise and Vibration

Construction of the Current Project will be performed in several stages over the course of approximately 3.5 years. Extension of the Jersey City CSO will be performed in Stage 1, while the Long Slip Canal will be filled in during Stage 2. In Stage 3, the new bridge over Marin Boulevard will be constructed, and finally in Stage 4, the new tracks and platforms will be constructed along with the new station/crew facility at the eastern end of the Canal. Construction means and methods, schedule, number of truck deliveries and haul routes are based on a conceptual level of design and reasonable assumptions. Heavy operations are anticipated during each stage; therefore, based on FTA guidance found in Transit Noise and Vibration Impact Assessment, May 2006 (FTA Manual), a General Assessment of on-site construction activities was performed for each of the four main stages of construction. In order to evaluate the potential for noise and vibration impacts relative to adjacent sensitive receivers, heavy operations associated with each stage were identified. The four construction stages and activities with the greatest potential to generate noise and vibration impacts were evaluated and are described within.

Stage 1 - Jersey City CSO Extension (Estimated 15 months duration)

During Stage 1, sheet piling will be installed within the northern 20 feet of the Canal to create a cofferdam, which extends the length of the Canal to just west of the Hudson-Bergen Light Rail bridge structure. Typical sheet driving activities are performed utilizing a vibratory hammer mounted to an excavator, which has the potential to generate both noise and vibration impacts. Based on preliminary estimates, sheet pile installation is expected to last approximately three months. Once the construction of the entire cofferdam is complete and dewatered, a concrete box will be constructed to house the CSO extension, thereby requiring concrete mixer and pump trucks and a concrete vibrator to ensure smooth and even distribution of concrete. Noise impacts related to Stage 1 were evaluated based on assuming one crew utilizing a vibratory hammer and excavator, simultaneously, during creation of the cofferdam followed by one concrete crew utilizing one concrete mixer truck, one concrete pump truck, and one concrete vibrator to construct the concrete box housing the CSO extension. In accordance with the FTA Manual, the sheet driving activity was also assessed as part of the construction vibration analysis. All work within this stage was assumed to be located along the western and northern portion of the long slip construction site.

Stage 2 – Filling in Long Slip (Estimated 24 months duration)

Once Stage 1 is complete, modular retaining walls will be constructed during Stage 2 to hold back approximately 190,000 cubic yards of regulated fill. The noise analysis assumes one crew utilizing a crane and a backhoe to assemble the modular retaining wall segments. Once the retaining wall is complete, fill will be hauled in from an off-site location. Subsequently, once the fill arrives on site, the noise analysis assumes one dump truck and one excavator will be needed to distribute fill into
the Canal. All work within this stage was assumed to be located within the boundaries of the Canal. In accordance with the FTA Manual, activities occurring during Stage 2 are not anticipated to generate significant vibration.

**Stage 3 – Bridge Span over Marin Boulevard (Estimated 6 months duration)**

Concurrent with Stage 1 or Stage 2 activities, the new bridge span over Marin Boulevard for the two new approach tracks will be constructed. Construction of the bridge abutments will require impact pile driving and excavation. The construction noise analysis of this Stage 3 activity assumes one impact pile driver and one excavator. In accordance with the FTA Manual, the impact pile driver was also assessed as part of the construction vibration analysis. Work within this stage was assumed to be located at the two abutments at Marin Boulevard, the piers for the track bridge structure through the western end of Pullman Yard, and at the third abutment at the western end of the Canal.

**Stage 4 – Installation of Railroad Infrastructure (Estimated 8 months duration)**

Once Stage 3 is complete, construction of the tracks, catenary signals, platforms and station/crew facility and walkway to Hoboken Terminal may commence. Stage 4 work will occur from west to east. Two heavy operations were analyzed for Stage 4 and include, track installation with one crew utilizing a tie inserter and excavator, and pile driving and excavation with one impact pile driver and one excavator for construction of the station/crew facility building foundation. The noise analysis assumes that these two heavy operations will be concurrent during Stage 4, as the station/crew facility is located east of the proposed tracks. In accordance with the FTA Manual, only the impact pile driving was evaluated as part of the construction vibration assessment. Based on conceptual design assumptions, Stage 2 activities within the Canal may be concurrent with Stage 4 track installation, as tracks may be laid from west to east.

*Table B-2.1* presents a summary of the construction scenarios evaluated in each stage for the FTA General Assessment of on-site construction activities.
### Table B-2.1
**Construction Scenarios**

<table>
<thead>
<tr>
<th>Construction Stage</th>
<th>Heaviest Operation(s)</th>
<th>Potential Equipment Type</th>
<th>Reasonable Equipment Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 – Jersey City CSO Extension</td>
<td>Sheet Driving</td>
<td>Vibratory Hammer</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excavator</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Construction of Concrete Box</td>
<td>Concrete Mixer Truck</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Concrete Pump Truck</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Vibratory Concrete Mixer</td>
<td>1</td>
</tr>
<tr>
<td>2 – Filling in Long Slip</td>
<td>Retaining Wall Construction</td>
<td>Backhoe</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Crane</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Distribution of Fill Material</td>
<td>Dump Truck</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excavator</td>
<td>1</td>
</tr>
<tr>
<td>Stage 3 – Bridge Span Over Marin Blvd.</td>
<td>Pile Driving and Excavation</td>
<td>Impact Pile Driver</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excavator</td>
<td>1</td>
</tr>
<tr>
<td>4 – Installation of Railroad Infrastructure</td>
<td>Track Installation &amp; Pile Driving for Station/Crew Facility</td>
<td>Tie Inserter</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excavator</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Impact Pile Driver</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Excavator</td>
<td>1</td>
</tr>
</tbody>
</table>

**Note:**

1. The track installation and construction of the station/crew facility in Stage 4 were assumed to be performed concurrently since the station/crew facility is proposed east of the tracks. All other activities within each stage must be performed independently.


Due to the potential for certain stages to overlap, as described within, cumulative construction scenarios were also evaluated and are presented in Table B-2.2. Table B-2.3 presents sensitive receiver locations analyzed for construction noise and vibration assessments. Figure B-2.1 illustrates construction activity and analysis locations.
### Table B-1.2
**Cumulative Construction Scenarios**

<table>
<thead>
<tr>
<th>Construction Stage</th>
<th>Heaviest Operation(s)</th>
<th>Potential Equipment Type</th>
<th>Reasonable Equipment Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 &amp; 3 (Jersey City CSO Extension &amp; Bridge Span Over Marin Blvd.)</td>
<td>Sheet Driving + Pile Driving</td>
<td>Vibratory Hammer, Excavator, Impact Pile Driver</td>
<td>1, 2, 1</td>
</tr>
<tr>
<td></td>
<td>Concrete Mixer Truck, Concrete Pump Truck</td>
<td>1, 1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Construction of Concrete Box + Pile Driving</td>
<td>Vibratory Concrete Mixer, Impact Pile Driver, Excavator</td>
<td>1, 1, 1</td>
</tr>
<tr>
<td>2 &amp; 3 (Filling in Long Slip &amp; Bridge Span Over Marin Blvd.)</td>
<td>Retaining Wall Construction + Pile Driving</td>
<td>Backhoe, Crane, Impact Pile Driver, Excavator</td>
<td>1, 1, 1, 1</td>
</tr>
<tr>
<td></td>
<td>Distribution of Fill Material + Pile Driving</td>
<td>Dump Truck, Excavator, Impact Pile Driver</td>
<td>1, 2, 1</td>
</tr>
<tr>
<td>2 &amp; 4 (Filling in Long Slip &amp; Installation of Railroad Infrastructure)</td>
<td>Retaining Wall Construction + Track Installation</td>
<td>Backhoe, Crane, Tie Inserter, Excavator</td>
<td>1, 1, 1, 1</td>
</tr>
<tr>
<td></td>
<td>Distribution of Fill Material + Track Installation</td>
<td>Dump Truck, Excavator, Tie Inserter</td>
<td>1, 2, 1</td>
</tr>
</tbody>
</table>

**Note:**

1. The analysis assumes retaining walls must be constructed and the Canal must be filled prior to construction of the station/crew facility on elevated ground; therefore, the cumulative assessment of Stage 2 and Stage 4 assumes tracks can be installed west of the Canal either during retaining wall construction or during distribution of fill material into the Canal.

Table B-2.2
Construction Noise and Vibration Assessment Receiver Locations

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Receiver Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial/Industrial</td>
</tr>
<tr>
<td></td>
<td>700 Grove St.</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Condominiums/Zephyr Lofts</td>
<td>Residential</td>
</tr>
<tr>
<td>5</td>
<td>Office Building</td>
<td>Commercial</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
</tr>
<tr>
<td>9</td>
<td>Wheel Machine Building</td>
<td>Industrial</td>
</tr>
</tbody>
</table>

Notes:

1. Receiver locations 1 through 8 were included as part of the construction noise assessment to identify potential impacts to the closest residential, commercial and industrial properties in all directions from each construction stage.
2. Receiver location 9 was only utilized for the vibration-induced structural damage assessment due to its proximity to Stage 1 and Stage 4 sheet driving and impact pile driving, respectively.


The FTA’s guidance for evaluating construction noise impacts is focused on stationary and mobile on-site sources (i.e. non-road sources). However, as detailed within Section 4.9.2 “Construction Effects,” approximately 60 truck trips per day, four per hour, will be needed for concrete and fill deliveries during Stages 1 and 2, respectively. Noise-sensitive receptors are located along proposed haul routes, and therefore off-site construction noise sources (truck trips) were also addressed.
B-2.1 CONSTRUCTION NOISE ASSESSMENT

On-site Sources

Since specific construction information is not available at this time, a FTA Detailed Assessment of construction noise cannot be performed. Therefore, a modified version of the FTA General Assessment of on-site construction noise sources was performed utilizing information currently available. Specifically, the FTA General Assessment of construction noise provides procedures to evaluate worst-case construction scenarios based on a conceptual design, assuming equipment operates continuously for one hour at full load and from the project center. Attenuation due to ground effects is typically ignored under General Assessment procedures. Based on the nature of sheet pile installation as well as pile driving, and approximate work locations and limits, adjustments to the General Assessment procedures were made accordingly. The methodology utilized for this analysis and specific variations from FTA General Assessment procedures are described within.

Reference noise levels for construction equipment at a distance of 50 feet are provided in Table 12-1 of the FTA Manual as well as the FHWA’s Roadway Construction Noise Model (RCNM) database. In accordance with the FTA Manual, it is acceptable to utilize RCNM to evaluate construction noise impacts and incorporate reference noise levels provided in Table 12-1 within RCNM.

The RCNM algorithms for predicting construction noise levels are consistent with FTA methodology and assume equipment are point sources of noise, whereby the rate of reduction in noise levels is approximately 6 decibels per doubling of distance. However, RCNM provides a much more comprehensive database of equipment and therefore includes additional pieces of equipment not provided in FTA’s Table 12-1. Further, the RCNM database includes more realistic reference noise emission levels, particularly for a vibratory hammer, based on field-measured levels as part of the Central Artery/Tunnel project in Boston, Massachusetts. Therefore, to perform a reasonable worst-case construction noise analysis, the FHWA’s RCNM was utilized, including reference noise emission levels provided within the model. FHWA’s RCNM method for prediction of construction noise is computed based on using equation (1):

\[
(1) \text{Leq} = \text{E.L.} + 10 \log(\text{U.F.}) - 20 \log \left( \frac{D}{50} \right) - 10 \log \left( \frac{D}{50} \right) - A_{\text{shielding}}
\]

where:

- Leq = Leq at receptor location resulting from operation of single piece of equipment over a specified time period
- E.L. = reference equipment noise emission level (based on a Lmax at 50 ft)
- U.F. = equipment usage factor (percentage of time that equipment is operating at full power over the specified time period)
- D = distance between source and receptor (ft)
- G = ground effects constant (zero for acoustically hard ground surface conditions)
- A_{\text{shielding}} = attenuation provided by intervening buildings, barriers, etc.

Default acoustic usage factors (‘U.F.’ in equation 1) provided in RCNM, representing the percentage of time equipment is operating during the analysis period, were also utilized rather than performing
the analysis with the FTA General Assessment assumption that equipment operates continuously at full load for a one hour period (i.e. 100 percent of the hour). Due to soil obstructions and time to lift and ensure sheets are plum, sheet driving operations do not typically run continuously for an entire hour. Similarly, an impact pile driver will not typically run continuously for an entire hour, as the time is dictated by soil obstructions and depth to which the piles need to be driven. Concrete pump trucks follow behind sheet and pile driving and are typically not operating continuously for an entire hour. Other equipment, including dump trucks, excavators, backhoes and cranes also do not typically operate continuously for an entire hour.

Since approximate work locations and limits are known for each activity (see Figure B-2.1), the analyses were performed based on these work limits, as opposed to performing the analysis with the FTA General Assessment assumption that all equipment operates from project center. Consistent with the FTA Manual for General Assessment, ground effects (‘G’ in equation 1) were ignored (i.e. additional attenuation due to ground absorption was not accounted for in the analysis). Additional attenuation due to shielding by intervening buildings and barriers (‘A_{shielding}’ in equation 1) was also ignored in order to perform a preliminary worst-case analysis.

Under FTA’s General Assessment, construction noise levels are compared to both daytime (7:00 AM – 10:00 PM) and nighttime (10:00 PM – 7:00 AM) hourly equivalent noise level (L_{eq(h)}) limits established for residential, commercial, and industrial land use. Based on conceptual design information, construction could occur in two shifts from 6:00 AM – 2:00 PM and from 2:00 PM – 10:00 PM weekdays as well as on weekends; therefore, impacts were assessed based on the day and night hourly equivalent noise level (L_{eq(h)}) criteria for each land use type. FTA General Assessment construction noise criteria are presented in Table B-2.4.

<table>
<thead>
<tr>
<th>Land Use</th>
<th>Day</th>
<th>Night</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(7:00 AM – 10:00 PM)</td>
<td>(10:00 PM – 7:00 AM)</td>
</tr>
<tr>
<td>Residential</td>
<td>90</td>
<td>80</td>
</tr>
<tr>
<td>Commercial</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Industrial</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>


Construction noise analysis locations are shown in Figure B-2.1 and represent the closest structures in each FTA land use category to the heaviest operations identified for the four major construction stages. Results of the construction noise analysis for each individual stage are presented within Tables B-2.5 through B-2.10.
Figure B-2.1: Construction Activity and Analysis Locations

Long Slip Fill and Rail Enhancement Project
Table B-2.5 depicts the results of the Stage 1 sheet driving noise assessment. As shown in the table, noise levels are predicted to exceed the FTA’s nighttime 1-hour $L_{eq}$ noise impact criterion of 80 dBA for residential land use at the proposed Newport Development Site. During daytime hours (7:00 AM – 10:00 PM), noise levels are predicted to be below the FTA’s criterion of 90 dBA. To preclude impact to this site, sheet driving should be prohibited from 10:00 PM – 7:00 AM. Noise levels are not predicted to exceed the FTA’s 1-hour $L_{eq}$ impact criterion of 100 dBA for commercial and industrial land use.

**Table B-2.4**  
Construction Noise Assessment Results  
Stage 1 - Sheet Driving

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA)</th>
<th>Distance to Sheet Driving (ft)</th>
<th>Predicted 1-hour $L_{eq}$ Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>167</td>
<td>83.4</td>
<td>NO/YES</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>757</td>
<td>70.3</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>816</td>
<td>69.7</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts</td>
<td>Residential</td>
<td>90/80</td>
<td>730</td>
<td>70.6</td>
<td>NO/NO</td>
</tr>
<tr>
<td>5</td>
<td>Office Building Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>1062</td>
<td>67.4</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>807</td>
<td>69.8</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>708</td>
<td>70.9</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>693</td>
<td>71.1</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour $L_{eq}$ criterion.


Table B-2.6 depicts the results of the analysis of the construction of the concrete box to house the Jersey City CSO extension during Stage 1. As shown in the table, noise levels are not predicted to exceed the FTA’s daytime or nighttime 1-hour $L_{eq}$ noise impact criteria for any land use types.
### Table B-2.5
Construction Noise Assessment Results

#### Stage 1 - Construction of Concrete Box

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA) Day/Night</th>
<th>Distance to Concrete Box (ft)</th>
<th>Predicted 1-hour $L_{eq}$ Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>167</td>
<td>68.4</td>
<td>NO/NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>757</td>
<td>55.3</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>816</td>
<td>54.7</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts</td>
<td>Residential</td>
<td>90/80</td>
<td>730</td>
<td>55.6</td>
<td>NO/NO</td>
</tr>
<tr>
<td>5</td>
<td>Office Building and Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>1062</td>
<td>52.4</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>807</td>
<td>54.8</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>708</td>
<td>55.9</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>693</td>
<td>56.1</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour $L_{eq}$ criterion.


**Tables B-2.7 and B-2.8** summarize the results of the Stage 2 analysis of constructing retaining walls and filling in the Canal, respectively. As shown in the tables, noise levels are not predicted to exceed the FTA’s daytime or nighttime 1-hour $L_{eq}$ noise impact criteria for any land use types during either activity.
### Table B-2.6
**Construction Noise Assessment Results**

**Stage 2 - Retaining Wall Construction**

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA) Day/Night</th>
<th>Distance to Retaining Wall (ft)</th>
<th>Predicted 1-hour $L_{eq}$ Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>55</td>
<td>75.3</td>
<td>NO/NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>693</td>
<td>53.3</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>793</td>
<td>52.1</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts</td>
<td>Residential</td>
<td>90/80</td>
<td>723</td>
<td>52.9</td>
<td>NO/NO</td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>1055</td>
<td>49.6</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>800</td>
<td>52.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>699</td>
<td>53.2</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>684</td>
<td>53.4</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour $L_{eq}$ criterion.

### Table B-2.7
Construction Noise Assessment Results

**Stage 2 – Distribution of Fill Material**

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA) Day/Night</th>
<th>Distance to Fill (ft)</th>
<th>Predicted 1-hour $L_{eq}$ Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>55</td>
<td>77.3</td>
<td>NO/NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>693</td>
<td>55.3</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>793</td>
<td>54.1</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts Office Building</td>
<td>Residential</td>
<td>90/80</td>
<td>723</td>
<td>54.9</td>
<td>NO/NO</td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>1055</td>
<td>51.6</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>800</td>
<td>54.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>699</td>
<td>55.2</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>684</td>
<td>55.4</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

**Note:** Bold values represent receiver locations where noise levels are predicted to exceed the applicable 1-hour $L_{eq}$ criterion.


Table B-2.9 depicts the results of the noise assessment performed for pile driving and excavation related to construction of the abutments and piers for the new two-track bridge over Marin Boulevard. As shown in the table, noise levels are predicted to exceed the FTA’s nighttime 1-hour $L_{eq}$ noise impact criterion of 80 dBA for residential land use at the 700 Grove St. Condominiums and Zephyr Lofts. During daytime hours (7:00 AM – 10:00 PM), noise levels are predicted to be below the FTA’s criterion of 90 dBA. To preclude impact to this residential structure, impact pile driving should be prohibited from 10:00 PM – 7:00 AM. Noise levels are not predicted to exceed the FTA’s 1-hour $L_{eq}$ impact criterion of 100 dBA for commercial and industrial land use during Stage 3.
Table B-2.8  
Construction Noise Assessment Results

Stage 3 – Pile Driving and Excavation of Marin Blvd. Bridge

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA)</th>
<th>Distance to Pile Driving &amp; Excavation (ft)</th>
<th>Predicted 1-hour L_{eq} Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>1031</td>
<td>68.1</td>
<td>NO/NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>652</td>
<td>72.1</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>221</td>
<td>81.4</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts Office Building</td>
<td>Residential</td>
<td>90/80</td>
<td>214</td>
<td>81.7</td>
<td>NO/YES</td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>737</td>
<td>71.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>816</td>
<td>70.1</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>1475</td>
<td>65.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>1539</td>
<td>64.6</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour L_{eq} criterion.


