CHAPTER 20: CONSTRUCTION

A. INTRODUCTION

This chapter assesses the potential impacts of the construction of buildings expected to result on Projected Development Sites in the Project Area in the With-Action Condition. The following sections discuss the potential impacts resulting from the construction on the Projected Development Sites as described in the Reasonable Worst Case Development Scenario (RWCDS) in Chapter 1, "Project Description." Construction impacts, although temporary, can include noticeable and disruptive effects from an action that is associated with construction or could induce construction. As stated in the *CEQR Technical Manual,* determination of the significance of construction impacts is usually important when construction activity could affect traffic conditions, hazardous materials, archaeological resources, integrity of historic resources, community noise patterns, or air quality conditions. According to the *CEQR Technical Manual*, construction duration is often broken down into short-term (less than two years) and long-term (two or more years). Where the duration of construction is expected to be short-term, any impacts resulting from such short-term construction generally do not require detailed assessment. As described in this chapter, it is estimated that it would generally take less than 24 months to complete construction on most of the Projected Development Sites; therefore, construction duration under the Proposed Actions would generally be considered short-term. However, as construction activity associated with the RCWDS would occur on multiple Projected Development Sites within the same geographic area, such that there is the potential for several construction timelines to overlap, a preliminary assessment of potential construction impacts was prepared in accordance with the guidance of the *CEQR Technical Manual*.

As described in other chapters of this Final Environmental Impact Statement (FEIS), buildings constructed on the Projected Development Sites in the With-Action Condition are expected to be between 35 to 145 feet in height. Construction on the 30 Projected Development Sites is anticipated to be completed in the 12 years following the adoption of the Proposed Actions (Build Year 2030). In addition, there are 23 Potential Development Sites considered less likely to be developed by the 2030 analysis year and are therefore not considered in this assessment.

B. PRINCIPAL CONCLUSIONS

TRANSPORTATION

Trips generated due to construction activity associated with the Proposed Actions are expected to peak in the first quarter (Q1) of 2029. Therefore, this time period was selected as a reasonable worst-case analysis period to assess the potential for transportation impacts during construction. As most Projected Development Sites would be constructed and occupied by the peak construction period, it is recommended that all mitigation measures related to traffic, transit and pedestrian elements be advanced and implemented for the 2029 (Q1) construction peak condition. Based on construction analysis, as presented in this chapter, it is expected that construction transportation impacts would be mitigated by the proposed mitigation measures, provided for the project (operational) and no additional significant transportation impacts are likely. However, a limited detailed transportation analysis for the peak construction period would be conducted for potential transportation significant impacts, during the construction period.

TRAFFIC

During construction, traffic would be generated by construction workers commuting via autos and by trucks making deliveries to Projected Development Sites. In 2029 (Q1), traffic conditions during the 6:00 to 7:00 AM and 3:00 to 4:00 PM construction peak hours are expected to be generally similar or better than during the analyzed operational peak hours with full build-out of the Proposed Actions in 2030. Consequently, there would be less likelihood of significant adverse traffic impacts during the construction period beyond those identified in Chapter 14, "Transportation". It is expected that the mitigation measures identified for 2030 operational traffic impacts would also be effective at mitigating any potential impacts from construction traffic during 2029 (Q1).

TRANSIT

The Projected Development Sites are in an area that is well served by public transportation. During 2029 (Q1), transit conditions during the 6:00 to 7:00 AM and 3:00 to 4:00 PM construction peak hours are expected to be generally better than during the analyzed operational peak hours with full build-out of the Proposed Actions in 2030. As the Proposed Actions are not expected to result in any significant Staten Island Railway (SIR) station or linehaul impacts, no SIR impacts are expected during construction. The Proposed Actions' significant adverse bus impacts would also be less likely to occur during construction than with full build-out of the Proposed Actions in 2030, as incremental demand would be lower during construction and would not occur during the peak hours of commuter demand. It is expected that the mitigation measures identified for 2030 operational transit impacts in Chapter 21, "Mitigation," would also be effective at mitigating any potential bus impacts from construction transit trips during 2029 (Q1).

PEDESTRIANS

Pedestrian trips generated by construction workers during 2029 (Q1) would be distributed among the four Projected Development Sites that would be under construction in this period and would primarily occur outside of the weekday AM and PM commuter peak periods. There would be fewer overall pedestrians in the study area during the commuter peak hour during 2029 (Q1) compared to the full build-out of the Proposed Actions in 2030. Consequently, there would be less likelihood of significant adverse pedestrian impacts during the construction period. It is expected that the mitigation measures identified for 2030 operational pedestrian impacts would also be effective at mitigating any potential impacts from construction pedestrian traffic during 2029 (Q1).

PARKING

Based on the extent of available on-street parking spaces within ¼-mile of the Project Area, there would be sufficient on-street parking capacity to accommodate all projected construction worker parking demand during the 2029 (Q1) peak construction period. Therefore, significant adverse parking impacts during construction are not anticipated.

AIR QUALITY

Measures would be taken to reduce pollutant emissions during construction in accordance with all applicable laws, regulations, and building codes, and if applicable, New York City Local Law 77[1]. These include dust suppression measures, idling restriction, and the use of ultra-low-sulfur diesel (ULSD). In addition to the required laws and regulations, an emissions reduction program, including the use of best available tailpipe reduction technologies and utilization of newer equipment would be implemented for Projected Development Sites with construction durations of more than two years. 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 that the annual-average NO_2, one-hour and 8-hour CO and 24-hour and annual $PM_{2.5}$ concentrations would be below their corresponding National Ambient Air Quality Standards (NAAQS) and de-minimus thresholds for both time periods evaluated. Therefore, construction under the Proposed Actions would not result in significant adverse air quality impacts due to construction sources.

