11 CONSTRUCTION

11.1 Introduction

According to the 2020 *CEQR Technical Manual*, construction activities, although temporary, may sometimes result in significant adverse impacts. Construction duration, a critical measure to determine a project's potential for adverse impacts, is categorized as short-term (less than 24 months) and long-term (24 months or more). For construction activities not related to in-ground disturbance, short-term construction generally does not warrant a detailed construction analysis. However, consideration of several factors – including the location and setting of the project in relation to surrounding uses, and the intensity of construction activities – may indicate that a project's construction activities, even if short-term, warrant analysis in additional areas such as transportation, hazardous materials, historic and cultural resources, noise, and air quality.

As discussed in Chapter 1, "Project Description," approval of the Proposed Actions would facilitate the development of three buildings on Projected Development Site 1 and one building on Projected Development Site 2. Construction would last more than two years and would involve construction on multiple development sites on the same block; therefore, a construction assessment is warranted.

Projected Development Site 1 is owned by the Applicant and comprises Block 13, Lots, 82, 92 100, and Tentative Lot 95 (the portion of Lot 8 within 185 feet of Stuyvesant Place). The site is vacant except for scattered vegetation and remnants of building foundations on Lot 82. Projected Development Site 2 comprises Block 13, Lots 68, 71, and 73, and contains two two-family detached residences. Buildings 1, 2, and 3 would be constructed on Projected Development Site 1.

Building 1 on Lot 100 would be the largest of the three proposed buildings. Building 1 would be a 26-story, 403,547 gsf building comprising 325,310 gsf of residential space (348 DU), 11,888 gsf of retail space, and 66,349 gsf of accessory parking (224 spaces).

Building 2 would be sited on Lot 92, and would be a 25-story, 237,559 gsf buildings comprising 2,102 gsf of retail space and 235,457 gsf of residential space (313 DUs).

Building 3 would be sited on Lot 82. Building 3 would be an 11-story, 171,932 gsf building comprising 9,155 gsf of retail space, 127,027 gsf of residential space (136 DUs), and 35,750 gsf of accessory parking (142 spaces).

Projected Development Site 2 is to the west of Lot 82 and comprises Block 13, Lots 68, 71, 73. Lot 68 is vacant, and Lots 71 and 73 are each developed with one two-family house. Projected Development Site 2 is not under control of the Applicant. However, to present a conservative analysis, Project Development Site 2 is anticipated to be developed with a 117,848 gsf building containing 4,929 gsf of retail, 100,019 gsf of residential space (100 DUs), and 12,900 sf of accessory parking (43 spaces).

This chapter describes the City, state, and federal regulations and policies that govern construction, followed by the conceptual construction schedule assumed for analysis, and the types of activities likely to occur during construction. The types of construction equipment are also discussed, along with the projected number of workers and truck deliveries. Finally, the potential impacts from construction activity are assessed, and the methods that may be employed to avoid potential 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 could occur at different times for different analyses. For example, the noisiest part of construction may not be at the same time as the heaviest construction traffic.

11.2 Principal Conclusions

Construction of the Proposed Actions have the potential to result in significant adverse construction traffic and noise impacts. The Proposed Actions would facilitate the demolition of the existing structures in the Project Area and the development of four buildings across two development sites. Three buildings would be constructed on Projected Development Site 1 and one building would be constructed on Projected Development Site 2. Project-generated construction would be completed in two phases over an approximately 51 month period, including a six-month gap between Phase 1 and Phase 2 construction activities. Phase 1, which includes the entirety of Development Site 1, would be fully constructed 30 months after construction commences. Phase 2, which would involve construction of Projected Development Site 2, would be constructed in 15 months; including a six-month period of no construction activities between Phases 1 and 2, the cumulative construction period would be 51 months. Significant adverse construction traffic impacts would occur at seven intersection approaches/lane groups, and significant adverse construction noise impacts would occur at 20 locations.

Open Space

Construction activities would not occur on or adjacent to public open spaces, and the proposed open space on Projected Development Site 1 would be open after Phase 1 and would not be available for construction during Phase 2. Phase 2 construction would occur more than 400 feet from the proposed privately accessible open space on Projected Development Site 1; therefore, there would be no significant adverse construction open space impacts.

Hazardous Materials

A detailed assessment of the potential risks related to the construction for the proposed actions with respect to any hazardous materials and mitigation measures related to the potential impacts is provided in Chapter 4, "Hazardous Materials."

To reduce the potential for adverse impacts associated with new construction resulting from the proposed actions, further environmental investigations and remediation will be required. To ensure that these investigations are undertaken, a hazardous materials (E)-Designation would be placed on the projected development sites. The (E)-Designations would require approval by the NYC Office of Environmental Remediation (OER) prior to obtaining NYC Buildings Department (DOB) permits for new development entailing soil disturbance.

With the inclusion of the measures required by the (E)-Designations, construction resulting from the Proposed Actions would not result in significant adverse impacts related to hazardous materials.

Transportation

The peak number of trips generated by construction of the Proposed Actions is expected to occur in the second quarter of 2023 (seventh quarter of construction [Q7]). During this peak quarter, project-generated construction would generate an average of approximately 462 workers and 34 truck deliveries per day. Therefore, Q7 was selected to assess the construction transportation conditions to identify any potentially significant adverse impacts to traffic, transit, pedestrians and parking in the study area.

Traffic

Construction of the Proposed Project would generate a maximum of approximately 230 and 210 Passenger Car Equivalent (PCE) vehicle trips during the weekday AM (6:00 AM – 7:00 AM) and PM (3:00 PM – 4:00 PM) construction peak hours, respectively. Traffic conditions were evaluated for these two peak hours at seven intersections in the general vicinity of the Project Site, where the net increase in vehicle trips due to construction of the Proposed Project would exceed the CEQR threshold for conducting detailed traffic analysis. The capacity analyses indicate that the following seven intersection approaches/lane groups in the study area could experience potentially significant adverse traffic impacts in at least one peak hour as a result of construction activities associated with the Proposed Project:

- The eastbound through-right movement of Richmond Terrace at Jersey Street during the weekday AM construction peak hour.
- The westbound through-right movement of Richmond Terrace at Jersey Street during the weekday PM construction peak hour.
- The eastbound approach of Richmond Terrace at Westervelt Avenue during the weekday AM construction peak hour.
- The westbound approach of the Parking Garage Driveway/Nicholas Street at Richmond Terrace during the weekday PM construction peak hour.
- The westbound approach of the Empire Mall Driveway at Richmond Terrace during the weekday AM and PM construction peak hours.
- The northbound right-turn of Richmond Terrace at Wall Street during the weekday PM construction peak hour.

- The southbound left-through movement of Bay Street at Victory Boulevard during the weekday PM construction peak hour.

Chapter 13, "Mitigation," discusses potential measures to mitigate these potentially significant adverse traffic impacts.

Transit

The Project Area is well-served by 22 New York City Transit (NYCT)/MTA bus lines, as well as the Staten Island Railway (SIR) which can be accessed at the St. George Terminal approximately 0.5 miles from the Project Site. However, the maximum peak hour subway/rail and bus trip generation due to construction of the Proposed Project are below the CEQR threshold for conducting detailed analyses of transit conditions. Therefore, the Proposed Actions would not result in potentially significant adverse transit impacts during construction.

Pedestrians

Construction of the Proposed Actions would generate a maximum of approximately 370 construction worker trips during the weekday AM (6:00 AM – 7:00 AM) and PM (3:00 PM – 4:00 PM) construction peak hours. The net increase in pedestrian trips due to project-generated construction is expected to exceed the CEQR threshold for conducting detailed analysis during the weekday AM and PM construction peak hours at the northwest corner at the intersection of Richmond Terrace and Hamilton Avenue. However, this pedestrian element is expected to operate at acceptable conditions during construction of the Proposed Project given the similar pedestrian increments and projected future operating conditions summarized in the operational analysis (see Chapter 5, "Transportation"). Therefore, the Proposed Actions would not result in potentially significant adverse pedestrian impacts during construction.

Parking

Construction of the Proposed Project would generate a maximum parking demand of approximately 260 spaces during the weekday midday period. The operational parking analysis conducted for the Proposed Project indicates that in the No-Action Condition, off-site public parking facilities within ¼-mile of the Project Site would operate at approximately 82 percent utilization with approximately 468 available spaces during the weekday midday period. Therefore, the Proposed Actions would not result in a potential public parking shortfall in the area during construction.

Air Quality

Detailed air quality modeling was completed to assess whether the emissions during the construction stage would have the potential to result in significant adverse air quality impacts during construction. The worst-case construction-generated air effects would occur during the second quarter of Phase 1, and the worst-case annual effects would occur between the first and fourth quarters of Phase 1. Construction of Projected Development Site 2 (Phase 2), would be short-term, and would result in fewer air quality emissions than Phase 1.

Dispersion modeling analysis of construction-related air emissions from the worst-case construction period confirmed that construction under the Proposed Actions and would not result in significant adverse air quality impacts with the following emission control measures:

- Ultra-low-sulfur diesel (ULSD) fuel would be used for all diesel engines;

- All equipment would use Best Available Technology (BAT) to minimize particulate emissions. The BAT includes diesel particulate filters on all nonroad equipment with a capacity of 50 horsepower (hp) or less;
- For construction on Building 3, diesel generators rated at less than 50 hp, would use diesel particulate filters (DPFs), either installed by the original equipment manufacturer (OEM) or retrofitted;
- All non-road construction equipment with a power rating of 50 hp or greater would meet at least the Tier 3 emissions standard to the extent practicable.
- Vehicle idle time would be restricted to three minutes for equipment and vehicles that do not require their engines to operate a function such as loading, unloading, or processing device (e.g., concrete mixing trucks), or as otherwise required for the proper operation of the engine.

With the implementation of these emission reduction measures, the dispersion modeling of construction-related air emissions for both on-site and off-site sources determined that the annual-average NO_2, one-hour and eight-hour CO, and 24-hour and annual $PM_{2.5}$ concentrations would be below the corresponding NAAQS and *de minimis* thresholds at the sensitive receptors during peak construction. Construction-related emissions would be reduced outside of the peak construction periods, and would similarly be below the NAAQS and *de minimis* thresholds. Therefore, the Proposed Actions would not result in significant adverse construction impacts in the area of air quality.

Noise

Construction resulting from the Proposed Actions ~~have~~has the potential to result in a temporary significant adverse noise impact. The detailed analysis of construction noise found that project-generated construction has the potential to result in ~~increased maximum quarterly noise levels exceeding the 15 dBA threshold over 12 months at 18 location and exceeding the 20 dBA threshold over three months at 16 locations in worst-case conditions. The project-generated construction would also exceed the CEQR screening threshold of 3 dBA over 24 months at up to 20 locations. Therefore, absent mitigation, project-generated construction noise would result in a temporary significant adverseconstruction noise impact. The analysis was conservatively based on reviewing noise level increases as compared to the existing average L90 noise levels; a further refined analysis, which will include a calibrated modelling of the existing Leq noise levels, will be completed between the draft and final EIS. Mitigations will be developed between the draft and final EIS. During construction of Projected Development Site 1, the Proposed Actions have the potential to result in significant adverse impacts at~~ construction noise levels that exceed the *CEQR Technical Manual* construction noise screening threshold for an extended period of time or the construction noise impact criteria at receptors surrounding the proposed construction work areas at the following properties:

- 185 St Marks Place
- ~~165 St Marks Place~~
- 41 Hamilton Ave
- 47 Hamilton Ave
- 53 Hamilton Ave
- 59 Hamilton Ave
- ~~224 Richmond Terrace~~
- 51 Stuyvesant Place
- 140 Richmond Terrace
- ~~160 Richmond Terrace~~
- ~~1 Hamilton Ave~~
- ~~205 St. Marks Place~~
- 199 St. Marks Place
- ~~198 Richmond Terrace~~

- 36 Hamilton Ave
- 60 Hamilton Ave
- Castleton Park Apartments South Playground
- ~~204 Richmond Terrace~~
- ~~100 Richmond Terrace~~

The increase in noise levels at nearby receptors would primarily be due to noise generated by on-site construction activities (rather than construction-related traffic). This noise analysis examined worst-case hourly noise levels that would result from construction in each analyzed quarter, and ~~represent~~it represents the worst-case increase in noise levels from project-generated construction activities. Typically, the loudest hourly noise level during each quarter of construction would not persist throughout the entire quarter, and would be dependent on the specific construction equipment that would be employed for various construction tasks. ~~Furthermore, the~~ Actual construction-generated noise would be of less magnitude~~, in which case~~ and therefore construction noise would be less intense than this assessment predicts.

There is no potential for project-on-project significant adverse construction impacts. Construction of Projected Development Site 2 would be complete within 5 quarters (15 months), and construction on this site would commence 6 months after construction of Projected Development Site 1 is complete. The construction noise from Projected Development Site 2 would be classified as short-term per CEQR.

11.3 Methodology

This construction assessment follows the guidelines set forth in the *CEQR Technical Manual* and the Final Scope of Work. In the With-Action Condition, the Applicant would construct three buildings on Projected Development Site 1 in a single phase. The Applicant does not control Projected Development Site 2, and would not control when development would occur on this site. To present a conservative assessment, and to analyze the potential for on-site sensitive receptors to exist during construction, this assessment contemplates two construction phases. In Phase 1, Buildings 1-3 would be simultaneously constructed on Projected Development Site 1. Projected Development Site 2 would be constructed in Phase 2, which would commence six month after Phase 1 is complete. In this construction sequence, Buildings 1, 2, and 3 would be occupied by tenants during Phase 2 construction, thereby allowing for a scenario where there is the potential for project-on-project construction effects.

Including development at Projected Development Site 2, construction resulting from the Proposed Actions is projected to last up to 51 months, and new development would be fully operational by the end of 2025 (the “Build Year”). The cumulative construction period would last more than two years, and the longest construction phase would require 30 up to months. Therefore, because construction activities would cumulatively exceed a two year period and would involve the simultaneous construction of multiple buildings, an assessment of the potential for construction activities to result in adverse environmental effects was warranted to examine the potential construction effects in the areas of open space, hazardous materials, transportation, air quality, and noise.

11.4 Preliminary Assessment

Regulatory Agencies and Oversight

Compliance with New York City construction regulations is required regardless of the length of the construction period. In addition to the regulatory requirements, applicants must coordinate with New York City, New York State, and occasionally federal agencies to ensure that effects of construction are reasonably minimized.

New York City Air Pollution Control Code

All projects, whether or not subject to the requirements of CEQR, are required to comply with the New York City Air Pollution Control Code, which regulates fugitive dust under Section 1402.2-9.11, "Preventing Particulate Matter from Becoming Air-Borne; Spraying of Asbestos Prohibited; Spraying of Insulating Material and Demolition Regulated" (Title 24 of the Administrative Code of the City of New York, Chapter 1, Subchapter 6, Section 24-146).

New York City Asbestos Control Program

The purpose of the New York City Asbestos Control Program is to protect public health and the environment by minimizing the emission of asbestos fibers into the air when buildings or structures with asbestos-containing material are renovated, altered, repaired, or demolished by ensuring that asbestos-containing material is handled appropriately and by individuals qualified to do so. The program includes specific procedures that must be followed to control the handling of asbestos during construction. In instances where demolition of an existing building could result in the release of asbestos, all applicable rules and regulations would be followed.

Required Permits from the New York City Department of Transportation's Office of Construction Mitigation and Coordination

Before permits can be issued by the New York City Department of Transportation (DOT) for general construction activity, sidewalk construction, canopy permits, traffic, bicycle detour, and pedestrian access plans must be approved by the DOT Office of Construction Mitigation and Coordination (OCMC). Among other matters, the OCMC-approved pedestrian access plans will identify the extent that any sidewalks and/or crosswalks would be closed or narrowed to allow for construction-related activity and describe how pedestrian access to adjacent land uses and intersections will be maintained.

New York City Noise Control Code

The New York City Noise Control Code, as amended by Local Law 113 of 2005, defines "unreasonable and prohibited noise standards and decibel levels" for the City of New York. The New York City Noise Control Code, Section 24-219, contains rules that prescribe "noise mitigation strategies, methods, procedures, and technology that shall be used at construction sites" when certain construction devices or activities occur. Additionally, the New York City Noise Control Code requires construction activities to occur between 7 AM and 6 PM Monday through Friday. Construction activities occurring outside the permitted days/hours would require an After Hours Variance from the Department of Buildings (DOB).

New York City Procedure for the Avoidance of Damage to Historic Structures

Regulations for the protection of historic structures are found in "Technical Policy and Procedure Notice #10/88, Procedures for the Avoidance of Damage to Historic Structures Resulting from Adjacent Construction When Subject to Controlled Inspection by Section 27-724 and for Any Existing Structure Designated by the Commissioner," issued by DOB. As noted previously, there are no historic structures within 90 feet of the Project Area.

General Construction Practices

Hours of Work

Construction activities will adhere to New York City laws and regulations, which generally permit construction work to begin at 7:00 AM on weekdays, with workers arriving to prepare work areas between 6:00 AM and 7:00 AM. Construction activities would typically cease around 3:30 PM, but on occasion can be extended to finish specific tasks, such as finishing a concrete pour of a floor deck. In the case of an extended workday, construction activities would continue until about 6:00 PM and would only include the workers involved in the task requiring additional work time.