Table B-2.10 depicts the results of the noise assessment performed for the concurrent activities of installing the six new tracks and pile driving to construct the foundation for the new station/crew facility just east of the new tracks and platforms. As shown in the table, noise levels are predicted to exceed the FTA’s nighttime 1-hour L_{eq} noise impact criterion of 80 dBA for residential land use at the proposed Newport Development Site. During daytime hours (7:00 AM – 10:00 PM), noise levels are predicted to be just below the FTA’s criterion of 90 dBA. To preclude nighttime noise impact to this site, impact pile driving should be prohibited from 10:00 PM – 7:00 AM. Noise levels are not predicted to exceed the FTA’s 1-hour L_{eq} impact criterion of 100 dBA for commercial and industrial land use during Stage 4.
### Table B-2.9

**Construction Noise Assessment Results**

**Stage 4 – Track Installation & Pile Driving of Station/Crew Facility**

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA) Day/Night</th>
<th>Distance to Track Installation/Pile Driving (ft)</th>
<th>Predicted 1-hour L&lt;sub&gt;eq&lt;/sub&gt; Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>65/98</td>
<td>89.1</td>
<td>NO/YES</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>95/190</td>
<td>64.9</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>119/2302</td>
<td>77.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts</td>
<td>Residential</td>
<td>90/80</td>
<td>119/2302</td>
<td>75.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>726/2018</td>
<td>64.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>810/1187</td>
<td>67.4</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>714/735</td>
<td>71.3</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>726/721</td>
<td>71.4</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour L<sub>eq</sub> criterion.


**Tables B-2.11 through B-2.16** depict the results of the cumulative construction noise assessment.

**Table B-2.11** depicts the results of the cumulative noise assessment performed for the concurrent activities of sheet driving in Stage 1 and impact pile driving in Stage 3. As shown in the table, noise levels are predicted to exceed the FTA’s nighttime 1-hour L<sub>eq</sub> noise impact criterion of 80 dBA for residential land use at the proposed Newport Development Site and at the 700 Grove St. Condominiums/Zephyr Lofts. Due to the distance to Stage 3 pile driving, concurrent heavy operations in Stage 1 and Stage 3 increase noise levels at the proposed Newport Development Site by only 0.1 dBA. Similarly, noise levels increase at the 700 Grove St. Condominiums/Zephyr Lofts by 0.4 dBA. Increases of 0.1 and 0.4 dBA are not perceivable. While sheet driving and impact pile driving activities during Stages 1 and 3 may be performed concurrently without a perceivable increase in noise levels at the proposed Newport Development Site and 700 Grove St.
Condominiums/Zephyr Lofts, these activities should be prohibited between 10:00 PM and 7:00 AM to preclude impact.

Table B-2.10
Cumulative Construction Noise Assessment Results
Stage 1 & Stage 3 – Sheet Driving + Pile Driving

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA) Day/Night</th>
<th>Distance to Sheet Driving/Pile Driving (ft)</th>
<th>Predicted 1-hour $L_{eq}$ Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>167/1247</td>
<td>83.5</td>
<td>NO/YES</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>757/652</td>
<td>74.3</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>816/221</td>
<td>81.7</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts</td>
<td>Residential</td>
<td>90/80</td>
<td>730/214</td>
<td>82.1</td>
<td>NO/YES</td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>1073/737</td>
<td>72.5</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>851/816</td>
<td>72.7</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>708/1665</td>
<td>71.7</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>693/1776</td>
<td>71.8</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour $L_{eq}$ criterion.


Table B-2.12 depicts the results of the cumulative noise assessment performed for the concurrent activities of concrete box construction in Stage 1 and impact pile driving in Stage 3. As shown in the table, noise levels are predicted to exceed the FTA’s nighttime 1-hour $L_{eq}$ noise impact criterion of 80 dBA for residential land use at the 700 Grove St. Condominiums/Zephyr Lofts. Concurrent construction of the concrete box in Stage 1 with impact pile driving of abutments and piers in Stage 3 is not predicted to increase noise levels at the 700 Grove St. Condominiums, compared to if Stage 3 was performed independently of Stage 1. However, to preclude impact to this residential site, impact pile driving in Stage 3 should be prohibited between 10:00 PM and 7:00 AM.
<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA) Day/Night</th>
<th>Distance to Concrete Box/Pile Driving (ft)</th>
<th>Predicted 1-hour ( L_{eq} ) Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>167/1247</td>
<td>70.6</td>
<td>NO/NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>757/652</td>
<td>72.1</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>816/221</td>
<td>81.5</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts</td>
<td>Residential</td>
<td>90/80</td>
<td>730/214</td>
<td>81.7</td>
<td>NO/YES</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>1073/737</td>
<td>71.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>851/816</td>
<td>70.2</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>712/1632</td>
<td>64.7</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>703/1700</td>
<td>64.4</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour \( L_{eq} \) criterion.


**Table B-2.13** depicts the results of the cumulative noise assessment performed for the concurrent activities of retaining wall construction in Stage 2 and impact pile driving in Stage 3. **Table B-2.14** depicts the results of the cumulative noise assessment performed for the concurrent activities of fill distribution in Stage 2 and impact pile driving in Stage 3. As shown in both tables, noise levels are predicted to exceed the FTA’s nighttime 1-hour \( L_{eq} \) noise impact criterion of 80 dBA for residential land use at the 700 Grove St. Condominiums/Zephyr Lofts. Concurrent heavy operations in Stage 2 and Stage 3 would not result in an increase in noise levels at this residential site, compared to if Stage 3 work is performed independently. However, to preclude impact to this residential site, impact pile driving in Stage 3 should be prohibited between 10:00 PM and 7:00 AM.
**Table B-2.12**

*Cumulative Construction Noise Assessment Results*

**Stage 2 & Stage 3 – Construction of Retaining Walls + Pile Driving**

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA) Day/Night</th>
<th>Distance to Retaining Walls/Pile Driving (ft)</th>
<th>Predicted 1-hour ( L_{eq} ) Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>55/1247</td>
<td>75.8</td>
<td>NO/NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>694/652</td>
<td>72.1</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>811/221</td>
<td>81.5</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td><strong>700 Grove St./Zephyr Lofts</strong></td>
<td>Residential</td>
<td>90/80</td>
<td>723/214</td>
<td>81.7</td>
<td>NO/YES</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>1066/737</td>
<td>71.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>846/816</td>
<td>70.2</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>703/1632</td>
<td>64.4</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>694/1700</td>
<td>64.1</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour \( L_{eq} \) criterion.

Table B-2.13
Cumulative Construction Noise Assessment Results

Stage 2 & Stage 3 – Distribution of Fill Material + Pile Driving

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA) Day/Night</th>
<th>Distance to Fill/Pile Driving (ft)</th>
<th>Predicted 1-hour $L_{eq}$ Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>55/1247</td>
<td>77.6</td>
<td>NO/NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>694/652</td>
<td>72.1</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>811/221</td>
<td>81.5</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts</td>
<td>Residential</td>
<td>90/80</td>
<td>723/214</td>
<td>81.7</td>
<td>NO/YES</td>
</tr>
<tr>
<td></td>
<td>Office Building</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>1066/737</td>
<td>71.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>846/816</td>
<td>70.2</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>703/1632</td>
<td>64.6</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>694/1700</td>
<td>64.3</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour $L_{eq}$ criterion.


Table B-2.15 depicts the results of the cumulative noise assessment performed for the concurrent activities of retaining wall construction in Stage 2 and track installation in Stage 4. Table B-2.16 depicts the results of the cumulative noise assessment performed for the concurrent activities of fill distribution in Stage 2 and track installation in Stage 4. As shown in both tables, noise levels are not predicted to exceed the FTA’s construction noise impact criteria for any land use types during either of these concurrent operations.
### Table B-2.14

**Cumulative Construction Noise Assessment Results**

Stage 2 & Stage 4 – Retaining Wall + Track Installation

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA) Day/Night</th>
<th>Distance to Retaining Wall/Track Installation (ft)</th>
<th>Predicted 1-hour $L_{eq}$ Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>55/1033</td>
<td>75.3</td>
<td>NO/NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>694/669</td>
<td>60.7</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>811/95</td>
<td>76.8</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts</td>
<td>Residential</td>
<td>90/80</td>
<td>1061/119</td>
<td>74.9</td>
<td>NO/NO</td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>1066/726</td>
<td>59.6</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>846/862</td>
<td>58.6</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>703/1518</td>
<td>56.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>694/1582</td>
<td>55.9</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour $L_{eq}$ criterion.

Table B-2.15
Cumulative Construction Noise Assessment Results

Stage 2 & Stage 4 – Distribution of Fill + Track Installation

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Land Use</th>
<th>FTA Impact Criteria (dBA) Day/Night</th>
<th>Distance to Fill/Track Installation (ft)</th>
<th>Predicted 1-hour $L_{eq}$ Noise Level (dBA)</th>
<th>Exceeds FTA Day/Night Impact Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>Residential</td>
<td>90/80</td>
<td>55/1033</td>
<td>77.3</td>
<td>NO/NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>100/100</td>
<td>694/669</td>
<td>61.2</td>
<td>NO/NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial</td>
<td>100/100</td>
<td>811/95</td>
<td>76.8</td>
<td>NO/NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St./Zephyr Lofts</td>
<td>Residential</td>
<td>90/80</td>
<td>1061/119</td>
<td>74.9</td>
<td>NO/NO</td>
</tr>
<tr>
<td></td>
<td>Office Building</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>Commercial</td>
<td>100/100</td>
<td>1066/726</td>
<td>59.8</td>
<td>NO/NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers</td>
<td>Industrial</td>
<td>100/100</td>
<td>846/862</td>
<td>59.1</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>Residential</td>
<td>90/80</td>
<td>703/1518</td>
<td>57.1</td>
<td>NO/NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>Commercial</td>
<td>100/100</td>
<td>694/1582</td>
<td>57.1</td>
<td>NO/NO</td>
</tr>
</tbody>
</table>

Note: **Bold values** represent receiver locations where noise levels are predicted to exceed the applicable 1-hour $L_{eq}$ criterion.


**Off-site Sources**

Delivery trucks will access the construction site via Washington Boulevard by either utilizing I-78/Rt. 139 eastbound and Marin Boulevard or Jersey Avenue and 18th Street (see Figure B-2.2). Delivery trucks will leave the site through Washington Boulevard, head south down Marin Boulevard, and west along I-78/Rt. 139. FTA Land Use Category 2 noise-sensitive receivers (i.e. residences and other buildings where people normally sleep, including hospitals and hotels) are located along these proposed haul routes. Specifically, the Holland Hotel is located along I-78/Rt. 139 eastbound. Residential structures are located along I-78/Rt. 139 westbound at Manila Avenue as well as along Jersey Avenue (Holland Gardens apartments and a multi-family residential structure under construction). Therefore, the potential for increases in noise levels was evaluated.
Legend

- Traffic Count Location
- Hoboken Yard
- Municipality
- Long Slip Canal

Figure B-2.2: Traffic Count Locations

Hoboken Yard
Municipality
Long Slip Canal

Path: \Atlas\gisdata\Projects\NJ_Transit\Tier3\HobokenLongSlip\2015_EA\MXD\FigureB-2.2_TrafficCount.mxd
Appendix B-2 Construction Noise and Vibration Impact Assessment

Noise is described in a logarithmic scale, where a doubling of the power of a noise source results in a 3 decibel increase in the sound pressure level. An increase in noise levels of 3 dBA is generally regarded by the healthy human ear as a perceivable change in noise levels. In order to determine if the construction-related truck trips would result in a perceivable change in existing noise levels at noise-sensitive receivers along proposed haul routes, heavy truck volumes were counted in three locations (see Figure B-2.2) along these haul routes. Since the volume of heavy truck traffic is typically lower on weekends than on weekdays, and both weekday and weekend work can be expected based on conceptual design information, traffic data collection was performed on Saturday, October 3, 2015. The counts were performed for the hour from 6:00 AM – 7:00 AM, which was assumed to be the weekend hour with the lowest volume of truck traffic and therefore the hour with the greatest potential for truck traffic and noise levels to double (i.e. increase by 100%) during construction. Table B-2.17 summarizes the total number of heavy trucks counted in each location from 6:00 AM – 7:00 AM, the hourly volume of trucks that would be added to the proposed haul route in each location, the total hourly volume of trucks anticipated during construction, and the percent increase in truck traffic during Stage 1 and Stage 2 when concrete and fill deliveries are anticipated. Since heavy truck volumes do not double (i.e. increase by 100%) along any leg of the haul routes where sensitive receptors are located, increases in noise levels associated with truck deliveries in Stage 1 and Stage 2 are not expected to be perceivable (i.e. 3 dBA increase).

Table B-2.16
Haul Route Truck Traffic Impacts Summary

<table>
<thead>
<tr>
<th>Count Location</th>
<th>Road Name</th>
<th>Total Existing Heavy Truck Volume 6:00 AM – 7:00 AM</th>
<th>Hourly Volume of Construction Trucks</th>
<th>Total Heavy Truck Volume During Construction 6:00 AM – 7:00 AM</th>
<th>Percentage Increase of Heavy Truck Traffic During Construction</th>
<th>Perceivable Change in Noise Level Expected at Nearby Sensitive Receiver?</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Jersey Avenue</td>
<td>12</td>
<td>4</td>
<td>16</td>
<td>33%</td>
<td>NO</td>
</tr>
<tr>
<td>B</td>
<td>I-78/Rt. 138 Westbound</td>
<td>8</td>
<td>4</td>
<td>12</td>
<td>50%</td>
<td>NO</td>
</tr>
<tr>
<td>C</td>
<td>I-78/Rt. 138 Eastbound</td>
<td>15</td>
<td>4</td>
<td>19</td>
<td>27%</td>
<td>NO</td>
</tr>
</tbody>
</table>


B-2.2 CONSTRUCTION VIBRATION ASSESSMENT

In accordance with the FTA Manual, construction-induced vibration should be quantitatively assessed for activities such as blasting, pile driving, vibratory compaction, demolition, drilling and excavation in close proximity to sensitive structures as such activities have the greatest potential to generate vibration impacts. As aforementioned, construction of the cofferdam within the Canal in Stage 1 would require the installation of sheeting. Further, pile driving is required to construct the
abutments for the bridge over Marin Boulevard as well as for the foundation of the new station/crew facility in Stages 3 and 4, respectively. Therefore, the vibration assessment was performed for sheet driving and impact pile driving in Stages 1, 3 and 4.

Impacts related to construction-generated vibration are typically assessed based on structural damage and annoyance thresholds. Structural damage is based on the peak particle velocity (PPV) of the vibrations in inches per second (in/sec), and the criteria for assessing damage is based on building material, as presented in Table B-2.18. The closest structures to sheet driving in Stage 1 (receiver no. 1 and 9) and impact pile driving in Stage 3 (receiver no. 3 and 4) and Stage 4 (receiver no. 1 and 9) were included in the vibration-induced damage assessment. All locations evaluated were assumed to be Building Category II structures, which are buildings constructed of engineered concrete and masonry. PPV estimates above 0.3 in/sec indicate a potential for damage to a structure in this category.

<table>
<thead>
<tr>
<th>Building Category</th>
<th>PPV (in/sec)</th>
<th>Approximate Lv1</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Reinforced Concrete, steel or timber (no plaster)</td>
<td>0.5</td>
<td>102</td>
</tr>
<tr>
<td>II. Engineered concrete and masonry (no plaster)</td>
<td>0.3</td>
<td>98</td>
</tr>
<tr>
<td>III. Non-engineered timber and masonry buildings</td>
<td>0.2</td>
<td>94</td>
</tr>
<tr>
<td>IV. Buildings extremely susceptible to vibration damage</td>
<td>0.12</td>
<td>90</td>
</tr>
</tbody>
</table>

Note:

1. RMS velocity in decibels (VdB) re 1 micro-inch/second.

Vibration annoyance is evaluated based on vibration velocity levels (Lv) measured in units of VdB. FTA criteria for assessing annoyance due to construction-related vibrations are based on land use categories and are presented in Table B-2.19.
## Table B-2.18
FTA Construction Vibration Annoyance Criteria

<table>
<thead>
<tr>
<th>Land Use Category</th>
<th>GBV Impact Levels (VdB re 1 micro-inch/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequent Events¹</td>
</tr>
<tr>
<td>Category 1: Buildings where vibration would interfere with interior operations.</td>
<td>65 VdB⁴</td>
</tr>
<tr>
<td>Category 2: Residences and buildings where people normally sleep.</td>
<td>72 VdB</td>
</tr>
<tr>
<td>Category 3: Institutional land use with primarily daytime use.</td>
<td>75 VdB</td>
</tr>
</tbody>
</table>

Notes:

1. “Frequent Events” is defined as more than 70 vibration events of the same source per day.
2. “Occasional Events” is defined as between 30 and 70 vibration events of the same source per day.
3. “Infrequent Events” is defined as fewer than 30 vibration events of the same kind per day.
4. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration-sensitive manufacturing or research will require detailed evaluation to define the acceptable vibration levels.


In accordance with the FTA Manual, vibration land use Category 1 is intended to represent other non-residential buildings with high sensitivity such as buildings where vibration-sensitive research and manufacturing is performed, hospitals with vibration-sensitive equipment, and university research operations. There are no Category 1 land use types within the study area.

Vibration land use Category 2 is intended to represent residences as well as hotels and hospitals where people sleep. The proposed Newport Development Site, 700 Grove St. Condominiums and adjacent Zephyr Lofts, and 55 Bloomfield St. residential structures are the closest residential land use to the sheet driving in Stage 1 and impact pile driving in Stage 3 and Stage 4.

Vibration land use Category 3 is intended to include schools and churches as well as quiet office buildings where vibration may interfere with activities; however this category is not intended to include all buildings with office space (e.g. industrial buildings which have office space, where the primary use is industrial, are not included). The closest Category 3 structures to the Stage 1 sheet driving and Stage 3 and Stage 4 impact pile driving are the TD Bank on Marin Blvd., the office building at the corner of Adams St. and Newark St. in Hoboken, and the Ironstate Development Offices at 50 Washington St. in Hoboken.
For comparison to the criteria, it was assumed that vibration events would be infrequent (i.e. less than 30 events per day, per the FTA criterion definition), thereby indicating that vibration velocity levels above 80 VdB would be considered to be annoying to nearby residents and above 83 VdB would be considered to be annoying to the nearby structures with office spaces.

Table 12-2 of the FTA Manual includes a list of construction equipment with reference vibration source levels in PPV and VdB at a distance of 25 feet. The reference source levels are representative of a variety of measured data. Although soil conditions can vary actual vibrations, the FTA Manual states that these reference source levels provide a reasonable estimate for a wide range of soil conditions. For the sheet pile installation, the upper range value of a sonic (vibratory) pile driver was utilized to perform a conservative worst-case analysis. Similarly, to construct the bridge and station/crew facility building foundation, the upper range value of an impact pile driver was utilized.

Reference source levels are utilized within equations (2) and (3), which are provided in the FTA Manual, to identify vibration velocity levels at nearby structures. Equation (2) was utilized to perform the construction vibration damage assessment, and includes a factor “n” to account for the attenuation rate of vibrations through the ground in accordance with FTA procedures. The value of “n” may be varied if detailed soil information is known. An “n” value of 1.5 is representative of “competent soils” (including sand, sandy clays, silty clays, silts, gravel and weathered rock). Equation (3) was utilized to predict vibration velocity levels for the annoyance assessment.

\[
(2) \quad PPV_{\text{equi}} = PPV_{\text{ref}} \times \left(\frac{25}{D}\right)^n, \text{ and}
\]

\[
(3) \quad L_v(D) = L_v(25\text{ft}) - 30\log\left(\frac{D}{25}\right)
\]

where:

- \(PPV_{\text{ref}}\) = reference vibration level in in/sec at 25 feet
- \(D\) = distance between source and receptor (ft)
- \(n\) = attenuation rate of vibrations through the ground

Results of the construction-generated vibration damage assessment for sheet driving during Stage 1 are presented in Table B-2.20. Assuming on crew utilizing one vibratory hammer at any given time, the potential for damage is not anticipated at the closest structures to this operation.
### Table B-2.19
**Construction Vibration Damage Assessment Results**
**Stage 1 - Sheet Driving**

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Distance from Stage 1 Sheet Driving (ft)</th>
<th>Predicted PPV (in/sec)</th>
<th>Building Category</th>
<th>Damage Threshold (in/sec)</th>
<th>Exceeds Damage Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>167</td>
<td>0.04</td>
<td>II.</td>
<td>0.30</td>
<td>NO</td>
</tr>
<tr>
<td>9</td>
<td>Wheel Machine Building</td>
<td>66</td>
<td>0.17</td>
<td>II.</td>
<td>0.30</td>
<td>NO</td>
</tr>
</tbody>
</table>

**Notes:**
1. **Bold values** represent receiver locations where vibration levels are predicted to exceed the applicable damage threshold.
2. Analysis was performed for the closest structures to the sheet driving operation.


