Appendix B: Methodology Report

Appendix B: Methodology Report Addendum

B.1 INTRODUCTION

The October 2020, *Western Rail Yard Infrastructure Project Environmental Impact Statement Effects Assessment Methodology Report* provided the framework that the Federal Railroad Administration (FRA) used to evaluate potential impacts resulting from the No Action Alternative and Preferred Alternative. As part of the development of the Draft Environmental Impact Statement (EIS) and Draft Section 4(f) Evaluation, FRA developed a revised framework and terminology to clarify the definition of the Affected Environment, and define the methodology for conducting impact analyses. For technical areas using future conditions as the basis for analysis, the analysis year was changed from 2030 to 2026 (completion of the Preferred Alternative's construction period). Summarized below are the resulting changes FRA has made to analysis methodologies, assumptions, and definitions.

B.2 NO ACTION ALTERNATIVE

The No Action Alternative will include a description of actions at the Project Site (Western Rail Yard) that would likely happen without the construction of the Proposed Action. The No Action Alternative will include any other transportation projects that would maintain the Western Rail Yard in its current condition including normal maintenance and/or modernization actions. Transportation and development projects that occur outside Western Rail Yard, but within the Study Area, would become part of the cumulative impact discussion unless planned for completion before 2026 and already included as part of the Affected Environment.

B.3 AFFECTED ENVIRONMENT

The Affected Environment is the existing natural, cultural, and social conditions of an area that may be impacted by a proposed Federal action. FRA is defining the Affected Environment by space (the Study Area) and time (construction or operation). FRA has determined that the discussion of environmental consequences will include both adverse and beneficial impacts, as applicable.

The Affected Environment of the various resource categories include any planned transportation and development projects within the Study Area that will be operational before or during the construction period for the Proposed Action. There will be no separate future affected environment. The transportation and development projects identified within the Study Area that are planned for completion before 2026, will be part of the Affected Environment.

The transportation analysis will be the exception to the general analysis and definition of the affected environment assessed in other resource categories. In particular, the transportation analysis will continue to include an Affected Environment Existing Conditions and an Affected Environment Future Conditions. The transportation chapter of the EIS will include a narrative explaining how and why this chapter differs from the analysis framework of the rest of the EIS.

B.4 EVALUATION OF IMPACTS

The following section clarifies the analysis approach for each resource area that FRA will use to determine the potential for the No Action Alterative and/or the Preferred Alternative to result in direct, indirect, and cumulative impacts.

Direct impacts: The EIS will identify and analyze the potential direct impacts of the Preferred Alternative on each resource category within the Study Area. Resource categories will be analyzed for both construction and operational impacts.

- The Study Area is generally a ½-mile radius from the Project Site. Each resource category chapter will further define the study area for that resource and explain the rationale for establishing the study area.
- Regulatory framework provides the Federal requirements by which analysis thresholds are determined for that resource category. In some instances, in lieu of Federal thresholds, FRA may use State or local thresholds (e.g., Transportation), where applicable and appropriate, as defined in the corresponding EIS chapter.
- Construction impacts of the Preferred Alternative would occur between 2021 and 2026. The analysis for each resource section will include, where appropriate, peak construction year analysis impacts to show the largest potential impacts that would result from the Preferred Alternative on that resource category within the Study Area.
- Operational impacts are those impacts that would occur at the conclusion of construction for the Preferred Alternative (2026), and continue for the operational life of the Platform and Tunnel Encasement. The analysis will include potential impacts from the operation and maintenance of the Preferred Alternative within the Study Area.

Indirect Impacts: The EIS will identify indirect impacts within the Study Area that would result from the construction and operation of the Preferred Alternative. The Overbuild and any other planned development and transportation projects that would likely happen as a result of the Preferred Alternative and completed by 2030 will be analyzed in the EIS chapter that addresses indirect impacts by resource category.

Cumulative Impacts: The cumulative impact analysis for each resource category will take a larger view of impacts of the Proposed Action aggregated with the impacts of other transportation and development projects in the Study Area, as well as applicable regional transportation projects.

B.5 RESOURCE CATEGORY UPDATES

B.5.1 SAFETY AND SECURITY

The approach to the Safety and Security analysis has been updated since October 2020 when the original *Western Rail Yard Infrastructure Project Environmental Impact Statement Effects Assessment Methodology Report* was prepared. The EIS addresses elements of safety and security issues in a variety of the resource category analyses (e.g., traffic and pedestrian safety are addressed in Chapter 6, "Transportation"), rather than collecting these analyses into one EIS chapter. This is a departure from what FRA envisioned when the Methodology Report was prepared. Considerations that involve or must adhere to specific safety and security measures and regulatory requirements are part of the design of the Preferred Alternative. These design measures are now part of a descriptive narrative in Chapter 3, "Alternatives," to illustrate that the design complies with all safety and security regulations that apply to the Project Site. The portions of the Project Site that will be occupied by the various components of the Preferred Alternative will not be accessible to the public and will be secured at all times, with access only allowed by authorized personnel. ✷

Western Rail Yard Infrastructure Project
Environmental Impact Statement
Draft Effects Assessments
Methodology Report

October 2020

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Acronym List

AAI - All Appropriate Inquiries

ACHP - Advisory Council on Historic Preservation

ACS - American Community Survey

ADA - Americans with Disabilities Act of 1990

ADF - Air Discharge Facilities Index

AERMOD - American Meteorological Society/Environmental Protection Agency Regulated Model

APE - Area of Potential Effect(s)

APTA - American Public Transit Association

ASTM - American Society for Testing and Materials

ATR - automated traffic recorder

BAT - best available technology

BCP - Brownfield Cleanup Program

BPIP - Building Profile Input Program

BPIPRM - Building Profile Input Program for the PRIME model

CAA - Clean Air Act (Federal)

CAPCOA - California Air Pollution Control Officers Association

CBS - Chemical Bulk Storage

CEQ - Council on Environmental Quality (Federal)

CEQR - New York City Environmental Quality Review

CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act

CERCLIS - Comprehensive Environmental Response, Compensation, and Liability Information System

CFR - Code of Federal Regulations

CH_4 - methane

CHASP - Construction Health and Safety Plan

CMP - New York State Coastal Management Program

CO - carbon monoxide

CO_2 - carbon dioxide

CO_2e - carbon dioxide equivalent
CPC - New York City Planning Commission
CREC - Controlled Recognized Environmental Condition(s)
CRIS - Cultural Resource Information System (New York State)
CRRA - Community Risk and Resiliency Act (New York State)
CSO - combined sewer outfalls
CWA - Clean Water Act (Federal)
CZMA - Coastal Zone Management Act of 1972 (Federal)
dB - decibel
dBA - "A"-weighted sound level
DEIS - Draft Environmental Impact Statement
DHS - U.S. Department of Homeland Security
DM-30 - Dual-Mode diesel-electric engines
DOI - U.S. Department of the Interior
EA - environmental assessment
EIA - Energy Information Administration (Federal)
EIS - Environmental Impact Statement
EO - Executive Order
ERNS - Emergency Response Notification System
ESA - Phase I Environmental Site Assessments
ESI - Phase II Environmental Site Investigation
FEMA - Federal Emergency Management Agency
FHWA - Federal Highway Administration (USDOT)
FIRMs - Flood Insurance Rate Maps (Federal FEMA)
FOIA - Freedom of Information Act (Federal)
FOIL - Freedom of Information Law (New York State)
FONSI - Finding of No Significant Impact (Federal)
FRA - Federal Railroad Administration (USDOT)
FTA - Federal Transit Administration (USDOT)
GHG - greenhouse gas emissions
GIS - Geographic Information Systems
GREET - Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation
gsf - gross square feet

GWP - global warming potential

HARBS - *Historic Architectural Resources Background Study*

HC - hydrocarbon

HFC - hydrofluorocarbon

HHS - U.S. Department of Health and Human Services (Federal)

hp - horsepower

HREC - Historic Recognized Environmental Conditions

HUD - U.S. Department of Housing and Urban Development (Federal)

Hz - Hertz

IPAC - Information, Planning, and Conservation System (Federal)

IPCC - Intergovernmental Panel on Climate Change (United Nations)

ISR - In-Stack Ratio

LEP - Limited English Proficiency

LIRR - Long Island Rail Road (New York State - MTA)

LOS - level of service

LPC - New York City Landmarks Preservation Commission

LTCP - Long Term Control Plan

LWRP - Local Waterfront Revitalization Program

MOA - Memorandum of Agreement

MOSF - Major Oil Storage Facilities

MOVES - Motor Vehicle Emission Simulator

MPO - Metropolitan Planning Organization

MTA - Metropolitan Transportation Authority (New York State)

N_2O - nitrous oxide

NAA - non-attainment areas

NAAQS - National Ambient Air Quality Standards

NEPA - National Historic Preservation Act of 1966

NESHAPS - National Emissions Standards for Hazardous Air Pollutants

NFPA - National Fire Protection Association

NHL - National Historic Landmark

NHPA - National Historic Preservation Act of 1966

NO - nitric oxide

NO_2 - nitrogen dioxide

NOAA - National Oceanic and Atmospheric Administration (Federal)

NPCC - New York City Panel on Climate Change

NPL - National Priority List

NR or NRHP - National Register of Historic Places

NRCS - Natural Resources Conservation Service (Federal - U.S. Department of Agriculture)

NYC Parks - New York City Department of Parks and Recreation

NYCDCP - New York City Department of City Planning

NYCDEP - New York City Department of Environmental Protection

NYCDOT - New York City Department of Transportation

NYCOER - New York City Office of Environmental Remediation

NYCT - New York City Transit (New York State - MTA)

NYMA - New York Metropolitan Area

NYMTC - New York Metropolitan Transportation Council

NYSDEC - New York State Department of Environmental Conservation

NYSDOS - New York State Department of State

NYSDOT - New York State Department of Transportation

NYSHPO - New York State Historic Preservation Office

NYSM - New York State Museum

O_3 - Ozone

OPRHP - New York State Office of Parks, Recreation, and Historic Preservation

OSHA - Occupational Safety and Health Administration (Federal - U.S. Department of Labor)

PA - Programmatic Agreement

PABT - Port Authority Bus Terminal

PANYNJ - Port Authority of New York and New Jersey

PBS - Petroleum Bulk Storage

PFC - perfluorocarbon

PM - particulate matter

PM_{10} - particles with an aerodynamic diameter of less than or equal to 10 micrometers

$PM_{2.5}$ - particles with an aerodynamic diameter of less than or equal to 2.5 micrometers

ppm - parts per million

PS/IS - elementary/intermediate public school

PVMRM - Plume Volume Molar Ratio Method

RCRA - Resource Conservation and Recovery Act (Federal)

REC - Recognized Environmental Condition(s)

RGGI - Regional Greenhouse Gas Initiative

rms - root mean square

ROD - Record of Decision

RRIF - Railroad Rehabilitation and Improvement Financing

SCA - New York City School Construction Authority

SCO - Soil Cleanup Objectives

SEA - supplemental environmental assessment

SEQRA - New York State Environmental Quality Review Act

SF_6 - sulfur hexafluoride

SHPA - New York State Historic Preservation Act

SHWS - State Hazardous Waste Sites

SIP - State Implementation Plan

SO_2 - sulfur dioxide

SO_x - sulfur oxides

SPDES - State Pollutant Discharge Elimination System

SSURGO - Soil Survey Geographic Database

SWF - Solid Waste Facilities

THPO - Tribal Historic Preservation Officer

TIMS - Traffic Information Management System

TIP - Transportation Improvement Program

TRIS - Toxic Chemical Release Inventory System

TSA - Transportation Security Administration (Federal - DHS)

ULSD - ultra-low sulfur diesel

ULURP - Uniform Land Use Review Procedure (New York City)

USDA - U.S. Department of Agriculture

USDOT - U.S. Department of Transportation

USEPA - U.S. Environmental Protection Agency

V/C - volume/capacity

VCP - Voluntary Cleanup Program

VdB - velocity in decibels

VOC - volatile organic compound

WIT - width increment threshold

WRP - New York City Waterfront Revitalization Program

WSS - Web Soil Survey

zsf – zoning square feet

Chapter 1: Introduction

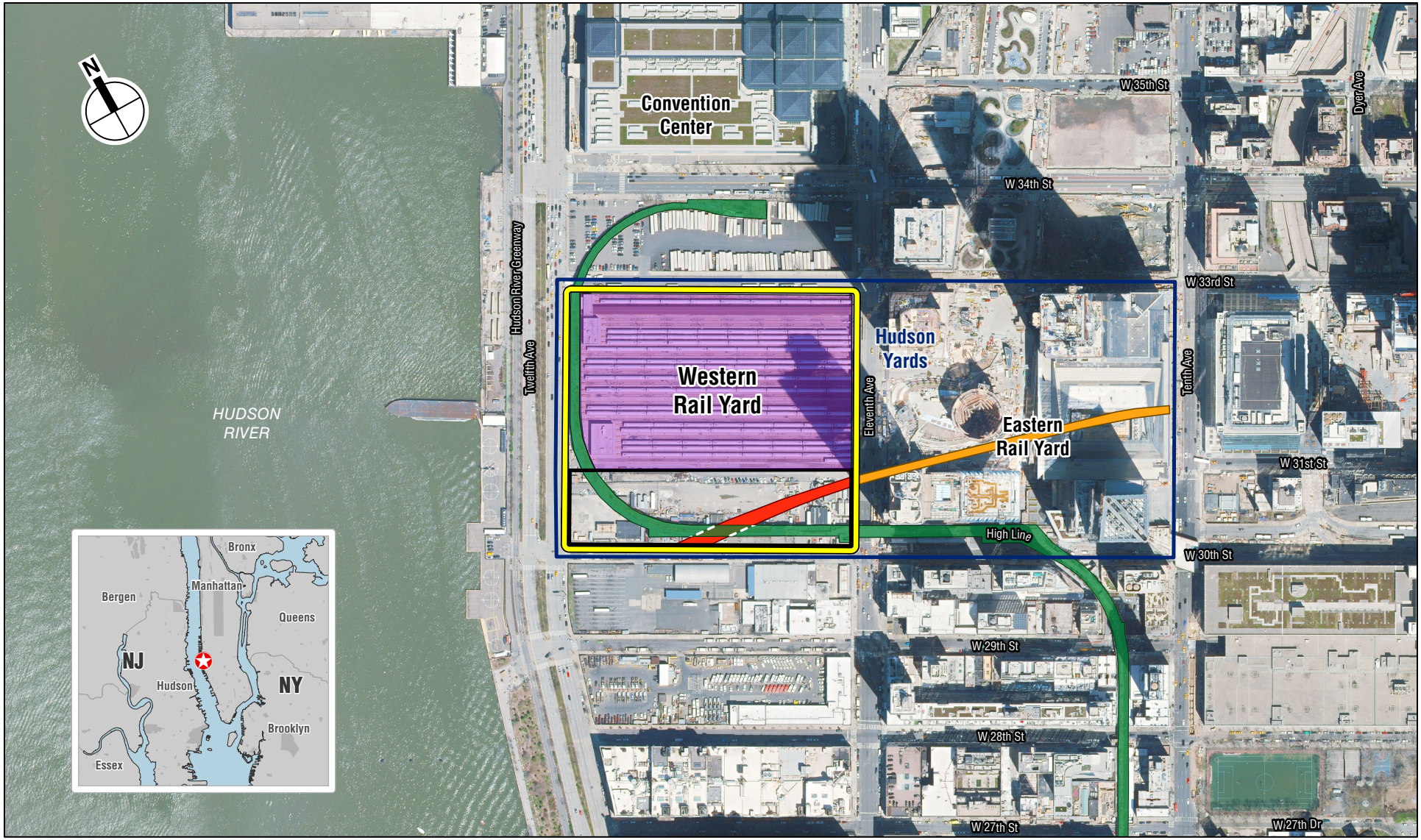
WRY Tenant LLC (an affiliate of The Related Companies, LP)[1] and the National Railroad Passenger Corporation (Amtrak) are partnering in a joint venture (the Project Sponsor) to seek Federal financial assistance through the Railroad Rehabilitation and Improvement Financing (RRIF) Program, which is a loan program administered by the Build America Bureau (Bureau) of the U.S. Department of Transportation (USDOT). The Federal Railroad Administration (FRA) is conducting the environmental analysis to ensure compliance with the National Environmental Policy Act of 1969 (NEPA), (42 USC 4321 et seq.) and other applicable environmental laws.

Financial assistance would fund the construction of a Platform and a Tunnel Encasement on the 13-acre Western Rail Yard site, located on the western half of the Metropolitan Transportation Authority (MTA) Long Island Rail Road (LIRR) John D. Caemmerer Yard (aka "Hudson Yards") (Block 676, Lots 1 and 5) in New York County (Manhattan), New York (see **Figure 1-1**). The Proposed Acton, or Project, includes the Platform and Tunnel Encasement.

The 9.8-acre structural steel and concrete Platform would be constructed above the MTA's existing rail yard, which is used and operated by LIRR as a commuter railroad storage yard and maintenance facility. The yard contains storage tracks for 12-car trains, a car-cleaning platform, and other maintenance facilities for LIRR's commuter rail service into Penn Station. The Platform would include building foundations, which would keep interruptions of yard operations to a minimum. The construction of the Platform would require the reconstruction and upgrades to approximately 20,000 square feet of railroad staff facilities and other LIRR support services including existing emergency electrical equipment, and rail car cleaning services. The Platform would house other infrastructure, including critical life safety and mechanical, electrical and plumbing support services for the yard, including new lighting, sprinklers and an extensive platform ventilation system. Once complete, the entire rail yard would contain comprehensive state-of-the-art life safety systems, securing this critical infrastructure and protecting both the workers and the railroad equipment in the rail yard.

[1] The Related Companies, LP (Related) was the successful bidder of a competitive bid issued by the Metropolitan Transportation Authority (MTA) for the long-term ground leases with option to purchase severed fee parcels (for the development air rights over the Hudson Yards from MTA). Related is a privately owned, American real estate firm headquartered in New York City.

6.30.20



Data source: NYS ITS GIS Program Office; NYS Digital Orthoimagery Program (NYSDOP), 2018 Imagery

Project Site (Western Rail Yard)
Hudson Yards
Approximate Terra Firma Area
Proposed Platform
Existing Concrete Encasement
Proposed Tunnel Encasement
Existing High Line Park (Remains Unaltered)

0 400 FEET

Project Location

WESTERN RAIL YARD INFRASTRUCTURE PROJECT

Figure 1-1

The Tunnel Encasement in Western Rail Yard would extend from Eleventh Avenue to 30th Street. Amtrak estimates the concrete casing extension would be 605 feet long, between 50 and 65 feet wide and between 27 and 38 feet high under the Western Rail Yard. The Tunnel Encasement in Western Rail Yard would extend from the recently completed encasement under Eleventh Avenue and the Eastern Rail Yard. Together, the encasement below both rail yards (Western Rail Yard and Eastern Rail Yard) would preserve a total ROW of approximately 1,400 feet. No permanent operational components, such as tracks, lighting, ventilation, or electrical system, would be constructed within the Tunnel Encasement as part of the Proposed Action. This project does not include any efforts to make the encasement operational.

The Platform and Tunnel Encasement have each been the subjects of prior environmental reviews. These prior studies are described below in Section A, followed by an overview of the current FRA environmental review described in Section B, which will be prepared pursuant to NEPA. Section C provides a description of each component of the Proposed Action), and Section D provides the framework for the resource category analyses that FRA will undertake in the Environmental Impact Statement (EIS), and an outline for of the remainder of this report.

A. PRIOR ENVIRONMENTAL REVIEWS

FRA will use information developed in previously prepared environmental documents (described below) to the extent applicable to support the corresponding impact analysis for the Project. Where appropriate, FRA will incorporate findings and analyses from these documents. This will include using information such as estimates of construction worker and trucking activity, equipment and logistical information, and operational characteristics of the project elements; accounting for any updates needed.

WESTERN RAIL YARD PROJECT

In 2009, The Western Rail Yard site was the subject of a New York State Environmental Quality Review Act (SEQRA) and New York City Environmental Quality Review (CEQR) EIS, The Final EIS was published on October 9, 2009 ("2009 SEQRA/CEQR FEIS"). The proposed actions evaluated in the 2009 SEQRA/CEQR FEIS pertaining to the Western Rail Yard site were addressed the following for the construction and operation of the Platform and a privately funded mixed-use development (Overbuild) that would sit on top of the Platform. The proposed action for the 2009 FEIS included: (1) the lease of, with option to purchase, the air space over the Western Rail Yard and related property interests by MTA to the developer; (2) zoning map and text amendments and accessory parking special permits by the City of New York pursuant to the Uniform Land Use Review Procedure (ULURP); (3) the establishment of new legal grades on West 33rd Street between Eleventh and Twelfth Avenues; and (4) the site selection by the New York City School Construction Authority (SCA) for an elementary/intermediate public school ("PS/IS school") on the Western Rail Yard site.

Based on the findings of the 2009 SEQRA/CEQR FEIS, the zoning actions associated with the Overbuild were approved by the New York City Planning Commission (CPC) and adopted by the New York City Council as zoning text and map amendments to the New York City Zoning Resolution. The Overbuild is now as-of-right development, since it will be built in accordance with the New York City Zoning Resolution's existing zoning controls, which regulate type of use, building envelopes, publicly accessible open space areas, street wall controls, retail continuity, and maximum floor area ratio (i.e., the ratio of floor area to lot size).

CONCRETE CASING

FRA conducted an environmental assessment (EA) under NEPA for the construction of a concrete casing in the Hudson Yards, and issued a Finding of No Significant Impact (FONSI) in 2013 for the concrete casing project's EA,[2] and in 2014 for the concrete casing project's Supplemental EA (SEA).[3] The purpose of the concrete casing project was to preserve underground passenger railroad ROW in Hudson Yards to maintain opportunities to expand passenger rail services, meet future demand, and improve intercity and commuter rail system safety and reliability. The preservation of the railroad ROW is necessary to ensure the Platform and Overbuild construction would not eliminate the possibility of future passenger rail development and expansion through Hudson Yards and into New York Penn Station.

Since FRA's issuance of the 2013 and 2014 FONSIs, the portion of concrete casing extending beneath the Eastern Rail Yard has been built. The final section of the concrete casing included in the 2013 and 2014 FONSI is the Tunnel Encasement that would be constructed under the Western Rail Yard site (see **Figure 1-1**). The construction of this section of Tunnel Encasement is a component of the Proposed Action, as described in more detail below. For more information about FRA's past environmental review of the concrete casing and Tunnel Encasement, please see https://www.fra.dot.gov/Page/P0666.

B. CURRENT ENVIRONMENTAL REVIEW

An environmental review is necessary as an integral part of the overall review for the RRIF loan application. Therefore an EIS in accordance with NEPA, Council on Environmental Quality NEPA regulations (40 CFR Parts 1500–1508), 23 CFR Part 771, and 23 U.S.C. 139). FRA will evaluate direct, indirect and cumulative changes to the human and natural environment resulting from the operation and construction of the Platform and construction of the Tunnel Encasement. FRA will comply with other applicable environmental laws and regulations, including Section 106 of the National Historic Preservation Act of 1966 (NHPA) (54 U.S.C. § 306108); the Clean Air Act (42 U.S.C. § 7401 et seq.); the Endangered Species Act (16 U.S.C. § 1531); Section 4(f) of the Department of Transportation Act of 1966 (Section 4(f) 49 U.S.C. § 303) and FRA's implementing regulations at 23 CFR part 774; U.S. DOT Order 5650.2 on Floodplain Management; the Coastal Zone Management Act (16 U.S.C. § 1451 et seq.); and Executive Order 12898 on Environmental Justice; as well as other related statutes and regulations (collectively "environmental reviews").

Since the Project is being undertaken in New York City, FRA will, where appropriate, use methodologies consistent with the *CEQR Technical Manual*[4] as the basis of quantitative and qualitative analysis. FRA intends for the EIS analysis to provide the environmental documentation needed for all permits or approvals for the Proposed Action.

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[2] Amtrak and FRA. May 2013. Finding of No Significant Impact, Environmental Assessment for Construction of a Concrete Casing in the Hudson Yards, New York, New York.

[3] Amtrak and FRA. November 2014. Finding of No Significant Impact, Supplemental Environmental Assessment for Construction of a Concrete Casing Extension in the Hudson Yards, New York, New York.

[4] https://www1.nyc.gov/site/oec/environmental-quality-review/technical-manual.page

C. PROJECT DESCRIPTION

The descriptions provided below for each of the components of the Proposed Action are based on the latest available information and the most current design documentation provided by the Project Sponsor. FRA will apply the methodologies described in this document to the Proposed Action.

PROJECT SITE AND STUDY AREA

The Project Site is the 13-acre Western Rail Yard site (shown above in **Figure 1-1**), which includes the area for both the Platform and Tunnel Encasement. In the EIS resource category technical analyses, FRA will consider the Project Site and a Study Area representing the area where the Proposed Action has the potential for community or environmental effects during construction and operation. FRA has identified a general overall Study Area for the Project, which includes the Project Site and an approximate ½-mile radius around the Project Site. This overall Study Area is generally bounded by West 42rd Street to the north, Eighth Avenue to the east, West 21st Street to the south, and the Hudson River to the west (see **Figure 1-2**). The purpose of this Study Area is to identify a geographic area large enough to support assessment of potential environmental impacts of the Proposed Action to the various resource categories that will be studied in the EIS. The Study Areas will differ for different resource categories and analyses because the type and range of potential impacts varies. For example, the Study Area for visual and aesthetic considerations encompasses areas from which the construction activities or permanent elements of the Proposed Action may be visible, while the Study Area for traffic consists of nearby intersections where traffic related to the Proposed Action's construction and operation may adversely affect local traffic conditions. Each chapter of this methodology report describes the specific Study Area used for each resource.

PROPOSED ACTION

PLATFORM

An approximately 9.8 acre structural Platform would be constructed to cover the railroad storage tracks and maintenance facilities in MTA's Western Rail Yard, which are used and operated by the LIRR. The Platform would consist of deep footings called caissons, shear walls, and a concrete slab. Approximately 400 caissons (i.e., watertight columns) would be drilled into bedrock through the water table and soil to the rock that is up to 120 feet below the surface of the rail yard's track beds outside of the current track configuration.

The Platform's caissons would be threaded between the existing railroad tracks and associated infrastructure in Western Rail Yard. For additional support for the mixed-use Overbuild, shear walls will be located parallel to and between the existing tracks below the Platform. When Hudson Yards was redeveloped in 1986, the tracks and other facilities were reconfigured and laid out to accommodate the columns and supporting structures that future development would require. As a result, no existing storage tracks would be displaced and train service would be maintained during the construction of the Platform.

Study Area

WESTERN RAIL YARD INFRASTRUCTURE PROJECT

Figure 1-2

Construction of the Platform would also necessitate the installation of critical life safety, mechanical, electrical, and plumbing support services for the Western Rail Yard, including new lighting, sprinklers, and an extensive platform ventilation system. This infrastructure would be necessary for the safe operation of the yard once covered by the Platform. Other LIRR support facilities and services would be relocated, reconstructed, and upgraded, including existing emergency electrical equipment, rail car cleaning services, and approximately 20,000 square feet of railroad staff facilities, which support more than 250 staff. Once complete, the entire enclosed Western Rail Yard would contain comprehensive state-of-the-art life safety systems, securing this critical infrastructure and protecting both the workers and the railroad equipment in the yard. The ventilation system, electrical substation, and maintenance buildings are described in more detail below.

- The new ventilation system would provide ventilation necessary to maintain ambient air temperatures for LIRR personnel working in the yard. This ventilation system consists of distributed intake fan plants which direct outside air into the railyard where the intake air mixes with the ambient air. The rail yard air is exhausted through a central plenum which is connected to a consolidated exhaust air fan plant in the northwest. The ventilation system will also provide for emergency ventilation which will provide a tenable environment for LIRR personnel to safely egress the yard, and will also meet temperature and visibility requirements for emergency responders into the yard.

  The ventilation system is supplemented with a series of localized exhaust fans that directly capture diesel exhaust from Dual-Mode (DM-30) locomotives when parked in assigned positions. Localized exhaust hoods would vent diesel exhaust directly into the central exhaust plenum where it would be exhausted through the exhaust fan plant. The DM-30 Locomotives would operate in diesel for required pre-run testing, as well as for idling to provide power to the rest of the train while parked in the yard.

  When completed, the new Western Rail Yard ventilation system would be integrated with the Eastern Rail Yard system to provide a single ventilation system for the concurrent monitoring and control of all of the track and hood exhaust ventilation fans in both rail yards. This component of the new Platform infrastructure that is part of the Proposed Action is important to the EIS resource category analyses not only for FRA to examine the potential construction effects of this Project component, but also so FRA can examine the potential operational effects of these systems (e.g., noise and vibration from fan operations or air quality effects from diesel exhaust vented from the rail yard).
- Block End Buildings A and B will house LIRR replacement facilities. Buildings A and B will include employee changing rooms, lockers, offices, and equipment storage to support day-to-day maintenance and inspection of trains (these facilities would not support major repairs). In addition, the Proposed Action includes the construction of temporary interim block buildings as replacement facilities for existing LIRR facilities being moved to facilitate Project construction.

- The new electrical Substation MO3 for the Project Site, will be housed in Building C, which will have two stories above grade with a cellar level, and will be constructed on a solid ground portion of the Project Site. Building C will be mainly be used to house mechanical and electrical equipment. Building C will also house five emergency generators, fuel oil storage, office space and LIRR substation equipment. Besides Con Edison service connection and its associated electrical equipment, the facility will house the Medium-Voltage Substation (which will provide incoming electrical service for Western Yard for the rail operations), five emergency generators for the Eastern and Western Railyards, electrical distribution rooms and services, Western Rail Yard fire pump and fire protection valve rooms (with sprinklers), and communication systems rooms, as well as office and storage spaces associated with the above program.

TUNNEL ENCASEMENT

The Tunnel Encasement would effectively be a concrete box. The Tunnel Encasement footprint would be between 50 and 65 feet wide and between 27 and 38 feet high. It would start at the western edge of Eleventh Avenue, and extend across to the northern edge of West 30th Street underneath a portion of the High Line.[5] Construction of the Tunnel Encasement would require the underpinning of the historic elevated structure during construction. Temporary systems, such as sump pumps, lighting, and ventilation would be installed in the Tunnel Encasement to enable its construction; therefore, FRA will assess the construction effects of these systems in this EIS. No permanent operational components, such as tracks, lighting, ventilation, or electrical system would be constructed within the Tunnel Encasement as part of the Proposed Action; therefore, FRA will not assess potential effects of the operation of the Tunnel Encasement in this EIS.

D. OVERVIEW OF THIS REPORT

This Effects Assessment Methodology Report will provide the framework that FRA intends to use to evaluate potential impacts resulting from the Proposed Action. FRA will reflect any subsequent changes to analysis methodologies directly in the EIS. Setting the framework is an important aspect of understanding how the analyses will be performed and enables agencies to effectively use the EIS as a basis for other Federal, state, and local actions, such as permits. Study Area

Below is a description of the common terminology that FRA will use to assess each resource, analyze data, and characterize potential impacts throughout the EIS.

AFFECTED ENVIRONMENT

The Affected Environment is the existing natural, cultural, and social conditions of an area that are subject to change because of a proposed Federal action. The EIS will use a wide range of data sources to describe the Affected Environment within the Study Area of each resource. The data sources used to describe the Affected Environment are summarized in the methodology description for each resource.

[5] The High Line is a 1.45-mile-long elevated linear park, greenway and rail trail created on a former New York Central Railroad spur on the west side of Manhattan in New York City under jurisdiction of the New York City Department of Parks and Recreation.

The Proposed Action will be assessed during Project construction and at Project completion (operational). The Project is anticipated to be operational by 2030. Since construction and operation of the Proposed Action would take place in the future, its environmental setting is not the current environment, but instead the future environment as it would exist during Project construction and once operational. The Affected Environment will be described for each resource category by first assessing the 2019 existing conditions within the Project Study Area. In addition, extensive private development is occurring in the Project Study Area as a result of recent public policy initiatives in the area, and many sites are currently under construction with high-density developments. These private development projects will occur independently of the Project, and therefore, can be assumed to be implemented prior to the analysis year of 2030. The Affected Environment will include consideration of these private development projects in addition to the 2019 existing conditions. For documentation purposes and to identify the foundational setting of the resource category, the 2019 existing conditions will be identified as the Affected Environment Existing Conditions. The Affected Environment that includes both the 2019 existing conditions and the private development projects will be identified as the Affected Environment Future Conditions. The Affected Environment Future Conditions will serve as the resource category setting from which FRA will assess the No Action Alternative and the Proposed Action. Both Affected Environments will be documented in the EIS. To further clarify:

- Affected Environment Existing Conditions: This section of each analysis describes existing conditions as of 2019.
- Affected Environment Future Conditions: This section of each analysis describes the affected environment as it will be in the future, independent of the No Action Alternative or Proposed Action. This section of the evaluation considers the private development projects reasonably anticipated to occur in the Project.

EVALUATION OF IMPACTS

The CEQ regulations (40 CFR §§ 1500-1508) define impacts and effects that must be addressed and considered by Federal agencies in satisfying the requirements of NEPA. The CEQ also defines considerations of how to address both the context and intensity of such impacts and effects. Impacts and effects in the EIS will be characterized in the following ways:

- Direct effects are caused by the action and occur at the same time and place. This EIS will discuss how the Platform and the Tunnel Encasement would have the potential to cause direct effects on resources.
- Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems. This EIS will discuss how the Platform and the Tunnel Encasement would have the potential to cause indirect effects on resources, including the Overbuild development, which is an indirect effect of the Platform.
- Cumulative impacts are the impacts on the environment, which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. This EIS will discuss how the Platform and the Tunnel Encasement would have the potential to cause cumulative impacts to resources when combined with other similar projects.

Impacts may vary with regard to their duration, significance, and outcome. For this EIS, FRA will consider impacts and effects with the following terms where appropriate:

- Duration: The impact analyses for each alternative address operational impacts and construction impacts. Operational impacts are long-term or permanent impacts associated with the operation of the Project. They would occur for the foreseeable future. Construction impacts are associated with the construction phase of the Project and would stop with the completion of construction activities. In that sense, they are short-term or temporary impacts.
- Context and Intensity: Depending on the nature of the topic, relevant contexts include society as a whole (human, national), the affected region, the affected interests, or the locality. Intensity refers to the severity of impact and includes consideration of beneficial and adverse impacts. Intensity can be assessed using a wide range of criteria. Among these criteria are public health and safety, unique characteristics of the geographic locale, whether the action would fail to comply with applicable laws and regulations, and other considerations.

As part of the EIS impact analysis, FRA will characterize whether the impact is beneficial or adverse to the resource category:

- Beneficial impacts would result in positive outcomes to the natural or human environment.
- Adverse impacts would result in unfavorable or undesirable outcomes to the natural or human environment.

FRA will analyze and assess the potential impacts of the No Action Alternative and the Proposed Action on environmental resources, as described in this document. The No Action Alternative includes planned transportation infrastructure projects that are likely to be in place with or without the implementation of the Proposed Action. Each resource category will describe the impacts of the No Action Alternative. The No Action Alternative represents the conditions against which the effects of the Proposed Action can be measured.

As mentioned above, the potential impacts of the Proposed Action will be assessed during construction and once operational.

- Construction Conditions: For assessing temporary impacts of the Proposed Action during construction, an analysis year during the period of peak construction will be identified as the "Peak Construction Condition," and will be specified in the relevant resource chapters in the EIS. Based on the construction schedules provided by the Project Sponsors, construction activities for the Proposed Action, including construction of the Platform and its associated infrastructure, and the Tunnel Encasement, would occur over an approximately 5-year period (late 2021 to late 2026). For most resource category analyses, that entire construction period will be discussed and analyzed. However, it is possible that the year the Proposed Action's construction activity would be the most intensive could be different years for different resource categories. For example, the peak construction traffic year may not be the same as the peak construction noise or peak construction air quality analysis year; which will be determined from construction information provided by the Project Sponsors, including the construction schedules and stages, site logistics diagrams, and the way the construction equipment utilization information overlaps for each component of the Proposed Action.
- Operational Conditions: Operational impacts would be assessed for the Proposed Action once it is operational. This analysis considers the year 2030 as the timeframe when the Proposed Action would be built and operational.

In summary, the following terminology will be used in the EIS:

- Affected Environment Existing Conditions (represents current or Existing Conditions as of 2019)
- Affected Environment Future Conditions (represents the addition of ongoing and reasonably anticipated to occur private development, but not transportation projects to Affected Environment Existing Conditions)
- No Action Alternative Conditions (includes Affected Environment Future Conditions adding planned transportation projects as of 2030)
- Peak Construction Conditions (No Action Alternative and Proposed Action)
- Operational Conditions (No Action Alternative and Proposed Action in 2030)

Chapters 2 through 19 present the laws and regulations that apply to the resource under consideration, data sources to be used for establishing the affected environment, and describes the methodologies to be used for the impact assessment. Whenever applicable and practicable, the analyses have been conducted in accordance with local environmental review policies and guidance. In particular, as discussed above in Section B, FRA will, where appropriate, use methodologies consistent with the *CEQR Technical Manual*, including impact criteria to inform evaluation of the No Action Alternative and Proposed Action. ✷

Chapter 2: Land Use, Land Planning, and Property

This chapter describes how FRA will document and evaluate the consistency of the No Action Alternative and Proposed Action with existing and future land use and Land Planning codes and regulations in the EIS. The EIS will consider land use, compatibility of the Project with existing zoning and public policy goals, and the potential for land use and land planning impacts, as well as identify the need for property acquisitions or displacements for the Proposed Action. This chapter of the EIS will also focus on developing the land use information that will be used in other chapters (e.g., Transportation, Air Quality, Noise and Vibration, Cultural Resources, Parks and Recreation Areas, Socioeconomics, Coastal Zone Consistency, and Environmental Justice) to assess impacts.

A. REGULATORY CONTEXT

Following 23 CFR Part 771 and relevant CEQ guidelines, FRA's land use analysis will consider the project's potential to impact existing and planned land use and comprehensive regional planning. These analyses will be prepared using the methodology guidelines set forth in the *CEQR Technical Manual* (see Chapter 4, Section 300).

Should this project result in property acquisitions or displacements, FRA will adhere to the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, as codified in Title 42, Section 4601 et seq. of the United States Code (42 USC 4601), and the applicable implementing regulations set forth in Title 49, Part 24 of the Code of Federal Regulations (49 CFR part 24) (collectively, "the Uniform Act") with regard to relocation services, moving payments, and other allowable payments related to commercial and residential moving costs and displacement.

B. STUDY AREA

The land use, land planning and property analysis for the EIS will use a Study Area of a ½-mile radius from the Project Site, as described in Chapter 1, "Introduction." The Study Area for this resource category is the distance that, based on *CEQR Technical Manual* guidelines, defines the area in which the Proposed Action could cause impacts. The ½-mile Study Area for the land use assessment includes the Project Site and is generally bounded by West 42rd Street to the north, Eighth Avenue to the east, West 21st Street to the south, and the Hudson River to the west (see Figure 1-2, in Chapter 1, "Introduction").

C. DATA SOURCES

The data sources for this resource category will consist of existing and proposed land uses that FRA will obtain by updating the information from the prior environmental reviews using field visits and Geographic Information Systems (GIS) mapping layers, including data obtained from the New York City Department of City Planning (NYCDCP), as described in **Table 2-1**. In addition, FRA will identify ongoing and planned development and potential changes to policy or plans through coordination efforts with NYCDCP to obtain and confirm land uses, zoning, and data related to proposed development and rezoning actions that are anticipated to occur within the Study Area by 2030, the operational year of the Proposed Action.

Table 2-1
Data Sources

Analysis Area	Data Source
Land Use and Consistency with Land Use Planning and Policy	State Office of Information and Technology NYCDCP Comprehensive plans Local planning organizations Field visits
Zoning	New York City Zoning Resolution text and maps Comprehensive plans

D. ANALYSIS TECHNIQUES

The land use assessment will evaluate the compatibility of the No Action Alternative and Proposed Action with existing and proposed future land uses and public policy documents. In accordance with the guidelines in the *CEQR Technical Manual* (see Chapter 4, Section 300), FRA will evaluate local land use plans, comprehensive regional plans, and public policies (e.g., Location of City Facilities, *OneNYC 2050,*[1] and *Vision 2020*: New York City's Comprehensive Waterfront Revitalization Plan) with respect to the Proposed Action to identify any inconsistencies with these plans and public policies. The land use, land planning and property assessment in the EIS will consider all areas in which the Proposed Action could alter land uses, will identify any need for displacements or property acquisition, and will assess the consistency of the Proposed Action with public planning and policy documents. The assessment that FRA will perform for land use, land planning and property will include the following elements:

A. FRA will provide a detailed description of existing land use and will identify recent land use trends in the Study Area. In addition, FRA will identify land uses sensitive to changes in environmental conditions (i.e., noise levels or air quality), which may include housing, hospitals, schools, and other community facilities and parks.

[1] *One New York: The Plan for a Strong and Just City* (*OneNYC 2050*) is the official strategic plan of New York City for development based on "principles of growth, equity, sustainability, and resiliency." It was released in April 2015 as the successor document to *PlaNYC* and has been followed by yearly progress reports.

B. FRA will identify, describe, and graphically portray predominant land use patterns in the Study Area based on existing studies, GIS information for the area, and field surveys. FRA will describe recent land use trends and major factors influencing land use trends, as applicable, based on information that will be obtained from public agencies and private development entities, as available.

C. FRA will describe and map existing zoning and recent zoning actions in the Study Area.

D. FRA will summarize relevant public policies that apply to the Project Site and the Study Area for this resource category, such as the New York Metropolitan Transportation Council[2] (NYMTC) Transportation Improvement Program (TIP) and NYMTC's Long Range plan, *OneNYC 2050*, the New York City Waterfront Revitalization Program, Amtrak's Northeast Corridor Gateway Program, applicable Smart Growth policies, the New York City Zoning Resolution, and other identified public policies.

E. FRA will tabulate and summarize the future transportation, infrastructure, and private development projects in the Study Area that could affect future land use patterns and trends by 2030. As part of the analysis of the No Action Alternative, the EIS will consider other, independent transportation and infrastructure projects that will be implemented, or are being planned by others and appear likely to be implemented within the same timeframe as the Proposed Action. In addition, FRA will consider private development projects anticipated within the Study Area as part of defining the Affected Environment Future Condition to the extent relevant to its environmental analysis. FRA will also consider known private development projects, confirmed in collaboration with NYCDCP, in the affected environment that will be analyzed in the EIS. FRA will use this information to establish the Affected Environment Future Condition. FRA will summarize the plans for public improvements and pending zoning actions or other public policy actions as they relate to the Study Area, if any. Based on these changes, FRA will assess future land use and zoning conditions for the Affected Environment Future Condition, for the No Action Alternative, and the Proposed Action.

F. FRA will identify potential impacts of the Proposed Action during construction and operation on land use and land use trends, and consistency of the No Action Alternative and Proposed Action with local and regional plans.

G. FRA will identify potential property acquisitions or displacements resulting from the Proposed Action, and how compensation for any necessary displacements or acquisitions would comply with the statutory requirements of the Uniform Act.

[2] The New York Metropolitan Transportation Council (NYMTC) is a regional council of governments that is the metropolitan planning organization (MPO) for New York City, Long Island, and the lower Hudson Valley. N YMTC provides a collaborative planning forum to address transportation-related issues, develops regional plans, and makes decisions on the use of Federal transportation funds.

E. IMPACT CRITERIA

The EIS will describe any changes in land use or land planning that would result from the construction or operation of the Proposed Action, and describe the benefits of the Proposed Action. The analysis will compare conditions of the Proposed Action during construction and operation against the No Action Alternative to determine potential impacts of the Proposed Action. In addition, adverse effects of the Proposed Action identified and described in other chapters of the EIS (e.g., socioeconomic conditions, visual resources, public open space, transportation, and noise) will be examined for their potential adverse effects on land use and land planning.