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

NOISE

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

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

[1] New York City Administrative Code § 24-163.3, adopted December 22, 2003, also known as Local Law 77, requires that any diesel-powered nonroad engine with a power output of 50 hp or greater shall be powered by ULSD, and utilize the Best Available Technology (BAT) for reducing the emission of pollutants, primarily PM and secondarily NO_x. This requirement applies to all City-owned nonroad diesel vehicles and engines and any privately owned diesel vehicles and engines used on construction projects funded by the City.

Based on the construction predicted to occur at each Projected Development Site during each of the selected analysis periods, many receptors are expected to experience an exceedance of the *CEQR Technical Manual* noise impact threshold. One peak construction period per year was analyzed, from 2019 to 2030. Receptors where noise level increases are predicted to exceed the noise impact threshold criteria for two or more consecutive years were identified.

The noise analysis results show that the predicted noise levels could exceed the *CEQR Technical Manual* impact criteria throughout the Project Area. This analysis is based on a conceptual site plan and construction schedule. It is possible that the actual construction may be of less magnitude, or that construction on multiple Projected Development Sites may not overlap, in which case construction noise would be less intense than the analysis predicts.

VIBRATION

The buildings and structures of most concern with regard to the potential for structural or architectural damage due to vibration would be buildings immediately adjacent to a Projected Development Site. Vibration levels at all of these buildings and structures would be expected to be below the 0.50 inches/second PPV limit. At locations further from Projected Development Sites, the distance between construction equipment and receiving buildings or structures is large enough to avoid vibratory levels that would approach the levels that would have the potential to result in architectural or structural damage.

In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels that exceed the 65 VdB limit are pile drivers. They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 230 feet. However, the operation would only occur for limited periods of time at a particular location and, therefore, would not result in any significant adverse impacts. In no case are significant adverse impacts from vibrations expected to occur.

OTHER ANALYSIS AREAS

Construction of the 30 Projected Development Sites would not result in significant adverse impacts in the areas of land use and neighborhood character, socioeconomic conditions, open space, or hazardous materials. Based on the RWCDS construction schedule, construction activities would be spread out over a period of approximately 12 years, throughout an approximately 20-block Project Area, and construction of most of the Projected Development Sites would be short-term (i.e., lasting up to 24 months), with the exception of Projected Development Sites 2, 4, 5, 7, City Disposition Site 2, and the Stapleton Waterfront Phase III sites, which are assumed to last up to 27 months. While construction of the Projected Development Sites would result in temporary increases in traffic during the construction period, access to residences, businesses, and institutions in the area surrounding the development sites would be maintained throughout the construction period (as required by City regulations). No open space resources would be located on any of the Projected Development Sites, nor would any access to publicly accessible open space be impeded during construction within the Project Area. In addition, measures would be implemented to control noise, vibration, emissions, and dust on construction sites, including the erection of construction fencing incorporating sound reducing measures. While construction of the new buildings due to the Proposed Actions would cause temporary impacts, particularly related to noise, it is expected that such impacts in any given area would be relatively short-term, even under the worst-case construction sequencing, and therefore would not create an open space or neighborhood character impact.

A detailed assessment of potential impacts on historic and cultural resources, including both archaeological and architectural resources, is described in Chapter 7, "Historic and Cultural Resources." Construction period impacts on any designated historic resources would be minimized, and the historic structures would be protected, by ensuring that adjacent development projected as a result of the Proposed Actions adheres to all applicable construction guidelines and follows the requirements laid out in the New York City Department of Building's (DOB's) Technical Policy and Procedure Notices (TPPN) #10/88. This would apply to construction activities on two Projected Development Sites: Site 2, which is located within 90 feet of Tompkinsville (Joseph H. Lyons) Pool (New York City Landmarks Preservation Commission (LPC) -designated; State/National Register of Historic Places (S/NR) -eligible), and City Disposition Site 1, which is located within 90 feet of the 120th Police Precinct Station House (LPC-designated; S/NR-eligible) and the Staten Island Family Courthouse (LPC-designated; S/NR-eligible). Development under the Proposed Actions could also potentially result in construction-related impacts to non-designated and/or non-listed resources, as these resources are not afforded the added special protections under DOB's TPPN #10/88. Additional protective measures afforded under DOB's TPPN #10/88 would only become applicable if the eligible resources are designated, and/or listed in the future prior to the initiation of construction. The Proposed Actions would result in significant adverse construction-related impacts to two eligible historic resources, the S/NR-eligible 292 Van Duzer Street and the S/NR-eligible and New York City Landmark (NYCL) -eligible Stapleton Branch of the New York City Public Library from construction of developments within 90 feet on Potential Development Site Q and Projected Development Site 20, respectively. In addition, construction activity at Projected Development Site 5 has the potential to result in significant adverse archaeology impacts.

Any potential construction-related hazardous materials would be avoided by the inclusion of (E) designations, for all privately held Projected and Potential Development Sites (25 Projected Development Sites and 23 Potential Development Sites). In addition, for two of the three City-owned sites identified for disposition (City Disposition Sites 1 and 2), the environmental requirements with respect to hazardous materials would be incorporated into the land disposition agreement (LDA) between the City of New York and the future developer.[2] For the two Stapleton Waterfront Phase III Projected Development Sites, human exposure to known on-site hazardous materials on both of the sites would be reduced or eliminated during and after remediation/construction by following the health and safety protocols and implementing the remedial measures outlined in the Phase II Environmental Site Investigation (ESI) Report and Remedial Action Work Plan (RAWP). Implementation of the RAWP would be required pursuant to a Memorandum of Understanding (MOU) between the New York City Economic Development Corporation (EDC) and the New York City Department of Environmental Protection (DEP).). Through the implementation of the preventative and remedial measures outlined in the (E) designations applied to 25 eligible Projected Development Sites and all of the 23 Potential Developments Sites, and comparable measures applied to City Disposition Sites 1 and 2, and Stapleton Phase III Sites, the Proposed Actions would not result in significant adverse impacts from hazardous materials. In addition, demolition of interiors, portions of

