19.0 Construction

Introduction

This chapter assesses the potential impacts of the construction of buildings expected to result on sites in the Atlantic Avenue Mixed-Use Plan area from the Proposed Actions. The following sections discuss the potential impacts resulting from the construction of the projected development sites as described in the reasonable worst-case development scenario (RWCDS) presented in **Chapter 1, Project Description**. Construction impacts, although temporary, can include noticeable and disruptive effects from an action that is associated with construction or could induce construction. As stated in the 2021 *CEQR Technical Manual*, determination of the significance of construction impacts and need for mitigation is generally based on the duration and magnitude of the impacts.

Construction impacts are usually important when construction activity could affect traffic conditions, hazardous materials, archaeological resources, the integrity of historic resources, community noise patterns, vibration, and air quality conditions.

The Proposed Actions consist of zoning map and text amendments, Urban Renewal Plan (URP), and disposition approval, as well as other actions not subject to the Uniform Land Use Review Procedure (ULURP).

The Proposed Actions are expected to facilitate the construction of new mixed-use development in support of greater density in an area that has strong public transit access and is well-connected to other employment nodes. The Proposed Actions are also expected to support new housing with affordable housing opportunities and promote job-generating uses and clusters of non-residential uses.

As discussed in **Chapter 1, Project Description**, 70 development sites (54 projected and 16 potential) have been identified in the Project Area. These projected and potential development sites are depicted in **Figure 1-3**.

Under the RWCDS, the total development expected to occur under on the 54 projected development sites under the With-Action condition would consist of approximately 6,657,597 square feet (sf) of floor area (see **Table 1-1**: 2034 RWCDS No-Action and With-Action Land Uses in **Chapter 1**), including 5,320,984 sf of residential floor area (approximately 5,278 DUs), a

substantial proportion of which are expected to be affordable pursuant to Mandatory Inclusionary House (MIH) and City-based programs, 870,116 sf of commercial uses, 77,095 sf of industrial and automotive uses, and 389,402 sf of community facility uses. There would be no accessory parking spaces under the With-Action condition.

As described in other chapters of this Environmental Impact Statement (EIS), the projected developments resulting from the Proposed Actions are expected to range from 65 to 185 feet in height. The 54 projected development sites would be completed in the 10 years following the adoption of the Proposed Actions (by the analysis year 2034). In addition, there are 16 potential development sites considered less likely to be developed by the 2034 analysis year and are therefore not considered in this assessment.

According to the 2021 *CEQR Technical Manual*, construction duration is often broken down into short term (less than two years) and long term (two or more years). Where the duration of construction is expected to be short term, any impacts resulting from such short-term construction generally do not require detailed assessment. As described below, it is estimated that most of the projected development sites would generally take less than 24 months to construct and would therefore be considered short term. However, as construction activity associated with the RWCDS would occur on multiple development sites within the same geographic area—creating the potential for several construction timelines to overlap—a preliminary assessment of potential construction impacts was prepared in accordance with the guidance of the 2021 *CEQR Technical Manual*. The preliminary assessment is presented in this chapter.

The findings of the preliminary assessment identified the need to undertake more detailed construction impact assessments for air quality, noise, and construction traffic. To conduct these detailed assessments, this chapter describes the City, state, and federal regulations and policies that govern construction, followed by the conceptual construction schedule and the types of activities likely to occur during construction of the 54 projected development sites. The types of construction equipment are also discussed, along with the expected number of workers and truck deliveries. Finally, the potential impacts from construction activity are assessed and the methods that may be employed to avoid significant adverse construction-related impacts are presented.

For each of the various technical areas presented below, appropriate construction analysis years were selected to represent reasonable worst-case conditions relevant to that technical area, which can occur at different times for different analyses. For example, the noisiest period of construction may not coincide with the heaviest construction traffic.

Principal Conclusions

Transportation

The first quarter of 2032 was selected as the reasonable worst-case analysis period for assessing potential cumulative traffic impacts from operational trips from completed portions of the projected developments and construction trips associated with construction activities. An assessment of traffic generated during this peak period is presented below.

It is expected that potential significant adverse traffic and pedestrian impact could occur during construction. The mitigation measures identified in **Chapter 20, Mitigation,** for 2034 operational traffic and pedestrian impacts would also be similarly effective at mitigating any potential impacts from construction traffic during the peak-construction activity expected with the Proposed Actions.

Traffic

During construction, traffic would be generated by construction workers commuting via autos and by trucks making deliveries to projected development sites. Each worker vehicle was assumed to arrive in the morning and then depart in the afternoon or early evening, while truck deliveries would occur throughout the construction day. To avoid congestion and ensure that materials are on-site for the start of each shift, construction truck deliveries would often peak during the hour before the regular day shift, overlapping with construction worker arrival traffic. Each truck delivery was assumed to result in two truck trips during the same hour (one inbound and one outbound). For analysis, truck trips were converted into Passenger Car Equivalents (PCEs) based on one truck being equivalent to an average of two PCEs.

In the first quarter of 2032, construction-related traffic is expected to peak during the 6:00 a.m. to 7:00 a.m. and 3:00 p.m. to 4:00 p.m. periods. During the 6:00 a.m. to 7:00 a.m. peak hour, there would be 344 PCE vehicle trips, including 289 inbound trips and 55 outbound trips. During the 3:00 p.m. to 4:00 p.m. peak hour, there would be 252 PCE trips, including 9 inbound trips and 243 outbound trips.

Transit

The construction sites are located in an area that is well served by public transportation with seven subway routes, 10 bus routes, commuter rail, and several other subway routes located on the periphery of the Project Area.

Construction worker travel demand is expected to generate approximately 237 transit trips in each of the 6:00 a.m. to 7:00 a.m. and 3:00 p.m. to 4:00 p.m. peak-construction periods. Given that construction worker trips via transit would be distributed among numerous subway routes, bus routes, and the Long Island Rail Road in proximity to projected development sites that are located throughout the rezoning area, the number of incremental construction trips by transit are not expected to exceed the 200-trip 2021 *CEQR Technical Manual* analysis threshold for any individual subway station or the 50-trip threshold for a bus analysis (per route, per direction) in either peak -construction hour in 2032.

Pedestrians

During the 2032 (first quarter) peak-construction period, net incremental travel demand on area sidewalks, corners, and crosswalks is expected to total approximately 295 trips in the 6:00 a.m. to 7:00 a.m. and 3:00 p.m. to 4:00 p.m. peak -construction hours. These trips would be widely distributed among the projected development sites that would be under construction in the first quarter of 2032 and would primarily occur outside the weekday AM and PM peak -commuter periods and weekday midday and Saturday peak periods when area pedestrian facilities typically experience their greatest demand.

Incremental pedestrian trips with full build-out of the Proposed Actions in 2034 would be substantially greater in number, totaling 6,930, 7,814, 9,934, and 11,088 during the analyzed weekday AM, midday, PM, and Saturday midday operational peak hours, respectively. Year 2032 pedestrian conditions during the weekday 6:00 a.m. to 7:00 a.m. and 3:00 p.m. to 4:00 p.m. peak -construction hours are therefore expected to be generally better than during the analyzed operational peak hours with full build-out of the Proposed Actions in 2034. Consequently, there would be less likelihood of significant adverse pedestrian impacts during the peak -construction hours in the cumulative analysis year than with full build-out of the Proposed Actions in 2034. It is expected that the mitigation measures identified for 2034 operational pedestrian impacts in **Chapter 21, Mitigation**, would be similarly effective at mitigating any potential impacts from construction pedestrian trips during the 2032 analysis period for cumulative construction and operational travel demand.

Parking

With full build-out of the Proposed Actions in 2034, there would be a parking demand for more than 2,000 vehicles between 11:00 a.m. and 6:00 p.m. Year 2032 parking conditions during the weekday midday are therefore expected to be generally better than during the analyzed operational peak hours with full build-out of the Proposed Actions in 2034. Consequently, there would be less likelihood of a parking shortfall during the peak -construction hours in the cumulative analysis year (2032) than with full build-out of the Proposed Actions in 2034. While the 2032 (first quarter) construction worker parking demand could contribute to any such shortfall in the midday, the project site is located in Parking Zone 2, per 2021 *CEQR Technical Manual* guidance, and any potential shortfall would not be considered significant because the site is served by nearby alternative modes of transportation.

Air Quality

Measures required to reduce pollutant emissions during construction include all applicable laws, regulations, and the City's building codes. These include dust suppression measures, idling restriction, and the use of ultra-low sulfur diesel (ULSD) fuel. With the implementation of these emission reduction measures, the dispersion modeling analysis of construction-related air emissions for both on-site and on-road sources determined that particulate matter PM_{10}, annual-average nitrogen dioxide (NO_2), and carbon monoxide (CO) concentrations would be below their corresponding *de minimis* thresholds or National Air Quality Ambient Standards (NAAQS), respectively. $PM_{2.5}$ would be below its NAAQS for all analyzed Sites and would exceed annual *de minimis* threshold at Sites 10 and 14. The exceedance of the *de minimis* threshold would be considered a significant adverse air quality impact. Since construction activities are temporary and the total annual $PM_{2.5}$ concentrations resulted by the construction activities would be lower than NAAQS, the temporary exceedance of the *de minimis* criterion does not indicate public health impact.

~~Between the Draft and Final EIS, additional review and evaluation will be performed to determine whether the identified impacts related to Annual PM2.5 increments will be avoided. This may include use more refined assumptions in terms of construction equipment usage, and the use of newer construction equipment with lower particulate emissions, as applicable.~~

Noise

Detailed construction noise modeling was performed for two representative development sites with anticipated construction durations of more than 24 months, for all construction phases. The selected representative development sites include Site 14, one of the largest projected development sites, and Site 22, a relatively large projected development site. These sites were selected to represent remaining sites of similar size with construction durations close to 24 months. Sites with anticipated construction durations of less than 24 months do not require detailed quantitative construction noise analysis. Characteristics considered in the selection of sites to be represented by Site 14 and Site 22 included building size, building height, and sensitive receptor proximity and line of sight to the construction site. Specifically, construction noise analysis results evaluated from Site 14 were used to evaluate potential noise impacts from Projected Development Sites 15, 54, and 55. Construction noise analysis results from Site 22 were used to evaluate potential noise impacts from Projected Development Sites 6, 9, 10, 20, and 45.

Based on the detailed analysis of Projected Development Site 14, construction noise levels are predicted to result in significant noise level increases of at least 20 dBA at noise-sensitive receptors within approximately 150 feet of the site. These very objectionable noise level increases will be considered significant adverse impacts if they are sustained for at least three continuous months. Construction noise levels are predicted to result in an increase of at least 15 dBA at noise-sensitive receptors within approximately 250 feet of the site, which will be considered a significant adverse impact if sustained for 12 continuous months.

Upon completion of Phase 1, noise level increases during Phase 2 and Phase 3 will decrease, with maximum predicted construction noise levels ranging between 65 to 87 dBA. Very objectionable noise levels may be experienced at noise-sensitive receptors within 50 feet of Phase 2 and Phase 3, which will be considered a significant adverse impact if they are sustained for at least three continuous months. Objectionable noise levels may be experienced at noise-sensitive receptors within approximately 150 feet of Phase 2 and 100 feet of Phase 3, which will be considered a significant adverse impact if sustained for 12 continuous months.

Based on the detailed analysis of Projected Development Site 22, construction noise levels are predicted to result in significant noise level increases of at least 20 dBA at noise-sensitive receptors within approximately 150 feet of the site. These very objectionable noise level increases will be considered significant adverse impacts if they are sustained for at least three months. The conceptual construction schedule indicates Phase 1 would last for approximately four months; however, this duration represents the entirety of Phase 1. Foundation work that includes pile driving would likely take less than three months, although elevated noise levels may continue from the intermittent use of excavators and dozers on-site as well as concrete pump and mixer trucks in use outside the perimeter construction barrier. Construction noise levels are predicted to result in an increase of at least 15 dBA at noise-sensitive receptors within approximately 250 feet of the site, which will be considered a significant adverse impact if sustained for 12 continuous months.

Upon completion of Phase 1, noise level increases during Phase 2 and Phase 3 will decrease, with maximum predicted construction noise levels ranging between 64 to 86 dBA. Very objectionable noise levels may be experienced at noise-sensitive receptors within 50 feet of Phase 2 and Phase 3. These very objectionable noise level increases will be considered a significant adverse impact if they are sustained for at least three months. Objectionable noise levels may be experienced at noise-sensitive receptors within approximately 150 feet of Phase 2 and within approximately 100 feet of Phase 3, which will be considered a significant adverse impact if sustained for 12 continuous months.

Vibration

Vibration-inducing activities occurring during construction of the projected development sites include the use of pile drivers, large bulldozers, and haul trucks loaded with debris and materials. The highest vibration levels would result from impact pile drivers during building foundation work. Vibration-induced structural damage has the potential to occur if pile driving is conducted within approximately 72 feet of non-engineered timber and masonry buildings, which equates to a vibration level of 0.2012 peak particle velocity (PPV). When impact pile driving occurs further than approximately 72 feet from non-engineered timber and masonry buildings, there would be no potential for structural damage. If it is determined through field surveys that existing structures adjacent to construction sites are comprised of more solid materials, such as engineered concrete and masonry, structural damage from impact pile driving could potentially occur within 50 feet of this activity. In addition, vibration-induced annoyance is predicted to occur at residential and institutional land uses within approximately 30 feet from impact pile driving. Vibrations from large bulldozers and loaded trucks are not anticipated to result in structural damage to adjacent buildings, as the highest vibration levels would generally occur within 8 feet of equipment.

Other Analyses

Construction of the 54 projected development sites would not result in significant adverse impacts on land use and neighborhood character, socioeconomic conditions, open space, or hazardous materials. Based on the RWCDS construction schedule, construction activities would be spread out over approximately 10 years, throughout an approximately 23-block rezoning area, and construction of most of the projected development sites would be short term (less than 24 months) with the exceptions of Sites 9, 14, 15, 20, 54, and 55, which are assumed to include multiple buildings or any single building larger than 200,000 sf.

Additionally, while construction of the projected development sites would result in temporary increases in traffic during the construction period, access to residences, businesses, and institutions in the area surrounding the development sites would be maintained throughout the construction period (as required by City regulations). No open space resources would be located on any of the projected development construction sites, nor would any access to publicly accessible open space be impeded during construction within the proposed rezoning area. In addition, measures would be implemented to control noise, vibration, emissions, and dust on construction sites, including construction fencing that incorporates sound-reducing measures.

Further, while the construction of new buildings due to the Proposed Actions would cause temporary impacts, particularly related to noise, these impacts (in any given area) are anticipated to be relatively short term—even under worst-case construction sequencing—and therefore would not impact open space or neighborhood character.

Archaeological Resources: A Phase IA Archaeological Documentary (Phase IA) study of the projected/potential development sites where a new, in-ground disturbance is proposed determined that ~~34~~ 9 of the 70 sites are archaeologically sensitive for 19th-century shaft features. The Project Area was determined to have no sensitivity for precontact archaeological resources.

The Phase IA study recommended additional archaeological analysis for certain development sites, including Phase IB archaeological testing and ownership research in addition to continued consultation with the New York City Landmarks Preservation Commission (LPC) and submission and concurrence of all required work plans.

Development at nine projected and potential sites under the Proposed Actions could potentially result in construction-related impacts to five non-designated historic resources, two of which are historic districts, located within 90 feet of the projected/potential development sites. These five non-designated resources would be afforded limited protection under the New York City Department of Buildings (DOB) regulations that are applicable to all buildings located adjacent to construction sites; however, they are not afforded the added special protections under the DOB's TPPN #10/88 because they are not S/NR-listed or NYCL-designated.