F. MITIGATION ANALYSIS

If the Proposed Action would result in adverse impacts to land use, land planning, inconsistencies with existing public policies, or property acquisitions or displacements, the EIS will explore measures to avoid or mitigate these impacts.

G. CORRELATION WITH OTHER ANALYSES

FRA will use information from this chapter of the EIS in and to help inform several other resource category analyses. The transportation analyses will use the list of planned transportation and infrastructure projects that will be included in the No Action Alternative, as well as the planned private development projects to generate the Affected Environment Future Condition traffic networks. The Air Quality, and Noise and Vibration analyses will use land use information to identify sensitive receptors. The cultural resources analyses will use existing land use information to identify historic districts. FRA will use land use information to identify potentially affected public parks, open spaces, and recreational areas for the impact analyses of Parks and Recreation Areas. The socioeconomics resource category analyses will use land use information to identify potentially affected residential and commercial property owners. Coastal Zone Consistency will use existing land use information to identify the coastal zone and the waterfront revitalization plan boundaries. The Environmental Justice analysis will use land use information to identify potentially affected residential areas in environmental justice communities. ✷

Chapter 3: Transportation

This chapter describes the methodology that FRA will use to prepare the analysis of potential effects to transportation facilities and systems in the project Study Area from the construction and operation of the Proposed Action. This chapter of the EIS will primarily consider the potential for construction period effects of building the Proposed Action compared with No Action Alternative conditions in the anticipated Peak Construction analysis year, which will be determined as part of the EIS analysis. The Peak Construction analysis year is expected to be prior to 2026, which is the anticipated year of completion of the Platform and Tunnel Encasement. This assessment will include consideration of construction period effects of the Proposed Action on Study Area traffic, parking, public transit modes, passenger rail service and operations, bicycles, and pedestrian conditions. Once completed, the Proposed Action would not generate any demand for transportation, but it would allow for the indirect effect of constructing a privately funded mixed-use Overbuild development that was approved in 2009 (described in Chapter 1, "Introduction," and discussed in Chapter 18, "Indirect and Cumulative Impacts").

This chapter of the EIS will include a description of the Affected Environment: Existing Conditions and Peak Construction Conditions, as well as a qualitative summary assessment of the Operational Conditions in 2030, when the Proposed Action (Platform and Tunnel Encasement) is anticipated to be fully constructed. While the Proposed Action has no incremental transportation demand on completion, it does allow for the previously approved Overbuild development, which is expected to be complete in 2030 (see Chapter 18, "Indirect Effects and Cumulative Impacts"). The Operational Conditions in 2030 also account for the completion of the Overbuild development, to enable one analysis year to cover the long term permanent impacts of the Proposed Action, and the permanent indirect effects of the Overbuild. The year of peak construction activity will be finalized based on the peak levels of activity in terms of construction vehicles accessing the site and the highest concentration of construction workers arriving and departing the site.

3.1 TRAFFIC AND PARKING

This section describes the methodology that FRA will use to prepare the analysis of potential effects to vehicular traffic on roadways and parking conditions from the construction and operation of the No Action Alternative and Proposed Action.

A. REGULATORY CONTEXT

The CEQ regulations defines the effects and impacts that Federal agencies are to address and consider in satisfying the requirements of the NEPA process. The transportation modes in the Study Area are regulated and/or monitored by federal, state, and local agencies, including: FRA, FTA, NYSDOT, NYCDOT, and CEQR guidelines.

Because the Project is being undertaken in New York City, the potential for transportation impacts of the Proposed Action will be evaluated by FRA as NEPA lead agency using, to the extent practicable, guidance and methodologies set forth in the *CEQR Technical Manual* (see Chapter 16). The FRA will utilize the guidance regarding the significance of potential effects in terms of their context and intensity as established in 40 CFR 150.27.

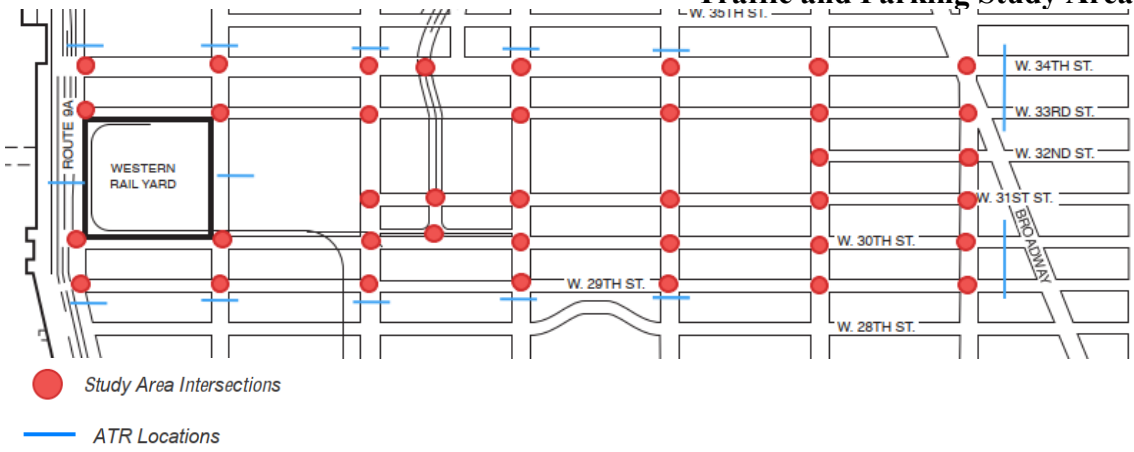
According to the *CEQR Technical Manual* (see Chapter 16, Section 200), actions proposed below 110th Street in Manhattan that would result in more than 240 residential dwelling units or 115,000 gross square feet (gsf) of office development require a traffic analysis. The Proposed Action, by itself, would not result in development exceeding these thresholds because the Platform and Tunnel Encasement would generate no new vehicular trips or parking demand. However, because the Proposed Action would involve a lengthy and intensive construction period in excess of the *CEQR Technical Manual* guidance of 24 months, FRA will undertake a traffic screening analysis, (as described below in Section E, "Analysis Techniques") involving the preparation of a Tier 1 and Tier 2 trip-generation and assignment for construction worker and truck traffic. These screening level analyses (prepared following *CEQR Technical Manual* guidelines) would be included in the Transportation chapter of the EIS to aid the narrative describing the likely changes in transportation resulting from construction of the Proposed Action. FRA would use the results of these analyses to determine if more detailed quantitative traffic analyses are necessary. Indirect impacts of the Proposed Action (i.e., the Overbuild) are discussed in Chapter 18, "Indirect Effects and Cumulative Impacts."

B. STUDY AREA

The *CEQR Technical Manual* (see Chapter 16, Section 300) guidelines suggest that intersections through which 50 or more project-generated vehicles may be expected to travel during peak periods should be analyzed as the basis for determining project impacts. Specific traffic study locations will be selected by FRA, in coordination with NYCDCP and NYCDOT, as needed.

In considering the *CEQR Technical Manual* guidelines, the Study Area for the assessment of potential traffic and parking impacts has been established that will encompass West 34th Street on the north, West 29th Street on the south, Twelfth Avenue on the west, and Sixth Avenue on the east (see **Figure 3-1**). FRA will analyze all intersections within this Study Area for potential traffic impacts using *CEQR Technical Manual* guidance (discussed in detail in Section F, below). FRA chose this Study Area by considering potential sites where construction staging or other construction activities could occur that would require lane closures or changes to traffic flow and the likely routes workers driving to or from the construction site and the haul routes that trucks would use to carry materials to, or debris from, the construction site.

Figure 3-1
Traffic and Parking Study Area



C. PEAK HOURS

Hour-by-hour estimates of the vehicular trips likely to be generated by transportation and infrastructure projects in the No Action Alternative indicate that trip generation would be greatest in the weekday AM, midday, and PM peak traffic periods. Therefore, FRA selected these peak periods for analysis of weekday traffic conditions. Weekend vehicular activity expected to be generated by construction of the Proposed Action and, while less peaked and lower in total volume than weekday trip generation, could result in traffic impacts as well. For this reason, FRA also selected the Saturday midday period for analysis. FRA will confirm peak hours with information from vehicular automated traffic recorders (ATRs) and other sources, and will conform with peak hours developed for other recent and ongoing transportation studies being conducted in the area as well, to ensure a coordinated and consistent Affected Environment Existing Condition for this Project's analyses in comparison to other ongoing studies in this part of Manhattan.

D. DATA SOURCES

Table 3-1 describes the sources of data to be used for the traffic and parking analyses.

Table 3-1
Traffic and Parking Analysis Data Sources

Analysis Area	Data Sources
Vehicular Traffic	Traffic studies, EIS documents, planning documents from Study Area agencies and projects.[1] Traffic counts conducted for this project (September 2016). Traffic information, including ATR data and bicycle counts, obtained from NYCDOT Traffic Information Management System (TIMS) database. Planned transportation services and infrastructure included in Long Range Plans of NYMTC.[2]
Parking	Parking surveys and assessments from other EAS/EIS documents and parking surveys conducted for this project (September 2016).
Data Sources Anticipated:	Empire Station Development Plan – ESD Port Authority Bus Terminal – PANYNJ CBD Tolling Program – TBTA 495 Eleventh Avenue (EIS in Progress) – NYCEDC Penn Station Master Plan – MTA 2009 Western Rail Yards FEIS[3] – NYCPC and MTA 2004 Hudson Yards FGEIS[4] – ESD Gateway Program Information – Amtrak

Available transportation data from previous studies (e.g., the Western Rail Yard 2009 SEQRA/CEQR FEIS, traffic studies, EIS documents for other developments, and agency planning documents) pertaining to the proposed Study Area will be utilized whenever possible. FRA will evaluate data that is older than three years to determine whether it is appropriate for utilization in this study. Since data collection cannot be conducted during the ongoing public health emergency, other sources of more current existing traffic network conditions will be identified to supplement older data including more recently released traffic impact studies for individual projects in or near the study are as well as network information from other ongoing projects by other agencies (most notably, the 2018 data collection and network development associated with the Port Authority of New York and New Jersey, Port Authority Bus Terminal (PABT) project, as with 2019 data from the CBT Tolling Program, and the current existing conditions under development as part of the Empire Station project which has a similar construction horizon and an overlapping Study Area) as well as NYCDOT's TIMS database. The TIMS database offers traffic data, including vehicular and pedestrian counts, collected by consultants and agencies for numerous projects from the last five years.

[1] "EIS Documents." *EIS Documents Environmental Review – NYCDCP*, www1.nyc.gov/site/planning/applicants/eis-documents.page.

[2] NYMTC, 2017, *Plan 2045: Maintaining the Vision for a Sustainable Region*, www.nymtc.org/Required-Planning-Products/Regional-Transportation-Plan-RTP.

[3] NYCDCP, 2009, *Western Rail Yard Project – Final Environmental Impact Statement*, www1.nyc.gov/site/planning/applicants/env-review/western-rail-yard.page. (2009 Western Rail Yard FEIS)

[4] Empire State Development, 2004, *2004 Hudson Yards Final Generic Environment Impact Statement*, esd.ny.gov/2004-hudson-yards-feis. (2004 Hudson Yards FGEIS)

Existing networks from other projects that overlap with the proposed Study Area, will be compared and calibrated into a reasonable Affected Environment Existing Conditions network, reflecting 2019 conditions prior to the ongoing COVID-19 public health emergency. Coordination with other ongoing projects will be undertaken to emphasize consistency of existing conditions for multiple projects, covering overlapping traffic networks. Specifically, the Empire Station project has an existing condition year of 2019 and will be used accordingly as the first layer of existing conditions network development for the Weekday AM, midday, and PM peak traffic periods. CBD Tolling and PABT projects have an existing condition year of 2018 and 2019, respectively, and will be used accordingly to update the 2016 counts originally collected for Western Rail Yards for the intersections missing from the Empire Station project network. To extrapolate Saturday midday traffic volumes, which were unavailable from the Empire Station project, FRA will calculate an extrapolation factor to use between Weekday midday and Saturday midday peak traffic periods, based on the comparison of available data from 2018 PABT and 2019 CBD Tolling ATR data sets. The project team has access, or has requested access, to this information. Geometric changes that affect travel patterns between 2016 and 2019 will be accounted for in the development and calibration of Affected Environment Existing Condition networks.

FRA will look at the opportunity to utilize continuous count data as a calibration tool, if possible and available, to analyze the Affected Environment Existing Conditions and the environmental consequences of the Proposed Action. The following field surveys will likely be required for the Proposed Project based on a review of the alternatives for the Project.

PHYSICAL ROADWAY INVENTORY

FRA will use physical inventory data on major access roadways in the Study Area to establish accurate network link characteristics to develop the traffic model. This inventory information will include the following:

- Number of travel lanes,
- Roadway and lane widths,
- Direction of travel,
- Roadway lane utilization
- Traffic control devices (signs and signals) and signal timing from NYCDOT, will be compared to field data,
- Curb parking regulations,
- Channelizations and turn prohibitions,
- Posted speed limits,
- Bicycle facilities and designated bikeways within the Study Area (i.e., Hudson River Greenway);
- Bus stop and truck loading areas; and
- Sidewalk and crosswalk widths (as applicable).

Network changes that may have resulted in changes in travel patterns between 2016 and 2019 will be documented and accounted for in the Affected Environment Existing Conditions network.

TRAFFIC COUNTS

Manual turning movement and vehicle classification counts were conducted for peak weekday time periods in September 2016. As shown above in **Figure 3-1**, red dots are those locations where turning movement counts were conducted and blue lines are locations where ATRs were placed. The hours of peak traffic levels have been preliminarily identified as 8 to 9 AM in the morning, noon to 1 PM in the midday, 5 to 6 PM in the evening, and Saturday 1 to 2 PM. Data will be checked and summarized to develop an understanding of background temporal distribution of traffic and to determine/confirm peak analysis hours. As available from existing data resources, bicycle volumes will also be obtained.

PARKING SURVEY

Public off-street facilities and legal on-street parking spaces within a ¼-mile radius of the proposed site will be inventoried, noting their locations, parking regulation, and capacities. FRA will compile the results of the parking occupancy survey conducted for the inventoried parking facilities located within the Study Area for a representative morning peak hour, such as 8 to 9 AM, and at a time of typical maximum occupancy, such as noon to 1 PM, or 1 to 2 PM. to develop current parking accumulation and occupancy data. Available parking data from more recent studies, primarily PABT, will be used to adjust the parking inventory as appropriate.

E. ANALYSIS TECHNIQUES

In accordance with CEQ's NEPA Implementing Regulations (40 CFR part 1508.27), impacts must be considered for their significance with respect to context and intensity. The EIS will assess the potential construction and operational impacts of the No Action Alternative and Proposed Action. Where potential adverse impacts are identified, mitigation to address the impacts will be developed, as appropriate and feasible.

The analysis will be prepared for vehicular traffic and parking. The discussion will be organized by mode as follows:

- Affected Environment Existing Conditions (2019 Base Year)
- Peak Construction Year No Action Alternative Conditions
- Peak Construction Year Proposed Action Conditions
- Peak Construction Year Mitigation Conditions
- 2030 Operational Conditions Summary Assessment

The analysis of construction and future impacts will utilize a range of criteria. The EIS will evaluate temporary changes to traffic and parking that may occur during the construction period of the Proposed Action and compare them to No Action Alternative for the Peak Construction Year. For traffic conditions, the following framework is anticipated for the environmental analyses.

TIER 1 AND 2 TRIP GENERATION AND ASSIGNMENT

For vehicular and parking assessment, a *CEQR Technical Manual* Tier 1 and Tier 2 Trip Generation and Assignment will be conducted. FRA will start with Tier 1 and, if necessary, move on to Tier 2; if both thresholds are met, a full analysis will be conducted as set forth in this methodology report.

Tier 1 determines the number of person-trips by mode for all analysis peak hours. A further quantified analysis would typically not be needed for a technical area if the proposed development would result in fewer than 50 peak hour vehicular trips. FRA will determine trip generation utilizing approved available trip generation rates for the Proposed Action, and available modal split characteristics for the site, or obtain data from new surveys at a comparable facility nearby within Midtown West, Manhattan.

Tier 2 assigns the calculated trips to specific intersections, bus routes, subway lines, or parking spaces. If the results of Tier 2 analysis conclude that the Proposed Action would result in 50 or more vehicle trips at a given intersection during any analysis peak hour, then additional detailed analysis will be undertaken for those affected resources. If vehicle thresholds are exceeded, the analysis would be undertaken as detailed below.[5]

AFFECTED ENVIRONMENT EXISTING CONDITIONS (IF REQUIRED)

The Affected Environment Existing Conditions (2019) for vehicular traffic, intersection geometries, and signal timings and operations will be established for the Study Area. The level of service (LOS) analysis for signalized intersections, volume/capacity (V/C) ratios, and stopped delay values, will be computed in accordance with the standard procedure prescribed in the *Highway Capacity Manual*. The Synchro 10 software accepted by NYCDOT will be used to determine traffic operations at critical intersections. Results of these analyses will be tabulated for each time period analyzed.

PEAK CONSTRUCTION YEAR NO ACTION ALTERNATIVE CONDITIONS (IF REQUIRED)

AFFECTED ENVIRONMENT FUTURE CONDITIONS

The Affected Environment Future Conditions will include the ongoing public and private development project occurring in the general project area. This is essential in determining the relative impacts to the surrounding traffic and parking networks. Affected Environment Future Conditions for vehicular traffic in the Study Area will be determined as follows:

- Affected Environment Existing Conditions will be used to project the Peak Construction Condition to the analysis year using appropriate growth factors obtained from the *CEQR Technical Manual* for local growth factors for intersections.
  - Identify additional vehicular trips and parking maneuvers expected to be generated by major private developments that have been approved, are in the process of being approved for construction, or are expected to be implemented by the Peak Construction Year in the Study Area. These trips will be added to the Affected Environment Existing Conditions data to determine the Affected Environment Future Conditions (this condition does not include any planned transportation infrastructure projects, which are considered under No Action Alternative Conditions).

[5] "Chapter 16: Transportation." *CEQR Technical Manual*, 2014, pp. 16–3-16–17.

NO ACTION ALTERNATIVE TRANSPORTATION PROJECTS

FRA will identify the No Action Alternative transportation projects, and will focus on the large-scale transportation network projects expected to be completed by the Peak Construction Analysis Year. No Action Alternative Conditions for vehicular traffic in the study are will be determined as follows:

- Identify additional vehicular trips and parking maneuvers expected to be generated by major transportation/infrastructure developments that have been approved, are in the process of being approved for construction, or are expected to be implemented by the Peak Construction Analysis year in the Study Area. These trips will be added to the volumes calculated for the Affected Environment Existing Conditions.
- Determine the potential shift in future traffic flow and transportation system conditions due to planned or committed major roadway or infrastructure improvements in the Study Area.

COMBINED NO ACTION ALTERNATIVE CONDITIONS

The combined volumes of the Affected Environment Future Conditions and No Action Alternative transportation projects will be added to the Affected Environment Existing Conditions to obtain the No Action Alternative Conditions. Traffic and parking conditions with the additional demand added to the network will be analyzed for the Peak Construction Analysis Year. A tabular summary of the No Action Alternative Conditions traffic levels will be presented, including traffic LOS, V/C, and delays.

PEAK CONSTRUCTION CONDITIONS (IF REQUIRED)

The direct effects of the construction activities of the Proposed Action on traffic and parking include changes in peak hour intersection volumes based on construction vehicles using local roadways and workers driving to and from the site. Construction effects to be analyzed also include the identification of any anticipated short-term closure of streets, sidewalk, or subway entrances and changes in parking supply and demand.

For the purposes of analyzing the reasonable worst-case development scenarios for construction, construction impacts will be evaluated for the year corresponding to the peak period of activity with the highest level of on-site workers, use of equipment, and construction vehicles arriving and departing the site.

In summary, for the Peak Construction Conditions, the traffic and parking analysis will include the following elements:

- Estimate additional trips to be generated by construction of the Proposed Alternative during the peak hours on a typical weekday and Saturday midday.
- Project-generated construction trips will be further delineated by mode, e.g., autos, walk, transit, and trucks.
- Estimate the anticipated approach and departure directional distributions of the site-generated construction traffic.
- Construction related changes to transportation network will be summarized and described (i.e., roadway closures, land or sidewalk closures, access to on- and off-street parking). These physical changes will be accounted for in the network assumptions.

- Incremental peak-hour project-generated construction trips (all modes) will be distributed to the network based on the directional distribution described above.
- No Action Alternative conditions will be combined with the site-generated construction trips to establish Peak Construction Conditions for the Proposed Action.
- Analyze the traffic and parking conditions within the Study Area for Peak Construction Conditions during the peak periods.

A tabular summary of the Peak Construction Condition for the Proposed Action will be presented, including LOS, V/C, and delays. Comparisons will be made to the results of No Action Alternative to determine potential traffic impacts.

The number of on-street parking spaces that would be temporarily eliminated due to lane or street closure will be estimated for the Peak Construction Conditions. A comparison of the No Action Alternative's parking conditions will be made to assess the potential parking impacts during construction.

2030 OPERATIONAL CONDITIONS SUMMARY ASSESSMENT

By the year 2030, the Platform and Tunnel Encasement will all be operational and, therefore, an Operational Conditions year of 2030 was chosen. All localized temporary street or sidewalk and lane closures required during construction at the Project Site would be restored. Any permanent changes to the traffic network would be described and identified.

The Proposed Action would not generate any additional traffic once operational; therefore, the EIS chapter will not include a detailed assessment for Operational Conditions in 2030, as these conditions would be the same as the No Action Alternative Conditions in 2030. The EIS will provide a qualitative summary of conditions. Indirect effects of the Proposed Action, including the Overbuild will appear in Chapter 18, "Indirect and Cumulative Impacts."

F. IMPACT CRITERIA

TRAFFIC

According to the impact criteria guidelines presented in the *CEQR Technical Manual* (see Chapter 16, Section 410), changes in conditions that can be considered adverse impacts and call for examination of mitigation occur if they result in an increase in the Proposed Action conditions of 5 or more seconds of delay in a lane group over No Action Alternative levels beyond mid-LOS D;4-second increase in delay at LOS E; and a 3-second increase in delay at LOS F. In addition, impacts requiring mitigation assessment include when levels of service deteriorate from acceptable A, B, or C in the No Action Alternative to marginally unacceptable LOS D (a delay in excess of 45 seconds, the midpoint of LOS D), or unacceptable LOS E or F in the Proposed Action conditions.

For unsignalized intersections, similar impact criteria guidelines are applicable, however for a minor street to cause a significant impact, 90 passenger car equivalents must be identified in the future with the Proposed Action in any peak hour.

As the Proposed Action will be located in New York City, FRA will use the impact guidelines presented in the *CEQR Technical Manual* to identify adverse traffic impacts for construction of the Proposed Action.

The *CEQR Technical Manual* (page 16-2) also calls for a vehicular safety assessment. However, this is not required by NEPA, and the Project Site is not located near high crash locations,[6] so this assessment will not be conducted.

PARKING

According to the *CEQR Technical Manual* (see Chapter 16, Section 450) guidelines, for proposed actions within the Manhattan Business District, the inability of the proposed action or the surrounding area to accommodate projected future parking demands would be considered a parking shortfall but is not deemed to be an adverse impact. This supports New York City policy to discourage private vehicles from coming to the Manhattan Business District. FRA will determine if the construction or operation of the Proposed Action would result in any parking shortfalls in the Study Area. Any unsatisfied demand for parking spaces during the midday peak utilization period would result in vehicles parking outside of the parking Study Area and motorists walking greater distances to their destinations. However, as parking shortfalls do not constitute adverse impacts under the *CEQR Technical Manual* guidelines, mitigation is not required.

BICYCLES (IF REQUIRED)

In addition to traffic and parking analysis, if required, a qualitative assessment will also be conducted of bicycle facilities and designated bikeways within the Study Area (e.g., Hudson River Greenway, and Ninth Avenue). Bicycle infrastructure will be inventoried throughout the Study Area for the Existing Conditions and, for the future, FRA will note future bicycle inventory available during the Peak Construction Condition and the Operational Condition analysis years. Engineering judgement, as well as possible past precedent from previous EIS documents, will be the primary driver in determining potential impact to bicycle infrastructure within the Study Area.

G. MITIGATION ANALYSIS (IF REQUIRED)

The Proposed Action construction activities will be planned and designed to minimize traffic and parking impacts to the maximum extent possible. However, if significant transportation impacts are identified (using the impact criteria discussed above) to occur during the construction phase, mitigation measures would be analyzed. For vehicular traffic, potential mitigation could include signal phasing and timing modifications, parking regulation modification, lane restriping and pavement marking changes, and street direction and other signage-oriented changes.

The mitigation assessment would include a review of the mitigation measures established in the Western Rail Yards 2009 SEQRA/CEQR FEIS or the lager comprehensive 2004 Hudson Yards FGEIS mitigation program. Mitigation elements that were approved but not yet implemented would be evaluated to see if those measures address impacts identified in this current EIS. Remaining significant impacts would be evaluated for new potential mitigation measures that could be implemented as part of this EIS. The EIS will disclose any impacts that cannot be mitigated.

[6] *Vision Zero View*, 30 June 2020, vzv.nyc/.

H. CORRELATION WITH OTHER ANALYSES

The results of the Traffic and Parking Analysis will be informed by or help inform the following investigations: Land Use, Land Planning, and Acquisitions; Air Quality, Greenhouse Gasses, and Resilience; Noise and Vibration; Socioeconomic Conditions; and Environmental Justice. These investigations will use the conclusions of the Traffic and Parking Analysis to determine if potential traffic impacts or improvements affect the outcome of their analyses.

3.2 TRANSIT AND PEDESTRIANS

This section describes the methodology that FRA will use to prepare the analysis of potential effects to pedestrian conditions and public transportation service conditions from the construction and operation of the No Action Alternative and Proposed Action.

I. REGULATORY CONTEXT

CEQ regulations define the effects and impacts that Federal agencies are to address and consider in satisfying the requirements of the NEPA process. The transportation modes in the Study Area are regulated and/or monitored by federal, state, and local agencies, including: FRA, FTA, NYSDOT, NYCDOT, and CEQR.

Because the Project is being undertaken in New York City, the potential for transportation impacts of the Proposed Action will be evaluated by FRA as NEPA lead agency using, to the extent practicable, guidance and methodologies set forth in the *CEQR Technical Manual* (see Chapter 16). The FRA will utilize the guidance regarding the significance of potential effects in terms of their context and intensity as established in 40 CFR 150.27.

According to *CEQR Technical Manual* Chapter 16, Section 200 guidelines, detailed analyses are required if a proposed action or project would generate 200 or more peak hour transit trips at a particular subway station (street stairways and control areas) or bus route. Similarly, the *CEQR Technical Manual* specifies that detailed analyses are required if a proposed action or project would generate 200 or more peak hour pedestrian trips at a particular pedestrian element.

Since the Proposed Action generates no new transit or pedestrian trips when completed, it would not result in development exceeding these thresholds and no further analysis would be needed. However, the Proposed Action would involve a lengthy and intensive construction period with hundreds of construction workers likely to arriving to and from the site on any given day with a portion of workers using transit and/or walking to the site. As a result, some level of transit and pedestrian analyses will be conducted, beginning with an initial screening analysis of trip generation and transit and pedestrian assignments to determine if construction activities would result in threshold exceedances. If the quantified analysis thresholds identified in the *CEQR Technical Manual* guidelines for pedestrian and/or transit analysis are not reached, the EIS would not include a detailed quantified evaluation of transit and pedestrian conditions.

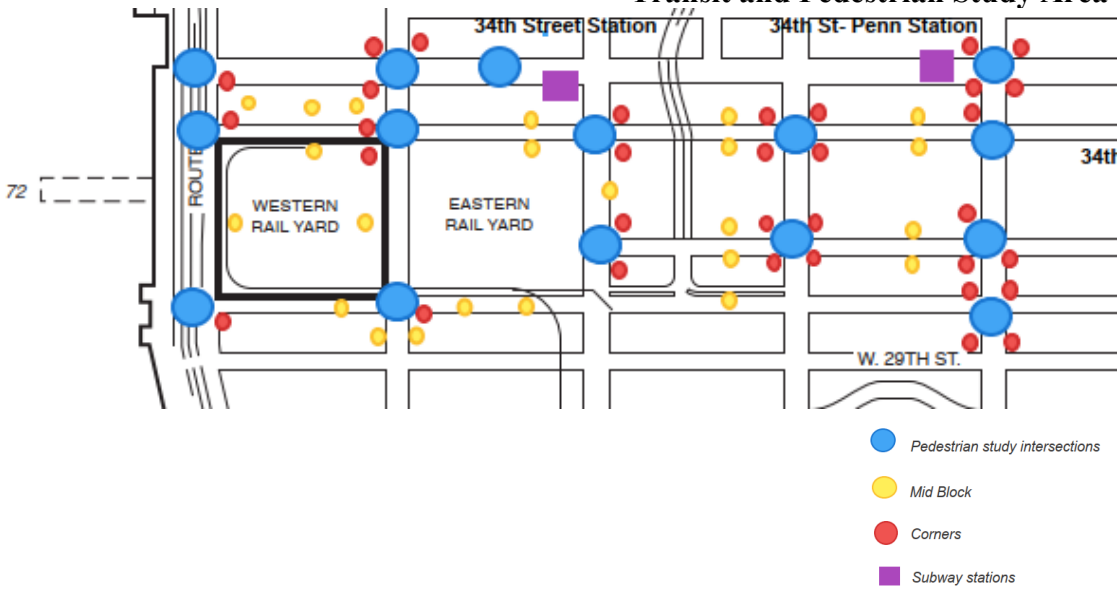
The EIS will describe any temporary or permanent changes to pedestrian circulation or transit access resulting from construction or operation of the Proposed Action. Additionally, as the Proposed Action is being undertaken in an active LIRR rail yard, any potential construction period effects to the railyard operations will be described and analyzed. Specific transit and pedestrian study locations will be selected by FRA, in coordination with NYCDCP and NYCDOT, as needed.

Potential impacts resulting from the Proposed Action will be identified using the methodology established in the *CEQR Technical Manual*, as outlined below.

J. STUDY AREA

If additional analysis is required, the Study Area for the assessment of potential transit and pedestrian impacts will encompass West 33rd on the north, West 30th Street on the south, Twelfth Avenue on the west, and Eighth Avenue on the east (see **Figure 3-2**). The Study Area includes walking routes between the Project Site and the nearest subway stations, bus stops, and New York Penn Station.

Figure 3-2
Transit and Pedestrian Study Area



K. DATA SOURCES

FRA will obtain information on existing and future transit services, operations and passenger volumes from the transportation service operators including: Amtrak, NJ TRANSIT, the Port Authority of New York and New Jersey (PANYNJ), MTA, LIRR, New York City Transit (NYCT), NYSDOT, NYCDOT, and bus service operators (private carriers, such as Mega Bus and GoBus, and NYCT). In addition, NYMTC will be contacted to review the listing of transportation projects in the adopted long-range transportation plan that are in or expected to affect the Study Area. **Table 3-2** describes the sources of data to be used in the transit and pedestrian analyses.

Table 3-2
Transit and Pedestrian Analysis Data Sources

Analysis Area	Data Sources
Transit	Passenger counts conducted within subway stations for this project. Transit studies, EIS documents, planning documents from Study Area agencies and projects.[7] Public transportation service operators (NYCT, Amtrak, NJ TRANSIT, LIRR). Planned transportation services and infrastructure included in the NYMTC Long Range Plan.[8]
Pedestrians	Pedestrian counts and physical inventories collected for this Project (September 2016). Pedestrian studies, EIS documents, planning documents from Study Area agencies and projects.
Data Sources Anticipated:	Empire State Development Network Development – ESD Port Authority Bus Terminal – PANYNJ CBD Tolling – PANYNJ 495 Eleventh Avenue (EIS in Progress) – NYCEDC Penn Station Master Plan – MTA 2009 Western Rail Yards FEIS[9] – NYCPC and MTA 2004 Hudson Yards FGEIS[10] – ESD Gateway (DEIS)

TRANSIT

Existing transit services providing access to the Project Site include the following: MTA NYCT subway lines, MTA NYCT bus routes, NJ TRANSIT and MTA LIRR commuter rail services operating from Penn Station, Amtrak intercity passenger rail services also operating from Penn Station, and the New York Waterways ferries operating from Pier 78 at 39th Street.

Pedestrian volume counts were conducted on subway station elements for the Proposed Action in September 2016 at the new Eleventh Avenue–34th Street Station on the No. 7 line and at the 34th Street station on the Eighth Avenue subway line served by the A, C, and E lines. Routes within the stations that project-generated transit passengers are expected to use to access platforms were identified and counts were conducted on key elements along those routes. In the Eleventh Avenue station counts were conducted at two escalator banks and their associated inclined elevators, and on three stairways connecting the mezzanine to the single platform. At the Eighth Avenue station, counts were conducted at one street stair and five internal stairways.

[7] "EIS Documents." *EIS Documents Environmental Review – DCP*, www1.nyc.gov/site/planning/applicants/eis-documents.page.

[8] NYMTC, 2017, *Plan 2045: Maintaining the Vision for a Sustainable Region*, www.nymtc.org/Required-Planning-Products/Regional-Transportation-Plan-RTP.

[9] DCP, 2009, *Western Rail Yard Project- Final Environmental Impact Statement*, www1.nyc.gov/site/planning/applicants/env-review/western-rail-yard.page. (2009 Western Rail Yard FEIS)

[10] Empire State Development, 2004, *2004 Hudson Yards Final Generic Environment Impact Statement*, esd.ny.gov/2004-hudson-yards-feis. (2004 Hudson Yards FGEIS)

Data on the existing public transportation services and infrastructure will be obtained from the transit service operators for the Affected Environment Existing Conditions (2019) to match field observations collected for the CBD Tolling project. Data on forecasted ridership changes and planned future services will be requested from the transit service operators. In addition, data on future plans will be obtained from the Study Area's MPOs, NYMTC and NJTPA.

MTA LIRR and NYCT subway and bus within the Study Area are among the services to be examined for construction, operational, or secondary impacts in the EIS. LIRR services share PSNY platforms and tracks with NJ TRANSIT and Amtrak trains and could be affected by changes to NJ TRANSIT or Amtrak service.

Trip data for 2019 will also be collected from TNCs, such as Lyft, Uber, as well as bikeshare such as Citi Bike, with the goal of calculating the numbers of trips originating and ending within the Study Area.

PEDESTRIANS

Pedestrian volume counts were conducted for the Proposed Action in September 2016. Locations where project-generated pedestrian activity is expected to affect circulation were identified and counted. Pedestrian counts were conducted at 15 intersections (corners and crosswalks) and at 23 midblock sidewalk locations in the area between Twelfth Avenue on the west, Eighth Avenue on the east, 30th Street on the south, and 33rd Street on the north. Measures will be made of the critical dimensions of sidewalks and crosswalks in the Study Area, including items that affect circulation on the sidewalks such as light and signal poles, fire hydrants, doorways, waste baskets and other items.

The Empire Station project has an existing condition year of 2019 and will be used accordingly as the first layer of the Affected Environment Existing Conditions network development for the AM, midday, and PM peak traffic periods for Eighth Avenue intersections. The 2016 pedestrian counts will be updated and calibrated with new available data for all intersections west of Eighth Avenue. Additional available pedestrian data from previous studies (e.g., pedestrian studies, EIS documents for other developments, and agency planning documents) pertaining to the proposed Study Area will be reviewed for use as appropriate. Coordination with other ongoing projects will be undertaken to emphasize consistency of existing conditions for multiple projects, including pedestrian networks where they overlap. FRA will combine data from the 2016 pedestrian counts and 2018 PABT crosswalk counts and conduct a pedestrian trip assignment for buildings that have opened since those counts to estimate Affected Environment Existing Conditions pedestrian volumes. Changes to sidewalks and crosswalks between 2016 and 2019 will be accounted for in the development of the Affected Environment Existing Conditions pedestrian networks.

To extrapolate Saturday midday traffic volumes, which were unavailable from Empire Station project, FRA will calculate a comparison factor between Weekday midday and Saturday midday based on the comparison of available data from 2018 PABT and 2019 CBD Tolling data sets. The project team has access, or has requested access, to this information. Geometric changes that affect travel patterns between 2016 and 2019 will be accounted for in the development and calibration of the Affected Environment Existing Conditions pedestrian networks.

L. ANALYSIS TECHNIQUES

In accordance with CEQ's NEPA Implementing Regulations (40 CFR part 1508.27), impacts must be considered for their significance with respect to context and intensity. The EIS will assess the potential construction and operational impacts of each alternative. Where potential adverse impacts are identified, mitigation to address the impacts will be developed, as appropriate and feasible.

Tier 1 and 2 Trip Generation and Assignment Assessment to determine if further analysis is required. If necessary, the following will be completed. The transportation impacts analysis will be prepared for transit and pedestrians. The discussion will be organized by mode as follows:

- Affected Environment Existing Conditions (2019)
- Peak Construction Year No Action Alternative Conditions
- Peak Construction Year Proposed Action Conditions
- Peak Construction Year Mitigation Conditions
- 2030 Operational Conditions Summary Assessment

TIER 1 AND 2 TRIP GENERATION AND ASSIGNMENT

For both transit and pedestrian assessment, a *CEQR Technical Manual* Tier 1 and Tier 2 Trip Generation and Assignment will be conducted. FRA will start with Tier 1 and, if necessary, move on to Tier 2; if both thresholds are met, a full analysis will be conducted as set forth in this methodology report.

Tier 1 determines the number of person-trips by mode for all analysis peak hours. A further quantified analysis would typically not be needed for a technical area if the proposed development would result in fewer than 200 peak hour subway/rail or bus transit riders, or 200 peak hour pedestrian trips. FRA will determine trip generation utilizing approved available trip generation rates for the Proposed Action, and available modal split characteristics for the site, or obtain data from new surveys at a comparable facility nearby within Midtown West, Manhattan.

Tier 2 assigns the calculated trips to specific intersections, bus routes, subway lines, or parking spaces. If the results of Tier 2 analysis conclude that the Proposed Action would result in pedestrian elements with 200 or more pedestrian trips, 50 or more bus trips in a single direction on a single route, or 200 or more passengers at a subway station or on a subway line during any analysis peak hour, then additional detailed analysis will be undertaken for those affected resources. If transit or pedestrian thresholds are exceeded, the analysis would be undertaken as detailed below.[11]

[11] "Chapter 16: Transportation." *City Environmental Quality Review Technical Manual*, 2014, pp. 16–3-16–17.

TRANSIT (IF REQUIRED)

For analysis of public transportation modes, the evaluation criteria will include changes to capacity and ridership at stations and on transit routes serving the site. Line haul capacity and volumes on the Number 7 subway and on key bus routes serving the Project Site will be analyzed. Commuter railroads and ferries are not expected to be significantly affected by operation of the project so detailed analysis for those services is not expected. Analyses of transit conditions will be conducted for weekday AM and PM peak time periods.

AFFECTED ENVIRONMENT EXISTING CONDITIONS

Using the pedestrian counts conducted on select station elements in the 34th Street–Hudson Yards (Eleventh Avenue) and 34th Street–Penn Station (Eighth Avenue) stations, a LOS analysis will be conducted for key elements within those stations in accordance with procedures described in the *CEQR Technical Manual* (see Chapter 16, Section 352). Results of these analyses will be tabulated for each time period analyzed. Additional use of 34th Street–Penn Station is not expected to encourage a look at ridership on the A, C and E lines, nor for the No. 7 line to warrant analysis of transfer at Times Square–42nd Street and potential bottlenecks within the station.

Utilizing data obtained from NYC Transit for subway and bus, the status of existing services will be reviewed to identify current service patterns and passenger loading. A line-haul analysis will be performed to assess current passenger loading conditions on the No. 7 subway line and the M11, M12, and M34 bus routes.

PEAK CONSTRUCTION YEAR NO ACTION ALTERNATIVE CONDITIONS

Affected Environment Future Conditions

Forecasted ridership changes and planned projects in the Study Area will be reviewed to identify changes that will impact public transportation services and infrastructure in the Study Area. This will include:

- Identify additional transit trips expected to be generated by developments that are under construction, have been approved, are in the process of being approved, or are expected to be implemented by the Peak Construction Condition analysis year in the Study Area. These trips will be assigned to detailed routes within the two subway stations serving the area and will be added to the Affected Environment Existing Condition volumes. Bus trips generated by the project will be assigned to specific bus routes by direction.
- Determine physical changes to transit facilities due to projects currently under construction, committed, planned or projected in the Study Area.

No Action Alternative Transportation Projects

Forecasted ridership changes and planned transportation and infrastructure projects in the Study Area will be reviewed to identify changes that will impact public transportation services and infrastructure in the Study Area. This will include:

- Identify additional transit trips expected to be generated by transportation/infrastructure developments that are under construction, have been approved, are in the process of being approved, or are expected to be implemented by the Peak Construction Condition analysis year in the Study Area. These trips will be assigned to detailed routes within the two subway stations serving the area and will be added to the Affected Environment Existing Condition volumes. Bus trips generated by the project will be assigned to specific bus routes by direction.
- Determine physical changes to transit facilities due to transportation/infrastructure projects currently under construction, committed, planned or projected in the Study Area. In particular, the Moynihan Station project will affect access to commuter rail and Amtrak services within the Study Area. Although it would not be used by most project-related customers, a planned new northern entrance at the 34th Street–Eleventh Avenue subway station would shift some volumes from the existing southern entrance to that station.

Combined No Action Alternative Conditions

The combined ridership changes of the Affected Environmental Future Conditions and No Action Alternative Transportation projects will be added to the Affected Environment Existing Conditions to obtain the No Action Alternative Conditions. The study will analyze the transit conditions within the Study Area for the No Action Alternative during the three weekday peak periods as well as the Saturday midday peak period according to methods described in the *CEQR Technical Manual* (see Chapter 16, Section 353). These analyses will include level-of-service analysis for subway station elements and line-haul analyses for the No. 7 subway and three bus routes.

PEAK CONSTRUCTION YEAR PROPOSED ACTION CONDITIONS

Based on the Tier 1 and Tier 2 Trip Generation and Assignment analysis described above, transit trips generated by the Proposed Action will be assessed and assigned to specific subway stations and bus routes as appropriate serving the Study Area.

Level of service analysis will be conducted for the No Action Alternative and Proposed Action using methods described in the *CEQR Technical Manual* (see Chapter 16, Section 354).

Construction of the Proposed Action is not expected to significantly affect crowding on the subway or rail services in the Study Area. Traffic construction impacts may adversely affect local bus (M11, M12, and M34) and intercity bus (Mega Bus, GoBus) routes that have stops near the construction area. Mitigation plans will be put in place to maintain bus service reliability. Any required relocations of bus stops will be identified.

Any potential effects on operations in the LIRR Western Rail Yard during construction of the Proposed Action will be identified and addressed qualitatively. Construction effects on the rail yard would be temporary, limited to the portion of construction when foundation and first tier structural works are underway, and would be expected to occur during off-peak hours and or in accordance with approved track outage plans and schedules, to minimize impacts to rail operations.

2030 OPERATIONAL CONDITIONS SUMMARY ASSESSMENT

By the year 2030, the Platform and Tunnel Encasement will all be operational and, therefore, an Operational Conditions year of 2030 was chosen. All localized temporary street, sidewalk, or transit entrance closures or restrictions required during construction at the Project Site would be restored. Any permanent changes to the transit network expected to be in place by 2030 would be identified and described.