Occasionally, Saturday or overtime hours may be required to complete time-sensitive tasks. A permit from DOB and approval of a noise mitigation plan from the NYC Department of Environmental Protection (DEP) may be required for weekend work. The New York City Noise Control Code limits construction to weekdays between the hours of 7:00 AM and 6:00 PM and sets noise limits for specific pieces of construction equipment. Construction activities occurring after hours may be permitted only to accommodate: (i) emergency conditions; (ii) public safety; (iii) construction projects by or on behalf of city agencies; (iv) construction activities with minimal noise impacts; and (v) undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. Similar to an extended workday during the week, only the workers and equipment needed to complete the specific task during weekend work are required. The typical weekend workday would be on Saturday from 7:00 AM to 5:00 PM, and the level of activity for any weekend work would be less than a normal workday.

Deliveries and Access

The construction site would be fenced off and access would be limited to construction-related activities. Both workers and trucks that are not needed on the construction site would not be granted entry. Additionally, aside from the required workers on site, both security guards and flaggers may be posted as necessary. Security guards may patrol the Project Area after hours and over the weekends to deter unauthorized access. Access points to construction areas would be locked and closed after hours. Dedicated flaggers will be assigned to the work area during deliveries and debris removal as needed.

Material deliveries to the Project Area would be controlled and scheduled, with both workers and trucks required to pass through security points. Flaggers would be posted at each of the entry gates to assist delivery schedules and provide traffic aid when trucks enter and exit the on-street traffic streams.

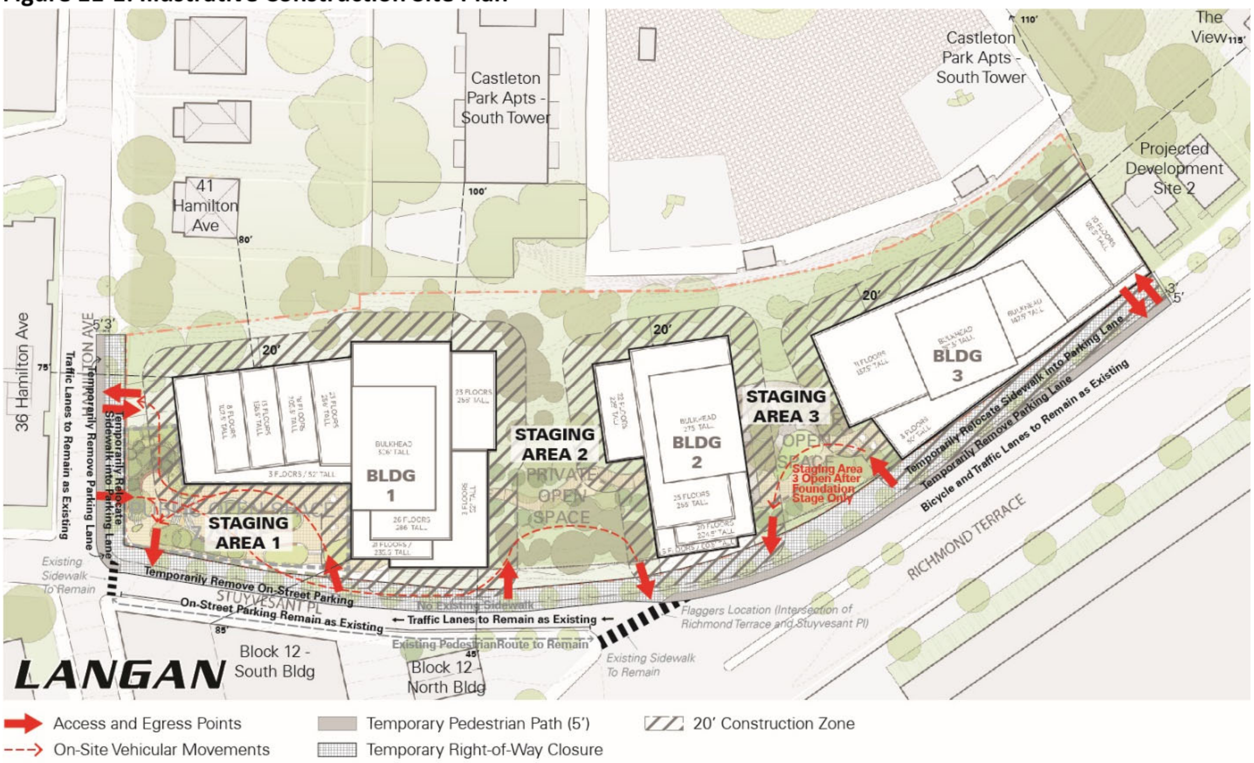
Rodent Control

Construction contracts may include provisions for a rodent control program. Before the start of construction, the contractor would survey and bait the appropriate areas and provide for proper site sanitation as necessary. During construction, the contractor would carry out a maintenance program as necessary and signage on all baiting areas would be posted to protect the community along with coordination with appropriate public agencies. Additionally, only Environmental Protection Agency (EPA) and Department of Environmental Conservation (DEC) registered rodenticides would be permitted. A rodent control program would be required to be implemented in a manner that is not hazardous to the general public, domestic animals, and non-target wildlife.

Construction Site Plan

Figure 11-1 shows the illustrative construction site plan for Projected Development Site 1, the Applicant-owned site.

Figure 11-1: Illustrative Construction Site Plan



Staging Areas

Staging, receiving, and other secondary construction activities would occur on Projected Development Site 1 and in the temporary sidewalk closures along Richmond Terrace, Stuyvesant Place, and Hamilton Avenue along the site's frontage.

As shown in Figure 11-1, Staging Area 1 would be located at the corner of Stuyvesant Place and Hamilton Avenue. Staging Area 2 would be in the vicinity of the intersection of Stuyvesant Place and Richmond Terrace, between Buildings 1 and 2. Staging Area 3 would be between Buildings 2 and 3. Staging Areas 1 and 2 would be available for staging throughout the construction period. Staging Area 3, which would be above the cellar between Buildings 2 and 3, would only become available after the foundation stage is complete.

Trucks would egress the site at the intersection of Richmond Terrace and Stuyvesant Place (Staging Area 2), where flaggers would assist truck traffic onto Richmond Terrace. Trucks and smaller vehicles may occasionally egress to Stuyvesant Place or Hamilton Avenue and use local streets to return to Richmond Terrace.

Construction access would occur on all four sides of Buildings 1 and 2, and on three sides of Building 3. The construction access to multiple sides of the buildings would allow for more efficient construction than buildings of similar size with more limited construction access.

Sidewalk Lanes and Closures

Traffic lanes and sidewalks would be closed or protected during the construction period at varying lengths of time. The New York City Department of Transportation (NYCDOT) OCMC and related office will review and approve all Maintenance and Protection of Traffic (MPT) plans, which will identify any planned sidewalk or lane closures and staging for all construction activities when the MPT plans are available at next stage of the developments. Additionally, coordination with DOT would be necessary to determine the appropriate measures to ensure pedestrian safety surrounding the Project Area, including any potential deployment of Traffic Enforcement Agents (TEAs) if needed.

Depending on the stage of construction, truck movements would generally occur between 6:00 AM and 3:00 PM. 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. Traffic and bicycle lanes would not be narrowed or closed during any point of construction. Due to construction activities, there would be temporary closing of on-street parking and sidewalks, but pedestrian circulation and access would be maintained through the use of a temporary sidewalk. During construction of Projected Development Site 1, the sidewalks and 8-foot-wide on-street parking lanes at the site's frontage along Richmond Terrace, Stuyvesant Place and Hamilton Avenue would be closed to accommodate construction activities. A temporary 5-foot-wide sidewalk would be provided in the parking lane along the site's Richmond Terrace and Hamilton Avenue frontages. Additionally, the use of sidewalk enclosures or sidewalk bridges may be implemented. No temporary sidewalk would be provided along the site's Stuyvesant Place frontage as there were fewer than 25 pedestrians per hour recorded using this sidewalk in the Existing Conditions. In addition, these pedestrians were only recorded using this sidewalk at the south end of the block (close to Hamilton Avenue) while no pedestrians were observed using this sidewalk at the north end of the block (close to Richmond Terrace).

Nearest Sensitive Receptors - Construction Phase 1

In Phase 1, Buildings 1, 2, and 3 would be constructed over a 30-month period, a construction duration classified as "long-term" per CEQR. Building 2 would be situated approximately 50 feet north of Building 1 and approximately 40 feet south of Building 3. Because the proposed three buildings would be constructed concurrently, there would be no potential for project-on-project effects during Phase 1. The nearest sensitive receptors to the proposed buildings are summarized in Table 11-1.

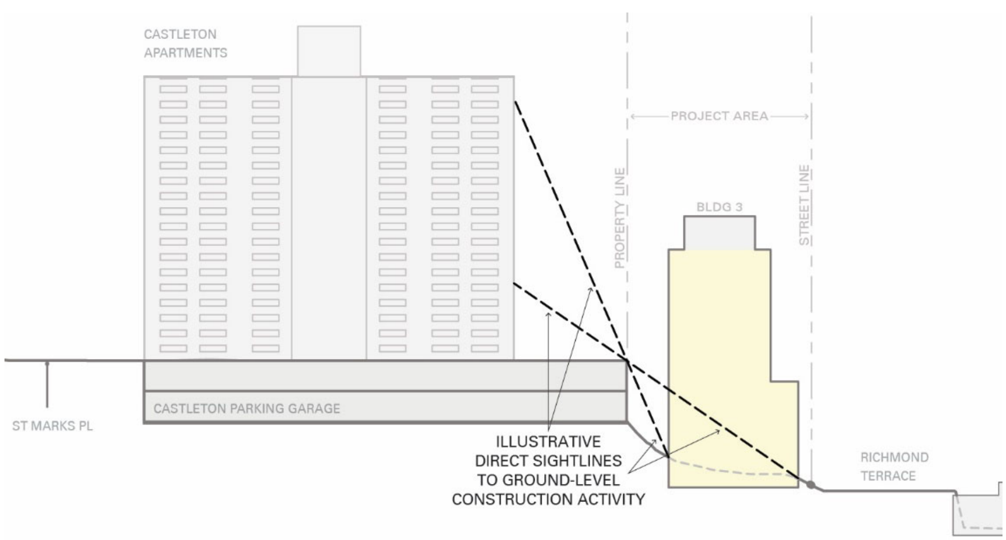
Table 11-1: Nearest Sensitive Receptors by Direction - Buildings

Direction	Nearest Building	Distance from Nearest Proposed Building (approx.)	Description
Northwest	Projected Development Site 2	< 5 feet	Two-story, two- family residence
	The View	115	Multifamily residential building
	Castleton Park Apartments – North Tower	110 feet	Multifamily residential building
West	Castleton Park Apartments – South Tower	100 feet	
Southwest	41 Hamilton Ave	80 feet	Three-story, single- family residence
South	36 Hamilton Ave	75 feet	Multifamily residential building
East	Block 12 – North Building	45 feet	One-story commercial building
	Block 12 – South Building	85 feet	Two-story commercial building

The buildings on Block 12 are across Stuyvesant Place from the development sites do not have windows or doors facing Stuyvesant Place; therefore construction-related air quality and noise effects would be minimal on these buildings.

Other than Building 3, which would be adjacent to Projected Development Site 2, each building's footprint would be more than 45 feet from surrounding sensitive receptors. The Castleton Park Apartments' parking garage (which is not a sensitive receptor per the *CEQR Technical Manual*) and the grade change between the Project Area and the Castleton Park Apartments limits the potential for construction-generated noise to travel along the direct lines of sight between on-the-ground construction activities in the Project Area and the surrounding sensitive receptors farther upland, as illustratively shown in Figure 11-2.

Figure 11-2: Illustrative Sightlines Between Projected Development Sites and Castleton Park Apartments



For illustrative purposes only.
Source: FXCollaborative

The privately-owned publicly accessible open space would be completed as part of the interior fit-out stage for Building 1 and activities would largely be performed with hand held tools, smaller machinery, and manual labor. However, earthwork and site grading for the privately-owned publicly accessible open space would occur during demolition, excavation, dewatering, and foundation. The open space would be used for construction staging during the superstructure and envelope and façade stages.

Primary Construction Stages

Excavation and Foundation

Projected Development Site 1 is largely vacant except for vegetation and remnants of building foundations on Lot 82. The Lot 68 portion of Projected Development Site 2 is vacant; however, Lots 71 and 73 contain two-family residences.

In the No-Action Condition, Site A would remain vacant and Projected Development Site 2 would remain improved with the existing two-family homes. To facilitate development on Development Site B, remnants of building foundations on the site would be demolished. In accordance with Special Hillsides Preservation District zoning provisions and applied policy, vegetation and slope within 15 feet of the building footprint would be removed to facilitate the demolition. Additionally, site preparation and excavation necessary to facilitate the development in the No-Action Condition would commence.

In the With-Action Condition, the tree and slope preservation requirements of the Special Hillsides Preservation District would be removed within the Block 13 portion of the Project Area. Where feasible, existing trees (including their critical root zones) and slope would not be disturbed and would remain as existing conditions. While the Applicant does not control Projected Development Site 2, existing vegetation would be removed on both development sites to facilitate construction. The existing two-family residences on Projected Development Site 2 and the existing building foundations on Site B would be demolished.

Generally, sheeting would be installed to hold back soil around the excavation area and excavators would then be used to remove soil to the appropriate depth. Below-grade elements and foundations would then be built for Buildings 1, 2, and 3 and the development on Projected Development Site 2. Equipment that would be used during the foundation stage includes bar benders, compactors, compressors, front end loaders, dozers, pumps (concrete), impact pile drivers, gradalls, vibratory concrete mixers, and generators. During this construction stage, construction vehicles would include dump trucks, flatbed trucks, pickup trucks, and concrete mix and pump trucks. These trucks would assist the excavation and foundation process through the removal of excavated soil and demolished materials.

Dewatering

The foundations would not be waterproofed until a slab-on-grade is built after excavation is complete, creating the potential for water to accumulate in the excavated area. Water from rain and snow collected in the excavation area during construction would be removed as necessary using a dewatering pump. If dewatering is required, it would be performed in accordance with the New York City Department of Environmental Protection (DEP) sewer use requirements. Testing would be required to protect against contaminated groundwater before it can be discharged into the existing sewer system.

Superstructure

The superstructure of a building includes the building's framework such as beams, slabs, and columns. Construction of the interior structure, or core, of the building would include elevator shafts, vertical risers for mechanical, electrical and plumbing systems, electrical and mechanical rooms, core stairs, and restroom areas. A crane would likely be utilized during the superstructure stage to lift structural components, façade elements, and other large materials.

Superstructure construction activities would typically also require the use of rebar benders, welding equipment and a variety of trucks to support superstructure construction. In addition, temporary construction elevators (hoists) would be used for the vertical movement of workers and materials during superstructure activities.

Envelope and Façade

The superstructure stage of construction would overlap with construction activity on the building envelope and façade. During this stage of construction, the exterior façade would be installed. Façade elements would arrive on trucks and would be lifted into place for attachment.

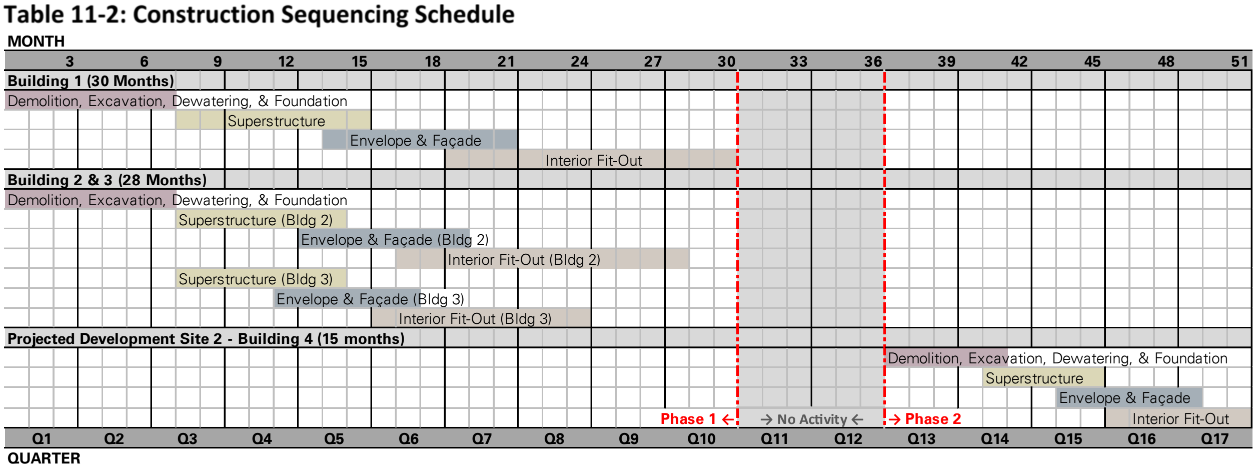
Interior Fit-Out

This final stage of construction would include the construction of interior partitions, installation of lighting fixtures, interior finishes (such as flooring, painting, cabinetry, etc.), and mechanical and electrical work, such as the installation of elevators and lobby finishes. Final cleanup, building system (e.g., electrical system, fire alarm, plumbing, etc.) testing, and inspections would also be part of this stage of construction. Equipment used during interiors and finishing would generally include hoists, forklifts, scissor lifts, delivery trucks, welders, pneumatic (air compressed) tools, and a variety of small hand-held tools. Interior fit-out activities would be limited to the interior of the building, and generally would not require the use of diesel machinery. The interior fit-out stage would generate significantly less heavy duty diesel vehicle trips to the Project Area than the excavation and superstructure phases. The use of heavy machinery would also be minimal during this construction stage, thereby limiting the noise and air effects on the surroundings.