Any potential construction-related hazardous materials would be avoided by the inclusion of (E) designations, or other measures comparable to such a designation, for all RWCDS development sites. In addition, the demolition of interiors, portions of buildings, or entire buildings is regulated by the DOB and requires abatement of asbestos prior to any intrusive construction activities, including demolition. The Occupational Safety and Health Administration (OSHA) regulates construction activities to prevent excessive exposure of workers to contaminants in the building materials, including lead paint. New York State Solid Waste regulations control where demolition debris and contaminated materials associated with construction are handled and disposed of. Adherence to these existing regulations would prevent impacts from construction activities at any of the projected development sites in the rezoning area.

Regulatory Framework

Governmental Coordination and Oversight

The governmental oversight of construction in New York City is extensive and involves a number of City, state, and federal agencies. **Table 19-1** shows the main agencies involved in construction oversight and each agency's areas of responsibility. The primary responsibilities lie with New York City agencies. The DOB has the primary responsibility for ensuring that construction meets the requirements of the New York City Building Code and that buildings are structurally, electrically, and mechanically safe. In addition, the DOB enforces safety regulations to protect both construction workers and the public. Areas of responsibility include the enforcement of regulations

pertaining to the installation and operation of construction equipment, such as cranes and lifts, sidewalk sheds, and safety netting and scaffolding.

The New York City Department of Parks and Recreation (NYC Parks) oversees, enforces, and permits the replacement of street trees that are lost due to construction. The New York City Department of Environmental Protection (DEP) enforces the New York City Noise Control Code (also known as Chapter 24 of the Administrative Code of the City of New York, or Local Law 113); enforces the DEP Notice of Adoption Rules for Citywide Construction Noise Mitigation (also known as Chapter 28); approves Remedial Action Plans and Construction Health and Safety Plans; regulates water disposal into the sewer system; and oversees dust control for construction activities.

The New York City Fire Department (FDNY) has primary oversight for compliance with the New York City Fire Code and for the installation of tanks containing flammable materials. The New York City Department of Transportation (DOT) reviews and approves any traffic lane and sidewalk closures. New York City Transit is in charge of bus stop relocations and any subsurface construction within 200 feet of a subway. The New York City LPC approves studies and testing to prevent the loss of archaeological materials and damage to fragile historic structures.

On the state level, the New York State Department of Environmental Conservation (NYSDEC) regulates the discharge of water into rivers and streams, the disposal of hazardous materials, and the construction, operation, and removal of bulk petroleum and chemical storage tanks. The New York State Department of Labor (DOL) licenses asbestos workers.

On the federal level, the U.S. Environmental Protection Agency (EPA) has wide-ranging authority over environmental matters, including air emissions, noise emission standards, hazardous materials, and the use of poisons; although much of this responsibility is delegated to the state level. OSHA sets standards for work site safety.

Table 19-1: Construction oversight in New York City

Agency	Area(s) of Responsibility
New York City	
Department of Buildings (DOB)	Primary oversight for Building Code and site safety
Department of Environmental Protection (DEP)	Noise, hazardous materials, dewatering, dust
Fire Department (FDNY)	Compliance with Fire Code, tank operation
Department of Transportation (DOT)	Traffic lane and sidewalk closures
New York City Transit	Bus stop relocation; any subsurface construction within 200 feet of a subway
Landmarks Preservation Commission (LPC)	Archaeological and historic architectural protection
New York State	
Department of Labor (DOL)	Asbestos workers
Department of Environmental Conservation	Dewatering, hazardous materials, tanks, Stormwater Pollution Prevention Plan (SPDES), Industrial SPDES, if any discharge into the Hudson River
United States	
Environmental Protection Agency (EPA)	Air emissions, noise, hazardous materials, toxic substances
Occupation Safety and Health Administration (OSHA)	Worker safety

Conceptual Construction Schedule and Activities

This chapter presents a description of the construction process solely for the purposes of quantifying environmental effect due to construction activities. The chapter is not intended to describe the precise construction methods that may ultimately be used, nor is it intended to dictate or confine the construction process. Actual construction methods and materials may vary, depending in part on how the construction contractors choose to implement their work to be most cost effective, within the requirements set forth in bid, contract, and construction documents. Construction specifications will require that construction contractors comply with applicable environmental regulations and obtain necessary permits for the duration of construction. Construction of each development site would follow applicable federal, state, and New York City laws for building and safety, as well as the New York City Construction noise code, as appropriate.

Construction Sequencing

Because the projected development sites within the Project Area are predominantly privately owned, the timing of the development of those sites is unknown. As such, the RWCDS presented in **Chapter 1, Project Description**, does not describe which sites would be developed first nor does it assume a particular sequence of development. However, it is conservatively assumed that all projected development sites would be constructed by the end of the 2034 analysis year. Market considerations would ultimately determine the demand for development.

A reasonable worst-case for the anticipated schedule of construction activities and phases was provided by the New York City Department of City Planning (DCP) for the purposes of assessing potential construction impacts. Generally, the most underutilized land near transit was weighted

greater for redevelopment and with earlier construction dates. In addition, larger projected development sites with known plans are assumed to begin construction earlier, closer to the time of project approvals (second quarter 2025). In estimating the duration of the construction period for each site, it is generally assumed that sites accommodating less than approximately 200,000 sf of development would take 24 months or less to complete construction. On the other hand, sites with a greater amount of anticipated development floor area—for example, Projected Development Sites 9, 14, 15, 20, 54, and 55—are assumed to take longer.

An anticipated construction sequencing for use in the analysis of the Proposed Actions was developed based on the above assumptions and is illustrated in **Figure 19-1** (Assumed Construction Schedule). As shown in the figure, construction of the 54 projected development sites is anticipated to begin in 2025 and would be gradual (over 10 years). It is conservatively assumed that construction of all projected development sites would be completed by the end of the 2034 analysis year.

Typical Construction Activities

The construction of various components of the projected development sites would occur over a number of years, with varying activities and intensities depending upon which components of the overall development sites are underway at a given time. A general outline of typical construction stages on the development sites follows, but the duration and extent of new construction activities would vary by site. For smaller sites (such as Sites 2 or 3), the construction process is much simpler and shorter in duration, typically lasting 24 months or less. Alternatively, construction of larger projected development sites (such as Sites 14 and 55) would be more intensive and are conservatively estimated to last for approximately 41 months.

- Months 1-4: Site clearance, excavation, and foundation. The first four months of construction would entail site clearance (including demolition of existing buildings); digging, pile-driving, pile capping, and excavation for the foundation; dewatering (to the extent required); and reinforcing and pouring of the foundation. Typical equipment used for these activities would include excavators, backhoes, tractors, pile-drivers, hydraulic hammers, and cranes. Trucks would arrive at the site to remove any excavated material and construction debris as well as trucks transporting pre-mixed concrete and other building materials.
- Months 5-14: Underground parking foundation (if any), erection of the superstructure, and facade and roof construction. Once the foundations have been completed, the construction of the building's steel framework, parking ramp (if any), and decking would take place. This process involves the installation of beams, columns and decking, and would require the use of cranes, derricks, hoists, and welding equipment, as warranted. This stage of construction would also include the assembly of exterior walls and cladding, as well as roof construction.
- Months 15-24: Mechanical installation, interior and finishing work. This would include the installation of heating, ventilation and air conditioning equipment and ductwork; installation and checking of elevator, utility, and life safety systems; and work on

interior walls and finishes. During these activities, hoists and cranes would continue to be used, and trucks would remain in use for material supply and construction waste removal. Because much of this stage of construction would occur when the building is fully enclosed, disruption to the surrounding neighborhood would be minimized.

The phases, duration, and overlap of construction activities specific to a particular development site are identified on **Figure 19-1**, but the actual duration of these activities would vary by site. For example, the time necessary for each activity would vary depending upon such factors as work hours, traffic restrictions, and the means and methods of contractors. Other factors would include the number and type of utilities requiring relocation and the location and condition of nearby surface and subsurface structures.

Estimate of Construction Workers and Construction Period Trucks

Worker and truck projections were based on representative sites of similar sizes and uses from prior EIS documents and information for similar known construction projects in the City.[1] Projected development sites were categorized based on similar size and use, and the most intense month from each stage of construction (demolition/excavation/foundation, superstructure/exterior, interior) for each site was identified and used as a scaling factor for projections. Each of the 54 projected development sites was then assigned to the appropriate size category and the projections were scaled on a worker or truck per square foot basis.

Average daily on-site construction workers and trucks were forecast for the new construction anticipated on each of the projected development sites with the Proposed Actions. As shown in **Table 19-2**, the average number of workers would peak at an estimated 762 per day in the first quarter of 2032, while the average number of trucks per day would peak at an estimated 98 in the same quarter of 2032. These represent peak days of work, and other days during the construction period would have fewer construction workers and trucks on-site. Overall, the first quarter of 2032 is expected to be the peak period for total construction travel demand (worker trips and truck trips combined). During this peak-construction-worker-and-truck period (the fourth quarter of 2031 through the first quarter of 2032), 12 of the 54 (22 percent) projected development sites are expected to be under construction (refer to **Figure 19-1**).

[1]For this analysis, scaling factors for truck trip and workforce generation were derived from the 2016 East New York Rezoning FEIS.

Table 19-2: Average Incremental Number of Daily Construction Workers and Trucks by Year and Quarter

Year	2025				2026				2027			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	---	194	355	446	510	587	615	542	560	598	540	589
Trucks	---	56	69	71	76	91	98	75	77	85	76	85
Year	2028				2029				2030			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	392	280	262	271	284	356	271	229	328	484	491	493
Trucks	54	48	45	48	52	59	51	53	68	76	69	65
Year	2031				2032				2033			
Quarter	1st	2nd	3rd	4th	1st	2nd	3rd	4th	1st	2nd	3rd	4th
Workers	532	503	555	713	762	704	576	491	561	555	559	393
Trucks	71	69	79	93	98	90	79	71	82	77	73	56
Year	2034				Average				Peak			
Quarter	1st	2nd	3rd	4th								
Workers	304	338	280	245	455				762			
Trucks	46	45	33	26	68				98			

Determining Peak Year for Cumulative Construction and Operational Effects

According to the 2021 *CEQR Technical Manual*, if a project involves multiple development sites over varying construction timelines, there must be a preliminary assessment to determine whether the operational trips from completed portions of the project and construction trips associated with construction activities could overlap. For the purposes of establishing a reasonable worst-case for the construction assessment, based on the conceptual construction schedule presented in **Figure 19-1**, the first quarter of (2032) was selected as the peak-construction year for the transportation assessment in this chapter. As shown in **Figure 19-1**, in (2032), there would be 33 sites that are already completed and operational, 12 sites under construction, and 9 sites projected to be developed in the future. Any prior year would not have sufficient operational sites in proximity to one another for assessment purposes, whereas subsequent years would not have an adequate number of sites under construction.

Construction Work Hours

Construction activities for buildings in the City generally take place Monday through Friday, with exceptions that are discussed separately below. In accordance with City laws and regulations, construction work at the projected development sites would generally begin at 7 AM on weekdays, with workers arriving to prepare work areas between 6 and 7 AM. Construction work activities would typically finish around 3:30 PM; but on some occasions, the workday could be extended depending upon the need to complete some specific tasks beyond normal work hours, such as completing the drilling of piles, finishing a concrete pour for a floor deck, or completing the bolting of a steel frame erected that day. The extended workday would generally last until about 6 PM but only for those involved in the specific tasks requiring additional work time (not all on-site construction workers).

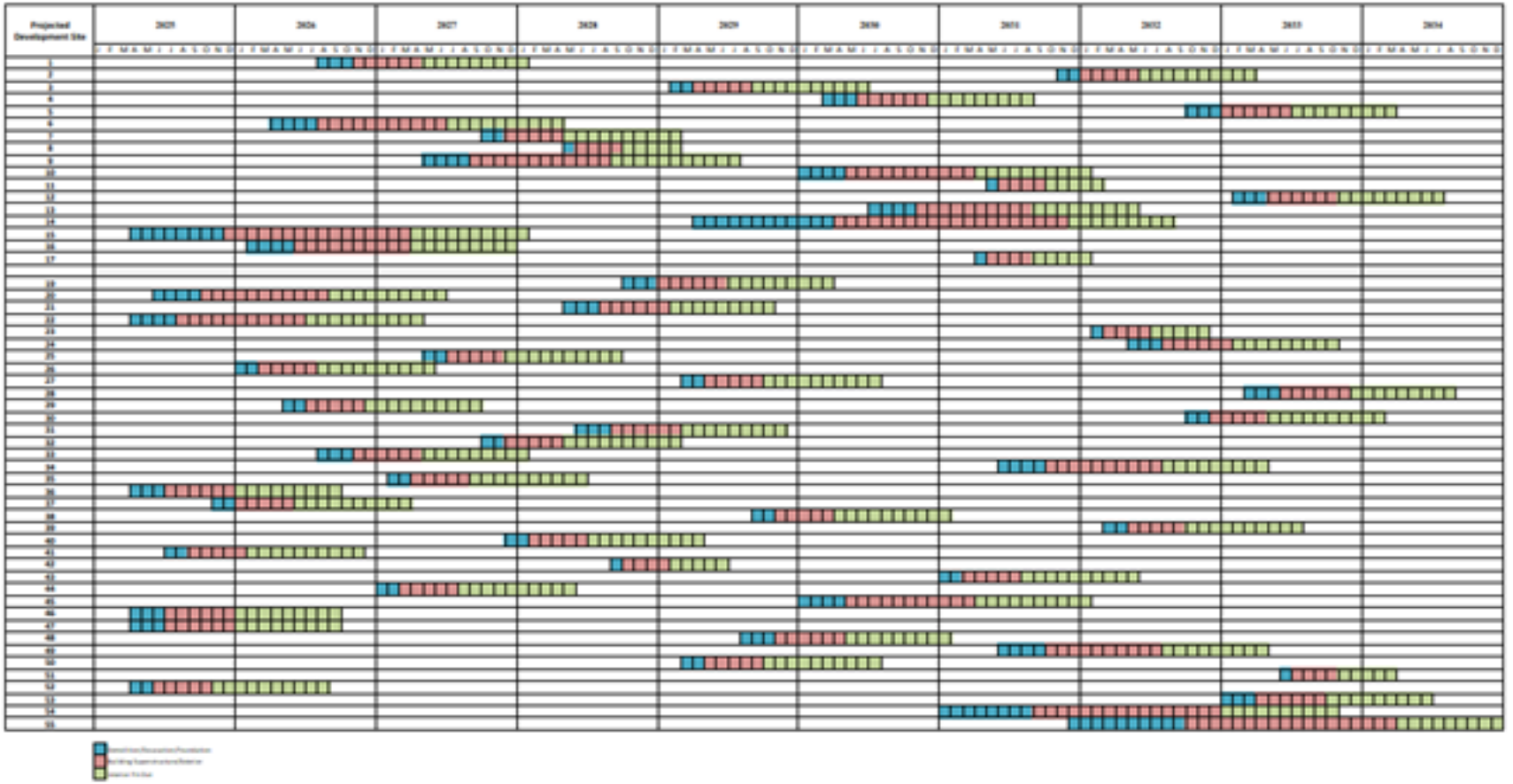
Occasionally, Saturday or overtime hours may be required to complete some time-sensitive tasks. Weekend work requires a permit from the DOB and, in certain instances, approval of a noise

mitigation plan from DEP under the City's Noise Code. The New York City Noise Control Code, as amended in December 2005 and effective July 1, 2007, limits construction (absent special circumstances as described below) to weekdays between the hours of 7 AM and 6 PM and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6 PM and 7 AM or anytime on weekends) may be permitted only to accommodate the following:

- Emergency conditions
- Public safety
- Construction projects by or on behalf of City agencies
- Construction activities with minimal noise impacts
- Undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and financial considerations

In such cases, the number of workers and pieces of equipment in operation would be limited to those needed to complete the particular authorized task. Therefore, the level of activity for any weekend work would be less than a normal workday. The typical weekend workday would be on Saturday from 7 AM with worker arrival and site preparation to 5 PM for site cleanup.