The Proposed Action would not generate any additional transit trips once operational; therefore, the EIS chapter will not include a detailed assessment for the Operational Condition Analysis Year (2030). The EIS chapter will provide a qualitative summary of conditions. Indirect effects of the Proposed Action, including the Overbuild, will appear in Chapter 18, "Indirect and Cumulative Impacts."

PEDESTRIANS (IF REQUIRED)

For analysis of pedestrian conditions, the following framework is anticipated for the environmental analyses. Pedestrian analyses will be conducted for the weekday AM, midday, PM, and Saturday midday peak time periods.

AFFECTED ENVIRONMENT EXISTING CONDITIONS

The Affected Environment Existing Conditions for pedestrian volumes, sidewalk and crosswalk dimensions, and crosswalk signal timings will be established for the Study Area. A pedestrian LOS analysis will be conducted for key pedestrian elements (sidewalks, corners, and crosswalks) in accordance with procedures described in the *CEQR Technical Manual* (see Chapter 16, Section 363). Results of these analyses will be tabulated for each time period analyzed.

PEAK CONSTRUCTION YEAR NO ACTION ALTERNATIVE CONDITIONS

Affected Environment Future Conditions

Future conditions without the Proposed Action are essential in determining the relative impacts to the surrounding pedestrian circulation and the communities using these facilities, the analysis will include:

- Identify additional pedestrian trips expected to be generated by developments (not transportation/infrastructure) that are under construction, have been approved, are in the process of being approved, or are expected to be implemented by the Peak Construction condition analysis year in the Study Area. These trips will be assigned to detailed routes in the area and added to the Affected Environment Existing Conditions volumes.
- Determine potential physical changes to pedestrian facilities due to said projects currently under construction, committed, planned or projected in the Study Area. As several current construction projects have temporarily closed sidewalks in the area, those sidewalks will be assumed to reopen in their future configuration and pedestrian volumes will be distributed to them.
- As all or most of the growth in pedestrian activity in the Study Area will derive from known development projects that are planned or underway, no background growth factor will be applied.

No Action Alternative Transportation Projects

No Action Alternative major transportation projects will also be identified and changes in pedestrian demand or circulation patterns resulting from these projects will be integrated into the analysis, including:

- Identify additional pedestrian trips expected to be generated by transportation/infrastructure projects that are under construction, have been approved, are in the process of being approved, or are expected to be implemented by the Peak Construction condition analysis year in the Study Area. These trips will be assigned to detailed routes in the area and added to the existing volumes.
- Determine potential physical changes to pedestrian facilities due to said projects currently under construction, committed, planned or projected in the Study Area. As several current construction projects have temporarily closed sidewalks in the area, those sidewalks will be assumed to reopen in their future configuration and pedestrian volumes will be distributed to them.
- As all or most of the growth in pedestrian activity in the Study Area will derive from known development projects that are planned or underway, no background growth factor will be applied.

Combined No Action Alternative Conditions

The combined pedestrian volumes and changes to the circulation patterns from the Affected Environment Future Conditions and No Action Alternative Transportation Projects will be added to the Affected Environment Existing Conditions to obtain the No Action Alternative Conditions. The study will identify the incremental change associated with the combined Peak Construction Year No Action Alternative for the pedestrian Study Area.

PEAK CONSTRUCTION CONDITIONS

During the Peak Construction Year, the movement of primarily construction workers to and from the job site during peak shift changes and breaks will add demand to the pedestrian network at and near the Project Site. These trips will be estimated and added to the network's combined No Action Alternative to determine the incremental changes in volume and level of service. In addition, construction of activities may require temporary constriction or closure of sidewalks and crosswalks adjacent to the site, which would be incorporated into the pedestrian analysis.

Maintenance and Protection of Traffic plans, which will include provisions for temporary sidewalk width reductions or closures, will be developed by the Project Sponsor for approval by NYCDOT. The construction condition will be analyzed for pedestrian conditions in terms of changes to sidewalk width and availability. Where significant existing pedestrian volumes would be diverted to the opposite side of a street due to a sidewalk closure, the sidewalk on the opposite side would be analyzed for the effects of increased pedestrian traffic.

Pedestrian trips generated by the Peak Construction of the Proposed Action will be assessed and assigned to detailed routes within the Study Area. It is anticipated that the Platform, associated infrastructure, and Tunnel Encasement will not generate future operational period pedestrian trips and, therefore, a zero-net change in pedestrian trips compared to the No Action Alternative is expected.

2030 OPERATIONAL CONDITIONS SUMMARY ASSESSMENT

By the year 2030, the Platform and Tunnel Encasement will all be operational and, therefore, an Operational Conditions year of 2030 was chosen. All localized temporary street, sidewalk, or transit entrance closures, restrictions, or changes required during construction at the Project Site would be restored. Any permanent physical changes to sidewalks and crosswalks associated with the Proposed Action will be identified and described.

The Proposed Action would not generate any additional pedestrian trips once operational; therefore, the EIS chapter will not include a detailed assessment for the Operational Condition Analysis Year (2030). The EIS will provide a qualitative summary of conditions. Indirect effects of the Proposed Action, including the Overbuild, will appear in Chapter 18, "Indirect and Cumulative Impacts."

M. IMPACT CRITERIA

TRANSIT – SUBWAY STAIRWAY AND PASSAGEWAY

The *CEQR Technical Manual* (see Chapter 16, Section 420) evaluates transit conditions for stairways and passageways in terms of the minimum width increment threshold (WIT) based on the minimum amount of additional capacity that would be required to restore conditions to either their No Action Alternative v/c ratio or to a v/c ratio of 1.00 (LOS C/D), whichever is greater. Stairways that are substantially degraded in level of service or which experience the formation of extensive queues from project generated demand would typically be considered as impacts once the thresholds shown in **Table 3-3** are reached or exceeded.

Table 3-3
Stairway and Passageway Impact Criteria

	WIT for Significant Impact (inches)	
Build Alternative v/c	Stairway	Passageway
1.00–1.09	8	13
1.10–1.19	7	11.5
1.20–1.29	6	10
1.30–1.39	5	8.5
1.40–1.49	4	6
1.50–1.59	3	4.5
1.60 and up	2	3

Source: 2014 *CEQR Technical Manual*, Table 16-11

TRANSIT – SUBWAY LINE HAUL

Increases in per car load levels that remain within NYCT subway car loading guidelines ("guideline capacity") are not considered as generating impacts. A projected Proposed Action increase from the No Action Alternative that exceeds guideline capacity is considered an impact pursuant to *CEQR Technical Manual* guidance of an increase of five or more transit riders per car or if the route is projected to operate under capacity in the No Action Alternative and overcapacity in the with the Proposed Action.

TRANSIT – BUS ROUTES

According to the *CEQR Technical Manual* and NYCT guidelines, additional bus service along a route is recommended when load levels exceed maximum capacity at the route's maximum load point. NYCT's general policy is to provide additional bus service where demand warrants increased service, considering financial and operational constraints.

PEDESTRIAN

The determination of significant pedestrian impacts is generally based on comfort and convenience characteristics of pedestrian flow and safety considerations. According to the *CEQR Technical Manual*, average pedestrian space on a sidewalk under the Proposed Action with an acceptable LOS C or better (greater than 31.5 SF/P) is not considered an impact in CBD areas. If the average pedestrian space under the No Action Alternative is between 6.4 and 39.2 SF/P, then the determination of whether impacts are identified for the Proposed Action should be determined using the formula in **Table 3-4**, shows a sliding-scale that identifies what decrease in pedestrian space is considered an impact for a given amount of pedestrian space.

Table 3-4
Sidewalk Impact Criteria for CBD Location with Platooned Flow

Baseline Condition Pedestrian Space (sf/ped)*	Build Alternative(s) Condition Ped Flow Increment to be Considered a Significant Impact (sf/ped)*
>39.2	Build Alternative Condition < 31.5
38.7 to 39.2	Reduction ≥ 3.8
37.8 to 38.6	Reduction ≥ 3.7
36.8 to 37.7	Reduction ≥ 3.6
35.9 to 36.7	Reduction ≥ 3.5
34.9 to 35.8	Reduction ≥ 3.4
34.0 to 34.8	Reduction ≥ 3.3
33.0 to 33.9	Reduction ≥ 3.2
32.1 to 32.9	Reduction > 3.1
31.1 to 32.0	Reduction > 3.0
30.2 to 31.0	Reduction > 2.9
29.2 to 30.1	Reduction > 2.8
28.3 to 29.1	Reduction > 2.7
27.3 to 28.2	Reduction > 2.6
26.4 to 27.2	Reduction > 2.5
25.4 to 26.3	Reduction > 2.4
24.5 to 25.3	Reduction > 2.3
23.5 to 24.4	Reduction > 2.2
22.6 to 23.4	Reduction > 2.1
21.6 to 22.5	Reduction > 2.0
20.7 to 21.5	Reduction > 1.9
19.7 to 20.6	Reduction > 1.8
18.8 to 19.6	Reduction > 1.7
17.8 to 18.7	Reduction > 1.6
16.9 to 17.7	Reduction > 1.5
15.9 to 16.8	Reduction > 1.4
15.0 to 15.8	Reduction > 1.3
14.0 to 14.9	Reduction > 1.2
13.1 to 13.9	Reduction > 1.1
12.1 to 13.0	Reduction > 1.0
11.2 to 12.0	Reduction > 0.9
10.2 to 11.1	Reduction > 0.8
9.3 to 10.1	Reduction > 0.7
8.3 to 9.2	Reduction > 0.6
7.4 to 8.2	Reduction > 0.5
6.4 to 7.3	Reduction > 0.4
< 6.4	Reduction > 0.3

Note: * sf/ped = square feet per pedestrian

According to the *CEQR Technical Manual*, average pedestrian space in a corner or crosswalk under the Proposed Action that is at an acceptable LOS C or better (greater than 19.5 SF/P) is not considered an impact in CBD areas. If the average pedestrian space under the No Action Alternative is between 5.1 and 21.5 SF/P, then the determination of whether the impact is considered significant under the Proposed Action would be determined using the formula in **Table 3-5**, shows a sliding-scale that identifies what decrease in pedestrian space is considered an impact for a given amount of pedestrian space.

Table 3-5
Crosswalk and Corner Impact Criteria for CBD Location

Baseline Condition Pedestrian Space (sf/ped)*	Build Alternative(s) Condition Ped Space Reduction to be Considered Significant Impact (sf/ped)*
>21.5	Build Alternative Condition < 19.5
21.3 to 21.5	Reduction ≥ 2.1
20.4 to 21.2	Reduction ≥ 2.0
19.5 to 20.3	Reduction ≥ 1.9
18.6 to 19.4	Reduction ≥ 1.8
17.7 to 18.5	Reduction ≥ 1.7
16.8 to 17.6	Reduction ≥ 1.6
15.9 to 16.7	Reduction ≥ 1.5
15.0 to 15.8	Reduction ≥ 1.4
14.1 to 14.9	Reduction ≥ 1.3
13.2 to 14.0	Reduction ≥ 1.2
12.3 to 13.1	Reduction ≥ 1.1
11.4 to 12.2	Reduction ≥ 1.0
10.5 to 11.3	Reduction ≥ 0.9
9.6 to 10.4	Reduction ≥ 0.8
8.7 to 9.5	Reduction ≥ 0.7
7.8 to 8.6	Reduction ≥ 0.6
6.9 to 7.7	Reduction ≥ 0.5
6.0 to 6.8	Reduction ≥ 0,4
5.1 to 5.9	Reduction ≥ 0.3
< 5.1	Reduction ≥ 0.2

Note: * sf/ped = square feet per pedestrian

The *CEQR Technical Manual* (page 16-2) also calls for pedestrian and bicycle safety assessments. This is not required by NEPA, and the project is not near high crash locations,[12] so this will only be conducted if requested.

N. MITIGATION ANALYSIS (IF REQUIRED)

The Proposed Action and its construction and phasing plan will be designed to minimize public transit and pedestrian impacts to the maximum extent possible. Potential impacts from the construction phase of the Proposed Action may include short-term changes that would be coordinated with the public transportation operator during off-peak periods. For pedestrian operations during construction, potential mitigation could include low cost readily implementable measures such as signal phasing and timing modifications, lane restriping, and pavement marking changes.

[12] Vision Zero View, 30 June 2020, vzv.nyc/.

However, if significant transportation impacts are identified (using the impact criteria discussed above) to occur during the construction phase, mitigation measures would be analyzed. This would include a review of the mitigation measures originally established in the 2009 Western Rail Yards SEQRA/CEQR FEIS or the lager comprehensive 2004 Hudson Yards FGEIS mitigation program. Mitigation elements that were approved but not yet implemented would be evaluated to see if they would address identified impacts from this current EIS. Remaining adverse impacts would be evaluated for new potential mitigation measures that could be implemented as part of this EIS. The EIS will disclose any impacts that cannot be mitigated.

O. CORRELATION WITH OTHER ANALYSES

The Transit and Pedestrian Analysis is interrelated with the following investigations: Land Use; Socioeconomic Conditions; and Environmental Justice. These investigations will use the conclusions of the Transit and Pedestrian Analysis to determine if potential impacts or improvements affect the outcome of their analyses. ✷

4.1 AIR QUALITY

Emissions from stationary sources, mobile sources, and construction sources, all have the potential to affect air quality. This chapter describes how FRA will assess the effects of the No Action Alternative and the Proposed Action on air quality in the EIS. As described in Chapter 1, "Introduction," the Proposed Action will include the construction of a Platform over the Western Rail Yard, including the installation of associated mechanical equipment related to life safety and ventilation components of the Platform and LIRR operations and service facilities, and the extension of a railroad right-of-way preservation Tunnel Encasement (which would run on a diagonal alignment from Eleventh Avenue to 30th Street). The potential for local air quality impacts resulting from stationary and construction source will be assessed at sensitive locations within a study area extending to at least 400 feet from the Project Site. The Study Area for mobile sources will be directly related to the Study Area used for the construction transportation analysis.

This chapter also describes how FRA will estimate the effects of the Proposed Action on greenhouse gas emissions (GHG) in the EIS, and will discuss the Proposed Action's conformity to the current New York City and New York State emission reduction goals and policies as laid out in *OneNYC 2050* and the Climate Leadership and Community Protection Act, respectively. Finally, this chapter describes how FRA will assess the effect of climate change on the Proposed Action in the EIS, in terms of resilience to severe weather events under future conditions affected by climate change, and the effect of the Proposed Action on climate change by evaluating GHG emissions generated by the construction and operation of the Proposed Action. This analysis focuses on the total emissions associated with the construction and operation of new uses to be introduced as part of the Proposed Action, and on the effect of measures to reduce those emissions.

A. POLLUTANTS FOR ANALYSIS

Air quality is primarily affected by air pollutants emitted from both mobile (e.g., motor vehicles and locomotives) and stationary (e.g., fixed facilities) sources. Ambient concentrations of carbon monoxide (CO) are predominantly influenced by mobile source emissions. Particulate matter (PM), volatile organic compounds (VOCs), and nitrogen oxides (nitric oxide [NO] and nitrogen dioxide [NO_2]), collectively referred to as NO_x) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NO_x, sulfur oxides (SO_x), ammonia, organic compounds, and other gases react or condense in the atmosphere. Emissions of sulfur dioxide (SO_2) are associated mainly with stationary sources, and some sources utilizing non-road diesel such as large international marine engines. On-road diesel vehicles currently contribute very little to SO_2 emissions since the sulfur content of on-road diesel fuel, which is federally regulated, is extremely low. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs. Ambient concentrations of CO, PM, NO_2, SO_2, ozone, and lead are regulated by the U.S. Environmental Protection Agency (USEPA) under the Clean Air Act (CAA), and are referred to as 'criteria pollutants'; emissions of precursors (i.e., VOCs, NO_x, and SO_2) to criteria pollutants are also regulated by USEPA.

In general, much of the heavy equipment used in construction is powered by diesel engines that have the potential to produce relatively high levels of NO_x and PM emissions. Dust generated by construction activities is also a source of PM. Gasoline engines produce relatively high levels of CO. Since the USEPA mandates the use of ultra-low sulfur diesel (ULSD) fuel for all highway and non-road diesel engines, SO_x emitted from the construction activities associated with the Proposed Action would be negligible. Therefore, the pollutants to be analyzed for the construction period are NO_2, which is a component of NO_x that is a regulated pollutant, particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and CO.

CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles.[1] CO concentrations can diminish rapidly over relatively short distances; elevated concentrations are usually limited to locations near crowded intersections, heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be predicted on a local, or microscale, basis.

NITROGEN OXIDES, VOCS, AND OZONE

NO_x are of principal concern because of their role, together with VOCs, as precursors in the formation of ozone. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are advected downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The effects of NO_x and VOC emissions from all sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions.

[1] Sher, Eran. Handbook of Air Pollution from Internal Combustion Engines – Pollutant Formation and Control, 1998.

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a regulated pollutant. Since NO_2 is mostly formed from the transformation of NO in the atmosphere, it has mostly been of concern further downwind from large permanent stationary point sources, and not a local concern from mobile sources or temporary/intermittent construction sources. (NO_x emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO_2 at the source.) However, with the 2010 1-hour average standard for NO_2, local sources such as construction emissions may become of greater concern for this pollutant, and will be qualitatively evaluated for the Proposed Action.

LEAD

Airborne lead emissions are currently associated principally with industrial sources. Lead in gasoline has been banned under the Clean Air Act, and therefore, lead is not a pollutant of concern for this project. Therefore, an analysis of this pollutant is not warranted.

RESPIRABLE PARTICULATE MATTER—PM_{10} AND $PM_{2.5}$

PM is a broad class of air pollutants that includes discrete particles of a wide range of sizes and chemical compositions, as either liquid droplets (aerosols) or solids suspended in the atmosphere. The constituents of PM are both numerous and varied, and they are emitted from a wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of naturally occurring VOCs; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and material from live and decaying plant and animal life; particles eroded from beaches, soil, and rock; and particles emitted from volcanic and geothermal eruptions and from forest fires. Naturally occurring PM is generally greater than 2.5 micrometers in diameter. Major anthropogenic sources include the combustion of fossil fuels (e.g., vehicular exhaust, power generation, boilers, engines, and home heating), chemical and manufacturing processes, all types of construction, agricultural activities, as well as wood-burning stoves and fireplaces. PM also acts as a substrate for the adsorption (accumulation of gases, liquids, or solutes on the surface of a solid or liquid) of other pollutants, often toxic, and some likely carcinogenic compounds.

As described below, PM is regulated in two size categories: $PM_{2.5}$ and PM_{10}, (which includes $PM_{2.5}$). $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that adsorb[2] to the surfaces of the particles, and is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from combustion material that has volatilized and then condensed to form primary PM (often soon after the release from a source exhaust) or from precursor gases reacting in the atmosphere to form secondary PM.

Diesel-powered vehicles, especially heavy duty trucks and buses, are a significant source of respirable PM, most of which is $PM_{2.5}$; PM concentrations may, consequently, be locally elevated near roadways with high volumes of heavy diesel powered vehicles, which are also sources of emissions due to brake and tire wear and fugitive road dust.

[2] Adsorption is the adhesion of atoms, ions, or molecules from a gas, liquid, or dissolved solid to a surface.

SULFUR DIOXIDE

SO_2 emissions are primarily associated with the combustion of sulfur-containing fuels (oil and coal). SO_2 is also of concern as a precursor to $PM_{2.5}$ and is regulated as a $PM_{2.5}$ precursor under the New Source Review permitting program for large sources. Due to the federal restrictions on the sulfur content in diesel fuel for on-road and non-road vehicles, no significant quantities are emitted from vehicular sources.

B. REGULATORY CONTEXT

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the CAA (42 U.S.C. § 7401 et seq.), primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for six major air pollutants: CO, NO_2, ozone, respirable PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect the public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary and secondary standards are the same for NO_2 (annual), ozone, lead, and PM, and there is no secondary standard for CO and the 1-hour NO_2 standard. The NAAQS are presented in **Table 4-1**. The NAAQS for CO, annual NO_2, and 3-hour SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only. New York State also has standards for total suspended particles, settleable particles, non-methane hydrocarbons, 24-hour and annual SO_2, and ozone which correspond to federal standards that have since been revoked or replaced, and for the noncriteria pollutants beryllium, fluoride, and hydrogen sulfide.

In 2008, an 8-hour ozone standard of 0.075 parts per million (ppm) was established, and the previous 1997 8-hour ozone standard was fully revoked effective April 1, 2015. Effective December 2015, USEPA lowered the 2008 ozone NAAQS, from 0.075 ppm to 0.070. USEPA issued final area designations for the revised standard on April 30, 2018.

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS

The CAA, as amended in 1990, defines non-attainment areas (NAA) as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non-attainment by USEPA, the state is required to develop and implement a State Implementation Plan (SIP), which delineates how a state plans to achieve air quality that meets the NAAQS under the deadlines established by the CAA, followed by a plan for maintaining attainment status once the area is in attainment.

In 2002, USEPA re-designated the New York City as in attainment for CO. The area is part of the New York–Northern New Jersey–Long Island, NY–NJ–CT CO maintenance area. Under the resulting maintenance plans, New York is committed to implementing site-specific control measures throughout the city to reduce CO levels, should unanticipated localized growth result in elevated CO levels during the maintenance period. The second CO maintenance plan for the region was approved by USEPA on May 30, 2014.

Table 4-1
National Ambient Air Quality Standards (NAAQS)

Pollutant	Primary ppm	Primary µg/m³	Secondary ppm	Secondary µg/m³
Carbon Monoxide (CO)				
8-Hour Average	9(1)	10,000	None	
1-Hour Average	35(1)	40,000		
Lead				
Rolling 3-Month Average	NA	0.15	NA	0.15
Nitrogen Dioxide (NO_2)				
1-Hour Average(2)	0.100	188	None	
Annual Average	0.053	100	0.053	100
Ozone (O_3)				
8-Hour Average(3)	0.070	140	0.070	140
Respirable Particulate Matter (PM_{10})				
24-Hour Average(1)	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean(4)	NA	12	NA	15
24-Hour Average(5)	NA	35	NA	35
Sulfur Dioxide (SO_2)				
1-Hour Average(6)	0.075	196	NA	NA
Maximum 3-Hour Average(1)	NA	NA	0.50	1,300

Notes:

ppm – parts per million (unit of measure for gases only)

µg/m³ – micrograms per cubic meter (unit of measure for gases and particles, including lead)

NA – not applicable

All annual periods refer to calendar year.

Standards are defined in ppm. Approximately equivalent concentrations in µg/m³ are presented.

[1] Not to be exceeded more than once per year (on average over 3 years for PM_{10}).

[2] 3-year average of the annual 98th percentile daily maximum 1-hr average concentration.

[3] 3-year average of the annual fourth highest daily maximum 8-hr average concentration.

[4] 3-year average of annual mean.

[5] Not to be exceeded by the annual 98th percentile when averaged over 3 years.

[6] 3-year average of the annual 99th percentile daily maximum 1-hr average concentration.

Source: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards

Manhattan had been designated as a moderate NAA for PM_{10}. USEPA clarified on July 29, 2015 that the non-attainment designation only applied to the revoked annual standard.

The five New York City counties and Nassau, Suffolk, Rockland, Westchester, and Orange Counties had been designated as a $PM_{2.5}$ NAA (the New York–Northern New Jersey–Long Island, NY–NJ–CT NAA) since 2004 under the CAA due to exceedance of the 1997 annual average standard, and were also nonattainment with the 2006 24-hour $PM_{2.5}$ NAAQS since November 2009. The area was redesignated as in attainment for that standard effective April 18, 2014, and is now under a maintenance plan. As stated above, USEPA lowered the annual average primary standard to 12 µg/m³, effective March 2013. USEPA designated the area as in attainment for the 12 µg/m³ NAAQS, effective April 15, 2015.

Effective June 15, 2004, USEPA designated Nassau, Rockland, Suffolk, Westchester, and the five New York City counties (NY portion of the New York–Northern New Jersey–Long Island, NY-NJ-CT NAA) as a "moderate" NAA for the 1997 8-hour average ozone standard. In March 2008, USEPA strengthened the 8–hour ozone standards, but certain requirements remain in areas that were either nonattainment or maintenance areas for the 1997 ozone standard ('anti-backsliding'). USEPA designated the same NAA as a "marginal" NAA for the 2008 ozone NAAQS, effective July 20, 2012. On April 11, 2016, as requested by New York State, USEPA reclassified the area as a "moderate" NAA. On July 19, 2017, the New York Department of Environmental Conservation (NYSDEC) announced that the New York Metro Area (NYMA) is not projected to meet the July 20, 2018 attainment deadline and therefore requested that USEPA reclassify the NYMA to "serious" nonattainment. USEPA reclassified the NYMA from "moderate" to "serious" NAA, effective September 23, 2019, which imposes a new attainment deadline of July 20, 2021 (based on 2018–2020 monitored data). On April 30, 2018, USEPA designated the same area as a moderate NAA for the revised 2015 ozone standard. SIP revisions are due by August 3, 2021.

New York City is currently in attainment of the annual average NO_2 standard. USEPA designated the entire state of New York as "unclassifiable/attainment" for the 1-hour NO_2 standard effective February 29, 2012. Since additional monitoring is required for the 1-hour standard, areas will be reclassified once three years of monitoring data are available.

USEPA has established a 1-hour SO_2 standard, replacing the former 24-hour and annual standards, effective August 23, 2010. In December 2017, USEPA designated the entire State of New York as in attainment for this standard with the exception of Monroe County, which was designated "unclassifiable".

Table 4-2 summarizes the attainment status in New York City.

Table 4-2
Attainment Status in New York City

Pollutant	Averaging Period	Attainment Status
Carbon Monoxide (CO)	1-Hour, 8-Hour	Attainment[1]
Particulate Matter (PM_{10})	24-Hour	Nonattainment (Moderate)
Fine Particulate Matter ($PM_{2.5}$)	Annual, 24-Hour	Attainment[2]
Ozone (O_3)	8-Hour	Nonattainment (Serious)
Nitrogen Dioxide (NO_2)	Annual, 1-Hour	Attainment, Unclassified
Sulfur Dioxide (SO_2)	1-Hour	Attainment

Notes:

[1] USEPA redesignated the New York City Metropolitan area as in attainment for the 1-hour and 8-hour CO NAAQS in 2002. The area is currently under a second maintenance plan.

[2] USEPA redesignated the New York area as in attainment for the 1997 annual and 24-hour NAAQS effective April 18, 2014. The area is now under maintenance plans.

CONFORMITY WITH STATE IMPLEMENTATION PLANS

The conformity requirements of the CAA and regulations promulgated thereunder (conformity requirements) limit the ability of federal agencies to assist, fund, permit, and approve transportation projects in non-attainment areas that do not conform to the applicable SIP.

Conformity of federal actions related to transportation plans, programs, and projects which are developed, funded, or approved under title 23 U.S.C. or the Federal Transit Act (49 U.S.C. 1601 et seq.) must be addressed according to the requirements of 40 CFR Part 93 Subpart A (federal transportation conformity regulations); all other federal actions are regulated under Subpart B of the same section (federal general conformity regulations).

An area's Metropolitan Planning Organization (MPO), together with the State, are responsible for demonstrating conformity with respect to the SIP on metropolitan long-range transportation plans and TIPs. USEPA must then concur with such conformity determinations. USDOT has final approval of conforming plans and TIPs. Transportation projects included in the TIP, by definition, conform to the SIP.

The general conformity requirements apply to those federal actions in non-attainment or maintenance areas where the action's direct and indirect emissions have the potential to impact one or more of the six criteria pollutants or their precursor pollutants at rates equal to or exceeding the prescribed rates. In New York City, the prescribed annual rates are 50 tons of VOCs and NO_x (ozone precursors, ozone serious NAA in transport region), 100 tons of CO (CO maintenance area), 100 tons of PM_{10} (PM_{10} moderate NAA) and 100 tons of $PM_{2.5}$, SO_2, or NO_x ($PM_{2.5}$ and precursors in $PM_{2.5}$ maintenance area).

The regulation assumes that a proposed federal action whose criteria pollutant emissions have already been included in the local SIP's attainment or maintenance demonstrations conforms to the SIP.

In addition to region-wide (mesoscale) emissions, conformity regulations also include provisions to ensure that local impacts do not cause or exacerbate exceedances of the NAAQS.

Each federal agency taking action is responsible, separately, for assessing and determining, if required, conformity of its action. For the Proposed Action, the lead agency is FRA and general conformity applies to the project. Therefore, region-wide emissions will be calculated on an annual basis for each year of the Proposed Action's construction period.

The Proposed Action would include the operation of five (5) emergency diesel generators that operate intermittently to provide emergency power to critical functions in the WRY, including the ventilation system, in the event of a power failure. Three (3) generators, each rated at 2,500 kilowatts (kW), would serve the WRY project, while two (2) generators, each rated at 2,000 kW, would provide service to the Eastern Rail Yard site, replacing two (2) existing diesel generators, with the new generators located near the WRY generators. The new generators will be equipped with selective catalytic reduction for control of nitrogen oxides (NO_x). The generators will operate intermittently for short periods for testing and maintenance. Therefore, annual emissions are anticipated to be well below the prescribed rates under general conformity and no further assessment is warranted. However, the construction air quality analysis will include any potential period of overlap between construction activities and operation of the emergency engines as well as address emissions and/or hot spot analyses, as applicable under the general conformity requirements.

The local air quality analyses described below, undertaken for NEPA disclosure purposes, will also serve to demonstrate compliance with conformity hotspot requirements, if applicable.

C. ANALYSIS METHODOLOGY

OPERATIONAL AIR QUALITY

The air quality analysis of the No Action Alternative and the Proposed Action will assess the potential for air quality impacts associated with emission sources.

The primary emissions that may need to be evaluated are emissions associated with fossil fuel-fired systems that are part of the Proposed Action. This may include potential fossil fuel-fired equipment and infrastructure related to life safety and ventilation components of the Platform and its associated infrastructure (such as venting of diesel locomotive emissions from the area below the Platform).

Life safety equipment is generally intended to operate in the event of an actual emergency involving the loss of utility electrical power, or for periodic testing for short periods of time to ensure the reliability and availability of the equipment in the event of an actual emergency. If required, a quantitative analysis of this equipment will be performed, as discussed in this section.

The dual-mode (diesel-electric) locomotives entering and leaving Penn Station will continue to operate in diesel mode under the proposed Platform in the Western Rail Yard. Diesel-fueled delivery, maintenance, and garbage trucks will also continue to operate in the yard. The proposed mechanical ventilation system that is a component of the Proposed Action, will exhaust these emissions above the Platform.

An analysis will be conducted to determine whether the potential impacts of these emissions would adversely impact air quality, as described in detail below.

EMISSION RATES AND STACK PARAMETERS

Emission rates will be estimated based on the types and sizes of engines operating in the future as well as anticipated daily train schedules.

Short-term and annual emission rates would be estimated based on estimated fuel consumption for specific equipment. Fuel consumption associated with the Platform's emission sources will be based on designs of the life safety and ventilation components of the Platform and available equipment information.

Stack parameters (stack height, diameter) will be obtained from available design information. The exhaust temperature for the below-grade ventilation system will be assumed to be 68°F.

AERMOD ANALYSIS

Potential air quality impacts will be evaluated using the USEPA American Meteorological Society/Environmental Protection Agency Regulated Model (AERMOD) Version 19191.[3] AERMOD is a state-of-the-art dispersion model, applicable to rural and urban areas, flat and complex terrain, surface and elevated releases, and multiple sources (including point, area, and volume sources). AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and includes handling of terrain interactions. The AERMOD model calculates pollutant concentrations from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability to calculate pollutant concentrations at locations where the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures. The analysis of potential impacts from exhaust stacks was performed assuming stack tip downwash, urban dispersion and surface roughness length, with and without building downwash, and elimination of calms. The AERMOD model also incorporates the algorithms from the PRIME model, which is designed to predict impacts in the "cavity region" (i.e., the area around a structure which under certain conditions may affect an exhaust plume, causing a portion of the plume to become entrained in a recirculation region). The Building Profile Input Program (BPIP) program for the PRIME model (BPIPRM) will be used to determine the projected building dimensions modeling with the building downwash algorithm enabled. The modeling of downwash from sources accounts for all obstructions within a radius equal to five obstruction heights of the stack.

METHODOLOGY UTILIZED FOR ESTIMATING NO_2 CONCENTRATIONS

Annual NO_2 concentrations from stationary sources will be estimated assuming that all NO_x emitted by these operations is fully transformed to NO_2, following USEPA's Tier 1 guidance.

EPA has developed further guidance for assessing 1-hour average NO_2 concentrations for compliance with the NAAQS in their March 1, 2011 Clarification memo.[4] This guidance, along with guidance from the California Air Pollution Control Officers Association (CAPCOA),[5] will be used to develop representative 1-hour background concentrations based on the latest three years of monitored NO_2 1-hour concentrations. The seasonal backgrounds will be added to the predicted concentrations to determine total NO_2 concentrations. Consistent with USEPA and NYSDEC guidance, the third highest value from each season (a maximum of 90–92 days) and the hour-of-day averaged over the latest three years of monitored concentrations (2017–2019) will be used for the representative background concentration from the Queens College background monitoring station. The seasonal hour-of-day concentrations are determined by organizing all of the NO_2 1-hour concentrations by the hour of the day (1 AM, 2 AM, 3 AM, etc.) for each season of the year in descending order and selecting the third highest NO_2 concentrations for each hour of the day and season. The values are then averaged over the latest three years of monitored concentrations to develop representative background concentrations for each season and hour-of-day combination.

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[3] USEPA. *User's Guide for the AMS/EPA Regulatory Model (AERMOD)*. Office of Air Quality Planning and Standards. USEPA-454/B-19-027. Research Triangle Park, North Carolina. August 2019.

[4] USEPA Memorandum, "Additional Clarification Regarding Application of Appendix W, Modeling Guidance for the 1-Hour NO_2 National Ambient Air Quality Standard," March 1, 2011.

[5] Modeling Compliance of the Federal 1-Hour NO_2 NAAQS", CAPCOA Guidance Document, October 27, 2011, http://www.valleyair.org/busind/pto/Tox_Resources/CAPCOANO2GuidanceDocument10-27-11.pdf

Total 1-hour NO_2 concentrations will be determined following the USEPA "Tier 3" modeling approach referenced in 40 CFR Part 51, Appendix W. The methodology is based on adding representative seasonal hour-of-day background concentrations to modeled concentrations, as follows: hourly modeled concentrations from pollutant sources are first added to the appropriate seasonal hourly background monitored concentrations from the Queens College background monitoring station; then the highest combined daily 1-hour NO_2 total concentration are determined at each location; then the 98th percentile of daily 1-hour maximum concentration for each modeled year is calculated within the AERMOD model at each location; finally the 98th percentile concentrations are averaged over the latest five years of metrological data at each location represent the modeled impact result at each location.

One-hour average NO_2 concentration increments from the stationary sources will be estimated using AERMOD's Plume Volume Molar Ratio Method (PVMRM) module to analyze chemical transformation within the model. The PVMRM module incorporates hourly background ozone concentrations to estimate NO_x transformation within the source plume. Ozone concentrations will be taken from the NYSDEC Queens College monitoring station, which is the nearest ozone monitoring station with a complete five years of hourly data available (2015–2019). Initial NO_2 to NO_x ratio at a source exhaust stack will be assumed for combustion using USEPA's database of in-stack ratios[6] for specific equipment, which is considered representative. If no appropriate source can be determined, a default ratio of 50 percent will be used.[7]

METEOROLOGICAL DATA

The meteorological data set will consist of five consecutive years of meteorological data provided by NYSDEC, with surface data collected at LaGuardia Airport, and concurrent upper air data collected at Brookhaven, New York. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year period.

RECEPTOR PLACEMENT

Discrete receptors (i.e., locations at which concentrations are calculated) are modeled along the existing and proposed building façades to represent potentially sensitive locations such as operable windows and intake vents. Rows of receptors at spaced intervals on the modeled buildings will be analyzed at multiple elevations. Receptors will also be placed at publicly accessible ground-level locations, including sidewalks and open spaces. A map showing the locations of all receptors used in the modeling will be included in the EIS documentation.

[6] USEPA. *NO_x /NO_2 In-Stack Ratio (ISR) Database.* https://www.epa.gov/scram/nitrogen-dioxidenitrogen-oxide-stack-ratio-isr-database

[7] USEPA Memorandum, "Additional Clarification Regarding Application of Appendix W, Modeling Guidance for the 1-Hour NO_2 National Ambient Air Quality Standard," March 1, 2011

Background Concentrations

To estimate the maximum expected total pollutant concentrations, the calculated impacts from the emission sources must be added to a background value that accounts for existing pollutant concentrations from other sources (see **Table 4-3**). The background levels are based on concentrations monitored at the nearest NYSDEC ambient air monitoring stations over the most recent three-year period for which data are available (2017–2019), with the exception of annual NO_2, which is based on five years of data, consistent with current DEP guidance (2015–2019). For the 24-hour PM_{10} concentration the highest of the second-highest measured value over the three-year period will be used, consistent with applicable guidance. $PM_{2.5}$ impacts are assessed on an incremental basis and will be compared with the *CEQR Technical Manual* $PM_{2.5}$ *de minimis* criteria (see Chapter 12, Section 412). The $PM_{2.5}$ 24-hour average background concentration of 19.67 µg/m^3 (based on the 98th percentile concentrations, averaged over 2017 to 2019 was used to establish the *CEQR Technical Manual de minimis* value.

Table 4-3
Maximum Background Pollutant Concentrations

Pollutant	Average Period	Location	Concentration (µg/m^3)	NAAQS (µg/m^3)
NO_2	1-hour	IS 52, Bronx	110.6	188
	Annual	IS 52, Bronx	37.9	100
$PM_{2.5}$	24-hour	Division Street, Manhattan	19.67	35
	Annual	Division Street, Manhattan	9.0	12
PM_{10}	24-hour	Division Street, Manhattan	38	150

Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2015–2019.

CONSTRUCTION AIR QUALITY

Emissions from on-site construction equipment and on-road construction vehicles, as well as dust-generating construction activities, have the potential to affect air quality. The analysis of potential construction air quality impacts will include an analysis of the Proposed Action for both on-site and on-road sources of air emissions, and the combined impact of both sources, where applicable. The analysis will address both local (microscale) and regional (mesoscale) construction period emissions.

The following section outlines the general methodology for the air quality analysis to be undertaken in the EIS. Depending on the peak construction activity, its duration, intensity, distances to nearby sensitive receptors (i.e., residences, open spaces, etc.), and effects of on-road traffic, the construction air quality assessment will contain a detailed qualitative discussion of emissions, a quantitative analysis, or a combination of both. The construction periods with activities closest to sensitive receptors and with the most intensive activities and highest emissions will be selected as the worst-case periods for analysis.

CONSTRUCTION MICROSCALE ANALYSIS (DETAILED QUALITATIVE ANALYSIS)

For a qualitative analysis, emissions will be estimated from construction equipment and vehicles. The analysis will then include a qualitative review of the projected activity and equipment in the context of emissions intensity, duration, and location relative to nearby sensitive receptors; and identify any project-specific control measures required to further reduce the effects of construction on air quality and to eliminate any adverse air quality impacts. Strategies to reduce impacts may include:

- *Clean Fuel.* ULSD fuel would be used exclusively for all diesel engines throughout the construction site.
- *Diesel Equipment Reduction.* Electrically powered equipment such as welders and saws would be used over diesel-powered versions of that equipment, to the extent feasible and practicable.
- *Dust Control Measures.* To minimize dust emissions from construction activities, a dust control plan, including a watering program, would be required as part of contract specifications. For example, all trucks hauling loose material would be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the Project Site and water sprays would be used for all demolition, excavation, and transfer of soils to ensure that materials would be dampened as necessary to avoid the suspension of dust into the air;
- *Idling Restriction.* As required by local law, all stationary vehicles on roadways adjacent to the Project Site would be prohibited from idling for more than three minutes. The idling restriction excludes vehicles that are using their engines to operate a loading, unloading, or processing device (e.g., concrete-mixing trucks) or otherwise required for the proper operation of the engine.
- *Engine Retrofits.* Non-road diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract with the Proposed Action), including but not limited to, concrete mixing and pumping trucks would utilize the best available technology (BAT) (e.g., diesel particulate filters) for reducing diesel particulate matter emissions.
- *Utilization of Newer Equipment.* USEPA's Tier 1 through 4 standards for non-road engines regulate the emission of criteria pollutants from new engines, including PM, CO, NO_x, and hydrocarbons (HC). All diesel-powered non-road construction equipment with a power rating of 50 hp or greater would meet at least the Tier 3[8] emissions standard. *Source Location.* In order to reduce the resulting concentration increments at sensitive receptor locations such as residential buildings and publicly accessible open spaces, large emissions sources and activities such as concrete trucks and pumps would be located away from these locations to the extent practicable.

[8] The first federal regulations for new non-road diesel engines were adopted in 1994, and signed by USEPA into regulation in a 1998 Final Rulemaking. The 1998 regulation introduces Tier 1 emissions standards for all equipment 50 hp and greater and phases in the increasingly stringent Tier 2 and Tier 3 standards for equipment manufactured in 2000 through 2008. In 2004, the USEPA introduced Tier 4 emissions standards with a phased-in period of 2008 to 2015. The Tier 1 through 4 standards regulate the USEPA criteria pollutants, including PM, HC, NO_x and CO. Prior to 1998, emissions from non-road diesel engines were unregulated. These engines are typically referred to as Tier 0.

CONSTRUCTION MICROSCALE ANALYSIS (QUANTITATIVE ANALYSIS)

For a quantitative analysis, concentrations will be predicted using dispersion models to determine the potential for air quality impacts during on-site construction activities and due to construction-generated traffic on local roadways. Concentrations for each pollutant of concern due to construction activities at each sensitive receptor will be predicted during the most representative worst-case time period(s). The potential for significant adverse impacts will be determined by comparing modeled concentrations to NAAQS, and modeled increments to applicable *CEQR Technical Manual de minimis* thresholds (see Chapter 12, Section 412). As with the detailed qualitative analysis approach described above, the quantitative analysis will identify any project-specific control measures required to reduce the effects of construction and to eliminate any significant adverse air quality impacts.

Section 4.1C, "Operational Air Quality," above, contains a review of the general methodology for stationary and mobile source air quality analyses. Additional details relevant only to the construction air quality analysis methodology are presented in the following section.

On-Site Construction Activity Assessment

To determine which construction periods constitute the worst-case periods for the pollutants of concern (PM, CO, NO_2), construction-related emissions will be calculated for each calendar year throughout the duration of construction on a rolling annual and peak day basis for $PM_{2.5}$. $PM_{2.5}$ is selected for determining the worst-case periods for all pollutants analyzed, because the ratio of predicted $PM_{2.5}$ incremental concentrations to impact criteria is anticipated to be higher than for other pollutants. Therefore, initial estimates of $PM_{2.5}$ emissions throughout the construction years will be used for determining the worst-case periods for analysis of all pollutants. Generally, emission patterns of PM_{10} and NO_2 would follow $PM_{2.5}$ emissions, since they scale with diesel engine horsepower. CO emissions may have a somewhat different pattern but would also be anticipated to be highest during periods when the most activity would occur. Based on the resulting multi-year profiles of annual average and peak day average emissions of $PM_{2.5}$, and the proximity of the construction activities to residences and publicly accessible open spaces, worst-case short-term and annual periods for construction will be identified for dispersion modeling of annual and short-term (i.e., 24-hour, 8-hour, and 1-hour) averaging periods. Dispersion of the relevant air pollutants from the construction sites during these periods will then be analyzed. Broader conclusions regarding potential concentrations during non-peak construction periods, which will not be modeled, will be presented as well, based on the multi-year emissions profiles and the modeled peak period results.