[2] The remaining City-owned site proposed for disposition (City Disposition Site 3; [Block 6, Lot 2]) is not anticipated to require environmental restrictions.

buildings, or entire buildings are regulated by the DOB and require abatement of asbestos prior to any intrusive construction activities, including demolition. U.S. Occupational Safety and Health Administration (OSHA) regulates construction activities to prevent excessive exposure of workers to contaminants in the building materials, including lead paint. New York State Solid Waste regulations control where demolition debris and contaminated materials associated with construction are handled and disposed of. Adherence to these existing regulations would prevent impacts from construction activities at any of the Projected Development Sites in the Project Area.

C. REGULATORY FRAMEWORK

GOVERNMENTAL COORDINATION AND OVERSIGHT

The governmental oversight of construction in New York City is extensive and involves a number of City, state, and federal agencies. Table 20-1 shows the main agencies involved in construction oversight and each agency's areas of responsibility. The primary responsibilities lie with New York City agencies. DOB has the primary responsibility for ensuring that the construction meets the requirements of the New York City Building Code and that buildings are structurally, electrically, and mechanically safe. In addition, DOB enforces safety regulations to protect both construction workers and the public. The areas of responsibility include the enforcement of regulations pertaining to the installation and operation of construction equipment, such as cranes and lifts, sidewalk sheds, and safety netting and scaffolding. DEP enforces the New York City Noise Control Code (also known as Chapter 24 of the Administrative Code of the City of New York, or Local Law 113) and the DEP Notice of Adoption Rules for Citywide Construction Noise Mitigation (also known as Chapter 28), approves Remedial Action Plans (RAPs) and Construction Health and Safety Plans (CHASPs), regulates water disposal into the sewer system, and oversees dust control for construction activities. The New York City Fire Department (FDNY) has primary oversight for compliance with the New York City Fire Code and for the installation of tanks containing flammable materials. The New York City Department of Transportation (DOT) reviews and approves any traffic lane and sidewalk closures. The New York City Landmarks Preservation Commission (LPC) approves studies and testing to prevent loss of archaeological materials and to prevent damage to fragile historic structures.

Table 20-1: Construction Oversight in New York City

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

On the state level, the New York State Department of Environmental Conservation (DEC) regulates discharge of water into rivers and streams, disposal of hazardous materials, and construction, operation, and removal of bulk petroleum and chemical storage tanks. The New York State Department of Labor (DOL) licenses asbestos workers. New York City Transit (NYCT) oversees bus stop relocations, and any subsurface construction within 200 feet of a subway. On the federal level, the U.S. Environmental Protection Agency (EPA) has wide ranging authority over environmental matters, including air emissions, noise emission standards, hazardous materials, and the use of poisons. Much of the responsibility is delegated to the state level. The U.S. Occupational Safety and Health Administration (OSHA) sets standards for work site safety.

D. CONCEPTUAL CONSTRUCTION SCHEDULE AND ACTIVITIES

A total of 30 Projected Development Sites have been identified in the Project Area on which new buildings could be constructed or existing buildings enlarged and/or converted over an approximately 12-year construction period through 2030. At this time, there are no specific construction programs or finalized designs for the Projected Development Sites. Actual construction methods and materials may vary, depending on how the construction contractors choose to implement their work to be most cost effective, within the requirements set forth in bid, contract, and construction documents. Construction specifications for each Projected Development Site would require that construction contractors comply with applicable environmental regulations and obtain necessary permits for the duration of construction. Construction of each development site would follow applicable federal, state, and local laws for building and safety, as well as local noise ordinance, as appropriate.

CONSTRUCTION SEQUENCING

For analysis purposes, a reasonable worst-case conceptual construction phasing and schedule for the development anticipated to occur under the Proposed Actions was established by the New York City Department of City Planning (DCP) to illustrate how development could occur over approximately the next 12 years. Because the Projected Development Sites within the Project Area are predominantly in private ownership, the timing of the development of those sites is unknown. As such, RWCDS presented in Chapter 1, "Project Description" does not describe which of the sites would be developed first to assume a particular sequence of development. Market considerations would ultimately determine the demand for development.

Generally, vacant or partially vacant development sites without irregular lot conditions and that do not require assemblages were given greater weight for an earlier construction start. Development sites with existing buildings, with irregular lot conditions or requiring assemblage for development are assumed to be developed later within the build year. In addition, the Projected Development Sites where there are known plans are assumed to begin construction earlier, closer to the time of project approvals (i.e., in the third quarter of 2019). In estimating the duration of the construction period for each site, it is generally assumed that sites accommodating less than 75,000 sf of development would take between 12 and 18 months to complete construction, whereas sites with a larger anticipated development floor area are assumed to take between 24 and 27 months. Conversions of existing buildings are anticipated to take less than 12 months. The conceptual construction schedule conservatively accounts for overlapping construction activities at development sites in proximity to one another to capture the cumulative nature of construction impacts with respect to number of worker vehicles, trucks, and construction equipment at any given time, within reasonable construction scheduling constraints for each of the Development Sites in the Project Area.

Figure 20-1 presents the conceptual construction sequencing for use in the analysis of the Proposed Actions. In the conceptual construction schedule, construction activities are assumed to begin in the third quarter of 2019 and take place over a 12-year period. It is conservatively assumed that construction of all Projected Development Sites would be completed by the end of the 2030 analysis year. Construction of most of the Projected Development Sites would be considered short-term (i.e., lasting up to 24 months) in accordance with the *CEQR Technical Manual*. Seven of the Projected Development Sites would have a construction period lasting more than 24 months (27months each).