Results of the construction-generated vibration damage assessment for impact pile driving during Stages 3 and 4 are presented in Table B-2.21, respectively. Assuming one crew utilizing one impact pile driver at any given time, the potential for damage is not anticipated during Stage 3 or Stage 4 at the closest structures to these operations.

### Table B-2.20
**Construction Vibration Damage Assessment Results**
**Stages 3 and 4 – Impact Pile Driving**

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Distance from Stage 3 or Stage 4 Impact Pile Driving (ft)</th>
<th>Predicted PPV (in/sec)</th>
<th>Building Category</th>
<th>Damage Threshold (in/sec)</th>
<th>Exceeds Damage Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Site</td>
<td>98</td>
<td>0.09</td>
<td>II.</td>
<td>0.30</td>
<td>NO</td>
</tr>
<tr>
<td>3</td>
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<td>221</td>
<td>0.03</td>
<td>II.</td>
<td>0.30</td>
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</tr>
<tr>
<td>4</td>
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<td>214/277</td>
<td>0.03/0.02</td>
<td>II.</td>
<td>0.30</td>
<td>NO/NO</td>
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<tr>
<td>9</td>
<td>Wheel Machine Building</td>
<td>94</td>
<td>0.10</td>
<td>II.</td>
<td>0.30</td>
<td>NO</td>
</tr>
</tbody>
</table>

**Notes:**
1. **Bold values** represent receiver locations where vibration levels are predicted to exceed the applicable damage threshold.
2. Analysis was performed for the closest on-site and off-site structures to the impact pile driving operation for each Stage. Receiver no. 3 and 4 are closest to Stage 3, and receiver no. 1 and 9 are closest to Stage 4.


Results of the construction-generated vibration annoyance assessment for sheet driving during Stage 1 are presented in Table B-2.22. Assuming on crew utilizing one vibratory hammer at any given time, residents at the proposed Newport Development Site have the potential to experience
annoyance during the sheet driving operation in Stage 1. Figure B-2.3 depicts the location of vibration-induced annoyance during this operation.

Table B-2.21
Construction Vibration Annoyance Assessment Results
Stage 1 – Sheet Driving

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Distance from Stage 1 Sheet Driving (ft)</th>
<th>Predicted Vibration Level (VdB)</th>
<th>Vibration Annoyance Land Use Category</th>
<th>Annoyance Threshold (VdB) (Infrequent Events)</th>
<th>Exceeds Annoyance Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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<td>80.0</td>
<td>YES</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>757</td>
<td>60.6</td>
<td>3</td>
<td>83.0</td>
<td>NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St. Condominiums/Zephyr Lofts</td>
<td>730/769</td>
<td>61.0/60.4</td>
<td>2</td>
<td>80.0</td>
<td>NO/NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St.</td>
<td>708</td>
<td>61.4</td>
<td>2</td>
<td>80.0</td>
<td>NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices</td>
<td>693</td>
<td>61.7</td>
<td>3</td>
<td>83.0</td>
<td>NO</td>
</tr>
</tbody>
</table>

Notes:
1. Bold values represent receiver locations where vibration levels are predicted to exceed the applicable annoyance threshold.
2. Analysis was performed for the closest Category 2 and 3 land use in all directions from Stage 1 sheet driving.


Results of the construction-generated vibration annoyance assessment for impact pile driving during Stages 3 and 4 are presented in Table B-2.23. Assuming one crew utilizing one impact pile driver at any given time during each stage, the 700 Grove St. Condominiums and adjacent Zephyr Lofts have the potential to experience vibration-induced annoyance during Stage 3 impact pile driving, and the residents at the proposed Newport Development Site have the potential to experience vibration-induced annoyance during Stage 4 impact pile driving. Vibration-induced annoyance is not anticipated at any Category 3 (i.e. commercial office space) receivers during either Stage. Figure B-2.4 depicts the locations of vibration-induced annoyance at Category 2 receivers (i.e. residential structures) during Stages 3 and 4.
Long Slip Fill and Rail Enhancement Project

Figure B-2.3: Vibration-Induced Annoyance (Stage 1 - Sheet Driving)

Legend
- Location of Stage 1 Sheet Driving
- Analysis Location
- Stage 1 Vibration-Induced Annoyance
- Hoboken Yard
- Long Slip Canal

Path: \Atlas\gigs\data\Projects\NJ_Transit\Ttr\HobokenLongSlip\2015_EA\MXD\figureB-2.3Vibration.mxd
Figure B-2.4: Vibration-Induced Annoyance (Stages 3 & 4 Pile Driving)

Legend
- Location of Stage 3 Pile Driving
- Location of Stage 4 Pile Driving
- Analysis Location
- Stage 3 Vibration-Induced Annoyance
- Stage 4 Vibration-Induced Annoyance
- Hoboken Yard
- Long Slip Canal

Long Slip Fill and Rail Enhancement Project

Path: \Atlas\gisdata\Projects\NJ_Transit\Veh\Hoboken\LongSlip\2015\EA\MXD\FigureB-2.4_VibrationStage3&4.mxd
Table B-2.22
Construction Vibration Annoyance Assessment Results
Stages 3 and 4 – Impact Pile Driving

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Distance from Stage 3 or Stage 4 Impact Pile Driving (ft)</th>
<th>Predicted Vibration Level (VdB)</th>
<th>Vibration Annoyance Land Use Category</th>
<th>Annoyance Threshold (VdB)</th>
<th>Exceeds Annoyance Threshold?</th>
</tr>
</thead>
<tbody>
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<td>Proposed Newport Development Site</td>
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<td>94.2</td>
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<td>80.0</td>
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<td>4</td>
<td>700 Grove St. Condominiums/Zephyr Lofts</td>
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<td>80.0</td>
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<td></td>
<td>Office Building</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Adams St. and Newark St.</td>
<td>737</td>
<td>67.9</td>
<td>3</td>
<td>83.0</td>
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<td>67.9</td>
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<td>68.2</td>
<td>3</td>
<td>83.0</td>
<td>NO</td>
</tr>
</tbody>
</table>

Notes:

1. **Bold values** represent receiver locations where vibration levels are predicted to exceed the applicable annoyance threshold.
2. Analysis was performed for the closest Category 2 and 3 land use to impact pile driving in each Stage. Receiver no. 4 and 5 are closest to Stage 3, while receiver no. 1, 7 and 8 are closest to Stage 4.


To minimize annoyance to residents during sheet driving and impact pile driving operations in Stages 1, 3 and 4, the contractor should develop and implement a Vibration Control and Monitoring Plan, which documents expected vibration levels during these operations and methods to control vibration. Further, public outreach should be performed to maintain positive community relations and inform the public of construction plans and efforts to minimize vibration.

**B-2.3 CONCLUSIONS**

During construction of the Current Project, noise levels are predicted to exceed FTA’s nighttime 1-hour Leq criterion of 80 dBA at the proposed Newport Development Site and 700 Grove St. Condominiums/Zephyr Lofts as a result of Stage 1 sheet driving and Stage 3 and 4 impact pile driving. Concurrent sheet driving and impact pile driving during Stage 1 and 3 is anticipated to increase noise levels by less than 3 dBA. To preclude impact to the proposed Newport Development Site (if developed) and 700 Grove Street Condominiums/Zephyr Lofts, sheet driving and impact pile driving should be prohibited between the hours of 10:00 PM and 7:00 AM. Vibration-induced structure damage is not anticipated, however, sheet driving and impact pile driving during Stages 1,
3 and 4 are expected to result in vibration-induced annoyance at the proposed Newport Development Site and 700 Grove St. Condominiums/Zephyr Lofts.
Attachment B-2

Construction Analysis Supportive Files
### Construction Noise Assessment Results

#### Stage 1 - Sheet Driving

<table>
<thead>
<tr>
<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>Distance to Sheet Driving (ft)</th>
<th>Noise Level (dBA)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Residential</td>
<td>90 80</td>
<td>167</td>
<td>83.4</td>
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<tr>
<td>2</td>
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<tr>
<td>3</td>
<td>Verizon Commercial/Industrial</td>
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<td>816</td>
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<td>NO</td>
<td>NO</td>
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<tr>
<td>4</td>
<td>700 Grove St Condominiums/Zephyr Lofts</td>
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<td>90 80</td>
<td>730</td>
<td>70.6</td>
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<tr>
<td>5</td>
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<tr>
<td>6</td>
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<td>Commercial/Industrial</td>
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<td>807</td>
<td>69.8</td>
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<tr>
<td>7</td>
<td>55 Bloomfield St Residential</td>
<td>90 80</td>
<td>708</td>
<td>70.9</td>
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<tr>
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</table>

#### Stage 1 - Construction of Concrete Box

<table>
<thead>
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<th>Land Use</th>
<th>Distance to Concrete Box (ft)</th>
<th>Noise Level (dBA)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
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<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development Residential</td>
<td>90 80</td>
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<td>68.4</td>
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<td>NO</td>
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<tr>
<td>2</td>
<td>TD Bank Commercial</td>
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<td>3</td>
<td>Verizon Commercial/Industrial</td>
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<td>4</td>
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<td>90 80</td>
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<td>6</td>
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<td>100 100</td>
<td>807</td>
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<tr>
<td>7</td>
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#### Stage 2 - Retaining Wall Construction

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<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>Distance to Retaining Wall (ft)</th>
<th>Noise Level (dBA)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
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<tbody>
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<td>100 100</td>
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</table>
### Construction Noise Assessment Results

**Stage 2 - Filling in Long Slip Canal**

<table>
<thead>
<tr>
<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>FTA Impact Criteria</th>
<th>Daytime (7:00 AM - 10:00 PM)</th>
<th>Nighttime (10:00 PM - 7:00 AM)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
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<td>80</td>
<td>55</td>
<td>77.3</td>
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<td>693</td>
<td>55.3</td>
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<td>793</td>
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<td>100</td>
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</table>

### Construction Noise Assessment Results

**Stage 3 - Pile Driving & Excavation for Marin Boulevard Bridge**

<table>
<thead>
<tr>
<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>FTA Impact Criteria</th>
<th>Daytime (7:00 AM - 10:00 PM)</th>
<th>Nighttime (10:00 PM - 7:00 AM)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
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### Construction Noise Assessment Results

**Stage 4 - Track Installation & Pile Driving for Station/Crew Facility**

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<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>FTA Impact Criteria</th>
<th>Daytime (7:00 AM - 10:00 PM)</th>
<th>Nighttime (10:00 PM - 7:00 AM)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
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<td>1</td>
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<td>80</td>
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<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers (300 Observer Highway)</td>
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<td>100</td>
<td>726/721</td>
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</table>
### Cumulative Construction Noise Assessment Results

**Stage 1 & Stage 3 - Sheet Driving + Pile Driving**

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<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>FTA Impact Criteria</th>
<th>Daytime (7:00 AM - 10:00 PM)</th>
<th>Nighttime (10:00 PM - 7:00 AM)</th>
<th>Distance to Sheet Driving/Impact Pile Driving (ft)</th>
<th>Noise Level (dBA)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
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</thead>
<tbody>
<tr>
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<td>Proposed Newport Development</td>
<td>Residential</td>
<td></td>
<td>90</td>
<td>80</td>
<td>167/1247</td>
<td>83.5</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td></td>
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<td>100</td>
<td>757/652</td>
<td>74.3</td>
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<td>NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial/Industrial</td>
<td></td>
<td>100</td>
<td>100</td>
<td>816/221</td>
<td>81.7</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St Condominiums/Zephyr Lofts</td>
<td>Residential</td>
<td></td>
<td>90</td>
<td>80</td>
<td>730/214</td>
<td>82.1</td>
<td>NO</td>
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<tr>
<td>5</td>
<td>Office Building Adams St and Newark St</td>
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<td></td>
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<td>100</td>
<td>1073/737</td>
<td>72.5</td>
<td>NO</td>
<td>NO</td>
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<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers (300 Observer Highway)</td>
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<td>100</td>
<td>851/816</td>
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<td>7</td>
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<td>708/1665</td>
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<td>8</td>
<td>Ironstate Development Offices 50 Washington St</td>
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<td></td>
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<td>100</td>
<td>693/1776</td>
<td>71.8</td>
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</tbody>
</table>

### Cumulative Construction Noise Assessment Results

**Stage 1 & Stage 3 - Construction of Concrete Box + Pile Driving**

<table>
<thead>
<tr>
<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>FTA Impact Criteria</th>
<th>Daytime (7:00 AM - 10:00 PM)</th>
<th>Nighttime (10:00 PM - 7:00 AM)</th>
<th>Distance to Concrete Box/Impact Pile Driving (ft)</th>
<th>Noise Level (dBA)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development</td>
<td>Residential</td>
<td></td>
<td>90</td>
<td>80</td>
<td>167/1247</td>
<td>70.6</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td></td>
<td>100</td>
<td>100</td>
<td>757/652</td>
<td>72.1</td>
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<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial/Industrial</td>
<td></td>
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<td>100</td>
<td>816/221</td>
<td>81.5</td>
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<td>NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St Condominiums/Zephyr Lofts</td>
<td>Residential</td>
<td></td>
<td>90</td>
<td>80</td>
<td>730/214</td>
<td>81.7</td>
<td>NO</td>
<td>YES</td>
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<tr>
<td>5</td>
<td>Office Building Adams St and Newark St</td>
<td>Commercial</td>
<td></td>
<td>100</td>
<td>100</td>
<td>1073/737</td>
<td>71.0</td>
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<td>NO</td>
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<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers (300 Observer Highway)</td>
<td>Commercial/Industrial</td>
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<td>851/816</td>
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<td>7</td>
<td>55 Bloomfield St</td>
<td>Residential</td>
<td></td>
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<td>80</td>
<td>712/1632</td>
<td>64.7</td>
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<td>Commercial</td>
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<td>100</td>
<td>703/1706</td>
<td>64.4</td>
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</table>

### Cumulative Construction Noise Assessment Results

**Stage 2 & Stage 3 - Construction of Retaining Walls + Pile Driving**

<table>
<thead>
<tr>
<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>FTA Impact Criteria</th>
<th>Daytime (7:00 AM - 10:00 PM)</th>
<th>Nighttime (10:00 PM - 7:00 AM)</th>
<th>Distance to Retaining Walls/Impact Pile Driving (ft)</th>
<th>Noise Level (dBA)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
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<tbody>
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<td>1</td>
<td>Proposed Newport Development</td>
<td>Residential</td>
<td></td>
<td>90</td>
<td>80</td>
<td>55/1247</td>
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</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
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<td>100</td>
<td>100</td>
<td>694/652</td>
<td>72.1</td>
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</tr>
<tr>
<td>3</td>
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<td>80</td>
<td>723/214</td>
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<td>100</td>
<td>100</td>
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<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers (300 Observer Highway)</td>
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<td>100</td>
<td>100</td>
<td>846/816</td>
<td>70.2</td>
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<td>NO</td>
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<td></td>
<td>90</td>
<td>80</td>
<td>703/1632</td>
<td>64.4</td>
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<td>694/1706</td>
<td>64.1</td>
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</table>

### Cumulative Construction Noise Assessment Results

**Stage 2 & Stage 3 - Distribution of Fill + Pile Driving**
<table>
<thead>
<tr>
<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>FTA Impact Criteria</th>
<th>Distance to Retaining Wall/Track Installation (ft)</th>
<th>Noise Level (dBA)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development</td>
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<td>Daytime (7:00 AM - 10:00 PM) 90</td>
<td>55/1033</td>
<td>75.3</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>Nighttime (10:00 PM - 7:00 AM) 80</td>
<td>694/669</td>
<td>60.7</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial/Industrial</td>
<td></td>
<td>811/95</td>
<td>76.8</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>4</td>
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<td></td>
<td>1061/119</td>
<td>74.9</td>
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</tr>
<tr>
<td>5</td>
<td>Office Building Adams St and Newark St</td>
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<td></td>
<td>1066/726</td>
<td>59.6</td>
<td>NO</td>
<td>NO</td>
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<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers (300 Observer Highway)</td>
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<tr>
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<td>8</td>
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<td>694/1582</td>
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<td>NO</td>
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</table>

### Cumulative Construction Noise Assessment Results

**Stage 2 & Stage 4 - Retaining Wall + Track Installation**

<table>
<thead>
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<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>FTA Impact Criteria</th>
<th>Distance to Retaining Wall/Track Installation (ft)</th>
<th>Noise Level (dBA)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development</td>
<td>Residential</td>
<td>Daytime (7:00 AM - 10:00 PM) 90</td>
<td>55/1033</td>
<td>77.3</td>
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<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>Nighttime (10:00 PM - 7:00 AM) 80</td>
<td>694/669</td>
<td>61.2</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial/Industrial</td>
<td></td>
<td>811/95</td>
<td>76.8</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St Condominiums/Zephyr Lofts</td>
<td>Residential</td>
<td></td>
<td>1061/119</td>
<td>74.9</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>5</td>
<td>Office Building Adams St and Newark St</td>
<td>Commercial</td>
<td></td>
<td>1066/726</td>
<td>59.8</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers (300 Observer Highway)</td>
<td>Commercial/Industrial</td>
<td></td>
<td>846/862</td>
<td>59.1</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>7</td>
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<td>Residential</td>
<td></td>
<td>703/1518</td>
<td>57.1</td>
<td>NO</td>
<td>NO</td>
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<tr>
<td>8</td>
<td>Ironstate Development Offices 50 Washington St</td>
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<td></td>
<td>694/1582</td>
<td>57.1</td>
<td>NO</td>
<td>NO</td>
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</table>

### Cumulative Construction Noise Assessment Results

**Stage 2 & Stage 4 - Distribution of Fill + Track Installation**

<table>
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<th>RCV#</th>
<th>Receiver Name</th>
<th>Land Use</th>
<th>FTA Impact Criteria</th>
<th>Distance to Fill/Track Installation (ft)</th>
<th>Noise Level (dBA)</th>
<th>Exceeds FTA Daytime Criteria?</th>
<th>Exceeds FTA Nighttime Criteria?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development</td>
<td>Residential</td>
<td>Daytime (7:00 AM - 10:00 PM) 90</td>
<td>55/1033</td>
<td>77.3</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>Commercial</td>
<td>Nighttime (10:00 PM - 7:00 AM) 80</td>
<td>694/669</td>
<td>61.2</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>3</td>
<td>Verizon</td>
<td>Commercial/Industrial</td>
<td></td>
<td>811/95</td>
<td>76.8</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>4</td>
<td>700 Grove St Condominiums/Zephyr Lofts</td>
<td>Residential</td>
<td></td>
<td>1061/119</td>
<td>74.9</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>5</td>
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<td>Commercial</td>
<td></td>
<td>1066/726</td>
<td>59.8</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>6</td>
<td>R. Neumann &amp; Co. Fine Leathers (300 Observer Highway)</td>
<td>Commercial/Industrial</td>
<td></td>
<td>846/862</td>
<td>59.1</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>7</td>
<td>55 Bloomfield St</td>
<td>Residential</td>
<td></td>
<td>703/1518</td>
<td>57.1</td>
<td>NO</td>
<td>NO</td>
</tr>
<tr>
<td>8</td>
<td>Ironstate Development Offices 50 Washington St</td>
<td>Commercial</td>
<td></td>
<td>694/1582</td>
<td>57.1</td>
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<td>NO</td>
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</table>
## Vibration Source Level Information

<table>
<thead>
<tr>
<th>Equipment Type</th>
<th>Reference Source Level at 25 ft (LV VdB)</th>
<th>Reference Source Level at 25 ft (PPV in/sec)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vibratory Hammer</td>
<td>105</td>
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<tr>
<td>Impact Pile Driver</td>
<td>112</td>
<td>1.518</td>
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</tbody>
</table>

Source: Vibration sources from do not infringe on Table 12-2 of Vibration Impact Assessment May 2006 guidance document.