Engine Emissions

The sizes, types, and number of units of construction equipment will be estimated based on the construction activity schedule developed for the Proposed Action. Emission rates for NO_X, CO, PM_{10}, and $PM_{2.5}$ from truck engines will be developed using the USEPA Motor Vehicle Emission Simulator (MOVES2014b) emission model.[9] Emission factors for NO_x, CO, PM_{10}, and $PM_{2.5}$ from on-site construction engines, which include exhaust and crankcase emissions, will be developed using the NONROAD emission module included in the MOVES2014b emission model.

[9] USEPA, Motor Vehicle Emission Simulator (MOVES), User Guide for MOVES2014a, November 2015.

Dust Emissions

In addition to engine emissions, dust emissions from construction activities (e.g., excavation, grading, and transferring of excavated materials into dump trucks) will be calculated based on USEPA procedures delineated in AP-42 Table 13.2.3-1.[10]

Analysis Periods

As discussed above, the construction periods with activities closest to sensitive receptors and with the most intense activities and highest emissions will be selected as the worst-case periods for analysis.

Source Simulation

For short-term model scenarios (predicting concentration averages for periods of 24 hours or less), all stationary sources, such as compressors, pumps, or concrete trucks, which idle in a single location while unloading, will be simulated as point sources. Other engines, which would move around the site on any given day, will be simulated as area sources. For periods of 8 hours or less (less than the length of a shift), it will be assumed that all engines would be active simultaneously. All sources would move around the site throughout the year and will therefore be simulated as area sources in the annual analyses.

On-Road Sources Assessment

Since emissions from on-site construction equipment and on-road construction-related vehicles may contribute to concentration increments concurrently, on-road emissions adjacent to the construction sites will be included with the on-site AERMOD dispersion analysis (in addition to on-site truck and non-road engine activity) to address all local project-related emissions cumulatively.

CONSTRUCTION MESOSCALE ANALYSIS (QUANTITATIVE ANALYSIS)

The pollutants of concern on a regional basis are CO, PM_{10}, $PM_{2.5}$, NO_x, SO_2, and VOCs. Emissions from on-road construction trucks and worker vehicles and from non-road construction equipment will be calculated on an annual basis for each year of the Proposed Action's construction period based on the emissions modeling procedures described above for the microscale analysis.

D. DATA SOURCES

Air quality-sensitive receptor locations will be identified based on a review of the 2020 MapPLUTO 20v4 land use maps. Rail operation data, the preliminary construction schedule, and the construction means and methods information (i.e., construction logistics, equipment projection, etc.) necessary for the air quality analyses will be provided by the Project Sponsor's design team. In addition, background pollutant concentrations and local meteorological data used in the air quality analyses and calculations will be obtained from established government sources. **Table 4-4** describes the sources of data to be used in the air quality analyses.

[10] USEPA, Compilations of Air Pollutant Emission Factors AP-42, Fifth Edition, Volume I: Stationary Point and Area Sources, Ch. 13.2.1, NC, http://www.epa.gov/ttn/chief/ap42, January 2011.

Table 4-4
Air Quality Analyses Data Sources

Resource	Data Source
Receptor Locations	Review of MapPLUTO Land Use Maps
Local Meteorological Data	National Weather Service Stations (LaGuardia Airport for this Manhattan site); concurrent upper air data collected at Brookhaven, New York
Meteorological Data Preprocessing	USEPA AERMET Model
Background Pollutant Concentrations	New York State Department of Environmental Conservation (NYSDEC)
Existing and Proposed Action Future Conditions	Project Sponsor Design Team
Construction Schedule and Means and Methods	Project Sponsor Design Team

E. IMPACT CRITERIA

The *CEQR Technical Manual* state that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[11] In terms of the magnitude of air quality impacts, any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS (see **Table 4-4**) at an individual receptor would be deemed to have a potential adverse impact. In addition, in order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in NAAs, threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential adverse impact, even in cases where violations of the NAAQS are not predicted.

CO *DE MINIMIS* CRITERIA

New York City has developed *de minimis* criteria to assess the significance of the increase in CO concentrations that would result from the impact of Proposed Projects or actions on mobile sources, as set forth in Chapter 17, Section 412.1 of the *CEQR Technical Manual*. These criteria set the minimum change in CO concentration that defines a significant environmental impact. Significant increases of CO concentrations in New York City are defined as: (1) an increase of 0.5 ppm or more in the maximum 8-hour average CO concentration at a location where the predicted No Action 8-hour concentration is equal to or between 8 and 9 ppm; or (2) an increase of more than half the difference between the No Action Alternative concentrations and the 8-hour standard, when No Action concentrations are below 8.0 ppm.

$PM_{2.5}$ DE MINIMIS CRITERIA

The *CEQR Technical Manual de minimis* criteria, as described in Chapter 17, Section 412.2 and currently employed for determination of potential significant adverse $PM_{2.5}$ impacts, are as follows:

[11] New York City. *CEQR Technical Manual*. Chapter 1, section 222. March 2014

- Predicted increase of more than half the difference between the background concentration and the 24-hour standard; or
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.1 $\mu g/m^3$ at ground level on a neighborhood scale (i.e., the annual increase in concentration representing the average over an area of approximately 1 square kilometer, centered on the location where the maximum ground-level impact is predicted for stationary sources; or at a distance from a roadway corridor similar to the minimum distance defined for locating neighborhood scale monitoring stations); or
- Annual average $PM_{2.5}$ concentration increments that are predicted to be greater than 0.3 $\mu g/m^3$ at a discrete or ground level receptor location.

Actions under CEQR predicted to increase $PM_{2.5}$ concentrations by more than the CEQR *de minimis* criteria above will be considered to have a potential significant adverse impact.

While the Proposed Action is not subject to CEQR as a Federal action, FRA will use the above CEQR *de minimis* criteria to evaluate the potential for $PM_{2.5}$ impacts and determine the need to minimize particulate matter emissions resulting from the Proposed Action.

POTENTIAL MITIGATION MEASURES

If the operation and/or construction of the Proposed Action would result in adverse impacts on air quality, the EIS will explore measures to mitigate these impacts to the greatest extent practicable. For operational impacts, mobile source impacts could occur due to traffic generated by the Proposed Action, which would require an examination of traffic mitigation measures to reduce congestion at critical intersections. For stationary sources of emissions, mitigation may include restrictions on fuel type, stack heights and locations on fossil fuel fired heating and hot water equipment. As discussed above, for temporary construction impacts, mitigation may include, for example, use of ULSD, diesel equipment reduction, engine retrofits, utilization of newer equipment that meets specified USEPA tier emission standards, location of equipment away from sensitive uses, idling restrictions, and dust control measures.

F. CORRELATION WITH OTHER ANALYSES

The air quality analysis will use land use information to identify sensitive receptors. The air quality mobile source analysis will use traffic data such as existing traffic counts, projected future growth in traffic, and other information developed as part of the construction traffic analysis for the Proposed Action. To the extent that any adverse air quality impacts are identified, that information would be used to determine if the Proposed Action would have any disproportionate impacts on environmental justice populations.

4.2 GREENHOUSE GAS EMISSIONS AND RESILIENCE

As discussed in NYSDEC policy[12] and the *CEQR Technical Manual*,[13] climate change is projected to have wide-ranging effects on the environment, including rising sea levels, increases in temperature, and changes in precipitation levels. Although this is occurring on a global scale, the environmental effects of climate change are also likely to be felt at the local level. The United States, New York State, and New York City have all established sustainability initiatives and goals for greatly reducing GHG emissions and for adapting to climate change.

This chapter identifies the proposed methodology that FRA will use in the EIS for assessing climate change in relation to the Proposed Action, comprising two sections: (1) the effect of the Proposed Action on climate change by evaluating GHG emissions generated by the construction and operation of the Proposed Action and its consistency with the state and city GHG reduction goals and/or policies, and (2) the effect of climate change on the Proposed Action in terms of resilience to severe weather events under future conditions affected by climate change.

G. REGULATORY CONTEXT

GREENHOUSE GASES OF CONCERN

GHGs are those gaseous constituents of the atmosphere, both natural and anthropogenic, which absorb and emit radiation at specific wavelengths within the spectrum of infrared radiation emitted by the Earth's surface, the atmosphere, and clouds. This phenomenon causes the general warming of the Earth's atmosphere, also known as the "greenhouse effect." Water vapor, carbon dioxide (CO_2), nitrous oxide (N_2O), methane, and ozone are the primary greenhouse gases in the Earth's atmosphere.

There are also a number of entirely anthropogenic greenhouse gases in the atmosphere, such as halocarbons and other chlorine- and bromine-containing substances, which also damage the stratospheric ozone layer (and contribute to the "ozone hole"). Since these compounds are being replaced and phased out due to the 1987 Montreal Protocol, there is no need to address them in GHG assessments for most projects. Although ozone is technically a greenhouse gas, it does not need to be assessed as such at the project level since tropospheric levels are already being controlled as a criteria pollutant. Similarly, water vapor is of great importance to global climate change, but is not directly of concern as an emitted GHG since the negligible quantities emitted from anthropogenic sources are inconsequential.

CO_2 is the primary GHG of concern from anthropogenic sources. Although not the GHG with the strongest effect per molecule, CO_2 is by far the most abundant and, therefore, the most influential GHG. CO_2 is emitted from any combustion process (both natural and anthropogenic); from some industrial processes such as the manufacture of cement, mineral production, metal production, and the use of petroleum-based products; from volcanic eruptions; and from the decay of organic matter. CO_2 is removed ("sequestered") from the lower atmosphere by natural processes such as photosynthesis and uptake by the oceans. CO_2 is included in any analysis of GHG emissions.

[12] NYSDEC. DEC Policy: Assessing Energy Use and Greenhouse Gas Emissions in Environmental Impact Statements. July 15, 2009.

[13] New York City Mayor's Office of Environmental Coordination. *CEQR Technical Manual*. March 2014.

Methane and N_2O also play an important role since the removal processes for these compounds are limited and because they have a relatively high impact on global climate change as compared with an equal quantity of CO_2. Emissions of these compounds, therefore, are included in GHG emissions analyses when the potential for substantial emission of these gases exists.

The *CEQR Technical Manual* lists six GHGs (see Chapter 18, Section 112) that could potentially be included in the scope of a GHG analysis: CO_2, N_2O, methane, hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6). The analysis of GHGs from the Proposed Action will focus mostly on CO_2, N_2O, and methane. There are no significant direct or indirect sources of HFCs, PFCs, or SF_6 associated with the Proposed Action.[14]

To present a complete inventory of all GHGs, component emissions are added together and presented as carbon dioxide equivalent (CO_2e) emissions—a unit representing the quantity of each GHG weighted by its effectiveness in changing the energy balance, using CO_2 as a reference. This is achieved by multiplying the quantity of each GHG emitted by a factor called global warming potential (GWP). GWPs account for the lifetime and the radiative forcing[15] of each chemical over a period of 100 years (e.g., CO_2 has a much shorter atmospheric lifetime than SF_6, and therefore has a much lower GWP, indicating that SF_6 is more effective as a GHG overall). The GWPs for the main GHGs discussed here are presented in **Table 4-5**.

Table 4-5
Global Warming Potential (GWP) for Major GHGs

Greenhouse Gas	100-year Horizon GWP
Carbon Dioxide (CO_2)	1
Methane (CH_4)	25
Nitrous Oxide (N_2O)	298
Hydrofluorocarbons (HFCs)	124 to 18,800
Perfluorocarbons (PFCs)	7,390 to 12,200
Sulfur Hexafluoride (SF_6)	22,800

Note: The GWPs presented above are based on the Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report (SAR) of 2007, to maintain consistency in GHG reporting. The IPCC has since published updated GWP values that reflect new information on atmospheric lifetimes of GHGs and an improved calculation of the radiative forcing of CO_2. In some instances, if combined emission factors are used from updated modeling tools, some slightly different GWP may have been used for this study. Since the emissions of GHGs other than CO_2 represent a very minor component of the emissions, these differences are negligible.

Source: USEPA. Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990–2014. 2016.

[14] The gases are associated with leakage from air conditioning and refrigeration systems, and SF6 is mostly used electric high voltage and transmission systems as well as other specialty uses.

[15] *Radiative forcing* is a measure of the influence a gas has in altering the balance of incoming and outgoing energy in the Earth-atmosphere system and is an index of the importance of the gas as a GHG.

POLICY, REGULATIONS, STANDARDS, AND BENCHMARKS FOR REDUCING GHG EMISSIONS

There are several regional and local efforts to reduce GHG emissions. In 2009, Governor Paterson issued Executive Order No. 24, establishing a goal of reducing GHG emissions in New York State by 80 percent, compared with 1990 levels, by 2050, and creating a Climate Action Council tasked with preparing a climate action plan outlining the policies required to attain the GHG reduction goal; an interim draft plan has been published.[16] The State is now seeking to achieve some of the emission reduction goals via local and regional planning and projects through its Cleaner Greener Communities and Climate Smart Communities programs. The State has also adopted California's GHG vehicle standards.

The New York State Energy Plan outlines the State's energy goals and provides strategies and recommendations for meeting those goals. The latest version of the plan was published in June 2015. The new plan outlines a vision for transforming the state's energy sector that would result in increased energy efficiency (both demand and supply), increased carbon-free power production and cleaner transportation, in addition to achieving other goals not related to GHG emissions. The 2015 plan also establishes new targets: (1) reducing GHG emissions in New York State by 40 percent, compared with 1990 levels, by 2030; (2) providing 50 percent of electricity generation in the state from renewable sources by 2030; and (3) increasing building energy efficiency gains by 600 trillion British thermal units (Btu) by 2030.

New York State has also developed regulations to cap and reduce CO_2 emissions from power plants to meet its commitment to the Regional Greenhouse Gas Initiative (RGGI). Under the RGGI agreement, the governors of nine northeastern and Mid-Atlantic states have committed to regulate the amount of CO_2 that power plants are allowed to emit, gradually reducing annual emissions to half the 2009 levels by 2020, and reducing an additional 30 percent from 2020 to 2030. The RGGI states and Pennsylvania have also announced plans to reduce GHG emissions from transportation, through the use of biofuel, alternative fuel, and efficient vehicles.

Many local governments worldwide, including New York City, are participating in the Cities for Climate Protection™ campaign and have committed to adopting policies and implementing quantifiable measures to reduce local GHG emissions, improve air quality, and enhance urban livability and sustainability. New York City's long-term comprehensive plan for a sustainable and resilient New York City, which began as *PlaNYC 2030* in 2007, and continues to evolve today as *OneNYC 2050*, includes GHG emissions reduction goals, many specific initiatives that can result in emission reductions, and initiatives aimed at adapting to future climate change impacts. The goal to reduce citywide GHG emissions to 30 percent below 2005 levels by 2030 ("30 by 30") was codified by Local Law 22 of 2008, known as the New York City Climate Protection Act (the "GHG reduction goal").[17] The City has also announced a longer-term goal of reducing emissions to 80 percent below 2005 levels by 2050 ("80 by 50"), which was codified by Local Law 66 of 2014, and has published a study evaluating the potential for achieving that goal. More recently, as part of *OneNYC 2050*, the City has announced a more aggressive goal for reducing emissions from building energy down to 30 percent below 2005 levels by 2025.

[16] New York State Climate Action Council. *New York State Climate Action Plan Interim Report*. November 2010.

[17] Administrative Code of the City of New York, §24-803.

In December 2009, the New York City Council enacted four laws addressing energy efficiency in large new and existing buildings, in accordance with *PlaNYC 2030*. The laws require owners of existing buildings larger than 50,000 square feet to conduct energy efficiency audits and retro-commissioning every 10 years, to optimize building energy efficiency, and to "benchmark" the building energy and water consumption annually, using an USEPA online tool. By 2025, commercial buildings over 50,000 square feet will also require lighting upgrades, including the installation of sensors and controls, more efficient light fixtures, and the installation of submeters, so that tenants can be provided with information on their electricity consumption. The legislation also creates a local New York City Energy Conservation Code, which along with the Energy Conservation Construction Code of New York State (as updated in 2016), requires equipment installed during a renovation to meet current efficiency standards.

In April 2019, New York State enacted the Climate Leadership and Community Protection Act to achieve the GHG reductions goals established in the New York State Energy Plan as well as establishing a new long-term goal to reduce statewide GHG by 100 percent, compared with 1990 levels by 2050. The legislation charges New York State Climate Action Council with establishing statewide GHG emission limits and agency regulations to reduce emissions, increase investments in renewable energy sources, and ensure that significant portions of investments are made in disadvantaged communities. Pursuant to these requirements, the Climate Action Council will prepare and approve a scoping plan outlining recommendations for attaining the GHG emission limits and reduction goals. A final scoping plan is anticipated to be approved by 2022.

In May 2019, the New York City Council enacted Local Law 97 of 2019—the Climate Mobilization Act. For most buildings that exceed 25,000 gsf (excluding electricity/steam generation facilities, rent-regulated accommodations, places of public worship, and city-owned properties), the City has established annual building emission limits beginning in 2024 and would require the owner of a covered building to submit annual reports demonstrating the building is in compliance with the current GHG emission limits. For buildings not covered under the GHG emissions limits, owners may either demonstrate compliance with the current limits or implement specified energy conservation measures where applicable.

A number of benchmarks for energy efficiency and green building design have also been developed (green building design considerations include factors such as material selection, which affects GHG emissions associated with materials extraction, production, delivery, and disposal.) For example, the Leadership in Energy and Environmental Design (LEED) system is a benchmark for the design, construction, and operation of high-performance green buildings that includes energy efficiency components. Similarly, Envision is a voluntary system for benchmarking performance and resiliency of physical infrastructure projects. USEPA's Energy Star is a voluntary labeling program designed to identify and promote the construction of new energy efficient buildings, facilities, and homes and the purchase of energy efficient appliances, heating and cooling systems, office equipment, lighting, home electronics, and building envelopes.

H. DATA SOURCES

Table 4-6 lists data sources FRA will use to analyze GHG emissions; if during analyses, other data sources are used, they will be disclosed in the EIS.

Table 4-6
Data Sources for GHG Emissions

Source Type	Data Sources
Grid Power	eGrid data New York City GHG inventory data
Mobile Source	USEPA MOVES2014b model USEPA GHG inventory methodologies and data
Construction Materials	Lifecycle analyses published by USEPA, Energy Information Administration (EIA), or journals Information from USGS and manufacturing resources

I. ANALYSIS TECHNIQUES

GHG EMISSIONS

Identifying potential GHG emissions from a Proposed Action can help decision makers identify practicable opportunities to reduce GHG emissions and ensure consistency with policies aimed at reducing overall emissions. There are no established thresholds for assessing the significance of a project's GHG emissions; instead, the analyses seek to identify GHG sources and practicable means to reduce them. Therefore, the analysis will present the total GHG emissions potentially associated with the Proposed Action and identify measures that would be implemented and measures that are still under consideration to limit emissions.

FRA's GHG analysis will provide an estimate of the GHG emissions associated with both construction and operation of the Proposed Action. The construction analysis will include emissions associated with use of electricity, emissions from on-road and non-road vehicle use, and emissions embedded in the materials used during construction. These emissions will be estimated based on specific estimates of construction activity.

Operationally, the analysis will include building energy systems, including any systems required for the yard equipment and operations associated with the Platform, and emissions associated with on-road vehicle use generated by the operation of the Platform and its associated infrastructure, if any. Locomotive activity would not be substantially affected by the Proposed Action.

CO_2 is the primary GHG of concern from anthropogenic emission sources and is accounted for in the analysis of emissions from all types of projects. GHG emissions for gases other than CO_2 will be included where practicable or in cases where they comprise a substantial portion of overall emissions. The various GHG emissions will be added together and presented as metric tons of CO_2e emissions per year (see above).

BUILDING ENERGY EMISSIONS

Estimates of emissions resulting from building energy use, including fuel consumption and electricity use, will be prepared using projections of fuel and power use developed specifically for the Proposed Action by the project engineers and the emission factors referenced in the 2014 GHG emissions inventory for New York City[18] (which take into account NY grid power sources) or appropriate factors such as building energy intensity from the latest available New York City or EIA data.

[18] The City of New York Mayor's Office of Long-Term Planning and Sustainability. *Inventory of New York City Greenhouse Gas Emissions*. November 2014.

MOBILE SOURCE EMISSIONS

The number of annual vehicle trips by mode (cars, trucks) that would be generated by construction and operation of the Proposed Action will be calculated using the construction data and the transportation planning assumptions developed for the air quality analysis. Travel distances for construction will be estimated based on information about materials sourcing and disposal, and average commuting distances for the area from the 2009 National Household Travel Survey[19] and/or other relevant data if applicable. On-road engine emission factors will be calculated based on the USEPA MOVES2014b emissions model.

Construction non-road activity emissions will be calculated by estimating total fuel consumption based on detailed engine type and activity data based on the construction activity schedule developed for the Proposed Action (hours of operation, daily utilization percentages, and overall utilization percentages) and outputs from the NONROAD module of the MOVES2014b emissions model (average load factor). Construction nonroad engine emissions will be calculated based on the data developed for the air quality analysis, applying the NONROAD module of the MOVES2014b emissions model to provide fuel consumption estimates, and fuel emission factors from USEPA inventory methods.

Based on the latest fuel lifecycle model from Argonne National Laboratory,[20] emissions from producing and delivering fuel (well-to-pump) will be estimated to add an additional 25 percent to the GHG emissions from gasoline and 27 percent from diesel. The analysis will include total well-to-wheels emissions by applying emission factors and average fuel efficiency rates available from USEPA and the Energy Information Administration (EIA) and/or other applicable sources.

CONSTRUCTION MATERIALS EMISSIONS

Emissions embedded in the extraction or recycling, production, and transport of materials, including upstream emissions from steel, rebar, aluminum, and cement used for construction will be estimated based on quantity estimates for the Proposed Action and on carbon intensity information for steel and cement from available lifecycle analyses and other information from USEPA and EIA or other sources as applicable.

POTENTIAL MITIGATION/REDUCTION MEASURES

The analysis will discuss potential measures to reduce GHG emissions, such as energy-efficient design and construction options, qualitatively. Where practicable, quantified estimates of emission reductions will be included as well.

CORRELATION WITH OTHER ANALYSES

The GHG analysis will draw on energy and emissions analyses developed for the air quality analyses, as well as construction information and data developed for the construction analyses. Mobile source emissions will rely on data provided by the traffic analysis. The energy assessment will draw from the infrastructure analysis being prepared for the Proposed Action.

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[19] New York State Department of Transportation. 2009 National Household Travel Survey, New York State Add-On for NHTS, Key Table. Table 3: Average Travel Day Person Trip Length by Mode and Purpose. 2011

[20] Argonne National Laboratory. The Greenhouse Gases, Regulated Emissions, and Energy Use in Transportation (GREET) Model Software. GREET 1 Version 2016 Revision 1. January 26, 2017.

J. RESILIENCE TO CLIMATE CHANGE

REGULATORY CONTEXT AND PROJECTIONS FOR ADAPTATION

The New York State Sea Level Rise Task Force was created to assess potential impacts on the state's coastlines from rising seas and increased storm surge. The Task Force prepared a report of its findings and recommendations including protective and adaptive measures.[21] The recommendations are to provide more protective standards for coastal development, wetlands protection, shoreline armoring, and post-storm recovery; to implement adaptive measures for habitats; integrate climate change adaptation strategies into state environmental plans; and amend local and state regulations or statutes to respond to climate change. The Task Force also recommended the formal adoption of projections of sea level rise.

The New York State Climate Action Plan Interim Report identified a number of policy options and actions that could increase the climate change resilience of natural systems, the built environment, and key economic sectors—focusing on agriculture, vulnerable coastal zones, ecosystems, water resources, energy infrastructure, public health, telecommunications and information infrastructure, and transportation.[22] New York State's Community Risk and Resiliency Act (CRRA)[23] requires that applicants for certain State programs demonstrate that they have taken into account future physical climate risks from storm surges, sea-level rise and flooding, and required NYSDEC to establish official State sea-level rise projections by January 1, 2016. These projections will provide the basis for State adaptation decisions and are available for use by all decision makers. NYSDEC published a draft on November 2, 2015, proposing to adopt existing projections for use (see discussion of New York City Panel on Climate Change [NPCC] below). CRRA applies to specific State permitting, funding and regulatory decisions, including smart growth assessments; funding for wastewater treatment plants; siting of hazardous waste facilities; design and construction of petroleum and chemical bulk storage facilities; oil and gas drilling, and State acquisition of open space.

In New York City, the Climate Change Adaptation Task Force is tasked with fostering collaboration and cooperation between public and private organizations working to build the resilience of the city's critical infrastructure against rising seas, higher temperatures, and changing precipitation patterns. The Task Force is composed of over 57 New York City and New York State agencies, public authorities, and companies that operate, regulate, or maintain critical infrastructure in New York City. Led by the Mayor's office of Resilience and Recovery, the Task Force works together to assess risks, prioritize strategies, and examine how standards and regulations may need to be adjusted in response to a changing climate.

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[21] New York State Sea Level Rise Task Force. *Report to the Legislature*. December 2010.

[22] NYSERDA. New York State Climate Action Plan Interim Report. November 2010.

[23] *Community Risk and Resiliency Act.* Chapter 355, NY Laws of 2014. April 9, 2013. Signed September 22, 2014.

To assist the task force, the NPCC has prepared a set of climate change projections for the New York City region,[24] which was subsequently updated,[25] and has suggested approaches to create an effective adaptation program for critical infrastructure. The NPCC includes leading climatologists, sea-level rise specialists, adaptation experts, and engineers, as well as representatives from the insurance and legal sectors. The climate change projections include a summary of previously published baseline and projected climate conditions throughout the 21st century including heat waves and cold events, intense precipitation and droughts, sea level rise, and coastal storm levels and frequency. NPCC projected that sea levels are likely to increase by up to 30 inches by the 2050s and up to 75 inches by the end of the century (more detailed ranges and timescales are available and will be addressed in the analysis). In general, the probability of higher sea levels is characterized as "extremely likely," but there is uncertainty regarding the probability the various levels projected and timescale. Intense hurricanes are characterized as "more likely than not" to increase in intensity and/or frequency, and the likelihood of changes in other large storms ("Nor'easters") are characterized as unknown. Therefore, the projections for future 1-in-100 coastal storm surge levels for New York City include only sea level rise at this time, and do not account for changes in storm frequency. These sea level rise projections, applied by both New York State and New York City, along with the flood elevations provided in the preliminary flood insurance rate maps available from the Federal Emergency Management Agency (FEMA), are the most recent and relevant data for the New York City Metropolitan area and will be used for the resiliency analysis. For purposes of assessing GHG impacts resulting from the Project, the Study Area is defined as New York City.

There are many additional resources available from various agencies. Some additional resources are incorporated here by reference.[26]

METHODOLOGY FOR EVALUATING CLIMATE ADAPTATION AND RESILIENCE MEASURES

DATA SOURCES

Table 4-7 lists the data sources FRA will use to evaluate climate adaptation and resilience measures; other sources, if used, will be identified in the EIS.

[24] New York City Panel on Climate Change. *Climate Change Adaptation in New York City: Building a Risk Management Response*. Annals of the New York Academy of Sciences. May 2010.

[25] New York City Panel on Climate Change. Climate Risk Information 2013: Observations, Climate Change Projections, and Maps. June 2013.

[26] NYSEMO. New York State Coastal Counties Hurricane Storm Surge Zones (Map). September 2005.

NYSERDA. Responding to Climate Change in New York State: The ClimAID Integrated Assessment for Effective Climate Change Adaptation Strategies in New York State. November 2011 and 2014 supplements.

FHWA. Climate Change Model Language in Transportation Plans. FHWA-HEP-11-002. November 2010.

USDOT. Climate Adaptation Plan 2014: Ensuring Transportation Infrastructure and System Resilience. 2014.

Table 4-7
Data Sources for Evaluation of Climate Adaptation and Resilience Measures

Topic	Data Sources
Climate Conditions	• New York City Panel on Climate Change reports • ClimAID reports • USEPA climate impact and adaptation reports
Current and Projected Flooding	• FEMA Flood Insurance Rate Maps (FIRMs) • USGS topographic maps • New York City Panel on Climate Change reports
Other Climate Impacts	• USDOT adaptation plan and other documents • MTA climate documents

ANALYSIS TECHNIQUES

The Proposed Action would introduce critical infrastructure—the Platform over the railyard and the Tunnel Encasement—with very long design lifespans (assumed to be greater than 100 years). Accordingly, the Proposed Action would be reviewed in the context of climate scenarios projected for 2100 (NPCC, as cited above), and interim years (2050s, 2080s) would also be considered for adaptive resilience design (i.e., considering potential future resilience measures if necessary which may not be implemented by the 2030 analysis year).

The analysis will consider flooding impacts on the Proposed Action as well as any potential for affecting other uses. This chapter of the EIS will review the elevations of infrastructure and uses introduced by the Proposed Action and any protection measures included such as those that will be implemented by the West Side Yard Perimeter Protection Project (considered as part of the No Action Alternative) and other relevant measures, identify any potential vulnerabilities, and discuss any potential flooding risks identified. If other climate metrics such as changes in precipitation are found to be relevant, such as for drainage or other components, they will be evaluated as well.

CORRELATION WITH OTHER ANALYSES

The climate change adaptation evaluation will not rely on other analyses, although some related work will be coordinated with the natural resources and coastal zone consistency analyses. ✷

Chapter 5: Noise and Vibration

This chapter describes the methodology that FRA will use for assessing the effect of the No Action Alternative and the Proposed Action on ambient noise levels and ground-borne vibration in the EIS. The methodology describes the purpose of the noise and vibration studies, the types of noise and vibration sources, the applicable noise and vibration standards, the sources of noise and vibration during the operation and construction of the Proposed Action that will be considered in the EIS analyses, and FRA's approach for assessing the effects of the Proposed Action on ambient noise levels and the ground-borne vibration resulting from construction and operation of the Proposed Action.

The infrastructure associated with the Platform component of the Proposed Action would consist of new life-safety, mechanical, electrical and ventilation systems, as well as reconstruction and upgrades to approximately 20,000 square feet of railroad staff facilities and other LIRR support services including existing emergency electrical equipment, and rail car cleaning services (see Chapter 1, "Introduction," for a more detailed description). These components of the Proposed Action may have operational noise or vibration and will be considered in operational noise and vibration analyses. The Tunnel Encasement and Platform components of the Proposed Action would not have any associated operational noise or vibration, so analysis of these Proposed Action components will be focused on construction effects. The noise and vibration assessment for construction of the Proposed Action will include construction effects from all components of the Proposed Action (i.e., Platform, Infrastructure, and Tunnel Encasement).

A. INTRODUCTION AND DEFINITIONS

AIRBORNE NOISE

Operation of the infrastructure associated with the Platform has the potential to result in noise at surrounding receptors. Any unwanted sound constitutes noise. Noise receptors are any locations of frequent human use where noise would have the potential to interfere with typical activities; such locations would include residences, schools, hospitals, open spaces, etc. Construction of the Proposed Action has the potential to result in noise at receptors surrounding the construction staging and laydown areas, as well as along routes to and from these areas due to construction truck and worker vehicle trips. FRA will examine the operation and construction of the Proposed Action to determine whether the level of noise produced at surrounding sensitive receptors would constitute an adverse impact.

VIBRATION AND GROUND-BORNE NOISE

Vibration refers to oscillatory motion of solid objects, including ground and/or structures. Fixed railway operations have the potential to produce high vibration levels, since railway vehicles contact a rigid steel rail with steel wheels. Train wheels rolling on the steel rails create vibration energy that is transmitted into the track support system. The amount of vibrational energy is strongly dependent on such factors as how smooth the wheels and rails are and the vehicle suspension system. The vibration of the track structure "excites" the adjacent ground, creating vibration waves that propagate through the various soil and rock strata to the foundations of nearby buildings. As the vibration propagates from the foundation through the remaining building structure, certain resonant, or natural, frequencies of various components of the building may be excited.

Operation of the infrastructure associated with the Platform component of the Proposed Action may have the potential to result in increased vibration at nearby receptors. Construction of the Proposed Action has the potential to result in vibration at receptors surrounding the Project Site where pile installation would occur. This construction vibration could occur as a result of on-site impact equipment. FRA will examine construction and operation of the Proposed Action to determine whether the level of vibration produced at nearby receptors would constitute an adverse impact.

B. NOISE AND VIBRATION FUNDAMENTALS

AIRBORNE NOISE FUNDAMENTALS

Quantitative information on the effects of airborne noise on people is well documented. If sufficiently loud, noise may adversely affect people in several ways. For example, noise may interfere with human activities, such as sleep, speech communication, and tasks requiring concentration or coordination. It may also cause annoyance, hearing damage, and other physiological problems. Several noise scales and rating methods are used to quantify the effects of noise on people. These scales and methods consider such factors as loudness, duration, time of occurrence, and changes in noise level with time. However, all the stated effects of noise on people are subjective.

Sound pressure levels are measured in units called "decibels" (dB). The particular character of the noise that we hear is determined by the rate, or "frequency," at which the air pressure fluctuates, or "oscillates." Frequency defines the oscillation of sound pressure in terms of cycles per second. One cycle per second is known as 1 Hertz (Hz). People can hear over a relatively limited range of sound frequencies, generally between 20 Hz and 20,000 Hz, and the human ear does not perceive all frequencies equally well. High frequencies are more easily discerned and therefore more intrusive than many of the lower frequencies.

"A"-WEIGHTED SOUND LEVEL (dBA)

To bring a uniform noise measurement that simulates people's perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human ear. This is known as the A-weighted sound level, or "dBA," and because of the weighting based on human perception, it is the most often used descriptor of noise levels where community noise is the issue. As shown in **Table 5-1**, the threshold of human hearing is defined as 0 dBA; very quiet conditions (as in a library, for example) are approximately 40 dBA; levels between 50 dBA and 70 dBA define the range of normal daily activity; levels above 70 dBA are considered noisy, and then loud, intrusive, and deafening as the scale approaches 130 dBA. For most people to perceive an increase in noise, it must be at least 3 dBA. At 5 dBA, the change will be readily noticeable (Bolt, Beranek and Newman, 1973). An increase of 10 dBA is generally perceived as a doubling of loudness.

Table 5-1
Common Noise Levels

Sound Source	(dBA)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Freight train at 30 meters	95
Train horn at 30 meters	90
Heavy truck at 15 meters	
Busy city street, loud shout	80
Busy traffic intersection	
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Light car traffic at 15 meters, city or commercial areas or residential areas close to industry	
Background noise in an office	50
Suburban areas with medium density transportation	
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0

Note A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.

Source: Cowan, James P. Handbook of Environmental Acoustics. Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

Combinations of different sources are not additive in an arithmetic manner, because of the decibel scale's logarithmic nature. For example, two noise sources—a vacuum cleaner operating at approximately 72 dBA and a telephone ringing at approximately 58 dBA—do not combine to create a noise level of 130 dBA, the equivalent of a jet airplane or air raid siren (see **Table 5-1**). In fact, the noise produced by the telephone ringing may be masked by the noise of the vacuum cleaner and not be heard. The logarithmic combination of these two noise sources would yield a noise level of 72.2 dBA.

EFFECTS OF DISTANCE ON NOISE

Noise varies with distance. For example, highway traffic 50 feet away from a receptor (such as a person listening to the noise) typically produces sound levels of approximately 70 dBA. The same highway noise measures 66 dBA at a distance of 100 feet, assuming soft ground conditions (such as grass). This decrease is known as "drop-off." The outdoor drop-off rate for a line source, such as a railway, is a decrease of approximately 4.5 dBA (for soft ground) for every doubling of distance between the noise source and receptor. For hard ground (such as concrete), the outdoor drop-off rate is 3 dBA for line sources. Assuming soft ground, for a point source, such as a stationary piece of construction equipment (e.g., a drill rig), the outdoor drop-off rate is a decrease of approximately 7.5 dBA for every doubling of distance between the noise source and receptor (for hard ground the outdoor drop-off rate is 6 dBA for point sources).[1]

NOISE DESCRIPTORS USED IN IMPACT ASSESSMENT

The sound-pressure level unit of dBA describes a noise level at just one moment, but since very few noises are constant, other ways of describing noise over more extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific period as if it were a steady, unchanging sound (i.e., as if it were averaged over that time period). For this condition, a descriptor called the "equivalent sound level" (L_{eq}) can be computed. L_{eq} is the constant sound level that, in a given situation and period (e.g., 1 hour, denoted by $L_{eq[1]}$, or 24 hours, denoted as $L_{eq[24]}$), conveys the same sound energy as the actual time-varying sound.

A descriptor for cumulative 24-hour exposure is the day-night average sound level, abbreviated as L_{dn}. This is a 24-hour measurement that accounts for the moment-to-moment fluctuations in A-weighted noise levels due to all sound sources, combined. Mathematically, the L_{dn} noise level is the energy average of all $L_{eq(1)}$ noise levels over a 24-hour period, where nighttime noise levels (10 PM to 7 AM) are increased by 10 dBA before averaging because of increased noise sensitivity during nighttime when people are typically sleeping.

Following guidance in the Federal Transit Administration (FTA) guidance manual, *Transit Noise and Vibration Impact Assessment* (FTA Report No. 0123, September 2018), either the maximum $L_{eq(1)}$ sound level or the L_{dn} sound level is used for impact assessment, depending on land use category as described below in section 5D, under "Impact Criteria."

[1] FTA Transit Noise and Vibration Impact Assessment, FTA-VA-90-1003-06.

VIBRATION FUNDAMENTALS

Fixed railway operations have the potential to produce high vibration levels, since railway vehicles contact a rigid steel rail with steel wheels. Train wheels rolling on the steel rails create vibration energy that is transmitted into the track support system. The amount of vibrational energy is strongly dependent on such factors as how smooth the wheels and rails are and the vehicle suspension system. The vibration of the track structure "excites" the adjacent ground, creating vibration waves that propagate through the various soil and rock strata to the foundations of nearby buildings. As the vibration propagates from the foundation through the remaining structure, certain resonant, or natural, frequencies of various components of the building may be excited.

Vibrations consist of rapidly fluctuating motions in which there is no "net" movement. When an object vibrates, any point on the object is displaced from its initial "static" position equally in both directions so that the average of all its motion is zero. Any object can vibrate differently in three mutually independent directions: vertical, horizontal, and lateral. It is common to describe vibration levels in terms of velocity, which represents the instantaneous speed at a point on the object that is displaced. In a sense, the human body responds to average vibration amplitude, which is usually expressed in terms of the root mean square (rms) amplitude.

The effects of ground-borne vibration may include discernable movement of building floors, rattling of windows, and shaking of items on shelves or hanging on walls. In extreme cases, the vibration can cause damage to buildings. The vibration of floors and walls may cause perceptible vibration, rattling of such items as windows or dishes on shelves. The movement of building surfaces and objects within the building can also result in a low-frequency rumble noise. The rumble is the noise radiated from the motion of the room surfaces, even when the motion itself cannot be felt. This is called ground-borne noise.

All vibration levels will be referenced to $1x10^{-6}$ inches per second as is recommended in FTA and FRA guidance. "VdB" (referenced to $1x10^{-6}$ inches per second) is used for vibration decibels to reduce the potential for confusion with noise decibels.

EFFECT OF PROPAGATION PATH

Vibrations are transmitted from the source to the ground, and propagate through the ground to the receptor. Soil conditions have a strong influence on the levels of ground-borne vibration. Stiff soils, such as some clay and rock, can transmit vibrations over substantial distances. Sandy soils, wetlands, and groundwater tend to absorb movement and thus reduce vibration transmission. Because subsurface conditions vary widely, measurement of actual vibration conditions, or transfer mobility, at the site can be the most practical way to address the variability of propagation conditions.

HUMAN RESPONSE TO VIBRATION LEVELS

Although the perceptibility threshold for ground-borne vibration is about 65 VdB, the typical threshold of human annoyance is 72 VdB. As a comparison, buses and trucks rarely create vibration that exceeds 72 VdB unless there are significant bumps in the road, and these vehicles are operating at moderate speeds. Vibration levels for typical human and structural responses and sources are shown in **Table 5-2**.

Table 5-2
Typical Levels of Ground-Borne Vibration

Human/Structural Response	Velocity Level (VdB)	Typical Sources (at 50 feet)
Threshold, minor cosmetic damage fragile buildings	100	Blasting from construction projects
		Bulldozers and other heavy tracked construction equipment
Difficulty with vibration-sensitive tasks, such as reading a video screen	90	Locomotive powered freight train
Residential annoyance, infrequent events	80	Rapid Transit Rail, upper range
		Commuter Rail, typical range
Residential annoyance, frequent events		Bus or Truck over bump
	70	Rapid Transit Rail, typical range
Limit for vibration-sensitive equipment. Approximate threshold for human perception of vibration	60	Bus or truck, typical
		Typical background vibration
	50	

Source: U.S. Dept. of Transportation, FTA, *Transit Noise and Vibration Impact Assessment,* Sept 2018.

C. REGULATORY CONTEXT

FRA will use procedures described in the FTA guidance manual, *Transit Noise and Vibration Impact Assessment* (FTA Report No. 0123, September 2018) in the analysis of noise and vibration associated with the No Action Alternative and the Proposed Action. While FRA is the Federal lead agency for this EIS, the procedures set forth in the FTA guidance manual have been adopted by FRA for analysis of noise and vibration resulting from non-high-speed (i.e., 90 mph or below) rail projects. Since the Project Site is within New York City, FRA will also consider impact criteria from the guidelines included in the *CEQR Technical Manual* to identify potential noise and vibration impacts.

OPERATIONAL AIRBORNE NOISE

The analysis of airborne noise associated with operation of the Proposed Action will use procedures set forth in the FTA guidance manual. Following the methodologies set forth in this document, FRA will analyze airborne noise impacts using a three-step process that consists of a screening procedure, a general noise assessment, and a detailed noise analysis. FRA will perform the screening procedure first to determine whether any noise-sensitive receptors are within distances where impacts are likely to occur. If the screening reveals that there are noise-sensitive receptors in locations where impacts are likely to occur, then FRA will perform a general noise assessment to determine locations where noise impacts could occur. If this general assessment indicates that a potential for noise impact does exist, then a detailed noise analysis may be necessary. FRA will use the FTA's detailed analysis methodology to predict impacts and evaluate the effectiveness of mitigation with greater precision than can be achieved with the general noise assessment.

OPERATIONAL VIBRATION AND GROUND-BORNE NOISE

While neither the Platform nor Tunnel Encasement components of the Proposed Action would result in any operational vibration and ground-borne noise at surrounding receptors, the LIRR infrastructure associated with the Platform may generate operational vibration or ground-borne noise. FRA will conduct an operational vibration and ground-borne noise assessment for that aspect of the Proposed Action.

CONSTRUCTION

The analysis of noise and vibration associated with construction of the Proposed Action will also use the general quantitative analysis procedures described in the FTA guidance manual.

D. EFFECTS ASSESSMENT METHODOLOGY

STUDY AREA

The Study Area for the operational and construction airborne noise studies will include receptors surrounding the Project Site and along routes that vehicular traffic associated with the Proposed Action would use to travel. For each noise and/or vibration source included in the Proposed Action, FRA will identify a screening distance based on the FTA guidance manual, and will identify any noise-sensitive land uses within those distances. The area within the screening distance of each noise and/or vibration source will constitute the Study Area. FRA will identify this area and the noise receptors located within the area as part of the noise and vibration analyses.