Figure 19-1: Assumed Construction Schedule for Assessment of Construction Impacts



Construction Staging Areas, Sidewalk and Lane Closures

Construction staging areas, also referred to as "laydown areas," are sites that would be used for the storage of materials and equipment and other construction-related activities. Work zones are those areas where the construction is occurring. Field offices for contractors and construction managers would be situated in temporary job site trailers at staging areas or existing office space near the work areas. Staging areas would typically be fenced and lit for security and would adhere to New York City Building Codes.

Staging areas of adequate size and proximity to the construction sites are essential to minimize construction traffic through the Project Area and to provide adequate space and access for construction activities. While parcels proximate to several of the projected development sites are available and could be used for staging areas, it is anticipated that construction staging would most likely occur on the projected development sites themselves. In some cases, this staging may extend into the curbs, travel lanes, and sidewalks of public streets adjacent to the construction site.

No rerouting of traffic is anticipated during construction activities and all moving lanes on streets are expected to be available to traffic at all times. It is anticipated that some sidewalks immediately adjacent to construction sites would be closed to accommodate heavy loading areas for at least several months of the construction period for each site. Pedestrians would either use a temporary walkway in a sectioned-off portion of the street or be diverted to walk on the opposite side of the street. Detailed Maintenance and Protection of Traffic Plans for each construction site would be submitted for approval to the DOT Office of Construction Mitigation and Coordination, the office that ensures critical arteries are not interrupted, especially in peak travel periods. Builders would be required to plan and carry out noise and dust control measures during construction.

Appropriate protective measures for ensuring pedestrian safety surrounding each of the projected development sites would be implemented under these plans. Construction activities would also be subject to compliance with the New York City Noise Code and by the EPA noise emission standards for construction equipment. In addition, there would be requirements for street crossing and entrance barriers, protective scaffolding, and compliance with applicable construction safety measures.

Preliminary Assessment

In accordance with the guidance of the 2021 *CEQR Technical Manual*, this preliminary assessment evaluated the effects associated with the Proposed Actions construction-related activities including transportation (traffic, transit, pedestrians and parking), air quality, noise, land use and neighborhood character, socioeconomic conditions, community facilities, open space, historic and cultural resources, and hazardous materials.

Transportation

The assessment will be based on the guidance presented in the 2021 *CEQR Technical Manual* and will qualitatively consider losses in lanes, sidewalks, and other transportation services on the

adjacent streets during the various phases of construction and identify the increase in vehicle trips from construction workers and equipment. A travel demand forecast for the RWCDS peak-construction period will be prepared and compared to the travel demand forecast for the With-Action condition.

The Proposed Actions are anticipated to result in the construction of predominantly mixed-use developments on 54 projected development sites in the Project Area through 2034. These developments would replace vacant land as well as existing and anticipated as-of-right development on the projected development sites. During construction periods, projected development sites would generate trips from workers traveling to/from the construction sites and from the movement of materials and equipment. Given typical construction hours, worker trips would be concentrated more in the early morning and mid-afternoon on weekdays as opposed to during peak travel periods.

Air Quality

A detailed dispersion analysis of construction sources will be performed to determine the potential for air quality impacts on sensitive receptor locations. Air pollutant sources include combustion exhaust associated with non-road construction engines (such as cranes and excavators) and trucks operating on-site, construction-generated traffic on local roadways, as well as on-site activities that generate fugitive dust (such as excavation and demolition). The pollutants of concern include CO, PM, and NO_2. The potential for significant impacts will be determined by comparing model-predicted total concentrations to the NAAQS or by comparing the predicted increase in concentrations to applicable guidance thresholds. The air quality analysis will also include a discussion of the strategies to reduce project-related air pollutant emissions associated with construction activities.

According to the 2021 *CEQR Technical Manual*, a quantitative assessment of air quality for construction activities is likely not warranted if the project's construction activities: (1) are considered short-term, which for air quality assessments has generally been accepted as two years or less; (2) are not located near sensitive receptors; (3) do not involve the construction of multiple buildings where there is a potential for cumulative impacts from different buildings under simultaneous construction before the final build-out; and (4) would not operate multiple pieces of diesel equipment in a single location during peak construction. If a project does not meet one or more of the criteria above, a quantitative air quality assessment could be required.

During construction, the Proposed Action may result in off-site mobile source emissions resulting from increases or the redistribution of traffic. However, peak-hour traffic increments during construction would generally be lower than the operational traffic increments for the full build-out of the Proposed Action. As a result, impacts related to mobile sources would not be significant and a stand-alone mobile-source analysis is not required. Nevertheless, on-road emissions adjacent to the construction sites will be included with the on-site dispersion analysis to cumulatively address all local project-related emissions.

As construction of the projected development sites under the RWCDS would involve the construction of multiple buildings near sensitive receptors and the use of multiple pieces of diesel equipment, with eight of the projected development sites anticipated to be under construction for more than two years, the Proposed Actions do not screen out any of these four points. As a result, a quantitative air quality assessment was performed. The methodologies and results of this analysis are described in the "Detailed Analysis" section below.

Noise and Vibration

A quantitative construction noise analysis will be prepared to examine potential noise impacts due to construction-related stationary and mobile sources. Existing noise levels will be determined by noise measurements performed at various at-grade receptor locations throughout the Study Area. During representative worst-case periods, noise levels due to construction activities at projected development sites will be predicted for each sensitive receptor. Based on the results of the construction noise analysis, if necessary, the feasibility, practicability, and effectiveness of implementing measures to mitigate significant construction noise impacts will be examined. Construction activities have the potential to result in vibration levels that may result in structural or architectural damage as well as annoyance or interference with vibration-sensitive activities. A construction vibration assessment will be performed. This assessment will determine critical distances at which various pieces of equipment may cause damage or annoyance to nearby buildings based on the type of equipment, the building construction, and applicable vibration level criteria. Should it be necessary for certain construction equipment to be located closer to a building than its critical distance, vibration mitigation options will be proposed.

According to the 2021 *CEQR Technical Manual*, an assessment of noise for construction activities is likely not warranted if the project's construction activities: (1) are considered short-term; (2) are not located near sensitive receptors; (3) do not involve the construction of multiple buildings where there is a potential for cumulative impacts from different buildings under simultaneous construction before the final build-out; and (4) would not operate multiple pieces of diesel equipment in a single location during peak construction. If a project does not meet one or more of the criteria above, a quantitative noise assessment could be required.

As construction of the projected development sites under the RWCDS would involve the construction of multiple buildings near sensitive receptors and the use of multiple pieces of diesel equipment, with ten of the projected development sites anticipated to be under construction for more than two years, the Proposed Actions do not screen out any of these four points. As a result, a quantitative construction noise assessment was performed. The methodologies and results of this analysis are described in the "Detailed Analysis" section, below.

Other Technical Areas

In estimating the duration of the construction period for each site, it is generally assumed that sites that would accommodate less than approximately 200,000 sf of development would take 24 months or less to complete construction, whereas projected development sites with a greater amount of anticipated development floor area, such as Sites 9, 14, 15, 20, 54, and 55, are assumed to take longer.

Land Use and Neighborhood Character

According to the 2021 *CEQR Technical Manual*, a construction impact analysis for land use and neighborhood character is typically needed if construction would require continuous use of property for an extended duration, thereby having the potential to affect the nature of the land use and character of the neighborhood. A land use and neighborhood character assessment for construction impacts examines construction activities that would occur on the site (or portions of the site) and their duration. The analysis determines whether the type and duration of the activities would affect neighborhood land use patterns or neighborhood character. For example, a single property might be used for staging for several years, resulting in a "land use" that would be industrial in nature. Depending upon the nature of existing land uses in the surrounding area, the use of a single piece of property for an extended duration and its compatibility with neighboring properties may be assessed to determine whether it would have a significant adverse impact on the surrounding area.

Construction of the 54 projected development sites would be spread out over approximately 10 years and throughout an approximately 23-block rezoning area. As noted above, construction of most of the projected development sites would be short-term (less than approximately 24 months), while construction of Sites 9 (309,211 sf), 14 (695,221 sf), 15 (462,750 sf), 20 (211,441 sf), 54 (532,104 fs), and 55 (536,280 sf), which are larger and may include multiple buildings, would be more intensive. Construction activity at these development sites is conservatively estimated to last as long as 41 months.

Throughout the construction period (as required by City regulations), access to residences, businesses, and institutions in the area surrounding the development sites would be maintained. In addition, measures would be implemented to control noise, vibration, air emissions, and dust on construction sites, including construction fencing that incorporates sound-reducing measures (see **Chapter 20, Mitigation**). While construction of the new buildings resulting from the Proposed Actions would cause temporary impacts, particularly related to noise, it is expected that these impacts in any given area would be relatively short-term, even under worst-case construction sequencing. Therefore, no significant construction impacts to land use and neighborhood character are expected.

Socioeconomic Conditions

According to the 2021 *CEQR Technical Manual*, construction impacts to socioeconomic conditions are possible if the Proposed Actions would entail construction of a long duration that could affect access to and thereby viability of a number of businesses and if the failure of those businesses has the potential to affect neighborhood character. As noted above, construction of most of the projected development sites would be short-term (up to 24 months), while construction of Sites 9, 14, 15, 20, 54, and 55, which are larger and may include multiple buildings, would be more intensive. Construction activity at these development sites is conservatively estimated to last as long as 41 months. During the construction period, construction activities would be dispersed throughout the 23-block rezoning area and would not affect access to businesses over an extended duration. Therefore, construction impacts to socioeconomic conditions are not expected.

Community Facilities

According to the 2021 *CEQR Technical Manual*, construction impacts to community facilities are possible if a community facility would be directly affected by construction (for example, if construction would disrupt services provided at a facility or close a facility temporarily). While there are community facilities throughout the rezoning area, as discussed in **Chapter 4, Community Facilities and Services**, the Proposed Actions would not result in the direct displacement of any community facilities, as defined in the 2021 *CEQR Technical Manual*. While construction of the projected development sites would result in temporary increases in traffic along certain routes during the construction period, access to and from any community facilities in the rezoning area would not be affected during the construction period. In addition, each construction site would be surrounded by construction fencing and barriers as required by the DOB, which would limit the effects of construction on nearby facilities. Construction workers would not place any burden on public schools and would have little (if any) needs for libraries, childcare facilities, and health care services.

FDNY Engine 219/Ladder 105 is located within the rezoning area and the New York City Police Department (NYPD) 78th Precinct is located adjacent to the rezoning area. Projected Development Site 46 is situated approximately 250 feet east of an FDNY facility, and Projected Development Sites 47 and 52 are on the other side of Bergen Street east of the NYPC facility. Development on these sites would not reduce the number of travel lanes in the vicinity or otherwise impede NYPD or FDNY response times. NYPD and FDNY emergency services and response times would not be materially affected by construction at other development sites due to the geographic distribution of the police and fire facilities and their respective coverage areas. Therefore, no construction impacts would be expected to community facilities in the area, and a further preliminary assessment is not needed for the disclosure of potential construction impacts to community facilities.

Open Space

According to the 2021 *CEQR Technical Manual*, construction impacts to open space are possible if the open space is taken out of service for a period during the construction process. While several of the projected development sites are located in proximity to existing open space resources, no open space resources would be located on any of the projected development construction sites, nor would any access to publicly accessible open space be impeded during construction within the proposed rezoning area. In addition, measures would be implemented to control noise, vibration, air emissions, and dust on construction sites, including construction fencing that incorporates sound-reducing measures. Because none of these impacts would be continuous or permanent, they would not create significant impacts on open space in the area. Therefore, while construction of the new buildings due to the Proposed Actions would cause temporary impacts, particularly related to noise, it is expected that such impacts in any given area would be relatively short-term, even under the worst-case construction sequencing. In short, no significant construction impacts on open space are expected.

Historic and Cultural Resources

According to the guidance in the 2021 *CEQR Technical Manual*, construction impacts may occur on historic and cultural resources if in-ground disturbances or vibration associated with the project's construction could undermine the foundation or structural integrity of nearby resources.

Chapter 7, Historic and Cultural Resources, provides a detailed assessment of potential impacts on architectural and archaeological resources. This section summarizes potential impacts during construction of the Proposed Action. Mitigation measures that could minimize or reduce these impacts are discussed in **Chapter 20** of this EIS.

The New York City Building Code provides some measures of protection for all properties against accidental damage from adjacent construction by requiring that all buildings, lots, and service facilities adjacent to foundation and earthwork areas be protected and supported. Additional protective measures apply to LPC-designated Landmarks and State and National Register-listed (S/NR-listed) historic buildings located within 90 linear feet of a proposed construction site. For these structures, the DOB's Technical Policy and Procedure Notice (TPPN) #10/88 applies. TPP #10/88 supplements the standard building protections afforded by the Building Code by requiring, among other things, a monitoring program to reduce the likelihood of construction damage to adjacent LPC-designated or S/NR-listed resources (within 90 feet) and to detect at an early stage the beginnings of damage so that construction procedures can be changed.

Archaeological Resources: A Phase IA Archaeological Documentary (Phase IA) study of the projected/potential development sites where a new, in-ground disturbance is proposed determined that 10~~34~~ of the 70 sites are archaeologically sensitive for 19th-century shaft features. The Project Area was determined to have no sensitivity for precontact archaeological resources.

The Phase IA study recommended additional archaeological analysis for certain development sites, such as Phase IB archaeological testing and ownership research in addition to continued consultation with LPC and submission and concurrence of all required work plans.

Architectural Resources: NYCL-designated or S/NR-listed historic buildings located within 90 linear feet of a projected or potential new construction site are subject to the protections of the DOB Technical Policy and Procedure Notice (TPPN) #10/88. Therefore, the Proposed Actions would not cause any significant adverse construction-related impacts to NYCL-designated or S/NR-listed historic buildings.

Development at nine projected and potential sites under the Proposed Actions could potentially result in construction-related impacts to five non-designated historic resources, two of which are historic districts, located within 90 feet of the projected/potential development sites. These five non-designated resources would be afforded limited protection under DOB regulations applicable to all buildings located adjacent to construction sites; however, they are not afforded the added special protections under DOB's TPPN #10/88 because they are not S/NR-listed or NYCL-designated. Additional protective measures under DOB's TPPN #10/88 would only become applicable if the eligible resources are designated in the future prior to the initiation of construction. However, if the eligible resources listed above are not designated, they would not be subject to

TPPN #10/88 and may therefore be adversely impacted by the adjacent developments resulting from the Proposed Actions.

Hazardous Materials

According to the guidance in the 2021 *CEQR Technical Manual*, any impacts from in-ground disturbance that are identified in hazardous materials studies should be identified in this chapter as well. Institutional controls, such as (E) designations or restrictive declarations should be disclosed here as well. If the impact identified in hazardous materials studies is fully mitigated or avoided, no further analysis of the effects from construction activities on hazardous materials is needed.

As stated in **Chapter 9, Hazardous Materials**, the Proposed Actions are anticipated to have no significant adverse impacts related to hazardous materials. An evaluation of potential hazardous materials impacts was conducted for the 54 projected and 16 potential development sites. The assessment revealed environmental concerns associated with each of these sites. Consequently, the proposed zoning map actions incorporate (E) designations for all privately owned projected and potential development sites. By implementing the (E) designation or an equivalent measure across all 70 projected and potential development sites, the potential presence of contaminated materials would be addressed and mitigated. The adoption of preventive and remedial measures outlined in the (E) designation is poised to mitigate or eliminate the potential for significant adverse impacts related to hazardous materials during construction within the rezoning area resulting from the Proposed Actions.