### Construction Vibration Damage Assessment Results

#### Stage 1 - Sheet Driving

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Distance from Stage 1 Sheet Driving (ft)</th>
<th>Predicted PPV (in/sec)</th>
<th>Building Category¹</th>
<th>Damage Threshold (in/sec)</th>
<th>Exceeds Damage Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development</td>
<td>167</td>
<td>0.04</td>
<td>II</td>
<td>0.30</td>
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<tr>
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<td>0.30</td>
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</tr>
</tbody>
</table>

Notes:
1. Assume all buildings are engineered concrete and masonry (no plaster).
2. Analysis was performed for the closest off-site and on-site buildings to the sheet driving operation.

Bold values represent receiver locations where vibration levels are predicted to exceed the applicable damage threshold.

#### Construction Vibration Annoyance Assessment Results

#### Stage 1 - Sheet Driving

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Distance from Stage 1 Sheet Driving (ft)</th>
<th>Predicted Vibration Level (VdB)</th>
<th>Vibration Annoyance Land Use Category</th>
<th>Annoyance Threshold (VdB) (Infrequent Events)</th>
<th>Exceeds Annoyance Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development</td>
<td>167</td>
<td>80.5</td>
<td>II</td>
<td>80.0</td>
<td>YES</td>
</tr>
<tr>
<td>2</td>
<td>TD Bank</td>
<td>73</td>
<td>60.6</td>
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<tr>
<td>3</td>
<td>700 Grove St Condominiums</td>
<td>78</td>
<td>61.0</td>
<td>II</td>
<td>80.0</td>
<td>NO</td>
</tr>
<tr>
<td>4</td>
<td>75 Bloomfield St</td>
<td>76</td>
<td>61.4</td>
<td>II</td>
<td>80.0</td>
<td>NO</td>
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<tr>
<td>5</td>
<td>Investors Development Offices</td>
<td>603</td>
<td>61.7</td>
<td>III</td>
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<td>NO</td>
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</tbody>
</table>

Notes:
1. Assume vibration events would be “infrequent” (i.e. less than 30 events per day).
2. Bold values represent receiver locations where vibration levels are predicted to exceed the applicable annoyance threshold.

### Construction Vibration Damage Assessment Results

#### Stage 3 and 4 - Impact Pile Driving

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Distance from Stage 3 or Stage 4 Impact Pile Driving (ft)</th>
<th>Predicted PPV (in/sec)</th>
<th>Building Category¹</th>
<th>Damage Threshold (in/sec)</th>
<th>Exceeds Damage Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development</td>
<td>98</td>
<td>0.09</td>
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<td>0.30</td>
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<tr>
<td>2</td>
<td>700 Grove St Condominiums</td>
<td>94</td>
<td>0.10</td>
<td>II</td>
<td>0.30</td>
<td>NO</td>
</tr>
<tr>
<td>3</td>
<td>Investors Development Offices</td>
<td>214</td>
<td>0.03</td>
<td>II</td>
<td>0.30</td>
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<tr>
<td>4</td>
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<td>221</td>
<td>0.03</td>
<td>II</td>
<td>0.30</td>
<td>NO</td>
</tr>
</tbody>
</table>

Notes:
1. Assume all buildings are engineered concrete and masonry (no plaster).
2. Analysis was performed for the closest building off-site and on-site buildings to the impact pile driving operation for each Stage. Stage 3 pile driving is closest to receivers 3 and 4, while Stage 4 impact pile driving is closest to receivers 1 and 9.

Bold values represent receiver locations where vibration levels are predicted to exceed the applicable damage threshold.

### Construction Vibration Annoyance Assessment Results

#### Stage 3 and 4 - Impact Pile Driving

<table>
<thead>
<tr>
<th>Receiver No.</th>
<th>Receiver Location</th>
<th>Distance from Stage 3 or Stage 4 Impact Pile Driving (ft)</th>
<th>Predicted Vibration Level (VdB)</th>
<th>Vibration Annoyance Land Use Category</th>
<th>Annoyance Threshold (VdB) (Infrequent Events)</th>
<th>Exceeds Annoyance Threshold?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Proposed Newport Development</td>
<td>98</td>
<td>94.2</td>
<td>II</td>
<td>80.0</td>
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<tr>
<td>2</td>
<td>700 Grove St Condominiums</td>
<td>214</td>
<td>84.0</td>
<td>II</td>
<td>80.0</td>
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</tr>
<tr>
<td>3</td>
<td>Office Building Adams St and Newark St</td>
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<td>67.9</td>
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<tr>
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<td>75 Bloomfield St</td>
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Notes:
1. Assume vibration events would be “infrequent” (i.e. less than 30 events per 8-hour day).
2. Distances are measured to the closest pile driving stage to each receiver. Receiver 4 and 5 are the closest Category 2 and 3 receiving Stage 3 impact pile driving, and receivers 1, 7 and 8 are the closest Category 2 and 3 receiving Stage 4 impact pile driving.

Bold values represent receiver locations where vibration levels are predicted to exceed the applicable annoyance threshold.
Appendix C: Agency Correspondence

**Attachment 1:** U.S. Army Corps of Engineers Meeting Request

**Attachment 2:** NJDEP Natural Heritage Program Consultation

**Attachment 3:** United States Fish and Wildlife Service Consultation

**Attachment 4:** National Marine Fisheries Service Consultation

**Attachment 5:** U.S. Environmental Protection Agency Comments on Preliminary Draft Environmental Assessment
Attachment 1: U.S. Army Corps of Engineers Meeting Request
June 17, 2015

Mr. James H. Cannon
U.S. Army Corps of Engineers
New York District
ATTN: Regulatory Branch, room 1937
26 Federal Plaza
New York, NY 10278-0090

Re: Long Slip Fill and Rail Enhancement Project
Hoboken, NJ
USACE Follow up Pre-app Meeting Request

Dear Mr. Cannon:

This letter responds to several regulatory and coordination issues that were raised at our last preapplication (March 20, 2015) meeting for the above referenced Project and we look forward to your feedback as we prepare our application documents as a work in progress. As such, we are submitting the following information on the Project’s purpose and need and existing site conditions, to support the proposed Project construction in Long Slip Canal and the approximate 4.1 acres of impacts to intertidal and subtidal area waters. We would like to hear from you sooner rather than in October when we file the complete application package and to apprise FTA of our progress. In addition to purpose and need, our presentation discusses inland and waterward alternative designs to minimize the filling of waters.

The below presentation addresses the revised draft FEMA flood hazard area boundaries, mapped as FIRM panels 34017C0106E and 34017C0107E and dated 1/30/2015, that designate a small area at the mouth of the Canal as Zone VE—a coastal high hazard area subject to high velocity wave action from storms or seismic sources where fill is prohibited. We further discuss the interface of this FTA-supported Project with HUD Rebuild by Design plans that may consider a seawall in the area along the shoreline and in the terminal area.

Project’s Purpose and Need

The need for the Project is based on several problems in Hoboken Yard and Terminal that are a result of natural flooding occurrences and mechanical/electrical matters, which causes significant and prolonged rail service disruptions in a site constricted area. The facility is subject to two different types of natural events: storm surges that enter via the Long Slip Canal during severe weather events; and tidewaters welling up along train shed tracks that result from a combination of heavy rainfall and spring tides that influence the water table and tide elevations.
**Strom Surge in the Yard**
After Superstorm Sandy, NJ TRANSIT had to perform extensive repairs to damaged equipment and structures in the Terminal and Yard and has made a number of resiliency improvements including raising critical assets such as signal relays and power supplies, rerouting electrical panels and wiring, and relocating substations to upper floors of buildings. Certain assets, however, cannot be raised. Switch heaters and switch motors must remain at track level and the tracks themselves cannot be elevated due to the need to maintain proper profiles at the yard approach tracks for the connection to the Morris & Essex Line. Switch heaters are considered sacrificial in NJ TRANSIT's Storm Loss Mitigation Plan but switch motors must be removed sequentially as commuter rail service is curtailed prior to shut down. To protect the switch motors all 143 units must be removed and stored in a safe place, which takes about four days to complete. A longer period of time, beyond four days is required for switch reinstallation following the inundation to allow for necessary signal testing. The entire removal, storage and reinstallation can take 9 or 10 days and costs an estimated $0.5 million to complete for each event. During this time, rail service is greatly curtailed and then restored as the switch motors are gradually taken out of and placed back in service.

**Tidal Inundation in the Train Shed**
The rail terminal elevation is only slightly above mean sea level where it was built integral to the ferry terminal in the 1800's. The historic fill in the train shed and platform areas consist of porous fill supported by the 1903 bulkhead. The Terminal structure is built on decking above a former estuary and open water and is subject to tidal inundation several times a year from the spring high tide. These events limit train access to varying tracks where the first two cars may approach the higher, west end of the platform necessitating commuters to walk forward from the rails coaches in the rear to access the platform. At other times when the welling covers the entire track, the trains may be queued and completely redirected to another causing arrival delays.

**Need for Resilient Station**
The Project includes the construction of new platforms, tracks, and Station/Crew Quarters building elevated well above the BFE to permit commuter service to Hoboken with access to the Terminal and PATH and ferry service via a walkway (see Figure 1, Project Alignment and AE/VE Zones). These improvements will permit greatly limit the need to curtail revenue rail service while the switch motors are decommissioned and re-commissioned because of inundation from high tides and tidal surges. The improvements will also improve storage capacity and operational efficiency, and reduce conflicts that result from having only one set of throat tracks into and out of the 18-track terminal. For a full description of the problems at Hoboken Terminal/Yard and the benefits of the Project, please see the attached Purpose and Need Statement.

NJ TRANSIT is moving forward with plans to construct NJ TRANSITGRID, a microgrid capable of providing highly reliable power to support traction power and critical facility needs, including at Hoboken Terminal. NJ TRANSITGRID is intended to address larger power grid vulnerabilities identified by the U.S. Department of Energy, the President's Hurricane Sandy Rebuilding Strategy, and New Jersey's Board of Public Utilities. In the event of a significant power outage, as a multi-modal facility that links lower and
midtown Manhattan with urban and suburban points in 13 counties of northern and central New Jersey, and Rockland and Orange Counties in New York State, Hoboken Terminal will be uniquely positioned to continue service because of the additional track support that the Long Slip Fill and Rail Enhancement Project will provide. The additional tracks and platforms will serve a critical function, running on a reliable power system independent of the northeast power grid.

The additional platforms provide greater capacity to queue passenger under emergency circumstances where there is limited space to assign riders in the Rail and Ferry Terminal and the PATH Station platforms. The additional platform and track capacity also provides alternate boarding areas in case of disruptions in rail equipment and infrastructure in and outside of the Rail Yard.

Why there are No Alternative Locations

The proposed new station must connect to the Morris & Essex Line west of the yard throat tracks near Marin Boulevard and, via a walkway, to the Hoboken Terminal on the banks of the Hudson River for PATH and Ferry connections. These two termini are fixed as the primary goal of the Project is to minimize disruptions to commuter rail service when Hoboken Terminal is not in service.

NJ TRANSIT property is bifurcated by the Long Slip Canal. To its immediate south are the Hudson-Bergen Light Rail tracks and to its immediate north is Hoboken Yard, which is fully built out with storage tracks, a locomotive fueling facility, train washer, engine house for locomotive inspection and repair, a wheel truing shop, and material storerooms for parts and servicing supplies (Figure 2, Hoboken Yard Existing Plan). The yard is currently undersized for its current functions requiring costly weekend and overnight operations for non-commuter activities that cannot be accommodated during normal working hours. There is no available land adjoining the yard for any type of expansion due to the location of the HBLRTS to the south and Observer Highway to the north which is a main thoroughfare filled with public utilities. Hoboken Yard is one of only a few heavy maintenance facilities serving the entire NJ TRANSIT commuter rail system. There are no opportunities to relocate any of the functions in this Yard elsewhere in NJ TRANSIT's system. As a result, there are no alternatives to the use of Long Slip Canal for the new station.

The No Action/No Fill Alternative is Not Reasonable

While historically, the Long Slip Canal was used as a rail-to-barge transportation resource, it no longer serves a waterborne or any other use. Based on recent sampling results (enclosed), it is a severely degraded resource that cannot support baseline food sources or aquatic life at various trophic levels, and conditions do not support subaqueous vegetation establishment (including algae). The Canal presents an ecological risk, with the potential to serve as a trap for transient or predatory aquatic species or mammals.

The Jersey City Combined Sewer Outfall (CSO) has been discharging into the Canal at its western end for decades and, in addition to continual incremental solids and organic discharges that create anoxic conditions, methane and sulfide contamination has been detected throughout its length. In 1999, NJDEP concluded that Long Slip Canal was "not a critical estuarine ecosystem that the rules intend to protect".
A comparison of the water quality data between then and now reveals further degradation and increased deposition primarily sourced from the CSO discharges.

Historically, water flow into and out of the Canal was restricted by its length, narrow width and limited flushing with the north and south currents of the main stem Hudson River. In 2006, the Hudson-Bergen Light Rail Transit bridge structure was constructed; traversing the width of the Canal at its eastern end, and further restricting tidal ebb and flow and its flushing of CSO-contaminated stagnant waters (see Figure 3, HBLRTS Bridge Structure As-Built Plan View). The bridge structure was built using cofferdams and a box culvert for the future extension of the CSO, which extends from the bottom (mud line) of the Canal to the bridge (see Figure 4, H-BLRTS Bridge Structure Elevation). As a result, flow is restricted on the west side of the canal contributing to increased detention times and deposition of CSO solids, and flushing is impeded by the non-linear path created by the angle of cofferdams, between the Hudson and the western part of the Canal. Furthermore, the future extension of the CSO will require the construction of a concrete vault for CSO nets to comply with regulations, maintenance and operations. This installation will essentially seal off the Canal from the Hudson River (see Figure 5, Concrete Vault for CSO Nets) and result in the filling of nearly 30 percent of the canal’s footprint.

Design Alternatives that Would Minimize the Use of Fill

While the new tracks, platforms and the Station/Crew facility could feasibly be built on pile-supported structures, alternatives that do not fill or only partially fill the Canal are not considered reasonable alternatives for a number of reasons, described below.

Pile Supported Alternatives
Any alternative that relies on pile-supported structures will further impede flow and confine the water in the Canal, and increase health, safety and water quality concerns such as:

- gas exposure issues from methane, hydrogen sulfide and mercaptans,
- longer detention times and increased anoxic periods with increased impacts on water quality in the mainstem of the Hudson River; and
- Increased water stagnation and mosquito breeding.

Compared to filling the Canal, these alternatives would have significantly higher capital and life cycle costs, with extensive maintenance requirements due to the corrosive nature of the acidic and saline moisture in the Canal. While construction of infrastructure on pile-supported structure would minimize the Project’s footprint in the mapped preliminary FEMA VE zone Flood Hazard boundary, the function (high velocity wave action) of the VE zone is already seriously compromised by the two substantial structures at the end of the canal, namely the Hudson-Bergen Light Rail bridge and the Hudson River Waterfront Walkway. As a result, the risks associated with these pile-supported alternatives clearly outweigh any benefit related to conforming to a preliminary flood designation.
Seawall and Tide-Gate Alternatives

Seawall and tide-gate alternatives would not meet NJ TRANSIT's goals for the Project that are prescribed by its Purpose and Need, since they would not mitigate the tidal inundation of tracks due to heavy rainfall/spring high tide conditions, would not provide for a resilient train station during severe weather events, would not provide additional track capacity for disruptions of the MidTown Direct Service trains to Hoboken or in the event of power outages, and would not provide expanded yard capacity under normal operating conditions. It is important to note that any seawall or tide-gate installation built in this area would also require an extension of the CSO (and necessitate filling one-quarter of the canal for this purpose) and the installation of the concrete vault for the CSO netting. Closing off the canal with a seawall or tide gate without extending the CSO discharge point would cause the canal to top its banks and flood the yard with its combined sewage.

The confined Canal waters would need to be filled, with or without the proposed Project, prior to the installation of a seawall or tide-gate to eliminate the risk of environmental hazards associated with a stagnant body of polluted water. Furthermore, a seawall or tide-gate installation at the mouth of the Canal would effectively eliminate the intended function of the VE zone designation. NJ TRANSIT is committed to coordinating with Rebuild by Design and others who are planning projects in the area to reduce the potential for flooding in Hoboken and Jersey City.

We would like to meet with you within the next couple of weeks (July 2015) to review this information and outline a permitting strategy for this Project. I will contact you next week to schedule a suitable meeting date, time and location. If you have any questions or require additional information in the interim please feel free to contact me at nvalente@njtransit.com or (973) 491-7211.

Very truly yours,

[Signature]

Nicholas J. Valente, Program Manager
Capital Planning and Programs

CC: Harold Olarte (BEM)
    K. Giblin (NJ TRANSIT)
    C. Dickerson (NJ TRANSIT)
    E. Daleo (NJ TRANSIT)
LONG SLIP RAIL ENHANCEMENT PROJECT
PURPOSE AND NEED STATEMENT

INTRODUCTION
The availability of public transportation is a critical quality of life factor in New Jersey. NJ TRANSIT is responsible for commuter rail, light rail, and bus operations throughout New Jersey and into adjoining states. It is charged with providing such public transportation services in an efficient, coordinated, safe, and responsive manner. By doing so, NJ TRANSIT conserves limited energy resources, expands public mobility, and protects the environment. Furthermore, it fosters commerce and economic development, and promotes urban center revitalization. These benefits cannot be provided efficiently unless adequate modern, safe facilities are available to store and maintain the revenue equipment utilized to provide the service.

Hoboken Terminal, a multi-modal facility located at the Hudson River waterfront, is a critical component of NJ TRANSIT’s system ranking second in passenger traffic among its New Jersey facilities. Nine commuter rail lines terminate in Hoboken and interface with ferry service, the PATH system, the Hudson-Bergen Light Rail, and NJ TRANSIT bus services. Since its opening in 2003, the Secaucus Junction transfer station has increased ridership at Hoboken Terminal by providing a location at which nearly all of NJ TRANSIT’s passengers can transfer between rail lines. This network of services links lower and midtown Manhattan with urban and suburban points in 13 counties of northern and central New Jersey, and Rockland and Orange counties in New York State.

The Hoboken Yard includes storage tracks and a locomotive fueling facility, train washer, engine house (locomotive inspection and repair), and wheel truing shop, as well as material storerooms housing parts and servicing supplies. It has a trained workforce of maintenance mechanics, car cleaners, yard hostlers and supervisors. The importance of this transportation facility will only intensify in future years as ridership continues to increase in response to increased employment and population growth in the service area, longer highway commuting times, and increased fuel costs.

The purpose and need for the Proposed Action, and its benefits are outlined below.

PROBLEM STATEMENT AND NEED FOR IMPROVEMENTS
The Purpose and Need for the Proposed Action is a result of a series of problems, most caused by the Long Slip Canal:

- The Long Slip Canal provides a pathway for storm surge that floods the Yard and Terminal, causing significant damage and associated disruptions to NJ TRANSIT’s commuter rail service.
- Although railroad infrastructure in Hoboken is being raised above flood risk elevations wherever possible, certain assets cannot be raised due to the need to maintain proper profiles for the Terminal and Yard.
The Long Slip Canal bifurcates NJ TRANSIT property and prohibits the expansion of Hoboken Yard, which is needed for existing and future train storage and to enhance the operational flexibility in the Terminal;

- The Long Slip Canal is supported by 140-year old deteriorating bulkheads that experience periodic partial collapse, and threaten existing yard infrastructure.

These problems are described below and the purpose and need for the Proposed Action is highlighted.