DATA SOURCES

FRA will review existing land uses for the Study Area as described above, and will categorize noise-sensitive receptor locations according to the Land Use Categories from the FTA guidance manual, which are described below. Based on the types of receptors identified, FRA will select noise survey locations, and will develop a noise survey program to measure existing noise levels in the Study Area. FRA will select the noise survey locations to provide geographic coverage of the Study Area, account for the various noise sources throughout the area (including rail activity, vehicular traffic, aircraft activity, industrial sources, etc.), determine the range of Affected Environment Existing Condition noise levels throughout the Study Area, and represent those locations with the greatest potential to experience a significant increase in noise levels associated with the No Action Alternative and Proposed Action. The noise survey will include a combination of 24-hour continuous noise level measurements and 1-hour short-term noise measurements taken in compliance with FTA guidance manual procedures. At locations where 1-hour noise level measurements are conducted, 24-hour noise levels will be determined by prorating, according to FTA guidance manual methods the 1-hour noise level based on the 24-hour distribution of noise levels at the nearest 24-hour noise measurement location if necessary. During each noise level measurement, FRA will record and document weather conditions, physical geometry of the surrounding area, and contributing noise sources. The Project Sponsors will provide FRA the information necessary for the predictive noise and vibration analyses. **Table 5-3** describes the sources of data to be used in the noise and vibration analyses.

Table 5-3
Noise and Vibration Analysis Data Sources

Data/Information	Source
Receptor Locations	Review of land use maps and on-site land use observations
Existing Noise Levels	To be field measured
Existing and Proposed Future vehicular traffic information	To be provided by Traffic Analysis
Existing rail operation information	MTA-LIRR
Information on infrastructure associated with proposed platform (e.g., equipment specs, operational patterns, locations, etc.)	30% and 60% design reports and engineering drawings provided by the Project Sponsors
Construction logistics, schedule, and equipment information	To be provided by Project Sponsors for all three Project components: Platform, Tunnel Encasement, and overbuild Mixed-Use Development

ANALYSIS TECHNIQUES

OPERATIONAL AIRBORNE NOISE

FRA will analyze operational airborne noise levels using the following procedures:

- Identify noise-sensitive land uses (i.e., residential, church, certain parks, etc.) within the screening distance(s) from noise sources included in the Proposed Action.
- Select representative noise receptor sites within the Study Area, as described above.
- Monitor existing noise levels at the selected receptor sites by performing field measurements and using acoustical fundamentals. For sites at which direct access to conduct noise level measurements is not available, FRA will perform measurements at a nearby location with a comparable level of noise.
- If applicable for a particular receptor site, FRA will calculate existing rail noise exposure using FTA's general assessment methodology and data associated with the Affected Environment Existing Conditions in the rail yard. The existing rail noise exposure will consist of all rail-related noise sources, including ventilation and signal equipment.
- Calculate future Project Noise Exposure associated with rail sources resulting from the No Action Alternative using FTA general assessment methodology.
- Calculate future Project Noise Exposure associated with rail sources resulting from the Proposed Action using FTA general assessment methodology.
- Calculate non-rail noise levels in the future with the No Action Alternative and Proposed Action based on projected future changes in vehicular traffic using noise modeling techniques as described in the *CEQR Technical Manual*.
- Determine total Project Noise Exposure with the No Action Alternative or Proposed Actions at each receptor site as the sum of noise exposure from rail sources and vehicular traffic as described above.
- Compare the difference in noise exposure between the No Action Alternative and the Proposed Action to the FTA and *CEQR Technical Manual* noise impact criteria to identify potential impacts.

CONSTRUCTION AIRBORNE NOISE

Analysis of airborne noise associated with construction of the Proposed Action will use the general analysis procedures described in the FTA guidance manual. Noise resulting from the operation of construction equipment on-site at a specific receptor location near a construction site is calculated by computing the sum of the noise produced by all pieces of equipment operating at the construction site. For each piece of equipment, the noise levels at a receptor site are a function of the following:

- The noise emission level of the equipment;
- A usage factor, which accounts for the percentage of time the equipment is operating;
- The distance between the piece of equipment and the receptor;
- Topography and ground effects; and
- Shielding.

Similarly, noise levels resulting from construction traffic are a function of the following:

- The noise emission levels of the type of vehicle (i.e., auto, light-duty truck, heavy-duty truck, bus, etc.);
- Vehicular speed;
- The distance between the roadway and the receptor;
- Topography and ground effects; and
- Shielding.

The analysis will assume a confluence of worst-case conditions—peak project-generated construction traffic, peak construction, and lowest ambient noise levels for Affected Environment Existing Conditions. This methodology results in a conservative estimate of impacts. FRA will calculate the noise effects resulting from construction activities, taking into account the noise power levels of the noise sources, attenuation with distance, attenuation due to shielding, etc. Based on the projected schedule of construction the expected duration of projected construction, FRA will also establish noise levels at each receptor. FRA will compare the projected construction noise levels at each receptor to the FTA construction noise impact criteria and *CEQR Technical Manual* construction noise impact criteria to determine the potential for construction noise impacts.

OPERATIONAL VIBRATION AND GROUND-BORNE NOISE

The FTA vibration analysis methodology begins with a vibration screening to determine whether any vibration-sensitive receptors are within a distance where an impact is likely to occur. For each receptor identified within the screening distances, FRA will analyze the vibration and ground-borne noise associated with operation of the Proposed Action using the general analysis procedures described in the FTA guidance manual. The analysis will assume the most conservative propagation of vibration from source to receptor and will not account for any reduction in vibration due to soil conditions. FRA will compare the predicted vibration levels to the FTA vibration criteria (see **Table 5-5**) to identify potential operational vibration impacts associated with the Proposed Action.

CONSTRUCTION VIBRATION AND GROUND-BORNE NOISE

FRA will analyze the vibration and ground-borne noise associated with construction of the Proposed Action using the general analysis procedures described in the FTA guidance manual. For each construction work area using impact equipment (e.g., pile driver, rock excavation equipment, etc.), FRA will project the vibration levels to nearby receptors and compare them to FTA vibration impact criteria.

IMPACT CRITERIA

OPERATIONAL AIRBORNE NOISE

FRA will consider impact criteria from both FTA and *CEQR Technical Manual* guidance in evaluating operational airborne noise impacts.

The FTA guidance manual defines noise criteria based on the specific type of land use that would be affected, with explicit operational noise impact criteria for three land use categories. These impact criteria are based on either peak 1-hour L_{eq} or 24-hour L_{dn} values. **Table 5-4** describes the land use categories defined in the FTA report, and provides noise metrics used for determining operational noise impacts. As described in **Table 5-4**, categories 1 and 3—which include land uses that are noise-sensitive, but where people do not sleep—require examination using the 1-hour L_{eq} descriptor for the noisiest peak hour. Category 2, which includes residences, hospitals, and other locations where nighttime sensitivity to noise is very important, requires examination using the 24-hour L_{dn} descriptor.

Table 5-4
FTA's Land Use Category and Metrics for Transit Noise Impact Criteria

Land Use Category	Noise Metric (dBA)	Description of Land Use Category
1	Outdoor $L_{eq(h)}$*	Tracts of land where quiet is an essential element in the intended purpose. This category includes lands set aside for serenity and quiet, and such land uses as outdoor amphitheaters and concert pavilions, as well as National Historic Landmarks with significant outdoor use. Also included are recording studios and concert halls.
2	Outdoor L_{dn}	Residences and buildings where people normally sleep. This category includes homes, hospitals, and hotels, where a nighttime sensitivity to noise is assumed to be of utmost importance.
3	Outdoor $L_{eq(h)}$*	Institutional land uses with primarily daytime and evening use. This category includes schools, libraries, and churches, where it is important to avoid interference with such activities as speech, meditation, and concentration on reading material. Places for study or meditation associated with cemeteries, monuments, museums, campgrounds and recreational facilities can also be considered to be in this category. Certain historical sites and parks are also included.

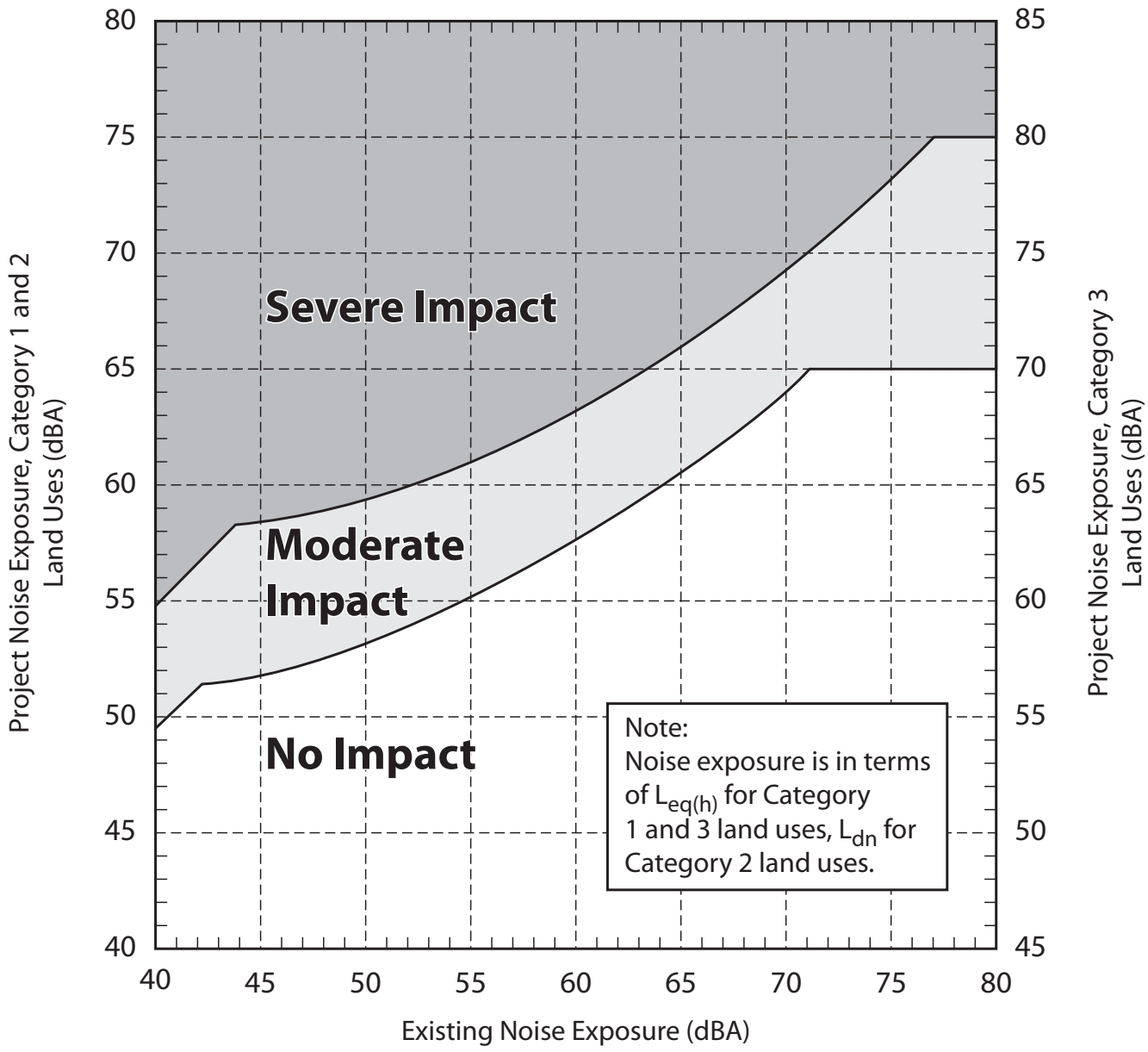
Note: * L_{eq} for the noisiest hour of transit-related activity during hours of noise sensitivity.

Source: Transit Noise and Vibration Impact Assessment, FTA, September 2018.

Figure 5-1, which references Figure 3-2 in the FTA guidance manual, shows FTA's noise impact criteria for transit projects. The FTA impact criteria are keyed to the noise level generated by the project (called "project noise exposure") in locations of varying existing noise levels. Two types of impacts—moderate and severe—are defined for each land use category, depending on existing noise levels. Thus, where existing noise levels are 55 dBA, for land use categories 1 and 2, the respective L_{eq} and L_{dn} noise exposure from the project would create moderate impacts if they were above approximately 55 dBA, and would create severe impacts if they were above approximately 61 dBA. For category 3, a project noise exposure level above approximately 60 dBA would be considered a moderate impact, and above approximately 66 dBA would be considered a severe impact. The qualitative difference between "severe impact" and "moderate impact" is that a severe impact occurs when a change in noise level occurs that a significant percentage of people would find annoying, while a moderate impact occurs when a change in noise level occurs that is noticeable to most people but not necessarily sufficient to result in strong adverse reactions from the community. Evaluation of operational airborne noise using FTA's noise impact criteria present a conservative evaluation under the *CEQR Technical Manual* noise impact criteria, and a separate evaluation is not necessary.

OPERATIONAL VIBRATION AND GROUND-BORNE NOISE

The FTA criteria for environmental impact from ground-borne vibration and noise are based on the maximum levels for a single event. The impact criteria as defined in the FTA guidance manual are shown in **Tables 5-5a and 5-5b**. The criteria for acceptable ground-borne vibration are expressed in terms of RMS velocity levels in decibels and the criteria for acceptable ground-borne noise are expressed in terms of A-weighted sound level. As shown in the table, the FTA methodology provides three different impact criteria—one for "infrequent" events, when there are fewer than 30 vibration events per day, one for "occasional" events, when there are between 30 and 70 vibration events per day, and one for "frequent" events, when there are more than 70 vibration events per day. These impacts occur only if a project causes ground-borne noise or vibration levels that are higher than existing vibration levels. Thus, if the vibration level for a building in Category 1 is already 70 VdB (5 VdB above the 65 VdB threshold listed in **Tables 5-5a and 5-5b**) but a hypothetical project will not increase that level, then the project will not be considered to have an impact.



Source: Transit Noise and Vibration Impact Assessment, FTA-VA-90-1003-06, May 2006

FTA Noise Impact Criteria for Transit Projects

Table 5-5a
Ground-Borne Vibration (GBV)
Impact Criteria for General Assessment

Land Use Category	GBV Impact Levels (VdB re 1 micro-inch/sec) Frequent Events[1]	GBV Impact Levels (VdB re 1 micro-inch/sec) Occasional Events[2]	GBV Impact Levels (VdB re 1 micro-inch/sec) Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	65 VdB[4]	65 VdB[4]	65 VdB[4]
Category 2: Residences and buildings where people normally sleep	72 VdB	75 VdB	80 VdB
Category 3: Institutional land uses with primarily daytime use	75 VdB	78 VdB	83 VdB

Notes:

Vibration-sensitive equipment is not sensitive to ground-borne noise.

1 "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

2 "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

3 "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail systems.

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. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

Table 5-5b
Ground-Borne Noise (GBN)
Impact Criteria for General Assessment

Land Use Category	GBN Impact Levels (dB re 20 micro Pascals) Frequent Events[1]	GBN Impact Levels (dB re 20 micro Pascals) Occasional Events[2]	GBN Impact Levels (dB re 20 micro Pascals) Infrequent Events[3]
Category 1: Buildings where vibration would interfere with interior operations	N/A[4]	N/A[4]	N/A[4]
Category 2: Residences and buildings where people normally sleep	35 dBA	38 dBA	43 dBA
Category 3: Institutional land uses with primarily daytime use	40 dBA	43 dBA	48 dBA

Notes:

Vibration-sensitive equipment is not sensitive to ground-borne noise.

1 "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

2 "Occasional Events" is defined as between 30 and 70 vibration events of the same source per day. Most commuter trunk lines have this many operations.

3 "Infrequent Events" is defined as fewer than 30 vibration events of the same kind per day. This category includes most commuter rail systems.

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. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.

The limits are specified for the three land use categories defined below:

- **Category 1: High Sensitivity** – Buildings where low ambient vibration is essential for the operations within the building, which may be well below levels associated with human annoyance. Typical land uses are vibration-sensitive research and manufacturing, hospitals, and university research operations.
- **Category 2: Residential** – This category covers all residential land uses and any buildings where people sleep, such as hotels and hospitals. No differentiation is made between different types of residential areas. This is primarily because ground-borne vibration and noise are experienced indoors and building occupants have practically no means to reduce their exposure. Even in a noisy urban area, the bedrooms often will be quiet in buildings that have effective noise insulation and tightly closed windows. Hence, an occupant of a bedroom in a noisy urban area is likely to be just as sensitive to ground-borne noise and vibration as someone in a quiet suburban area.
- **Category 3: Institutional** – This category includes schools, churches, other institutions, and quiet offices that do not have vibration-sensitive equipment, but still have the potential for activity interference.

There are some buildings, such as concert halls, TV and recording studios, auditoriums, and theaters that can be very sensitive to vibration and ground-borne noise, but do not fit into any of these three categories. Special vibration level thresholds, shown in **Tables 5-6a and 5-6b**, are defined in the FTA guidance manual for these land uses that have special sensitivity to vibration and ground-borne noise.

Table 5-6a
Ground-Borne Vibration (GBV)
Impact Criteria for Special Buildings

Type of Building or Room	GBV Impact Levels (VdB re 1 micro-inch/sec) Frequent Events[1]	GBV Impact Levels (VdB re 1 micro-inch/sec) Occasional or Infrequent Events[2]
Concert Halls	65 VdB	65 VdB
TV Studios	65 VdB	65 VdB
Recording Studios	65 VdB	65 VdB
Auditoriums	72 VdB	80 VdB
Theaters	72 VdB	80 VdB

Notes:

This table is new for the FEIS.

If the building will rarely be occupied when the trains are operating, there is no need to consider impact.

[1] "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

[2] "Occasional or Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.

Table 5-6b
Ground-Borne Noise (GBN)
Impact Criteria for Special Buildings

Type of Building or Room	GBN Impact Levels (dB re 20 micro Pascals) Frequent Events[1]	GBN Impact Levels (dB re 20 micro Pascals) Occasional or Infrequent Events[2]
Concert Halls	25 dBA	25 dBA
TV Studios	25 dBA	25 dBA
Recording Studios	25 dBA	25 dBA
Auditoriums	30 dBA	38 dBA
Theaters	35 dBA	43 dBA

Notes:

This table is new for the FEIS.

If the building will rarely be occupied when the trains are operating, there is no need to consider impact.

[1] "Frequent Events" is defined as more than 70 vibration events of the same source per day. Most rapid transit projects fall into this category.

[2] "Occasional or Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.

CONSTRUCTION AIRBORNE NOISE

FRA will use impact criteria from both FTA and *CEQR Technical Manual* guidance to evaluate construction airborne noise impacts.

The FTA guidance manual specifies separate noise impact thresholds for daytime construction and night-time construction. The impact thresholds for construction are 90 dBA ($L_{eq,\ 1h}$) during daytime hours and 80 dBA ($L_{eq,\ 1h}$) during nighttime hours, assessed for the two noisiest pieces of equipment for each phase of construction.

Chapter 22, Section 100, of the *CEQR Technical Manual* breaks construction duration into "short-term" and "long-term" and states that construction noise is not likely to require analysis unless it "affects a sensitive receptor over a long period of time." Consequently, the construction noise analysis considers both the potential for construction of a project to create high noise levels (the "intensity"), and whether construction noise would occur for an extended period of time (the "duration") in evaluating potential construction noise effects. As recommended in the *CEQR Technical Manual* the above-described operational noise impact criteria are considered in examining the intensity of construction noise. The concept of short-term and long-term is considered in evaluating the duration of construction noise.

CONSTRUCTION VIBRATION

Table 5-7 and Table 5-8 show architectural and structural damage risk and perceptibility thresholds for residential and historic structures in proximity to the types of construction activities that would occur during construction of the Proposed Action. Architectural damage includes cosmetic damage, such as cracked plaster, etc. Architectural damage is not considered potentially dangerous. As shown in **Table 5-7**, pile driving has the greatest potential to result in architectural damage to most building types. While not shown in the table, controlled blasting also can result in high vibration levels in excess of 100 VdB with resultant damage to existing structures. Most other construction activities require very small (i.e., less than 25 feet) distances between the structure and the construction equipment or the presence of highly fragile buildings for impacts to occur. For fragile and highly fragile buildings respectively, FTA recommends a limit of peak particle velocities of 0.2 and 0.12 inches per second or 94 and 90 VdB.

Table 5-7
Vibration Source Levels for Construction Equipment

Equipment	PPV at 25 ft (in/sec)	Approximate L_{v^*} at 25 ft
Pile Driver (impact)	0.644	104
Pile Driver (sonic)	0.170	93
Clam Shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall in soil)	0.008	66
Hydromill (slurry wall in rock)	0.017	75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drilling	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

Note: * RMS velocity in decibels (VdB) re 1 micro-inch/second

Source: *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.

Table 5-8
Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate L_{v^*}
I. Reinforced-concrete, steel or timber (no plaster)	0.5	102
II. Engineered concrete and masonry (no plaster)	0.3	98
III. Non-engineered timber and masonry buildings	0.2	94
IV. Buildings extremely susceptible to vibration damage	0.12	90

Note: * RMS velocity in decibels (VdB) re 1 micro-inch/second

Source: *Transit Noise and Vibration Impact Assessment*, FTA-VA-90-1003-06, May 2006.

POTENTIAL MITIGATION MEASURES

If the Proposed Action is found to have potential adverse noise or vibration impacts, avoidance and/or mitigation measures will be considered. Potential operational noise avoidance and/or mitigation measures may include vehicle or equipment noise specifications or operational restrictions, and/or building noise insulation.

Potential construction noise avoidance and/or mitigation measures may include noise barriers or equipment enclosures, truck route restrictions, changes to equipment placement, changes to operation sequencing and/or scheduling, or selection of alternative construction equipment or methods. Potential construction vibration avoidance and/or mitigation measures may include truck route restrictions, changes to equipment placement, changes to operation sequencing and/or scheduling, or selection of alternative construction equipment or methods. If necessary, FRA may specify a program for compliance enforcement, potentially including noise monitoring, vibration monitoring, and/or a method of informing the public and responding to complaints, as mitigation.

E. CORRELATION WITH OTHER ANALYSES

As described above, the noise and vibration resource category analyses will draw on land use information to identify sensitive receptors. In addition, the noise and vibration analysis will use traffic data such as existing traffic counts, projected future growth in traffic, and other information developed as part of the construction traffic analysis. To the extent that any adverse noise and vibration impacts are identified, that information would be used to determine if the Proposed Action would have any disproportionate impacts to environmental justice populations. FRA will address the potential noise and vibration effects on any identified threatened and endangered species associated with construction or operation of the Proposed Action in the natural resources chapter of the EIS. In addition, in accordance with *CEQR Technical Manual* guidance, if any adverse impacts relating to noise and vibration are identified, an analysis of the potential impacts to public health will be performed. ✷

Chapter 6: Cultural Resources

This chapter describes the methodology that FRA will use to identify and evaluate potential effects to historic properties and archaeological resources (collectively, "cultural resources") from the Western Rail Yard Infrastructure Project in the NEPA process. The cultural resources analysis will specifically: 1) identify previously evaluated and unevaluated cultural resources within the Project's Area of Potential Effects (APE); 2) evaluate the potential eligibility of newly identified cultural resources for listing on the National Register of Historic Places (NRHP or NR); and 3) assess the potential effects of the No Action Alternative and Proposed Action on cultural resources, including properties that are listed on the NR, determined eligible for listing on the NR as part of this undertaking, or determined eligible for listing on the NR as part of previous federal undertakings (i.e., historic properties that have been previously determined NR eligible but have not been formally listed). This methodology will be provided to the New York State Office of Parks, Recreation, and Historic Preservation (OPRHP)/New York State Historic Preservation Office (NYSHPO) for review and comment.

A. REGULATORY CONTEXT

FRA has determined that the Project constitutes an undertaking under Section 106 of NHPA, as amended (Section 106), and the Advisory Council on Historic Preservation's (ACHP) Section 106 implementing regulations at 36 CFR part 800. FRA is the lead agency responsible for compliance with Section 106 for this Project. FRA will conduct all required consultations and prepare all required analyses and determinations of effect. Section 106 requires that lead federal agencies take into account the effects of their actions on any historic properties, including National Historic Landmarks, National Register-listed, and/or National Register-eligible properties within the APE established for the undertaking.

The Section 106 process will be integrated with NEPA compliance processes in accordance with the Section 106 regulations at 36 CFR § 800.8 and a guidance document put forth by the ACHP entitled *NHPA: A Handbook for Integrating NEPA and Section 106 (*March 2013). There may be historic properties identified during the Section 106 process that are also subject to review under Section 4(f) of the U.S. Department of Transportation Act of 1966 (see Chapter 19, "Section 4(f) Evaluation").

The procedures of Section 14.09 of the New York State Historic Preservation Act (SHPA) do not apply to federal undertakings, and any review and comment by NYSHPO must be within the framework of Section 106 regulations (New York State Historic Preservation Act § 14.09[2]). Therefore, the cultural resources study for the Project will fulfill cultural resource compliance obligations under NEPA and Section 106. FRA will consult with NYSHPO and other consulting parties to identify historic properties that have the potential to be affected by the No Action Alternative and Proposed Action and determine the nature of the potential effects on those properties. Formal submissions to NYSHPO during the Section 106 process will be made through NYSHPO's online Cultural Resource Information System (CRIS).

If FRA determines that historic properties would be adversely affected as a result of the undertaking, and these effects cannot be avoided, FRA will consult with NYSHPO and other consulting parties (including ACHP if applicable) to develop and implement measures to minimize and/or mitigate such effects, which would be stipulated in a Section 106 agreement document Memorandum of Agreement (MOA) or Programmatic Agreement (PA).

B. ANALYSIS METHODOLOGY

Identification and analysis of the Project's potential effects to historic properties will be undertaken by FRA in accordance with the four-step decision making process established in the Section 106 regulations.

CONSULTATION

As specified by the Section 106 regulations at 36 CFR § 800.2(c), FRA has identified and invite appropriate parties to participate in the review and consultation process as consulting parties. Section 106 consulting parties for the undertaking will include NYSHPO, federally and state recognized Native American tribes, local historic governments, local preservation organizations, and organizations and individuals with a demonstrated interest in the undertaking and its potential effects on historic properties. FRA sought NYSHPO input on potential consulting parties and send invitation letters accordingly.[1] FRA also solicited participation from interested parties during the Project's EIS Scoping Meeting. Once the consulting parties are established, FRA will consult with them as appropriate and provide relevant project materials to solicit their review and comment throughout the Section 106 process.

The ACHP, which promulgates the Section 106 implementing regulations and also provides guidance and advice concerning the implementation of the Section 106 process, may choose to participate in the Section 106 process when it determines that its involvement is necessary to ensure that the purposes of Section 106 and the NHPA are met (36 CFR § 800.2[b]).

Shortly after initiating Section 106 consultation with NYSHPO, FRA formally notified the ACHP about the Project, and asked whether or not it wishes to participate in the Section 106 consultation process. If ACHP initially declines to participate, FRA will still provide notification as required by 36 § CFR 800.6 (a)(1) if an adverse effect finding is made, and invite the ACHP to participate in the development of an MOA or PA to resolve adverse effects.

Public outreach and involvement opportunities utilized by FRA for purposes of NEPA may be used to satisfy the public involvement requirements under Section 106, as long as such opportunities are adequately advertised for such purposes and the EIS contains adequate information about FRA's efforts to identify and assess the undertaking's effects on historic properties. The EIS Scoping process and public comment period provided an opportunity for public participation and comment. In addition, the public comment period of the Draft EIS, including public hearing(s), will also provide opportunity for public involvement and comment on the Project's potential effects on cultural resources.

[1] FRA sent initial Section 106 consultation invitation letters to the NYSHPO on July 3, 2020, to Federally recognized Native American tribes on July 29, 2020, and to ACHP and other identified potential Consulting Parties on August 6, 2020.

C. STUDY AREA

A required step in the Section 106 process is determining and documenting the APE, which is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if such properties exist" (36 CFR § 800.16[d]). Historic properties are buildings, structures, sites, objects, or districts that are listed in or eligible for listing in the NRHP. The APE is influenced by the scale and nature of an undertaking. The Section 106 APE, and the Study Area for assessing the Project's potential impacts on cultural resources pursuant to NEPA in the EIS, will be the same.

The APE includes the area in which historic properties may be affected by the undertaking. In general, potential effects on historic properties can include demolition, physical alteration, or damage, including effects caused by vibration; isolation of a historic property from its surrounding environment; and the introduction of visual, audible, or atmospheric (e.g., pollutants) elements that are out of character with a historic property or that alter its historic setting and context (36 CFR § 800.5(a)(1). FRA will establish the APE based on proposed construction activities for the Build Alternative(s) and its potential to affect historic properties, including potential construction-related and indirect effects, including from the privately funded, as-of-right mixed-use development (Overbuild).

The proposed APE is consistent with the 2009 SEQRA/CEQR FEIS. It encompasses the area within 800 feet of the Project Site boundaries, and the Project Site itself. The proposed APE encompasses a sufficiently large area to account for construction-related effects as well as the permanent visual impacts of the Project, including potential indirect effects of the Overbuild. The APE takes into consideration topography, vegetation, and the existing built environment that diminish sight lines. Field reconnaissance and information provided by the Project Sponsor regarding the characteristics of the Project components were utilized to help define the proposed APE. The analysis of potential effects to below-ground (archaeological) resources will be limited to the area of anticipated ground disturbance for construction activities, which is within the Western Rail Yard site boundary.

On July 3, 2020, FRA submitted a memorandum to NYSHPO that formally delineated the proposed APE, including a written description and supporting graphics, for NYSHPO review and concurrence. In its response to FRA dated August 3, 2020, NYSHPO concurred with FRA's proposed APE. FRA will provide the memorandum to the consulting parties as part of the Section 106 consultation to solicit comments and input. In its response to FRA dated August 3, 2020, NYSHPO also noted that it has no archaeological concerns with the proposed undertaking.

D. DATA SOURCES

Historic properties are defined as buildings, structures, sites, objects, and districts that are over 50 years old, possess integrity, and meet the NR criteria for evaluation, as defined by 36 CFR part 60 (the National Register of Historic Places).[2] Resource categories to be identified within the APE will include National Historic Landmarks (NHLs); National Register listed or eligible resources (NR-listed/eligible); and State Register-listed (SR-listed) resources that have either been previously identified and evaluated, or are identified during field surveys for the Project and are found to meet one or more NR eligibility criteria.

FRA will identify historic properties located in the APE and review previous reports and data that include the APE, including the 2009 SEQRA/CEQR FEIS prepared for the Western Rail Yard Project and the 2013 NEPA EA and 2014 NEPA Supplemental EA prepared for the Tunnel Encasement Project. FRA will also conduct additional desktop research and fieldwork as appropriate to assess current conditions, particularly any changes in the above-ground/built environment since 2009 and 2013/2014, including a review of databases and paper files maintained by NYSHPO (see **Table 6-1**).

Table 6-1
Cultural Resource Analysis Data Sources

Resource	Data Source
Historic Properties	• Surveys; – Previously completed relevant environmental documents/cultural resources studies (e.g., Western Rail Yard 2009 *SEQRA/CEQR FEIS*, and NEPA *Supplemental Environmental Assessment* for the Construction of a Concrete Casing Extension in Hudson Yards [2014]); • NYSHPO databases/documents on file; • Lists of locally designated properties; • Information available at state and local repositories (including the New York City Landmarks Preservation Commission), historic maps, and other relevant sources to identify age, history, and significance of properties such as books and historic newspaper articles; and • Resources identified through scoping/public outreach/consulting parties.
Archaeological Resources	• Site visits; • Previously completed relevant environmental documents/archaeological studies (e.g., Western Rail Yard *2009 SEQRA/CEQR FEIS*, and NEPA *Supplemental Environmental Assessment for the Construction of a Concrete Casing Extension in Hudson Yards* [2014]); • Previous environmental studies (e.g., boring data); • NYSHPO databases/documents on file; • Files located at the New York State Museum (NYSM); • Site files and compliance reports available at the local level (including the New York City Landmarks Preservation Commission); • Archival and cartographic sources available through state, local and online repositories including books, journals, historic newspaper articles, and historic maps; • Geophysical survey data; and • Resources of concern identified through scoping/public outreach/consulting parties.

[2] Under the NR Criteria for Evaluation, properties that achieved significance within the past 50 years shall not be considered eligible for the National Register, unless they meet Criteria Consideration G (exceptional importance).

IDENTIFICATION OF HISTORIC PROPERTIES

FRA will prepare a *Historic Architectural Resources Background Study (HARBS) and Effects Assessment* for submission to NYSHPO. The HARBS and Effects Assessment will be prepared in accordance with NYSHPO's *Standards for Cultural Resources Investigations.*

The HARBS and Effects Assessment will provide information regarding historic properties in the APE including: a) review of properties identified in the APE for the Western Rail Yard project and in other previously completed relevant environmental documents and cultural resources studies within the APE; b) verification of the presence/conditions of resources identified in previously completed relevant environmental documents and cultural resources studies; c) a review of the APE to identify if there are properties that require evaluation if they have reached an age of 50 years subsequent to the preparation of the 2009 SEQRA/CEQR FEIS or other previously completed relevant environmental documents and cultural resources studies; d) evaluation of any portions of the APE that have not been previously surveyed to identify potential historic properties; and e) assessment of the Project's potential effects on all identified historic properties (see "Criteria of Adverse Effect" section, below).

For any potentially NR-eligible properties identified, FRA will make a determination regarding NR eligibility and will seek NYSHPO's concurrence with this determination. FRA will submit the HARBS and Effects Assessment to NYSHPO and the consulting parties, which will provide consulting parties an opportunity to provide input into the identification of historic properties in the APE. Where applicable, FRA will obtain data on locally designated or surveyed resources in the APE from local government entities, local historical societies, local libraries, and/or municipal historians. For previously identified historic properties where no updates are required to address changes in condition over time or integrity, existing NYSHPO survey forms will be appended to the HARBS and Effects Assessment.

Using the Western Rail Yard project evaluated in the 2009 SEQRA/CEQR FEIS as a basis, because of the overlap in the Study Areas for the previous Western Rail Yard project and the proposed Western Rail Yard Infrastructure Project, the HARBS will also contain a historic context that focuses on broad themes such as settlement patterns, economic development, development of regional transportation systems, and major events of historic significance. The purpose of the historic context is to provide an increased understanding of the built environment of the APE as it has changed over time.

FRA will provide a historic properties field survey to confirm conditions in areas previously surveyed for the 2009 SEQRA/CEQR FEIS, to evaluate if there are properties in previously surveyed areas that have reached the 50 years of age criterion, and to identify potentially NR-eligible historic properties. FRA team members who meet the Secretary of the Interior's Professional Qualification Standards for Architectural History, codified under 36 CFR part 61 will conduct or oversee the survey. The purpose of the survey will be to identify known historic properties within the APE, and to make recommendations to FRA regarding S/NR-eligibility if they meet the NR criteria for evaluation and retain integrity.

IDENTIFICATION OF ARCHAEOLOGICAL RESOURCES

Archaeological resources are defined as "the place or places where the remnants of a past culture survive in a physical context that allows for the interpretation of these remains," meeting the NR criteria for evaluation as defined by 36 CFR part 60.[3] Archaeological resources may date to the prehistoric or historic period and may be located in terrestrial or submerged environments.

As described above, the Project has previously been reviewed by NYSHPO and the New York City Landmarks Preservation Commission (LPC), and the Western Rail Yard site has been determined to not be an archaeologically sensitive area. The 2009 SEQRA/CEQR FEIS relied on the assessment of potential archaeological sensitivity prepared for the 2004 *No. 7 Subway Extension-Hudson Yards Rezoning and Development Program FGEIS* (2004 *Hudson Yards FGEIS*), which concluded that the Western Rail Yard was not an archaeologically sensitive area, based on LPC's review of contextual studies, historic maps, and existing subsurface information, including boring logs, to confirm prior subsurface disturbance as well as the likelihood of initial resource deposition. The historical maps of the study area referenced in the cultural analyses conducted for the 2009 SEQRA/CEQR FEIS, the 2004 Hudson Yards FGEIS, and 2013 Concrete Casing EA, show that the shoreline prior to approximately 1850 was further east than the location of the present Project Site. Furthermore, the project area has previously been subject to extensive ground disturbance from construction of the Western Rail Yard. In its response to FRA dated August 3, 2020 (referenced above), NYSHPO noted that it has no archaeological concerns with the proposed undertaking.

E. ANALYSIS TECHNIQUES

After FRA has established the APE with concurrence from NYSHPO and historic properties within the APE have been identified, FRA will evaluate the potential for the No Action Alternative and Proposed Action to adversely affect such properties, in accordance with the criteria of adverse effect (36 CFR 800.5[a]) as described below.

F. CRITERIA OF ADVERSE EFFECT

FRA will apply the criteria of adverse effect in **Table 6-2** to determine if historic properties would be adversely affected by the undertaking. FRA's effects determination will be contained in the Effects Assessment. For any historic properties that would be adversely affected by the undertaking, FRA, in consultation with NYSHPO and other consulting parties, will seek ways to avoid or minimize those adverse effects. FRA will include measures to avoid or minimize adverse effects as stipulations in an MOA or PA.

[3] National Register Bulletin 36, *Guidelines for Evaluating and Registering Archeological Resources,* prepared by the National Park Service.

Table 6-2
Criteria of Adverse Effects

Criteria of an Adverse Effect	"An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all qualifying characteristics of an historic property, including those that may have been identified subsequent to the original evaluation of the property's eligibility for the National Register. Adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance or be cumulative."
Examples of Adverse Effects	Adverse effects on historic properties include, but are not limited to: 1. Physical destruction of or damage to all or part of the property; 2. Alteration of a property, including restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation and provision of handicapped access, that is not consistent with the *Secretary of the Interior's Standards for the Treatment of Historic Properties* (36 CFR Part 68) and applicable guidelines; 3. Removal of the property from its historic location; 4. Change of the character of the property's use or physical features within the property's setting that contribute to its historic significance; 5. Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features; 6. Neglect of a property which causes its deterioration, except where such neglect and deterioration are recognized qualities of a property of religious and cultural significance to an Indian tribe or Native Hawaiian organization; 7. Transfer, lease, or sale of property out of Federal ownership or control without adequate and legally enforceable restrictions or conditions to ensure long-term preservation of the property's historic significance.

Source: 36 CFR 800.5[a][1] and 36 CFR 800.5[a][2].

G. MITIGATION ANALYSIS

FRA will consult with NYSHPO, the consulting parties, and the ACHP (if participating), to develop mitigation measures for any identified adverse effects. Mitigation measures will be set forth in a Section 106 agreement document (PA or MOA) to be executed among FRA, NYSHPO, the Project Sponsor, ACHP (if participating), and any consulting parties that may be interested in being concurring parties to the document or established by FRA as invited signatories if they will have responsibilities related to implementation of the mitigation measures. The EIS will document the measures identified in the Section 106 agreement document. The Section 106 agreement document would be either an MOA or a PA, respectively, depending on whether FRA anticipates that all historic properties and Project effects to those properties will be known by the conclusion of the NEPA process, or whether there is a need for phased and/or future identification and evaluation efforts after conclusion of the NEPA process.

SECTION 106 COORDINATION WITH NEPA EIS

The results of the Section 106 process will be described in detail in the EIS in a dedicated cultural resources chapter, and a determination of impacts on cultural resources will be made pursuant to NEPA in the EIS. The results of the Section 106 process will include the establishment of the APE; a summary of the prior and updated determination of archaeological sensitivity by NYSHPO, the HARBS that will identify cultural resources, and the Effects Assessment that will assess potential effects to cultural resources within the APE; and steps taken in consultation with NYSHPO, ACHP and other consulting parties to avoid, minimize, or mitigate adverse effects to cultural resources if any such effects are identified.

Public outreach and involvement opportunities utilized by FRA for purposes of NEPA may be used to satisfy the public involvement requirements under Section 106, as long as such opportunities are adequately advertised for such purposes and the EIS contains adequate information regarding FRA's efforts to identify and assess to Project's effects on historic properties. Therefore, advertisements for the Draft EIS public hearing will identify that this is an opportunity for the public to participate in the Section 106 process. FRA formally initiated the Section 106 process through a letter submitted to the NYSHPO on July 3, 2020. The NEPA scoping process began on July 1, 2020**,** with the Scoping Presentation being made available to the public beginning on that date, which provided the public with an opportunity to provide comments with respect to cultural resources that could help inform the Section 106 process. The Draft EIS will contain information regarding the establishment of the APE, identification of cultural resources, and assessment of effects on identified cultural resources. The Draft EIS will be subject to a public comment period, allowing an opportunity for public review and comment on the Project's effects on cultural resources, including at public hearings that will be held to solicit public comments on the Draft EIS.

Measures to resolve any adverse effects would be contained in the Section 106 agreement document (MOA or PA), with a draft of the Section 106 agreement to be included in the DEIS for public comment. The Section 106 agreement will be executed prior to FRA's issuance of the NEPA Record of Decision (ROD).

H. CORRELATION WITH OTHER ANALYSES

Information from the cultural resources analysis will be used to inform other resource category analyses in the EIS. Cultural resources will be considered in the identification of visual resources in the aesthetic and visual quality analysis, and the results of the cultural resources analysis FRA will prepare pursuant to Section 106 of the NHPA will inform the Section 4(f) analyses with respect to historic properties. In addition, the analyses of potential effects on cultural resources will utilize information from the land use and noise and vibration assessments undertaken for the Project. ✷

Chapter 7: Parks and Recreation Areas

This chapter identifies the methodology that FRA will use to identify parks and recreation areas (also referred to as open spaces) and to evaluate the potential construction-related and operational effects of the No Action Alternative and Proposed Action on those resources. In addition, Section 4(f) resources will be identified in this chapter and inform the evaluation of Section 4(f) resources discussed in Chapter 19. As Section 4(f) also include historic properties, Chapter 6, "Cultural Resources," will identify historic properties that may be affected and included in the Section 4(f) evaluation. There are no wildlife and waterfowl refuges or conservation areas within the Study Area; therefore, this methodology will not address assessment of impacts to those resources.

A. REGULATORY CONTEXT

FRA will follow 23 CFR part 771 and relevant CEQ guidelines for the EIS analysis of the Project's potential to impact sites devoted to recreational activities, including impacts on non-site-specific activities, such as bicycling, and impacts on non-activity-specific sites, such as designated "open space," will follow 23 Code of Federal Regulations (CFR) Part 771 and relevant CEQ guidelines.

The analysis will also follow Section 4(f) of the USDOT Act of 1966. Section 4(f) prohibits Department of Transportation agencies from approving any program or project that requires the "use" of any publicly owned parkland, recreation area, or wildlife and waterfowl refuge; or any land from a publicly or privately owned historic site of national, state, or local significance (collectively, "Section 4(f) properties"), unless a) the agency determines that the use of the property will have a *de minimis* impact; or b) there is no feasible and prudent avoidance alternative to the use of the land, and the action includes all possible planning to minimize harm to the Section 4(f) property. In making its Section 4(f) determinations, FRA follows 23 CFR part 774. In addition, FRA considers FHWA's Section 4(f) guidance, known as the Section 4(f) Policy Paper.[1] More details on the Section 4(f) methodology FRA will follow for this Project can be found in Chapter 19, "Section 4(f) Evaluation."

In New York, temporary or long-term use of publicly owned parkland under the jurisdiction of a municipality (i.e., city, county, town, or village) for non-park purposes constitutes alienation, and requires the approval of the New York State Legislature. Parkland "alienation" occurs when a municipality wishes to sell, lease, or discontinue municipal parkland, including subsurface easements beneath parkland. Authorization is required in the form of legislation enacted by the New York State Legislature and approved by the governor. Alienation is not required for State parkland.[2] The analysis will consider the applicability of this regulation to the Proposed Action.

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[1] FHWA, Section 4(f) Policy Paper, July 20, 2012.

[2] New York State Office of Parks, Recreation and Historic Preservation, Handbook on the Alienation and Conversion of Municipal Parkland in New York, 2012, p. 20. http://nysparks.com/publications/documents/AlienationHandbook.pdf

B. STUDY AREA

The general Study Area for effects on parks and open space will be a radius of ½-mile from the Project Site (as defined in Chapter 1, "Introduction," and shown in Figure 1-2), generally bounded by West 43rd Street to the north, Seventh Avenue to the east, West 21st Street to the south, and the Hudson River to the west.