Construction Sequencing and Staging

The construction schedule is presented below in Table 11-2 and reflects the Applicant's schedule of construction activities at the site, as well as an assumption of the construction activities that would occur on Projected Development Site 2, which is not under control of the Applicant.

Table 11-2: Construction Sequencing Schedule



Construction activities in the Project Area would occur in two phases. Altogether, it is projected that construction activities would occur in two separate phases over a period of 51 months, including a six-month gap between the phases. Phase 1 of construction would occur over an approximately 30-month period, while Phase 2 would occur over an approximately 15-

month period. It is anticipated that Buildings 1, 2, and 3 would be constructed simultaneously, followed by the construction of Projected Development Site 2.

Demolition, Excavation, Dewatering, and Foundation

As shown in Table 11-2, demolition, excavation, dewatering, and foundation for Building 1 would occur over an approximately seven month period. Activities related to the demolition, excavation, dewatering, and foundation for Buildings 2 and 3 would occur over an approximately six and four month period, respectively, beginning after the completion of the foundation for Building 1. The equipment used for this stage would remain on site and would be re-deployed for Buildings 2 and 3 after foundation activities have concluded for Building 1. Construction during this stage would be limited to on-the-ground activities, and the change in topography to the west would minimize the available direct sightlines between the construction area and surrounding sensitive receptors farther upland, thereby limiting the typical noise effects of construction on the surrounding receptors.

Site grading, including for the proposed privately-owned publicly accessible open space, would be undertaken as a part of this stage. For the construction of Building 1, construction materials would be staged where the open space is planned. For Buildings 2 and 3, construction materials would be staged between Building 2 and Building 3, and on the Castleton panhandle.

Superstructure

Immediately following the completion of excavation and foundation, the superstructure stage for each building would commence. Construction of the superstructure for Buildings 1 and 2 would occur over an eight and seven month periods, respectively. Construction of the superstructure for Building 3, which would be 15 stories shorter than Building 1, would occur over a seven month period. During this stage, direct sightlines between construction work and residences on the lower levels of the Castleton Park Apartments would become available as the superstructure exceeds the elevation of the Castleton Park Apartments' parking garage.

Envelope and Façade

Construction of the envelope and façade of Buildings 1 and 2 would occur over eight- and seven-month periods, and the construction of the envelope and façade of Building 3 would occur over a six month period. For all buildings on Projected Development Site 1, construction of the envelope and façade would partially overlap with the superstructure stage. Envelope and façade construction would commence after six months of the superstructure stage for Building 1. For Building2, construction of the envelope and façade would commence after five months of the superstructure stage. For Building 3, construction of the envelope and façade would commence after four months of the superstructure stage. For Buildings 1 and 2, the envelope and façade construction stages would overlap for a period of two months with the superstructure stage while Building 3 would overlap for a period of three months.

Interior Fit-Out

Lastly, the interior fit-out of Buildings 1 and 2 would occur over a 12-month period and the interior fit-out for Building 3 would occur over a nine-month period. The interior fit-out stage would require the least amount of heavy machinery and mostly comprise of work that can be completed with hand tools such as painting, assembling cabinetry, or affixing finishes. Within all three buildings, interior fit-out activities would partially overlap with the envelope and façade stage. Interior fit-out activities would commence after five and four months of the envelope and façade stage for Building 1, and Buildings 2 and 3, respectively, overlapping with the envelope and façade stage for a period of two months for each building. The proposed privately-owned, publicly accessible open space on Lot 100 would be completed during this stage (except for earthworks, which would be completed in the demolition, excavation, dewatering, and foundation stage).

Construction Summary – Phase 2

Upon completion of Phase 1 there would be a six-month gap before Phase 2 construction would commence. Buildings 1, 2, and 3 would be occupied in this period, prior to start of Phase 2. Phase 2 of construction would consist of the development of Projected Development Site 2 over a 15 month period. Projected Development Site 2 is adjacent to Building 3 and The View, and is approximately 100 linear feet east of the Castleton Apartments. Building 3 would be an intervening building between the construction activities on Projected Development Site 2 and Buildings 1 and 2. Projected Development Site 2 would be more than 400 feet from Building 1.

Similar to Phase 1 construction, the Castleton Park Apartments' parking garage and the grade change in the Project Area minimizes the direct sight lines available between the Castleton Park Apartments' residences and the on-the-ground construction activities in the Project Area.

In Phase 2, Building 3 would have already been constructed and while construction activities would occur to the north of Building 3, the construction effects on Building 3 would be short-term (less than 24 months) and typical of new development.

Demolition, Excavation, Dewatering, and Foundation

Phase 2 would commence approximately six months after the completion of Phase 1 construction. Demolition, excavation, dewatering, and foundation for Projected Development Site 2 would occur over an approximately five month period. Building 3 would be occupied with residential and commercial tenants during the demolition, excavation and foundation phase for Projected Development 2. The construction activities in this stage would be limited to on-the-ground activities, where direct sightlines between construction activities and sensitive receptors at the Castleton Apartments are limited, thereby reducing the construction effects on upland sensitive receptors (see Figure 11-2).

Projected Development Site 2 is partially vacant and contains existing structures that would require demolition prior to excavation. The Lot 68 portion being vacant allows demolition access to the existing two two-family residences on Projected Development Site 2 from Richmond Terrace and Lot 68.

Superstructure

Following the five months of excavation and foundation, the superstructure of Projected Development Site 2 would be constructed over a five-month period. During this phase, direct sight lines would become available between construction areas and residences at lower levels of the Castleton Park Apartments as the superstructure's elevation exceeds that of the Castleton Park Apartments parking garage.

Envelope and Façade

Construction of the envelope and façade of Projected Development Site 2 would occur over a six-month period. Construction of the envelope and façade of Projected Development Site 2 overlap with the final two months of the superstructure stage.

Interior Fit-Out

Lastly, the interior fit-out activities on Projected Development Site 2 would occur over a six-month period. Interior fit-out activities would partially overlap with the final four months of the envelope and façade stage.

Summary of Construction Duration

Phase 1 construction would last 30 months, which includes 30 months to construct Building 1, 28 months to construct Building 2, and 24 months to construct Building 3. After 24 months, all three buildings would be in the interior fit-out stage, when construction effects are significantly less than other stages.

Phase 2 would commence approximately six months after the completion of Phase 1. Phase 2 would consist of 15 months of construction, a duration classified as short-term per CEQR. Therefore, the most intensive construction activities would occur during Phase 1, and the detailed construction assessment analyzed the effects of Phase 1 as worst-case conditions.

Open Space

As part of construction Phase 1, a 7,790 sf privately owned, publicly accessible open space would be developed during Phase 1. This privately-owned publicly accessible open space would be open upon completion of Phase 1 and would not be available for staging during construction Phase 2. The open space would remain open to the public upon completion. Phase 2 construction activities would occur more than 400 feet away from this open space, with Buildings 1, 2, and 3 precluding direct sightlines between the construction on Projected Development Site 2 and this project-generated open space. Therefore, the construction effects on the open space would not result in a significant adverse construction impacts, and no further assessment is warranted.

Hazardous Materials

As described in Chapter 4, "Hazardous Materials," an (E)-Designation would be placed on both projected development sites. The (E)-Designations would preclude the potential for significant adverse hazardous materials impacts during construction on these sites. If warranted, the appropriate remedial measures would be defined and enforced by the Mayor's Office of Environmental Remediation (OER) prior to the start of construction. Accordingly, with the proposed (E)-Designation in place, significant adverse construction impacts related to hazardous materials would be precluded, and no further assessment of construction with regard to hazardous materials is warranted.

The Applicant is applying to enroll Projected Development Site 1 in the Brownfield Cleanup Program (BCP) administered by the New York State Department of Environmental Conservation (DEC). The status of the BCP application will be updated between the DEIS and FEIS.

11.5 Detailed Assessment

According to *CEQR Technical Manual* guidelines, a construction assessment evaluates the temporary effects of construction activities on open space, hazardous materials, transportation, air quality, and noise. The cumulative construction period would be approximately 51 months during which multiple buildings would be constructed concurrently. The preliminary assessment indicated significant adverse construction impacts would not occur in the areas of open space and hazardous materials. Therefore, this detailed construction assessment analyzed the construction effects in the area transportation, air quality, and noise. Phase 1 was selected as the worst-case conditions for construction effects because three larger buildings would be constructed concurrently in a concentrated area, and construction activities in Phase 2 would be classified as short-term per CEQR.

Transportation

The analysis of construction transportation conditions assesses the potential for significant adverse impacts to traffic, transit, pedestrians and parking in the study area during the construction resulting from the Proposed Actions. The analysis is based on a study of peak worker and truck trips on a quarter-by-quarter basis, taking into account worker modal splits, vehicle occupancy and trip distribution, truck Passenger Car Equivalents (PCEs) and arrival/departure patterns. Therefore, the quarter with the highest estimated construction trip generation was selected for analysis.

Construction Trip Generation

The estimated average number of daily workers and material deliveries for each quarter of Phase 1 construction are shown in Table 11-3. The average number of workers on-site per day would be approximately 230, with the peak reaching an average of approximately 462 workers per day in the seventh quarter of construction (Q7). The average number of truck deliveries per day would be approximately 37, with the peak reaching an average of approximately 71 deliveries per day in the fourth quarter of construction (Q4).

Table 11-3: Average Number of Daily Workers and Truck Deliveries by Quarter

Quarter	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Peak	Average
Workers	60	60	110	155	325	390	462	360	250	123	462	230
Trucks	27	27	55	71	69	30	34	26	18	12	71	37

Source: Omnibuild and Madison Realty Capital

Peak Daily Worker Trips and Truck Deliveries

The daily worker and truck trip projections in the peak quarter were used as the basis for estimating peak hour construction trips. As shown in Table 11-3, it is expected that construction of the Proposed Project would generate the highest number of daily trips in Q7, with an average of approximately 462 workers and 34 truck deliveries per day.

Construction Worker Modal Split and Vehicle Occupancy

The construction worker modal split was obtained from the *Bay Street Rezoning and Related Actions FEIS* (CEQR No. 16DCP156R), which used the 2000 and 2010 U.S. Census Bureau Reverse Journey-to-Work (RJTW) data for the construction and excavation industry for census tracts in St. George and Tompkinsville, Richmond County. Modal splits of 67 percent by auto, 0 percent by taxi, 30 percent by transit and 3 percent by walk; and an average vehicle occupancy of 1.19 persons per vehicle are expected for construction workers commuting to/from the Project Site.

Traffic

Peak Hour Construction Vehicle Trips

The majority of construction activities at Projected Development Site would occur from 7:00 AM to 3:30 PM. While construction truck trips would occur throughout the day (with more trips during the early morning period), and most trucks would remain in the area for short durations, construction workers would commute during the hours before and after the work shift. For analysis purposes, each truck delivery was assumed to result in two trips during the same hour (one "in" and one "out"), whereas each worker vehicle was assumed to arrive near the work shift start hour and depart near the work shift end hour. Furthermore, in accordance with the *CEQR Technical Manual*, the traffic analysis assumed that each truck delivery has a PCE of 2.

The estimated daily vehicle trips for Q7 were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns for construction workers and trucks. For construction workers, the majority (approximately 80 percent) of the arrival and departure trips would take place during the hour before and after each work shift, respectively. Construction truck deliveries typically peak during the hour before each shift (25 percent), overlapping with construction worker arrival traffic. The hourly trip projections for the peak construction quarter (Q7) for the Proposed Project are shown in Table 11-4, which indicates that during Q7, the construction-generated peak hour vehicle trips would total approximately 230 and 210 PCEs in the weekday AM (6:00 AM – 7:00 AM) and weekday PM (3:00 PM – 4:00 PM) construction peak hours, respectively. The construction-generated vehicle trips (in PCEs) would exceed the *CEQR Technical Manual* screening threshold of 50 peak hour vehicle trips during both the weekday AM and PM construction peak hours.

Table 11-4: Hourly Vehicle Trip Projections during Peak Quarter (Q7) of Construction

										Total					
	Auto Trips			Pick-Up Truck Trips			Truck Trips			Vehicle Trips			PCE Trips		
Hour	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
6:00 AM - 7:00 AM	208	0	208	6	6	12	3	3	5	216	8	225	219	11	230
7:00 AM - 8:00 AM	52	0	52	2	2	5	1	1	2	55	3	59	56	4	61
8:00 AM - 9:00 AM	0	0	0	2	2	5	1	1	2	3	3	7	4	4	9
9:00 AM - 10:00 AM	0	0	0	2	2	5	1	1	2	3	3	7	4	4	9
10:00 AM - 11:00 AM	0	0	0	2	2	5	1	1	2	3	3	7	4	4	9
11:00 AM - 12:00 PM	0	0	0	2	2	5	1	1	2	3	3	7	4	4	9
12:00 PM - 1:00 PM	0	0	0	2	2	5	1	1	2	3	3	7	4	4	9
1:00 PM - 2:00 PM	0	0	0	1	1	2	1	1	1	2	2	3	2	2	4
2:00 PM - 3:00 PM	0	13	13	1	1	2	1	1	1	2	15	16	2	15	17
3:00 PM - 4:00 PM	0	208	208	1	1	1	0	0	1	1	209	210	1	209	210
4:00 PM - 5:00 PM	0	39	39	1	1	1	0	0	1	1	40	41	1	40	41

Notes:
1. Hourly construction worker and truck trips were derived from an estimated quarterly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (one "in" and one "out").
2. In and Out volumes may not sum to total due to rounding.

The construction-generated vehicle trips (in PCEs) were assigned to the study area intersections to determine which locations would experience construction-generated vehicle trips ~~exceeeding~~ exceeding the *CEQR Technical Manual* threshold for conducting detailed traffic analysis. The construction worker vehicle trips were conservatively assigned to the nearest public off-street garage on Richmond Terrace, opposite Nicholas Street, while pick-up truck trips were assigned to the Project Site construction driveways located (i) adjacent to the Richmond Terrace/Stuyvesant Place intersection and (ii) off of Hamilton Avenue, just west of Stuyvesant Place. The construction truck delivery trips were assigned to Projected Development Site 1's driveways via ~~New York City Department of Transportation (~~NYCDOT~~)~~-designated truck routes in the area. Using these distribution patterns, the total construction-generated vehicle trips (in PCEs) were assigned to the study area intersections for the weekday AM and PM construction peak hours (see Appendix F2 – Figures F2-1 and F2-2). Based on these assignments, the following seven study area intersections could experience 50 or more peak hour vehicle trips, and were selected for detailed traffic analysis:

1. Richmond Terrace and Jersey Street;
2. Richmond Terrace and Westervelt Avenue;
3. Richmond Terrace and Nicholas Street/Parking Garage Driveway;
4. Richmond Terrace and Stuyvesant Place;
5. Hamilton Avenue and Richmond Terrace;
6. Wall Street and Richmond Terrace; and
7. Bay Street and Victory Boulevard.

Existing Conditions

Existing traffic volumes for the construction study intersections were established based on TMC and ATR data collected at the study intersections as part of the operational traffic analysis (see Chapter 5, "Transportation"). Based on a comparison of 8:00 AM – 9:00 AM peak hour operational volumes to the early morning traffic levels based on the ATR counts, the 6:00 AM – 7:00 AM weekday morning construction peak hour volumes were determined for the seven intersections.

The weekday 3:00 PM – 4:00 PM construction peak hour volumes were based on the existing traffic counts collected during this period as part of the operational traffic analysis.

The Existing Conditions traffic volumes for the weekday AM and PM construction peak hours are shown in Appendix F2 – Figures F2-3 and F2-4, respectively. The Existing Conditions intersection capacity results – including v/c ratios, delays and LOS for the construction study intersections – are shown in Table 11-5.