Further, for the City-owned property at projected development sites 46, 47, 53, 54, and 55, the Land Development Agreement between the New York City Department of Housing Preservation and Development, the New York City Department of Education, and the future selected site developer or developers would ensure that no significant adverse impacts with respect to hazardous materials would occur. The DEP would provide oversight.

The (E) designation requires that the fee owner conduct a testing and sampling protocol and remediation, where appropriate, to the satisfaction of the NYC Office of Environmental Remediation before the issuance of a permit by the DOB. The environmental requirements for the (E) designation also include a mandatory construction health and safety plan, which must be approved by the NYC Office of Environmental Remediation.

In addition, demolition of interiors, portions of buildings, or entire buildings are regulated by the DOB and require abatement of asbestos prior to any intrusive construction activities, including demolition. OSHA regulates construction activities to prevent excessive exposure of workers to contaminants in the building materials, including lead paint. New York State Solid Waste regulations control where demolition debris and contaminated materials associated with construction are handled and disposed of. Adherence to these existing regulations would prevent impacts from construction activities at any of the projected development sites in the rezoning area.

Detailed Analyses

Transportation

Traffic

As discussed above, average daily on-site construction workers and trucks were forecast for the new construction anticipated on each of the projected development sites with the Proposed Actions. As shown in **Table 19-2**, the average number of workers would peak at an estimated 762 per day in the first quarter of 2032, while the average number of trucks per day would peak at an estimated 98 in the same quarter of 2032. These represent peak days of work; other days during the construction period would have fewer construction workers and trucks on-site. Overall, the first quarter of 2032 is expected to be the peak period for total construction travel demand (worker trips and truck trips combined).

In addition, during the first quarter of 2032, not only is construction traffic expected to peak but also operational trips from completed portions of the projected developments would simultaneously occur. As such, the first quarter of 2032 was selected as the reasonable worst-case analysis period for assessing potential cumulative traffic impacts from operational trips from completed portions of the projected developments and construction trips associated with construction activities. An assessment of traffic generated during this peak period is presented below.

Peak Construction Worker Travel Demand and Truck Trips—2032 (First Quarter)

Modal split and vehicle occupancy rates for construction workers were based on 2000 U.S. Census data for construction workers in tracts encompassing the Project Area. Based on these data, it is anticipated that approximately 38.8 percent of construction workers would use public transportation as part of their commute to/from the construction sites in the Project Area, which is well served by subway, rail, and bus transit. Approximately 50.7 percent of workers are expected to travel by personal automobile with an average occupancy of approximately 1.32 persons per vehicle; 1 percent are expected to taxi; and 9.5 percent are expected to walk or bicycle.

Table 19-3 shows a forecast of incremental hourly construction worker auto and construction truck trips during the 2032 (first quarter) peak-construction period. The temporal distribution for these vehicle trips was based on typical work shift allocations and conventional arrival/departure patterns for construction workers. Each worker vehicle was assumed to arrive in the morning and depart in the afternoon or early evening; whereas truck deliveries would occur throughout the construction day. To avoid congestion and ensure that materials are on-site for the start of each shift, construction truck deliveries would often peak during the hour before the regular day shift, overlapping with construction worker arrival traffic. Each truck delivery was assumed to result in two truck trips during the same hour (one inbound, one outbound). For analysis, truck trips were converted into PCEs based on one truck being equivalent to an average of two PCEs.

As shown in **Table 19-3**, in the first quarter of 2032, construction-related traffic is expected to peak during the 6:00 a.m. to 7:00 a.m. and 3:00 p.m. to 4:00 p.m. periods. During the 6:00 a.m. to 7:00 a.m. peak hour, there would be a total of 344 PCE vehicle trips, including 289 inbound

trips and 55 outbound trips. During the 3:00 p.m. to 4:00 p.m. peak hour, there would be a total of 252 PCE trips, including 9 inbound trips and 243 outbound trips.

Table 19-3: 2032 (First Quarter) Peak Incremental Construction Vehicle Trip Projections (in PCEs)

	Worker Vehicle Trips								Truck Trips					Total Vehicle Trips		
	%		Auto		Total	Taxi		Total	In		Out		Total	In	Out	Total
Hour	In	Out	In	Out		In	Out		%	#	%	#				
6-7 AM	80%	0%	234	0	234	5	5	10	25%	25%	50	50	100	289	55	344
7-8 AM	20%	0%	59	0	59	1	1	2	10%	10%	20	20	40	80	21	101
8-9 AM	0%	0%	0	0	0	0	0	0	10%	10%	20	20	40	20	20	40
9-10 AM	0%	0%	0	0	0	0	0	0	10%	10%	20	20	40	20	20	40
10-11 AM	0%	0%	0	0	0	0	0	0	10%	10%	20	20	40	20	20	40
11 AM-12 PM	0%	0%	0	0	0	0	0	0	10%	10%	20	20	40	20	20	40
12-1 PM	0%	0%	0	0	0	0	0	0	10%	10%	20	20	40	20	20	40
1-2 PM	0%	0%	0	0	0	0	0	0	5%	5%	9	9	18	9	9	18
2-3 PM	0%	5%	0	15	15	0	0	0	5%	5%	9	9	18	9	24	33
3-4 PM	0%	80%	0	234	234	5	5	10	2.5%	2.5%	4	4	8	9	243	252
4-5 PM	0%	15%	0	44	44	1	1	2	2.5%	2.5%	4	4	8	5	49	54
5-6 PM	0%	0%	0	0	0	0	0	0	0%	0%	0	0	0	0	0	0

Cumulative Operational Traffic—2032 (First Quarter)

As discussed above, **Table 19-3** shows hourly worker auto trips and construction truck trips (in PCEs) in the 2032 (first quarter) analysis period. Prior years would see the completion of substantially less new development, whereas subsequent years would see a decreasing intensity of construction activity and lower levels of construction traffic. During this peak period, construction travel demand would also simultaneously overlap with operational demand from completed projected development sites. During this cumulative construction and operational traffic analysis period, there would be 35 sites that are already completed and operational and 19 sites that are under construction.

Based on the planning factors outlined in **Chapter 13, Transportation**, the operational traffic generated as a result of the 35 sites is presented in **Table 19-4**. This table presents 2032 project-generated vehicular trips from completed developments during the traditional AM and PM peak hours for traffic (previously identified in the Transportation chapter) as well as the AM and PM peak-construction hours. In addition, for comparison purposes, **Table 19-4**, shows the comparison of 2032 Peak (First Quarter) Incremental Construction and Operational Vehicle Trips with 2034 Operational Vehicle Trips.

During the AM peak-construction hour in 2032, a total of 113 operational vehicle trips (in PCEs) are anticipated; during the PM peak-construction hour, a total of 731 operational trips are anticipated. By comparison, approximately 55 construction vehicle trips are anticipated during the AM operational peak hour, and approximately 27 construction vehicle trips are anticipated during the PM operational peak hour.

As shown in **Table 19-4**, combined with the operational trips generated by completed projected developments, there would be a net increase of approximately 457 vehicle trips during the AM peak-construction hour and a net increase of 983 trips during the PM peak-construction hour in 2032 (First Quarter). During the AM and PM operational peak hours, combined operational and construction vehicle trips would total approximately 828 and 1,001, respectively. During these operational peak hours, construction trips would account for only 55 of the combined trips in the AM and 27 in the PM.

Peak-construction and operational activity in 2032 would result in 291 and 386 fewer incremental vehicle trips during the traditional AM and PM peak hours, respectively, than would full build-out of the projected development sites under the Proposed Actions. As a result, there would be substantially fewer intersections with potentially significant adverse traffic impacts during the 2032 construction analysis year—compared to the 2034 operational analysis year—and no new intersections are likely to experience significant adverse traffic impacts in these peak hours. Similarly, peak-construction and operational activity would generate 274 more incremental vehicle trips during the AM peak-construction hour in 2032, and 69 fewer incremental vehicle trips during the PM peak-construction hour in 2032, compared with the operations of the Proposed Actions in 2034.

Further, overall traffic volumes on the Study Area street network are, in general, substantially lower during the AM and PM peak-construction hour than during the operational peak-commuter hours. As such, traffic conditions during the peak-construction hours are expected to be generally better than during the operational peak-commuter hours. For example, automatic traffic recorder count data indicate that in the aggregate, existing 6:00 a.m. to 7:00 a.m. traffic volumes on Study Area streets are approximately 27 percent lower than during the operational 7:45 a.m. to 8:45 a.m. period, and existing 3:00 a.m. to 4:00 a.m. traffic volumes on Study Area streets are approximately 7 percent lower than during the operational 4:30 p.m. to 5:30 p.m. period.

Consequently, there would be less likelihood of significant adverse traffic impacts during the peak-construction hour in the Proposed Actions peak-construction period than with the full build-out during operational peak hours analyzed in the Final EIS for this project. It is expected that the mitigation measures identified in **Chapter 20, Mitigation**, for 2034 operational traffic impacts would also be similarly effective at mitigating any potential impacts from construction traffic during the peak-construction activity expected with the Proposed Actions.

Table 19-4: Comparison of 2032 Peak (First Quarter) Incremental Construction and Operational Vehicle Trips with 2034 Operational Vehicle Trips

Peak Hour	Net Incremental Vehicle Trips				
	2032[1] Construction Trips	**2032[1] Operational Trips**	**2032[1] Construction + Operational Trips**	**2035 Operational Trips**	**Net Difference**
Construction AM	344	113	457	135	274
Operational AM[2]	55	773	828	1,119	-291
Construction PM	252	731	983	1,052	-69
Operational PM[3]	27	974	1,001	1,387	-386

Notes:
[1] 2032 construction trips represent the first quarter of that year.
[2] Construction trips for this period based on the average for the 7:00-8:00 a.m. and 8:00-9:00 a.m. periods.
[3] Construction trips for this period based on the average for the 4:00-5:00 p.m. and 5:00-6:00 p.m. periods.

Street Lane and Sidewalk Closures

Similar to other construction projects in New York City, temporary curb lane and sidewalk closures are anticipated adjacent to construction sites; but these closures would maintain dedicated access for delivery trucks (gates, driveways, ramps). Truck movements would be spread throughout the workday between 6:00 a.m. and 5:00 p.m., depending on the stage of construction. Flaggers are expected to be present during construction to manage the access and movement of trucks. Detailed Maintenance and Protection of Traffic Plans for each construction site would be submitted for approval to the DOT Office of Construction Mitigation and Coordination.

Transit

As previously discussed and shown in **Table 19-2**, in the 2032 peak (first) quarter for construction travel demand, there would be a net increase of approximately 762 construction workers traveling to/from projected development sites each day under the Proposed Actions. Approximately 38.8 percent of these construction workers are expected to travel to/from the proposed rezoning area by public transit (subway, bus, commuter rail). The RWCDS construction sites are located in a neighborhood that is well served by public transportation, with a total of 7 subway routes, 10 bus routes, a commuter rail, and several other subway routes located on the periphery of the Project Area.

As noted above, it is estimated that approximately 80 percent of all construction workers would arrive and depart in the peak hour before and after each shift. Therefore, in the first quarter of 2032, construction worker travel demand is expected to generate a total of approximately 237 transit trips in each of the 6:00 a.m. to 7:00 a.m. and 3:00 p.m. to 4:00 p.m. peak-construction hours. Given that construction worker trips via transit would be distributed among subway routes, bus routes, and the Long Island Rail Road—in proximity to projected development sites that are located throughout the rezoning area—the number of incremental construction trips by transit are not expected to exceed the 200-trip 2021 *CEQR Technical Manual* analysis threshold for any individual subway station or the 50-trip threshold for a bus analysis (per route, per direction) in

either peak-construction hour in 2032. And as stated above, construction worker trips via transit are primarily outside of the peak AM and PM commuter periods when area transit facilities and services typically experience their greatest demand.

In addition, as shown in **Table 19-2**, during the 2032 (first quarter) analysis period, cumulative construction and operational travel demand would simultaneously utilize the transit network as a result of projected development sites under construction and those completed with occupancy. Based on the planning factors outlined in **Chapter 13, Transportation**, the operational subway/rail trips generated as a result of the 35 completed project developments sites would total approximately 461 and 1,314 during the AM and PM peak-construction hours, respectively, while operational bus trips would increase by 44 and 301 during the same periods. In summation, construction and operational travel demand in the first quarter of 2032 would total 505 subway/rail trips and bus trips in the 6:00 a.m. to 7:00 a.m. peak-construction hour and 1,615 subway/rail trips and bus trips in the 3:00 p.m. to 4:00 p.m. peak-construction hour. By comparison, the net increase in operational subway trips with full build-out of the Proposed Actions in 2034 would be substantially greater in number, totaling approximately 3,897 and 3,710 transit trips during the weekday AM and PM peak-commuter periods when overall demand on area subway facilities and services typically peaks. Therefore, 2032 transit conditions during the 6:00 a.m. to 7:00 a.m. and the 3:00 p.m. to 4:00 p.m. peak-construction hours are expected to be generally better than during the analyzed peak-commuter hours with full build-out of the Proposed Actions in 2034.

Consequently, any significant adverse impacts on subway stations and line haul due to the Proposed Actions would be less likely in the cumulative analysis year than with full build-out of the Proposed Actions in 2034, and there would be no impacts on bus transportation. **Chapter 20, Mitigation**, discusses possible mitigation measures for significant adverse impacts on subway stations and line haul. Should any significant adverse impacts on subway stations and line haul occur in the 2032 (first quarter) cumulative analysis period, they would potentially remain unmitigated, pending the implementation of practicable mitigation measures suggested for full build-out of the Proposed Actions in 2034.

Pedestrians

As discussed above, during the 2032 (first quarter) peak-construction travel period, it is estimated that there would be a net increment of approximately 762 construction workers on-site daily under the Proposed Actions, approximately 38.8 percent of whom are expected to travel to/from the Project Area by transit, walking to and from area subway stops, rail stations, and bus stops. Up to an additional 9.5 percent are expected to walk to or from the Project Area. As approximately 80 percent of construction worker trips are expected to occur during any one peak hour, net incremental travel demand on area sidewalks, corners, and crosswalks is expected to total approximately 295 trips in the 6:00 a.m. to 7:00 a.m. and the 3:00 p.m. to 4:00 p.m. peak-construction hours. These trips would be widely distributed among the projected development sites that would be under construction in the first quarter of 2032 and would primarily occur outside of the weekday AM and PM peak-commuter periods and weekday midday and Saturday peak periods when area pedestrian facilities typically experience their greatest demand. At all locations where temporary sidewalk closures are required during construction activities,

adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with DOT requirements.

During the 2032 peak (first) quarter for analysis, construction and operational travel demand would occur simultaneously in the pedestrian network as a result of projected development sites under construction and those completed with occupancy. Based on the planning factors outlined in **Chapter 13, Transportation**, as a result of the 35 completed project developments sites, pedestrian trips (transit walk trips, bike trips, and walk-only trips combined) from completed projected development sites would total approximately 690 in the AM and 4,886 in the PM peak-construction hours in 2032. When combined with construction pedestrian trips (transit plus walk-only) from projected development sites under construction (295 trips in each period), the Proposed Actions would result in a net total of approximately 985 and 5,181 pedestrian trips during these periods, respectively, in 2032. By comparison, incremental pedestrian trips with full build-out of the Proposed Actions in 2034 would be substantially greater in number, totaling 7,165, 7,907, 10,142, and 11,293 during the analyzed weekday AM, midday, PM, and Saturday midday operational peak hours, respectively. 2032 pedestrian conditions during the weekday 6:00 a.m. to 7:00 a.m. and 3:00 p.m. to 4:00 p.m. peak-construction hours are therefore expected to be generally better than during the analyzed operational peak hours with full build-out of the Proposed Actions in 2034. Consequently, there would be less likelihood of significant adverse pedestrian impacts during the peak-construction hours in the cumulative analysis year than with full build-out of the Proposed Actions in 2034. It is expected that the mitigation measures identified for 2034 operational pedestrian impacts in **Chapter 20, Mitigation**, would be similarly effective at mitigating any potential impacts from construction pedestrian trips during the 2032 analysis period for cumulative construction and operational travel demand.