TYPICAL CONSTRUCTION ACTIVITIES

Construction of mid-rise or large-scale buildings in New York City typically follows a general pattern. The first task is construction startup, which involves the siting of field offices, installation of temporary power and communication lines, and the erection of site perimeter fencing. Then, if there is an existing building on the site, any potential hazardous materials (such as asbestos) are abated, and the building is then demolished with some of the materials recycled and the debris taken to a licensed disposal facility. For sites requiring new or upgraded public utility connections, these activities are undertaken next (e.g., electrical connections, and installation of new water or sewer lines and hook-ups, etc.). Excavation and removal and/or addition and re-grading of the soils is the next step, followed by construction of the foundations. When the below-grade construction is completed, construction of the core and shell of the new building begins. The core is the central part of the building and is the main part of the structural system. It contains the elevators and the mechanical systems for heating, ventilation, and air conditioning (HVAC). The shell is the outside of the building. As the core and floor decks of the building are being erected, installation of the mechanical and electrical internal networks would start. As the building progresses upward, the exterior cladding is placed, and the interior fit out begins. During the busiest time of building construction, the upper core and structure are built while the mechanical/electrical connections, exterior cladding, and interior finishing progress on lower floors. Finally, site work, including landscaping, and other site work associated with a particular building site, like completing or resurfacing new access roadways and sidewalks (or for waterfront sites, completing the associated segments of waterfront esplanade and upland connections) is undertaken, and site access and protection measures required during construction are removed.

GENERAL CONSTRUCTION TASKS

Construction of various components of the Projected Development Sites would occur over a number of years, with construction activities and intensities varying, depending upon which components of the overall development sites are underway at a given time. The following is a general outline of typical construction stages on the development sites. It should be noted, however, that the duration and extent of new construction activities would vary based on which site is being developed. For smaller sites, the construction process is much simpler and shorter in duration, typically lasting between 12 and 18 months, while construction of larger Projected Development Sites would be more intensive, and is conservatively estimated to last between 24 and 27 months.

- Months 1-4: Site clearance, excavation, and foundation. The first four months of construction would entail site clearance (including demolition of existing buildings); digging, pile-driving, pile capping, and excavation for the foundation; dewatering (to the extent required); and reinforcing and pouring of the foundation. Typical equipment used for these activities would include excavators, backhoes, tractors, pile-drivers, hammers, and cranes. Trucks would arrive at the site with pre-mixed concrete and other building materials and would remove any excavated material and construction debris.
- Months 5-12: Underground parking foundation (if any), erection of the superstructure, and façade and roof construction. Once the foundations have been completed, the construction of the building's steel framework, parking ramp (if any), and decking would take place. This process involves the installation of beams, columns and decking, and would require the use of cranes, derricks, hoists, and welding equipment, as warranted. This stage of construction would also include the assembly of exterior walls and cladding, as well as roof construction
- Months 13-24: Mechanical installation, interior and finishing work. This would include the installation of HVAC equipment and ductwork; installation and checking of elevator, utility, and life safety systems; and work on interior walls and finishes. During these activities, hoists and cranes would continue to be used, and trucks would remain in use for material supply and construction waste removal. It should be noted that since much of this stage of construction would occur when the building is fully enclosed, disruption to the surrounding neighborhood would be minimized.

The phases, duration, and overlap of construction activities specific to a particular development site are identified in Figure 20-1. It should be noted that the actual duration of such activities could vary based upon which site is developed. For example, the time necessary for each activity would vary depending upon such factors as work hours, traffic restrictions, and contractors' means and methods. Other factors would include the number and type of utilities requiring relocation and the location, and condition of nearby surface and subsurface structures.

ESTIMATE OF CONSTRUCTION WORKERS AND CONSTRUCTION PERIOD TRUCKS

Worker and truck projections were based on representative sites of similar sizes and uses from prior EIS documents and information for similar known construction projects in the City.[3] Projected Development Sites were categorized based on similar size and use, and the most intense month from each stage of construction (demolition/excavation/ foundation, superstructure/exterior, and interior) for each site was identified and used as a scaling factor for projections. Each of the 30 Projected Development Sites was then assigned to the appropriate size category and the projections were scaled on a worker or truck per square foot basis. The resultant estimate of the number of trucks and workers per quarter are summarized in Table 20-2. As indicated in Table 20-2**,** over the duration of the 12-year analysis period, the number of daily construction workers would average 194, and the number of daily construction trucks would average 33. The number of daily construction workers and trucks would peak in the first quarter of 2029 (at 377 construction workers and 62 construction trucks).

[3] For purposes of this analysis, construction data from the 2016 *East New York Rezoning Proposal FEIS* were used.

Figure 20-1: Assumed Construction Schedule for Assessment of Construction Impacts