Table 11-5: Existing Conditions – LOS Summary

ID	Intersection Name	Control	Street Name	Direction	Lane Group	Weekday AM Construction v/c ratio	Weekday AM Construction Delay (sec)	Weekday AM Construction LOS	Weekday PM Construction v/c ratio	Weekday PM Construction Delay (sec)	Weekday PM Construction LOS
1	Richmond Terrace & Jersey Street	Signal	Richmond Terrace	EB	L	0.11	15.2	B	0.02	16.5	B
					TR	0.75	26.2	C	0.52	17.6	B
				WB	L	0.06	20.8	C	0.07	16.9	B
					TR	0.66	32.2	C	0.84	36.9	D
			Jersey Street	NB	L	0.08	25.0	C	0.21	28.8	C
					TR	0.16	36.9	D	0.20	37.1	D
				SB	L	0.02	24.4	C	0.01	26.2	C
					TR	0.03	34.9	C	0.03	34.1	C
			Overall Intersection			-	*28.3*	*C*	-	*29.0*	*C*
2	Richmond Terrace & Westervelt Avenue	Signal	Richmond Terrace	EB	TR	0.80	21.4	C	0.58	15.4	B
				WB	LT	0.34	12.5	B	0.41	13.3	B
			Westervelt Avenue	NB	LR	0.28	33.0	C	0.48	37.6	D
			Overall Intersection			-	*20.0*	*B*	-	*18.5*	*B*
3	Nicholas Street & Richmond Terrace	Signal	Nicholas Street	EB	LTR	0.16	30.8	C	0.15	30.8	C
			Wheel Driveway	WB	LR	0.02	29.0	C	0.08	29.7	C
			Richmond Terrace	NB	UTR	0.23	11.0	B	0.29	6.6	A
				SB	LTR	0.35	12.2	B	0.25	11.3	B
			Overall Intersection			-	*13.5*	*B*	-	*11.2*	*B*
4	Stuyvesant Place & Richmond Terrace	TWSC[1]	Richmond Terrace	NB	L	0.03	9.0	A	0.03	8.9	A
				SB	TR	-	0.0	A	-	0.0	A
			Overall Intersection			-	*Note 3*	*Note 3*	-	*Note 3*	*Note 3*
5	Hamilton Avenue & Richmond Terrace	Signal	Richmond Terrace	NB	LT	0.31	11.9	B	0.37	7.8	A
				SB	TR	0.26	6.4	A	0.23	11.4	B
			Overall Intersection			-	*9.0*	*A*	-	*9.3*	*A*
6	Wall Street & Richmond Terrace	Signal	Wall Street	EB	LTR	0.46	43.3	D	0.40	41.7	D
			Empire Mall Driveway	WB	LR	0.03	25.7	C	0.02	22.5	C
			Richmond Terrace	NB	TR	0.20	13.0	B	0.28	16.3	B
				SB	LT	0.31	9.3	A	0.27	16.2	B
			Overall Intersection			-	*16.1*	*B*	-	*19.6*	*B*
7	Victory Boulevard & Bay Street	Signal	Victory Boulevard	EB	L	0.54	54.4	D	0.22	30.4	C
					LT	0.60	56.9	E	0.24	30.6	C
				WB	LTR	0.11	41.6	D	0.17	27.9	C
			Bay Street	NB	L	0.20	20.3	C	0.92	88.5	F
					TR	0.38	21.4	C	0.57	30.2	C
				SB	LT	0.29	20.2	C	0.62	31.0	C
					R	0.20	7.8	A	0.31	11.5	B
			Overall Intersection			-	*25.7*	*C*	-	*32.7*	*C*

Notes:
1. Two-Way Stop-Controlled
2. All-Way Stop-Controlled
3. Intersection delay and LOS information are not provided by HCS.

In summary, of the 30 total intersection approaches/lane groups in the construction study area, 3 would operate worse than mid-LOS D in at least one peak hour:

- The eastbound left-turn at the Victory Boulevard and Bay Street intersection (LOS D with average delay of 54.4 seconds during the weekday AM construction peak hour).
- The eastbound left-through movement at the Victory Boulevard and Bay Street intersection (LOS E with average delay of 56.9 seconds during the weekday AM construction peak hour).
- The northbound left-turn at the Victory Boulevard and Bay Street intersection (LOS F with average delay of 88.5 seconds during the weekday PM construction peak hour).

No-Action Condition (2023)

As discussed in Chapter 5, "Transportation," construction of an exclusive northbound right-turn lane on Richmond Terrace at Wall Street is planned as part of the *St. George Waterfront Redevelopment FEIS*. This public roadway infrastructure change was incorporated in to the No-Action Condition for the construction traffic analysis.

It is assumed that the peak construction quarter resulting from the Proposed Actions (i.e. Q7) would occur in 2023. A compounded annual background growth rate of 0.50 percent for St. George (Staten Island) was applied to the existing traffic volumes for four years (2019 through 2023). In addition, the trips generated by the No-Build Development Projects identified in Chapter 5, "Transportation," were layered on top of the existing traffic volumes and background growth to form the No-Action Condition traffic volumes for the weekday AM and PM construction peak hours.

The No-Action Condition traffic volumes for the weekday AM and PM construction peak hours are shown in Appendix F2 – Figures F2-5 and F2-6, respectively. The No-Action Condition intersection capacity results – including v/c ratios, delays and LOS for the construction study intersections – are shown in Table 11-6.

Table 11-6: No-Action Condition – LOS Summary

ID	Intersection Name	Control	Street Name	Direction	Lane Group	Weekday AM Construction v/c ratio	Weekday AM Construction Delay (sec)	Weekday AM Construction LOS	Weekday PM Construction v/c ratio	Weekday PM Construction Delay (sec)	Weekday PM Construction LOS
1	Richmond Terrace & Jersey Street	Signal	Richmond Terrace	EB	L	0.00	16.0	B	0.01	25.4	C
					TR	0.89	36.8	D	0.73	23.8	C
				WB	L	0.22	25.4	C	0.28	20.9	C
					TR	0.82	40.1	D	1.14	107.6	F
			Jersey Street	NB	L	0.08	25.0	C	0.22	28.9	C
					TR	0.21	37.9	D	0.32	39.6	D
				SB	L	0.00	24.1	C	0.00	26.1	C
					TR	0.00	34.5	C	0.00	33.8	C
			Overall Intersection			-	*37.5*	*D*	-	*65.9*	*E*
2	Richmond Terrace & Westervelt Avenue	Signal	Richmond Terrace	EB	TR	0.96	31.4	C	0.84	26.6	C
				WB	LT	0.46	14.3	B	0.62	17.3	B
			Westervelt Avenue	NB	LR	0.29	33.1	C	0.50	38.0	D
			Overall Intersection			-	*26.0*	*C*	-	*24.0*	*C*
3	Nicholas Street & Richmond Terrace	Signal	Nicholas Street	EB	LTR	0.16	30.8	C	0.16	30.8	C
			Wheel Driveway	WB	LR	0.08	29.8	C	0.12	30.3	C
			Richmond Terrace	NB	UTR	0.31	11.8	B	0.45	7.8	A
				SB	LTR	0.49	14.3	B	0.42	13.2	B
			Overall Intersection			-	*14.9*	*B*	-	*12.1*	*B*
4	Stuyvesant Place & Richmond Terrace	TWSC[1]	Richmond Terrace	NB	L	0.03	9.3	A	0.04	9.6	A
				SB	TR	-	0.0	A	-	0.0	A
			Overall Intersection			-	*Note 3*	*Note 3*	-	*Note 3*	*Note 3*
5	Hamilton Avenue & Richmond Terrace	Signal	Richmond Terrace	NB	LT	0.40	12.9	B	0.56	9.0	A
				SB	TR	0.32	6.8	A	0.37	13.0	B
			Overall Intersection			-	*9.8*	*A*	-	*10.7*	*B*
6	Wall Street & Richmond Terrace	Signal	Wall Street	EB	LTR	0.45	42.8	D	0.41	42.2	D
			Empire Mall Driveway	WB	LR	0.97	76.7	E	1.27	175.8	F
			Richmond Terrace	NB	T	0.22	13.1	B	0.36	17.3	B
					R	0.37	15.8	B	1.08	95.9	F
				SB	LT	0.48	11.3	B	0.69	25.2	C
			Overall Intersection			-	*29.1*	*C*	-	*74.5*	*E*
7	Victory Boulevard & Bay Street	Signal	Victory Boulevard	EB	L	0.70	63.1	E	0.49	35.9	D
					LT	0.76	67.6	E	0.50	36.1	D
				WB	LTR	0.11	41.6	D	0.18	27.9	C
			Bay Street	NB	L	0.40	25.0	C	1.92	490.7	F
					TR	0.51	23.6	C	1.03	71.0	E
				SB	LT	0.38	21.5	C	1.18	124.8	F
					R	0.26	8.4	A	0.68	19.4	B
			Overall Intersection			-	*28.6*	*C*	-	*101.3*	*F*

Notes:
1. Two-Way Stop-Controlled
2. All-Way Stop-Controlled
3. Intersection delay and LOS information are not provided by HCS.

In summary, of the 31 total intersection approaches/lane groups in the construction study area, 8 would operate worse than mid-LOS D in at least one peak hour:

- The westbound through-right movement at the Richmond Terrace and Jersey Street intersection (LOS F with average delay of 107.6 seconds during the weekday PM construction peak hour).
- The westbound approach at the Wall Street and Richmond Terrace intersection (LOS E with average delay of 76.7 seconds during the weekday AM construction peak hour and LOS F with average delay of 175.8 seconds during the weekday PM construction peak hour).
- The northbound right-turn at the Wall Street and Richmond Terrace intersection (LOS F with average delay of 95.9 seconds during the weekday PM construction peak hour).

- The eastbound left-turn at the Victory Boulevard and Bay Street intersection (LOS E with average delay of 63.1 seconds during the weekday AM construction peak hour).
- The eastbound left-through movement at the Victory Boulevard and Bay Street intersection (LOS E with average delay of 67.6 seconds during the weekday AM construction peak hour).
- The northbound left-turn at the Victory Boulevard and Bay Street intersection (LOS F with average delay of 490.7 seconds during the weekday PM construction peak hour).
- The northbound through-right movement at the Victory Boulevard and Bay Street intersection (LOS E with average delay of 71.0 seconds during the weekday PM construction peak hour).
- The southbound left-through movement at the Victory Boulevard and Bay Street intersection (LOS F with average delay of 124.8 seconds during the weekday PM construction peak hour).

With-Action Condition (2023)

In the With-Action Condition, the construction-generated peak hour vehicle trips (see Table 11-4) were assigned to the construction study intersections as described previously (see section *Peak Hour Construction Vehicle Trips*). The construction-generated peak hour vehicle trip assignments are shown in Appendix F2 – Figures F2-7 and F2-8 for the weekday AM and PM construction peak hours, respectively.

The With-Action Condition traffic volumes were projected by layering the construction-generated vehicle trip assignments on to the No-Action Condition traffic volumes. The With-Action Condition traffic volumes are shown in Appendix F2 – Figures F2-9 and F2-10 for the weekday AM and PM construction peak hours, respectively.

The With-Action Condition intersection capacity analysis results – including v/c ratios, delays and LOS for the construction study intersections – are shown in Table 11-7.

Table 11-7: With-Action Condition – LOS Summary

ID	Intersection Name	Control	Street Name	Direction	Lane Group	Weekday AM Construction v/c ratio	Weekday AM Construction Delay (sec)	Weekday AM Construction LOS	Weekday PM Construction v/c ratio	Weekday PM Construction Delay (sec)	Weekday PM Construction LOS
1	Richmond Terrace & Jersey Street	Signal	Richmond Terrace	EB	L	0.00	16.0	B	0.01	25.4	C
					TR	0.98	51.8	D	0.73	23.8	C
				WB	L	0.36	34.0	C	0.42	24.5	C
					TR	0.83	40.3	D	1.25	152.4	F
			Jersey Street	NB	L	0.08	25.0	C	0.22	28.9	C
					TR	0.22	38.0	D	0.32	39.6	D
				SB	L	0.00	24.1	C	0.00	26.1	C
					TR	0.00	34.5	C	0.00	33.8	C
			Overall Intersection			-	*46.1*	*D*	-	*89.8*	*F*
2	Richmond Terrace & Westervelt Avenue	Signal	Richmond Terrace	EB	TR	1.06	56.5	E	0.84	26.6	C
				WB	LT	0.46	14.3	B	0.77	22.5	C
			Westervelt Avenue	NB	LR	0.36	34.6	C	0.50	38.0	D
			Overall Intersection			-	*41.6*	*D*	-	*26.0*	*C*
3	Nicholas Street & Richmond Terrace	Signal	Nicholas Street	EB	LTR	0.23	32.0	C	0.17	31.2	C
			Wheel Driveway	WB	LR	0.09	29.9	C	0.73	47.5	D
			Richmond Terrace	NB	UTR	0.38	12.6	B	0.45	7.8	A
				SB	LTR	0.71	19.7	B	0.42	13.2	B
			Overall Intersection			-	*18.3*	*B*	-	*17.9*	*B*
4	Stuyvesant Place & Richmond Terrace	TWSC[1]	Richmond Terrace	NB	L	0.04	10.2	B	0.05	11.2	B
				SB	TR	-	0.0	A	-	0.0	A
			Overall Intersection			-	*Note 3*	*Note 3*	-	*Note 3*	*Note 3*
5	Hamilton Avenue & Richmond Terrace	Signal	Richmond Terrace	NB	LT	0.47	13.9	B	0.57	9.2	A
				SB	TR	0.32	6.8	A	0.43	13.7	B
			Overall Intersection			-	*10.6*	*B*	-	*11.3*	*B*
6	Wall Street & Richmond Terrace	Signal	Wall Street	EB	LTR	0.46	43.2	D	0.43	42.7	D
			Empire Mall Driveway	WB	LR	0.99	82.2	F	1.29	182.8	F
			Richmond Terrace	NB	T	0.27	13.7	B	0.36	17.3	B
					R	0.37	15.8	B	1.09	99.9	F
				SB	LT	0.51	11.7	B	0.77	28.7	C
			Overall Intersection			-	*29.7*	*C*	-	*76.0*	*E*
7	Victory Boulevard & Bay Street	Signal	Victory Boulevard	EB	L	0.70	63.1	E	0.49	35.9	D
					LT	0.76	67.6	E	0.50	36.1	D
				WB	LTR	0.11	41.6	D	0.18	27.9	C
			Bay Street	NB	L	0.40	25.1	C	1.92	490.7	F
					TR	0.57	24.8	C	1.03	71.0	E
				SB	LT	0.39	21.6	C	1.29	172.5	F
					R	0.26	8.4	A	0.68	19.4	B
			Overall Intersection			-	*28.8*	*C*	-	*120.8*	*F*

Notes:
1. Two-Way Stop-Controlled
2. All-Way Stop-Controlled
3. Intersection delay and LOS information are not provided by HCS.
4. Shading denotes a potentially significant adverse traffic impact.

In summary, of the 31 total intersection approaches/lane groups in the study area, the following 11 would operate worse than mid-LOS D in at least one peak hour:

- The eastbound through-right movement of Richmond Terrace at Jersey Street, which would:
    - Continue to operate at LOS D with an average delay of 51.8 seconds during the weekday AM construction peak hour, an increase of 15.0 seconds relative to the No-Action Condition.

- The westbound through-right movement of Richmond Terrace at Jersey Street, which would:
    - Continue to operate at LOS F with an average delay of 152.4 seconds during the weekday PM construction peak hour, an increase of 44.8 seconds relative to the No-Action Condition.
- The eastbound approach of Richmond Terrace at Westervelt Avenue, which would:
    - Drop from LOS C to LOS E with an average delay of 56.5 seconds during the weekday AM construction peak hour, an increase of 25.1 seconds relative to the No-Action Condition.
- The westbound approach of the Parking Garage Driveway/Nicholas Street at Richmond Terrace, which would:
    - Drop from LOS C to LOS D with an average delay of 47.5 seconds during the weekday PM construction peak hour, an increase of 17.2 seconds relative to the No-Action Condition.
- The westbound approach of the Empire Mall Driveway at Richmond Terrace, which would:
    - Drop from LOS E to LOS F with an average delay of 82.2 seconds during the weekday AM construction peak hour, an increase of 5.5 seconds relative to the No-Action Condition.
    - Continue to operate at LOS F with an average delay of 182.8 seconds during the weekday PM construction peak hour, an increase of 7.0 seconds relative to the No-Action Condition.
- The northbound right-turn of Richmond Terrace at Wall Street, which would:
    - Continue to operate at LOS F with an average delay of 99.9 seconds during the weekday PM construction peak hour, an increase of 4.0 seconds relative to the Future No-Action Condition.
- The eastbound left-turn of Victory Boulevard at Bay Street, which would:
    - Continue to operate at LOS E with an average delay of 63.1 seconds during the weekday AM construction peak hour, no change in delay relative to the No-Action Condition.
- The eastbound left-through movement of Victory Boulevard at Bay Street, which would:
    - Continue to operate at LOS E with an average delay of 67.6 seconds during the weekday AM construction peak hour, no change in delay relative to the No-Action Condition.
- The northbound left-turn of Bay Street at Victory Boulevard, which would:
    - Continue to operate at LOS F with an average delay of 490.7 seconds during the weekday PM construction peak hour, no change in delay relative to the No-Action Condition.
- The northbound through-right movement of Bay Street at Victory Boulevard, which would:
    - Continue to operate at LOS E with an average delay of 71.0 seconds during the weekday PM construction peak hour, no change in delay relative to the No-Action Condition.

- The southbound left-through movement of Bay Street at Victory Boulevard, which would:
  - Continue to operate at LOS F with an average delay of 172.5 seconds during the weekday PM construction peak hour, an increase of 47.7 seconds relative to the No-Action Condition.

Furthermore, the following seven study area intersection approaches/lane groups could experience potentially significant adverse traffic impacts during at least one peak hour as a result of construction activities associated with the Proposed Project:

- The eastbound through-right movement of Richmond Terrace at Jersey Street during the weekday AM construction peak hour.
- The westbound through-right movement of Richmond Terrace at Jersey Street during the weekday PM construction peak hour.
- The eastbound approach of Richmond Terrace at Westervelt Avenue during the weekday AM construction peak hour.
- The westbound approach of the Parking Garage Driveway/Nicholas Street at Richmond Terrace during the weekday PM construction peak hour.
- The westbound approach of the Empire Mall Driveway at Richmond Terrace during the weekday AM and PM construction peak hours.
- The northbound right-turn of Richmond Terrace at Wall Street during the weekday PM construction peak hour.
- The southbound left-through movement of Bay Street at Victory Boulevard during the weekday PM construction peak hour.

Chapter 13, "Mitigation," discusses potential measures to mitigate these potentially significant adverse traffic impacts.

Transit

The peak number of average daily workers on-site during the construction of the Proposed Project would occur in Q7, when there would be approximately 462 construction workers per day (see Table 11-3). As discussed previously (see section *Construction Worker Modal Split and Vehicle Occupancy*), approximately 30 percent of the daily construction workers are expected to commute to/from the Project Site via public transit. Therefore, project-generated construction is projected to generate a maximum of approximately 139 average transit trips during the weekday AM and PM construction peak hours. Due to the availability of multiple NYCT/MTA bus routes and the SIR in the vicinity of the Project Area, this level of peak hour transit trip generation is not expected to exceed the *CEQR Technical Manual* screening thresholds of 200 peak hour subway trips or 50 peak hour bus trips in one direction on a single route. Therefore, the Proposed Actions would not result in potentially significant adverse transit impacts during construction.