Parking

During the 2032 peak-construction traffic period, it is estimated that there would be approximately 762 construction workers on-site daily, approximately 50.7 percent of whom would be expected to travel to the rezoning area by private auto. Based on an average vehicle occupancy of 1.32 persons per vehicle, the maximum daily parking demand from project site construction workers would total approximately 293 spaces (see **Table 19-5**). These workers are expected to park on-street and in off-street public parking facilities in proximity to projected development sites throughout the Project Area. During the 2032 (first quarter) peak-construction analysis period, simultaneous operational parking demand would be generated by 35 completed projected development sites. Based on the planning factors outlined in **Chapter 13, Transportation**, parking demand from completed projected development sites would peak during weekday midday (3:00 PM to 4:00 PM) with 1,367 vehicles. In summation, construction and operational parking would total to approximately 1,660 vehicles during the midday. However, comparatively, with full build-out of the Proposed Actions in 2034, there would be a parking demand of over 2,000 vehicles between 11:00 a.m. and 6:00 PM. 2032 parking conditions during the weekday midday are therefore expected to be generally better than during the analyzed operational peak hours with full build-out of the Proposed Actions in 2034. Consequently, there would be less likelihood of a parking shortfall during the peak-construction hours in the cumulative analysis year (2032) than with full build-out of the Proposed Actions in 2034. While the 293 spaces of 2032 (first

quarter) construction worker parking demand would potentially contribute to any such shortfall in the midday, the project site is located in Parking Zone 2, per 2021 *CEQR Technical Manual* guidance, and any potential shortfall would not be considered significant as the site is served by alternative modes of transportation near the Project Area.

Table 19-5: 2032 (First Quarter) Construction Worker Parking Accumulation

Hour	2032 (First Quarter)		
	In	Out	Total
6-7 AM	234	0	234
7-8 AM	59	0	293
8-9 AM	0	0	293
9-10 AM	0	0	293
10-11 AM	0	0	293
11 AM-12 PM	0	0	293
12-1 PM	0	0	293
1-2 PM	0	0	293
2-3 PM	0	15	278
3-4 PM	0	234	44
4-5 PM	0	44	0
5-6 PM	0	0	0

Air Quality

Emissions from on-site construction equipment, on-road construction vehicles, and dust-generating construction activities all have the potential to affect air quality. The analysis of potential construction air quality impacts included both on-site and on-road sources of air emissions, and the combined impact of both sources, where applicable.

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 nitrogen oxides (NOx) and particulate matter (PM) emissions. Fugitive dust generated by construction activities is also a source of PM. Gasoline engines produce relatively high levels of carbon monoxide (CO). Because the EPA mandates the use of ULSD fuel for all highway and nonroad diesel engines, sulfur oxides (SOx) emitted from the Proposed Actions construction activities would be negligible. Therefore, the pollutants analyzed for the construction period are NO_2 (a component of NOx that is a regulated pollutant), particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM10), particles with an aerodynamic diameter of less than or equal to 2.5 micrometers (PM2.5), and CO. These pollutants and averaging periods are shown in **Table 19-6**.

Table 19-6: Pollutants for Analysis and Averaging Periods

Pollutant	Averaging Period
PM2.5	24-hour
	Annual Local
PM10	24-hour
NO_2	Annual
CO	1-hour
	8-hour

Concentrations were 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 were predicted during the most representative worst-case period. The potential for significant adverse impacts were determined by comparing modeled PM10, NO_2, and CO concentrations to NAAQS, and modeled PM2.5 to applicable *de minimis* thresholds.

The detailed approach for assessing the effect of construction activities resulting from the Proposed Actions on air quality is discussed further below.

On-Site Construction Activity Assessment

For a detailed analysis, Projected Development Site 54 was used as an example of a single larger site. The selection of this site is conservative as its total size of 432,104 sf is much larger than most of the projected development sites, and it would be developed in an early stage of the construction timeline, which indicates that its construction-related air pollutant emission intensity would be higher than similar or smaller sites or sites to be built later throughout the construction duration. Projected Development Site 10 and Projected Development Site 14 were selected for detailed analysis as examples of a cluster of large sites, and Projected Development Sites 36, 37, and 41 were selected for detailed analysis as examples of a cluster of smaller sites that may result in cumulative impact. Both clusters represent site groupings, which are adjacent to one another and their construction periods would overlap.

PM2.5 was selected for determining the worst-case air pollutant impact periods for all pollutants analyzed, because the ratio of predicted PM2.5 incremental concentrations to impact criteria is anticipated to be higher than for other pollutants. Therefore, initial estimates of PM2.5 emissions throughout the construction years of these three sites were used for determining the worst-case periods for analysis of all pollutants. Generally, emission patterns of PM10 and NO_2 would follow PM2.5 emissions because they are related to diesel engines by 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 emissions profiles, the last quarter of 2025 and the first quarter of both 2030 and 2031 were identified as worst-case short-term periods and were selected for analysis. In addition, the 2025, 2030, and 2031 calendar years were identified as worst-case annual periods and were selected for analysis. **Tables 19-7** and **19-8**,

show emission intensities over the duration of the project, for the three site groupings selected for the air quality construction assessment.

Table 19-7: Annual average project emission intensity for PM2.5 (lb/day)

	Construction Year									
Development Site Grouping	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
33,34,35 & 36	0.043	0.073	0.054	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10 & 14	0.000	0.000	0.000	0.000	0.188	0.340	0.237	0.013	0.000	0.000
54	0.000	0.000	0.000	0.000	0.000	0.000	0.188	0.176	0.014	0.000

Table 19-8: Short-term Project Emission Intensity for PM2.5 (lb/day)

	Construction Year									
Development Site Grouping	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**	**2031**	**2032**	**2033**	**2034**
33,34,35 & 36	1.710	2.666	2.006	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10 & 14	0.000	0.000	0.000	0.000	7.369	8.503	8.503	0.402	0.000	0.000
54	0.000	0.000	0.000	0.000	0.000	7.074	7.074	6.232	0.427	0.000

Engine Emissions

The sizes, types, and number of units of construction equipment were estimated based on the construction activity schedule developed for the Proposed Actions. Emission rates for NOx, CO, PM10, and PM2.5 from truck engines were developed using the EPA Motor Vehicle Emission Simulator (MOVES3.1)[2] emission model. Emission factors for NOx, CO, PM10, and PM2.5 from on-site construction engines were developed using the NONROAD emission module included in the MOVES3.1 emission model. The emission factor calculations were considered for any emissions reduction measures (such as the application of diesel particulate filters) that is required for the projected development sites.

On-Site Dust Emissions

In addition to engine emissions, dust emissions from operations (for example, excavating and transferring materials into dump trucks) were calculated based on EPA procedures delineated in AP-42 Table 13.2.3-1. Because construction is required to follow the New York City Air Pollution Control Code regarding construction-related dust emissions, a 50 percent reduction in particulate emissions from fugitive dust was conservatively assumed in the calculation (dust control methods such as wet suppression would often provide at least a 50 percent reduction in particulate emissions).

[2] EPA. Motor Vehicle Emission Simulator (MOVES), User Guide for MOVES3.1, November 2020.

Analysis Periods

The construction periods with activities closest to sensitive receptors—both off-site and completed portions of the projected development sites—and with the most intense activities and highest emissions were selected as the worst-case periods for analysis. The dispersion analysis included modeling of the three worst-case annual and three short-term (24-hour, 8-hour, and 1-hour) averaging periods identified in **Table 19-6**. The first quarter of 2031 and the annual period of January 2031 to December 2031 were analyzed to represent the worst-case short- and long-term periods, respectively, for Projected Development Site 54. These periods were selected because of the maximum construction intensity predicted and their proximity to an extremely dense set of residential sensitive receptors nearby. Additionally, secondary short-term and annual (first quarter of 2030 and January 2030 to December 2030) were selected for analysis at Projected Development Sites 10 and 14. These periods were selected because of the construction intensity at adjacent projected development sites and their proximity to nearby sensitive receptors. Finally, secondary short-term and annual (fourth quarter of 2025 and January 2025 to December 2025) were selected for analysis at Projected Development Sites 36, 37, and 41. These periods were also selected because of the construction intensity at adjacent projected development sites and their proximity to nearby sensitive receptors.

Dispersion Modeling

Potential impacts from the Proposed Actions construction sources were evaluated using the refined EPA/AMS AERMOD dispersion model. 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 and includes updated treatments of the boundary layer theory, understanding of turbulence and dispersion, and handling of terrain interactions.

Source Simulation

All stationary sources were simulated as area sources. For periods of eight hours or less (less than the length of a shift), it was assumed that all engines would be active simultaneously.

Meteorological Data

The meteorological data set consists of five consecutive years of latest available meteorological data: surface data collected at the nearest representative National Weather Service Station (LaGuardia Airport) from 2016 to 2020 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 years. These data were processed using the EPA AERMET program to develop data in a format which can be readily processed by the AERMOD model.

Receptor Locations

Receptors were placed at the following locations: publicly accessible locations, such as open spaces; residential and other sensitive use locations at both ground-level and higher elevations

(for example, residential windows); adjacent sidewalks locations; and completed and occupied buildings at projected development sites where applicable.

On-Road Sources

As presented above under "Transportation," the traffic increments during construction are lower than the operational traffic increments for the full build-out with the Proposed Actions. In addition, construction worker commutes and construction truck deliveries would generally occur during off-peak hours. Furthermore, when distributed over the transportation network, the construction trip increments would not be concentrated at any single location. Nevertheless, because 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 were included with the on-site dispersion analysis (in addition to on-site truck and non-road engine activity) to address all local project-related emissions cumulatively.

On-Road Vehicle Emissions

Vehicular engine emission factors were computed using the EPA mobile source emissions model, MOVES3.1. This emissions model can calculate engine emission factors for various vehicle types, based on the fuel type (gasoline, diesel, or natural gas), meteorological conditions, vehicle speeds, vehicle age, roadway type and grade, number of starts per day, engine soak time, and various other factors that influence emissions, such as inspection maintenance programs. The inputs and use of MOVES incorporate the most current guidance available from the NYSDEC.

On-Road Fugitive Dust

PM2.5 emission rates were determined with fugitive road dust to account for their impacts. However, fugitive road dust was not included in the annual average PM2.5 microscale analyses, per 2021 *CEQR Technical Manual* guidance for mobile source analyses. Road dust emission factors were calculated according to the latest procedure delineated by EPA.[3] An average weight of 17.5 tons and 2.5 tons was assumed for construction trucks and worker vehicles in the analyses, respectively.

Traffic Data

Traffic data for the air quality analysis was derived from existing traffic counts, projected future growth in traffic, and other information developed as part of the construction traffic analysis for the Proposed Actions.

Impact Criteria

The 2021 *CEQR Technical Manual* states that the significance of a predicted consequence of a project (that is, whether it is material, substantial, large, or important) should be assessed in connection with its setting (urban or rural), probability of occurrence, duration, irreversibility,

[3] EPA. 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.

geographic scope, magnitude, and the number of people affected.[4] 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 would be deemed to have a potential significant adverse impact. In addition, to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, CEQR *de minimis* 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 significant adverse impact, even in cases where violations of the NAAQS are not predicted.

Emission Control Measures

Measures are expected to be taken to reduce pollutant emissions during construction under the Proposed Actions in accordance with all applicable laws, regulations, and building codes. These required measures include dust suppression measures as specified in the DEP *Construction Dust Rules*, diesel- and gas-powered equipment reduction, the use of ULSD fuel, and truck idling restrictions. Overall, these emission control measures are expected to reduce air pollutant emissions during construction under the Proposed Actions.

Analysis Results

Maximum predicted concentration increments from construction activities on Projected Development Site 54, clustered Sites 10 and 14, and clustered Sites 36, 37, and 41 in the future with the Proposed Actions, and maximum overall concentrations including background concentrations, are presented in **Table 19-9**, **Table 19-10**, and **Table 19-11** for the peak-construction period analyzed. For PM2.5, monitored background concentrations are not added to modeled concentrations from sources, because impacts are determined by comparing the predicted increment from construction activities to the CEQR *de minimis* criteria. The maximum predicted concentration increments include both on-site construction sources and on-road construction sources.

[4] New York City. 2021 *CEQR Technical Manual*. Chapter 1, section 222. March 2021; and New York State Environmental Quality Review Regulations, 6 NYCRR § 617.7

Table 19-9: Maximum Pollutant Concentrations Resulting from Construction Activities on Projected Development Site 54 (µg/m³)

Pollutant	Averaging Period	Units	Maximum Modeled Impact	Background Concentration	Total Concentration	De Minimis Criteria[1]	NAAQS
PM2.5	24-Hour	µg/m³	0.76	17.9	18.7	8.6	35
	Annual	µg/m³	0.07	7.1	7.2	0.3	9
PM10	24-Hour	µg/m³	4.74	39.3	44.0	-	150
NO_2	Annual	µg/m³	1.34	28.7	30.0	-	100
CO	1-Hour	ppm	0.08	2.02	2.1	-	35 ppm
	8-Hour	ppm	0.02	1.7	1.7	-	9 ppm

Notes:
Results for any other period/locations are expected to be comparable or lower.
PM2.5 concentration increments were compared with the applicable de minimis criteria. Total concentrations were compared with the NAAQS.

1 PM2.5 de minimis criteria: 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35ug/m³.

Table 19-10: Maximum Pollutant Concentrations Resulting from Construction Activities on Projected Development Sites 10 and 14 (µg/m³)

Pollutant	Averaging Period	Units	Maximum Modeled Impact	Background Concentration	Total Concentration	DE Minimis Criteria [1]	NAAQS
PM2.5	24-Hour	µg/m³	1.85	17.9	19.8	8.6	35
	Annual	µg/m³	0.58	7.1	7.7	0.3	9
PM10	24-Hour	µg/m³	6.53	39.3	45.8	-	150
NO_2	Annual	µg/m³	6.81	28.7	35.5	-	100
CO	1-Hour	ppm	0.25	2.02	2.3	-	35 ppm
	8-Hour	ppm	0.07	1.7	1.8	-	9 ppm

Notes:
Results for any other period/locations are expected to be comparable or lower.
PM2.5 concentration increments were compared with the applicable de minimis criteria. Total concentrations were compared with the NAAQS.

1 PM2.5 de minimis criteria: 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35ug/m³.

Table19-11: Maximum Pollutant Concentrations Resulting from Construction Activities on Projected Development Sites 36, 37 and 41 (µg/m³)

Pollutant	Averaging Period	Units	Maximum Modeled Impact	Background Concentration	Total Concentration	De Minimis Criteria[1]	NAAQS
PM2.5	24-Hour	µg/m³	5.02	17.9	22.9	8.6	35
	Annual	µg/m³	0.06	7.1	7.2	0.3	9
PM10	24-Hour	µg/m³	8.72	39.3	48.0	-	150
NO_2	Annual	µg/m³	1.86	28.7	30.6	-	100
CO	1-Hour	ppm	1.41	2.02	3.4	-	35 ppm
	8-Hour	ppm	0.97	1.7	2.7	-	9 ppm

Notes:
Results for any other period/locations are expected to be comparable or lower.
PM2.5 concentration increments were compared with the applicable de minimis criteria. Total concentrations were compared with the NAAQS.

[1] PM2.5 de minimis criteria: 24-hour average, not to exceed more than half the difference between the background concentration and the 24-hour standard of 35ug/m³.