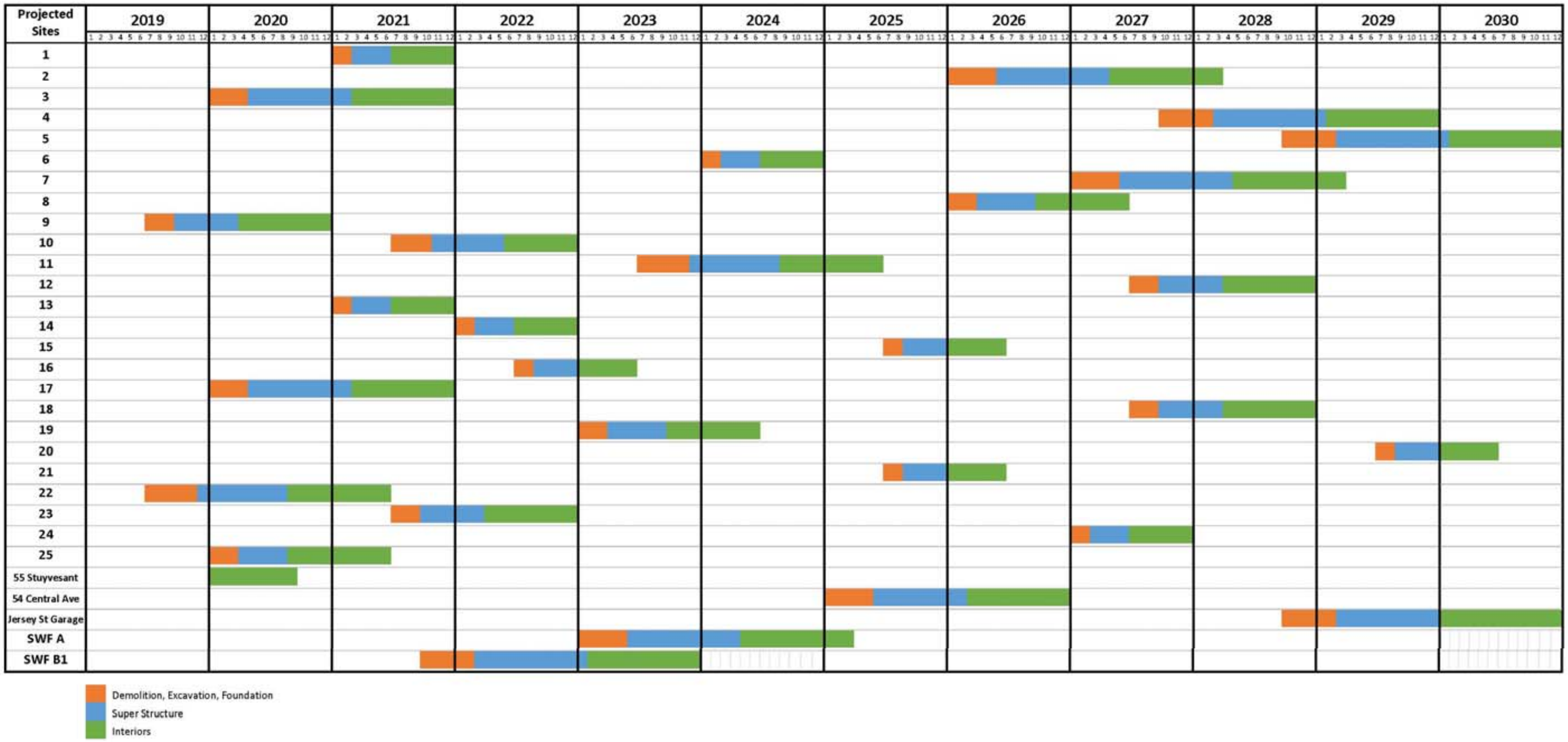


Table 20-2: Estimated Total Number of Construction Workers and Construction Trucks On-Site Per Day

Year	2019				2020				2021				2022			
Quarter	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*
Construction Workers	-	-	41	57	171	212	212	200	207	207	185	272	150	150	156	156
Construction Trucks	-	-	6	8	27	32	35	33	40	40	36	49	21	24	25	25
Year	**2023**				**2024**				**2025**				**2026**			
Quarter	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*
Construction Workers	213	253	267	276	181	181	168	168	177	59	38	38	113	142	134	134
Construction Trucks	39	43	45	46	26	34	34	34	35	10	5	5	20	23	21	21
Year	**2027**				**2028**				**2029**				**2030**			
Quarter	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*	*1st*	*2nd*	*3rd*	*4th*
Construction Workers	155	174	189	254	271	178	178	346	377	311	316	316	240	240	235	235
Construction Trucks	24	31	33	43	44	31	31	58	62	49	49	49	48	48	47	47

	Project Total	
	Peak	**Average**
Construction Workers	377	194
Construction Trucks	62	33

CONSTRUCTION WORK HOURS

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

Occasionally, Saturday or overtime hours may be required to complete some time-sensitive tasks. Weekend work requires a permit from the DOB and, in certain instances, approval of a noise mitigation plan from DEP under the City's Noise Code. The New York City Noise Control Code, as amended in December 2005 and effective July 1st, 2007, limits construction (absent special circumstances as described below) to weekdays between the hours of 7 AM and 6 PM and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6 PM and 7 AM or on weekends) 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. In such cases, the number of workers and pieces of equipment in operation would be limited to those needed to complete the particular authorized task. Therefore, the level of activity for any weekend work would be less than a normal workday. The typical weekend workday would be on Saturday from 7 AM with worker arrival and site preparation to 5 PM for site cleanup.

CONSTRUCTION STAGING AREAS, SIDEWALK AND LANE CLOSURES

Construction staging areas, also referred to as "laydown areas," are sites that would be used for the storage of materials and equipment and other construction-related activities. Work zones are those areas where the construction is occurring. Field offices for contractors and construction managers would be situated at staging areas or in existing office space near the work areas. Staging areas would typically be fenced and lit for security and would adhere to New York City Building Codes. Staging areas of adequate size and proximity to the construction sites are essential to minimize construction traffic through the Project Area and to provide adequate space and access for construction activities. While vacant parcels are available within close proximity to several of the Projected Development Sites that could be used for staging areas, it is anticipated that construction staging would most likely occur on the Projected Development Sites themselves and may in some cases, extend within the curb and travel lanes and sidewalks of public streets adjacent to the construction site.