Pedestrians

The peak number of average daily workers on-site during project-generated construction would occur in Q7, when there would be approximately 462 construction workers per day (see Table 11-3). As discussed previously (see section *Peak Hour Construction Vehicle Trips*), approximately 80 percent of the construction worker arrival and departure trips would take place during the weekday AM and PM construction peak hours, respectively. Therefore, project-generated construction would generate a maximum of approximately 370 average pedestrian trips (approximately 248, 111 and 11 auto, transit and walk-only trips, respectively) during the weekday AM and PM construction peak hours.

Pedestrian trips generated by construction of the Proposed Project would be concentrated along Projected Development Site 1's frontage and pedestrian facilities connecting the site to study area parking and transit ~~facilies~~facilities. Specifically, the construction-generated pedestrian trips were assigned to/from the site's construction access/egress locations as follows:

- Pedestrian auto trips were assigned to/from the parking garage to the northeast of Richmond Terrace, between Nicholas Street and Hamilton Avenue.
- Pedestrian bus trips were assigned to/from the S40 and S44 bus stops on the east and west sides of Richmond Terrace, north of Hamilton Avenue; and the S42 and S52 bus stops adjacent to the Hamilton Avenue/St. Marks Place intersection, west of the Project Area.
- Pedestrian subway/rail trips were assigned to/from the SIR stop at the St. George Terminal.
- Conservatively, pedestrian walk-only trips were combined proportionally with the transit trip assignments discussed above.

Based on these distribution patterns, the construction-generated pedestrian trips were assigned to the study area pedestrian facilities for the weekday AM and PM construction peak hours (see Appendix F2 – Figures F2-11 and F2-12). Based on these assignments, the northwest corner at the intersection of Richmond Terrace and Hamilton Avenue could experience more than 200 construction-generated pedestrian trips in each of the peak hours. However, this corner element was projected to operate at LOS A during all peak hours in the Proposed Project's No-Action and With-Action Conditions (see Chapter 5, "Transportation"). This pedestrian element is also expected to operate at acceptable conditions during the project-generated construction given the similar pedestrian increments as the operational condition. Therefore, no further analysis is warranted and the Proposed Actions would not result in potentially significant adverse pedestrian impacts during construction.

Parking

The peak number of average daily workers on-site during project-generated construction would occur in Q7, when there would be approximately 462 construction workers per day (see Table 11-3). As discussed previously (see section *Construction Worker Modal Split and Vehicle Occupancy*), approximately 67 percent of construction workers are expected to commute to/from the Project Site via private autos, with an average vehicle occupancy of approximately 1.19 persons per vehicle. Therefore, project-generated construction is projected to generate a maximum parking demand of approximately 260 spaces during the weekday midday period. According to the operational parking analysis conducted for the Proposed Actions (see Chapter 5, "Transportation"), in the No-Action Condition, off-site public parking facilities within ¼-mile of the Project Site are projected to operate at approximately 82 percent utilization with approximately 468 available parking spaces during the weekday midday period. Therefore, the Proposed Actions would not result in a potential public parking shortfall in the area during construction.

Air Quality

Emissions from on-site construction equipment and on-road construction-related vehicles, as well as dust generated from construction activities, have the potential to affect air quality. The analysis of construction-related air quality emissions includes a quantitative analysis of both on-site and off-site mobile sources, and the overall cumulative effects of both types of sources, where applicable. The preliminary assessment indicated a detailed quantitative air quality assessment was warranted to determine if the construction of the Proposed Actions would result in a significant adverse air quality impact during construction.

Methodology

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 (NO_x) and particulate matter (PM). Fugitive dust generated by construction activities is also a source of PM. Gasoline engines produce relatively high levels of carbon monoxide (CO). Because the Applicant would use ultra-low-sulfur diesel (ULSD) fuel for all diesel engines used in construction, sulfur oxides (SO_x) emitted during construction activities would be negligible, and an assessment of the resultant sulfur dioxide (SO_2) did not warrant detailed assessment.

Construction-related emissions were calculated throughout the duration of construction on Projected Development Site 1 to determine which construction period constitutes the worst-case period of emissions for the pollutants of concern (PM, CO, nitrogen dioxide (NO_2)). For Phase 1 construction (2022-2024), an annual work-day average of 8 hours and a peak daily work day of 11 hours was assumed. $PM_{2.5}$ was selected to determine the worst-case short-term emissions period because the ratio of $PM_{2.5}$ emissions to criteria is higher than for other pollutants, and is therefore the pollutant indicative of worst-case air quality emissions during construction. All NO_x emissions were assumed to be converted to NO_2 as a conservative approach. Generally, emission patterns of NO_2 would follow that of $PM_{2.5}$ emissions, because their emission rates are related to the capacity of diesel engines. CO emissions may have a different pattern than $PM_{2.5}$, but generally would also be highest during periods when the most construction activity would occur.

In general, where the construction is expected to be short-term, construction effects generally do not require detailed assessment. However, as construction of three buildings on Projected Development Site 1 may occur concurrently on one site, there is a potential for cumulative air quality effects from concurrent construction activities. Therefore, an emissions profile was generated for each of the three buildings to determine the construction periods with the highest potential to affect air quality. Construction activities in Phase 2 would be short-term (less than 24 months) and result in fewer construction air quality effects than Phase 1.

Worst-case short-term construction air quality emissions were identified based on the peak day average emissions of $PM_{2.5}$, the location of construction activities, and the nearby sensitive receptor locations (i.e., residences, publicly accessible open spaces, plazas, sidewalks, and commercial buildings). The inputs modeled the predicted annual and 24-hour concentrations of $PM_{2.5}$, one-hour and eight-hour concentrations of CO, and annual concentrations of NO_2.

For annual concentrations, the emissions factors were calculated for each month to determine the worst-case 12 month period, which was then selected for detailed dispersion modeling to represent worst-case conditions. The pollutants of concern from construction activities during the worst-case months were then analyzed in an air dispersion modeling program to predict the highest resulting concentrations at the surrounding sensitive receptors. If adverse construction air quality impacts can be ruled out during the worst-case periods of construction, it can be concluded that construction air quality impacts would be less during construction periods when emissions are lower, and would similarly not result in significant adverse construction air quality impacts.

Emission Control Measures

Typical of construction, construction activities have the potential to affect air quality as a result of diesel emissions. Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. These include the following dust suppression measures and the idling restriction for off-site mobile sources (i.e., construction vehicles):

- Idling Restrictions - In addition to adhering to the local law restricting unnecessary idling on roadways – including the New York State Anti-Idling Law – on-site vehicle idle time will also be restricted to three minutes for all equipment and vehicles that do not require their engines to operate a function such as loading, unloading, or processing device (e.g., concrete mixing trucks), or as otherwise required for the proper operation of the engine.
- In addition to laws and regulations already in place, an emissions reduction program for all construction activities that extend on a site for more than two years would be implemented to the extent practicable. The following commitments will be included in construction contract specifications, where necessary:
    - Use of Newer Equipment - EPA's Tier 1 through 4 standards for non-road engines regulate the emission of criteria pollutants from new engines, including PM, CO, NOx, and hydrocarbons (HC). All non-road construction equipment with a power rating of 50 hp or greater would meet at least the Tier 3 emissions standard to the extent practicable. Tier 3 NOx emissions range from 40 to 60 percent lower than Tier 1 emissions, and the emissions are considerably lower than uncontrolled engines. All non-road engines with capacity less than 50 hp would meet at least the Tier 2 emissions standard.
    - Best Available Tailpipe (BAT) Reduction Technologies - Non-road diesel engines with a power rating of 50 hp or greater and controlled truck fleets (i.e., truck fleets under long-term contract with the project) - including but not limited to concrete mixing and pumping trucks - would use the BAT technology to minimize diesel PM emissions. Diesel particulate filters (DPFs) are proven to have the highest reduction capability amongst current tailpipe technology. Construction contracts would specify that diesel engines rated at 50 hp or greater, as well as diesel generators rated at less than 50 hp at Building 3, would use DPFs, either installed by the original equipment manufacturer (OEM) or retrofitted. Retrofitted DPFs must be verified by EPA or the California Air Resources Board (CARB). Active DPFs (modeled with a 90 percent control factor) or other technologies proven to achieve an equivalent reduction may also be used.

Overall, the proposed emission reduction measures would greatly reduce air pollutant emissions during construction.

Engine Emissions

The sizes, types, and number of units of construction equipment were estimated based on the construction activity schedule in Appendix F. Emission factors for NO_X, CO, and $PM_{2.5}$ from on-site construction engines were developed using the NONROAD module in the US EPA MOVES 2014b emission model. With respect to trucks, emission rates for NO_X, CO, and $PM_{2.5}$ for truck engines were also developed using the MOVES emission model.

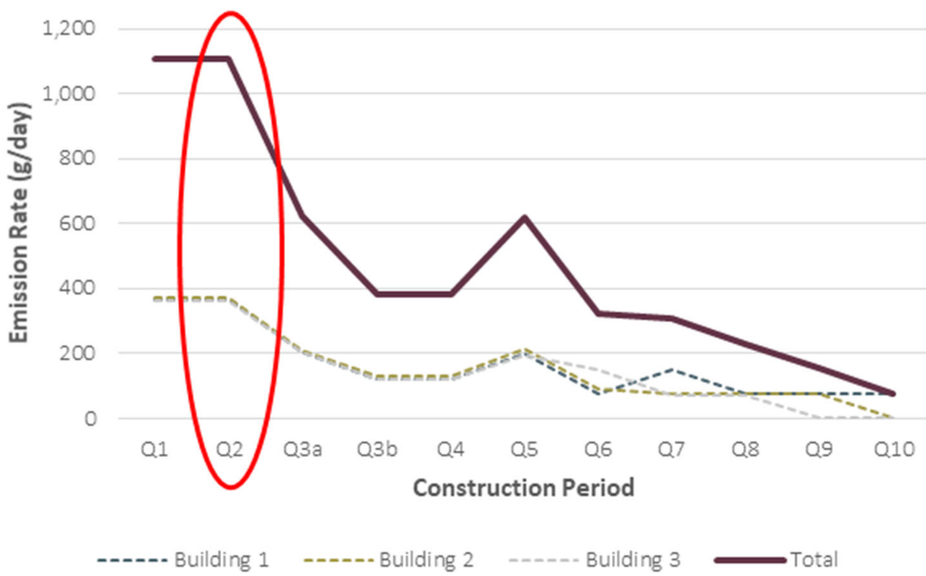
Fugitive Dust

Fugitive dust emissions from construction operations (e.g., excavation, grading, and transferring of excavated materials into dump trucks) were calculated based on EPA procedures delineated in AP-42 Table 13.2.3-1. As discussed above in “Emissions Control Measures,” all necessary measures would be implemented following the New York City Air Pollution Control Code’s regulations on construction-related dust emissions. The control of fugitive emissions would reduce PM emissions from such operations by approximately 50 percent. Fugitive dust emissions from re-entrainment generated by on-site and off-site vehicles were calculated based on EPA procedures delineated in AP-42 Tables 13.2.2-1 and 13.2.1-2 respectively.

Analysis Periods

The resulting emission factors were used for the emissions and dispersion analyses. Short-term (24-hour average) $PM_{2.5}$ engine emissions profiles were prepared by multiplying the emission rates for each piece of equipment by the number of engines, the work hours per day, and fraction of the day each engine would be expected to work during each month of construction. The resulting overall short-term emission profiles is presented in Figure 11-3.

Figure 11-3: Short Term (24-hour) $PM_{2.5}$ Construction Emission Profile



As shown in Figure 11-3, based on the short-term $PM_{2.5}$ construction emissions profile, Q2 (April to June 2022) would be the short-term period with the highest project-wide emissions. The worst-case annual period would begin in 2022 Q1.

Dispersion Modelling

The dispersion of pollutants during the worst-case short-term and annual periods was modeled in detail to predict resulting maximum concentration increments from construction activities, and the total concentrations (including background concentrations) that can be expected at sensitive receptors in the surrounding area. Although the modeled results are based on construction scenarios for specific sample periods, conclusions regarding other periods can be derived based on the fact that lower pollutant concentration increments from construction activities would generally be expected during periods with lower construction emissions. However, because the worst-case short-term pollutant concentrations are often indicative of very localized construction activities, similar maximum local concentrations may occur at any stage at various locations, and therefore, would not persist in any single location.

Emission sources would move locations throughout construction and would move throughout the site as construction work progresses. Overall, the modeled peak construction periods are considered representative of worst-case construction activities.

Dispersion of pollutants during the worst-case short-term and annual periods were modeled using AERMOD version 19191 to predict maximum concentrations from construction activities. The pollutant concentration results were compared to the applicable NAAQS and CEQR *de minimis* criteria.

Source Simulation

For the short-term model scenarios (predicting concentration averages for periods of 24 hours or less), all stationary sources, which idle in a single location while operating - such as pile drivers, air compressors, and generators - were simulated as point sources. Other engines, which would move around the site on any given day, 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. All on-site sources were considered as area sources for the annual analysis based on the assumption that the sources would move around the site throughout the year.

Receptor Locations

Receptors (locations in the model where concentrations are predicted) were placed at sensitive nearby ground-level uses (i.e., publicly accessible open spaces/parks, the private open space at the Castleton Park apartments, sidewalks, etc.) and elevated locations (i.e., residential windows) for the assessment of short-term (24-hour of less) impacts. For the assessment of annual impacts, receptors were located at sensitive receptor locations where long-term occupancy is expected (i.e. residential windows). Because the proposed three buildings on Projected Development Site 1 would be constructed concurrently, none of the proposed buildings on this site would not have sensitive receptors during Phase 1 (Projected Development Site 1) construction; therefore, no on-site receptors were considered during Phase 1. However, during the construction of Projected Development Site 1, two houses located on Projected Development Site 2 site would remain occupied and these were considered sensitive residential receptors during Phase 1 construction.

Off-Site Mobile Sources

Traffic conditions during construction peak hours would generally be similar to, or better than, during the operational peak hours with full build-out of the Proposed Project, and as such, a stand-alone construction mobile source air quality analysis is not warranted. Because emissions from on-site construction equipment and off-site construction-related heavy vehicles may contribute to concentration increments concurrently, off-site construction heavy vehicle emissions adjacent to the construction sites were included with the on-site dispersion analysis (in addition to on-site truck and engine activity) to represent local project-related emissions cumulatively.

Meteorological Data

For the refined dispersion analysis, the most recent 5 years of meteorological data available (2015-2019) from Newark International Airport and concurrent upper air data from Brookhaven, New York, were used in the detailed modeling.

Background Concentrations

Background concentrations were added to modeling results for construction sources to obtain total pollutant concentrations at the receptor locations. The background concentrations used in the analysis were in the statistical format of the NAAQS, which was adopted by New York State as the State standard. The background concentrations were calculated as follows:

- $PM_{2.5}$ – 24 hour – 3-year average of the 98th percentile
- $PM_{2.5}$ – annual – 3-year average of annual mean
- NO_2 – annual – maximum annual average over the past 3 years
- CO – 1 hour – maximum of the 2nd highest values over the past 3 years
- CO – 8 hour – maximum of the 2nd highest values over the past 3 years

The most recent available background values were obtained from the New York State ambient air quality reports for the Richmond Post Office ($PM_{2.5}$), Queens College (NO_2) and Queens College 2 (CO) sites[1].

Results

Maximum predicted concentration increments from the construction period selected for analysis, and maximum overall concentrations including background concentrations, are presented in Table 11-8. For $PM_{2.5}$, monitored background concentrations are not added to modeled concentrations from sources, because significant adverse impacts are determined by comparing the predicted increment from construction activities to the CEQR *de minimis* criteria. The maximum predicted concentration increments include both construction stationary sources and construction mobile sources.

Table 11-8: Maximum Predicted Pollutant Concentrations from Construction Site Sources—Peak Analysis Period

Pollutant	Averaging Period	Background (µg/m³)	Maximum Modeled Increment (µg/m³)[A]	Total Concentration (µg/m³)	*De Minimis* Criteria/ NAAQS (µg/m³)
$PM_{2.5}$	24-hour	-	5.3	5.3	9.7
	Annual Local	-	0.28	0.28	0.3
NO_2	Annual	28.7	21.9	50.6	100
CO	One-hour	1,969	677	2,646	40,000
	Eight-hour	1,374	274	1,648	10,000

[A] Concentration at the sensitive receptor locations.

Air Quality Conclusion

Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes. These include dust suppression measures, idling restriction, and the use of ULSD. In addition to the required laws and regulations, an emissions reduction program, including the use of BAT reduction technologies and the use of newer equipment would be implemented. In future years, the manufactured emissions for the construction equipment is expected to meet these emissions reduction requirements as there would be an increasing percentage of newer and cleaner engines, irrespective of any project specific commitments.