As shown in **Table 19-9**, **Table 19-10**, and **Table 19-11**, the maximum predicted total concentrations of PM10, PM2.5, CO, and annual-average NO_2 are below the applicable NAAQS, and the maximum predicted PM2.5 incremental concentrations are below the applicable CEQR *de minimis* criterion of 8.6 µg/m³ in the 24-hour average period. At Site 54 and Sites 36, 37, and 41, the maximum annual incremental PM2.5 concentration is predicted to be lower than the de minimis criteria. At Sites 10 and 14, the maximum annual incremental PM2.5 concentration is predicted to exceed the de minimis criterion.

~~Between the Draft and Final EIS, additional review and evaluation will be performed to determine whether the identified impacts related to Annual PM2.5 increments will be avoided. This may include use of less conservative assumptions in terms of construction equipment usage, and the use of newer construction equipment with lower particulate emissions, as applicable.~~

Although the modeled results are based on the representative peak-construction periods, conclusions regarding other periods could be derived based on the lower concentration increments from construction that would generally be expected during periods with lower construction emissions.

Conclusions

Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes, as well as New York City Local Law 77. These include dust suppression measures, idling restriction, utilization of newer equipment, and the use of ULSD fuel and best available tailpipe reduction technologies. With the implementation of these emission reduction measures, the dispersion modeling analysis of construction-related air emissions for both on-site and on-road sources determined that PM10, annual-average NO2, and CO concentrations would be below their corresponding de minimis thresholds or NAAQS, respectively;PM2.5 would be below its NAAQS for all analyzed Sites and would exceed annual de minimis threshold at Sites 10 and 14. This would be considered a significant adverse air quality impact. Since construction activities are temporary and the total annual PM2.5 concentrations

resulted by the construction activities would be all lower than NAAQS, the temporary exceedance of the *de minimis* criterion does not indicate public health impact.

Noise and Vibration

Impacts on community noise levels during construction under the Proposed Actions could result from noise from construction equipment operation and from construction and delivery vehicles traveling to and from the construction site. Noise levels caused by construction activities vary widely and depend on the stage of construction and the location of the construction relative to receptor locations. The most significant construction noise sources are expected to be the operation of impact equipment such as pile rigs and tower cranes as well as movements of trucks to and from each project site. Noise from construction activities and some construction equipment is regulated by the New York City Noise Control Code and by the EPA. The New York City Noise Control Code requires the adoption and implementation of a noise mitigation plan for each construction site, limits construction (absent special approvals) to weekdays between the hours of 7:00 AM and 6:00 PM and sets noise limits for certain specific pieces of construction equipment.

Given the scope and duration of construction activities for the Proposed Actions, a quantified construction noise analysis was performed. The purpose of this analysis was to determine whether significant adverse noise impacts would occur during construction, and if so, to examine the feasibility of implementing mitigation measures to reduce or eliminate such impacts.

This section documents the results of the analyses and identifies potential noise and vibration impacts from the project on noise-sensitive land use. Noise and vibration analyses were performed in accordance with the 2021 edition of the New York City 2021 *CEQR Technical Manual* and the Federal Transit Administration (FTA) *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018), which are the best guidance available for assessing construction-related vibration impacts.

Noise Terminology

Noise levels are presented on a logarithmic scale to account for the large pressure response range of the human ear. This logarithmic scale is expressed in units of decibels (dB). A dB is defined as the ratio between a measured value and a reference value usually corresponding to the lower threshold of human hearing. The lower threshold of human hearing is defined as 20 micro pascals. Typically, a noise analysis examines 11 octave (or 33 1/3 octave) bands ranging from 16 hertz (low) to 16,000 hertz (high). This octave band encompasses the human audible frequency range. Because the human ear does not perceive every frequency with equal loudness, spectrally varying sounds are often adjusted with a weighting filter. The A -weighted filter is applied to compensate for the frequency response of the human auditory system, known as a dBA.

An inherent property of the logarithmic dB scale is that the sound pressure levels of two separate sources are not directly additive. For example, if a sound of 50 dBA is added to another proximate sound of 50 dBA, the result is a 3 dB increase, which is a total of 53 dBA and not an arithmetic

doubling to 100 dBA. The human ear perceives changes in sound pressure level relative to changes in “loudness.”

Noise levels can be measured, modeled, and presented in various formats. The noise metrics that were employed in this analysis have the following definitions:

- The most common descriptors used in environmental noise assessments are (i) time-equivalent level (Leq); (ii) day-night level (Ldn); (iii) percentile level (Lx); (iv) sound exposure level (SEL); and (v) maximum instantaneous level (SPL). Each is typically based upon A-weighted measurements and described briefly below.
- Leq is the continuous equivalent sound level, defined as the single SPL that, if constant over a stated measurement period, would contain the same sound energy as the actual monitored sound that is fluctuating in level over the measurement period. Leq is widely recognized as the descriptor of choice for most environmental noise assessments. In addition to its simplicity, it is easy to combine with other readings or predictions to derive a total noise level. Leq is an energy-average quantity that must be contrasted with an average or median sound level. Leq must be qualified in terms of a period to have meaning. The normal representation for the period is placing it in parentheses in terms of hours (for example, Leq(1) refers to a 1-hour measurement and Leq(24) refers to a 24-hour measurement).
- Ldn is the day-night equivalent sound level, defined as a 24-hour continuous Leq with a 10 dB adjustment added to all hourly noise levels recorded between the hours of 10 PM and 7 AM. This 10 dB addition accounts for the extra sensitivity people have to noise during typical sleeping hours. Aircraft noise around airports is usually mapped out in terms of Ldn contours (note that the Federal Aviation Administration maps refer to Ldn as DNL), which are constant lines of Ldn mapped similarly to elevations on topographical maps.
- Lx is the percentile level, where x is any number from 0 to 100. Here x is percentage of the measurement time that the stated sound level has been exceeded. For example, L10 = 80 dBA means that SPL measurements exceeded 80 dBA 10 percent of the time during the measurement period. As with Leq, the measurement period must be specified and is denoted in parentheses (for example, L10(1) corresponds to the SPL exceeded 10 percent of the time during one hour).
- The most commonly used Lx values are L1, L10, L50, and L90. L1, the SPL exceeded 1 percent of the time, is usually regarded as the average maximum noise level when readings are an hour or less in duration. L10 is usually regarded as an indication of traffic noise exposure with a steady flow of evenly spaced vehicles. L50 provides an indication of the median sound level. L90 is usually regarded as the residual level, or the background noise level without the source in question or discrete events.
- SEL is the sound exposure level, defined as a single number rating indicating the total energy of a discrete noise-generating event (such as an aircraft flyover) compressed into 1-second. This level is handy as a consistent rating method that may be combined

with other SEL and Leq readings to provide a complete noise scenario for measurements and predictions. However, care must be taken in the use of these values since they may be misleading because their numeric value is higher than any sound level which existed during the measurement period.

Vibration Terminology

As noted in the FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018), both train operations and construction activities can be a source of ground-borne vibration. As discussed above, Federal Railroad Administration (FRA) has adopted FTA's procedures and guidance for assessing vibration impacts. During the construction phase, activities such as driving piles and operating heavy equipment may cause ground-borne vibration. Due to the weight of train equipment, the operation of trains can also cause ground-borne vibration. Vibration is an oscillatory motion, which can be described in terms of displacement, velocity, or acceleration. Velocity or acceleration is typically used to describe vibration. The following two descriptors are frequently used when discussing quantification of vibration:

- Peak particle velocity (PPV): the maximum instantaneous positive or negative peak of the vibration signal
- Root mean square (RMS): the square root of the average of the squared amplitude of the vibration signal, which is typically calculated over 1 second

Methodology

Construction of the projected development sites, made possible by the proposed Atlantic Avenue Mixed-Use Plan, is anticipated to last for more than two years. Therefore, a quantitative assessment of construction-related noise and vibration was conducted. Construction-related noise and vibration would result from the operation of stationary on-site construction equipment as well as construction-generated vehicle trips (worker trips and material, equipment, truck haul trips) on the surrounding roadways.

The following subsections provide the noise and vibration impact criteria and methodology for assessing impacts related to construction of the Proposed Actions.

Construction Noise Impact Criteria

The DCP has adopted a set of construction noise impact criteria for land use applications under the CEQR process. The determination of significant adverse construction noise impact is based on the intensity and duration of elevated noise levels. Significant adverse construction-related noise impacts are considered if (1) a noise level increment of 15 dBA or more (which is considered objectionable) occurs for a prolonged period of 12 months or more or (2) a noise level increment of 20 dBA or more (which is considered very objectional) occurs for a prolonged period of 3 months or more.



Representative Noise Measurement Groups

N1	N5	N9
N2	N6	N11
N3	N7	N12
N4	N8	

- Noise Measurement Location
- Projected Development Site
- Detailed Analysis Location

Atlantic Avenue Mixed-Use Plan

Figure 19-2
Noise Measurement Locations and Representative Noise Measurement Assignments for Determining Impact Criteria

Construction Vibration Impact Criteria

The FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018) includes criteria for evaluating vibration-induced structural damage and human annoyance. Both sets of criteria were used to identify potential vibration impacts from construction activities associated with the Proposed Actions.

As shown in **Table 19-12**, structural damage criteria are based on the PPV in inches per second (in/sec) and are separated by building category.

As shown in **Table 19-13**, vibration-induced annoyance criteria are based on land use type and the frequency of events. For this analysis, vibration annoyance was focused on residential and other land uses where people generally sleep (Vibration Category 2) as well as institutional land uses (Vibration Category 3), which include land use with only daytime use and sensitivity (schools, churches, quiet offices). Vibration Category 1 is generally focused on highly sensitive land use such as labs with sensitive equipment, hospitals, and vibration-sensitive research and manufacturing operations. Construction events such as pile strikes generated by an impact pile driver or passage of loaded trucks and bulldozers may be considered anywhere from occasional to infrequent. The FTA defines occasional events as 30 to 70 events of the same kind per day and infrequent events as less than 30 events of the same kind per day. The vibration impact assessment assumed infrequent construction vibration events of the same kind per day (that is, 80 velocity in decibels [VdB] for residential land use and 83 VdB for institutional land use).

Table 19-12: FTA Construction Vibration Damage Criteria

Building Category	PPV (in/sec)	Approximate L_V[1]
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

Source: U.S. Department of Transportation, FTA, Transit Noise and Vibration Impact Assessment Manual, September 2018.
Notes:
PPV=peak particle velocity
[1] Root Mean Square (RMS) velocity in decibels (VdB) RE 1 micro-in/sec

Table 19-13: FTA Construction Vibration Annoyance Criteria

Building Category	Ground-Borne Vibration Impact Levels (VdB)[1]		
	Frequent Events[2]	Occasional Events[3]	Infrequent Events[4]
1 – High Sensitivity Buildings	65	65	65
2 – Residential	72	75	80
3 – Institutional	75	78	83

Source: U.S. Department Of Transportation, FTA, *Transit Noise And Vibration Impact* Assessment Manual, September 2018.
Notes:
PPV=peak particle velocity
Root mean square (RMS) velocity in decibels (VdB) RE 1 micro-in/sec.
Frequent events – more than 70 vibration events of the same kind per day.
Occasional events – between 30 and 70 vibration events of the same kind per day.
Infrequent events – less than 30 vibration events of the same kind per day.

Construction Noise Reduction Measures

Construction noise is regulated by the requirements of the *New York City Noise Control Code* (also known as Local Law 113). These requirements mandate that the construction equipment and construction related motor vehicles meet specified noise emission standards, that construction activities be limited to weekdays between 7 AM and 6 PM, and that construction materials be managed and transported in such a manner as not to create unnecessary noise and annoyance to people living in the nearby community. Specific noise control measures would be incorporated in noise mitigation plan(s) required under the NYC Noise Control Code. These measures could include a variety of source and path controls.

In terms of source controls (i.e., reducing noise levels at the source or during the most sensitive time periods), the following measures, under New York regulations, would be implemented:

- Equipment that meets the sound level standards specified in Subchapter 5 of the NYC Noise Control Code would be utilized from the start of construction. **Table 19-14**, "Typical Construction Equipment Noise Emission Levels (dBA)," shows the noise levels for typical construction equipment that would be used for construction under the Proposed Actions.

Table 19-14: Typical Construction Equipment Noise Emission Levels (dBA)

Equipment Description	L_{max} at 50 Feet[1]
All Other Equipment > 5 HP	85
Concrete (Drum) Mixer	80
Concrete Pumps Truck	82
Concrete Mixer Truck	85
Concrete Vibratory Mixer	80
Crane	85
Crawl Crane	85
Dozer	85
Excavator	85
Fork Lift	64[2]
Front End Loader	80
Generator	82
Hoist	75[3]
Jackhammer	85
Impact Pile Driver	95
Pump	77
Rebar Bender	80
Scissor Lift	63
Trowel	76
Welder	73

Notes:
1 2021 *CEQR Technical Manual* Table 22-1, except where noted.
2 Dantruck.com.
3 "Noise Control for Construction Equipment…" Report for Hydro Quebec, 1985

- As early in the construction period as logistics would allow diesel- or gas-powered equipment would be replaced with electrical-powered equipment such as welders, water pumps, bench saws, and table saws (i.e., early electrification) to the extent feasible and practicable.

- Where feasible and practicable, construction sites would be configured to minimize back-up alarm noise. In addition, all trucks, other than those whose engine is used to operate a loading, unloading or processing device, would not be allowed to idle more than three minutes at the construction site based upon Title 24, Chapter 1, Subchapter 7, Section 24-163 of the NYC Administrative Code.
- Contractors and subcontractors would be required to properly maintain their equipment and mufflers.

In terms of path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), the following measures, included under New York regulations, would be implemented:

- Where logistics allow, noisy equipment, such as cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from and shielded from sensitive receptor locations.
- Noise barriers constructed from plywood or other materials would be erected to provide shielding; and
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) for certain dominant noise equipment would be employed to the extent feasible and practical based on the results of the construction noise calculations. The details to construct portable noise barriers, enclosures, tents, etc. are shown in DEP's Rules for Citywide Construction Noise Mitigation.

Construction Noise

Construction noise levels were evaluated in accordance with the latest version of the 2021 *CEQR Technical Manual*. When evaluating noise impacts from construction, factors such as construction duration, type of equipment, and location of construction relative to sensitive receptors were considered in the analysis. The analysis was based on the conceptual schedule of construction phases and activities prepared by the DCP for the Reasonable Worst-Case Development Scenario (RWCDS). The conceptual construction schedule illustrates how development may proceed, but since projected development sites are predominantly privately owned, the timing and exact sequencing of sites is unknown. The conceptual schedule conservatively accounts for overlapping construction activities at development sites in proximity to one another. The conceptual construction schedule is presented in **Figure 19-1**. The construction phases evaluated included: Phase 1: Demolition/Excavation/Foundation, Phase 2: Building Superstructure/Exterior, and Phase 3: Interior Fit-Out.

On-Site Construction Noise Analysis Methodology

Detailed construction noise modeling was performed to evaluate potential effects of construction activities on existing noise-sensitive receptors surrounding projected development sites with construction durations of 24 months or longer. Construction noise levels were calculated at two representative development sites for all construction phases. Results of the detailed construction noise analyses at the two selected development sites were used to draw conclusions regarding the effects of construction activities at other, non-analyzed projected development sites with

construction durations of 24 months or longer. Predicted construction noise levels were subsequently used to identify the intensity and duration of construction noise at receptors and identify potential significant adverse construction noise impacts.