**Need to Reduce Flooding of Vulnerable Assets**

NJ TRANSIT’s Hoboken Terminal and Yard facility was constructed on a filled former estuary, at an elevation only slightly above sea level, making it vulnerable to both Hudson River storm surge and tidal flooding that seeps through the ground during high tide/full moon conditions. Over the course of NJ TRANSIT’s 30+-year history, the Hoboken Terminal has been subjected to multiple high water conditions that required the suspension of passenger service. Several major events have occurred that necessitated the shutting down of Terminal and Yard operations, including the 1992 Nor’easter, 1993 spring storms, 2011 Hurricane Irene, and 2012 Superstorm Sandy. The Terminal and much of the yard are below both the FEMA Base Flood Elevation (BFE) (i.e. the 1% Annual Chance Flood or 100-year Flood Elevation) and Sandy storm surge levels; flood levels during Sandy were on the order of five feet deep at the lowest points in the complex.

It has been estimated that 49 percent of the water that flooded Hoboken Yard and Hoboken City came in via Long Slip. The Slip provided a pathway for storm surge early in the storm when flood elevation levels were still well below their peak and had not yet topped other shoreline areas. The storm surge and subsequent salt water submersion throughout the Terminal and Yard damaged or destroyed offices, substations, drainage systems, platforms, ticketing and waiting areas, and caused significant damage beyond the yard and into the City of Hoboken. Flooding from Sandy caused service outages that lasted two weeks and affected over 32,000 daily travelers.

The Project would block water ingress, significantly reducing storm surge flooding frequency, depth, intensity and duration by filling Long Slip to an elevation well above the FEMA BFE. Since tidal flooding would not be mitigated by filling Long Slip, there is a need for additional resiliency improvements, as described below.

**Need for Resiliency Improvements**

Following Superstorm Sandy, NJ TRANSIT performed extensive repairs to damaged equipment and structures. To further protect the complex from future storm events, NJ TRANSIT continues to undertake resiliency efforts at Hoboken that include the raising of signal relays and power supplies, the evaluation of Terminal and Yard building flood barriers, the rerouting of electrical panels and wiring, and the relocation of substations to upper floors of buildings.

NJ TRANSIT’s current approach to dealing with future flood risk is addressed in a Storm Preparedness Plan which deals with the means of securing materials, facilities and rolling stock against the impacts of significant wind and flooding. Although signal system wiring, power, and relays can, and are being elevated above the FEMA BFE, certain assets cannot be raised due to...
the location of the facility itself and the need to maintain proper profiles for approach tracks as they enter the Terminal and Yard areas. Switch heaters and switch motors must remain at track level so they cannot be elevated. Switch heaters are considered to be sacrificial in the Storm Preparedness Plan but switch motors must be removed. To protect the switch motors all 143 units must be removed and stored in a safe, dry place prior to inundation. These removals and spiking of the switches in advance of a storm takes approximately four days to complete. Following the removal of the switches from service, only four of the sixteen passenger yard tracks can continue to operate, significantly reducing the available level of service well in advance of the official closing of the yard in anticipation of a storm event. A longer period of time is required for switch reinstallation following the storm to allow for necessary testing; the entire removal, storage and reinstallation process costs an estimated $0.5 million to complete.

The Project would include the construction of ADA-compliant, center-track platforms and tracks elevated well above the one percent BFE to permit limited revenue rail service while the switch motors are decommissioned in the existing Yard and up to the moment that service is suspended for a storm. This would offer four days of additional mobility for commuters during the storm preparation phase. The same advantage would accrue following the storm when revenue trains would be brought back into limited operation within hours of the declaration that a storm has passed and even during the time when other equipment is being brought back to the yard for the resumption of normal operations.

**Need for Expanded and Reconfigured Yard and Additional Throat Tracks to Terminal**

While the existing Hoboken Yard has an extensive array of inspection and maintenance facilities, the size of the yard and its configuration severely limit its use. The storage yard cannot accommodate train sets that are longer than six cars in length. In addition, there is only one set of throat tracks into and out of the 18-track Terminal, with 260 trains passing through this area every day. This choke point limits operating flexibility and presents numerous opportunities for conflicts. Serious delays occur when overhead catenary wires are down, switch or signal problems occur, or trains derail or experience mechanical failure in this area. In addition, if there is a problem elsewhere on the system, at the Secaucus Junction transfer station, in the Hudson Tunnels, or on the Northeast Corridor, for example, trains are rerouted to Hoboken Terminal. In a recent event that rerouted MidTown Direct trains to Hoboken due to a problem in the Hudson Tunnels, 45 minute delays occurred due to the queue on the approach track.

The new yard storage area would be contiguous with the existing Hoboken Yard, and would be accessible from the existing electrified throat tracks coming from the Bergen Tunnels into Hoboken, thereby making this new storage area compatible with existing operations within the overall yard. Having a yard divided into two sections, each with a dedicated connection to the Hoboken Terminal throat tracks, would permit parallel movement capability and operational flexibility for all of the Yard’s functions – storage, service and inspections. The new storage tracks would be electrified for use with electric, diesel, and dual mode trains, further enhancing the operational flexibility within this new yard space.

Hoboken Yard is located in one of the most densely populated and highly developed areas of the state. By utilizing the space presently occupied by the Long Slip Canal for yard expansion, NJ TRANSIT would be able to realize the efficiencies of storing and servicing long train sets at Hoboken without having to acquire additional land. Filling Long Slip and building additional yard tracks on land already owned by NJ TRANSIT avoids land acquisition costs in an area with
some of the highest per acre values in the state. In addition, disruption and relocation of adjacent businesses and residences is avoided.

Need to Reduce Maintenance Costs and Risk of Bulkhead Collapse
The Long Slip Canal is vulnerable to continued erosion and decay from regular tidal action and major storms. The canal is contained by aging bulkheads that, despite ongoing maintenance, continue to deteriorate and experience periodic partial collapses. Flood water from Superstorm Sandy topped the Long Slip bulkhead and, as the waters receded, the ground level fill was scoured allowing additional water to percolate through the adjacent track ballast. The fill washed out through gaps in the timber wall. The ground subsided behind the seawall causing the nearby tracks and ties to shift, necessitating repairs, and creating a condition that places the three southernmost yard tracks at risk should additional flooding cause a collapse of the bulkhead. The filling of the Slip would totally eliminate the vulnerability of the bulkheads and the potential associated adjacent track damage.

BENEFITS OF THE PROPOSED ACTION
The Project would expand the storage capacity of Hoboken Yard, and its service and inspection capabilities, to meet existing and future needs of NJ TRANSIT commuter rail service to Hoboken Terminal. In the event of problems elsewhere on the system that cause trains to be rerouted to Hoboken, or if breakdowns occur that affect service into and out of the Terminal, the new tracks and station would provide an alternative to the delays caused by the existing choke point.

The Project would block water ingress which would not only reduce flooding frequency, depth, intensity and duration, but also enable NJ TRANSIT to remain in operation for longer periods of time prior to and during storm events, and recover more rapidly thereafter. The construction of the additional tracks and boarding platforms would further increase NJ TRANSIT’s ability to respond to such emergency situations. Building the tracks and passenger platforms would permit continued passenger service while the yard itself is being decommissioned in preparation for a major storm, and also as the yard is being restored for passenger operations after the storm has passed and flood waters have receded. The tracks could accommodate a total of 29 trains in a peak 2-hour period. Using 8-car single trains this would equate to over 26,000 seats accessing and departing Hoboken Terminal.

Filling Long Slip Canal would also serve to permanently stabilize the failing bulkheads. Encasing the bulkheads to prevent their further deterioration and collapse, thereby protecting yard tracks (Track 19, 21 and 4), an access road, and catenary structures.

Time-flood stage mapping from the NJDEP regional hydrologic study illustrates both the flooding that actually occurred during Superstorm Sandy under existing conditions (Long Slip not filled) and the reduction in the extent and recurrence of flooding in Hoboken Rail Yard and the Cities of Hoboken and Jersey City when Long Slip is filled above flood level. The NJDEP regional hydrologic study contains simulation mapping indicating that the project would decrease flooding in the yard and the City by a total of approximately 2.6 and between 14 and 34 acres, respectively, depending on the severity of the storm and its surface water elevation resulting in a measurable reduction of adverse impacts within the City as a whole. The mapping also showed reductions of flooding in surrounding areas of Jersey City.
LONG SLIP CANAL FILL AND RAIL ENHANCEMENT PROJECT
FIGURE 1
LONG SLIP TRACK PLAN AND FEMA ZONES
Figure 4
H-BLRTS Bridge Structure Elevation
Attachment 2: NJDEP Natural Heritage Program Consultation
August 6, 2015

Anna Loss
BEM Systems, Inc.
100 Passaic Avenue
Chatham, NJ 07928

Re: Hoboken Long Slip
Block(s) - 7302, Lot(s) - 1
Hoboken City, Hudson County

Dear Ms. Loss:

Thank you for your data request regarding rare species information for the above referenced project site in Hoboken City, Hudson County.

Searches of the Natural Heritage Database and the Landscape Project (Version 3.1) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Request for Data into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

We have checked the Landscape Project habitat mapping and the Biotics Database for occurrences of any rare wildlife species or wildlife habitat on the referenced site. The Natural Heritage Database was searched for occurrences of rare plant species or ecological communities that may be on the project site. Please refer to Table 1 (attached) to determine if any rare plant species, ecological communities, or rare wildlife species or wildlife habitat are documented on site. A detailed report is provided for each category coded as ‘Yes’ in Table 1.

We have also checked the Landscape Project habitat mapping and Biotics Database for all occurrences of rare wildlife species or wildlife habitat within one mile of the referenced site. Please refer to Table 2 (attached) to determine if any rare wildlife species or wildlife habitat is documented within one mile of the project site. Detailed reports are provided for each category coded as ‘Yes’ in Table 2. These reports may include species that have also been documented on the project site.

For requests submitted as part of a Flood Hazard Area Control Act (FHACA) rule application, we report records for all rare plant species and ecological communities tracked by the Natural Heritage Program that may be on your project site. (In some borderline cases these records may be described as on or in the immediate vicinity of your project site.) A subset of these plant species are also covered by the FHACA rules when the records are located within one mile of the project site. One mile searches for plant species will only report occurrences for those plant species identified under the FHACA regulations as being critically dependent on the watercourse. Please refer to Table 2 (attached) to determine if any rare plant species covered by the FHACA rules have been documented. Detailed reports are provided for each category coded as ‘Yes’ in Table 2. These reports may include species that have also been documented on the project site.

The Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State’s best habitats for rare and endangered species and ecological communities. Please refer to Tables 1 and 2 (attached) to determine if any priority sites are located on or within one mile of the project site.
A list of rare plant species and ecological communities that have been documented from the project site, referenced above, can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/countylist.html. If suitable habitat is present at the project site, the species in that list have potential to be present.

Status and rank codes used in the tables and lists are defined in EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS, which can be downloaded from http://www.state.nj.us/dep/parksandforests/natural/heritage/nhpcodes_2010.pdf.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive NJ-GeoWeb website at the following URL, http://www.state.nj.us/dep/gis/geowebsplash.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program at (609) 292-9400.


Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Robert J. Cartica
Administrator

c: NHP File No. 15-4007461-8110
**Invoice**

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**Bill to:**
BEM Systems, Inc.
100 Passaic Avenue
Chatham, NJ 07928

**Make check payable to:**
Office of Natural Lands Management
And forward with a copy of this statement to:
Mail Code 501-04
Office of Natural Lands Management
P.O. Box 420 Trenton, New Jersey 08625-0420

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Anna Loss
Project Name: Hoboken Long Slip

**Total**

$ 70.00
**Table 1: On Site Data Request Search Results (7 Possible Reports)**

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<td>7. Other Animal Species On the Project Site Based on Additional Species</td>
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<td><strong>Aves</strong></td>
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<td></td>
<td>Glossy Ibis</td>
<td>Plegadis falcinellus</td>
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<td>Snowy Egret</td>
<td>Egretta thula</td>
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### Table 2: Within 1 Mile for FHACA Searches (6 possible reports)

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## Rare Wildlife Species or Wildlife Habitat Within One Mile of the Project Site Based on Search of Landscape Project 3.1 Species Based Patches

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<tr>
<td><strong>Osteichthyes</strong></td>
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Attachment 3: United States Fish and Wildlife Service Consultation
Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed, and candidate species that may occur in your proposed action area and/or may be affected by your proposed project. This species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under Section 7(c) of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531 et seq.)

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: [http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html](http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html)

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA
is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably foreseeable future that would not occur without ("but for") the project that is currently being proposed.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment
Official Species List

Provided by:
New Jersey Ecological Services Field Office
927 NORTH MAIN STREET, BUILDING D
PLEASANTVILLE, NJ 08232
(609) 646-9310

Consultation Code: 05E2NJ00-2015-SLI-0567
Event Code: 05E2NJ00-2015-E-00407

Project Type: TRANSPORTATION

Project Name: Hoboken Long Slip Fill and Rail Enhancements
Project Description: Starting 2017, applicant proposes to fill the Canal by dredging and dewatering by separate steel-sheetpiled 'staging areas;' extend the existing CSO piping easternmost part of the Canal; elevate the to-be-filled Canal with retaining wall support; as well as construct inundation-resilient storage tracks on top of the filled Canal area, a crew and station facility with pedestrian walkways, and two approaching tracks diverging into six commuter tracks with new platforms and storage sheds.

Please Note: The FWS office may have modified the Project Name and/or Project Description, so it may be different from what was submitted in your previous request. If the Consultation Code matches, the FWS considers this to be the same project. Contact the office in the 'Provided by' section of your previous Official Species list if you have any questions or concerns.
Project Location Map:

Project Coordinates: MULTIPOLYGON ((-74.0372970700264 40.73432385732636, -74.03730779886246 40.73428320878227, -74.03706640005112 40.73424865750026, -74.03709322214127 40.73406370621496, -74.0370637178421 40.73403728456081, -74.03518885374069 40.733866559773325, -74.0306156873703 40.73346820023224, -74.03056740760803 40.733730386116875, -74.0372970700264 40.73432385732636))

Project Counties: Hudson, NJ
Endangered Species Act Species List

There are a total of 0 threatened or endangered species on your species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Critical habitats listed under the Has Critical Habitat column may or may not lie within your project area. See the Critical habitats within your project area section further below for critical habitat that lies within your project. Please contact the designated FWS office if you have questions.

There are no listed species identified for the vicinity of your project.
Critical habitats that lie within your project area

There are no critical habitats within your project area.
Attachment 4: National Marine Fisheries Service Consultation
Nick Valente  
Program Manager, Capital Project Management  
New Jersey Transit  
One Penn Plaza  
Newark, NJ 07105

Re: Long Slip Canal Fill and Rail Enhancement Project

Dear Mr. Valente,

We have completed an Endangered Species Act (ESA) section 7 consultation in response to your letter received on August 7, 2015, and additional information received through October 13, 2015. We concur with your determination that the proposed project is not likely to adversely affect any species listed by us as threatened or endangered under the ESA of 1973, as amended. Our supporting analysis is provided below.

Proposed Project
For this project, NJ TRANSIT, on behalf of the Federal Transit Administration, is proposing the following improvements to the Long Slip Canal and Jersey City Combined Sewerage Outfall (CSO), at Block 7302, Lot 1 in Hoboken, New Jersey:

- Install 4,000 sections of 50 foot long, 18" diameter steel sheet pile cofferdams with a vibratory hammer and segment the canal into separate staging areas using equipment from land, or possibly a single crane on a barge;
- Dewater the canal, where water will go to the Hudson through a series of five cells each allowing staged settlement of fines, comprised of a regimented closure and sedimentation system;
- Fill the canal and elevate the canal area to 12 feet using retaining walls;
- Construct six yard resilient storage tracks to serve three high level passenger platforms on top of the fill;
- Construct a crew and Station Facility, walkways, two approach tracks, diverging into six commuter tracks, as well as catenary structures, and a new two-track under-grade bridge;
- Relocation and reconfiguration of existing tracks, sheds and equipment at the western approach; and
- Extend the existing Combined Sewerage Outfall (CSO) piping at the western end of the canal, and perform maintenance to the floatables solid net collection using a truck-mounted crane to remove the net.

Description of the Project Action Area
The action area is defined as "all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action" (50 CFR § 402.02). For this project,
the action area consists of the footprint within the Long Slip Canal, as well as all underwater areas where effects of construction (underwater noise, increased turbidity) and any vessel traffic route will be experienced. The Long Slip Canal is approximately 535 meters long, with a footprint of 12,130 m². The Long Slip Canal is located at river kilometer (rkm) 5 of the Hudson River, which is approximately 1.7 kilometers wide in this area. Increased noise may be experienced, at most, up to 40 meters away from the piles being driven. The Hudson-Bergen Light Rail (HBLR) Transit crosses the eastern end of the canal, and limits the flow of water through two, ten foot wide openings in an otherwise solid wall. Due to the limited flow of water into the Canal, the water is stagnant and oxygen poor. During the dewatering process, water will be pumped through five dewatering cells, where sediment will be allowed to settle out of the water before being discharged into the Hudson River. A turbidity curtain at the east end of the canal will also minimize the effects of turbidity on the Hudson River. The extension of the CSO will be on the western side of the existing CSO and will not extend into the river. These areas are expected to encompass all of the effects of the proposed project.

**NMFS Listed Species in the Action Area**

**Atlantic Sturgeon**

There are five DPSs of Atlantic sturgeon listed as threatened or endangered. Atlantic sturgeon originating from the New York Bight, Chesapeake Bay, South Atlantic, and Carolina DPSs are listed as endangered, while the Gulf of Maine DPS is listed as threatened. The marine range of all five DPSs extends along the Atlantic coast from Canada to Cape Canaveral, Florida (Damon-Randall *et al.* 2013).

The New York Bight distinct population segment (DPS) of Atlantic sturgeon is the only DPS of Atlantic sturgeon that spawns in the Hudson River and thus, the information provided below regarding spawning adults, early life stages, and juveniles, only applies to this DPS. However, subadults and adults from other DPSs of Atlantic sturgeon are known to be present within the Hudson River (Damon-Randall *et al.* 2013). Therefore, subadult and adult Atlantic sturgeon from these DPSs may be present in the action area.

Atlantic sturgeon spawn in their natal river, with spawning migrations generally occurring during April-May in Mid-Atlantic systems, and May-July in Canadian systems (Murawski and Pacheco 1977; Smith, 1985; Bain 1997; Smith and Clugston 1997; Caron *et al.* 2002). Juvenile sturgeon move downstream into brackish waters, and eventually become residents in estuarine waters for months or years. Early life stages (eggs and larvae) and juveniles will not be present in any portion of the action area, as they are intolerant of the high salinity levels, characteristic of lower tidal rivers such as in the Hudson River. Spawning is not supported in the action area for the same reason. Due to the poor water quality and depleted dissolved oxygen levels at the mouth of the canal, sturgeon are not expected to be foraging in the area. Therefore, use of the action area will be limited to transient adult and sub-adult Atlantic sturgeon as they migrate between spawning, suitable foraging and overwintering grounds.

**Shortnose Sturgeon**

Shortnose sturgeon occur in rivers and estuaries along the East Coast of the U.S. and Canada (SSSRT 2010). There are 19 documented populations of shortnose sturgeon ranging from the St. Johns River, Florida (possibly extirpated from this system) to the Minas Basin in Nova Scotia,
Canada (NMFS 1998; Dadswell et al. 2013). While movements between river systems have been documented in the Gulf of Maine, between the Connecticut and Hudson, and in the Southeast, interbreeding between river populations is limited to very few individuals per generation; this results in morphological and genetic variation between most river populations (see Walsh et al. 2001; Grunwald et al. 2002; Waldman et al. 2002; Wirgin et al. 2005). Indirect gene flow estimates from mitochondrial DNA indicate an effective migration rate of less than two individuals per generation (SSSRT 2010). This means that while individual shorthose sturgeon may move between rivers, very few sturgeon are spawning outside their natal river; it is important to remember that the result of physical movement of individuals is rarely genetic exchange.