With the implementation of these emission reduction measures, the dispersion modeling analysis of construction-related air emissions for both on-site and off-site sources determined

[1] Department of Environmental Conservation: NYS Ambient Air Quality Reports for 2017-2019. (https://www.dec.ny.gov/chemical/8536.html)

that the annual-average NO_2, one-hour and eight-hour CO, and 24-hour and annual $PM_{2.5}$ concentrations would be below the corresponding NAAQS and *de-minimis* thresholds at the sensitive receptors during peak construction. Construction-related emissions would be reduced outside of the peak construction periods, and would similarly be below the NAAQS and *de-minimis* thresholds. Therefore, construction with the Proposed Actions would not result in significant adverse construction impacts related to air quality, and further assessment is not warranted.

Noise

Changes to community noise levels during construction would result from the noise emitted from construction equipment and from vehicles traveling to and from the construction site. Construction-generated noise levels at sensitive receptors vary widely, and depend on the stage of construction and the location of the construction activities relative to noise-sensitive receptor locations.

The most significant construction noise sources are expected to result from impact equipment and truck activity. Noise from construction activities and some construction equipment is regulated by the NYC Noise Control Code and by EPA. The NYC 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 project-generated construction activities, a quantified construction noise analysis was performed. The purpose of this analysis was to determine if significant adverse noise impacts would occur during construction, and if so, to examine the feasibility of implementing measures to reduce or eliminate such impacts. Noise levels were monitored in the Project Area~~. To present a conservative baseline, L90 levels were used as the baseline to estimate construction-generated noise level increases. Baseline noise levels will be refined between draft and final as the model is calibrated.~~ to determine ambient conditions.

Methodology

Project-generated construction activities would result in increased noise levels from construction equipment and construction-related vehicles movements (i.e., worker trips, and material and equipment trips) on the surrounding roadways. The effects of each of these noise sources was evaluated. The results show the effects of construction activities (i.e., noise due to both on-site construction equipment and construction-related vehicle operation) and the total cumulative effects from construction (as construction proceeds on uncompleted components of the Proposed Actions).

Noise from the operation of construction equipment on site at a specific receptor location near a construction site is calculated by computing the sum of the noise produced by all pieces of equipment operating at the construction site. For each piece of equipment, the noise level at a receptor site is a function of:

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

Similarly, noise levels due to construction-related traffic are a function of:

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

Because the two private playgrounds at the Castleton Park Apartments were not ~~is~~in use when noise readings were captured, the noise readings conducted to capture existing conditions did not capture potential noise generated by these playgrounds. Per CEQR guidance, each playground would generate up to 75 dBA of noise, and being approximately 30 feet from the Castleton Park Apartment towers, have the potential to affect localized noise conditions. ~~This additional playground noise will be analyzed in detail between the draft and final EIS.~~

Construction Noise Impact Criteria

Construction noise is regulated by the NYC Noise Control Code (Chapter 24 of the Administrative Code of the City of New York, or Local Law 113), the DEP Notice of Adoption Rules for Citywide Construction Noise Mitigation (also known as Chapter 28), and EPA noise emission standards. These local and federal requirements mandate that construction equipment and motor vehicles meet specified noise emission standards; that construction activities be limited to weekdays between the hours of 7:00 AM and 6:00 PM; and that construction materials be handled and transported in such a manner as not to create unnecessary noise. For weekend and after-hours work, permits would be required, as specified in the NYC Noise Control Code. In addition, EPA requirements mandate that certain classifications of construction equipment meet specified noise emission standards.

The *CEQR Technical Manual* states that significant adverse noise impacts due to construction would occur "only at sensitive receptors that would be subjected to high construction noise levels for an extensive period of time." To determine the potential for significant adverse impacts caused by the construction activity, the construction noise impacts are initially compared to the criteria for a significant adverse impact in Chapter 19, "Noise." If the construction noise levels exceed the significant adverse impact criteria, then the affected area and the magnitude and the duration of impacts would be also considered to account for the temporary and transient nature of construction impact. Therefore, the noise impact criteria described in Chapter 19, Section 410 of the *CEQR Technical Manual* serve as a screening-level threshold for potential construction noise impacts. If construction of a proposed project would not result in any exceedances of these criteria at a given receptor, then that receptor would not have the potential to experience a construction noise impact. However, as is the case with the Proposed Actions, if construction would result in exceedances of these noise impact criteria, then further consideration of the intensity and duration of construction noise is warranted at that receptor. The screening noise level impact criteria for mobile and on-site construction activities are as follows:

- If the No-Action noise level is less than 60 dBA $L_{eq(1)}$, a 5 dBA $L_{eq(1)}$ or greater increase would require further consideration.
- If the No-Action noise level is between 60 dBA $L_{eq(1)}$ and 62 dBA $L_{eq(1)}$, a resultant $L_{eq(1)}$ of 65 dBA or greater would require further consideration.

- If the No-Action noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the CEQR criteria as being between 10:00 p.m. and 7:00 a.m.), the threshold requiring further consideration would be 3 dBA $L_{eq(1)}$.

If project-generated construction would result in exceedances of these noise impact criteria at a receptor, then further consideration of the intensity and duration of construction noise is warranted at that receptor. Generally, exceedances of these screening criteria for more than 24 consecutive months are considered to be significant adverse impacts. Noise level increases that would be considered objectionable (i.e., equal to or greater than 15 dBA) lasting 12 consecutive months or more and noise level increases considered very objectionable (i.e., equal to or greater than 20 dBA) lasting three consecutive months or more would also be considered significant adverse impacts. While the above criteria is used as a guideline, whether or not significant adverse impacts may be identified by the Lead Agency on a case-by-case basis depending on the duration and magnitude of noise level and noise level increment.

As discussed below, the presence of window/wall attenuation measures at noise receptor sites, such as double-glazed windows and alternate means of ventilation, were considered when evaluating locations projected to experience significant noise level increases from construction in excess of *CEQR Technical Manual* impact criteria.

Construction Noise Modeling

Noise effects from construction activities were evaluated using the CadnaA model, a computerized model developed for noise prediction and assessment. The model can be used for the analysis of a wide variety of noise sources, including stationary sources (e.g., construction equipment, industrial equipment, and power generation equipment) and transportation sources (e.g., roads, highways, railroad lines, busways, airports). The model takes into account the reference sound pressure levels of the noise sources at 50 feet, attenuation with distance, ground contours, reflections from barriers and structures, attenuation due to shielding, and other conditions. The CadnaA model is based on the acoustic propagation standards promulgated in International Standard ISO 9613-2. This standard is currently under review for adoption by the American National Standards Institute (ANSI) as an American Standard. The CadnaA model is a state-of-the-art tool for noise analysis and is approved for construction noise level prediction by the *CEQR Technical Manual*.

Geographic data input into the CadnaA model included site work areas, adjacent building envelopes, the locations of streets, and the locations of sensitive receptors. For each analysis period, the geographic location and operational characteristics—including equipment usage rates (percentage of time operating at full power) for each piece of construction equipment operating at Projected Development Site 1, as well as noise control measures—were input into the model. Noise-reflective and noise-shielding barriers that would be erected on the construction site were considered, as well as shielding from both adjacent buildings and project-generated buildings as they are constructed. The model produced A-weighted $L_{eq(1)}$ noise levels at each receptor location for each analysis period, as well as the contribution from each noise source.

In general, the CadnaA methodology involved the following process:

- Establish noise levels at receptors in the Study Area using the CadnaA model for the development sites across the analysis periods.
- Receptors were either located directly adjacent to the construction site or along streets where construction trucks would pass. Each receptor was placed at a residence or other noise-sensitive use. The receptors in the model are developed to be representative of

other noise receptors in the immediate area, and to conservatively predict the noise conditions around the Study Area during construction;

- Input the construction-generated noise sources, as determined by the conceptual construction schedule and equipment schedule;
- Based on the CadnaA model outputs, determine the receptor locations that would experience noise levels that would exceed the significant adverse noise impact threshold criteria during each analysis period; and
- Determine receptor locations where noise level increases could last 24 months or longer.

Due to the site topography, it is possible that elevated construction-generated noise may cause additional construction-generated noise on all floors of the Castleton Park Apartments. To determine the magnitude of potential noise level increases due to elevated equipment on the Castleton Park Apartments (both North and South towers), equipment that could be used at an elevated height was modeled at the top floor elevation to determine the worst case scenario.

On-Site Equipment Noise

The equipment anticipated to be used for each building during the construction of Projected Development Site 1 is shown in Table 11-9 and Table 11-10. The total active pieces of each equipment at any time were used as the source input for the noise model, and is based on consultation with the construction management team. Unless otherwise noted, DEP and FTA typical noise data has been included directly from the 2020 *CEQR Technical Manual*. Concrete trucks and loaders were modeled as point sources, to reflect these machines would not be restricted to the maximum three-minute idling standards; pursuant to the New York City Idling Law, other trucks would not idle beyond three minutes, and were considered only as line noise sources during site access, egress, and circulation.

Table 11-9: Typical Construction Equipment Noise Emission Levels (dBA)

Equipment List	Max. Number Used				DEP & FTA Typical L_{max} Noise Level at 50 feet[2] (per 1 item)
	Max. Active at Any Time[1]	Building			
		1	2	3	
Excavation & Foundation Stage					
Auger Drill Rig	4	~~6~~2	~~6~~2	~~6~~2	85
Bar Bender	~~6~~4	~~6~~2	~~6~~2	~~6~~1	80
Compactor (ground)	4	~~4~~2	~~4~~2	~~4~~2	80
Compressor (air, > 350 cfm)	~~6~~3	~~6~~2	~~6~~1	~~6~~1	58[4]
Concrete Mixer Truck	2	~~3~~1	~~3~~1	~~3~~1	85
Concrete Pump Truck	2	~~3~~1	~~3~~1	~~3~~1	82
Dozer	2	~~4~~1	~~4~~1	~~4~~1	85
Dump Truck[5]	4	~~7~~2	~~7~~2	~~7~~2	84
Excavator	6	~~6~~3	~~4~~3	~~4~~3	85
Front End Loader	6	~~6~~3	~~6~~3	~~6~~3	80
Generator (< 25 KVA, VMS signs)	3	~~3~~1	~~3~~1	~~3~~1	70~~82~~
Gradall	1	~~1~~0	1	1	85
Pumps	4	~~4~~2	~~4~~2	~~4~~2	77

Equipment List	Max. Number Used				DEP & FTA Typical L_{max} Noise Level at 50 feet[2] (per 1 item)
	Max. Active at Any Time[1]	Building			
		1	2	3	
Pickup Truck[5]	2	~~4~~1	~~4~~1	~~4~~1	55
Superstructure Stage					
Bar Bender	~~5~~4	~~5~~2	~~5~~2	~~5~~2	80
Compressor (air, ≤ 350 cfm)	~~2~~3	~~2~~1	~~2~~1	~~2~~1	53[4]
Compressor (air, > 350 cfm)	3	~~3~~1	~~3~~1	~~3~~1	58[4]
Concrete Mixer Truck	3	~~5~~1	~~5~~1	~~5~~1	85
Concrete Pump Truck	~~2~~3	~~3~~1	~~3~~1	~~3~~1	82
Dozer	1	1	1	1	85
Dump Truck[5]	4	~~7~~2	~~7~~2	~~7~~2	84
Pickup Truck[5]	4	~~8~~2	~~8~~2	~~8~~2	55
Concrete Saw	3	~~3~~1	~~3~~1	~~3~~1	90
Crane	3	~~3~~1	~~3~~1	~~3~~1	85
Drum Mixer	3	~~3~~1	~~3~~1	~~3~~1	80
Dumpster/Rubbish Removal	3	~~3~~1	~~3~~1	~~3~~1	78
Flat Bed Truck[5]	3	~~6~~1	~~6~~1	~~6~~1	84
Jackhammer	6	~~6~~2	~~6~~2	~~6~~2	73[4]
Man Lift	3	~~3~~1	~~3~~1	~~3~~1	85
Pneumatic Tools	6	~~6~~2	~~6~~2	~~6~~2	85
Ventilation Fan	6	~~6~~2	~~6~~2	~~6~~2	59[3]
Welder Torch	3	~~3~~2	~~3~~1	~~3~~1	73
Envelope and Façade Stage					
Compressor (air, > 350 cfm)	3	~~3~~1	~~3~~1	~~3~~1	58
Generator (< 25 KVA, VMS signs)	2	~~2~~1	~~2~~1	~~2~~0	70~~82~~
Pickup Truck[5]	2	~~4~~1	~~4~~1	~~4~~1	55
Dumpster/Rubbish Removal	3	~~3~~1	~~3~~1	~~3~~1	78
Flat Bed Truck[5]	2	~~3~~1	~~3~~1	~~3~~1	84
Jackhammer	3	~~3~~1	~~3~~1	~~3~~1	73
Man Lift	3	~~3~~1	~~3~~1	~~3~~1	85
Pneumatic Tools	~~6~~4	~~6~~2	~~6~~2	~~6~~2	85
Ventilation Fan	~~6~~4	~~6~~2	~~6~~2	~~6~~2	59[3]
Welder Torch	3	~~3~~1	~~3~~1	~~3~~1	73
Interior Fitout Stage					
Generator (< 25 KVA, VMS signs)	3	~~3~~1	~~3~~1	~~3~~1	70~~82~~
Pickup Truck[5]	4	~~8~~1	~~8~~2	~~8~~2	55
Dumpster/Rubbish Removal	3	~~3~~2	~~3~~1	~~3~~1	78
Flat Bed Truck[5]	2	~~3~~1	~~3~~1	~~3~~1	84
Jackhammer	3	~~3~~1	~~3~~1	~~3~~1	73
Man Lift	3	~~3~~1	~~3~~1	~~3~~1	85

Equipment List	Max. Number Used: Max. Active at Any Time[1]	Max. Number Used: Building 1	Max. Number Used: Building 2	Max. Number Used: Building 3	DEP & FTA Typical L_{max} Noise Level at 50 feet[2] (per 1 item)
Pneumatic Tools	~~6~~4	~~6~~2	~~6~~2	~~6~~2	85
Ventilation Fan	~~6~~4	~~6~~2	~~6~~2	~~6~~2	59[3]
Welder Torch	3	~~3~~1	~~3~~1	~~3~~1	73

[1] Represents the maximum amount of equipment that will be operating at any one time on Projected Development Site 1
[2] Sources: Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007. Transit Noise and Vibration Impact Assessment, FTA, 2006
[3] Maximum noise level per noise reduction measures
[4] Indicates the value is from Local Law 113
[5] Indicates vehicles subject to 3-minute idling restriction

Table 11-10: Active Construction Equipment Per Quarter (Full Site)

Equipment	Construction Quarter: Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
Auger Drill Rig	4	4	~~4~~0	0	0	0	0	0	0	0
Bar Bender	~~6~~4	~~6~~4	~~6~~8	5	5	0	0	0	0	0
Compactor (ground)	4	~~4~~3	~~4~~1	0	0	0	0	0	0	0
Compressor (air, ≤ 350 cfm)	0	0	~~2~~3	2	~~2~~3	0	0	0	0	0
Compressor (air, > 350 cfm)	6	6	~~6~~9	3	~~3~~6	3	1	0	0	0
Concrete Mixer Truck	2	2	~~3~~5	3	3	0	0	0	0	0
Concrete Pump Truck	2	2	~~2~~5	~~2~~3	~~2~~3	0	0	0	0	0
Dozer	2	2	~~2~~3	~~1~~3	~~1~~3	0	0	0	0	0
Dump Truck	4	4	~~4~~10	~~4~~6	~~4~~6	0	0	0	0	0
Excavator	6	~~6~~5	~~6~~0	0	0	0	0	0	0	0
Front End Loader	6	~~6~~5	~~6~~0	0	0	0	0	0	0	0
Generator(< 25 KVA, VMS signs)	3	3	3	0	2	~~2~~4	~~3~~4	3	3	1
Gradall	1	1	~~1~~0	0	0	0	0	0	0	0
Pumps	~~0~~4	~~0~~4	~~0~~4	0	0	0	0	0	0	0
Pickup Truck	~~0~~2	~~0~~2	~~4~~8	~~4~~6	~~3~~9	~~3~~6	~~4~~6	~~4~~5	4	~~1~~2
Concrete Saw	0	0	3	3	3	~~3~~0	~~3~~0	~~3~~0	~~3~~0	~~1~~0
Crane	0	0	3	3	3	~~3~~0	~~3~~0	~~3~~0	~~3~~0	~~1~~0
Drum Mixer	0	0	3	3	3	~~3~~0	~~3~~0	~~3~~0	~~3~~0	~~1~~0
Dumpser/Rubbish Removal	0	0	3	3	~~3~~6	~~3~~5	4	3	3	1
Flat Bed Truck	0	0	3	3	6	~~6~~5	~~6~~4	~~6~~3	~~6~~3	~~2~~1
Jackhammer	0	0	6	6	~~6~~9	~~6~~5	~~6~~4	~~6~~3	~~6~~2	~~2~~0
Man Lift	0	0	3	3	~~3~~6	~~3~~5	~~3~~4	~~3~~1	3	1
Pneumatic Tools	0	0	6	6	~~6~~12	6	~~6~~2	~~6~~0	~~6~~0	~~2~~0
Ventilation Fan	0	0	6	6	~~6~~12	6	~~6~~2	~~6~~0	~~6~~0	~~2~~0
Welder/Torch	0	0	3	3	~~3~~6	3	~~3~~1	~~3~~0	~~3~~0	~~1~~0

Noise Reduction Measures

Project-generated construction would follow the noise control measures of the NYC Noise Control Code (NYC Noise Code) for construction. Specific noise control measures will be described in a noise mitigation plan that is required under the NYC Noise Code. These measures could include a variety of source and path controls. For source controls (i.e., reducing noise levels at the source or during the most sensitive time periods), the following measures would be implemented in accordance with the NYC Noise Code:

- Equipment that meets the sound level standards specified in Subchapter 5 of the New York City Noise Control Code would be used from the start of construction. Table 11-9 shows noise levels for typical construction equipment and the mandated noise levels for the equipment that would be used for construction of the proposed project. The Applicant has committed to lower noise emission limits for venitlation fans.
- As early in the construction period as logistics will 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 practical;
- Where feasible and practical, construction areas would be configured to minimize back-up alarm noise;
- All trucks would not be allowed to idle more than three minutes in accordance with 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;
- Generators used during construction would have a capacity of less than 25 kilovolt amps (KVA); and
- Auger drills will be used in lieu of impact pile drivers to drill piles.