The construction noise analysis involved the following steps:

1. Select cumulative on-site and off-site (construction truck and worker trips) analysis hours. Daily construction worker and truck trip projections by mode were prepared by quarter for the duration of construction as part of the transportation assessment. Peak construction-generated truck and worker trips would occur in the first quarter of 2032. Conservatively, the construction traffic AM peak hour (6 to 7 AM) volumes were assigned to roadways adjacent to each development site to evaluate worst-case, off-site construction noise levels overlapping with on-site activities.

2. Select representative construction sites for detailed analysis. In general, sites that would take less than 24 months to complete do not require quantitative construction noise assessments. The selected representative development sites include Site 14, one of the largest projected development sites, and Site 22, a relatively large projected development site. These sites were selected to represent remaining sites of similar size with construction durations close to 24 months. Characteristics considered in the selection of sites to be represented by Site 14 and Site 22 included building size, building height, and sensitive receptor proximity and line of sight to the construction site. Specifically, construction noise analysis results from Site 14 were used to evaluate potential construction noise levels from Projected Development Sites 15, 54, and 55. Construction noise analysis results from Site 22 were used to evaluate potential noise impacts from Projected Development Sites 6, 9, 10, 20, and 45.

3. Select analysis time period. The construction phases evaluated at the two representative Projected Development sites included: Phase 1: Demolition/Excavation/Foundation, Phase 2: Building Superstructure/Exterior, and Phase 3: Interior Fit-Out.

4. Select receptor locations. Receptors were placed every 50 feet in an evenly spaced grid to form “receptor rings” beginning at 5 feet above ground level and up to six stories (assuming 10 feet per floor, equating to approximately 60 feet). Since the model did not include the shielding effects of existing buildings, receptor rings as far as 500 feet were modeled to determine the extent of construction noise effects.

5. Establish existing noise levels along receptor rings. Per DCP guidance, noise measurements conducted as part of the operational noise assessment for the Proposed Actions were used to define existing noise levels and determine the construction noise increment at noise-sensitive receptors during each phase. The lowest measured L_{eq} during the two weekday measurement periods (AM and MD) was conservatively used to identify background noise levels and determine construction noise increments. Each noise-sensitive receptor was assigned a representative noise measurement location. **Figure 19-2** shows the noise measurement locations conducted as part of the operational

noise assessment as well as the boundaries depicting the assignments for receptors around the Proposed Actions.

6. Calculate construction noise levels at receptor rings. The cumulative noise levels from all equipment types (except concrete pump and mixer trucks) and quantities for each construction phase were applied to area sources within SoundPLAN. Cumulative noise levels were converted to sound power levels. Each detailed analysis site was evaluated with a perimeter construction barrier. Concrete pump and mixer trucks were modeled as point sources outside the perimeter construction barrier since there is no guarantee that these trucks would operate within the site behind the barrier. The ground type was modeled as a hard, reflective surface (i.e., G = 0). Off-site sources (construction truck and worker vehicles) were modeled using the Federal Highway Administration's (FHWA) TNN2.5 module within SoundPLAN.

7. Determine total noise levels and noise level increments during construction at each receptor ring. For each construction phase, construction noise levels were logarithmically added to background noise levels to yield total noise levels. The background noise levels were then arithmetically subtracted from total noise levels to identify the predicted noise level increase during each construction phase.

8. Compare total noise levels and noise increases with "Construction Noise Impact Criteria" described above to determine the magnitude of construction noise at noise sensitive receptors surrounding the two representative analysis sites.

9. Establish the magnitude of construction noise at sensitive receptors that would be affected by other projected development sites with construction durations of 24 months or longer. The predicted construction noise levels at each receptor ring for Site 14 were applied in GIS to receptor rings generated at the same 50-foot intervals around Projected Development Sites 15, 54, and 55. Similarly, the predicted noise levels at each receptor ring for Site 22 were applied to receptor rings generated at the same 50-foot intervals around Projected Development Sites 6, 9, 10, 20, and 45. For example, if the predicted construction noise level at 50 feet from Projected Site 14 was 85 dBA, that same noise level was applied to the 50-foot receptor ring generated around Sites 15, 54, and 55. The noise level increment was then calculated at the 50-foot receptor ring for Sites 15, 54, and 55 separately, since background noise levels differ around each site.

10. Establish construction noise duration. Predicted noise level increments and the conceptual construction schedule were reviewed to determine the potential duration of elevated noise levels.

11. Identify and describe potential significant and adverse construction noise impacts. The magnitude and duration of predicted noise level increases during construction were used to determine whether the Proposed Actions would have the potential to result in significant adverse construction noise impacts.

Construction Noise Modeling

Noise levels from both on-site (demolition, excavation, foundation work) and off-site sources of construction noise (haul and delivery trucks, construction worker vehicles) were determined using the SoundPLAN model. This model is a state-of-the-art analytic tool for determining noise exposure from various types of noise generating transportation and construction activities. SoundPLAN is a three-dimensional, ray-tracing model in which noise sources can be modeled as point, line, and area source components. The model can account for distance attenuation, elevation differences, ground absorption, building shielding, and noise reduction achieved by sound barriers and enclosures. The resultant noise levels can be predicted at any number of receptor locations of interest. Use of SoundPLAN for construction noise modeling is acceptable per 2021 *CEQR Technical Manual* guidance.

SoundPLAN inputs were developed in GIS using project site plans and existing building footprints[5] and roadway center lines[6] obtained from NYC Open Data. Construction equipment types and quantities were provided by the DCP for each construction phase. Equipment quantities are based on size of development. Reference sound levels for construction equipment as well as acoustic usage factors that affect the L_{eq} were based on values provided in Table 22-1 of the 2021 *CEQR Technical Manual*, the FTA manual, and source noise levels provided by the DCP from previous projects. Area sources for each phase were generated from the footprints of the two representative analysis sites in GIS. The same footprint was used to develop the area source modeled for each construction phase; however, the sound level applied to the area source differed for each phase based on differences in equipment types and quantities. All construction vehicles were conservatively placed on roadways directly adjacent to the representative construction sites and modeled at a speed of 25 mph.

The predicted construction noise levels were then compared to existing levels to determine impact significance. The determination of significant adverse construction noise impact is based on the intensity and duration, as described above.

Appendix H includes a detailed list of construction equipment types and quantities assumed for the analysis as well as the "RCNM equivalent" for any pieces of equipment not directly listed in the RCNM database.

Off-Site Construction Noise Analysis

Off-site construction noise sources include construction-generated haul and delivery trucks transporting and delivering materials and employee vehicles arriving to and departing from work shifts along local roads adjacent to the projected development sites. Peak construction -generated traffic will occur during the hour prior to startup of on-site construction activities (6 AM to 7 AM) and during the hour after on-site activities are completed for the day (3 PM to 4 PM).

[5] Building Footprints | NYC Open Data (cityofnewyork.us)
[6] NYC Street Centerline (CSCL) | NYC Open Data (cityofnewyork.us)

Construction Vibration

The 2021 *CEQR Technical Manual* does not include a methodology for the evaluation of construction-induced vibration. However, certain heavy construction activities, such as pile driving, demolition, and excavation, may result in vibration-induced annoyance and structural damage. Therefore, potential vibration impacts from construction were assessed using the methodology outlined in Section 7.2 of the FTA *Transit Noise and Vibration Impact Assessment Manual* (FTA 2018).

Vibration source levels for a variety of typical construction equipment types are outlined in Table 7-4 of the FTA manual in terms of PPV in inches per second (ips or in/sec) and velocity in decibels (VdB), both at a reference distance of 25 feet from the source. The project construction equipment types that would generate the highest vibration levels include impact pile drivers, large bulldozers, and loaded trucks. **Table 19-15** summarizes the vibration source levels for equipment used in the construction vibration assessment.

The FTA calculation method is dependent on the equipment vibration source level and the distance between the equipment and the vibration-sensitive receptor. Using equations from Section 7.2 of the FTA manual, PPV and vibration velocity were calculated in 1-foot increments for an impact pile driver, a large bulldozer, and loaded trucks to determine the distance beyond which there would no longer be a potential for structural damage or vibration annoyance during each construction phase in which these pieces of equipment are anticipated to be used. In general, properties more than 300 feet away do not experience elevated vibration levels unless significant pile driving occurs.

Table 19-15. FTA Construction Equipment Vibration Source Levels

Equipment	PPV At 25 Feet (In/Sec)	Approximate L_v[1] At 25 Feet (Vdb)
Pile driver (impact)	0.644	104
Large bulldozer	0.089	87
Loaded trucks	0.076	86

Source: U.S. Department of Transportation, FTA, *Transit Noise and Vibration Impact Assessment Manual*, September 2018.
Notes:
PPV=peak particle velocity
1. Root mean square (RMS) velocity in decibels (VdB) RE 1 micro-in/sec

Construction Impact Analysis Results

Using the methodology described above, cumulative noise levels from both on- and off-site construction sources were predicted at receptor distance rings to identify maximum hourly L_{eq} noise levels for each phase of construction.

Projected Development Site 14

According to the conceptual construction schedule, construction of Projected Development Site 14 would commence in 2029 with Phase 1: Demolition/Excavation/Foundation, which would last approximately 12 months. Maximum predicted noise levels would range between 69 dBA and 93 dBA $L_{eq(h)}$, with the highest noise levels experienced by noise-sensitive receptors immediately

adjacent to the construction site and during periods when the noisiest equipment is operating (for example, impact pile drivers). Noise-sensitive receptors located further from the construction site would experience lower noise levels. The results of the detailed construction noise analysis for Projected Development Site 14 are summarized in **Table 19-16**.

Based on the detailed analysis of Projected Development Site 14, construction noise levels are predicted to result in significant noise level increases of at least 20 dBA at noise-sensitive receptors within approximately 150 feet of the site. These very objectionable noise level increases will be considered significant adverse impacts if they are sustained for at least three continuous months. Construction noise levels are predicted to result in an increase of at least 15 dBA at noise-sensitive receptors within approximately 250 feet of the site, which will be considered a significant adverse impact if sustained for 12 continuous months.

Upon completion of Phase 1, noise level increases during Phase 2 and Phase 3 will decrease, with maximum predicted construction noise levels ranging between 65 to 87 dBA. Very objectionable noise levels may be experienced at noise-sensitive receptors within 50 feet of Phase 2 and Phase 3. Objectionable noise levels may be experienced at noise sensitive receptors within approximately 150 feet of Phase 2 and 100 feet of Phase 3. According to the conceptual construction schedule, Phase 2 at Site 14 would last approximately 20 months, while Phase 3 would last approximately 9 months.

The maximum predicted noise levels were conservatively estimated, assuming all equipment necessary to complete each phase would operate concurrently during each workday and hour when the construction site is active. However, impact pile drivers (for example) typically operate intermittently throughout the workday including preparation time between each pile. In addition, it is unlikely for pile driving to occur throughout the 12-month period of Phase 1, particularly because pile driving would only be necessary during foundation work. Less noisy equipment, including excavators and bulldozers, would operate more consistently throughout the workday and during most of Phase 1, except during foundation work when their use would be more limited. The noisiest pieces of equipment in Phase 2 would likely be concrete pump and mixer trucks outside the perimeter construction barrier along with troweling machines and concrete vibrators, which will be used intermittently throughout the day. Under Phase 3, the noisiest pieces of equipment will be multiple manlifts and a couple of cranes. However, manlifts run intermittently throughout the workday, with the engine operating only when the lift is being raised and lowered and when the lift is moving around the site. While a contractor is working, the manlift engine is typically throttled down to an idle.

Construction noise would differ based on direct line of sight between construction noise sources and noise-sensitive receptors. Consequently, receptors beyond the first row adjacent to the construction sites may have obstructed lines of sight and therefore lower noise level increases than predicted. Therefore, the maximum distance to objectionable and very objectionable noise levels would be less for receptors with obstructed lines of sight.

Table 19-16. Projected Development Site 14 Noise Analysis Results L_{eq} (dBA)

RECEPTOR RING DISTANCE	EXISTING LEQ		TOTAL LEQ		INCREMENT	
	MIN	MAX	MIN	MAX	MIN	MAX
Largest – 50 feet	63	70	75	93	7	29
Largest – 100 feet	63	70	72	88	4	24
Largest – 150 feet	63	70	70	84	3	21
Largest – 200 feet	63	70	68	82	2	19
Largest – 250 feet	63	70	67	79	1	16
Largest – 300 feet	63	70	66	77	1	14
Largest – 350 feet	63	70	66	76	1	12
Largest – 400 feet	63	70	65	75	1	10
Largest – 450 feet	63	70	65	74	1	9
Largest – 500 feet	63	70	65	74	0	9

Note: Construction noise levels are based on conservatively assuming all equipment necessary for Phase 1 will operate concurrently. The analysis also conservatively assumes unobstructed line of sight from construction noise sources to noise-sensitive receptors.

Projected Development Site 22

According to the conceptual construction schedule, construction of Projected Development Site 22 would commence in 2025 with Phase 1: Demolition/Excavation/Foundation, which would last approximately four months. Maximum predicted noise levels would range between 69 dBA and 92 dBA $L_{eq(h)}$, with the highest noise levels experienced by noise-sensitive receptors immediately adjacent to the construction site and during periods when the noisiest equipment is operating (for example, impact pile drivers). Noise-sensitive receptors located further from the construction site would experience lower noise levels. The results of the detailed construction noise analysis for Projected Development Site 22 are summarized in **Table 19-17.**

Based on the detailed analysis of Projected Development Site 22, construction noise levels are predicted to result in significant noise level increases of at least 20 dBA at noise-sensitive receptors within approximately 150 feet of the site. These very objectionable noise level increases will be considered significant adverse impacts if they are sustained for at least three continuous months. The conceptual construction schedule indicates Phase 1 would last for approximately four months; however, this duration represents the entirety of Phase 1. The foundation work that includes pile driving would likely last for less than three months, although elevated noise levels may continue from the intermittent use of excavators and dozers on-site as well as concrete pump and mixer trucks in use outside the perimeter construction barrier. Construction noise levels are predicted to result in an increase of at least 15 dBA at noise-sensitive receptors within approximately 250 feet of the site, which will be considered a significant adverse impact if sustained for 12 continuous months.

Upon completion of Phase 1, noise level increases during Phase 2 and Phase 3 will decrease, with maximum predicted construction noise levels ranging between 64 to 86 dBA. Very objectionable noise levels may be experienced at noise-sensitive receptors within 50 feet of Phase 2 and Phase 3. Objectionable noise levels may be experienced at noise-sensitive

receptors within approximately 150 feet of Phase 2 and within approximately 100 feet of Phase 3. According to the conceptual construction schedule, Phase 2 at Site 22 would last approximately 11 months, while Phase 3 would last approximately 10 months.

Maximum predicted noise levels were conservatively estimated, assuming all equipment necessary to complete each phase would operate concurrently during each workday and hour when the site is active. However, impact pile drivers, for example, typically operate intermittently throughout the workday, with preparation time between each pile. In addition, it is unlikely for pile driving to occur throughout the 4-month period of Phase 1, particularly because pile driving would only be necessary during foundation work. Less noisy equipment, including excavators and bulldozers would operate more consistently throughout the workday and during most of Phase 1, except during foundation work when their use would be more limited. In addition, the construction noise analysis is based on direct line of sight between construction noise sources and noise-sensitive receptors. In reality, receptors beyond the first row adjacent to the construction sites will have obstructed lines of sight and therefore lower noise level increases. The maximum distance to objectionable and very objectionable noise levels would be much less for receptors with obstructed lines of sight. The noisiest pieces of equipment in Phase 2 would likely be concrete pump and mixer trucks outside the perimeter construction barrier along with troweling machines and concrete vibrators, which will be used intermittently throughout the day. Under Phase 3, the noisiest pieces of equipment will be multiple manlifts and a couple of cranes. However, manlifts run intermittently throughout the workday, with the engine operating only when the lift is being raised and lowered and when the lift is moving around the site. While a contractor is working, the manlift engine is typically throttled down to an idle.