C. DATA SOURCES

All publicly accessible parks and open spaces located within the Study Area will be inventoried using information from the New York City Department of Parks and Recreation (NYC Parks), Hudson River Park Trust, and GIS mapping layers, including data from NYCDCP, as well as information provided in the 2009 SEQRA/CEQR FEIS (updated as appropriate to reflect changed conditions in the Study Area).

Table 7-1
Parks and Recreation Area Analysis Data Sources

Analysis Area	Data Source
Parks, Open Space, and Recreation Areas	The New York City Department of Parks and Recreation (NYC Parks) Hudson River Park Trust NYCDCP data GIS mapping layers Field visits 2009 SEQRA/CEQR FEIS

D. ANALYSIS TECHNIQUES

In the absence of FRA-specific guidance for assessment of parks and recreation areas, the analysis will be prepared in accordance with the methodology outlined in Chapter 7, "Open Space," of the *CEQR Technical Manual*.

Under the *CEQR Technical Manual* analysis methodology guidelines, the first step in the analysis of parks and recreation areas is to define a Study Area (see above) and map the resources within that area.

FRA will conduct an inventory of all public parks and recreation areas located within the Study Area using information from NYC Parks, Hudson River Park Trust, and GIS mapping layers, including data from NYCDCP. Field visits will be undertaken if possible, given the current state of accessibility restrictions resulting from the ongoing COVID-19 public health emergency. In conducting the inventory, FRA will identify the acreage, current condition, and use of all public parks and recreation areas within the Study Area. Information provided in the 2009 SEQRA/CEQR FEIS will be updated as appropriate to reflect changed conditions in the Study Area.

The analysis will then identify any expected changes in future levels of open space supply and demand, based on other planned development projects within the Study Area and any new parks and recreation areas expected to be developed. Open space ratios for worker and resident populations will be developed for the Proposed Action and compared with ratios for the No Action Alternative to determine expected changes in future levels of adequacy. The analysis will also include a qualitative evaluation that considers such factors as the proximity of other parks and recreation areas outside the Study Area. In coordination with other tasks, FRA will also identify any potential direct impacts on parks and recreation areas from air quality or noise generated by the construction and operation of the Proposed Action.

E. IMPACT CRITERIA

Under the analysis methodology guidelines detailed in Chapter 7, "Open Space," and Section 100 of the *CEQR Technical Manual*, a direct effect occurs when a Proposed Project physically changes, diminishes, or eliminates a public open space resource. This could include the physical loss of a resource because of encroachment onto the space or displacement of the space; changes to the use of the resource so that it no longer serves the same user population; limitations on public access to the resource; or increased noise or air pollutant emissions or odors that affect the usefulness of the resource, whether on a permanent or temporary basis. Parks and recreation areas may also experience short-term (temporary) effects during construction of a Proposed Project, from activities that would impede the operation of the park or open space (or its uses) for construction-related activities, including construction access or staging. The potential for indirect effects, such as from an increased user population that would place new demands on such resources, will be considered in Chapter 18, "Indirect and Cumulative Impacts." FRA will apply these *CEQR Technical Manual* guidelines to determine potential adverse impacts to parks, recreation areas or other public open space resources from construction or operation of the Proposed Action.

F. MITIGATION ANALYSIS

If the construction or operation of the Proposed Action would result in adverse impacts on parks, recreation areas, or other public open spaces, the EIS will explore measures to avoid and/or mitigate such impacts to the greatest extent practicable. For temporary construction impacts, mitigation may include, for example, the expansion or improvement of another nearby park or open space, or the provision of alternate access to a park or open space if public access is limited or lost.

G. CORRELATION WITH OTHER ANALYSES

This analysis will be informed by the land use transportation, air quality, noise and vibration, and cultural resources analyses. Section 4(f) resources will be identified in this chapter, and the Section 4(f) Evaluation and the environmental justice analysis will be informed by information developed as part of this chapter. ✷

Chapter 8: Aesthetics and Visual Quality

This chapter describes the methodology that FRA will use to analyze and evaluate the potential effects of the No Action Alternative and the Proposed Action on visual and aesthetic resources in the EIS.

A. REGULATORY CONTEXT

NEPA requires the consideration of visual resources when analyzing the potential effects of a Proposed Project; therefore, FRA will assess the potential for impacts from the No Action Alternative and the Proposed Action to aesthetics and visual quality.

In the absence of FRA-specific guidance for assessment of visual impacts, the analysis will be prepared in accordance with the Guidelines for the Visual Impact Assessment of Highway Projects (January 2015) prepared by the Federal Highway Administration (FHWA), as appropriate and applicable to the Project. Although this project is not a highway project, many of the components in the guidance are applicable. Such elements as effects on neighborhood character, viewer groups, and viewer sensitivity will be included in the visual assessment.

B. STUDY AREA

The Project Site consists of areas where the Proposed Action would have permanent features or where construction activities for the Proposed Action would occur. To consider the effects of the Proposed Action, based on the specific features of the Proposed Action and the characteristics of the surrounding area. FRA will establish the Area of Visual Effect. Views of visible components of the Proposed Action from within the surrounding area may be obscured by obstructions, landforms, vegetation, structures, or diminished by distance or environmental conditions.

FHWA guidance identifies types of viewsheds. A viewshed is "what people can see in the environment, which is a result of the intersection between the physical constraints of the environment and the physiological limits of human perceptions." The guidance defines "static viewsheds" as "what neighbors of the road see from a stationary location. Dynamic viewsheds are what travelers …see as they move through the landscape. The Area of Visual Effect is the sum of the viewsheds of all travelers with views from the road and all neighbors with views of the road." To account for the geographic area covered by the Proposed Action and to account for long views to the Project Site along Eleventh Avenue and West 30th and 33rd Streets (which border the Project Site), the Area of Visual Effect will be defined as the area generally bounded by West 38th Street to the north, Tenth Avenue to the east, West 26th Street to the south, and the Hudson River to the west. The Area of Visual Effect is considered the Study Area for this resource category analysis.

C. DATA SOURCES

For aesthetic and visual resources, site visits, information from the previously prepared 2009 SEQRA/CEQR FEIS, aerial imagery, GIS data, and information compiled for the analyses of cultural resources and parks and recreation will be used to describe the existing visual character and visual and aesthetic context of the affected environment, which FRA will analyze to determine potential impacts of the No Action Alternative and Proposed Action.

D. ANALYSIS TECHNIQUES

FRA will assess visual impacts by evaluating the compatibility of the No Action Alternative and the Proposed Action with the surrounding context, sensitivity of the viewers, and degree of impact. The assessment of compatibility comprised consideration of the No Action Alternative and the Proposed Action's visual effects in relation to such elements as scale, form, materials, visual character, and distance between the viewer and the visual resource.

In accordance with the FHWA guidelines, the visual impact assessment will consist of four phases: 1) the establishment phase, in which the Study Area is defined and the Area of Visual Effect identified; 2) the inventory phase, in which the existing visual quality and the components of the affected environment and populations are examined; 3) the analysis phase, in which potential impacts on visual quality are evaluated and the degree of impact assessed; and 4) the mitigation phase, in which measures to minimize and lessen any negative effects or impacts are identified.

The establishment phase of the analysis process involves examination of supporting documentation, such as the project description, purpose and need, scoping document, conceptual designs and preliminary engineering, comprehensive plans or municipal ordinances and field observation and recording. The Area of Visual Effect was determined by the Project information and the visibility of project features through landform, land cover, atmospheric conditions, and limits of sight, and as detailed above under "Study Area," the Area of Visual Effect has been defined as the area generally bounded by West 38th Street to the north, Tenth Avenue to the east, West 26th Street to the south, and the Hudson River to the west. The Area of Visual Effect is considered the Study Area for this resource category analysis.

Once the Area of Visual Effect was identified, the inventory phase involved identifying and describing the existing visual character and existing conditions of the affected environment and the affected population. Visual character is a "description of the visible attributes of a scene or object…"[1] Views that are available to the affected population are identified and the quality of those views is described in this phase.

[1] FHWA, Guidelines for the Visual Impact Assessment of Highway Projects, January 2015, p. A-3.

During the analysis phase, the impacts of the Proposed Action are identified and described, and the compatibility of the impact with the surrounding area is determined and the sensitivity of viewers to the impact is evaluated; all of these factors help in assessing the degree of impact on visual quality. Visual quality is defined as "what viewers like and dislike about visual resources that compose the visual character of a particular scene. Different viewers may evaluate specific visual resources differently based on their interests in natural harmony, cultural order, and project coherence. Neighbors and travelers may, in particular, have different opinions on what they like and dislike about a scene."[2]

Viewer sensitivity is "defined by the ability of viewers to see and care about a project's impacts. The sensitivity to impact is based on viewer sensitivity to changes in the visual character of visual resources. Viewers are either sensitive or insensitive to impacts."[3] A key view is a "location from which a viewer (traveler or neighbor) can see either iconic or representative landscapes, with or without the highway (facility), of the project corridor."[4] The impact on visual quality may be beneficial, adverse, or neutral. A Proposed Project may benefit visual quality by enhancing visual resources, creating better views of certain resources, and improving the experience of the viewers. Alternatively, it may adversely affect visual quality by degrading visual resources or obstructing or altering desired views.

Upon completion of the analysis phase, mitigation may be recommended for operational impacts or for construction impacts or both. The mitigation phase identifies potential measures to avoid or minimize the effects of adverse visual impacts. Mitigation measures may include screening or blocking of undesirable views, or enhancing the visual quality of project elements.

In addition, the *CEQR Technical Manual*, Chapter 10, Section 300, has detailed methodology for the assessment of effects on visual resources, which includes consideration of important public view corridors, vistas, and natural and built features. These important aesthetic features will be identified in the inventory phase of the analysis described above.

CEQR TECHNICAL MANUAL GUIDELINES

As defined in the *CEQR Technical Manual*, Chapter 10, Section 100, urban design is the totality of components that may affect a pedestrian's experience of public space. These components include the following:

- Streets—the arrangement and orientation of streets define location, flow of activity, street views, and create blocks on which buildings and open spaces are arranged. Other elements, including sidewalks, plantings, street lights, curb cuts, and street furniture, also contribute to an area's streetscape.
- Buildings—a building's size, shape, setbacks, pedestrian and vehicular entrances, lot coverage, and orientation to the street are important urban design components that define the appearance of the built environment.
- Visual Resources—visual resources include significant natural or built features, including important views corridors, public parks, landmarks structures or districts, or otherwise distinct buildings.

[2] FHWA, pp. A-3, A-4.

[3] FHWA, p. A-3.

[4] FHWA, p. A-2.

- Open Space—open space includes public and private areas that do not include structures, including parks and other landscaped areas, cemeteries, and parking lots.
- Natural Features—natural features include vegetation, and geologic and aquatic features that are natural to the area.

Following the methodology of the *CEQR Technical Manual*, Chapter 10, Section 400, urban design impacts are determined "by considering the degree to which a project would result in a change to a built environment's arrangement, appearance, or functionality such that the change would negatively affect a pedestrian's experience of the area."

E. IMPACT CRITERIA

FRA will follow the FHWA guidelines described above, in the analysis phase to determine the degree of impact on visual quality. The impact on visual quality may be beneficial, adverse, or neutral. A Proposed Project may benefit visual quality by enhancing visual resources, creating better views of certain resources, and improving the experience of the viewers. Alternatively, it may adversely affect visual quality by degrading visual resources or obstructing or altering desired views.

To determine whether the Proposed Action would negatively affect a pedestrian's experience of the area, FRA will use the *CEQR Technical Manual* criteria found in Chapter 10, "Urban Design and Visual Resources," Section 400: Determining Impact Significance. This criteria considers the degree to which a project would result in a change to the built environment's arrangement, appearance, or functionality and whether the change would negatively affect a pedestrian's experience of the area.

To determine whether the Proposed Action would result in adverse impacts to visual resources, FRA will use the criteria found in Chapter 10, "Urban Design and Visual Resources," Section 400: Determining Impact Significance of the *CEQR Technical Manual*, to assess whether the Proposed Action "will obstruct important visual resources and whether such obstruction would be permanent, seasonal, or temporary; how many viewers would be affected; whether the view is unique or do similar views exist; or whether the visual resource can be seen from many other locations."

F. MITIGATION ANALYSIS

If the Proposed Action would result in adverse aesthetic and visual impacts, FRA will explore measures to mitigate these impacts, and describe them in the EIS. Mitigation measures would vary depending on the type of impact identified.

G. CORRELATION WITH OTHER ANALYSES

The visual impacts analysis will be informed by other resource category analyses in the EIS, including land use, cultural resources, and parks and recreational resources to identify visual resources and sensitive viewers. ✴

Chapter 9: Contaminated Materials

This chapter describes the methodology that FRA will use for the assessment and analysis of potential contaminated materials impacts from the Western Rail Yard Infrastructure Project. The analysis in the EIS will present an evaluation of the potential presence and extent of contaminated materials that may be impacted by construction of the Proposed Action, and potential operational impacts of the No Action Alternative and Proposed Action following construction. The Affected Environment Existing Conditions for this resource area are the same as the Affected Environment Future Conditions, no changes are expected to occur in the future conditions.

A. REGULATORY CONTEXT

FEDERAL

The environmental evaluation process will be conducted pursuant to the following Federal laws and regulations, where applicable to Phase I Environmental Site Assessments (ESAs) and/or Phase II Site investigations:

- USEPA – Clean Water Act, 33 U.S.C. s/s 1251 et seq. (1977).
- USEPA – Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), 42 U.S.C. s/s 9601 et seq. (1980).
- USEPA – Resource Conservation and Recovery Act, 42 U.S.C. s/s 321 et seq. (1976).
- USEPA – Safe Drinking Water Act, 42 U.S.C. s/s 300f et seq. (1974).
- USEPA – Toxic Substances Control Act, 15 U.S.C. s/s 2601 et seq. (1976).
- USEPA – National Emissions Standards for Hazardous Air Pollutants (NESHAPS), 40 C.F.R. Part 61.
- USEPA – 40 C.F.R. Parts 260, 261, 262, 263, 266, 268, and 280.
- USEPA – Asbestos Hazardous Emergency Response Act, 40 C.F.R. Part 763.
- Occupational Safety and Health Administration (OSHA) – 29 C.F.R. 1910.120, 1910.1001, 1910.1101, 1926.62, and 1929.58.
- OSHA – Lead: Occupational Health and Environmental Controls, 29 C.F.R. 1926.62.
- OSHA – Asbestos, 29 C.F.R. 1926.1101.

NEW YORK STATE

The environmental evaluation process for the Project Site will be conducted in accordance with NYSDEC and New York City Department of Environmental Protection (NYCDEP) regulations and guidelines, including the following, as applicable (some provisions may or may not be applicable depending on the initial findings of a site assessment for the Project Site, and if further investigations would be conducted during the preparation of the EIS):

- Soil Cleanup Objectives (SCOs) as detailed in 6 NYCRR Subpart 375-6: Remedial Program Soil Cleanup Objectives.
- Water Quality Regulations for Surface Waters and Groundwater as detailed in 6 NYCRR Parts 700-705.
- NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation.
- *CEQR Technical Manual* (see Chapter 12).
- New York State Department of Health, Final Guidance for Evaluating Soil Vapor Intrusion in the State of New York, October 2006.
- New York State Environmental Conservation Law – Article 12 – Oil Spill Prevention, Control, and Compensation, Article 15 – Protection of Waters Program, Article 17 – State Pollutant Discharge Elimination System (SPDES) Permit Program.
- NYSDEC – Spill Technology and Remediation Series (STARS) Memo No. 1, Petroleum-Contaminated Soil Guidance Policy.
- NYSDEC – Division of Water, Spill Response Guidance Manual, January 1990.
- NYSDEC Division of Water, Sampling Guidelines and Protocols, March 1991.
- 6 NYCRR Part 364, Waste Transporter Permits.
- 6 NYCRR Part 371, Identification and Listing of Hazardous Waste.
- 6 NYCRR Part 372, Hazardous Waste Manifest System and Related Standards for Generators, Transporters and Facilities.

Applicable regulations will be cited in the contaminated materials assessments, as warranted. New York City Office of Environmental Remediation (NYCOER) review and approval will be required for investigation and remediation activities associated with hazardous materials at any affected (E) Designated sites, i.e., sites that are already subject to institutional controls placed as a result of prior CEQR reviews (such as that for Hudson Yards). Sites with an (E) Designation (as shown on the New York City zoning map) cannot undergo a change of use or development requiring a New York City Department of Buildings permit without first obtaining approval from NYCOER.

B. STUDY AREA

The American Society for Testing and Materials (ASTM) Standard E1527-13 defines the distance to which various environmental categories pertaining to the historic and current use of nearby properties must also be evaluated. Therefore, the Study Area for this analysis will include the entire Project Site, and will also extend to the known environmental record sources in accordance with ASTM E1527-13, for the contaminated materials assessment. The Phase I ESA will be performed to identify potential environmental concerns associated with the Project Site resulting from past or current site usage or usage of neighboring properties (i.e., areas adjacent to the Tunnel Encasement and Platform) pursuant to ASTM Standard E1527-13 including the associated search radii which various environmental categories pertaining to the historic and current use of nearby properties must also be evaluated.

C. DATA SOURCES

The investigation will include a review of Federal and state environmental agency records obtained using a third party service that searches these databases. New York Freedom of Information Law (FOIL), or Federal Freedom of Information Act (FOIA) requests will be submitted, as warranted, to NYSDEC, NYCDEP, USEPA, and potentially other agencies to review files for certain sites identified as contaminated or potentially contaminated. In addition, historical sources, such as Sanborn Fire Insurance Maps, aerial photographs, and topographic maps will be reviewed for the Study Area to identify RECs, HRECs, and CRECs.

Published literature, available on environmental and contaminated materials studies for the Study Area will be obtained for review from Federal and New York government sources.

The potential for hazardous materials contamination at the Project Site was previously examined as part of the 2004 Hudson Yards FGEIS and 2009 SEQRA/CEQR FEIS for the Western Rail Yard Development. Environmental assessments associated with that examination included a Phase I ESA (completed in September 2004) and Phase II Environmental Site Investigation (ESI) (completed as part of the 2009 SEQRA/CEQR FEIS effort). The 2009 SEQRA/CEQR FEIS, 2013 FRA EA/FONSI, and the 2014 SEA/FONSI also discussed hazardous materials conditions at the Project Site. Petroleum contamination was encountered (spill 04-07411) during the Phase II investigation. The Phase I ESA conducted for the 2009 SEQRA/CEQR FEIS was conducted in accordance with the previous ASTM standard (ASTM E1527-05). The Phase I ESA and hazardous materials assessment in the EIS Contaminated Materials Chapter associated with the construction of the Proposed Action will include information for the ongoing remediation work associated with spill 04-07411 pursuant to a DEC Consent Order, as well as the other findings of recent ESIs and relevant information included in the 2009 SEQRA/CEQR FEIS, 2013 FRA EA/FONSI, and the 2014 SEA/FONSI. These studies will be utilized for the contaminated materials analysis for this EIS.

Additionally, at a minimum, the following databases will be searched as part of the Phase I ESA that will be prepared for the Proposed Action.

The following Federal databases will be searched as part of the Phase I ESA:

- National Priority List (NPL): The USEPA's database of uncontrolled or abandoned hazardous waste sites identified for priority remedial actions under the Superfund Program.
- Comprehensive Environmental Response, Compensation and Liability Information System (CERCLIS): A compilation of sites the USEPA has or is investigating for a release or threatened release of hazardous substances under the CERCLA (Superfund Act) of 1980.
- Resource Conservation and Recovery Act (RCRA) Treatment, Storage, or Disposal Facilities: A compilation of facilities that treat, store, or dispose of hazardous waste.
- RCRA Generators or Transporters: A compilation of facilities that generate or transport hazardous waste.
- Toxic Chemical Release Inventory System (TRIS): Contains information on chemical releases reported pursuant to Section 313 of the Emergency Planning and Community Right-to-Know Act.
- Emergency Response Notification System (ERNS): A federal listing of reported releases of petroleum and other potentially hazardous substances.

- United States Environmental Protection Agency Civil Enforcement Docket: The USEPA's system for tracking civil judiciary cases filed on behalf of the agency by the Department of Justice.

The following State databases will be searched as part of the Phase I ESA:

- State Hazardous Waste Sites (SHWS): An inventory of all actual or suspected inactive hazardous waste disposal sites maintained by the NYSDEC.
- Petroleum Bulk Storage (PBS): A listing of all petroleum bulk storage facilities registered with the NYSDEC. All facilities with a total storage capacity of 1,100 gallons or more are required to register.
- Spills: A listing of all active and inactive petroleum or chemical spills or releases reported to federal and state agencies, including leaking underground storage tanks.
- Solid Waste Facilities (SWF): Landfills, incinerators, transfer stations, recycling centers, and other facilities that manage solid wastes.
- Chemical Bulk Storage (CBS): A listing of all tanks storing hazardous substances registered with the NYSDEC. All underground tanks and all stationary aboveground tanks with a capacity of 185 gallons or more are required to register.
- Major Oil Storage Facilities (MOSF): Sites in New York State storing more than 400,000 gallons of petroleum products.
- Permit Compliance System of Toxic Wastewater Discharges: Facilities discharging wastewaters with toxic chemicals.
- Air Discharge Facilities Index (ADF): Facilities releasing air pollutants.
- Environmental Restoration Program: A list of New York State sites enrolled in the Environmental Restoration Program.
- Voluntary Cleanup Program (VCP): A list of New York State sites enrolled in the Voluntary Cleanup Program.
- Brownfield Cleanup Program (BCP): A list of New York State sites enrolled in the Brownfield Cleanup Program.

In addition to the regulatory databases associated with the Phase I ESA research, the Phase I ESA will be performed to identify potential environmental concerns associated with the Project Site resulting from past or current site usage or usage of neighboring properties (i.e., areas adjacent to the Tunnel Encasement and Platform) pursuant to ASTM Standard E1527-13 including the associated search radii which various environmental categories pertaining to the historic and current use of nearby properties must also be evaluated.

D. ANALYSIS TECHNIQUES

FRA will conduct a Phase I ESA as part of the contaminated materials analysis. The Phase I ESA will be consistent with the requirements of ASTM 1527-13 (the "ASTM Standard") and is intended to satisfy federal "All Appropriate Inquiries (AAI)" criteria to obtain protection from potential liability CERCLA as an innocent landowner, a contiguous property owner, or a bona fide prospective purchaser. The Phase I ESA will include: a review of available records and historical maps and/or aerial photos to determine previous on-site and adjacent land uses; a site inspection and general area characterization; interviews with past and/or present site managers, operators and occupants of the property (if applicable); an evaluation of regulatory database listings for the subject and neighboring properties; a determination of the need for further investigations. Records maintained by USEPA and the NYSDEC will be obtained and reviewed to assess the potential for contamination, due to the presence of identified problem sites and activities on or adjacent to the property. The database search areas will be at least as extensive as those recommended in ASTM Standard E1527-13. A list of databases anticipated to be used as part of completed the Phase I ESA are listed in the previous section.

ASTM Standard E1527-13 describes the process to be followed to conduct a Phase I ESA. It was designed to standardize the process by which commercial real estate transactions are screened for potential environmental liabilities. When performed correctly, the ASTM compliant Phase I ESA documents known environmental conditions and provides a possible defense as an innocent landowner defined by CERCLA, defined in 42 USC 9601(35)(B), in the event that unknown environmental contamination is discovered in the future. The ASTM Standard is widely used as a framework for environmental reviews and property transactions to identify the presence of Recognized Environmental Conditions (RECs), Historic RECs (HRECs), Controlled RECs (CRECs), and Business Environmental Risk, at the Project Site.

The previous Phase I ESA for the Western Rail Yard was conducted in accordance with the previous ASTM standard (ASTM E1527-05); the updated Phase I ESA for the Proposed Action will be conducted in accordance with the current ASTM guidance (ASTM E1527-13) and focus on areas of potential disturbance associated with the Proposed Action (e.g., the entire Project Site). The analysis techniques (described below) for both the Proposed Action and No Action Alternative will include a visual inspection of the property; a review of available regulatory records, historical land use maps and aerial photographs to determine previous on-site and adjacent land uses; and an evaluation of regulatory databases for the Project Site and neighboring properties. Records relating to past and current site uses, spills, and other relevant information (including available prior environmental reports) will be reviewed for properties located within the Study Area and adjacent areas.

A site reconnaissance will be performed as part of the Phase I ESA for the Project Site. Adjoining properties will also be inspected if they are accessible. However, if adjoining properties are inaccessible, observations with regard to the potential for contamination will be rendered, to the extent possible, from publicly accessible areas including public streets and right of ways. The environmental history and regulatory status for the Study Area will be reviewed as part of the Phase I ESA, along with prior reports. Potential environmental concerns in the Study Area that may be impacted by the Proposed Action will be identified based on the review of historical uses and/or the regulatory database information to assess the presence, type, level, and approximate extent of subsurface contamination (if applicable), and to evaluate potential contamination issues including soil, groundwater, and/or soil vapor conditions. The findings of the assessment will be used to support the engineering design and make recommendations for material handling and management and will be summarized in the EIS Contaminated Materials Chapter. Remedial options will be evaluated, as warranted, including excavation and off-site disposal, on-site reuse, in-situ stabilization and treatment, as applicable based on the findings of the Phase I ESA.

Additionally, FRA will review environmental records to identify potential vapor encroachment/intrusion concerns associated with the Proposed Action from contaminated materials that may be disturbed as a result of implementing the Proposed Action.

FRA will summarize the Phase I ESA findings in the EIS, and in addition to evaluating remedial options, the analysis will identify appropriate health and safety measures to be employed during construction to protect workers and the public during intrusive construction activities (e.g., soil excavation and disturbance).

According to the guidelines of the *CEQR Technical Manual* (see Chapter 12, "Hazardous Materials"), public health concerns for which an assessment may be warranted include: increased vehicular traffic or emissions from stationary sources resulting in increased exposure to heavy metals and other contaminants in soil/dust resulting in significant adverse hazardous materials; the presence of contamination from historic spills or releases of substances that might have affected or might affect ground water to be used as a source of drinking water; and actions for which any potential impacts result in an exceedance of accepted Federal, state, or local standards. Drawing on other EIS chapters, this task will assess and summarize the potential for adverse impacts on public health from potential disturbance activities associated with hazardous materials during construction at the Project Site.

E. IMPACT CRITERIA

The impact criteria applicable to the contaminated materials evaluation of the No Action Alternative and Proposed Action will be Federal standards as defined by ASTM 1527-13 and Chapter 12 of the *CEQR Technical Manual*, as well as regulatory guidance and action levels established for the evaluation of soil, sediment, groundwater, and surface water in these jurisdictions. Federal regulatory standards/action levels may include the USEPA RCRA characteristic waste tests for Ignitability (D001), Corrosivity (D002), Reactivity (D003), and Toxicity (D004-D043).

F. MITIGATION ANALYSIS

Based on the findings of the updated Phase I ESA, additional subsurface investigation may be warranted of soil, soil vapor and/or groundwater (e.g., to investigate potential areas of contamination and/or testing to characterize soil/fill for off-site disposal). The results of the Phase I ESA and any subsequent subsurface testing would support an evaluation of construction protocols that would be necessary to mitigate the potential for impacts from the Proposed Action on workers, the public, and the environment. This would take the form of a site-specific Construction Health and Safety Plan (CHASP) for implementation during ground disturbance. The results of the analysis will be summarized in the EIS Contaminated Materials chapter. The mitigation analysis will be used to support (1) planning efforts for the handling and management of any known or potentially contaminated materials encountered or generated during construction, including soil, sediment, groundwater, and surface water, and (2) potential site remediation activities that may be required on properties or portions of properties within the Proposed Action considered in the EIS.

The CHASP will be designed to protect construction workers and the public from potential exposures that are specific to the Proposed Action, with protocols for community air monitoring of particulate and organic vapors, as appropriate, and measures to address potential subsurface contamination and/or underground storage tanks encountered during site excavation. The EIS will include estimates of the amount of excavated contaminated materials that could require disposal, Federal and State regulations governing the disposal of such material, and associated potential effects from transporting this material to disposal locations. The mitigation analysis will describe the methods that will be used to properly dispose of any excavated fill/soil in accordance with all applicable rules and regulations.

G. CORRELATION WITH OTHER ANALYSES

This subject analysis may be interrelated with and draw information from the following resource analyses: land use, cultural resources, soils and geology, water quality, public health, and environmental justice. Primarily, the contaminated materials analysis would be used by these listed investigations to inform their conclusions. However, there could be more involved interaction between investigations. For example, excavation of contaminated soil would be accounted for in noise and air quality analyses; groundwater contamination would need to be assessed in relation to existing ground- and surface water conditions. Also, transportation routes for contaminated materials transport, if necessary, would be considered with the potential need for mitigating community impacts or utilizing federal and state hazardous materials transportation requirements. In addition, if any adverse impacts relating to contaminated materials are identified, an analysis of the potential impacts to public health will be performed using the *CEQR Technical Manual* (see Chapter 20, Sections 200 and 300) for general guidance. ✷

Chapter 10: Utilities and Energy

This chapter describes the methodology that FRA will use to prepare the analysis of potential effects from the No Action Alternative and Proposed Action, under consideration in the NEPA review for the Western Rail Yard Infrastructure Project, to utilities (e.g., water supply, wastewater, and stormwater services; solid waste and sanitation services; and energy supply) serving the Project Site. The assessment will include the additional demands on the utility infrastructure that would result from the operation of the Proposed Action, as well any potential effects to utility services during construction of the Proposed Action. Proposed sustainable design measures to reduce water consumption, sewage generation, stormwater management, and energy usage will be described.

A. REGULATORY CONTEXT

The Council on Environmental Quality (CEQ) regulations define the effects and impacts that Federal agencies are to address and consider in satisfying the requirements of the NEPA process. The FRA has also developed Procedures for Considering Environmental Impacts that will be followed in the preparation of the NEPA EIS for the Western Rail Yard Infrastructure Project. The New York Public Service Commission regulates utilities, stormwater, and other related water utilities under the New York Energy Law. In addition, NYCDEP – Sewers and Departments own and regulate the stormwater collection system within New York City.

B. STUDY AREA

The Study Area includes the approximately 13-acre Project Site (described in Chapter 1, "Introduction," and shown in Figure 1-2), bounded by Eleventh Avenue to the east, West 33rd Street to the north, Twelfth Avenue to the west, and West 30th Street to the south. Additionally, streets immediately adjacent to the Project Site are also included in the Study Area for this resource category. This would include locations where any potentially affected utility infrastructure and services that will be crossed or are adjacent to the Project Site are located; these locations will be identified and described.

C. DATA SOURCES

Information on existing and planned utility infrastructure and services for the Study Area will be obtained from government entities and private service providers. The following potential sources may be contacted for location information including "as-built" drawings or other mapping:

- MTA and LIRR
- NYCDOT
- NYSDOT
- NYCDEP – Sewers and Departments
- Consolidated Edison

- New York City Department of Sanitation
- Private solid waste disposal providers
- New York Public Service Commission

D. ANALYSIS TECHNIQUES AND CRITERIA

FRA will conduct an assessment of the potential impacts of the Proposed Action to utilities and energy for the EIS. Where potential adverse impacts are identified, FRA will develop mitigation to address the impacts, as appropriate and feasible.

CONSTRUCTION IMPACTS

Existing and proposed utility infrastructure and services locations will be compiled from as-built drawings, information obtained for proposed infrastructure (as available), and plotted on graphics as appropriate to support the impact analysis of the No Action Alternative and Proposed Action. Construction-related impacts (short-term and long-term) will be assessed considering key questions:

- Will an existing utility line require protection, relocation or replacement as a result of Project construction?
- To what extent would such impact(s) result in service disruption for the utility (e.g., who would be affected, duration of effects)?
- Potential impacts to any proposed, future utility infrastructure will also be evaluated.

Estimates of construction-related and future operational power consumption by the Western Rail Yard Infrastructure Project will be developed by the project designers to ensure that the existing Project Area power grid will be able to accommodate the increased load.

OPERATIONAL IMPACTS

The Platform component of the Proposed Action would have little to no operational power consumption associated with it. The analyses will focus on estimating the additional demands that the Proposed Action would place on the energy supply from the increased load required to operate the new and reconstructed LIRR infrastructure associated with the Platform (e.g., ventilation system, life-safety systems, etc.), described in more detail in Chapter 1, "Introduction."

The Proposed Action includes a new permanent power sub-station for the operation of the rail yard, as described in Chapter 1, "Introduction." The need and potential location(s) of any additional new, temporary, or permanent electric power sub-stations will be evaluated and any potential impacts to utilities will be assessed.

NYCDEP has prepared an updated Manhattan Trunk Main Master Plan to identify the rehabilitation required to the existing, aging trunk water main system and improvements to connect the distribution network to the Water Tunnel No. 3, which is presently under construction. Consideration of water supply infrastructure capabilities will include recommendations of this Trunk Plan.

NYCDEP has prepared an Amended Drainage Plan for a portion of the Hudson Yards area that includes the area generally bounded by Twelfth Avenue (Route 9A) to the west, West 40th Street to the north, West 32nd Street to the south, and Tenth Avenue to the east. The wastewater and stormwater analyses described below will take into account the Amended Drainage Plan, as the Affected Environment/Existing Condition, and future changes to the combined and separate storm systems associated with the Amended Drainage Plan under the No Action Alternative.

The utility and energy analyses FRA will include in the EIS include the following:

WATER SUPPLY

A. Based on information obtained from NYCDEP, the existing water supply network and capacity of the distribution system that currently serves the Project Site will be described. Improvements to the water supply system recommended as part of the Trunk Plan that are expected to be implemented as part of the Hudson Yards Rezoning and Development Program and that relate to the No Action Alternative and Proposed Action will also be identified.
B. A projection of the demand from the Proposed Action will be developed using water usage rates for typical land uses provided in Table 13-2 in Chapter 13, "Water and Sewer Infrastructure," of the *CEQR Technical Manual*, and estimates of the water demand in the No Action Alternative and the Proposed Action will be compared.
C. The potential for impacts on the water supply system's abilities to maintain adequate water supply and operating pressure, as a result of the Proposed Action's incremental water demand, and demand trends citywide including the impacts of Local Law 29 of 1989 will be assessed. The potential for reductions in water demand from various water conservation measures and sustainable design features will be identified, and to the extent practicable their benefit will be quantified.

WASTEWATER

A. Based on information obtained from NYCDEP, the existing sewer system serving the Project Site will be described. The existing average and maximum monthly flows to the North River Water Pollution Control Plant for the latest 12-month period will be provided.
B. Using the water demand determined in the task above and NYCDEP projections, the sanitary sewage generation for conditions under the No Action Alternative and the Proposed Action will be estimated. The Platform (and its associated infrastructure) and Tunnel Encasement are not anticipated to generate any significant volumes of wastewater.
C. The potential for impacts in terms of system conveyance and Water Pollution Control Plant treatment capacity as a result of the Proposed Actions' incremental sanitary sewage demands will be assessed. This evaluation would include a screening level assessment that compares the estimated stormwater and sanitary volumes and flows that would be discharged to the combined sewer under the No Action Alternative. If the screening indicates the need for further analyses, modeling would be conducted in consultation with NYCDEP and in consideration of the results of the screening level assessment.
D. The compliance of the North River Water Pollution Control Plant with its permit requirements, which protect Hudson River water quality, will be discussed.
E. The adequacy of the Amended Drainage Plan to meet the requirements of the Proposed Action will be assessed.

F. Conformity of the Proposed Action, and Amended Drainage Plan, with the DEP's Long Term Control Plan (LTCP) Project which monitors and assures compliance with applicable Administrative Consent Orders between DEC and New York City for the CSO Abatement Program.

STORMWATER

A. The existing storm and combined sewer system serving the Project Site will be described. The description will include the major sewer lines and the location of existing CSOs into the Hudson River.

B. Using NYCDEP design criteria, stormwater runoff rates from the No Action Alternative and Proposed Action will be calculated and compared. Based on the project-generated runoff, analyses or modeling would be conducted in consultation with NYCDEP, to identify the following: modifications to the storm and combined sewer infrastructure that may be required to accommodate project-generated runoff, resultant CSO events associated with this increased runoff, and stormwater management measures to be implemented as part of the Proposed Action. If necessary, the EIS will provide an assessment and description of stormwater treatment technologies. The potential for adverse impacts on water quality in the Hudson River as a result of these changes will be assessed.

C. The potential reductions in stormwater runoff from proposed sustainable measures included in the design of the Proposed Action will be reflected in the analysis.

SOLID WASTE AND SANITATION SERVICES

This chapter of the EIS will assess the additional demands the operation of the No Action Alternative and the Proposed Action would place on solid waste disposal services. During construction of the Proposed Action, the only demand for solid waste disposal service would be to dispose of construction debris, which would be accommodated by private solid waste carters, no municipal solid waste disposal would be required. The construction and operation of the Tunnel Encasement and Platform components of the Proposed Action would have little to no demand for municipal solid waste and sanitation services associated with them. The analyses will focus on estimating the additional demands that the Project Action would place on solid waste and sanitation services from the operation of the new and reconstructed LIRR infrastructure associated with the Platform (e.g., ventilation system, life-safety systems, etc.), as described in more detail in Chapter 1, "Introduction."

ENERGY

A. Based on information obtained from Con Edison, the existing energy distribution systems (electricity, natural gas, and steam) serving the Project Site and estimated energy usage at the Project Site for the Affected Environment Existing Conditions will be described.

B. Using energy usage rates for typical land uses provided in Table 15-1 of Chapter 15, "Energy," of the *CEQR Technical Manual*, energy demands for the No Action Alternative and the Proposed Action will be estimated. The Tunnel Encasement and Platform components of the Proposed Action would have little to no additional energy demand associated with them, so the analyses will focus on estimating the additional demands that the Proposed Action would place on energy usage from the new and reconstructed LIRR infrastructure associated with the Platform (e.g., ventilation system, life-safety systems, etc.), as described in more detail in Chapter 1, "Introduction." The energy demands of the Proposed Action will be considered in relation to the energy demands and supply conditions in the No Action Alternative. This analysis will include consideration of the projected development in the Study Area as part of the energy demand under the No Action Alternative.

C. The potential for adverse impacts on energy distribution system capacities as a result of the incremental energy demand of the Proposed Action will be assessed, and if adverse impacts are identified, potential mitigation would be described. If it is found that they are necessary, improvements to the energy distribution infrastructure will be identified.

D. Any proposed energy saving contributions of implementing LEED certification or other sustainable design elements include in the Proposed Action will also be described.

E. MITIGATION ANALYSIS

The Proposed Action would be planned and designed to minimize infrastructure impacts to the maximum extent practicable. Design and construction of the various components of the Proposed Action would seek to avoid physical disruption of utility infrastructure. If conflicts are unavoidable, mitigation, such as protection, relocation or replacement of the utility infrastructure segment impacted, will be proposed to avoid or minimize any long-term impacts. Timing restrictions for any unavoidable temporary service disruptions will also be considered as a way to minimize impacts to utility customers.

The Proposed Action would be designed to avoid impacts resulting from water use; wastewater generation; stormwater generation; solid waste and sanitation services; and energy consumption. Mitigation may be implemented if necessary to avoid or minimize such impacts.

F. CORRELATION WITH OTHER ANALYSES

The Utilities and Energy analysis is potentially interrelated with the analyses of the following resource categories: Air Quality, Greenhouse Gases, and Resilience; and Safety and Security. These investigations will use the conclusions of the utility and energy analysis to determine if impacts from utility construction/reconstruction or service disruptions affect the outcome of these resource category analyses. ✷

This chapter describes the methodology that FRA will use for the assessment and analysis of soils and geologic conditions, as well as the potential for seismic activity in the area, which would need to be accounted for as part of the design of the Proposed Action. These studies will also assess the future No Action Alternative conditions and potential construction impacts of the Proposed Action. The Proposed Action is not anticipated to result in any operational impacts. The Affected Environment Existing Conditions for this resource area are the same as the Affected Environment Future Conditions, no changes are expected to occur in the future conditions. Potential construction impacts will be evaluated with respect to geologic structure and faults, seismicity, slope stability, and unique geologic features, based on available soils and geologic data.

A. REGULATORY CONTEXT

Requirements of the New York City Building Code and New York City Department of Buildings will be followed in the determination of foundation requirements, seismic design criteria and excavation practices.

B. STUDY AREA

The Study Area for this analysis will include the boundaries of the Project Site for the analysis of soils and geologic conditions.

C. DATA SOURCES

In addition to any soil investigations performed during the previously prepared 2009 SEQRA/CEQR FEIS, 2013 NEPA EA/FONSI, 2014 SEA/FONSI, or by the Project Sponsors during design, the analysis of soils and geology will include a review of published information obtained from Federal and New York State government sources about the geologic, hydrogeologic, hydrologic, or topographic characteristics of the Study Area, including seismic data (as shown in **Table 11-1**). An assessment of the soil units located within the Study Area will also be undertaken, including reviewing the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (WSS) and the Soil Survey Geographic Database (SSURGO).

Table 11-1
Database and Resources Consulted for Soils and Geology

Data Sources
USGS 7.5 Minute Topographic Map
USGS National Seismic Hazard Map of New York
USGS maps for southern New York region (bedrock and surficial geologic maps)
New York State Geology Museum for Earthquake epicenters, bedrock geology, surface geology, aquifers, and landslides
USDA Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO)
NYSDEP for wells, mines, and aquifers

D. ANALYSIS TECHNIQUES

The soils and geology at the Project Site, including any available geologic mapping and any available soil investigation data, will be analyzed to identify type of soil/geology present at the Project Site. This analysis will support the engineering design for the Tunnel Encasement and Platform structure foundations, estimating the amount of materials to be excavated from the site, and identification of any dewatering needs during construction of the Proposed Action.

Soils/rock that have the potential to be impacted by the Proposed Action, such as soil or rock anticipated to be excavated, will be evaluated to determine if any remediation or special disposal is required or if any special removal procedures are required.

E. IMPACT CRITERIA

The EIS will include estimates of the amount of material excavated from the site, the intended method of excavation and the intended disposal strategy. The soil/rock removed will be transported and disposed at licensed disposal facilities in accordance with federal and state standards, as well as regulatory guidance and action levels established for the evaluation of soil, sediment, and geology in these jurisdictions. Excavation performed and material removals would be coordinated with New York City Transit Authority, Long Island Rail Road and the Metropolitan Transit Authority to limit interference with rail operations during removals. For bedrock removal, the Project Sponsor's contractor will obtain and adhere to the excavation, rock splitting and blasting permit from the New York City Department of Buildings. Vibrations during construction will be monitored, and action levels developed, to evaluate the potential impacts of the contractor's means and methods for removal of rock and soil on adjacent facilities.

F. MITIGATION ANALYSIS

If adverse impacts are identified, the EIS will recommend measures to avoid or mitigate these effects. Mitigation measures could include design changes to address potential impacts.

G. CORRELATION WITH OTHER ANALYSES

This subject analysis may be interrelated with and draw information from the analyses completed as part of the contaminated materials analysis. ✷

Chapter 12: Water and Natural Resources

This chapter describes the methodology that FRA will use to guide the analysis of potential effects to natural resources, water resources, and water quality from the No Action Alternative and the Proposed Action under consideration in the NEPA review for the Western Rail Yard Infrastructure Project.

The Project Site is a fully developed site with no wetlands, minimal vegetation, and no suitable habitat because of the active rail yard and associated LIRR maintenance and operational facilities that occupy the majority of the Project Site. Therefore, the analysis of water and natural resource are not anticipated to require intensive examination. Similarly, as the Proposed Action would not require any in-water construction activities within the Hudson River, the analyses will focus on any potential temporary construction impacts or operational effects on water resources and water quality that may result from the Proposed Action, and the potential for coastal flooding to affect the Proposed Action, as the majority of the Project Site is located within the 100-year floodplain.