For path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), the following construction measures, which go beyond typical construction techniques, 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. Once building foundations are completed, delivery trucks would operate behind construction fences, where possible;
- Noise barriers constructed from plywood or other materials would be installed to provide shielding. A 15-foot-tall construction barrier will extend along the full perimeter of the site, except along Projected Development Site 1's frontage to Richmond Terrace, where an 8-foot-tall construction barrier would be placed; and
- Path noise control measures (i.e., portable noise barriers, panels, enclosures, and acoustical tents, where feasible) would be required for certain dominant noise equipment (i.e., generators, jack hammers, pile drivers, and pumps) to the extent feasible and practical, based on the results of construction noise calculations. The details to construct portable noise barriers, enclosures, tents, etc., are provided in DEP's Rules for Citywide Construction Noise Mitigation. These path control measures were not considered in the construction noise model.

Receptor Sites

Noise measurement locations were used to determine the baseline noise levels. Figure 11-4 and Table 11-11 show the 52 receptor locations that were selected as discrete noise receptor sites for the detailed construction noise assessment. Commercial retail uses are not considered sensitive receivers, and therefore were not assessed.

Figure 11-4: Receptor Locations

Note: This figure was revised for the FEIS.

Table 11-11: Noise Receptors by Location and Land Use

Receptor	Location	Land Use
1	36 Hamilton Ave	Residential
2	60 Hamilton Ave	Residential
3	41 Hamilton Ave	Residential
4	47 Hamilton Ave	Residential
5	53 Hamilton Ave	Residential
6	59 Hamilton Ave	Residential
7	205 St. Marks Place	Residential
8	199 St. Marks Place	Residential
9	185 St. Marks Place (Castleton Park Apartments – South Tower)	Residential
10	165 St. Marks Place (Castleton Park Apartments – North Tower)	Residential
11	198 Richmond Terrace	Residential
12	204 Richmond Terrace	Residential
13	224 Richmond Terrace	Residential
14	51 Stuyvesant Place	~~Residential~~Office (Vacant)

Receptor	Location	Land Use
15	100 Stuyvesant Place	Residential
16	259 St. Marks Place	Residential
17	257 St. Marks Place	Residential
18	249 St. Marks Place	Residential
19	51-57 Wall Street	Residential
20	59-61 Wall Street	Residential
21	34 Academy Place	Residential
22	234 St. Marks Place	Residential
23	230 St. Marks Place	Residential
24	228 St. Marks Place	Residential
25	86 Hamilton Ave	Residential
26	232 RIchmond Terrace	Residential
27	236 Richmond Terrace	Residential
28	167 Carroll Place	Residential
29	240 Richmond Terrace	Residential
30	242 Richmond Terrace	Residential
31	244 Richmond Terrace	Residential
32	159 Carroll Place	Residential
33	155-157 Carroll Place	Residential
34	248 Richmond Terrace	Residential
35	250 Richmond Terrace	Residential
36	260 Richmond Terrace	Residential
37	270 Richmond Terrace	Residential
38	272 Richmond Terrace	Residential
39	135 Carroll Place	Residential
40	147 Carroll Place	Residential
41	145 Carroll Place	Residential
42	139 Carroll Place	Residential
43	32 Nicholas Street	Residential
44	141 St. Marks Place	Residential
45	135 St. Marks Place	Residential
46	131 St. Marks Place	Residential
47	125 St. Marks Place	Residential
48	1 Hamilton Ave	Office
49	10 Hamilton Ave	Office
50	100 Richmond Terrace (Staten Island Family Courthouse)	Community Facility
51	75 Stuyvesant Place (Staten Island Museum)	Community Facility
52	78 Richmond Terrace (NYPD 120th Precinct)	Community Facility
53	140 Richmond Terrace	Office

These locations were chosen because of their location close to the areas of construction. Baseline noise conditions have been ~~established~~ calculated and modeled using the noise levels captured from the project's noise reading locations (see Chapter 8, "Noise") as well as traffic data., however, L90 values have been used to be conservative and further calibration will be made between the draft and final EIS based on measured sound levels at the closest measurement location and the variation in the modeled sound levels at each receptor location. Each modeled receptor site represents the location of a residence or other noise-sensitive use and was modeled at all floors. Where warranted, multiple building façades and floors (elevations) were analyzed. The receptor sites selected for detailed analysis are representative of other noise receptors in the immediate area and are the locations where worst-case project-generated construction noise would occur.

Project-generated noise level increases were predicted for the representative noise receptor locations, and the geographic extent of potential noise impacts was determined. The receptors were placed based on sightlines and the geographic extent where project-generated noise has the potential to result in noise levels that exceed the noise impact threshold criteria. The conceptual construction schedule was used to determine duration of the construction noise levels, the receptors that could experience construction noise levels that exceed the noise impact threshold criteria for two consecutive years or more.

Project-generated construction traffic between the hours of 6:00a.m. and 7:00a.m. would access the site from Richmond Terrace, which is an existing bus and truck route. Based on measured data between 7:00a.m. and 8:00a.m., construction generated traffic would not significantly increase existing truck activity along Richmond Terrace. Construction-generated traffic would also not add truck traffic to local roads that do not already experience truck traffic between 6:00a.m. and 7:00a.m. Furthermore, residential properties in the immediate area are located away from Richmond Terrace where trucks will be entering and leaving the site along a DOT designated truck route. Therefore, there would be no significant adverse impact from construction generated traffic.

Construction Noise Analysis Results

Using the methodology described above and considering the noise abatement measures for source and path controls to satisfy DEP's Rules for Citywide Construction Noise Mitigation, cumulative noise analyses were performed to determineddetermine maximum one-hour equivalent ($L_{eq(1)}$) noise levels that would be expected to occur at Projected Development Site 1 during each of the excavation/foundation and superstructure construction stages, when construction-generated noise would be greatest. The construction noise analysis results indicate there would be no receptors where noise levels would exceed 85 dBA, which is the Public Health noise exposure limit.

Readings of existing noise conditions did not capture noise generated by the private playgrounds at the Castleton Park Apartments, therefore, the ambient noise levels for receptors along the facades of the South Tower (185 St. Marks Place) and the North Tower (165 St. Marks Place) that face the Castleton Park Apartments playground were adjusted for expected playground noise, based on a sound level of 75 dBA at 5 feet (per *CEQR Technical Manual* Chapter 19, Section 132).

Construction in quarters 8, 9 and 10 – when interior fitout of Buildings 1, 2, and 3 would occur – would result in decreased construction-generated noise because:

- Construction materials being delivered would largely be related to finishes, which would be delivered in smaller delivery vehicles. To conservatively represent worst-case conditions, the analysis assumed these finishing materials would be delivered in large (noisier) trucks; and
- Interior fitout equipment numbers are equal to or less than those used during previous phases, and would be mostly enclosed within the building façades.

Table 11-12: Maximum Noise Levels (dBA) at Recievers Over Threshold by Quarter

ID	Property	Condition	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
1	185 St Marks Place	Projected Sound Level	77.5 ~~78.2~~	77.2 ~~78.9~~	79.9 ~~80.3~~	79.3 ~~78.8~~	81.0 ~~80.6~~	76.4 ~~77.1~~	73.7 ~~74.2~~	63.6 ~~69.2~~	64.3 ~~70.7~~	62.4 ~~66.0~~
1	185 St Marks Place	Increase Over Ambient	20.4 ~~26.7~~	20.3 ~~27.4~~	21.8 ~~28.8~~	21.1 ~~27.3~~	23.0 ~~29.1~~	19.5 ~~25.6~~	17.9 ~~22.7~~	7.8 ~~17.7~~	8.6 ~~19.2~~	7.2 ~~14.5~~
~~2~~	~~165 St Marks Place~~	~~Projected Sound Level~~	~~77.3~~	~~77.5~~	~~78.5~~	~~76.6~~	~~78.1~~	~~75.0~~	~~70.0~~	~~67.8~~	~~69.5~~	~~62.5~~
~~2~~	~~165 St Marks Place~~	~~Increase Over Ambient~~	~~25.8~~	~~26.0~~	~~27.0~~	~~25.1~~	~~26.6~~	~~23.5~~	~~18.5~~	~~16.3~~	~~18.0~~	~~11.0~~
~~3~~2	41 Hamilton Ave	Projected Sound Level	76.5 ~~76.7~~	76.0 ~~77.2~~	78.6 ~~78.8~~	77.8 ~~77.2~~	79.4 ~~79.0~~	74.7 ~~74.9~~	74.0 ~~74.4~~	65.1 ~~64.8~~	65.3 ~~68.1~~	64.8 ~~67.8~~
~~3~~2	41 Hamilton Ave	Increase Over Ambient	24.0 ~~27.3~~	23.5 ~~27.8~~	26.3 ~~29.4~~	25.4 ~~27.8~~	27.0 ~~29.6~~	22.2 ~~25.5~~	21.1 ~~25.0~~	11.7 ~~15.4~~	11.9 ~~18.6~~	11.2 ~~18.3~~
~~4~~3	47 Hamilton Ave	Projected Sound Level	72.1 ~~72.1~~	71.7 ~~72.8~~	73.3 ~~73.8~~	72.7 ~~72.0~~	74.5 ~~74.1~~	70.2 ~~70.7~~	68.1 ~~68.8~~	59.9 ~~61.9~~	59.7 ~~64.3~~	58.8 ~~63.1~~
~~4~~3	47 Hamilton Ave	Increase Over Ambient	20.1 ~~22.7~~	19.7~~2~~ ~~3.4~~	21.7 ~~24.4~~	20.8 ~~22.6~~	22.4 ~~24.7~~	18.2 ~~21.3~~	16.1 ~~19.3~~	8.5 ~~12.4~~	8.3 ~~14.9~~	7.5 ~~13.6~~
~~5~~4	53 Hamilton Ave	Projected Sound Level	67.7 ~~67.9~~	67.0 ~~68.3~~	69.6 ~~70.2~~	68.9 ~~68.6~~	70.3 ~~70.1~~	65.4 ~~66.2~~	63.1 ~~64.1~~	55.3 ~~58.3~~	55.3 ~~61.0~~	54.1 ~~59.2~~
~~5~~4	53 Hamilton Ave	Increase Over Ambient	18.3 ~~18.4~~	17.6 ~~18.8~~	20.2 ~~20.8~~	19.5 ~~19.1~~	20.9 ~~20.7~~	16.1 ~~16.7~~	13.8 ~~14.7~~	6.9 ~~8.9~~	6.9 ~~11.6~~	5.9 ~~9.7~~
~~6~~5	59 Hamilton Ave	Projected Sound Level	65.7 ~~66.2~~	65.2 ~~66.8~~	67.8 ~~68.4~~	67.0 ~~66.6~~	68.6 ~~68.3~~	63.9 ~~64.5~~	61.2 ~~62.0~~	51.9 ~~56.6~~	51.7 ~~58.7~~	49.9 ~~56.3~~
~~6~~5	59 Hamilton Ave	Increase Over Ambient	16.4 ~~16.7~~	15.9 ~~17.3~~	18.4 ~~18.9~~	17.6 ~~17.1~~	19.2 ~~18.8~~	14.6 ~~15.1~~	12.0 ~~12.5~~	4.2 ~~7.2~~	4.3 ~~9.3~~	3.2 ~~6.9~~
~~7~~	~~224 Richmond Terrace~~	~~Projected Sound Level~~	~~75.9~~	~~76.1~~	~~76.8~~	~~74.9~~	~~76.5~~	~~73.5~~	~~67.5~~	~~66.2~~	~~68.0~~	~~59.8~~
~~7~~	~~224 Richmond Terrace~~	~~Increase Over Ambient~~	~~24.1~~	~~24.3~~	~~25.0~~	~~23.1~~	~~24.7~~	~~21.7~~	~~15.7~~	~~14.3~~	~~16.2~~	~~7.9~~
~~8~~6	36 Hamilton Ave	Projected Sound Level	77.2 ~~76.9~~	76.6 ~~77.3~~	80.7 ~~81.0~~	80.2 ~~79.9~~	81.5 ~~81.3~~	76.0 ~~76.3~~	76.3 ~~76.6~~	70.0 ~~65.4~~	70.4 ~~68.4~~	70.3 ~~71.2~~
~~8~~6	36 Hamilton Ave	Increase Over Ambient	21.3 ~~27.5~~	20.8 ~~27.9~~	24.7 ~~31.6~~	24.1 ~~30.5~~	25.3 ~~31.9~~	19.7 ~~26.9~~	19.9 ~~27.2~~	13.9 ~~16.0~~	14.1 ~~18.9~~	13.9 ~~21.8~~
~~9~~7	60 Hamilton Ave	Projected Sound Level	72.2 ~~72.4~~	71.9 ~~72.9~~	74.5 ~~74.9~~	73.6 ~~73.2~~	74.8 ~~74.5~~	69.3 ~~69.8~~	68.2 ~~69.0~~	62.3 ~~62.1~~	62.6 ~~64.3~~	62.1 ~~64.1~~
~~9~~7	60 Hamilton Ave	Increase Over Ambient	19.9 ~~23.0~~	19.6 ~~23.5~~	22.1 ~~25.5~~	21.2 ~~23.8~~	22.4 ~~25.1~~	16.8 ~~20.4~~	15.5 ~~19.6~~	10.3 ~~12.7~~	10.6 ~~14.9~~	10.1 ~~14.6~~
~~10~~ 8	51 Stuyvesant Place	Projected Sound Level	73.1 ~~73.2~~	72.5 ~~73.7~~	75.3 ~~75.7~~	74.6 ~~74.2~~	75.8 ~~75.5~~	70.1 ~~70.6~~	68.4 ~~69.2~~	61.3 ~~62.5~~	61.4 ~~64.9~~	60.7 ~~64.0~~
~~10~~ 8	51 Stuyvesant Place	Increase Over Ambient	20.3 ~~23.8~~	19.7 ~~24.3~~	22.4 ~~26.3~~	21.7 ~~24.8~~	22.9 ~~26.1~~	17.3 ~~21.2~~	15.6 ~~19.8~~	9.0 ~~13.1~~	9.1 ~~15.5~~	8.5 ~~14.5~~
~~11~~ 9	140 Richmond Terrace	Projected Sound Level	75.6 ~~76.0~~	75.1 ~~76.5~~	76.3 ~~77.3~~	75.2 ~~74.9~~	77.1 ~~76.9~~	72.9 ~~73.8~~	70.6 ~~72.1~~	61.0 ~~67.0~~	61.1 ~~69.3~~	58.2 ~~66.3~~
~~11~~ 9	140 Richmond Terrace	Increase Over Ambient	20.0 ~~26.6~~	19.5 ~~27.1~~	20.6 ~~27.9~~	19.5 ~~25.5~~	21.4 ~~27.5~~	17.3 ~~24.4~~	15.0 ~~22.7~~	6.4 ~~17.5~~	6.5 ~~19.9~~	4.4 ~~16.8~~
~~12~~	~~160 Richmond Terrace~~	~~Projected Sound Level~~	~~71.3~~	~~71.7~~	~~73.5~~	~~71.9~~	~~73.4~~	~~69.8~~	~~65.0~~	~~62.5~~	~~63.3~~	~~55.2~~
~~12~~	~~160 Richmond Terrace~~	~~Increase Over Ambient~~	~~22.1~~	~~22.4~~	~~24.2~~	~~22.6~~	~~24.1~~	~~20.6~~	~~15.7~~	~~13.2~~	~~14.0~~	~~5.9~~
~~13~~	~~1 Hamilton Ave~~	~~Projected Sound Level~~	~~65.0~~	~~65.6~~	~~67.4~~	~~65.6~~	~~67.4~~	~~64.1~~	~~58.8~~	~~57.0~~	~~58.1~~	~~51.6~~
~~13~~	~~1 Hamilton Ave~~	~~Increase Over Ambient~~	~~15.6~~	~~16.2~~	~~17.9~~	~~16.2~~	~~17.9~~	~~14.7~~	~~9.4~~	~~7.5~~	~~8.7~~	~~2.2~~
~~14~~	~~205 St. Marks Place~~	~~Projected Sound Level~~	~~63.3~~	~~63.6~~	~~65.4~~	~~63.9~~	~~65.5~~	~~61.5~~	~~59.5~~	~~53.5~~	~~55.5~~	~~55.2~~
~~14~~	~~205 St. Marks Place~~	~~Increase Over Ambient~~	~~13.8~~	~~14.1~~	~~16.0~~	~~14.4~~	~~16.1~~	~~12.0~~	~~10.0~~	~~4.1~~	~~6.1~~	~~5.7~~
~~15~~ 10	199 St. Marks Place	Projected Sound Level	67.4 ~~67.7~~	67.0 ~~68.4~~	69.1 ~~69.9~~	68.3 ~~68.0~~	69.8 ~~69.5~~	64.9 ~~65.3~~	62.9 ~~63.5~~	53.9 ~~57.6~~	54.1 ~~59.6~~	53.0 ~~58.1~~
~~15~~ 10	199 St. Marks Place	Increase Over Ambient	18.0 ~~18.2~~	17.6 ~~18.9~~	19.7 ~~20.5~~	18.9 ~~18.5~~	20.4 ~~20.1~~	15.6 ~~15.9~~	13.6 ~~14.0~~	5.8 ~~8.2~~	5.9 ~~10.2~~	5.1 ~~8.7~~
~~16~~	~~198 Richmond Terrace~~	~~Projected Sound Level~~	~~82.6~~	~~82.7~~	~~82.2~~	~~78.8~~	~~80.3~~	~~77.9~~	~~70.5~~	~~70.5~~	~~72.2~~	~~57.9~~
~~16~~	~~198 Richmond Terrace~~	~~Increase Over Ambient~~	~~30.8~~	~~30.9~~	~~30.4~~	~~27.0~~	~~28.5~~	~~26.1~~	~~18.6~~	~~18.6~~	~~20.4~~	~~6.0~~
~~17~~	~~204 Richmond Terrace~~	~~Projected Sound Level~~	~~75.2~~	~~75.5~~	~~76.3~~	~~74.2~~	~~75.6~~	~~72.2~~	~~66.8~~	~~65.2~~	~~67.1~~	~~59.1~~
~~17~~	~~204 Richmond Terrace~~	~~Increase Over Ambient~~	~~23.4~~	~~23.7~~	~~24.5~~	~~22.4~~	~~23.8~~	~~20.4~~	~~15.0~~	~~13.4~~	~~15.3~~	~~7.3~~