Construction noise would differ based on direct line of sight between construction noise sources and noise-sensitive receptors. Consequently, receptors beyond the first row adjacent to the construction sites may have obstructed lines of sight and therefore lower noise level increases than predicted. Therefore, the maximum distance to objectionable and very objectionable noise levels would be less for receptors with obstructed lines of sight.

Table 19-17: Projected Development Site 22 Noise Analysis Results L_{eq} (dBA)

RECEPTOR RING DISTANCE	EXISTING LEQ		TOTAL LEQ		INCREMENT	
	MIN	MAX	MIN	MAX	MIN	MAX
Large – 50 feet	63	66	74	92	9	29
Large – 100 feet	63	66	71	88	5	25
Large – 150 feet	63	66	69	84	4	21
Large – 200 feet	63	70	67	82	2	19
Large – 250 feet	63	70	66	79	2	16
Large – 300 feet	63	70	66	77	1	13
Large – 350 feet	63	70	65	75	1	11
Large – 400 feet	63	70	65	74	1	10
Large – 450 feet	63	70	65	73	1	10
Large – 500 feet	63	70	64	72	1	9

Note: Construction noise levels are based on conservatively assuming all equipment necessary for Phase 1 will operate concurrently. This analysis also conservatively assumes unobstructed line of sight from construction noise sources to noise-sensitive receptors.

Appendix H includes the construction noise analysis results for the eight sites represented by Projected Development Sites 14 and 22.

Construction Noise Analysis Results – Other Projected Development Sites

The results of the detailed construction noise analyses performed for representative Development Sites 14 and 22 were used to estimate anticipated construction noise impacts from other projected development sites with construction durations of 24 months or longer. As discussed above, Site 14 was used to represent the largest development sites and therefore estimate construction noise impacts from Projected Development Sites 15, 54, and 55. Site 22 was used to represent relatively large development sites and was therefore used to estimate construction noise impacts from Projected Development Sites 6, 9, 10, 20, and 45. ~~Error! Reference source not found.~~**Figure 19-3** and **Figure 19-4** illustrate~~s~~ the receptor locations predicted to experience noise level increases during construction that would constitute significant impacts based on the criteria described above.

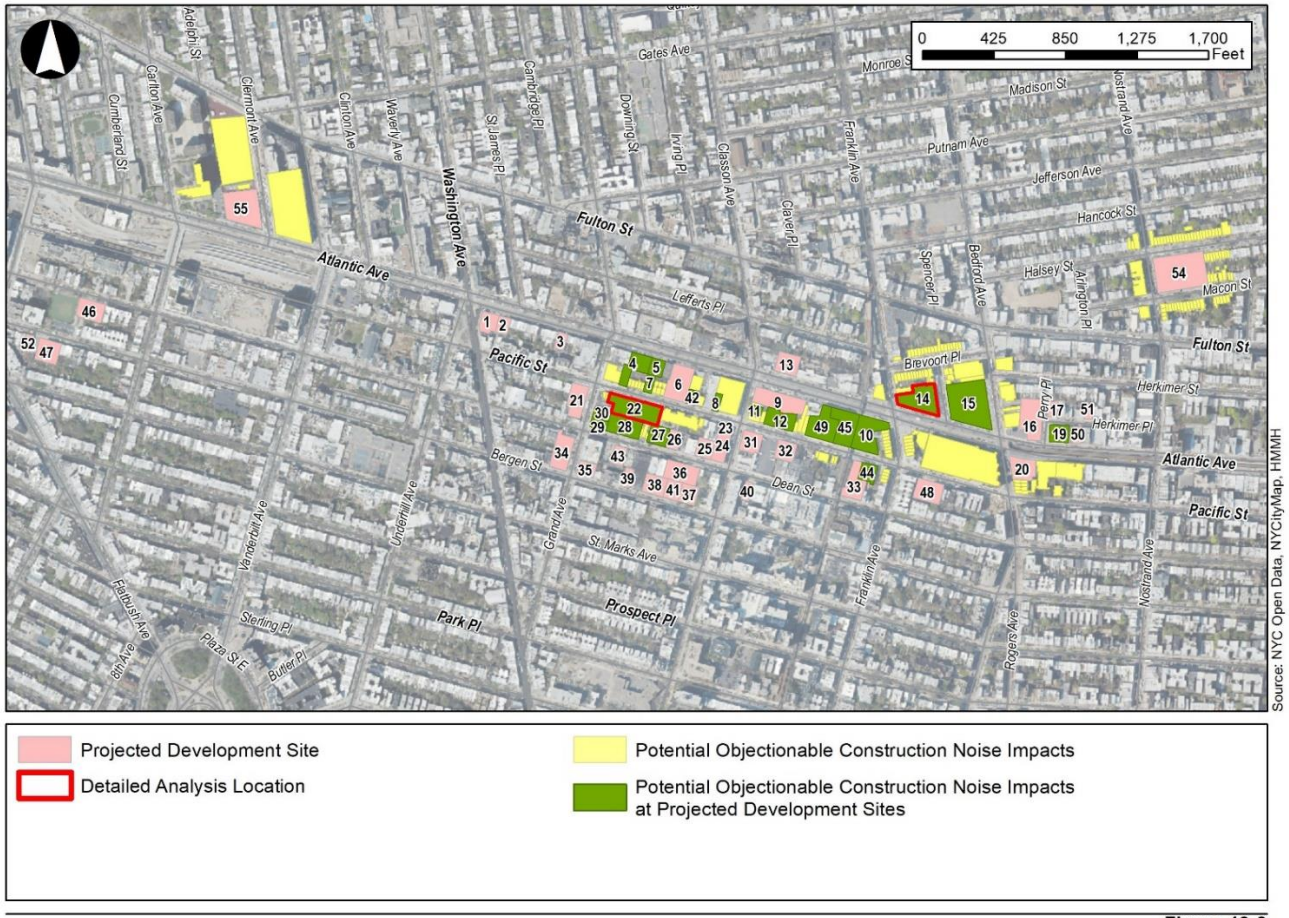
~~Between Draft and Final EIS, the construction noise analysis and chapter may be revised.~~

As previously discussed, the noise analysis conservatively assumes all equipment operating concurrently throughout each construction phase. Therefore, predicted significant noise level increases are also conservative. Typically, the loudest hourly noise level would not be sustained throughout the entire month or duration of the construction phase. In addition, the analysis is based on conceptual site plans and construction schedules. Therefore, it is possible that construction on adjacent development sites will not overlap, and actual construction may be of less magnitude, in which case noise would be less intense than the analysis predicts.

Construction Noise at Completed and Occupied Development Sites

Since certain projected development sites are expected to include noise-sensitive uses (e.g., residential, community facility) that may be exposed to construction noise (i.e., when a building is completed and occupied, but other development assumed under the Proposed Actions would still be under construction), there is the potential that all of the projected development sites within ~~the~~ **Figure 19-3** and **Figure 19-4**, could experience significant construction noise impacts due to the potential for construction to occur in a sequencing other than the conceptual schedule assumed for the purposes of the construction noise analysis.

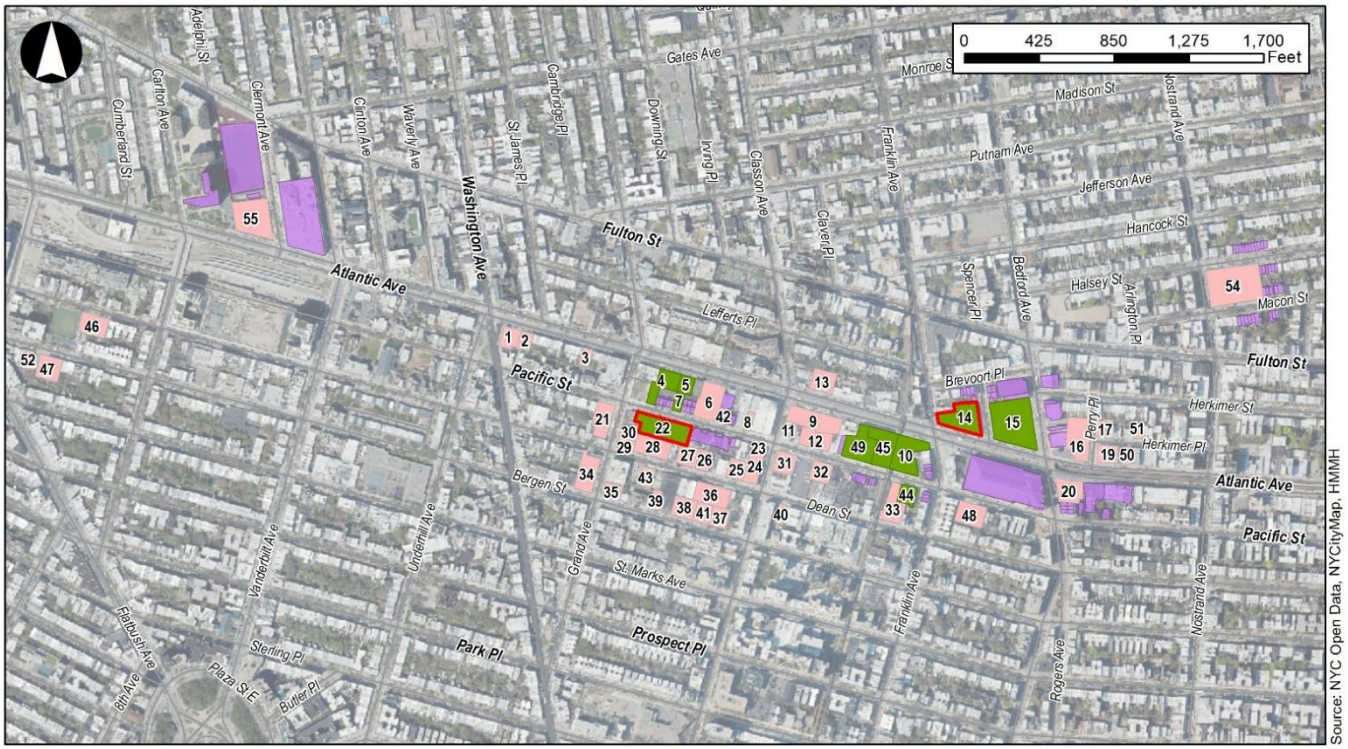
As with the existing receptors, the predicted exceedances of acceptable noise levels at the completed and occupied projected development sites would be due principally to noise generated by on-site construction activities (rather than construction-related traffic). As previously discussed, this noise analysis examined the reasonable worst-case peak hourly noise levels that would result from construction, and consequently is conservative in predicting significant increases in noise levels.



Atlantic Avenue Mixed-Use Plan

Figure 19-3
Construction Noise Analysis Results - Objectionable Impacts

***This figure is new for the FEIS.**
Above impacts are conservatively assumed using the maximum distance at which exceedance of impact criteria may occur. When implementing these maximum distances onto above Figure, consideration for line of sight was limited and, as a result, actual resultant construction noise levels may be greatly reduced if any building were to completely block the line of sight between receptor and construction noise sources. Projected Development Site 53 is not shown on the figure due to its distance from the other projected development sites, and it is not impacted by the construction activities.



Atlantic Avenue Mixed-Use Plan

Figure 19-4
Construction Noise Analysis Results - Very Objectionable Impacts

***This figure is new for the FEIS.**
Above impacts are conservatively assumed using the maximum distance at which exceedance of impact criteria may occur. When implementing these maximum distances onto above Figure, consideration for line of sight was limited and, as a result, actual resultant construction noise levels may be greatly reduced if any building were to completely block the line of sight between receptor and construction noise sources. Projected Development Site 53 is not shown on the figure due to its distance from the other projected development sites, and it is not impacted by the construction activities

Vibration

Construction Vibration

The vibration-induced structural damage analysis conservatively assumes that most structures surrounding the projected development sites are FTA Category III structures. These are structures made of non-engineered timber and masonry buildings. For vibration annoyance, land use that is most sensitive to construction vibration includes places where people typically sleep, such as residences.

Vibration-inducing activities occurring during construction of the projected development sites would include the use of pile drivers, large bulldozers, and haul trucks loaded with debris and materials. The highest vibration levels would result from impact pile drivers during building foundation work. Vibration-induced structural damage has the potential to occur if pile driving is conducted within approximately 72 feet of non-engineered timber and masonry buildings, which equates to a vibration level of 0.2012 PPV. When impact pile driving occurs further than approximately 72 feet from non-engineered timber and masonry buildings, there would be no potential for structural damage. If it is determined through field surveys that existing structures adjacent to construction sites consist of more solid materials, such as engineered concrete and masonry, structural damage from impact pile driving could potentially occur within 50 feet of this activity. In addition, vibration-induced annoyance is predicted to occur at residential and institutional land uses within approximately 30 feet from impact pile driving. Vibrations from large bulldozers and loaded trucks are not anticipated to result in structural damage to adjacent buildings, as the highest vibration levels would generally occur within 8 feet of equipment. Construction vibration calculations are included within **Appendix H**.

Summary and Mitigation

Construction noise is anticipated to result in significant increases in noise levels, especially during the demolition/excavation/foundation phase when pile driving would be necessary. To minimize and reduce noise during construction, the contractor would be required to comply with the New York City Noise Code, which requires the adoption of a noise control mitigation plan prior to commencement of construction activities. The following noise control measures defined in Title 15, Chapter 28: Citywide Construction Noise Mitigation of The Rules of the City of New York are examples of mitigation strategies that may be incorporated into the noise control mitigation plans for each site:

- All construction equipment operating on a site shall be equipped with the appropriate manufacturer’s noise reduction devices, including a manufacturer’s muffler (or equivalently rated material) that is free of rust, holes, and exhaust leaks.
- Noise from construction devices with internal combustion engines shall be mitigated by ensuring that the engine's housing doors are kept closed, and by using noise-insulating material mounted on the engine housing that does not interfere with the manufacturer's guidelines for engine operation or exhaust.
- Portable compressors, generators, pumps and other such devices shall be covered with noise-insulating fabric to the maximum extent possible that does not interfere with

the manufacturer's guidelines for engine operation or exhaust, and shall further reduce noise by operating the device at lower engine speeds during the work to the maximum extent possible.

- Vehicle engine idling on-site shall be limited to no longer than 3 minutes while parking, standing, or stopping as per New York City Administrative Code § 24-163.
- Quieter back-up alarms on construction equipment shall be used whenever practical.
- Strategically positioning construction vehicles as to minimize operation near receptors and avoiding tailgate slamming to the extent possible.
- Noise pathway controls, including noise barriers and enclosures free from gaps and holes, should be placed as close as possible to construction areas. Construction of noise barriers and enclosures should follow rules and guidelines detailed within Title 15, Chapter 28; Citywide Construction Noise Mitigation.

The last bullet may be the most useful for reducing construction noise, and these temporary barriers are most effective if deployed either close to operating equipment or close to noise-sensitive properties. For example, to reduce construction noise occurring at the lower levels of the buildings, the contractor could position temporary sound curtains close to operating equipment and between the construction activity and impacted receptors. However, receptors located at higher floors and above the work would not receive much benefit from noise mitigation at the ground level.

Based on the construction-related vibration assessment, there may be a potential for structural damage at buildings immediately adjacent to construction sites during impact pile driving. In addition, vibration-sensitive land use may experience annoyance during this activity. Vibration minimization measures may be incorporated into contract documents requiring the construction contractor to:

- Establish construction vibration structural damage response action and stop-work levels.
- Conduct a pre-construction survey of all buildings adjacent to operations requiring vibratory or impact pile driving equipment and identify existing cracks and building conditions.
- Develop and implement a vibration control and mitigation plan that documents anticipated vibration levels and methods to control vibration.
- Implement third-party construction vibration compliance monitoring.
- Repair any damages resulting from construction operations.