A population of the federally endangered shorthose sturgeon occurs in the Hudson River from upper Staten Island (approximately rkm 4.8) to the Troy Dam (approximately rkm 245). The Hudson River population of shorthose sturgeon is the largest in the United States. Studies indicated an extensive increase in abundance from the late 1970s (13,844 adults (Dovel et al. 1992), to the late 1990s (56,708 adults (95% CI 50,862 to 64,072; Bain et al. 1998). This increase is thought to be the result of high recruitment (31,000 – 52,000 yearlings) from 1986-1992 (Woodland and Secor 2007). The population in the Hudson River exhibits substantial recruitment and is considered to be stable at high levels. The proposed project will involve work in the lower portion of the Hudson River (approximately rkm 5). Due to the distance from shorthose sturgeon spawning grounds in the Hudson River (i.e., greater than 200 km downstream) and the higher salinity of the action area, shorthose sturgeon eggs or larvae, whose occurrence is limited to the low salinity waters near the spawning grounds, and young of the year (YOY), whose occurrence is also restricted to areas of low salinity, will not occur in the action area.

Shorthose sturgeon are known to use the Lower Hudson River (waters below rkm 14) between November and April, as evidenced by an annual sampling programs along the Hudson River that has been going on since 2003. From 2003 through 2007, a total of 65 shorthose sturgeon were caught in the Manhattan Battery and New York Harbor areas of the Lower Hudson River (i.e., waters below rkm 14) during an annual mark-recapture program for striped bass (ASA 2008). From November 1, 2013, to April 30, 2014, a total of 12 shorthose sturgeon were caught in the Manhattan Battery area as part of the Hudson River Biological Monitoring Program (Normandeau Associates, Inc. 2014), indicating that shorthose continue to use this area. There is currently not enough information to determine whether these fish are transient or are using the habitat in the lower river for some essential behaviors, such as foraging or overwintering. Because sampling that could capture shorthose sturgeon has not occurred outside the November–April period, we have no information on the use of this reach of the river by shorthose sturgeon during other months. As shorthose sturgeon are well-distributed throughout the Hudson River during the summer months and in other river systems shorthose sturgeon are most often found in the lowermost reaches of the river during the summer, we assume that shorthose sturgeon are also present in this reach of the Hudson River during the summer. However, due to the poor water quality and depleted dissolved oxygen levels at the mouth of the canal, sturgeon are not expected to be foraging in the action area.
Any subadult and adult shortnose sturgeon present in the lower Hudson River are likely using the deeper navigation channel outside the action area as they move to and from foraging, overwintering, and/or spawning grounds located upstream of the action area (i.e., primarily rkm 38-245). However, given the known presence of shortnose sturgeon in the general area and because there is nothing preventing shortnose sturgeon from entering the action area, we assume that shortnose sturgeon are present in the action area year round. Thus, subadult and adult shortnose sturgeon may be present in the action area at any time of the year.

**Effects of the Action**

*Maintenance to Floatable Solids Collection Net*

Maintenance on the floatable solids net will be performed from land, and will not require any in-water work. Therefore, this action will have no effect on listed sturgeon.

*Extension of CSO*

The CSO will be extended at the western end of the existing CSO, and will not require any in-water work. Because the extension of the CSO will not alter the current flow of storm water into the Hudson River, no new effects will occur on listed sturgeon.

*Dewatering the Canal*

During the dewatering process, water will be pumped through five dewatering cells, where sediment will be allowed to settle out of the water before being discharged into the Hudson River. A turbidity curtain will be placed at the east end of the canal to minimize the effects of turbidity on the Hudson River. Any sediment not settled out in the dewatering cells or before the turbidity curtain is expected to be minimal and dilute in the Hudson River quickly and very close to shore, due to the large flow and volume of water nearby in the River.

Additionally, sturgeon are extremely unlikely to be present within the canal, due to the stagnant water and low oxygen content, and limited access through the two, ten foot wide openings in the HBLR. Therefore, effects of dewatering the canal will be extremely unlikely to affect sturgeon in the Hudson River, and the dewatering is discountable.

*Vessel Interactions*

While the exact number of sturgeon killed as a result of a vessel strike is unknown, it is a concern in some areas. Sturgeon may be injured or killed as a result of being struck by boat hulls or propellers. The factors relevant to determining the risk to these species from vessel strikes vary, but may be related to the size and speed of the vessels, navigational clearance (i.e., depth of water and draft of the vessel) in the area where the vessel is operating, and the behavior of individuals in the area (e.g., foraging, migrating, overwintering, etc.). During the project, a small, temporary increase in vessel traffic in the Hudson River will occur if one barge is utilized during this project. We have considered the likelihood that the minor increase in vessel traffic associated with the project will increase the risk of interactions between sturgeon and vessels in the project area, compared to baseline conditions. The use of one barge will cause a small, localized, temporary increase in vessel traffic. Given the large volume of traffic in the project area, the increase in traffic associated with the project is extremely small. As such, it is extremely unlikely for sturgeon to be struck by the vessel during this project if they are present.
in the action area. Based on the best available information, we are able to concur that the interaction between sturgeon and vessels is discountable.

**Pile Driving**

Pile driving produces underwater sound pressure waves that can affect aquatic species, including sturgeon. Effects to fish can range from temporary avoidance of an area to death due to injury of internal organs, such as swim bladders. The type and size of pile, installation method (i.e., vibratory vs. impact hammer), size of the organism (smaller individuals are more susceptible to effects) and particular species, and distance from the sound source (i.e., sound dissipates over distance so noise levels are greater closer to the source) all contribute to the likelihood of effects to an individual. Generally, the larger the pile and the closer an individual is to the pile, the greater the likelihood of effects.

**Background Information on Noise and Sturgeon**

Sturgeon rely primarily on particle motion to detect sounds (Lovell et al. 2005). While there are no data either in terms of hearing sensitivity or structure of the auditory system for Atlantic and shortnose sturgeon, there are data for the closely related lake sturgeon (Lovell et al. 2005, Meyer et al. 2010), which because of the biological similarities, for the purpose of considering acoustic impacts, are a good surrogate for Atlantic and shortnose sturgeon. The available data suggest that lake sturgeon can hear sounds from below 100 Hz to 800 Hz (Lovell et al. 2005, Meyer et al. 2010). However, since these two studies examined responses of the ear and did not examine whether fish would behaviorally respond to sounds, it is hard to determine thresholds for hearing (that is, the lowest sound levels that an animal can hear at a particular frequency) using information from these studies. The best available information indicates that Atlantic and shortnose sturgeon are not capable of hearing noise in frequencies above 1000 Hz (1 kHz) (Popper 2005). Sturgeon are categorized as hearing “generalists” or “non-specialists” (Popper 2005). Sturgeon do not have any specializations, such as a coupling between the swim bladder and inner ear, to enhance their hearing capabilities, which makes these fish less sensitive to sound than hearing specialists. Low-frequency impulsive energies, including pile driving, cause swim bladders to vibrate, which can cause damage to tissues and organs as well as to the swim bladder (Halvorsen et al. 2012a). Sturgeon have a physostomous (open) swim bladder, meaning there is a connection between the swim bladder and the gut (Halvorsen et al. 2012a). Fish with physostomous swim bladders, including Atlantic and shortnose sturgeon, are able to expel air, which can diminish tension on the swim bladder and reduce damaging effects during exposure to impulsive sounds. Fish with physostomous swim bladders are expected to be less susceptible to injury from exposure to impulsive sounds, such as pile driving, than fish with physoclistous (no connection to the gut) swim bladders (Halvorsen et al. 2012a).

If a noise is within a fish’s hearing range and is loud enough to be detected, effects can range from mortality to a minor change in behavior (e.g., startle), with the severity of effects increasing with the loudness and duration of the noise (Hastings and Popper 2005). The actual nature of effects and the distance from the source at which they could be experienced will vary and depend on a large number of factors, such as fish hearing sensitivity, source level, how the sounds propagate away from the source and the resultant sound level at the fish, whether the fish stays in the vicinity of the source, the motivation level of the fish, etc.
Criteria for Assessing the Potential for Physiological Effects to Sturgeon

The Fisheries Hydroacoustic Working Group (FHWG) was formed in 2004 and consists of biologists from NMFS, USFWS, FHWA, and the California, Washington, and Oregon DOTs, supported by national experts on sound propagation activities that affect fish and wildlife species of concern. In June 2008, the agencies signed a Memorandum of Agreement documenting criteria for assessing physiological effects of pile driving on fish. The criteria were developed for the acoustic levels at which physiological effects to fish could be expected. It should be noted that these are onset of physiological effects (Stadler and Woodbury 2009), and not levels at which fish are necessarily mortally damaged. These criteria were developed to apply to all species, including listed green sturgeon, which are biologically similar to Atlantic and shortnose sturgeon and, for these purposes, is considered a surrogate. The interim criteria are:

- Peak Sound Pressure Level (SPL): 206 decibels relative to 1 micro-Pascal (dB re 1 μPa) (206 dB_Peak).
- Cumulative Sound Exposure Level (cSEL): 187 decibels relative to 1 micro-Pascal-squared second (dB re 1μPa²-s) for fishes above 2 grams (0.07 ounces) (187 dB_cSEL).
- cSEL: 183 dB re 1μPa²-s for fishes below 2 grams (0.07 ounces) (183 dB_cSEL).

At this time, these criteria represent the best available information on the thresholds at which physiological effects to sturgeon from exposure to impulsive noise, such as pile driving, are likely to occur. Therefore, we will consider the potential for physiological effects upon exposure to impulsive noise of 206 dB_Peak and 187 dB_cSEL. Use of the 183 dB_cSEL threshold is not appropriate for this consultation because all sturgeon in the action area will be larger than 2 grams. It is important to note that physiological effects may range from minor injuries from which individuals are anticipated to completely recover with no impact to fitness to significant injuries that will lead to death. The severity of injury is related to the distance from the pile being installed and the duration of exposure. The closer the fish is to the source and the greater the duration of the exposure, the higher likelihood of significant injury.

Available Information for Assessing Behavioral Effects on Sturgeon

To date, neither we nor the FHWG have published criteria for underwater noise levels resulting in behavioral responses. However, in practice, we rely on a level of 150 dB re 1μPa RMS as a conservative indicator as to when a behavioral response can be expected in fish exposed to impulsive noise such as pile driving. This level is based on the available literature where fish behavior has been observed (see Fewtrell 2003 and Mueller-Blenkle et al. 2010). Because there are no published studies establishing the noise levels at which sturgeon respond behaviorally to noise, these studies of fish—which are likely more sensitive to noise than Atlantic or shortnose sturgeon—are a reasonable conservative indicator of when sturgeon can be expected to respond behaviorally to noise.

We are aware of only one study that has attempted to assess the behavioral responses of sturgeon to underwater noise. A monitoring plan is currently being implemented at the Tappan Zee Bridge replacement project (Hudson River, New York) using acoustic telemetry receivers to examine the behavior of acoustically tagged sturgeon. During the installation of test piles, the movements of tagged Atlantic sturgeon were monitored with a series of acoustic receivers. Tagged Atlantic sturgeon spent significantly less time in the detection area (an area that encompassed the 206 dB
re 1uPa peak, 187 dB re 1uPa 2s cSEL and 150 dB re 1uPa RMS SPL isopleths), during active impact pile driving compared to that time period just prior to the work window. Results of this study indicate that sturgeon are likely to avoid areas with potentially injurious levels of noise (AKRF and Popper (2012a, 2012b)). However, due to limitations of the study design, it is not possible to establish the threshold noise level that results in behavioral modification or avoidance of Atlantic sturgeon. Monitoring is ongoing as the bridge project progresses. To date, hundreds of tagged sturgeon have been documented in the project area; however, no sturgeon have been injured or killed as a result of exposure to pile-driving noise.

For the purposes of this analysis, we will use 150 dB re 1 μPa RMS as a conservative indicator of the noise level at which there is the potential for behavioral effects, provided the operational frequency of the source falls within the hearing range of the species of concern. That is not to say that exposure to noise levels of 150 dB re 1 μPa RMS will always result in behavioral modifications or that any behavioral modifications will rise to the level of “take” (i.e., harm or harassment) but that there is a potential, upon exposure to noise at this level, to experience some behavioral response. We expect that behavioral responses could range from a temporary startle to avoidance of the area with disturbing levels of sound. The effect of any anticipated response on individuals will be considered in the effects analysis below.

Table 1 below describes the estimated average underwater noise levels produced by the driving of similar sized piles associated with this action (data from ICF Jones and Stokes and Illingworth and Rodkin, Inc. 2009). The noise levels are taken from a distance of 10 meters from the pile being driven.

<table>
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<tr>
<th>Type of Pile</th>
<th>Hammer Type</th>
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<th>Estimated Pressure Level (dB$_{RMS}$)</th>
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<td>177</td>
<td>163</td>
<td>163</td>
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</tbody>
</table>

Actual sound levels are dependent not only on the pile and hammer characteristics, but also on the geometry and boundaries of the surrounding underwater and benthic environment. However,

1 Peak sound pressure level: the largest absolute value of the instantaneous sound pressure and is expressed as dB re: 1 μPa.

Root Mean Square (RMS) pressure: the square root of the average squared pressures over the duration of a pulse; most pile-driving impulses occur over a 50 to 100 millisecond (msec) period, with most of the energy contained in the first 30 to 50 msec (Illingworth and Rodkin, Inc. 2001, 2009). Therefore, RMS pressure levels are generally “produced” within seconds of pile driving operations, and represent the effective pressure, and its resultant intensity (in dB re: 1 μPa$_2$sec), produced by a sound source.

Sound Exposure Level (SEL): that level which, lasting for one second, has the same acoustic energy as the transient and is expressed as dB re: 1μPa2*sec.

2 Steel sheet pile values taken from Table 1.2-3 of Appendix 1, ICF Jones and Stokes and Illingworth and Rodkin, Inc. 2009; water depth was 15 meters.
the values presented above represent a reasonable estimate of the sound that will be produced during the construction. This is because the piles are the same size and material and were installed in similar water depths. As the distance from the source increases, underwater sound levels produced by pile driving are known to dissipate rapidly.

Underwater noise levels produced from the driving of concrete piles will attenuate approximately 5 dB every 10 meters (ICF Jones and Stokes and Illingworth and Rodkin, Inc. 2009). This value is are based on a conservative estimate of attenuation rates for the driving of timber piles (ICF Jones and Stokes and Illingworth and Rodkin, Inc.).

Peak noise levels will not be above 206 dB re 1 μPaPeak. Therefore, there is not potential for a sturgeon to experience physiological impacts, including injury, upon exposure to a single pile strike. Therefore, no injury is anticipated.

In addition to the “peak” exposure criteria which relates to the energy received from a single pile strike, the potential for injury exists for multiple exposures to noise over a period of time; this is accounted for by the cSEL threshold. The cSEL is not an instantaneous maximum noise level, but is a measure of the accumulated energy over a specific period of time (e.g., the period of time it takes to install a pile). When it is not possible to accurately calculate the distance to the 187 dB re 1μPa cSEL re: 1μPa²•s isopleth, we calculate the distance to the 150 dB re 1μPa sSEL isopleth.³ The further a fish is away from the pile being driven, the more strikes it must be exposed to accumulate enough energy to result in injury. At some distance from the pile, a fish is far enough away that, regardless of the number of strikes it is exposed to, the energy accumulated is low enough that there is no potential for injury. This distance is where the 150 dB re 1μPa sSEL isopleth occurs (Stadler and Woodbury 2009). A fish located outside of this isopleth has no potential for injury, regardless of the number of pile strikes it is exposed to (i.e., sound levels will not accumulate to injurious levels). The distance to the 150 dB re 1μPa sSEL isopleth is 40 meters. In order to be exposed to potentially injurious levels of noise during installation of the piles, a sturgeon would need to be within 10 meters of the pile being driven. This is extremely unlikely to occur because we expect sturgeon to modify their behavior (i.e., avoid an ensonified area) upon exposure to underwater noise levels of 150 dB re 1 μPa rms.

Given that a sturgeon would be exposed to levels of noise that cause behavioral modification (at 40 m, see Table 2 below) before being exposed to injurious levels of noise (within 10 m of the pile), we expect sturgeon would swim away from the sound source and never be exposed to

³ The Practical Spreading Loss Model is used to determine underwater noise attenuation rates and can be used to calculate the distance at which a specific noise value (e.g., cSEL) is attained. This model is not a reliable predictor of attenuation in shallow, relatively confined waters such as rivers and typically results in overestimates of distances to thresholds of concern. For that reason, we are not using that model to estimate the distance to the 187 dB re 1μPa’s criteria. Rather, we estimate the distance to the 150 dB re 1μPa sSEL isopleth, using reported attenuation rates not the practical spreading loss model. Regardless of the number of pile strikes a fish is exposed to, we recognize there is no potential for injury to a fish exposed to noise below 150 dB re 1μPa sSEL (see Stadler and Woodbury 2009). Calculating the distance to the 150 dB re 1μPa sSEL isopleth allows us to calculate the distance from the pile at which there is no potential for physiological effects, including injury. We assume for these analyses, that a fish that remains between the pile and the 150 dB re 1μPa sSEL isopleth could be injured although we cannot accurately predict how close a fish would need to be or for how long it would need to stay there.
potentially injurious levels of underwater noise. Therefore, no injury or other physiological effects are anticipated.

**Behavioral Effects of Pile Driving to Sturgeon**

Behavioral effects, such as avoidance or disruption of foraging activities, may occur in sturgeon exposed to noise above 150 dB re 1 μPa RMS. Underwater noise levels produced from the driving of steel sheet piles will attenuate approximately 5 dB every 10 meters. These values are based on a conservative estimate of attenuation rates for the driving of timber piles (ICF Jones and Stokes and Illingworth and Rodkin, Inc.).

**Table 2: Calculated distances at which noise levels are expected to be below 150 dB re 1uPa RMS**

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<thead>
<tr>
<th>Type Pile</th>
<th>Hammer Type</th>
<th>Distance from pile at which noise levels will be below 150 dB RMS</th>
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<tr>
<td>24” Steel Sheet Pile</td>
<td>Vibratory Hammer</td>
<td>40 Meters</td>
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</table>

Should an Atlantic sturgeon occur within the area where piles are being driven, it is reasonable to assume that it, on hearing the pile driving sound, would either avoid the source or move around it. Since the area that would be avoided extends only 40 m around a piling, and the width of the Hudson River in the action area is approximately 1.7 kilometers wide, at least nearly 97.7% of the river would be available for unimpeded movements. The existing wall of the HBLR bridge may further reduce the distance that noise from pile driving occurs into the river. If any movements away from the area where piles are being installed do occur, it is extremely unlikely that these movements will affect any sturgeon due to the very small around to be avoided. Additionally, the extent of underwater noise is not likely to present a barrier to sturgeon movements and as such, if individuals are present within the vicinity of the action area, they are likely to veer/swim away from the pile driving sites and continue normal behaviors (e.g., feeding, resting, and migrating) in other portions of the action area and/or in other locations in the Hudson River. Based on this analysis, effects to Atlantic and shortnose sturgeon from pile driving noise are insignificant.

**Water Quality Effects from Pile Driving**

The installation and removal of the steel sheet piles will disturb bottom sediments and may cause a temporary increase in suspended sediment in the action area. Using available information, we expect pile driving activities to produce total suspended solids (TSS) concentrations of approximately 5 to 10 mg/L within approximately 300 feet of the pile being driven (FHWA 2012). The small resulting sediment plume is expected to settle out of the water column within a few hours. Additionally, the openings of the HBLR abutment into the Hudson River are only ten feet wide, with low flow rate, and a turbidity curtain will be placed at the eastern end of the canal, so any increase in turbidity from the pile driving will be contained within the canal. Since sturgeon are extremely unlikely to be present within the canal, due to the limited entry, stagnant water and low oxygen content, sturgeon will not be exposed to any effects of increased turbidity due to sheet pile installation and removal within the canal. Based on this analysis, effects to Atlantic and shortnose sturgeon are insignificant.
Conclusions
Based on the analysis that any effects to listed species will be insignificant or discountable, we concur with your determination that the dredging is not likely to adversely affect any listed species or critical habitat under our jurisdiction. Therefore, no further consultation pursuant to section 7 of the ESA is required.

Reinitiation of consultation is required and shall be requested by the Federal agency or by the Service, where discretionary Federal involvement or control over the action has been retained or is authorized by law and: (a) If new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered in the consultation; (b) If the identified action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in the consultation; or (c) If a new species is listed or critical habitat designated that may be affected by the identified action. No take is anticipated or exempted. If there is any incidental take of a listed species, reinitiation would be required. Should you have any questions about this correspondence, please contact Ms. Ainsley Smith at (978) 281-9291 or by email (Ainsley.Smith@Noaa.gov).