As is typical with construction projects in New York City, it is anticipated that some sidewalks immediately adjacent to construction sites would be closed to accommodate heavy loading areas for at least several months of the construction period for each site. Pedestrians would either use a temporary walkway in a sectioned-off portion of the street or be diverted to walk on the opposite side of the street. Detailed MPT plans for each construction site would be submitted for approval to the DOT Office of Construction Mitigation and Coordination (OCMC), the entity that insures critical arteries are not interrupted, especially in peak travel periods. Builders would be required to plan and carry out noise and dust control measures during construction.

Appropriate protective measures for ensuring pedestrian safety surrounding each of the Projected Development Sites would be implemented under these plans. Construction activities would also be subject to compliance with the New York City Noise Code and by the U.S. Environmental Protection Agency (EPA) noise emission standards for construction equipment. In addition, there would be requirements for street crossing and entrance barriers, protective scaffolding, and compliance with applicable construction safety measures.

E. PRELIMINARY ASSESSMENT

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

TRANSPORTATION

The Proposed Actions would result in the construction of 30 Projected Development Sites in the Project Area between 2019 and 2030, a 12-year period. These developments would replace anticipated No-Action uses on the Projected Development Sites. During the construction period, Projected Development Sites would generate trips by workers traveling to and from the construction sites, as well as trips associated with the movement of construction materials and equipment. An evaluation of construction phasing and worker/truck projections was undertaken to assess potential transportation-related impacts associated with construction; however, given typical construction hours, construction-related trips would be concentrated in the early morning and mid-afternoon periods on weekdays and are generally not expected to represent a substantial increment during the area's peak travel periods. As most Projected Development Sites would be constructed and occupied by the peak construction period, it is recommended that all mitigation measures related to traffic, transit and pedestrian elements be advanced and implemented for the 2029 (Q1) construction peak condition.

TRAFFIC

Average daily construction worker and truck activities by quarter were projected for the entire construction period, as shown in Figure 20-1. Construction is anticipated to begin in the third quarter of 2019 and end in the fourth quarter of 2030. Peak construction traffic is expected to be generated during 2029 (Q1), at which time four Projected Development Sites would be under construction: Sites 4, 5, and 7 on Bay Street and the Jersey Street Garage Site. All other sites except Site 20 would have been constructed and in operation at this time; construction of Site 20 would start during 2029 (Q3). For a reasonable worst-case analysis of potential transportation-related impacts during construction, the daily workforce and truck trip projections during this period were used as the basis for estimating peak hour construction trips. As shown in Table 20-2, above it is expected that construction activities would generate an average of 377 workers and 62 truck deliveries per day during the peak construction period.

Worker and truck trip projections were refined to account for worker modal splits and vehicle occupancy based on the 2000 and 2010 Census reverse-journey-to-work data for the construction and excavation industry for census tracts in the St. George and Tompkinsville areas of Staten Island. As reverse-journey-to-work data on an industry level was not collected after the 2000 Census, the 2000 Census data was referenced to develop the construction worker modal splits and vehicle occupancy. The 2000 data was adjusted to more recent travel characteristics based on the 2010 Census data. Approximately 67 percent of the construction workers would be expected to travel to the sites by private autos at an average occupancy of 1.19 persons per vehicle. The remaining 33 percent would walk (3 percent) or use public transportation (12 percent SIR, 18 percent bus).

Worker and truck trip projections were also refined to account for arrival and departure distribution and passenger car equivalent (PCE) factors for construction truck traffic.

Table 20-3 shows a forecast of hourly construction worker auto and construction truck trips during the 2029 (Q1) peak construction period. The temporal distribution for these vehicle trips was based on typical work shift allocations and conventional arrival/departure patterns for construction workers. Each worker vehicle was assumed to arrive in the morning and depart in the afternoon or early evening, with most arriving/departing in the peak hour before or after each shift. Truck deliveries were assumed to arrive over the course of the day, more heavily weighed to the morning hours. Each truck delivery would arrive and depart within the same hour and was therefore counted as two trips per hour. For the purpose of this analysis, truck trips were converted into PCEs based on one truck being equivalent to two passenger cars.

As shown in Table 20-3, in 2029 (Q1), construction-related vehicle traffic is expected to peak during the 6:00 AM to 7:00 AM and 3:00 to 4:00 PM peak hours with a total of 233 PCEs (202 in, 31 out) and 177 PCEs (3 in, 174 out), respectively.

Table 20-3: 2029 (Q1) Peak Incremental Construction Vehicle Trip Projections (in PCEs)

Hour	Auto Trips					Truck Trips					Total Vehicle Trips		
	In		Out		Total	In		Out		Total			
	%	#	%	#		%	#	%	#		In	Out	Total
6 AM - 7 AM	80%	171	0%	0	171	25%	31	25%	31	62	202	31	233
7 AM - 8 AM	20%	43	0%	0	43	10%	12	10%	12	25	55	12	67
8 AM - 9 AM	0%	0	0%	0	0	10%	12	10%	12	25	12	12	25
9 AM - 10 AM	0%	0	0%	0	0	10%	12	10%	12	25	12	12	25
10 AM - 11 AM	0%	0	0%	0	0	10%	12	10%	12	25	12	12	25
11 AM - 12 PM	0%	0	0%	0	0	10%	12	10%	12	25	12	12	25
12 PM - 1 PM	0%	0	0%	0	0	10%	12	10%	12	25	12	12	25
1 PM - 2 PM	0%	0	0%	0	0	5%	6	5%	6	12	6	6	12
2 PM - 3 PM	0%	0	5%	11	11	5%	6	5%	6	12	6	17	23
3 PM - 4 PM	0%	0	80%	171	171	2.5%	3	2.5%	3	6	3	174	177
4 PM - 5 PM	0%	0	15%	32	32	2.5%	3	2.5%	3	6	3	35	38

Note: Hourly construction worker and truck trips were derived from an estimated monthly average number of construction workers and truck deliveries per day, with each truck delivery resulting in two daily trips (arrival and departure).