The EIS will also focus on any potential temporary construction impacts or operational effects of the Proposed Action on wetlands. Any subsequent changes to analysis methodologies will be reflected directly in the EIS. This effects assessment methodology has also been prepared to ensure that the EIS will fulfill any applicable federal, state, and local environmental review requirements to support review of the document by participating agencies.

A. REGULATORY CONTEXT

The following laws and statutes, Executive Orders (EOs), and regulations apply to natural resources, floodplains, groundwater, wetlands, and water quality within the vicinity of the Project Site (coastal zone policies and rules, as well as issues and regulations related to hazardous materials, will be addressed in separate chapters).

FEDERAL

CLEAN WATER ACT (33 USC §§ 1251 – 1387)

The objective of the Clean Water Act, (CWA) is to restore and maintain the chemical, physical, and biological integrity of the waters of the United States. It regulates point sources of water pollution, such as discharges of municipal sewage, industrial wastewater, and stormwater runoff; the discharge of dredged or fill material into navigable waters and other waters; and non-point source pollution (e.g., runoff from streets, construction sites) that enter water bodies from sources other than through an outfall or other outlet. Applicants for discharges to navigable waters in New York must obtain a Section 401 Water Quality Certificate from the NYSDEC.

Section 404 of the CWA regulates the discharge of dredged or fill material into waters of the United States, including to regulated wetlands.

EO 11990, "PROTECTION OF WETLANDS"

In accordance with EO 11990, "Protection of Wetlands," federal agencies must avoid undertaking or providing assistance for new construction in wetlands unless there is no practical alternative to such construction and the proposed action includes all practicable measures to minimize harm to the wetland.

FLOODPLAIN MANAGEMENT EXECUTIVE ORDER 11988 (42 FR 26951)

EO 11988 and USDOT Order 5650-2, "Floodplain Management and Protection," April 23, 1979 require federal agencies to avoid to the extent possible the long and short-term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. The guidelines address an eight-step process that agencies should carry out as part of their decision-making on projects that have potential impacts to or within the floodplain.

ENDANGERED SPECIES ACT OF 1973 (16 USC §§ 1531 TO 1544)

The Endangered Species Act of 1973 recognizes that endangered species of wildlife and plants are of aesthetic, ecological, educational, historical, recreational, and scientific value to the nation and its people. The Act provides for the protection of critical habitats on which endangered or threatened species depend for survival. The Act also prohibits the importation, exportation, taking, possession, and other activities involving illegally taken species covered under the Act, and interstate or foreign commercial activities.

NEW YORK STATE

STATE POLLUTANT DISCHARGE ELIMINATION SYSTEM (SPDES) (ECL ARTICLE 3, TITLE 3; ARTICLE 15; ARTICLE 17, TITLES 3, 5, 7, 8; ARTICLE 21; ARTICLE 70, TITLE 1; ARTICLE 71, TITLE 19; IMPLEMENTING REGULATIONS 6 NYCRR ARTICLES 2, 3).

Title 8 of Article 17, ECL, Water Pollution Control, authorized the creation of SPDES to regulate discharges to New York State's waters pursuant to a delegation by USEPA to New York State of permitting authority pursuant to the CWA. Activities requiring a SPDES permit include point source discharges of wastewater into surface or groundwater of the state, constructing or operating a disposal system (sewage treatment plant), discharge of stormwater, and construction activities that disturb one or more acres.

ENDANGERED AND THREATENED SPECIES OF FISH AND WILDLIFE; SPECIES OF SPECIAL CONCERN (ECL ARTICLE 11, TITLE 5, SECTIONS 11-0535[1]-[2], 11-0536[2], [4], IMPLEMENTING REGULATIONS 6 NYCRR PART 182)

The Endangered and Threatened Species of Fish and Wildlife, Species of Special Concern Regulations prohibit the taking, import, transport, possession, or selling of any endangered or threatened species of fish or wildlife, or any hide, or other part of these species as listed in 6 NYCRR §182.6. Under these regulations, adverse modification of occupied habitat of endangered or threatened species is prohibited without authorization from NYSDEC.

B. STUDY AREA

For terrestrial resources and floodplains, the Study Area will be restricted to the Project Site and the area immediately adjacent (i.e., the adjacent roadways and portion of the High Line) because of the highly developed nature of the surrounding land uses. An exception is made for the identification of threatened or endangered species, which will be evaluated for a distance of at least ½-mile from the Project Site. The Study Area for water quality and aquatic biota includes the Lower Hudson River, focusing on the area of the river with the potential to receive stormwater runoff from the Project Site, combined sewer outfalls (CSOs) with the potential to be affected by the No Action Alternative and Proposed Action, and effluent from the North River Water Pollution Control Plant.

The Study Area for water resources will include all portions of the Project Site affected by the Proposed Action. This will include potential areas of temporary and permanent disturbance, including staging areas, and areas adjacent to these areas of disturbance that have the potential to be affected by the Proposed Action. The Study Area will be determined primarily based on field reconnaissance, inventory and analysis; therefore, the EIS will include a more exact description and depiction of the water quality, wetland, and water resource Study Areas.

C. DATA SOURCES

Table 12-1 lists data sources used to characterize floodplains, water quality, wetlands, water resources, and natural resources (including threatened or endangered species, wildlife, and habitats) within the Study Area.

Table 12-1
Data Sources for Natural Resources, Water Resources and Water Quality Analyses

Resource Area	Data Sources
Floodplains	• FEMA Flood Insurance Rate `Maps (FIRMs) • USGS topographic maps
Threatened or Endangered Species	• USFWS Planning and Conservation System (IPaC) results • Coordination with USFWS and NMFS for a Section 7 Consultation • Coordination with NYNHP • NYSDEC Environmental Resource Mapper • NatureServe • Publicly available empirical studies conducted within proximity to the Project Site
Wildlife and Habitats	• NYSDEC 2000–2005 Breeding Bird Atlas results • NYSDEC Herp Atlas Project results • NYSDEC Environmental Resource Mapper • Publicly available empirical studies conducted within proximity to the Project Site • Results from field survey
Wetlands	• USFWS NWI maps • USGS topographic maps • NYSDEC tidal wetlands maps • NYSDEC Environmental Resource Mapper • NYC Oasis Mapper • Soils data and maps, USDA Web Soil Survey • Results from field survey
Water Quality and Water Resources	• NYCDEP Harbor Water Quality Survey reports • NYSDEC Environmental Resource Mapper • Hudson River Estuary Program • Results from field survey

D. ANALYSIS TECHNIQUES

FRA will utilize the data collection tools described above to characterize the current condition of Study Area water resources, water quality, and natural resources in the EIS. For example, the EIS will identify and describe any wetlands within the Study Area using mapping tools and other existing information, field surveys, and agency consultation, as appropriate. The Affected Environment Existing Conditions section of the EIS will establish the current conditions of natural and water resources.

The EIS will qualitatively describe existing terrestrial habitats and wildlife present on the Project Site and in the Study Area, and will describe the Affected Environment Existing Conditions for floodplain, terrestrial resources, and threatened or endangered species.

The EIS will assess the Affected Environment Future Conditions for natural and water resources by considering future private development projects that will be implemented with or without the Proposed Action.

The qualitative assessment of water resources, water quality, and natural resources for the Affected Environment Future Conditions will consider both ongoing and proposed projects within the Study Area, including, but not limited to the following that would occur by the analysis year:

- Water quality and sediment quality goals of regional and local programs such as the Hudson River Estuary Program that may lead to future improvements;
- Habitat enhancement or restoration activities associated with the Hudson River Estuary Program;
- Effects on aquatic resources from other changes in the Hudson River; and
- Planned projects with the potential to affect water resources and water quality within the Study Area.

FRA will undertake an assessment of the effects of the No Action Alternative and Proposed Action in the EIS on water resources, water quality, and natural resources, including terrestrial and aquatic habitats and wildlife on and near the Project Site.

FRA will assess potential impacts by examining results of empirical studies conducted by other researchers or project proponents within or near the Study Area or other relevant studies performed in other geographic areas that relate to the Proposed Action, and identifying potential issues through consultation with regulatory agencies.

Potential impacts to water resources and water quality from the No Action Alternative and Proposed Action will be evaluated in order to compare impacts through undertaking the following:

- Assess the potential effects of the No Action Alternative and Proposed Action on future water quality of the Hudson River. This analysis will consider the potential short- and long-term effects of possible stormwater discharges to the Hudson River during construction and operation of the Proposed Action.
- Analyze potential short- and long-term effects to water quality of the Hudson River in the vicinity of the North River Water Pollution Control Plant due to projected discharges of sanitary sewage to the combined sewer system as a result of the construction and operation of the Proposed Action.

- Conduct Section 7 consultation required under the ESA to ensure the No Action Alternative and construction and operational impacts associated with the Proposed Action do not jeopardize the continued existence of any listed species.
- Assess the potential impacts to the projected future terrestrial and floodplain resources, taking into consideration projections of sea level rise (see Chapter 4, "Air Quality, Greenhouse Gas Emissions, and Resilience").

The outcome of the examination and consultation will determine if the No Action Alternative and Proposed Action would result in:

- Temporary and long-term direct impacts such as habitat loss, fragmentation, or modification, wetland filling, and/or
- Temporary increases in suspended sediment within surface waters.

Potential impacts to aquatic resources will consider the following temporary and long-term impacts:

- Temporary construction impacts on water quality due to possible dewatering;
- Temporary construction impacts on water quality of the Hudson River from the discharge of stormwater during construction;
- Potential long-term operational impacts on water quality associated with the operation of the Proposed Action; and
- Potential impacts to groundwater resources during construction of the project and operation of the Proposed Action on the basis of the results of the Contaminated Materials and Soils and Geology analyses.

E. IMPACT CRITERIA

Under the *CEQR Technical Manual* (see Chapter 11, "Natural Resources," Sections 100 and 400), natural resources include plant and animal species, any area capable of providing habitat for plant and animal species, and areas capable of functioning to support ecological systems and maintain the City's environmental stability. Areas that may support plants and animals in urban systems include surface water bodies and groundwater; wetland resources, including freshwater and tidal wetlands; terrestrial resources, including grasslands, fields, woodlands, gardens and other ornamental landscaping; and built resources, including piers and other waterfront structures. An adverse impact occurs if the No Action Alternative and Proposed Action would disturb a natural resource to such an extent that its values or functions are compromised. To determine whether the impacts to ecological communities and wildlife would be adverse, the potential abundance of the resource within the region, and the potential impact to the regional population or community from a direct loss of individuals or habitat area will be considered. Impacts to natural resources within the Study Area will be evaluated against the appropriate regulatory programs and would involve coordination with local, state, and federal agencies, on the basis of results of relevant empirical studies, and best professional judgement.

Federal Executive Order 11988, "Floodplain Management," requires 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 on or loss of a vital transportation facility; or a notable adverse impact on natural and beneficial floodplain values.

In accordance with CEQ's NEPA Implementing Regulations (40 CFR part 1508.27), impacts must be considered for their significance with respect to context and intensity. The EIS will assess the potential construction and operational impacts of the Proposed Action. Where potential adverse impacts are identified, mitigation to address the impacts will be developed, as appropriate and feasible.

Impacts to water resources and water quality within the Study Area will be evaluated against the appropriate regulatory programs in accordance with federal/state/local guidance and would involve coordination with local, state, and federal agencies, on the basis of results of relevant empirical studies, and best professional judgement.

Should it be determined that wetlands would be adversely impacted by the Proposed Action, then a Wetland Finding statement as per EO 11990 will be prepared accordingly. This would be appended to the EIS being prepared pursuant to the NEPA and CEQR. Impacts to wetlands will be described in the EIS and, if necessary, mitigation will be proposed.

F. MITIGATION ANALYSES

If adverse impacts are identified to any of the resources considered in this analysis, FRA will recommend measures to mitigate these effects in the EIS. The Proposed Action would first seek to identify measures (including changes to design) to avoid, and then minimize impacts to protected water resources, water quality, or natural resources to the extent practicable. Where the Proposed Action would result in unavoidable adverse impacts, compensatory mitigation would be proposed, and would be included as a condition of any applicable permit authorizations from state and federal agencies. Compensatory mitigation for unavoidable adverse impacts would be in accordance with New York regulations and may take the form of on-site mitigation, off-site mitigation, and purchase of compensatory mitigation credits from a mitigation bank or in-lieu fee program.

G. CORRELATION WITH OTHER ANALYSES

Analysis of Water Resources and Water Quality will draw upon information developed in several other resource category analyses including: Land Use, Land Planning, and Property; Air Quality, Greenhouse Gas Emissions, and Resilience; Noise and Vibration; Parks and Recreational Resources, Contaminated Materials; Utilities and Energy; Coastal Zone Consistency; Socioeconomic Conditions; and Section 4(f) chapters will draw upon information developed in the analysis. In addition, if any adverse impacts relating to water resources or water quality are identified as part of the analyses, an analysis of the potential impacts to public health will be performed (see Chapter 15, "Public Health"). Analysis of Natural Resources will draw upon information developed for the resource category analyses related to air quality, greenhouse gas and resilience, noise and vibration, utilities and energy, and coastal zone consistency. ✷

Chapter 13: Coastal Zone Consistency

This chapter identifies the methodology FRA will use for assessing the consistency with the New York State Coastal Management Program (CMP) of the No Action Alternative and Proposed Action that will be considered in the NEPA process for the Western Rail Yard Infrastructure Project. The Affected Environment Existing Conditions for this resource area are the same as the Affected Environment Future Conditions, no changes are expected to occur in the future conditions. As the Project Site is located within New York City's Coastal Zone, the operation and construction of the Proposed Action will also be assessed for its consistency with the City's Local Waterfront Revitalization Program (LWRP). The EIS will include a detailed analysis of the CMP and the LWRP policies and assess the consistency of the Proposed Action with the policies. The analysis will draw from various impact analyses throughout the EIS, as relevant to the coastal zone.

A. REGULATORY CONTEXT

FEDERAL

Coastal Zone Management Act (CZMA) of 1972. The CZMA was established to encourage coastal states to manage development within the states' designated coastal areas to balance conflicts between coastal development and protection of resources within the coastal zone. Requirements for federal approval of coastal zone management programs and grant application procedures for development of the state programs are included in 15 CFR Part 923, Coastal Zone Management Program Development and Approval Regulations, National Oceanic and Atmospheric Administration (NOAA). Among other things, these regulations authorize states to issue general concurrences for certain activities (40 CFR § 930.53[b]). The Coastal Zone Management Act requires that federal activities within a state's coastal zone be consistent with that state's coastal zone management plan. New York has a federally approved coastal zone management program.

NEW YORK STATE

The New York State Department of State (NYSDOS) administers the CMP in New York. New York State permits any local government that has any portion of its jurisdiction contiguous to the state's coastal waters to submit a LWRP to NYSDOS for approval. The New York City Waterfront Revitalization Program (WRP) is the City's LWRP, and it's principal coastal zone management tool.

NEW YORK CITY

Waterfront Revitalization Program Section (197-a, City Charter). NYCDCP administers New York City's WRP. Because the Project is located within New York City's Coastal Zone Boundary, it will be reviewed for consistency with the WRP policies.

B. STUDY AREA

The Study Area for the coastal zone consistency determination will comprise all portions of the Project Site located within the New York State coastal zone boundary. The Project Site is defined in Chapter 1 of this Methodology Report.

C. DATA SOURCES

The data sources used to conduct the consistency determination would comprise the same data sources used to characterize existing resources managed by the New York State coastal zone program (e.g., natural, cultural, socioeconomic, recreational, land use, floodplain, hazardous materials, visual, and other resources). The No Action Alternative and Proposed Action will be assessed against the following New York City coastal management policies, stated in the City's WRP:

1. Support and facilitate commercial and residential redevelopment in areas well-suited to such development.
2. Support water-dependent and industrial uses in New York City coastal areas that are well-suited to their continued operations.
3. Promote use of New York City's waterways for commercial and recreational boating and water-dependent transportation.
4. Protect and restore the quality and function of ecological systems within the New York City coastal area.
5. Protect and improve water quality in the New York City coastal area.
6. Minimize loss of life, structures, infrastructure, and natural resources caused by flooding and erosion, and increase resilience to future conditions created by climate change.
7. Minimize environmental degradation and negative impacts on public health from solid waste, toxic pollutants, hazardous materials, and industrial materials that may pose risks to the environment and public health and safety.
8. Provide public access to, from, and along New York City's coastal waters.
9. Protect scenic resources that contribute to the visual quality of the New York City coastal area.
10. Protect, preserve, and enhance resources significant to the historical, archaeological, architectural, and cultural legacy of the New York City coastal area.

D. ANALYSIS TECHNIQUES

Each policy or rule listed in the New York State and New York City coastal management programs will be reviewed for applicability to the Proposed Action. Those considered applicable will be reviewed for consistency based on the criteria and goals described for each and the existing conditions, and potential impacts due to construction and operation of the Proposed Action as described for each coastal resource in the appropriate chapters of the EIS. Applicable and non-applicable policies or rules will be listed and identified as such in a table. This chapter of the EIS will provide a general understanding of the consistency of the No Action Alternative with the coastal management programs and provide a qualitative comparison of the Proposed Action and No Action Alternative. The appropriate coastal consistency forms will be completed for the Proposed Action, as determined through consultation between FRA and the relevant New York State and City agencies.

E. IMPACT CRITERIA

FRA will, to the extent practicable, analyze the Proposed Action under the guidance of the criteria provided by each of the applicable coastal rules and policies. FRA will identify coastal resources managed by a particular rule or policy with the potential to be adversely affected by the Proposed Action, provide the reasons why the Proposed Action would not comply with the respective rule or policy, and identify mitigation measures that would result in consistency. NYSDOS, in consultation with NYCDCP, will issue a concurrence with the consistency certification prepared for the Proposed Action.

F. MITIGATION ANALYSIS

The No Action Alternative and Proposed Action considered in the EIS would avoid impacts to coastal resources protected under the applicable coastal management programs (e.g., wetland fills, habitat loss) to the extent practicable, and would minimize impacts when avoidance is not practicable. If mitigation is required to compensate for the inability to meet the criteria of a coastal rule or policy, the mitigation will be described.

G. CORRELATION WITH OTHER ANALYSES

The Coastal Zone Consistency analysis will be informed by the resource category analyses conducted for Land Use, Land Planning and Property; Transportation; Air Quality, Greenhouse Gas Emissions, and Resilience; Noise and Vibration; Cultural Resources; Parks and Recreation Areas; Contaminated Materials; Utilities and Energy; Water and Natural Resources; and Socioeconomic Conditions, to determine the consistency of the Proposed Action with the relevant coastal zone policies and rules. ✷

Chapter 14: Socioeconomics

This chapter describes the methodology FRA will use to evaluate the potential effects of the No Action Alternative and Proposed Action on the Study Area's social and economic characteristics from the construction or operation of the Project. In the EIS, FRA will describe the social and economic characteristics of the people who live and work within the Study Area, including descriptions of employment, jobs, and housing, and the trade and economic characteristics of businesses located within the Study Area. The analysis for this resource category will also evaluate potential effects of the No Action Alternative and the Proposed Action on the elderly and persons with disabilities, as well as potential effects on community facilities and services.

A. REGULATORY CONTEXT

Following the 23 CFR Part 771 and relevant CEQ guidelines, FRA will consider the No Action Alternative and Proposed Action's potential to impact the social and economic environment. This includes the number and types of available jobs likely to be affected by the No Action Alternative and Proposed Action, the possibility of demographic shifts, the need for and availability of relocation housing, potential impacts on commerce, and impacts on local government services.

In addition, FRA will consider the potential impact of the Proposed Action on persons with disabilities. Guidelines and standards from the American Disabilities Act (ADA) and Title VI of the Civil Rights Act of 1964 has established regulations and design requirements for the construction and alteration of facilities subject to the law. These enforceable standards apply to places of public accommodation, commercial facilities, state and local government facilities, and programs receiving federal financial assistance.

B. STUDY AREA

This resource category assessment will consider all areas in which the Proposed Action could alter socioeconomic conditions. The size of the Study Area will be based on a consideration of potential project impacts during construction, including the location of active construction in combination with the potential construction access routes, and operation. As a result, the general Study Area for socioeconomic effects will be the same as the land use Study Area—a radius of ½-mile from the Project Site will be used, based on the area most likely to be affected in the vicinity of the Project. This area also corresponds to the study are for the Environmental Justice analysis. However, if during the course of the analyses it is found that the Proposed Action would have effects beyond this established Study Area, the Study Area would be expanded accordingly. In addition, because much of the socioeconomic resource category analysis will rely on economic and demographic data based on geographic boundaries such as census tracts, the Study Area will be adjusted to make its boundaries contiguous with these geographic boundaries (i.e., to include entire census tracts instead of arbitrarily splitting them, with no way to accurately assign corresponding demographic information to a fractional census tract).

C. DATA SOURCES

For socioeconomic conditions, the following data sources will be consulted to gather information in understanding existing conditions and likely trends: U.S. Census Bureau, American Community Survey (ACS) data, Center for Economic Studies OntheMap data, New York State Department of Labor; rental rate and sales price data from local brokerage firms; zoning and land use information and GIS mapping layers gathered as part of the broader EIS effort; and site visits (see **Table 14-1**). The primary geography for analysis will be census tracts, but larger geographies may be used when appropriate or to provide context.

Table 14-1
Data Sources

Analysis Area	Data Source
Population Data	U.S. Census Bureau, ACS Data
Income Data	U.S. Census Bureau, ACS Data
Age Distribution Data	U.S. Census Bureau, ACS Data
Language Proficiency Data	U.S. Census Bureau, ACS Data
Employment and Business Data	U.S. Census Bureau's OntheMap; New York State Department of Labor
Property Data	Geographic Information Systems (GIS) mapping layers; land use information, field visits; real estate listings
Housing/Vacancy Data	Geographic Information Systems (GIS) mapping layers; land use information, field visits
Community Facilities and Services	Site visits; land use information, previous 2009 SEQRA/CEQR EIS; resources and areas of cultural value identified by federal, state, and local laws and programs; any resources identified through scoping/public outreach

D. ANALYSIS TECHNIQUES

FRA will use the *CEQR Technical Manual* (see Chapter 5, Section 300) methodology as guidance for the analysis of potential impacts to socioeconomic conditions from the construction and operation of the Proposed Action. The *CEQR Technical Manual* contains guidelines for preliminary assessment and detailed analysis methodologies for five principal issues of concern with respect to socioeconomic conditions and whether an alternative would result in significant impacts due to: (1) direct residential displacement; (2) direct business displacement; (3) indirect residential displacement; (4) indirect business displacement; and (5) adverse effects on a specific industry. For indirect residential displacement and indirect business displacement, those assessments are considered in Chapter 18, "Indirect and Cumulative Impacts." The *CEQR Technical Manual* guidance is further described below for these three issues considered under direct effects to socioeconomic conditions.

The *CEQR Technical Manual* also has detailed methodology for the assessment of effects on community facilities and services, including: public schools, libraries, publicly funded day care facilities, outpatient and emergency health care facilities, and police and fire protection services. FRA will use the *CEQR Technical Manual* methodology as guidance for the analysis of potential impacts to community facilities and services from the construction or operation of the Proposed Action.

POPULATION AND DEMOGRAPHIC CHARACTERISTICS

FRA will identify the population and demographic characteristics of the Study Area via the latest available ACS 5-Year Estimates and OntheMap data from the U.S. Census Bureau including: total population, average household income, number of housing units, and workforce characteristics such as employment by industry sector. FRA will identify specific demographic groups including populations of those with Limited English Proficiency (LEP), elderly citizens, and low-income and minority populations. This will be in addition to the Environmental Justice analyses of low income and minority populations which FRA will include in the EIS (see Chapter 16, "Environmental Justice," for more details). FRA will describe the probable shifts in socioeconomic conditions given the rapidly developing Hudson Yards area and evaluate the Proposed Action's compatibility with socioeconomic trends.

ECONOMIC CHARACTERISTICS

FRA will identify and characterize conditions and trends in employment and business within the Study Area using data from the following sources: U.S. Census Bureau ACS and OntheMap; ESRI, Inc.; New York State Department of Labor; Dunn & Bradstreet; rental rate and sales price data from local brokerage firms; and zoning and land use information gathered as part of the broader EIS effort.

DIRECT RESIDENTIAL DISPLACEMENT

Field reconnaissance will confirm the absence or presence of any residences located on or adjacent to the Project Site that would be displaced either temporarily due to construction or permanently as a result of the Proposed Action.

As noted above, direct residential displacement is a principal issue of concern under the *CEQR Technical Manual* (see Chapter 5, 321.1). Direct residential displacement occurs when residents would be involuntarily displaced from a site that is directly affected by a Proposed Project. In accordance with the *CEQR Technical Manual* (see Chapter 5, 321.1), FRA will identify and disclose the number of residents (if any) that would be displaced by the Proposed Action. FRA will determine if the displaced population represents a substantial proportion of the population in the Study Area (more than five percent is considered substantial). If the displaced population is more than five percent of the Study Area population, FRA will conduct a detailed assessment to determine if the displaced population has an average income that is lower than that of the Study Area population and whether relocation opportunities exist within the Study Area for the displaced households.

DIRECT BUSINESS DISPLACEMENT

Field reconnaissance will confirm the absence or presence of any business located on or adjacent to the Western Rail Yard site that would be displaced either temporarily due to construction or permanently as a result of the Proposed Action.

As noted above, direct business displacement is a principal issue of concern under the *CEQR Technical Manual* (see Chapter 5, 321.2). Direct business displacement occurs when businesses would be involuntarily displaced from a site that is directly affected by a Proposed Project. In accordance with the *CEQR Technical Manual* (see Chapter 5, 321.2), FRA will conduct a preliminary assessment to determine if the displaced businesses provide products or services essential to the local economy that would no longer be available in the businesses' "trade areas." A trade area may be larger than the Study Area depending on the draw of the business. The preliminary assessment will also determine if the businesses to be displaced are subject to other regulations or publicly adopted plans to preserve, enhance, or otherwise protect it. If either of these preliminary assessment conditions are possible, FRA will conduct a detailed assessment with the objective of better understanding the displaced businesses, their markets, the potential for relocation, and if the products or services they provide would still be available. FRA will also assess the extent to which the Proposed Action would displace or necessitate the relocation and reconstruction of any railroad facilities or operations, in light of a Project objective to maintain uninterrupted LIRR operations during the construction of the Platform and its associated infrastructure, and Tunnel Encasement.

ADVERSE EFFECTS ON A SPECIFIC INDUSTRY

As noted above, adverse effects on specific industries is a principal issue of concern under the *CEQR Technical Manual* (see Chapter 5, 323). FRA will conduct a preliminary assessment of effects on specific industries using the guidance of the *CEQR Technical Manual* (see Chapter 5, 323). This assessment will determine whether the Proposed Action would adversely affect business conditions in any industry or category of businesses within or outside the Study Area, or whether the Proposed Action would substantially reduce employment or impair viability in a specific industry or category of businesses. FRA will use data from the Land Use assessment and the U.S Census Bureau's OntheMap to determine the presence of specific industries in the Study Area that may be affected by the Proposed Action.

COMMUNITY FACILITIES AND SERVICES

FRA will use the guidance of the *CEQR Technical Manual* (see Chapter 6) to analyze the Proposed Action's effect on community facilities and services in the Study Area, including public schools, libraries, child care centers, health care facilities, fire protection, police protection, and other community facilities. FRA will use data from the Land Uses assessment to determine the presence and location of community facilities in the Study Area. FRA will assess the potential direct and indirect effects of the Proposed Action on community facilities and services. Direct effects would occur if the Proposed Action would displace or physically alter a community facility. Indirect effects would occur if the Proposed Action introduces a population that would increase demand for existing services. The analysis of police and fire protection in this chapter will be limited to service delivery. In Chapter 17, "Safety and Security," FRA will analyze system safety- and security-related requirements, policies, procedures, protocols, and infrastructure and identify new elements that will be incorporated into the Proposed Action.

ELDERLY AND PERSONS WITH DISABILITIES

FRA will assess whether the Proposed Action would displace any facilities serving elderly and/or disabled populations, introduce any new populations of elderly or disabled persons, or interfere with the movement of these user groups in the area. FRA will estimate the elderly and/or disabled population in the Study Area based on information from the U.S. Census Bureau's ACS. FRA will assess if construction or operation of the Proposed Action would affect this population's access to local businesses and health care facilities. FRA will discuss the existence of transit; existing pedestrian facilities such as sidewalks and crossings; and adequacy of traffic signal timing as appropriate.

E. IMPACT CRITERIA

In accordance with CEQ's NEPA Implementing Regulations (40 CFR part 1508.27), impacts must be considered for their significance with respect to context and intensity. The EIS will assess the potential construction and operational impacts of the No Action Alternative and Proposed Action. Where potential adverse impacts are identified, mitigation to address the impacts will be developed, as appropriate and feasible.

The assessment will consider socioeconomic impacts resulting from potential direct residential and business displacements, and increased demand for community facilities and services.

FRA will use the *CEQR Technical Manual* as guidance in determining if the Proposed Action has the potential to result in adverse impacts. The *CEQR Technical Manual* guidance is as follows (see Chapter 5, 420; Chapter 6, 400):

DIRECT RESIDENTIAL DISPLACEMENT

- A Build Alternative has the potential to result in adverse impacts due to direct residential displacement if the Proposed Action would result in the displacement of a low-income population that exceeds five percent of the Study Area population or relevant subareas, and these low-income households could not be relocated within the Study Area.

DIRECT BUSINESS DISPLACEMENT

- A Build Alternative has the potential to result in adverse impacts due to direct business displacement if the businesses to be displaced provide goods or services that may not be found elsewhere within the Study Area or the business is otherwise subject to a regulations or publicly adopted plans to preserve, enhance, or otherwise protect it and the business could not be relocated into a suitable space within the Study Area.

COMMUNITY FACILITIES AND SERVICES

- A Build Alternative has the potential to result in adverse impacts community facilities and services if service delivery would deteriorate to unacceptable levels as a result of a substantial (more than five percent) increase in population due to the project.

ELDERLY AND PERSONS WITH DISABILITIES

- The *CEQR Technical Manual* does not provide impact criteria for determining impacts on the elderly and persons with disabilities. FRA will determine if the Proposed Action would impede the movement of this population in the Study Area or would displace a facility that serves this population.

F. MITIGATION ANALYSIS

If the Proposed Action would result in adverse impacts to socioeconomic conditions, community facilities and services, or to the elderly or disabled, FRA will explore measures to avoid or mitigate these impacts, and describe these measures in the EIS.

G. CORRELATION WITH OTHER ANALYSES

Data presented in the socioeconomic conditions assessment will inform the environmental justice analysis. ✷

Chapter 15: Public Health

This chapter describes the methodology that FRA will use to assess the potential for public health impacts from the No Action Alternative and the Proposed Action. It is important to ensure that potential impacts to public health from the construction and operation of the Proposed Action are adequately identified and evaluated for the short term and long-term health of people and businesses in the vicinity of the Project. This public health assessment methodology has been prepared to guide the analyses that will be prepared for the EIS; any subsequent changes to analysis methodologies will be reflected directly in the EIS. This effects assessment methodology has also been prepared to ensure that the EIS will fulfill any applicable federal, state and local environmental review requirements.

A. REGULATORY CONTEXT

The National Environmental Policy Act of 1969 requires consideration of the potential effects of Federal actions on public health (42 USC 4321). Following 23 CFR Part 771 and relevant CEQ guidelines, FRA procedures indicate that public health should be considered. New York City also provides guidance in the *CEQR Technical Manual* (see Chapter 20, Section 300) for assessing potential impacts on public health.

USEPA is principally responsible for issues of public health caused by environmental factors, and has issued a technical memorandum. *Promoting the Use of Health Impact Assessment to Address Human Health in Reviews Conducted Pursuant to the National Environmental Policy Act and Section 309 of the Clean Air Act* (USEPA Health Impact Memorandum), as guidance for public health assessments. The U.S. Department of Health and Human Services is the lead public health agency in the country. The Occupational Safety and Health Administration is responsible for governing public health conditions at places of employment nationwide. Many of the laws and regulations protecting public health are resource-specific—for example, the Clean Air Act of 1970 and its amendments of 1990 (42 USC 7401), and the National Ambient Air Quality Standards (40 CFR 50). However, it is important to consider these laws and the impacts from resources in regard to overall public health concerns.

NEPA regulations do not require quantitative analysis regarding public health; however, environmental, social, demographic, and economic conditions drive the health and well-being of communities and will be considered as part of this analysis. The conclusions regarding public health will be based on the analyses of those resource categories that may be associated with the following public health effects: Air Quality, Noise, Contaminated Materials (concerning hazardous materials), and Water Quality. FRA will prepare a public health analysis referencing the resource categories identified above, using USEPA guidance in combination with the guidance presented in the *CEQR Technical Manual*, Chapter 20.

B. STUDY AREA

The Study Area includes the Project Site and the area extending ½-mile immediately adjacent to the Project Site (as described in Chapter 1, "Introduction," and shown in Figures 1-1 and 1-2). The Study Area accounts for effects that may be felt outside the area of direct impacts, such as changes in air quality, noise, or vibration. The Study Area for the public health impacts assessment will coincide with the Study Areas of the resource category analyses for Air Quality (see Chapter 4), Noise and Vibration (see Chapter 5), Contaminated Materials (see Chapter 9), and Water Quality (see Chapter 12). To the extent that the Study Area is different between the resource category analyses, the public health Study Area is consistent with the Study Areas identified in those chapters, and includes the Project Site, receptors surrounding the Project Site, and along routes that vehicular traffic associated with the Proposed Action would use to travel.

C. DATA SOURCES

For the public health impacts assessment, data sources will include the Air Quality, Noise, Contaminated Materials, and Water Quality analyses for the Project, as well as reference guidance materials from USEPA and the *CEQR Technical Manual* shown in **Table 15-1**.

Table 15-1
Public Health Analysis Data Sources

Analysis Area	Data Source
Public Health	Project EIS Analyses of: - Air Quality - Noise - Contaminated Materials - Water Quality Reference and guidance materials, including: - U.S. Department of Health and Human Services health data - USEPA Human Health Risk Assessment Tools and Databases, and Guidelines[1] - USEPA EPCRA existing Tier I and Tier II reports and other requirements under that law[2]

[1] U.S. Environmental Protection Agency. Human Health Risk Assessment. (https://www.epa.gov/risk/human-health-risk-assessment), accessed August 20, 2020.

[2] U.S. Environmental Protection Agency. Emergency Planning and Community Right-to-Know Act. (https://www.epa.gov/epcra), accessed August 20, 2020.

D. ANALYSIS TECHNIQUES

As stated above, using the relevant CEQ and USEPA guidelines, and the guidance provided in the *CEQR Technical Manual* (see Chapter 20, Section 300), the results of the Air Quality, Noise, Contaminated Materials, and Water Quality analyses will be reviewed to determine if there are any public health concerns as a result of the construction or operation of the Proposed Action. FRA will evaluate potential for public health impacts from the Proposed Action, including both qualitative and quantitative methods. FRA will consider both potential temporary (e.g., construction) and long-term (permanent) impacts to public health from the Proposed Action. The analysis will include a qualitative description of how the Proposed Action could affect public health based on a review of the resource category impact analyses for the Air Quality, Noise, Contaminated Materials, and Water Quality, followed by a discussion of avoidance and minimization measures if needed. The direct impacts related to public health will be analyzed through qualitative analysis based on the aforementioned guidelines for public health assessment, for the No Action Alternative and the Proposed Action for both temporary (construction period) and permanent (operational) impacts.

E. IMPACT CRITERIA

Drawing on the EIS chapters for the resource categories listed below, this task will assess and summarize the potential for adverse impacts on public health from activities associated with the construction and operation of the Proposed Action.

AIR QUALITY

According to the guidelines of the *CEQR Technical Manual*, public health concerns related to air quality issues for which an assessment may be warranted include increased vehicular traffic or emissions from stationary sources resulting in adverse air quality impacts.

Emissions from stationary sources, mobile sources, and construction sources, all have the potential to affect air quality. FRA will use the methodology to analyze potential air quality impacts described in Chapter 4, "Air Quality, Greenhouse Gas Emissions, and Resilience," and will include both on-site and on-road sources of air emissions, and the combined impacts of both sources, where applicable. The analyses will address both local (microscale) and regional (mesoscale) emissions where applicable.

NOISE

According to the guidelines of the *CEQR Technical Manual*, public health concerns related to noise for which an assessment may be warranted include increased vehicular traffic or emissions from stationary sources resulting in adverse noise impacts.

Emissions from stationary sources, mobile sources, and construction sources, all have the potential to affect noise. FRA will use the methodology to analyze potential noise impacts described in Chapter 5, "Noise and Vibration," and will include both on-site and on-road sources of noise emissions, and the combined impacts of both sources, where applicable.

CONTAMINATED MATERIALS

According to the guidelines of the *CEQR Technical Manual*, public health concerns related to contaminated materials for which an assessment may be warranted include increased vehicular traffic or emissions from stationary sources resulting in increased exposure to heavy metals and other contaminants in soil/dust resulting in adverse hazardous materials; the presence of contamination from historic spills or releases of substances that might have affected or might affect ground water to be used as a source of drinking water; and actions for which any potential impacts result in an exceedance of accepted Federal, state, or local standards. FRA will use the methodology for the contaminated materials analysis described in Chapter 9, "Contaminated Materials."

WATER QUALITY

According to the guidelines of the *CEQR Technical Manual*, public health concerns related to water quality for which an assessment may be warranted include discharge of pollutants into waterways resulting in adverse water quality impacts. FRA will use the methodology for the water quality analysis described in Chapter 12, "Water and Natural Resources."

F. MITIGATION ANALYSES

Depending on the impact assessment results, FRA will evaluate the need for public health mitigation will provide mitigation recommendations. If an adverse impact to public health is identified, mitigation measures that may be utilized will be identified based on the type of the impact(s). FRA will assess potential public health mitigation measures based on the magnitude of the impacts identified. FRA will assess potential public health mitigation measures for the Proposed Action for their effectiveness relative to reducing public health risks related to any or all of the following:

- Air quality, as identified in that chapter of the EIS;
- Noise, as identified in that chapter of the EIS;
- Water quality, as identified in that chapter of the EIS; and
- Contaminated materials including solid waste and hazardous materials, as identified in that chapter of the EIS.

G. CORRELATION WITH OTHER ANALYSES

This chapter will be informed by and use information from the analyses of Air Quality, Noise, Contaminated Materials, and Water Quality, to support the determination of potential public health impacts from the Proposed Action ✷

Chapter 16: Environmental Justice

This chapter describes the methodology that FRA will use for the assessment and analysis of potential impacts to minority and/or low-income populations (collectively, environmental justice populations) from the No Action Alternative and the Proposed Action considered in the EIS. If there are environmental justice populations in the Study Area, the analysis will determine whether the construction and operation of the Proposed Action would have any disproportionately high and adverse effects on those populations following CEQ, USDOT, other federal guidance and New York State guidance.

A. REGULATORY CONTEXT

On February 11, 1994, President Clinton issued EO 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." The Executive Order is designed to ensure that each Federal agency "shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations."

All federal agencies are required to determine whether their proposed actions (those that are undertaken directly by a federal agency or are funded or approved by a federal agency) would have a disproportionately high and adverse environmental effect on environmental justice populations. CEQ, which has oversight of the Federal government's compliance with EO 12898 and NEPA, developed guidance to assist Federal agencies with their NEPA procedures so that environmental justice concerns are effectively identified and addressed (Environmental Justice Guidance under the National Environmental Policy Act, December 1997, referred to in this document as CEQ guidance).

Federal agencies may supplement the CEQ guidance with more specific procedures tailored to their particular programs or activities. As such, USDOT issued *Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (USDOT Order 5610.2[a], May 2, 2012) which sets forth the USDOT policy to consider environmental justice principles in all USDOT programs, policies, and activities. It describes how the objectives of environmental justice are integrated into planning and programming, rulemaking, and policy formulation. USDOT Order 5610.2(a) also requires that any activities that will have a disproportionately high and adverse effect on environmental justice populations will only be carried out if: (1) further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse effects are not practicable; and (2) a substantial need for the action exists, and other alternatives that would have less adverse impacts on the subject population and still satisfy the need, would either have other adverse impacts that are more severe or involve increased costs of extraordinary magnitude.

Minority populations, as defined in the USDOT Order 5610.2(a), are any readily identifiable group or groups of minority persons who live in geographic proximity and, if circumstances warrant, geographically dispersed or transient persons, such as migrant workers or Native Americans, who will be similarly affected by the Proposed Project. Minority population includes persons who are Black or African American (not of Hispanic origin), American Indian or Alaskan Native, Asian American, Native Hawaiian or Other Pacific Islander, and Hispanic or Latino. This environmental justice analysis also considers minority to include persons identified as being either "some other race" or "two or more races" in the census data.

A low-income person, as defined in the DOT Order 5610.2(a), is one whose median household income is at or below the Department of Health and Human Services (HHS) poverty guidelines. A low-income population is any readily identifiable group or groups of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed or transient persons who will be similarly affected by a proposed USDOT, program, policy, or activity.

FTA also issued Environmental Justice Policy Guidance for Federal Transit Administration Recipients (FTA Circular 4703.1, August 2012) to provide a framework for conducting an environmental justice analysis for transit-related projects. This document further outlines procedures for complying with EO 12898 that FRA will use as guidance in this analysis.

Additionally, the environmental justice analysis will comply with applicable New York State Environmental Justice laws, regulations and guidelines, including the recent amendment to the New York State Environmental Conservation Law, to include a new Article 48, Environmental Justice.

B. STUDY AREA

In general, the Study Area for the environmental justice extends beyond the Project Site, to not only include the physical limits of the proposed alternatives, but also to account for effects that may be felt beyond the Project footprint, such as air quality, noise, vibration, and land uses that may adversely or disproportionately affect low-income or minority communities. FRA will define the Study Area for this environmental justice analysis to include all census block groups that are at least 50 percent within a ½-mile radius of the Project Site, consistent with the socioeconomic Study Area (see Chapter 14, "Socioeconomics"), which is likely the area where any potential adverse impacts resulting from the Proposed Action could occur. As presently defined, the environmental justice Study Area includes 22 census block groups. Should the other technical analyses in the EIS identify resource impacts in locations outside the socioeconomic Study Area, then FRA will amend the environmental justice Study Area to include the additional location or locations to assess impacts to environmental justice populations.

C. DATA SOURCES

Data for the environmental justice analysis will come from the following source.

The data source FRA will use for the identification of low-income and minority populations is the U.S. Census Bureau's ACS five-year average data for 2014 to 2018 (inclusive). Minority and low-income populations will be quantified for the census block groups in the Study Area. The ACS is an ongoing survey that provides data on age, sex, race, family and relationships, income and benefits, health insurance, education, veteran status, disabilities, where people work and how they get there, and where people live and how much people pay for essentials. The purpose of the ACS is to provide an annual data set that enables communities, state governments, and Federal programs to plan investments and services. ACS provides period estimates that describe the average characteristics of population and housing over a period of data collection. The ACS is administered continually and is a random sampling of people from all counties and county-equivalents in the United States

Table 16-1
Data Sources

Analysis Area	Data Source
Environmental Justice	2014–2018 American Community Survey (ACS), Table B17001 (or more current ACS estimates, if available)

D. ANALYSIS TECHNIQUES

Following the guidance documents referred above, FRA will follow a five-step process for this analysis to identify whether or not a proposed action would result in a disproportionately high and adverse effect on environmental justice populations, and if so, whether further assessment is necessary to alleviate those effects, if practicable, FRA will follow the five steps listed below.