Fish and Wildlife Coordination Act
A wide variety of resources of concern to us occur in the Hudson River including but not limited to winter flounder, windowpane, summer flounder, bluefish and Atlantic tomcod. Anadromous fish including striped bass, alewife, blueback herring and American shad may also be found in the project area. As part of the federal permit process, the applicant should demonstrate that the impacts to the aquatic environment have been avoided, minimized to the extent practical and unavoidable impacts mitigated. Should the filling of the canal be authorized, we would recommend that the canal be sealed off from the river before filling. Seasonal work restrictions may be needed to minimize impacts to EFH and other NOAA resources.
Magnuson-Stevens Fishery Conservation and Management Act - Essential Fish Habitat

Essential Fish Habitat (EFH) has been designated in the project area. Further consultation by the federal action agency may be required as part of the federal permit process. Should project plans change that would alter the basis for determination, or if new species or EFH is designated, consultation should be reinitiated. For a listing of EFH and further information, please go to our website at: http://www.nero.noaa.gov/hcd. If you wish to discuss this further, please contact Melissa Alvarez at melissa.alvarez@noaa.gov.

Sincerely,

[Signature]

Kimberly B. Damon-Randall
Assistant Regional Administrator
for Protected Resources

File: Section 7 Team\Section 7\Non-Fisheries\FHWA_State DOTs\Informals\NJ DOT\2015\Long Slip Fill and Rail Enhancement

EC: Olarte; NMFS Smith, Alvarez

PCTS: NER-2015-12634
References


August 7, 2015
TIER3-03/3

Ms. Karen Greene
Habitat Conservation Division - Northeast Region
National Marine Fisheries Service
James J. Howard Marine Sciences Laboratory
74 Magruder Road
Highlands, New Jersey 07732

RE: NMFS Threatened and Endangered Species Determination Request
   Long Slip Fill and Rail Enhancement Project
   Block: 7302, Lot: 1
   City of Hoboken, Hudson County, New Jersey

Dear Ms. Greene:

On behalf of New Jersey TRANSIT (NJ TRANSIT), BEM Systems, Inc. (BEM) submits this Threatened and Endangered Determination Request to the National Marine Fisheries Service (NMFS) for the above referenced site. Located in southernmost portion of the City of Hoboken, the Long Slip Canal (the Canal) is bound by the Hoboken Rail Yard, a known contaminated site, to the north, the Hudson River to the east, 18th Street to the south and Main Boulevard to the west. Additionally, a Combined Sewer Outfall (CSO) is located within the Canal discharging at the western end and Hoboken Terminal is the northeast of the Canal. Please see the enclosed USGS Site Location Map (USGS Quadrangle NE Jersey City NJ) for a general site location.

New Jersey TRANSIT is currently proposing to:

1. Fill the Long Slip Canal by segmenting the Canal into separate ‘staging’ areas, and dewatering each area individually;
2. Extend the Jersey City Combined Sewerage Outfall (CSO) piping to the easternmost part of the Canal with a floatables solid net collection system to be maintained;
3. Elevate the newly filled Canal area to approximately twelve feet (NAVD88) with the support of retaining walls;
4. Construct six yard resilient storage tracks to serve three high level passenger platforms on top of the elevated fill;
5. Construct a crew and Station Facility, and walkways from the new facility to the existing terminal entrance and;
6. Construct two approaching tracks diverging into six commuter tracks, as well as catenary structures, a new two-track under-grade bridge over Marin Boulevard (formerly Henderson...
Street), and relocation/reconfiguration of existing tracks, sheds and equipment at western approach.

**Water Quality and Development in Long Slip Canal**

Previous baseline studies were completed to support a previous NEPA Environmental Assessment and land use permit approvals, NJDEP File No. 0905-95-0003.5 and USACE File No. 1998-02350, which authorized the filling of 4.6 acres of the Canal and associated improvements. Although these minor improvements to adjoining waters were completed, specifically dredging to improve circulation and habitat creation, the filling of the Canal was not completed. Additionally, the approved permits for the above referenced activities have since expired.

In 1995, Dames and Moore (D&M) prepared a Biological Baseline Study of Long Slip Canal, and interference with the Hudson River and conducted a follow-up field assessment and documented their 1995 findings in an Environmental Assessment and Section 4(f) Evaluation dated June 2000. For the June 2000 report, D&M collected data at the mouth of the Canal in 1997 and in various adjacent areas within the surrounding waterfront basin and Hudson River at varying depths. Measurements taken included pH, turbidity, and dissolved oxygen and salinity readings to qualify conditions during the time of sampling, noted on the results sheets in Attachment A. As shown on the attached ‘Long Slip Canal Habitat Creation Project Water Quality Recording Sheets’ (Attachment A), water quality sampling was completed for waters located adjacent to the Canal, within the immediate waterfront basin, and within the Hudson River. It should be noted that the waterfront stations received increased mixing activities with the Hudson River, whereas the Canal at that time and today does not receive the same interaction. Also as shown, station B5 is located closer to the main stem of the Hudson River, allowing a comparison from the mouth of the Canal to the Hudson River for this project.

Station B5’s results were taken at low and high tide and yield consistent dissolved oxygen level (10.9-11.9mg/l) and salinity readings (.32-1.2%), while pH (5.6-8.2) and turbidity (10-46) varying with the changing tides. As noted, B5’s results were more favorable to marine life when compared to station B1, which is located directly adjacent to the mouth of the Canal. As shown on the results sheets, B1 resulted in consistent pH (7.4-7.9) and salinity readings (4-1.3) but drastically differing dissolved oxygen (9.9-11.1mg/l) and turbidity readings (10-46). These results and water quality is influenced by rainfall and activation of the CSO discharges due to heavy rainfall.

Since the 1995 and 2000 D&M studies for the site, Hudson-Bergen Light Rail Transit (HBLRT) were completed, which involved placing structures within the Canal. These include a coffer dam and, box culvert to house a future CSO structures, all of which obstruct the Canal’s confluence with the Hudson and receipt of inputs from the Hudson River (Figure 2). As such, waters within the Canal have been further degraded due to the restricted natural tide ebb and flow into and out of the Canal, which are decelerated by the HBLRT crossing structures that force waters to abruptly change direction, and cannot influence the entire length of the Canal.
Additionally, the construction of the HBLRT crossing has increased sediment deposition throughout the Canal with greatest accumulation at the mouth of the Canal (Figure 3). As shown on Figures 5-A through 5-B, the Canal bottom is convex, gently sloping down from the westernmost portion, and suddenly sloping up again towards the HBLRT crossing structure. This area’s elevation deviates from the constant downgrade of the rest of the Canal due to sediment settling and being trapped like a “fish-bowl” within the Canal. D&M found that sediments along the bottom of the Canal were also found to appear black and ‘gooey’. The black coloration is due to high sulfide concentrations, which relates to the low oxygen conditions within the Canal. This increasing sedimentation leaves a ‘methane blanket’ that provides limitation on habitat functionality and water quality that would be conductive to support baseline food sources for aquatic species survival, foraging or breeding.

In April 2015, BEM sampled the water quality of the Canal at varying depths for comparison to the D&M 2000 results discussed above, which were taken before the construction of the HBLRT crossing. Each sampling station is identified on Figure 3 and the results are shown on the attached ‘BEM Long Slip Canal Water Quality Sampling Results’ (Attachment B). The study characterizes the current Canal water chemistry to be increasingly acidic nearest the mouth (5.79) of the Canal, with increasing turbidity (5.3) and dissolved oxygen (12.9) readings as well, in comparison to the D&M 2000 study.

Species Habitat Discussion

In the enclosed 2011 Threatened and Endangered Species Determination for the Canal site, NMFS indicated in a previous guidance letter dated January 19, 2011 (Attachment C) that previous design and filling within Long Slip Canal should consider any potential to impact Shortnose sturgeon (Acipenser brevirostrum) and Atlantic Sturgeon (Acipenser oxyrinchus oxyrinchus) in accordance with the Endangered Species Act. In consideration of the Fish and Wildlife Coordination Act other species of concern in the general area of the proposed project include the following: winter flounder (Pseudopleuronectes americanus), windowpane flounder (Scophthalmus aquosus), summer flounder (Paralichthys dentatus), bluefish (Pomatomus saltatrix), Atlantic tomcod (Microgadus tomcod), striped bass (Morone saxatilis), alewife (Alosa pseudoharengus), blueback herring (Alosa aestivalis) and American shad (Alosa sapidissima).

Additionally, upon review of the NMFS Essential Fish Habitat (EFH) Web Mapper in July 2015, BEM has found that the Atlantic and Shortnose Sturgeon species are not listed as EFH for the project site or within direct vicinity of the site. However, Bluefish and Summer Flounder EFH was mapped within the vicinity of the Canal, but not within the Canal itself, and as such EFH for these species are not anticipated to be impacted by the proposed project.

Shortnose and Atlantic Sturgeon are known to use the Hudson River as a migratory pathway, as well as for spawning. According to the Atlantic States Marine Fisheries Commission (ASMFC),

Atlantic sturgeon are "anadromous"; adults spawn in freshwater in the spring and early summer and migrate into "estuarine" and marine waters where they spend most of their lives. They spawn in moderately flowing water (46-76 cm/s) in deep parts of large rivers.
Sturgeon eggs are highly adhesive and are deposited on bottom substrate, usually on hard surfaces (e.g., cobble). It is likely that cold, clean water is important for proper larval development. Once larvae begin migrating downstream they use benthic structure (especially gravel matrices) as refuges. Juveniles usually reside in estuarine waters for months to years.

Subadults and adults live in coastal waters and estuaries when not spawning, generally in shallow (10-50 m depth) nearshore areas dominated by gravel and sand substrates.

BEM does not anticipate the proposed filling to the Long Slip Canal to have an adverse effect on Shortnose and Atlantic Sturgeon or other regional or diadromous species, as BEM does not believe these species are found within the Canal for the following reasons:

- The HBLRT crossing has obstructed water flow into and out of the Canal, and by extension, marine life access as well. Due to the lack of water flow, oxygen-enriched water from the Hudson River does not mix with the Canal waters, creating stagnant methane abundant, and oxygen-deprived marine environment. Furthermore, marine life that venture into the Canal in search of habitat could be unable to navigate to the access point at the mouth of the Canal, and be entrapped within the Canal, making this an ecological ‘attractive nuisance’ area. This would increase the duration of exposure to the contaminated waters and endanger the entrapped aquatic life under low tide conditions.

- High Methane concentraions within the Canal, and pocketed within the gooey bottom on the Canal create a negative environment for marine life, and cause potential hazards to future development within the vicinity of the Canal.

- Water quality within the Canal is not advantageous for Shortnose or Atlantic Sturgeon or other diadromous fish which have been known to migrate or forage within the adjacent Hudson River, and is continuously decreasing in quality. Water flow flushing is little to none due to the construction of the HBLRT crossing. The Canal’s turbidity and dissolved oxygen results are consistently non-favorable, with increased degradation of water chemistry when compared to the D&M 2000 report findings from the Hudson River, a more favorable environment for documented species.

- As stated by the ASMFC, Sturgeon eggs require a hard bottom substrate to cling to for survival. As shown on Figures 3 and 5.3, sediment deposition within the Canal, more specifically towards the mouth of the Canal, has been increasing. This soft mucky, waste and sewage laden substrate decreases likelihood of survival of the eggs, as they have nothing to cling to and less suitable water chemistry exist.

- Adult sturgeon prefer to live in shallow water with gravelly bottoms, and are benthic feeders, feeding on invertebrates including crustaceans, worms and mollusks. As stated above, the bottom of the Canal is soft with sediment deposition, an unfavorable habitat for such invertebrates to inhabit conditions also documented in the previous Biological Baseline Study. The limited food source would make survival difficult for both newly hatched fish larvae as well as adults.
In summary, the proposed Long Slip Canal Fill and Rail Replacement project will be completed in a dry setting to prevent the discharge of construction-altered waters into the adjacent Hudson River. This will be accomplished by installing sheet pile grids and dewatering and filling localized cells to allow for the CSO extension. If required, turbidity barriers and silt curtains will be provided at the east end as a secondary Best Management Practices measure.

Based on the information provided above, please provide our office with your findings regarding a threatened and endangered species determination at your earliest convenience. Should you require any additional information or have any questions, please do not hesitate to call our office.

Sincerely,

BEM Systems, Inc.

Harold Olarte  
Senior Ecologist/Wetland Scientist  
Program Manager, NEPA, Permitting & Ecological Services

Enclosures:
Attachment A – 1997 Scale Diagram Long Slip Canal Approach and Water Quality Recording Sheets 1-4
Attachment B - April 2015 BEM Long Slip Canal Water Quality Sampling Results
Attachment C - 2011 NMFS Threatened or Endangered Species Determination
Figure 1 – USGS Site Location Map
Figure 2 – Canal Elevations and Substrate
Figure 3 – HBLRT Crossing Structure
Figure 4 – Final Closure Cofferdams Site Plan
Figure 5-A – Long Slip Canal Bathymetry (2015)
Figure 5-B – Long Slip Canal Bathymetry (2015)
Figure 5-C – Long Slip Canal Bathymetry (2015)
ATTACHMENT A

1997 Scale Diagram Long Slip Canal Approach and Water Quality Recording
Sheets 1-4
Scale Diagram of
LONG SLIP CANAL APPROACH

Showing Monitoring Sites A2 - C4
with compass bearings and distances to fixed points
N, S, F1, F2, & P
### Long Slip Canal Habitat Creation Project

**Water Quality Recording Sheet**

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**Surface**

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**Shallow Bot**

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3 FT ON SCALE

WINDY, OVERCAST

WATER CHOPPY
### Long Slip Canal Habitat Creation Project

**Water Quality Recording Sheet**

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**Deep Bot B-5**

| pH (pH units) | 7.8 |
| Turb (NTU)    | 20  |
| DO (mg/l)     | 10.9|
| TEMP (deg C)  | 9   |
| Sal (%)       | 2.0 |

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- High Tide: 5
- Eelgrass: 9
- No Waves: 10
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**Deep Bot B-5**

| pH (pH units) | 7.0 |
| Turb (NTU) | 20 |
| DO (mg/l) | 12.0 |
| Temp (deg C) | 9.5 |
| Sal (%) | 0.5 |

**High Tide** 7 ft on depth stick, raining, overcast. Waves 1 ft.
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**DEEP BOT B-1**

| pH (pH units)        |     |     |     |     |     |     |     |     |     |     |     |     |
| Turb (NTU)           |     |     |     |     |     |     |     |     |     |     |     |     |
| DO (mg/l)            |     |     |     |     |     |     |     |     |     |     |     |     |
| TEMP (deg C)         |     |     |     |     |     |     |     |     |     |     |     |     |
| Sal (%)              |     |     |     |     |     |     |     |     |     |     |     |     |

*Bottom samples not taken because pump was not available.*
ATTACHMENT B

April 2015 BEM Long Slip Canal Water Quality Sampling Results
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<td>328</td>
<td>16.3</td>
<td>5.3</td>
<td>12.9</td>
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</tbody>
</table>
ATTACHMNT C

2011 NMFS Threatened or Endangered Species Determination
TO: Harry Strano  
Amy S. Greene Environmental Consultants Inc.  
4 Walter E. Foran Blvd., Suite 209  
Flemington, NJ 08822

SUBJECT: NJ Transit Long Slip Canal Refill Project  
(Formerly Long Slip Canal Habitat Creation Project)  
NJ Transit Hoboken Terminal  
City of Hoboken and Jersey City, Hudson County, NJ  
ASGECI Project # 3278

January 19, 2011

We have reviewed the information provided to us regarding the above subject project. We offer the following preliminary comments pursuant to the Endangered Species Act, the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act:

Endangered Species Act

Threatened and endangered shortnose sturgeon may be present in the project area at certain times of the year. Atlantic sturgeon may also be present in the project area at certain times of the year. Atlantic sturgeon has been proposed for listing as an endangered species within the New York Bight Distinct Population Unit. As a result, the federal action agency should contact NMFS Protected Resources Division to initiate coordination on this project as part of the federal permit process. Requests for coordination can be addressed to: Endangered Species Coordinator, NOAA Fisheries Service’s Protected Resources Division, One Blackburn Drive, Gloucester, MA 01930-2298.

Fish and Wildlife Coordination Act

A wide variety of resources of concern to NMFS occur in the Hudson River including but not limited to winter flounder, windowpane, summer flounder, bluefish and Atlantic tomcod. Anadromous fish including striped bass, alewife, blueback herring and American shad may also be found in the project area. As part of the federal permit process, the applicant should demonstrate that the impacts to the aquatic environment have been avoided, minimized and mitigated. Should the filling of the canal be authorized, we would recommend that the canal be sealed off from the river before filling. In-water work outside of the canal should be avoided from 2/1 to 5/1 to minimize impacts to winter flounder.

Magnuson-Stevens Fishery Conservation and Management Act  
Essential Fish Habitat

Essential Fish Habitat (EFH) has been designated in the project area. Further consultation but the federal action agency may be required as part of the federal permit process. Should project plans change that would alter the basis for determination, or if new species or EFH is designated, consultation should be reinitiated. For a listing of EFH and further information, please go to our website at: http://www.nmfs.noaa.gov/hcd. If you wish to discuss this further, please call 732-872-3023.
Note: Not to Scale
Note: Not to Scale

Coordinate System:
NAD 1983 New Jersey State Plane (feet)

Data Source:

Figure 5-C:

Long Slip Fill
and Rail Enhancement Project

Project No.: TIERRIII-03
Date: August 2015

BEM
100 Passaic Avenue
Chatham, NJ 07928
P. (908) 598-2800
Attachment 5: U.S. Environmental Protection Agency Comments on Preliminary Draft Environmental Assessment
Dear Mr. Moser:

The Environmental Protection Agency (EPA) has reviewed the Federal Transit Administration’s (FTA) preliminary draft environmental assessment (EA) for the Long Slip Fill and Rail Enhancement Project. This project entails filling in approximately 4.3 acres of the existing Long Slip Canal and adjacent land within Hoboken Yard to an elevation of 12 feet. This new elevated land will provide for the expansion of train storage and installation of six electrified tracks, high level platforms, a station/crew facility and a walkway to Hoboken Terminal. In addition, these elevated tracks will be able to function should the Hoboken terminal be flooded.

While EPA concurs that the document supports a finding of no significant impact, we would like to make the following comments.

- EPA’s analysis of the Long Slip Canal environment concurs that the water quality shows low dissolved oxygen, high fecal coliform counts, little or no circulation, sediments that would be considered industrial waste in New Jersey, and that the canal walls are failing. The no action alternative would leave the canal in place as an uninhabitable area. However, appropriate mitigation will provide a net benefit to the environment. While EPA understands that the applicant, New Jersey Transit, will be working with the U.S. Army Corps of Engineers (Corps) regarding the Clean Water Act requirements under Section 404, EPA recommends that the EA include as much of the mitigation plans as possible to ensure public understanding and participation.

- While the Long Slip Fill and Rail Enhancement project is within the New Jersey Transportation Improvement Program, and therefore covered under Transportation Conformity, the Corps permitting will require a General Conformity applicability analysis under Section 176(c) of the Clean Air Act. While not necessary, the applicability analysis could be added to the EA.

- The EA should discuss the Port Authority Trans Hudson sump pump outlets, and describe their placement after the filling of the canal.
EPA also requests that New Jersey Transit work with both the New Jersey Department of Environmental Protection and the Jersey City Municipal Authority to ensure that the combined sewer overflow meets all permit requirement during the extension construction and final placement.

Thank you for the opportunity to comment. Should you have any questions, please call or email Lingard Knutson of my staff at (212) 637-3747 or Knutson.lingard@epa.gov.