The construction analysis conservatively considers the overlay of the construction-related vehicle trips generated during the peak hours of construction (6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM) and the operational trips generated by completed With-Action developments and the No-Action trips generated by those developments not yet constructed during the AM and PM peak hours analyzed for the Proposed Actions (7:45 AM to 8:45 AM and 4:45 PM to 5:45 PM). As shown in Table 20-4, there would be a total of 1,073 vehicle trips generated during the 6:00 AM to 7:00 AM peak hour and 1,295 trips generated during the 3:00 PM to 4:00 PM peak hour in 2029 (Q1).

Table 20-4: 2029 (Q1) vs 2030 Peak Hour Construction and Operational Traffic Volumes (PCEs)

Hour	2029 (Q1) Construction Trips (6:00 AM to 7:00 AM and 3:00 to 4:00 PM)	2029 (Q1) Operational Trips[1] (7:45 AM to 8:45 AM and 4:45 PM to 5:45 PM)	2029 (Q1) Total Trips	2030 Operational Trips
AM Peak Hour	233	840	1,073	1,007
PM Peak Hour	177	1,118	1,295	1,301

Note:
1. Operational trips reflect the net increment of With-Action developments expected to be completed by the 2029 (Q1) peak construction period less the demand generated by No-Action developments on projected development sites that are under construction or not yet under construction.

During the 6:00 AM to 7:00 AM peak hour, the 1,073 construction trips and operational trips during 2029 (Q1) would exceed the 2030 operational trips by 66 vehicles. However, the aggregate Automatic Traffic Recorder (ATR) count data indicates that overall traffic volumes on the study area street network are approximately 53 percent lower during the 6:00 AM to 7:00 AM peak hour than the Weekday AM peak hour analyzed for the Proposed Actions. Therefore, the 2029 (Q1) traffic conditions during the 6:00 AM to 7:00 AM peak hour are expected to operate significantly better than during the analyzed 7:45 AM to 8:45 AM operational peak hour for the 2030 With-Action condition. Consequently, there would be less likelihood of significant adverse traffic impacts during the 6:00 AM to 7:00 AM peak hour during the peak construction period compared to the full-build out of the With-Action condition.

During the 3:00 PM to 4:00 PM peak hour, the 1,295 construction trips and operational trips during 2029 (Q1) would be less than the 2030 operational trips by 6 vehicles. Additionally, the aggregate ATR count data indicates that overall traffic volumes on the study area street network are approximately 2 percent lower during the 3:00 PM to 4:00 PM peak hour than the Weekday PM peak hour analyzed for the Proposed Actions. Therefore, the 2029 (Q1) traffic conditions during the 3:00 PM to 4:00 PM peak hour are expected to operate better than during the analyzed 4:45 PM to 5:45 PM operational peak hour for the 2030 With-Action condition. Consequently, there would be less likelihood of significant adverse traffic impacts during the 3:00 PM to 4:00 PM peak hour during the peak construction period compared to the full-build out of the With-Action condition.

It is expected that the mitigation measures identified in Chapter 21, "Mitigation" for the 2030 Build Year would also be similarly effective at mitigating potential impacts during the peak construction period, which is within one year of the 2030 Build Year. As most Projected Development Sites would be constructed and occupied by the peak construction period, it is recommended that all mitigation measures be advanced and implemented for the 2029 (Q1) construction peak condition.

TRANSIT

During the peak construction period of 2029 (Q1), a total of 377 construction workers are expected to travel to and from the Projected Development Sites each day. Approximately 30 percent of these construction workers are expected to travel to and from the rezoning area by public transit (SIR and/or bus). The sites under construction during 2029 (Q1) are located along Bay Street and Victory Boulevard which are both well served by the SIR and/or bus transit.

It is expected that 80 percent of all construction workers would arrive and depart in the peak hour before and after each shift. Therefore, construction worker travel demand is expected to generate a total of approximately 89 transit trips during each of the 6:00 to 7:00 AM and 3:00 to 4:00 PM peak hours (35 SIR trips and 54 bus trips). Combined with operational transit trips generated by completed Projected Development Sites less the demand generated by No-Action developments on Projected Development Sites that are under construction or not yet under construction during the Weekday AM and PM commuter peak hours, there would be a total of approximately 345 SIR trips and 632 bus trips generated during the AM peak construction peak hour and 458 SIR trips and 780 bus trips generated during the PM peak construction peak hour, as shown in Table 20-5. By comparison, transit trips generated by the full build-out of the Proposed Actions in 2030 would total 433 SIR trips and 860 bus trips during the AM peak hour and 578 SIR and 1,093 bus trips during the PM peak hour. Therefore, 2029 (Q1) transit conditions during the 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM construction peak hours are expected to be generally better than during the analyzed commuter peak hours with full build-out of the Proposed Actions in 2030. It is expected that the mitigation measures identified for 2030 operational transit impacts in Chapter 21, "Mitigation," which include providing additional buses during the peak hours, would also be effective at mitigating any potential impacts due to construction-related transit trips during 2029 (Q1). As most Projected Development sites would be constructed and occupied by the peak construction period, is recommended that all mitigation measures be advanced and implemented for the 2029 (Q1) construction peak condition.