ID	Property	Condition	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10
~~18~~	~~100 Richmond Terrace~~	~~Projected Sound Level~~	~~66.9~~	~~67.2~~	~~71.0~~	~~70.0~~	~~71.8~~	~~67.6~~	~~67.2~~	~~56.2~~	~~57.9~~	~~60.3~~
		~~Increase Over Ambient~~	~~17.4~~	~~17.7~~	~~21.6~~	~~20.6~~	~~22.4~~	~~18.1~~	~~17.7~~	~~6.8~~	~~8.4~~	~~10.8~~
~~19~~	~~Casteton Park Apts North Playground~~	~~Projected Sound Level~~	~~71.0~~	~~71.5~~	~~73.1~~	~~71.5~~	~~73.2~~	~~69.7~~	~~66.5~~	~~62.4~~	~~63.8~~	~~59.5~~
		~~Increase Over Ambient~~	~~19.6~~	~~20.1~~	~~21.7~~	~~20.1~~	~~21.8~~	~~18.2~~	~~15.1~~	~~10.9~~	~~12.3~~	~~8.1~~
~~20~~ 11	Casteton Park Apts South Playground	Projected Sound Level	70.5 ~~66.4~~	70.1 ~~66.7~~	72.7 ~~67.6~~	72.1 ~~65.8~~	73.6 ~~67.3~~	68.8 ~~64.0~~	65.5 ~~60.0~~	56.9 ~~57.6~~	57.3 ~~59.3~~	54.9 ~~55.4~~
		Increase Over Ambient	15.4 ~~15.0~~	15.0 ~~15.3~~	17.6 ~~16.1~~	17.0 ~~14.3~~	18.5 ~~15.8~~	13.8 ~~12.6~~	10.7 ~~8.5~~	3.9 ~~6.1~~	4.2 ~~7.8~~	2.9 ~~3.9~~

As demonstrated in ~~Table 11-13~~Table 11-12, project-generated construction has the potential to result in increased maximum quarterly noise levels exceeding the 15 dBA threshold over 12 months at ~~18~~11 locations and exceeding the 20 dBA threshold over three months at ~~16~~9 locations in worst-case conditions. The project-generated construction would also exceed the CEQR screening threshold of 3 dBA over 24 months at up to ~~20~~11 locations. These increases are based on a comparison to calibrated existing ~~conservative baseline conditions~~noise levels.

Properties of concern where the CEQR noise impact criteria would be exceeded - and CEQR screening threshold criteria would be exceeded over 24 months - under worst-case conditions are shown in Table 11-13. A significant adverse construction noise impact is assumed for all of these receptors. Potential measures to address these impacts are discussed in Chapter 13, "Mitigation."

Table 11-13: Properties that Exceed Construction Noise Impact Criteria

	Total L~~10~~eq dBA		CEQR Threshold Exceedance Type		
Receptor Location	**Max**	**Min**	**20 dBA by 1Q**	**15 dBA by 4Qs**	**3 dBA by 8 Qs**
185 St Marks Place	81.0 ~~80.6~~	52.5 ~~58.5~~	X	X	X
~~165 St Marks Place~~	~~78.5~~	~~51.6~~	~~X~~	~~X~~	~~X~~
41 Hamilton Ave	79.4 ~~79.0~~	46.7 ~~55.6~~	X	X	X
47 Hamilton Ave	74.5 ~~74.1~~	42.9 ~~53.6~~	X	X	X
53 Hamilton Ave	70.3 ~~70.2~~	41.5 ~~52.6~~	X	X	X
59 Hamilton Ave	68.6 ~~68.4~~	39.7 ~~50.8~~		X	X
~~224 Richmond Terrace~~	~~76.8~~	~~53.3~~	~~X~~	~~X~~	~~X~~
36 Hamilton Ave	81.5 ~~81.3~~	64.0 ~~59.6~~	X	X	X
60 Hamilton Ave	74.8 ~~74.9~~	57.0 ~~56.0~~	X	X	X
51 Stuyvesant Place	75.8 ~~75.7~~	53.0 ~~57.1~~	X	X	X
140 Richmond Terrace	77.1 ~~77.3~~	58.2 ~~50.3~~	X	X	X
~~160 Richmond Terrace~~	~~73.5~~	~~49.3~~	~~X~~	~~X~~	~~X~~
~~1 Hamilton Ave~~	~~67.4~~	~~51.6~~		~~X~~	~~X~~
~~205 St. Marks Place~~	~~65.5~~	~~50.6~~			~~X~~
199 St. Marks Place	69.8 ~~69.9~~	50.9 ~~54.0~~	X	X	X
~~198 Richmond Terrace~~	~~82.7~~	~~52.5~~	~~X~~	~~X~~	~~X~~
~~204 Richmond Terrace~~	~~76.3~~	~~54.4~~	~~X~~	~~X~~	~~X~~
~~100 Richmond Terrace~~	~~71.8~~	~~53.6~~	~~X~~	~~X~~	~~X~~

Receptor Location	Total L10eq dBA		CEQR Threshold Exceedance Type		
	Max	Min	20 dBA by 1Q	15 dBA by 4Qs	3 dBA by 8 Qs
Casteton Park Apts North Playground	73.2	59.5	X	X	X
Castleton Park Apts South Playground	73.6 67.6	54.9 55.4	X	X	X

When accounting for multiple floors at receptors, the properties of concern where the CEQR noise criteria of 3 dBA or more would be exceeded for two or more years under worst-case conditions are:

- 185 St. Marks Place (Castleton Park Apartments – South Tower) – All Floors, northern, eastern, and southern façades;
- Castleton Park Apartments – North Tower (165 St. Marks Place) – All Floors;
- 41 Hamilton Avenue – All Floors, northern (rear) and eastern façades;
- 47 Hamilton Avenue – All Floors, northern (rear) and eastern façades;
- 53 Hamilton Avenue – All Floors, northern (rear) and eastern façades;
- 59 Hamilton Avenue – Floors 2-3 Floor 3, northern (rear) and eastern façades;
- 224 Richmond Terrace – All Floors;
- 36 Hamilton Avenue – All Floors Floors 2-7, northern and eastern façades;
- 60 Hamilton Avenue – All Floors Floors 3-7, northern and eastern façades;
- 51 Stuyvessant Place – All Floors, northern façade;
- 140 Richmond Terrace – All Floors Floor 2, northern and eastern façades;
- 160 Richmond Terrace – All Floors;
- 1 Hamilton Avenue – All Floors;
- 205 St. Marks Place – Level 3;
- 199 St. Marks Place – All Floors Floors 2-3, eastern (rear) façade;
- 198 Richmond Terrace – All Floors;
- 204 Richmond Terrace – All Floors;
- 100 Richmond Terrace – All Floors;
- Castleton Park Apartments North Playground
- Castleton Park Apartments South Playground

Due to site topography, it is possible that elevated construction-generated noise may cause additional significant adverse impacts to construction-generated noise on all floors of the Castleton Park Apartments. This will be analyzed between the draft and final EIS.The ambient conditions at the properties of concern on Stuyvesant Place and Hamilton Avenue range from 58.3 dBA to 66.5 dBA. The maximum quarterly noise increase at the receptorts of concern range from 31.9 dBA at 36 Hamilton Avenue to 16.1 dBA at 205 St. Marks Place. To determine the magnitude of potential noise level increases due to elevated equipment on the Castleton Park Apartments (both North and South towers), equipment that could be used at an elevated height was modeled at the top floor elevation to determine the worst case scenario. When comparing the increase over ambient noise levels, the Castleton Park Apartments' towers are exposed to an additional 0.0 to 10.5 dB of construction-generated noise from elevated sources, with the greatest increase in noise occurring in Q6 during the Envelope and Façade phase. Construction-generated noise levels during the Interior Fit-out phase is projected to be equal to or less than the Superstructure and Envelope and Façade phases because much of the equipment will be enclosed behind the attenuating façade.

The Castleton Park Apartments – South Tower (185 St. Marks Place), 36 Hamilton Avenue, and 60 Hamilton Avenue include double-pane windows and through-wall AC units, while the receivers 199 St. Marks Place and 41, 53, and 59 Hamilton Avenue include single-pane windows and window AC units. 47 Hamilton Avenue includes single pane windows but does not appear to have alternate means of ventilation. 51 Stuyvesant Place is currently a vacant building, owned by the city and is expected to remain vacant in the No-Action and With-Action conditions. 140 Richmond Terrace includes double pane windows and rooftop AC units.

~~Most of the receivers along Hamilton Avenue and Stuyvesant Place include single pane windows while some buildings may include double pane windows.~~ Single pane windows with alternate means of ventilation are estimated to have a minimum attenuation of 25 dBA~~,~~ and double pane windows with alternate means of ventilation are estimated to have a minimum attenuation of 30 dBA. ~~Receptors with single pane windows were noted to have through-wall or through-window are conditioning units, as this could affect interior noise levels. Based on the maximum estimated quarterly construction noise levels, interior noise levels of approximately 60 dBA would occur where single pane windows are used, and an interior noise level of 55 dBA would occur where double pane windows are used. Detailed review of window attenuation will be completed between the draft and final EIS, however, all properties exceeding the impact criteria under worst case conditions are considered for potential significant adverse impacts.~~ Windows without alternate means of ventilation are assumed to be open window condition, which is estimated to have an attenuation of 10 dBA. Based on the maximum estimated quarterly construction L_{eq} noise levels adjusted to L_{10} noise levels, the following interior L_{10} noise levels are expected:

- Castleton Park Apartments – South Tower (185 St. Marks Place) – 54.0 dBA;
- 41 Hamilton Avenue – 57.4 dBA;
- 47 Hamilton Avenue – 67.5 dBA;
- 53 Hamilton Avenue – 48.3 dBA
- 59 Hamilton Avenue – 46.6 dBA;
- 36 Hamilton Avenue – 54.5 dBA;
- 60 Hamilton Avenue – 47.8 dBA;
- 51 Stuyvesant Place – 53.8 dBA;
- 140 Richmond Terrace – 50.1 dBA; and
- 199 St. Marks Place – 47.8 dBA.

With alternate means of ventilation, residential receptors at the Castleton Park Apartments – South Tower, 36 Hamilton Avenue, 41 Hamilton Avenue, 53 Hamilton Avenue, 59 Hamilton Avenue, 60 Hamilton Avenue, 51 Stuyvesant Place, and 199 St. Marks Place are expected to have interior noise levels between 48.3 dBA and 57.4 dBA. Without an identified alternate means of ventilation, the residential property at 47 Hamilton Avenue is expected to have interior noise levels up to 67.5 dBA. The commercial office receptor on the second floor of 140 Richmond Terrace is expected to have an interior noise level up to 50.1 dBA.

According to the *CEQR Technical Manual*, nuisance levels for noise are generally considered to be more than 45 dBA indoors for residential and community facility uses, and 50 dBA for commercial office uses. Project-generated noise may temporarily exceed the applicable CEQR screening or impact criteria for the project-generated construction period at Castleton Park Apartments – South Tower, 36 Hamilton Avenue, 41 Hamilton Avenue, 47 Hamilton Avenue, 53 Hamilton Avenue, 59 Hamilton Avenue, 60 Hamilton Avenue, 51 Stuyvesant Place, 199 St. Marks Place, and 140 Richmond Terrace. During projected worst-case conditions, there would be less than a 3 dBA exceedance of the recommended CEQR interior noise levels at the residential properties of 59 Hamilton Avenue (46.6 dBA), 60 Hamilton Avenue (47.8 dBA) and 199 St. Marks Place (47.8 dBA), and at the second floor of the commercial office building at 140 Richmond Terrace (50.1 dBA).

Elevated noise levels in the surrounding area are typical for nearly all construction projects. The maximum predicted noise levels shown in Table 11-12 details the worst-case scenario for the peak hourly noise levels (i.e. the most noise- intensive activities of construction) resulting from construction in each quarter, when all equipment used in each quarter is assumed to operate simultaneously. The projected noise levels are conservative in predicting increases in noise levels. Typically, the loudest hourly noise level during each quarter of construction would not persist throughout the entire quarter (nor do they occur every workday or work hour on days ~~during which~~ those activities are conducted); therefore, it is highly likely that actual noise levels will be lower than the worst-case conditions. During hours when the more substantive noise sources (e.g., concrete trucks and dozers) are in use significantly less, receptors would experience lower construction noise levels. Further, construction noise levels also fluctuate during the construction period at each receptor, with the greatest levels of construction noise occurring for limited periods during construction.

~~Construction in quarters 8, 9 and 10, when interior fitout of Buildings 1 and 2 would occur, construction-generated noise would be less because:~~

- ~~Construction materials being delivered would largely be related to finishes, which would be delivered in smaller delivery vehicles. To conservatively represent worst-case conditions, the analysis assumed these finishing materials would be delivered in large (noisier) trucks; and~~

- ~~To present a worst-case condition, construction equipment projected to be used in the interior fitout stage was assumed to be used outside the buildings. In practice, some of the machinery would be used within the building, and would be partially attenuated by the buildings' façades. The construction noise may be audible, however, the project-generated noise would begin to drop after the first five quarters of construction.~~

~~Readings of existing noise conditions did not capture noise generated by the private playgrounds at the Castleton Park Apartments; therefore, the results above present a conservative assessment of the increase in noise levels over the ambient conditions. When ambient noise levels are recalibrated to account for playgroud noise, the ambient noise levels will increase. Baseline ambient noise conditions will be recalibrated between the draft and final EIS to account for playground noise from the Castleton Park Apartments, which may reduce the increase in noise levels during construction.~~

Buildings 1, 2, and 3 will be built simultaneously, and therefore would not become sensitive receivers during the ongoing construction (and therefore would not result in project-on-project effects). The construction of Building 3 would shield a significant amount of construction-generated noise from reaching the residences on Projected Development Site 2, and would not generate a significant adverse construction impact at this location. The construction of Projected Development Site 2 would occur six months after construction is complete on Projected Development Site 1, and would be classified as short-term because construction would last for 15 months (five quarters).

Noise Conclusion

The detailed construction noise analysis found project-generated construction has the potential to exceed either the *CEQR Technical Manual* construction noise screening threshold for an extended period of time or the CEQR construction noise impact criteria at receptors surrounding the proposed construction work areas. Construction of the proposed project would result in increased maximum quarterly noise levels exceeding the 15 dBA threshold over 12 months at ~~18 location~~11 locations and exceeding the 20 dBA threshold over three months at ~~16~~9 locations in worst-case conditions. The project-generated construction would also exceed the CEQR screening threshold of 3 dBA over 24 months at up to ~~20~~11 locations. Therefore, absent mitigation, project-generated construction noise would result in a significant adverse construction noise impact. ~~The analysis was conservatively based on reviewing noise level increases as compared to the existing average L90 noise levels; a further refined analysis, which will include a calibrated modelling of the existing Leq noise levels, will be completed between the draft and final EIS. Mitigations will be developed between the draft and final EIS.~~

The increase in noise levels at nearby receptors would primarily be due to noise generated by on-site construction activities (rather than construction-related traffic). This noise analysis examined worst-case hourly noise levels that would result from construction in each analyzed quarter and represent the worst-case increase in noise levels from project-generated construction activities. Typically, the loudest hourly noise level during each quarter of construction would not persist throughout the entire quarter, and would be dependent on the specific construction equipment ~~that would be~~ employed for various construction tasks. When accounting for projected worst-case construction noise levels, eight residential properties are projected to experience interior noise levels above 45 dBA, exceeding the acceptable interior noise level criteria per CEQR for residential properties. The commercial office space on the second floor of 140 Richmond Terrace would only exceed the interior noise level criteria by a maximum of 0.1 dBA for one quarter. 51 Stuyvesant Place – the other commercial building that would experience a significant adverse construction noise impact – is a vacant, city-owned office building that is expected to remain vacant. Furthermore, the actual construction-generated noise would be of less magnitude, in which case construction noise would be less intense than this assessment predicts.