- Define the Study Area;
- Identify environmental justice populations in the Study Area;
- Identify adverse effects of the proposed action;
- Determine whether adverse effects are disproportionately high; and
- Determine whether disproportionately high and adverse effects will be borne by environmental justice populations.

A key component of an environmental justice analysis is engaging environmental justice populations to better understand their concerns. FRA will include and describe the outreach undertaken to these populations during the environmental review process in this analysis.

FRA will map the minority and low-income population data to illustrate the location of environmental justice populations in comparison to the project area. New York County (the Borough of Manhattan) will be used as the project's primary statistical reference area.

Following CEQ guidance, FRA will identify minority populations where either: (1) the minority population of the affected area exceeds 50 percent of the total population; or (2) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis. For this analysis, the minority or low-income population of Census block groups in the Study Area will be compared to New York County's (Borough of Manhattan's) percentage of minority or low-income populations. As Manhattan's minority populations is 53.1 percent, FRA will use the more conservative 50 percent CEQ threshold. Accordingly, FRA will consider any block group with a minority population of more than 50 percent, an environmental justice population for the analysis.

According to the USDOT order, low-income population means any readily identifiable group of low-income persons who live in geographic proximity, and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who will be similarly affected by a proposed USDOT program, policy or activity. In Manhattan overall, 16.6 percent of people live below the poverty level. Therefore, if a block group has 16.6 percent or more of its population living below the poverty level, FRA will identify it as an environmental justice population.

These thresholds have been established based on the CEQ guidance discussed above to reflect local conditions and set a conservative boundary for defining minority and low-income populations in this analysis. In some cases, additional environmental justice populations may be identified even in US Census areas that do not achieve the threshold percentages, in accordance with USDOT.

E. IMPACT CRITERIA

The environmental justice analysis will evaluate both the No Action Alternative and the Proposed Action to determine whether the respective alternatives would result in disproportionately high and adverse effects to minority and low-income populations.

Under USDOT Order 5610.2(a), adverse effects could include, but are not limited to:

- Bodily impairment, infirmity, illness, or death;
- Air, noise, and water pollution and soil contamination;
- Destruction or disruption of man-made or natural resources;
- Destruction or diminution of aesthetic values;
- Destruction or disruption of community cohesion or a community's economic vitality;
- Destruction or disruption of the availability of public and private facilities and services;
- Vibration;
- Adverse employment effects;
- Displacement of persons, businesses, farms, or non-profit organizations;
- Increased traffic congestion, isolation, exclusion or separation of individuals within a given community or from the broader community; and
- The denial of, reduction in, or significant delay in the receipt of benefits of USDOT programs, policies, or activities.

Based on the FTA Circular, FRA's evaluation will consider the following criteria in determining whether the activity will result in a "disproportionately high and adverse effect on human health or the environment":

- Would the alternative's adverse impacts be predominantly borne by minority or low-income populations? This will be determined by identifying whether adverse impacts are concentrated in minority or low-income communities.
- Would adverse impacts to minority or low-income populations be appreciably more severe or greater in magnitude than those suffered by non-minority or low-income populations?

- Does the Project affect a resource that is especially important to an environmental justice population? For example, does the Project affect a resource that serves an especially important social, religious, or cultural function for an environmental justice population?
- What would be the effect of the alternative's offsetting benefits when considering these impacts?
- What would be the effect of mitigation measures that would be incorporated into the alternative and any other enhancements or betterments that would be provided in lieu of mitigation when considering these impacts?

The analysis of impacts for resource categories listed above (which will be analyzed in their respective EIS chapters), will be evaluated with consideration of the location of environmental justice populations. FRA will not consider the environmental categories with no adverse effects identified in the other technical chapters of the EIS for additional environmental justice analysis due to no potential for disproportionately high and adverse effects to minority or low-income populations.

Where FRA identifies impacts that could occur within and near environmental justice populations, the EIS will describe these impacts and whether or not they can be fully mitigated. For any impacts that cannot be fully mitigated, FRA will determine whether these are disproportionately high and adverse effects that would be borne by environmental justice populations.

F. MITIGATION ANALYSIS

Under USDOT Order 5610.2(a), where it is found that activities are expected to have a disproportionately high and adverse effect on minority populations or low-income populations, those activities will only be carried out if further mitigation measures or alternatives that would avoid or reduce the disproportionately high and adverse effect are not practicable. In determining whether a mitigation measure or an alternative is "practicable," the social, economic (including costs), and environmental effects of avoiding or mitigating the adverse effects will be considered.

If FRA identifies disproportionately high and adverse effects to environmental justice populations, FRA will evaluate whether there is a further practicable mitigation measure or practicable alternative that would avoid or reduce the disproportionately high and adverse effects. This assessment will first examine whether additional mitigation could fully alleviate the disproportionately high and adverse effects, and if not, FRA will examine potential alternatives that could avoid or diminish the disproportionately high and adverse effects.

G. CORRELATION WITH OTHER ANALYSES

The environmental justice analysis will incorporate the results of all other relevant analyses presented in the EIS. ✷

Chapter 17: Safety and Security

This chapter describes the approach for safety and security measures that the FRA will consider as part of the design for the Proposed Action, based on the design developed by the Project Sponsor for the Proposed Action. In this chapter of the EIS, FRA will identify existing system safety- and security-related requirements, policies, procedures, protocols, and infrastructure and new elements that would be considered in the design of the Proposed Action. The Affected Environment Existing Conditions for this resource area are the same as the Affected Environment Future Conditions, no changes are expected to occur at the Project Site in the future conditions. FRA will identify safety and security project elements that would be components of the Proposed Action and safety and security measures that would be implemented in the Study Area under the No Action Alternative. Vehicular safety, pedestrian safety, and bicycle safety methodology is discussed in Chapter 3, "Transportation." Chapter 14, "Socioeconomics," discusses the methodology for community facilities and services, including police and fire protection services.

A. REGULATORY CONTEXT

FRA is the key agency with regulatory jurisdiction on intercity passenger, commuter, and freight railroad safety. FRA has jurisdiction over all aspects of the physical railroad system including railroad infrastructure (for example, tracks, bridges, and tunnels), equipment (for example, locomotives, and railcars), freight, and passengers.[1] Other key agencies in the safety and security of railroad infrastructure, material transport, and passenger safety are the USDOT Pipeline and Hazardous Materials Safety Administration, the United States Department of Homeland Security (DHS), and the Transportation Security Agency (TSA), an agency within DHS.

[1] 49 USC 201

FRA is responsible for the administration of the Rail Safety Improvement Act of 2008 and the High-Speed Passenger Rail Safety Strategy.[2,3] The DHS and TSA play a role in monitoring and securing freight across the country; this includes the transport of hazardous materials, as well as mass transit and passenger rail security and preparedness.[4,5] The National Fire Protection Association (NFPA), a trade organization, is also responsible for publishing guidance, codes and standards intended to eliminate death, injury, property and economic loss due to fire and related hazards. FTA provides financial and technical assistance to local public transit systems, including buses, subways, light rail, commuter rail, trolleys and ferries. FTA also oversees safety measures and helps develop next-generation technology research.[6] FRA will consult FTA guidance, including but not limited to, the Transit Security Handbook, Public Transportation System Security and Emergency Preparedness Guide, and Safety Certification Handbook.

MTA is responsible for the operation and maintenance of its trains in the Study Area, as well as assessing and implementing safety and security measures within the Western Rail Yard (which is also the Project Site, as described in Chapter 1, "Introduction").

MTA train operations in the Study Area are regulated and monitored by Federal, state, and local agencies, including FRA, FTA, NYSDOT, and local law enforcement.

Regulatory codes and laws on safety and security measures will be obtained from Federal, state and local agencies.

B. STUDY AREA

The Study Area is limited to the Project Site. As defined in Chapter 1, "Introduction," the Project Site includes the entire 13-acre Western Rail Yard site, bounded by Eleventh Avenue to the east, West 33rd Street to the north, Twelfth Avenue to the west, and West 30th Street to the south.

C. DATA SOURCES

FRA will obtain information and guidance on safety and security measures from Federal, state and local agencies. Governmental agencies and industry organizations that provide safety and security related regulations, criteria and guidance include the following entities: OSHA; NFPA; FRA, FTA, American Public Transit Association (APTA). FRA guidance includes but not limited to Emergency Preparedness Guidelines for Passenger Trains, 49 CFR § 200-299, and Rail Safety Improvement Act of 2008. DHS's rail transportation security 49 CFR § 1580.27. FTA guidance includes but is not limited to the Transit Security Handbook, Public Transportation System Security and Emergency Preparedness Guide, and Safety Certification Handbook. **Table 17-1** presents a listing of this information and data sources that FRA will use in this analysis.

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[2] Public Law 110-432

[3] USDOT, FRA. 2009. High-Speed Passenger Rail Safety Strategy. Accessed from https://www.fra.dot.gov/eLib/Details/L03624. Accessed September 21, 2020.

[4] 49 CFR 1580

[5] DHS, Office of the Inspector General. 2010. TSA's Preparedness for Mass Transit and Passenger Rail Emergencies. Accessed from https://www.oig.dhs.gov/assets/Mgmt/OIG_10-68_Mar10.pdf. Accessed September 21, 2020.

[6] FTA, 2020. About FTA. Accessed from https://www.transit.dot.gov/about-fta. Accessed September 21, 2020.

Table 17-1
Safety and Security Data Sources

Analysis Area	Data Sources
MTA Safety and Security programs, plans, and procedures	MTA, Federal, and NY law enforcement agencies
Federal, state and local design and construction codes, regulations, and guidelines that are safety and security related	Governmental agencies and industry organizations that provide safety and security related regulations, criteria and guidance for. Entities include the Federal Occupational Health and Safety Agency (OSHA); National Fire Protection Association (NFPA); FRA, FTA, American Public Transit Association (APTA). FRA guidance includes but not limited to Emergency Preparedness Guidelines for Passenger Trains. CEQ's NEPA Implementing Regulations (49 CFR § 200-299), Rail Safety Improvement Act of 2008. DHS's rail transportation security regulation 49 CFR § 1580.27. FTA guidance includes but is not limited to the Transit Security Handbook, Public Transportation System Security and Emergency Preparedness Guide, and Safety Certification Handbook.

D. ANALYSIS TECHNIQUES AND CRITERIA

The EIS will describe the approach for incorporating safety and security measures that FRA will consider as part of the design for the Proposed Action and during construction of the Proposed Action. During the EIS, the safety and security analysis will identify potential safety issues to be addressed by the design of the Proposed Action and construction methods and security to be provided during construction. FRA will identify and describe existing system safety- and security-related requirements, policies, procedures, protocols, and infrastructure. FRA will also describe safety and security elements (to the extent possible given the confidentiality of certain elements) that will be incorporated into the Proposed Action. FRA will also describe the construction practices that will be used to ensure security of the Project Site and safe construction of the Proposed Action.

The Proposed Action would introduce new infrastructure elements that would change the physical setting of the rail yard. These changes to the rail yard's physical setting would affect rail yard workers in particular. The new Platform would virtually completely enclose the rail yard and would introduce the potential for new hazards for workers and potential new security issues. To determine potential impacts, FRA will examine and describe how the change in the rail yard's physical setting resulting from the Proposed Action would affect worker safety, and FRA will address the new security issues introduced by the change in physical setting at the Project Site from the Platform and Tunnel Encasement. FRA will also identify any potential safety and/or security issues resulting from the construction and operation of the Proposed Action in this chapter of the EIS, and will describe how these issues will be addressed through the design of the Proposed Action, or through construction period or operational security measures to be implemented as part of the Proposed Action's construction or operation. **Table 17-1** lists the data sources for identifying and guiding the description of the design standards that must be complied with as part of the design of the Proposed Action.

Among the design criteria to be applied in the safety and security analysis will be the National Fire Protection Association's Standard for Fixed Guideway Transit and Passenger Rail Systems—NFPA 130 (NFPA 130). This will ensure the design of the Proposed Action meets the applicable standards set forth for addressing emergency fire conditions in the rail yard. Among NFPA 130, requirements to be considered include emergency ventilation, emergency exits, and fire standpipe systems. The analysis will also identify and describe any other applicable design criteria that would influence the provision of safety and security measures at the Project Site for the Proposed Action. The description will identify potential effects and benefits of these and other safety and security project elements that would be components of the No Action Alternative and Proposed Action. In the No Action Alternative, nothing at the Project Site will change, and the existing safety and security systems and practices will remain in place.

E. MITIGATION ANALYSIS

Safety and security elements of the Proposed Action for construction and operation will be planned and designed at the Preliminary Engineering level to minimize impacts on the public, police, other security services, fire, emergency, and medical services to the maximum extent possible. The design and engineering for the Platform and associated railroad infrastructure, and the Tunnel Encasement is being developed to incorporate long-term resilience considerations, including design elements aimed against evolving security threats, in order to help minimize the potential for future life safety and/or security threats to the Project Site. If there are inconsistencies with safety and security requirements and procedures, FRA will revise the design and procedures of the Proposed Action to be in compliance with all applicable laws and regulations.

F. CORRELATION WITH OTHER ANALYSES

The Safety and Security effects assessment does not rely on analysis in other areas of the EIS. ✷

Chapter 18: Indirect Effects and Cumulative Impacts

This chapter identifies the methodology that FRA will follow to assess the indirect effects and cumulative impacts of the Proposed Action for the Western Rail Yard Infrastructure Project.

Indirect effects are those that are "caused by an action and are later in time or farther removed in distance, but are still reasonably foreseeable" (40 CFR § 1508.8). For the Proposed Action, this includes the indirect effect associated with the implementation of an as-of-right mixed-use development over the Platform (Overbuild). The Overbuild development was comprehensively analyzed in the 2009 SEQRA/CEQR FEIS and subsequently approved by New York City (as described in detail in Chapter 1, "Introduction"). The program as set forth in the 2009 approvals and the environmental findings that support the approval will be summarized and described in this chapter. Additionally, this chapter will look at the findings of the 2013 FRA EA/FONSI and the 2014 SEA/FONSI for the Concrete Casing in the Hudson Yards to determine if there is an indirect effect associated with the Proposed Action. Following the methodologies set forth in this document, FRA's EIS will analyze the indirect effects of the Proposed Action for both construction and operational effects.

Cumulative impacts result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions (40 CFR § 1508.7). The direct effects of an individual action may be negligible, but may contribute to a measurable environmental impact when considered cumulatively with other past and/or future projects. However, as noted throughout the technical chapters of this EIS, the Proposed Action itself would generally not result in employment, population, and other generation of demand that could yield cumulative impacts when considered with other projects. This chapter will identify and evaluate the potential for cumulative impact on any given resource category analyzed in this EIS. Following the methodologies set forth in this document, the EIS will analyze the cumulative effects of the Proposed Action for both construction and operational effects. The EIS chapter on Indirect and Cumulative Impacts will include a summary table to summarize indirect and cumulative impacts.

A. REGULATORY CONTEXT

NEPA requires federal agencies to consider the potential for indirect and cumulative effects from a project. The indirect effects and cumulative impact analysis will be consistent with CEQ and other agency guidance documents. CEQ regulations and other relevant sources provide the following definitions of indirect and cumulative effects:

- Indirect Effects are "caused by the action and are later in time or farther removed in distance but are still reasonably foreseeable." Indirect effects "may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR § 1508.8[b]). Indirect effects may also result from other actions' impacts created outside the federal decision-making nexus.

- Cumulative effects (defined in CEQ guidance as cumulative "impacts") are "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively major actions taking place over a period of time" (40 CFR § 1508.7). A transportation action's direct and indirect effects can contribute to its cumulative effects.

FHWA issued a position paper on indirect and cumulative effects in 1992 entitled "*Secondary and Cumulative Impact Assessment in the Highway Project Development Process*," that lists project considerations regarding indirect and cumulative impacts that remain applicable to transit projects as well. Two NCHRP guidebooks regarding indirect and cumulative impact assessment are particularly relevant. These documents are: "*NCHRP Report 403: Guidance for Estimating the Secondary Effects of Proposed Transportation Projects*," 1998, and "*NCHRP Report 423A: Land Use Impacts of Transportation: A Guidebook*," 1999. These documents are the basis for this proposed methodology to study indirect effects and cumulative impacts of the Western Rail Yard Infrastructure Project.

B. STUDY AREA

The geographic limits for the indirect effects and cumulative impacts assessment will be established through an examination of multiple resource boundaries. While the spatial boundaries for analysis will vary by resource, some of the resources Study Areas may be larger than those used for the direct impacts analyses considered in the EIS due to the potential for indirect effects and cumulative impacts to extend over a larger geographic area than direct effects (e.g., effects to traffic, air quality, water quality can extend over larger geographic areas). Resources will then be mapped and analyzed to determine the nature and extent of indirect and cumulative effects resulting from the Proposed Action. The Study Area for the cumulative effects analysis will:

- Include logical boundaries for evaluating effects on resources of the natural and built environment.
- Encompass past, present, and reasonably foreseeable future actions that may also contribute to effects to the same resources as are affected by the Proposed Action and actively affecting those resources within the timeframe impacts being considered.

C. DATA SOURCES

The indirect effects analysis will be based on the same data sets used for the direct effects analyses, and may involve additional data collection over a larger geographic and temporal range, using the same data collection methodologies. The data sources anticipated for these efforts are summarized in **Table 18-1**.

Table 18-1
Indirect Effects and Cumulative Impacts Analyses Data Sources

Analysis Area	Data Source
Indirect Effects	Planning documents, local master plans, development applications, municipal planning departments, field visits, and Geographic Information Systems (GIS) mapping layers, and other EIS analyses (e.g., land use, traffic)
Cumulative Effects	Planning documents, local master plans, development applications, municipal planning departments, field visits, GIS, and other EIS analyses (e.g., land use, traffic)

The indirect effects analysis will require an understanding of reasonably foreseeable future projects in the geographic and temporal Study Areas that could, in combination with the Project, lead to indirect effects. The "Land Use, Land Planning, and Property" chapter of the EIS will include a list of reasonably foreseeable ongoing projects included in the No Build Alternative that will inform the indirect effects and cumulative impacts analysis. This will include the previously approved (and now as-of-right) private Overbuild development project on the Western Rail Yard site, analyzed in the 2009 SEQRA/CEQR FEIS, that is made possible by the implementation of the Proposed Action.

The Platform is needed to support the provision of developable land area that would generate revenue for the MTA and its subsidiary agencies and modernize state-of-the-art life safety systems for the entire Western Rail Yard. Therefore, the indirect effect analyses will predominantly focus on the previously approved Overbuild development as described in the 2009 SEQRA/CEQR FEIS that would occur on the Project Site above the Platform and Tunnel Encasement.

The cumulative impacts analysis will require an understanding of past and reasonably foreseeable future projects in the geographic and temporal Study Areas that could, in combination with the Project, lead to cumulative impacts. The "Land Use, Land Planning, and Property" chapter of the EIS will include a list of reasonably foreseeable and ongoing projects included in the No Build Alternative that will inform the cumulative impacts analysis.

D. ANALYSIS TECHNIQUES

INDIRECT EFFECTS

The EIS indirect effects analysis will include FRA's assessment of both adverse and beneficial effects associated with the Proposed Action, including the Overbuild development, on the following resource areas:

- Land Use, Land Planning, and Property
- Transportation
- Air Quality, Greenhouse Gas Emissions, and Resilience
- Noise and Vibration
- Cultural Resources
- Parks and Recreation
- Aesthetics and Visual Quality
- Contaminated Materials
- Utilities and Energy
- Soils and Geology
- Water and Natural Resources
- Coastal Zone Consistency
- Socioeconomics
- Public Health
- Environmental Justice
- Safety and Security

The methodology for these indirect analyses will follow the analysis methodology described in the methodology for the direct impact assessment for the relevant resource category and apply those to the induced changes resulting from the Proposed Action.

In addition, for all resource areas listed above and below, FRA will reference the 2009 SEQRA/CEQR FEIS findings to describe the indirect construction period and/or operational effects of the Overbuild development resulting from the Proposed Action in this EIS. FRA will also account for any other changes that have occurred in the Study Area that could influence the indirect affects assessment in the EIS. FRA will also identify the phasing and sequencing of construction activities for the Proposed Action in the EIS, and will examine how these influence the identification of peak construction activities for the Overbuild for each resource analysis, as applicable. The EIS will note that peak construction activities for the Proposed Action will occur earlier and largely independent of the peak construction activities for the Overbuild. Therefore, the indirect assessment of construction activities will summarize the findings of the 2009 SEQRA/CEQR FEIS in terms of anticipated impacts and identified mitigation commitments as well as the more current update to construction sequencing, phasing and overall levels of construction activities, accounting for any relevant changes in the surrounding neighborhood since the 2009 SEQRA/CEQR FEIS.

For Transportation, FRA will analyze the effects of the indirect vehicular, mass transit, parking, and pedestrian demand resulting from the introduction of additional trips within the Study Area associated with the Overbuild. The 2009 SEQRA/CEQR FEIS includes a comprehensive evaluation of the transportation demand and potential impacts of the Overbuild. As described in Chapter 1, "Introduction," of this Methodology Report, the Overbuild is not a component of the Proposed Action, and is now considered an as-of-right development in accordance with the New York City Zoning Resolution; no further land use approvals are required. Therefore, FRA will assess the indirect effects of the Overbuild for this EIS based on a summary presentation of the changes in transportation demand generated by the Overbuild, and the levels of traffic and transportation mitigation commitments that were established in the 2009 SEQRA/CEQR FEIS. In the indirect assessment, FRA will identify what, if any, mitigation measures have already been implemented and if there have been any intervening updates on mitigation requirements based on on-going transportation planning and improvements in the study area since completion of the 2009 SEQRA/CEQR FEIS.

For Socioeconomics, this analysis includes: indirect residential displacement as a result of the introduction of a new population into the Study Area; indirect business or institutional displacement as a result of new development and associated effects on rents or property values in commercial and industrial buildings, indirect effects to community facilities and services as a result of new populations in the Study Area, and indirect impact on elderly, transit dependent, and persons with disabilities in the Study Area (if any). The methodology for these indirect analyses of effects to community facilities and services as a result of new populations in the Study Area, and indirect impact on elderly, transit dependent, and persons with disabilities in the Study Area (if any) would follow the analysis methodology described in the methodology for the direct impact assessment for this resource category (see Chapter 14, "Socioeconomics"). Analysis of indirect residential displacement and indirect business or institutional displacement is further described below.

INDIRECT RESIDENTIAL DISPLACEMENT

Indirect (or secondary) residential displacement is the involuntary displacement of residents that may result from a change in socioeconomic conditions created by a project. The concern is whether a project could lead to increases in property values, and thus rents, making it difficult for some residents to afford their homes. The objective of the indirect residential displacement assessment is to determine whether the Proposed Action would either introduce a trend or accelerate a trend of changing socioeconomic conditions that may potentially displace a vulnerable population to the extent that the socioeconomic character of the neighborhood would change. According to *CEQR Technical Manual* guidance (see Chapter 5, 332.1), an assessment of indirect residential displacement should be conducted for actions that result in the incremental development of more than 200 residential dwelling units.

If an analysis of indirect residential displacement is warranted, FRA will determine if the Proposed Action would introduce a population with a higher average income than that of the Study Area population. FRA will examine market rents and the planned affordability levels of any new residential units added by the Proposed Project to determine the average household income of the new population. If the new population would have an average household income that is higher than that of the Study Area population, FRA will then determine if the new population would result in an increase in population in the Study Area of more than five percent. If the population increase is less than five percent, no further analysis is warranted. If the population increase is more than five percent but less than ten percent, FRA will look at rent trends in the Study Area to determine if the Study Area is already experiencing a trend toward increasing rents. If the population increase is more than ten percent of the Study Area population, FRA will conduct a detailed analysis of indirect residential displacement. This detailed analysis will determine whether there is a low income population in the Study Area living within units not protected by rent stabilization, rent control, or other form of government regulations restricting rent, that may be at risk of indirect displacement by the Proposed Action.

According to the *CEQR Technical Manual*, an adverse impacts due to indirect residential displacement may occur if the Study Area contains a vulnerable population potentially subject to indirect displacement that exceeds five percent of the Study Area or relevant sub-areas and this populations would not be similarly displaced under the No Action Alternative.

INDIRECT BUSINESS AND INSTITUTIONAL DISPLACEMENT

Similar to indirect residential displacement, the concern with respect to indirect business displacement is whether a project could lead to increases in property values, and thus rents, making it difficult for some businesses to afford their rent. FRA will use the methodology outlined in the *CEQR Technical Manual* (see Chapter 5, 322.2) to assess the potential for indirect business and institutional displacement. FRA will begin with a preliminary assessment that describes and characterizes conditions and trends in employment and businesses within the Study Area using the most recent available data from such sources as the U.S. Census Bureau, as well as private sources such as ESRI and real estate brokerage firms, as necessary. FRA will use this information to consider: whether the Proposed Action would introduce enough of a new economic activity to alter existing economic patterns; whether the Proposed Action would add to the concentration of a particular sector of the local economy enough to alter or accelerate existing economic patterns; and whether the Proposed Action would directly displace any type of use that either directly supports businesses in the area or brings a customer base to the area for local businesses, or if it indirectly displaces residents, workers, or visitors who form the customer base of existing businesses in the area.

If FRA cannot rule out the potential for adverse impacts due to indirect business displacement in the preliminary assessment, then FRA will conduct a detailed analysis. In the detailed analysis, FRA would utilize more in-depth analysis of businesses' operations and industry trends, additional field surveys, and interviews with business owners and/or industry experts; identify categories of businesses at risk for displacement; and assess potential impacts on any identified categories of businesses at risk.

According to the *CEQR Technical Manual*, an adverse impacts due to indirect business displacement may occur if the Proposed Action would create a trend that would result in the displacement of businesses as described above in "Direct Business Displacement" and these businesses would not receive relocation assistance or would not be able to relocated to a suitable space in the Study Area. An impact could also occur if the Proposed Action would add retail uses that draw substantial sales from existing businesses.

OPERATIONAL CUMULATIVE EFFECTS

The analysis FRA will prepare will follow the eight-step methodology presented in NCHRP guidance. This methodology is consistent with CEQ guidance on cumulative effects analysis. This process includes the following steps:

- **Step 1 – Define the Study Area Boundaries and Timeframe** sets appropriate Study Area boundaries for the analysis of indirect and cumulative effects as well as the timeframe for the analysis.
- **Step 2 – Identify the Study Area Communities' Trends and Goals** gathers information on community trends and goals in the Study Area for the analysis of indirect and cumulative effects.
- **Step 3 – Inventory Notable Features** identifies specific valued, vulnerable, or unique elements of the human and natural environment for assessment for the analysis of indirect and cumulative effects.
- **Step 4 – Identify Impact-Causing Activities of the Proposed Alternative** identifies the cause-and-effect relationships between a transportation action and its potential effects on the goals identified in Step 2 or the notable features identified in Step 3.

- **Step 5 – Identify Potential Impacts for Analysis** compares the effects identified in Step 4 with the inventory of community trends and goals and notable features identified in Steps 2 and 3.
- **Step 6 – Analyze Impacts** determines the magnitude and location of the potential effects identified in Step 5.
- **Step 7 – Evaluate Analysis Results** evaluates the uncertainties in the methodology used to evaluate the effects to better understand the analysis results.
- **Step 8 – Assess Consequences and Develop Mitigation** assesses the consequences of the effects and develops strategies to address adverse effects.

FRA will consider the following resource areas under the cumulative analysis for cumulative operational effects of the Proposed Action:

- Land Use, Land Planning, and Property: The EIS will reference the findings of the land use, land planning, and property analysis for the Proposed Action. If there is a direct impact identified, an analysis will be performed using the methodologies listed above in section 18D, "Operational Cumulative Effects," and Chapter 2, "Land Use, Land Planning, and Property."
- Project Site Air Quality, Greenhouse Gas Emissions, and Resilience: Emissions associated with stationary source fossil fuel-fired equipment and infrastructure related to life safety and ventilation components of the Platform (such as venting of diesel locomotive emissions from the area below the Platform) were identified as potential direct impacts. Therefore, potential air quality impacts from the Proposed Action alongside stationary sources of emissions that may result in a cumulative impact will be evaluated using the USEPA AERMOD dispersion model, consistent with the methodology listed above in Chapter 4, "Air Quality, Greenhouse Gas Emissions, and Resilience."
- The EIS will reference the direct GHG emissions from building energy use, including fuel consumption and electricity use, as well as indirect impact identified above in section 18D. The operational cumulative impact will be conservatively estimated as the summation of both the direct and indirect impacts, consistent with the methodology listed above in Chapter 4, "Air Quality, Greenhouse Gas Emissions, and Resilience."
- Noise and Vibration: As described in Chapter 5, "Noise and Vibration," these components of the Proposed Action may have operational noise or vibration associated with operation of the critical life safety and mechanical, electrical and plumbing support services for the yard, including new lighting, sprinklers and an extensive platform ventilation system. Therefore, potential noise and vibration impacts from the Proposed Action alongside stationary sources of emissions may result in a cumulative impact and may be evaluated using the methodology listed above in Chapter 5, "Noise and Vibration" if a direct impact is determined.

As described in Chapter 3, "Transportation," once completed, the Proposed Action does not generate any demand for transportation services; therefore, a cumulative analysis on transportation is not appropriate for the operation of the Proposed Action. For related analysis of transportation for noise and vibration and air quality, there would be no direct impact from mobile source emissions associated with the Proposed Action.

The Proposed Action is not anticipated to have a direct operational effect on the following resource categories and thus, a cumulative analysis for these resources is not appropriate for the operation of the Proposed Action. If there is a direct impact identified, an analysis will be performed using the methodologies listed above in section 18D:

- Cultural Resources
- Parks and Recreation Areas
- Aesthetics and Visual Quality
- Contaminated Materials
- Utilities and Energy
- Soils and Geology
- Water and Natural Resources
- Coastal Zone Consistency
- Socioeconomics
- Environmental Justice
- Safety and Security

For the resource categories that will be considered in the public health assessment, a cumulative impact analysis may be completed using the methodology listed above in Chapter 15, "Public Health," if a direct impact to one or more of the resource category assessments pertinent to a public health assessment (Air Quality, Noise, Contaminated Materials, and Water Quality) is identified.

CUMULATIVE CONSTRUCTION EFFECTS

The potential construction effects of the Proposed Action with the construction of the portion of the Overbuild development and other projects being constructed within the same vicinity and timeframe that is expected to overlap with the construction of the Proposed Action will be cumulatively assessed in the following sections where these resources will likely be effected:

- Transportation
- Air Quality, Greenhouse Gas Emissions, and Resilience
- Noise and Vibration
- Cultural Resources
- Parks and Recreational Areas

The analysis will follow the procedures outlined in the resource category chapters in this document.

With respect to Greenhouse Gas and Resilience, the EIS will reference the findings of the resource category for the Proposed Action. If there is a direct impact identified, an analysis will be performed using the methodologies listed above in section 18D.

The Proposed Action is not anticipated to have a direct construction effect on the following resource categories, and thus, a cumulative analysis would not be appropriate for the construction of the Proposed Action. If there is a direct impact identified, an analysis will be performed using the methodologies listed above in section 18D:

- Land Use, Land Planning, and Property
- Aesthetics and Visual Quality
- Contaminated Materials
- Utilities and Energy

- Soils and Geology
- Water and Natural Resources
- Coastal Zone Consistency
- Socioeconomics
- Environmental Justice
- Safety and Security

For the resource categories that will be considered in the public health assessment, a cumulative impact analysis may be completed using the methodology listed above in Chapter 15, "Public Health," if a direct construction-related impact to one or more of the resource category assessments pertinent to a public health assessment (Air Quality, Noise, Contaminated Materials, and Water Quality) is identified.

E. IMPACT CRITERIA

An alternative may have an adverse indirect effect on a resource if the direct effects of the project lead to other, indirect effects that meet the criteria for significance for the resource type in question.

An alternative may have an adverse cumulative impact on a resource if the project, together with other actions, contributes to an effect that meets the criteria for significance for the resource type in question. Determining whether a significant cumulative impact has occurred involves consideration of:

> *"...whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment." (40 CFR § 1508.27)."*

F. MITIGATION ANALYSIS

If the Proposed Action would result in significant indirect or cumulative impacts, the EIS will identify feasible and practicable measures to avoid or mitigate these impacts. Mitigation measures to be implemented would depend on the affected resource category in question (as described in more detail in the various resource category analysis methodology chapters in this report), and may include direct mitigation measures developed to address impacts of the Proposed Action, or other measures that would serve to avoid indirect and/or cumulative impacts.

G. CORRELATION WITH OTHER ANALYSES

The analyses prepared in this chapter will draw from many of the other resource category analyses prepared for the EIS, including, land use, traffic and other transportation analyses, air quality, and noise and vibration, and parks and recreation areas. A critical input to the analyses for this chapter is identification of other planned developments and infrastructure projects in the area that would be completed or under construction during the analysis timeframe for the Proposed Action. ✷

Chapter 19: Section 4(f) Evaluation

This chapter describes the methodology that FRA will use for the Section 4(f) evaluation of the No Action Alternative and the Proposed Action under consideration in the NEPA process for the Western Rail Yard Infrastructure Project. The Section 4(f) evaluation will identify whether either the No Action Alternative and/or the Proposed Action would result in a proposed "use" of properties protected under Section 4(f) of the USDOT Act of 1966, as explained below.[1] If the Proposed Action would result in the "use" of any Section 4(f) properties, and those impacts exceed the *de minimis* threshold, FRA will also evaluate whether there are any feasible and prudent avoidance alternatives that would not require the "use" of those properties. If no such alternatives are available, the evaluation will include the development of mitigation measures comprising all possible planning to minimize impact to the affected Section 4(f) properties. Section 1301 (23 U.S.C. 138 c/49 U.S.C. 303[e]) requires the Section 4(f) process to be aligned with the processes of NEPA and Section 106 of the NHPA (54 U.S.C. 306108) to the maximum extent practicable.

A. REGULATORY CONTEXT

Section 4(f) of the USDOT Act of 1966 (49 USC § 303), prohibits Department of Transportation agencies from approving the "use" of Section 4(f) property unless a) the agency determines that there is no feasible and prudent avoidance alternative to the use of the land, and the action includes all possible planning to minimize harm to the property from such use; or b) the agency determines that the use of the property, including any measure(s) to minimize harm (such as avoidance, minimization, mitigation, or enhancement measures) committed to by the applicant, will have a *de minimis* impact on the property.[2] A historic site is considered to be a property that is listed on, or eligible for listing on, the National Register of Historic Places. When there is a finding of no feasible and prudent avoidance alternatives, the Section 106 process may be used to comply with the requirement in Section 4(f) to undertake all possible planning to minimize harm.

In making its Section 4(f) determinations, FRA follows the FHWA/FTA/FRA Section 4(f) regulations (23 CFR part 774) as well as FHWA's Section 4(f) guidance, known as the Section 4(f) Policy Paper.[3] 23 USC 138 also defines the requirements for making a finding of *de minimis* impact.

Pursuant to 23 CFR 774.17, a use of Section 4(f) property occurs when:

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[1] According to the Section 4(f) guidance, for projects that have impacts below the *de minimis* threshold, those impacts are not considered a "use" under Section 4(f) criteria. If FRA identifies any impacts to Section 4(f) properties that qualify under one or more exceptions to Section 4(f) (per 23 CFR 774.13 and/or Section 11502 of the FAST Act), those impacts will also be presented in this evaluation.

[2] "Section 4(f) properties" are defined as any publicly owned parkland, recreation area, or wildlife and waterfowl refuge; or any land from a publicly or privately owned historic site of national, state, or local significance.

[3] FHWA, Section 4(f) Policy Paper, July 20, 2012.

- Land is permanently incorporated into a transportation facility;
- There is a temporary occupancy of land that is adverse in terms of the statute's preservation purpose as determined by the criteria in 23 CFR 774.13(d);[4] or
- There is a constructive use of a Section 4(f) property as determined by the criteria in 23 CFR 774.15.[5]

If FRA determines that a Section 4(f) property experiences a use for a transportation project, FRA will prepare documentation to demonstrate that no feasible and prudent alternative exists to the use of the 4(f) property, and that the Project includes all possible planning to minimize harm to the property. Also, FRA must consult with the U.S. Department of the Interior (DOI), and if appropriate, with the U.S. Department of Housing and Urban Development (HUD) and USDA, and State and local authorities, prior to approving the use of a 4(f) property (23 CFR 774.5[a]).

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

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

If there is no feasible and prudent avoidance alternative, FRA may approve only the alternative that causes the least overall harm in light of Section 4(f)'s preservation purpose. As stated in 23 CFR § 774.3, the "least overall harm" is determined by balancing the following list of factors:

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[4] "Temporary occupancies of land that are so minimal as to not constitute use must meet the following conditions: 1) duration must be temporary, i.e., less than the time needed for construction of the project, and there should be no change in ownership of the land; 2) scope of work must be minor, i.e., both the nature and the magnitude of the changes to the Section 4(f) property are minimal; 3) there are no anticipated permanent adverse physical impacts, nor will there be interference with the protected activities, features, or attributes of the property, on either a temporary or permanent basis; 4) the land being used must be fully restored, i.e., the property must be returned to a condition which is at least as good as that which existed prior to the project; and 5) there must be documented agreement of the official(s) with jurisdiction over the Section 4(f) property regarding the above conditions." A use would occur when a temporary occupancy does not meet one or more of the above criteria, which are listed in 23 CFR 774.13(d).

[5] "A constructive use occurs when the transportation project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the protected activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired."

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

DE MINIMIS IMPACTS

FRA's Section 4(f) regulations (23 CFR Part 774) establish procedures for determining if the use of a Section 4(f) property has a *de minimis* impact on a property. As defined by the Section 4(f) regulations, *de minimis* impacts related to historic sites are defined as the determination of either "no adverse effect" or "no historic properties affected" in compliance with Section 106 of NHPA (16 USC § 470 et seq.; 36 CFR Part 800). *De minimis* impacts on publicly owned parks, recreation areas, and wildlife and waterfowl refuges are defined as those that do not "adversely affect the activities, features, and attributes" of the Section 4(f) property (23 CFR Part 774.17). Section 4(f) and the implementing regulations at 23 CFR 774.5(b) provide the below standards for *de minimis* impact findings. 23 USC 138 also defines the requirements for making a finding of *de minimis* impact.

A finding of a *de minimis* impact on a historic site may be made when:

- The process required by Section 106 of the NHPA results in the determination of "no adverse effect" or "no historic properties affected" with the concurrence of the NYSHPO and/or Tribal Historic Preservation Officer (THPO), if applicable, and ACHP, if participating in the Section 106 consultation;
- The NYSHPO and/or THPO, and ACHP, if the ACHP is participating in the Section 106 consultation, is informed of FRA's intent to make a *de minimis* impact finding based on their written concurrence in the Section 106 determination; and
- The FRA has considered the views of any consulting parties participating in the Section 106 consultation.

The impacts of a transportation project on a park, recreation area, or wildlife and waterfowl refuge may be determined to be *de minimis* if:

- The transportation use of the Section 4(f) property, together with any impact avoidance, minimization, and mitigation or enhancement measures incorporated into the project, does not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f);
- The official(s) with jurisdiction over the property are informed of FRA's intent to make the *de minimis* impact determination based on their written concurrence that the project will not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f); and

- The public has been afforded an opportunity to review and comment on the effects of the project on the protected activities, features, and attributes of the Section 4(f) property.

If FRA determines, through appropriate consultation and public involvement, that a transportation use of a Section 4(f) property results in a *de minimis* impact, then analysis of avoidance alternatives are not required and the Section 4(f) evaluation process is complete. FRA will coordinate to receive concurrence from the official(s) with jurisdiction (as described above), and document that determination consistent with the requirements of 23 CFR Part 774 and relevant CEQ guidelines.

B. ANALYSIS APPROACH

FRA will prepare a Draft Section 4(f) Evaluation in accordance with the FHWA policy paper and the Section 4(f) regulations (23 CFR Part 774), to be included in the EIS. The evaluation will include sufficient supporting documentation to allow FRA to make Section 4(f) determinations and the documentation will be included in the Draft EIS that will be prepared for the No Action Alternative and Proposed Action in accordance with NEPA.

The Section 4(f) chapter will contain the following sections:

- Introduction
- Regulatory Context
- Identification of Section 4(f) Properties
- Use of Section 4(f) Properties
  - Exceptions and Exemptions
  - *De Minimis* Impacts
- Alternatives to Avoid the Use of the Section 4(f) Property (as relevant)
- Least Overall Harm Alternative (as relevant)
- Measures to Minimize Harm
- Coordination and Public Involvement

The Study Area for the Section 4(f) evaluation will comprise the Project Site and directly adjacent blockfronts. The listing of properties in the Section 4(f) evaluation will utilize the information collected for relevant chapters of the EIS (i.e., parks and recreation, cultural resources). The Section 106 consultation process will identify historic properties that will be included in the Section 4(f) evaluation.

IDENTIFICATION OF SECTION 4(F) PROPERTIES

As part of the Section 4(f) evaluation, FRA will identify historic properties, publicly owned parks, and wildlife and waterfowl refuges that could experience an impact or Section 4(f) use from the No Action Alternative and Proposed Action. The analysis from relevant chapters of the EIS (i.e., parks and recreation, cultural resources) will inform the listing of properties in the Section 4(f) evaluation. The Section 106 consultation process will identify historic properties that will be included in the Section 4(f) evaluation.

EVALUATION OF THE PROPOSED ACTION'S POTENTIAL USE OF SECTION 4(F) PROPERTIES

For each Section 4(f) property identified, FRA will use the analysis methodology described above during the preparation of the EIS to evaluate the Proposed Action's potential use of Section 4(f) properties. The analysis will consist of the following steps:

- FRA will determine whether any exceptions apply as per 23 CFR 774.13; or if the historic resource is exempt from Section 4(f) evaluation as per Section 11502 of the FAST Act.
- Assess the potential use of the Section 4(f) property by considering whether the construction or operation of the Western Rail Yard Infrastructure Project will: (1) permanently incorporate the resource into the transportation ROW; (2) result in temporary occupancy; and/or (3) result in constructive use.
- FRA will determine whether there is a *de minimis* impact.
- For any use of Section 4(f) properties that are not considered *de minimis*, FRA will conduct an analysis to identify feasible and prudent alternatives that avoid such use of it and other Section 4(f) properties. Section 4(f) regulations require that no Section 4(f) property may be used unless there are no feasible and prudent alternatives to that use. The assessment will consider the No Action Alternative and Proposed Action identified in EIS to determine whether they fit the definition of feasible and prudent avoidance alternatives. In addition, the assessment will consider design modifications to the Proposed Action and other alternatives that avoid and/or minimize impacts to each Section 4(f) property. The assessment will evaluate avoidance alternatives effects on each Section 4(f) property to demonstrate whether it would avoid a use. FRA will identify Alternatives that avoid the use of the Section 4(f) property, if any exist. In finding that an alternative is not feasible or prudent, FRA's evaluation will consider adverse factors such as environmental impacts, safety, engineering/operational deficiencies, poor transportation service, increased costs, and other factors as per 23 CFR § 774.17.
- If FRA determines that more than one alternative results in a use of a Section 4(f) property and there is no feasible and prudent avoidance alternative, the alternatives must be compared to identify which alternative causes the least overall harm in light of the statute's preservation purpose. To determine which of the alternatives would cause the least overall harm, FRA will consider the seven factors set forth in 23 CFR 774.3(c)(1) concerning the alternatives (see section "Regulatory Context," above).
- If FRA determines that the Proposed Action would result in the use of any Section 4(f) resource, all possible planning will be undertaken to develop measures to minimize harm to affected resources. This will include citing stipulations of the Section 106 MOA or PA and any other mitigation developed as part of the EIS that is relevant to the proposed Section 4(f) use. ✷