Sincerely,

Grace Musumeci, Chief
Environmental Review Section
Sustainability and Multi Media Programs Branch
Appendix D: Construction Air Quality Analysis
Appendix D  Construction Air Quality Analysis

D.1  Air Quality

Construction-related impacts include particulate matter in the form of fugitive dust (from ground clearing and preparation, grading, stockpiling of materials, on-site movement of equipment and transportation of construction materials), as well as exhaust emissions from material delivery trucks, construction equipment and worker’s private vehicles. Dust emissions typically occur during dry weather and periods of maximum demolition or construction activities or high wind conditions. On-site construction activities typically require the use of heavy duty diesel-powered equipment, which generate carbon monoxide (CO), oxides of nitrogen (NOx), sulfur dioxide (SO2), volatile organic compounds (VOC) and particulate matter (PM10 and PM2.5) emissions from the engine exhaust. The primary pollutants of concern for a construction air quality analysis include CO, NOx, SO2, VOC, PM10 and PM2.5.

Construction of the proposed Current Project is expected to occur over 3.5 years. Construction was assumed to commence in June of 2018. Phase 1, 15-month duration, will require use of an excavator-mounted vibratory hammer to drive sheets and a combination of concrete mixer truck, concrete pump trucks and vibratory concrete mixer to construct a concrete box associated with the CSO extension. Phase 2, 24-month duration, will require a backhoe and crane to construct the retaining wall as well as a dump truck and excavator to distribute fill material. Stage 3 will involve an excavator and impact pile driving rig to construct a bridge span over Marin Blvd and requires a 6 month construction period. In addition, two excavators, an impact pile driver and tie inserter was assumed to be necessary to construct catenary signals, platforms, station/crew facility, walkway to Hoboken Terminal and new tracks within Phase 4, 8-month duration. The air quality construction analysis represents a conservative, worst-case analysis, in which no air quality control measures were assumed.

D.2  On-Site Air Quality Construction Analysis

Construction-related emissions were calculated for pollutants of concern (CO, NOx, SO2, VOC, PM2.5 and PM10), for the worst-case construction period over the course of the project. Based on the project schedule and associated heavy equipment, it was determined that maximum annual
concentrations will occur during the peak construction calendar year of 2021. Stages 2, 3 and 4 are predicted to overlap within CY 2021 with 72 pieces of equipment on the site over this year. As such, annual air quality concentrations were predicted for CY 2021.

D.3 Methodology and Results

The USEPA’s NONROAD2008a Emission Model (NONROAD), incorporated within the most updated motor vehicle emission simulator (MOVES2014a) was utilized to develop emission rates for various sizes and types of construction equipment. The model included temperature profiles for Hudson County provided by New Jersey Department of Environmental Protection (NJDEP). Fuel supply and fuel formulation data assumed ultra-low sulfur fuel (ULSF). Emission factors for CO, NO\(_x\) (NO and NO\(_2\)), SO\(_2\), VOC, PM\(_{10}\) and PM\(_{2.5}\) were obtained for each month related to on-site construction equipment necessary to construct the project during CY 2021.

Excavators, crane, backhoe, pile driving rig, tie inserter, and dump trucks necessary to construct the new infrastructure were assumed to be diesel-powered equipment. Worst-case emission factors obtained from NONROAD2008/MOVES2014a in grams/brake-horsepower-hour were converted to grams/second for each piece of equipment, assuming continuous operation. Estimates assumed construction activities will be performed five days a week as well as Saturdays. To adjust for actual utilization and obtain hourly emissions, emission rates were subsequently multiplied by the reasonable horsepower engine size necessary to perform each task, number of pieces of equipment as well as a usage factor accounting for the percentage of time the equipment is in operation during an 8-hour work shift.

In addition, fugitive dust emissions from operations (e.g. grading, excavation, loading fill material from dump trucks) were calculated based on EPA procedures included within AP-42 Table 13.2.3-1 (EPA, 1995-2006). In addition, interior haul routes were assumed to be unpaved for re-suspended deposited material. The fugitive dust analysis was performed for the peak construction calendar year of 2021, however that analysis does not address any off-site hauling emissions. The Long Slip fill operations are anticipated to be performed over eight (8) months during 2021.

---

1 Analysis performed including diesel fuel formulation with sulfur content of 11 ppm. A sulfur content of 11 ppm is a default value representative of the average sulfur content of diesel fuel meeting the 15 ppm standard, as fuels meeting this standard are produced with a compliance margin to account for differences in testing and contamination downstream. A sulfur content value of 11 ppm is a default fuel formulation within MOVES2014a tables.
Pursuant to 40 CFR 93.153, *de minimis* levels or minimum thresholds have been established for specific pollutants. Applicability analyses performed which exceed these thresholds would indicate the need to perform a conformity determination for the project. Based on the construction-related air emissions analysis performed, emissions estimated for the peak construction calendar year do not exceed *de minimis* thresholds. Table D-1 details predicted NOx, VOC, CO, PM10, PM2.5 and SO2 levels predicted for CY 2021.

**Table D-1: Predicted Construction Emissions Compared to De Minimis Thresholds**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>General Conformity Applicability Thresholds</th>
<th>CY 2021 Estimated Construction Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td>100</td>
<td>15</td>
</tr>
<tr>
<td>VOC</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>CO</td>
<td>100</td>
<td>16</td>
</tr>
<tr>
<td>PM10</td>
<td>100</td>
<td>13</td>
</tr>
<tr>
<td>PM2.5</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>SO2</td>
<td>100</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Sources: [https://www3.epa.gov/airquality/genconform/deminimis.html](https://www3.epa.gov/airquality/genconform/deminimis.html) accessed April 29, 2016 (note that the proposed Current Project will not result in air quality emissions beyond the 3.5 year construction period); USEPA’s NONROAD2008a Emission Model (NONROAD); MOVES2014a; EPA Procedures AP-42 Table 13.2.3-1 (EPA, 1995-2006).

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

1. use of ultra-low-sulfur diesel fuel to power construction equipment;
2. limiting idling times to less than three minutes on diesel powered engines. Signs will be posted at the site to remind contractors to comply with the idling limits;
3. Non-road diesel equipment greater than 100 horsepower shall meet EPA Tier 4 engine emission standards or be equipped with EPA or CARB-verified emission controls to reduce particulate matter and NOx emissions; locating diesel powered exhausts away from local residential or building air intakes;
4. limiting on-site equipment to operating speeds of 5 mph to reduce dust and particulate pollutants from tires and brakes;

5. spraying water or a suppressing agent on any dust pile;

6. utilizing water or appropriate liquids for dust control during demolition, land clearing, filling, grading, and on material stockpiles or surfaces;

7. covering open-body trucks when transporting materials;

8. Haul trucks will use designated truck routes designed to minimize impacts on sensitive receptors; and

9. removing surface materials promptly.
APPENDIX D

CONSTRUCTION-RELATED AIR EMISSIONS

CALCULATIONS
<table>
<thead>
<tr>
<th>Stage</th>
<th>2018</th>
<th>2019</th>
<th>2020</th>
<th>2021</th>
<th>2022</th>
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<td>1 - Jersey City CSO Extension</td>
<td>15 months</td>
<td>16 months</td>
<td>17 months</td>
<td>10 months</td>
<td>8 months</td>
</tr>
<tr>
<td>2 - Fill In Long Slip</td>
<td>24 months</td>
<td>24 months</td>
<td>24 months</td>
<td>24 months</td>
<td>24 months</td>
</tr>
<tr>
<td>3 - Bridge Span over Marin Boulevard</td>
<td>6 months</td>
<td>6 months</td>
<td>6 months</td>
<td>6 months</td>
<td>6 months</td>
</tr>
<tr>
<td>4 - Installation of Railroad Infrastructure</td>
<td>8 months</td>
<td>8 months</td>
<td>8 months</td>
<td>8 months</td>
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**Equipment**

- **Vibatory Hammer (Excavator Mounted)**: 1
- **Excavator**: 1
- **Concrete Mixer Truck**: 1
- **Concrete Pump Truck**: 1
- **Concrete Vibrator**: 1
- **Crane**: 1
- **Backhoe**: 1
- **Crane**: 1
- **Concrete Vibrator**: 1
- **Concrete Mixer Truck**: 1
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- **Backhoe**: 1
- **Crane**: 1
- **Concrete Vibrator**: 1
- **Concrete Mixer Truck**: 1
- **Concrete Pump Truck**: 1
- **Crane**: 1
### Notes:
- a. Road dust emissions were not calculated on a per vehicle basis but rather on a fleet-wide basis. Excavators, loaders and backhoes move about in small incremental steps as the excavation progresses (i.e., minimal distances) and would therefore generate negligible amounts of fugitive dust.
- b. Annual emissions were multiplied by 5/7 to account for a six day work week.

### Assumptions:
- Dump Trucks: 60 trucks/day
- Mileage Around Site
- Each Vehicle Travels: 0.5 mile
- VMT = (0.5 mile per truck x 60 trucks/day x 240 days in 8 months/year) = 7200 miles

### Unpaved Road Emission Factor - Sample Calculation (Short Term):

\[
E_f = k \times \left(\frac{s}{12}\right)^a \times \left(\frac{W}{3}\right)^b
\]

where:
- \(E_f\) = size specific emission factor in pounds per vehicle mile traveled (lb/VMT)
- \(k\) = an empirical constant selected from AP-42 Table 13.2.2-2 for PM\(_{10}\) (industrial roads); PM\(_{10}\)=1.5, PM\(_{2.5}\)=0.15
- \(s\) = surface material silt content in percent silt selected from AP-42 Table 13.2.2-1 (for a construction site)
- \(a\) = an empirical constant selected from AP-42 Table 13.2.2-2 for PM\(_{10}\) (industrial roads-same for PM\(_{10}\) & PM\(_{2.5}\) )
- \(W\) = mean vehicle weight in tons
- \(b\) = an empirical constant selected from AP-42 Table 13.2.2-2 for PM\(_{10}\) (industrial roads-same for PM\(_{10}\) & PM\(_{2.5}\) )

\[
E_f = 1.5 \times \left(\frac{8.5}{12}\right)^{0.9} \times \left(\frac{30}{3}\right)^{0.45}
\]

\[
E_f = 3.10 \text{ lb/VMT}
\]

### Sample Emission Rate Calculation (Short Term):

\[
E_R = \frac{(E_f \text{ unpaved} \times \text{ VMT}) \times 453.59 \text{ (g/lb)}}{60 \text{ (min/hr)}} \times 60 \text{ (s/min)} \times 0.5
\]

where:
- \(E_R\) = PM\(_{10}\) emission rate in grams per second
- \(E_f \text{ unpaved}\) = unpaved road emission factor in lb/VMT
- \(\text{VMT}\) = vehicle miles traveled
- 0.5 = 50% control for watering program (none assumed)

\[
E_R = (3.10 \times x) \times 453.59 \text{ (g/lb)} / 60 \text{ (min/hr)} / 60 \text{ (s/min)} \times 0.5
\]
### 2020 NJTRANSIT LONG SLIP

#### AP-42 Fugitive Dust Calculation - Excavators

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Activity</th>
<th>Emission Factor&lt;sub&gt;₂&lt;/sub&gt; lb/ton</th>
<th>Number of Dump Trucks&lt;sup&gt;₁&lt;/sup&gt;</th>
<th>Volume Added Hourly cubic yards&lt;sup&gt;₁,₂&lt;/sup&gt;</th>
<th>Default Soil Density lbs/cubic yard</th>
<th>Tons Removed Hourly</th>
<th>PM&lt;sub&gt;₁₀&lt;/sub&gt; Emission Rate lb/hr</th>
<th>PM&lt;sub&gt;₁₀&lt;/sub&gt; Emissions g</th>
<th>PM&lt;sub&gt;₁₀.₅&lt;/sub&gt; Emission Rate lb/hr</th>
<th>PM&lt;sub&gt;₁₀.₅&lt;/sub&gt; Emissions g</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavators</td>
<td>Excavates/ Transfer to 12 cy Truck</td>
<td>2.42E-04</td>
<td>60</td>
<td>96.0</td>
<td>2,600</td>
<td>125</td>
<td>0.003</td>
<td>52554.76</td>
<td>0.001</td>
<td>16517.21</td>
</tr>
</tbody>
</table>

**Notes:**
1. A maximum "fill" transfer is based on 60 dump trucks per day.
2. 12 cubic yards of fill per truck
3. Emission factors for soil transfer operations are based on Equation 1 from Section 13.2.4 of AP-42.
   Emission factor calculations are provided
4. 240 days of transfer activities in 2021

**Transfer/Drop Operation Emission Factor - Sample Calculation for PM<sub>₁₀</sub>:**

\[
Ef = k \times (0.0032) \times (U/5)^{1.3} / (M/2)^{1.4}
\]

where:
- \(Ef\) = size specific emission factor in pounds per ton (lb/ton)
- \(k\) = an empirical constant selected from AP-42 (0.35 for PM<sub>₁₀</sub> and 0.11 for PM<sub>₁₀.₅</sub>)
- \(U\) = mean wind speed in miles per hour (mph)
- \(M\) = material moisture content in percent moisture (%) from Table 13.2.4-1 of AP-42 (for overburden)

\[
Ef = 0.35 \times (0.0032) \times (12.5/5)^{1.3} / (14/2)^{1.4}
\]

\[
Ef = 2.42E-04 \text{ lb/ton}
\]

**Sample Emission Rate Calculation for PM<sub>₁₀</sub> (excavator):**

\[
ER = Ef \times PM<sub>₁₀</sub> \times \text{(soil volume} \times \text{soil density} / 2,000 \text{ lbs/ton}) \times 453.59 / 60 / 60
\]

where:
- \(ER\) = PM<sub>₁₀</sub> emission rate in grams per second
- \(Ef\) = PM<sub>₁₀</sub> emission factor in lb/ton
- soil volume = volume of soil handled in cubic yards per hour
- soil density = 2,600 lbs/YD³
- 0.5 = Fugitive Emissions reduction program factor (none assumed)

\[
ER = 2.42E-04 \times (45 \times 2,600 / 2,000) \times 2 \times 0.5 \times 453.59 / 60 / 60
\]

\[
ER = 1.78E-03 \text{ g/s}
\]
## 2021 NJTRANSIT LONG SLIP NOx EMISSIONS WORKSHEET

<table>
<thead>
<tr>
<th></th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Excavator</strong></td>
<td>519291.987</td>
<td>480409.615</td>
<td>1078531.955</td>
<td>1038585.443</td>
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<td>778938.443</td>
<td>808897.647</td>
<td>778938.443</td>
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<td>519293.700</td>
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<tr>
<td><strong>Crane</strong></td>
<td>81426.819</td>
<td>75163.250</td>
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<td>81426.811</td>
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<td>6514144.527</td>
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<tr>
<td><strong>Backhoe</strong></td>
<td>16477.837</td>
<td>15210.299</td>
<td>34223.154</td>
<td>32955.668</td>
<td>32955.668</td>
<td>32955.668</td>
<td>34223.138</td>
<td>32955.668</td>
<td>16477.833</td>
<td>16477.824</td>
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<td>264912.665</td>
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<tr>
<td><strong>Bore Rig</strong></td>
<td>139101.520</td>
<td>128401.341</td>
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<td>139101.648</td>
<td>139101.589</td>
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<tr>
<td><strong>Dump Trucks</strong></td>
<td>454290.742</td>
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<td>454291.108</td>
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**TOTAL NOx EMISSIONS FOR 2021**

- 13526344.209 g/year
- 14.906 tons/year
## 2021 NJTRANSIT LONG SLIP VOC EMISSIONS WORKSHEET

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<tr>
<th>Year</th>
<th>Excavator</th>
<th>Crane</th>
<th>Backhoe</th>
<th>Bore Rig</th>
<th>Dump Trucks</th>
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<tbody>
<tr>
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<td>January</td>
<td>February</td>
<td>March</td>
<td>April</td>
<td>May</td>
</tr>
<tr>
<td>2021</td>
<td>72441.863</td>
<td>66869.267</td>
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<tr>
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<td>104803.961</td>
<td>96741.814</td>
<td>108835.117</td>
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<tr>
<th></th>
<th>TOTAL VOC EMISSIONS FOR 2021</th>
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<tbody>
<tr>
<td></td>
<td>2175357.825 g/year</td>
</tr>
<tr>
<td></td>
<td>2.397 tons/year</td>
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## 2021 NTRANSIT LONG SLIP CO EMISSION WORKSHEET

<table>
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<tr>
<th>2021</th>
<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
<th>July</th>
<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>Total</th>
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<tbody>
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<td>Excavator</td>
<td>526,352.065</td>
<td>485,715.987</td>
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<td>18,780.515</td>
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<td>20,345.616</td>
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<td>0.000</td>
<td>0.000</td>
<td>162,764.666</td>
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</tr>
<tr>
<td>Backhoe</td>
<td>13,362.136</td>
<td>12,334.313</td>
<td>27,751.973</td>
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<td>26,724.131</td>
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<td>Bore Rig</td>
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<td>Dump Trucks</td>
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**TOTAL CO EMISSIONS FOR 2021**

- 14306923.221 g/year
- 13,766 tons/year
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<th>January</th>
<th>February</th>
<th>March</th>
<th>April</th>
<th>May</th>
<th>June</th>
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<th>August</th>
<th>September</th>
<th>October</th>
<th>November</th>
<th>December</th>
<th>Total</th>
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<tbody>
<tr>
<td><strong>Excavator</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>593253.313</td>
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<tr>
<td></td>
<td>42201.363</td>
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<tr>
<td><strong>Crane</strong></td>
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<td><strong>Backhoe</strong></td>
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<tr>
<td><strong>Bore Rig</strong></td>
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<td>11429.930</td>
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<tr>
<td><strong>Dump Trucks</strong></td>
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<table>
<thead>
<tr>
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<th>ON-SITE EQUIPMENT PM10 EMISSIONS FOR 2021</th>
<th>1312334.8016 g/year</th>
</tr>
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<tr>
<td></td>
<td>ON-SITE TRUCK MOVEMENT PM10 EMISSIONS FOR 2021</td>
<td>10849984.2800 g/year</td>
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<tr>
<td></td>
<td>ON-SITE TRANSFER OPERATIONS PM10 EMISSIONS FOR 2021</td>
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<td>TOTAL ON-SITE PM10 EMISSIONS</td>
<td>13.4608 g/year</td>
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### 2021 NJTRANSIT LONG SLIP PM2.5 EMISSIONS WORKSHEET

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<th>Equipment</th>
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<td>January</td>
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<tr>
<td>Excavator</td>
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</tr>
<tr>
<td>Crane</td>
<td>2234.3779</td>
</tr>
<tr>
<td>Backhoe</td>
<td>1725.7436</td>
</tr>
<tr>
<td>Bore Rig</td>
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<tr>
<td>Dump Trucks</td>
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</table>

<table>
<thead>
<tr>
<th>Emissions</th>
<th>Amount</th>
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</thead>
<tbody>
<tr>
<td>On-Site Equipment PM2.5 Emissions</td>
<td>1261518.5482 g/year</td>
</tr>
<tr>
<td></td>
<td>1.3902 tons/year</td>
</tr>
<tr>
<td>On-Site Truck Movement PM2.5 Emissions</td>
<td>1084998.4300 g/year</td>
</tr>
<tr>
<td></td>
<td>1.1957 tons/year</td>
</tr>
<tr>
<td>On-Site Transfer Operations PM10 Emissions</td>
<td>16517.2100 g/year</td>
</tr>
<tr>
<td></td>
<td>0.0182 tons/year</td>
</tr>
<tr>
<td>Total On-Site PM2.5 Emissions</td>
<td>2.6041 g/year</td>
</tr>
<tr>
<td></td>
<td>2021</td>
</tr>
<tr>
<td>----------------</td>
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</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavator</td>
<td></td>
</tr>
<tr>
<td>Crane</td>
<td></td>
</tr>
<tr>
<td>Backhoe</td>
<td></td>
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<tr>
<td>Bore Rig</td>
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<td>Dump Trucks</td>
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**TOTAL SO2 EMISSIONS FOR 2021**

<p>| | | | | | | | | | | | | |</p>
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<tbody>
<tr>
<td>SO2 EMISSIONS</td>
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<td>0.013 tons/year</td>
<td>0.013 tons/year</td>
<td>0.013 tons/year</td>
<td>0.013 tons/year</td>
<td>0.013 tons/year</td>
<td>0.013 tons/year</td>
<td>0.013 tons/year</td>
<td>0.013 tons/year</td>
<td>0.013 tons/year</td>
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