Table 20-5: 2029 (Q1) vs 2030 Peak Hour Construction and Operational Transit Trips

Hour	2029 (Q1) Construction Trips SIR (6:00 AM to 7:00 AM and 3:00 to 4:00 PM)	2029 (Q1) Construction Trips Bus (6:00 AM to 7:00 AM and 3:00 to 4:00 PM)	2029 (Q1) Operational Trips[1] SIR (7:45 AM to 8:45 AM and 4:45 PM to 5:45 PM)	2029 (Q1) Operational Trips[1] Bus (7:45 AM to 8:45 AM and 4:45 PM to 5:45 PM)	2029 (Q1) Total Trips SIR	2029 (Q1) Total Trips Bus	2030 Operational Trips SIR	2030 Operational Trips Bus
AM Peak Hour	35	54	310	578	345	632	433	860
PM Peak Hour	35	54	458	780	494	834	578	1,093

Note:
1. Operational trips reflect the net increment of With-Action developments expected to be completed less the demand generated by No-Action developments on projected development sites that are under construction or not yet under construction.

PEDESTRIANS

During the peak construction period of 2029 (Q1), a total of 377 construction workers are expected to travel to and from the Projected Development Sites each day. Approximately 33 percent of these construction workers are expected to travel to and from the Project Area on foot or via public transit.

It is expected that 80 percent of all construction workers would arrive and depart in the peak hour before and after each shift. Therefore, construction worker travel demand is expected to generate a total of approximately 98 pedestrian trips (89 transit trips and 9 walk trips) during each of the 6:00 to 7:00 AM and 3:00 to 4:00 PM peak hours. Combined with operational pedestrian trips generated by completed Projected Development Sites less the demand generated by No-Action developments on Projected Development Sites that are under construction or not yet under construction during the Weekday AM and PM peak hours, there would be a total of approximately 1,407 and 2,615 pedestrian trips generated during the peak construction hours, respectively, as shown in Table 20-6. By comparison, pedestrian trips generated by the full build-out of the Proposed Actions in 2030 would total 1,743 and 2,836 trips during the AM and PM peak hours. Therefore, 2029 (Q1) pedestrian conditions during the 6:00 AM to 7:00 AM and 3:00 PM to 4:00 PM construction peak hours are expected to be generally better than during the analyzed peak hours with full build-out of the Proposed Actions in 2030. It is expected that the mitigation measures identified for 2030 operational pedestrian impacts in Chapter 21, "Mitigation," would also be effective at mitigating any potential impacts due to construction-related pedestrian trips during 2029 (Q1). As most Projected Development Sites would be constructed and occupied by the peak construction period, is recommended that all mitigation measures be advanced and implemented for the 2029 (Q1) construction peak condition.

Table 20-6: 2029 (Q1) vs 2030 Peak Hour Construction and Operational Pedestrian Trips

Hour	2029 (Q1) Construction Trips (6:00 AM to 7:00 AM and 3:00 to 4:00 PM)	2029 (Q1) Operational Trips[1] (7:45 AM to 8:45 AM and 4:45 PM to 5:45 PM)	2029 (Q1) Total Trips	2030 Operational Trips
AM Peak Hour	98	1,309	1,407	1,743
PM Peak Hour	98	2,517	2,615	2,836

Note:
1. Operational trips reflect the net increment of With-Action developments expected to be completed less the demand generated by No-Action developments on projected development sites that are under construction or not yet under construction.

PARKING

A total of 377 construction workers are expected to travel to and from the Projected Development Sites each day during the peak construction period in 2029 (Q1). Approximately 67 percent of construction workers are expected to travel by private auto. Based on an average vehicle occupancy of 1.19 persons per vehicle, the peak parking demand generated by construction-related activity would be approximately 213 parking spaces. It is expected that all parking demand would be accommodated on-street and that construction workers would arrive during the 6:00 AM to 7:00 AM peak hour in advance of their shift starting time, which is before most residents parking overnight on-street would have left for work. As described in Chapter 14, "Transportation," within a ¼-mile radius of the study area, there would be approximately 1,930 and 790 parking spaces available in the overnight period for the 2030 No-Action and With-Action conditions, respectively. Based on the extent of available parking spaces during this period, which is when construction workers are expected to arrive, there would be sufficient capacity to accommodate the additional parking demand generated during the peak construction period. Therefore, construction activities during 2029 (Q1) would not result in a significant adverse parking impact.

AIR QUALITY

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

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

NOISE

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

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

OTHER TECHNICAL AREAS

LAND USE AND NEIGHBORHOOD CHARACTER

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

Construction of the 30 Projected Development Sites would be spread out over a period of approximately 12 years, throughout an approximately 20-block Project Area. As noted above, construction of most of the Projected Development Sites would be short-term (i.e., lasting up to 24 months), with the exception of Sites 2, 4, 5, 7, City Disposition Site 2, and the Stapleton Waterfront Phase III sites, which are assumed to last up to 27 months. Throughout the construction period (as required by City regulations), access to residences, businesses, and institutions in the area surrounding the development sites would be maintained. In addition, measures would be implemented to control noise, vibration, emissions, and dust on construction sites, including the erection of construction fencing incorporating sound reducing measures. Since none of these impacts would be continuous or ultimately permanent, they would not create significant impacts on land use patterns or neighborhood character in the area. Therefore, while construction of the new buildings resulting from the Proposed Actions would cause temporary impacts, particularly related to noise, it is expected that such impacts in any given area would be relatively short-term, even under the worst-case construction sequencing and, therefore, would not create a neighborhood character impact. Therefore, no significant adverse construction impacts to land use and neighborhood character are expected.

SOCIOECONOMIC CONDITIONS

According to the *CEQR Technical Manual*, construction impacts to socioeconomic conditions are possible if the Proposed Actions would entail construction of a long duration that could affect access to and thereby viability of a number of businesses and if the failure of those businesses has the potential to affect neighborhood character. As noted above, construction of most of the Projected Development Sites would be short-term (i.e., lasting up to 24 months), with the exception of construction of Sites 2, 4, 5, 7, City Disposition Site 2, and the Stapleton Waterfront Phase III sites, which are assumed to last up to 27 months. During the construction period, construction activities would be dispersed throughout the 20-block Project Area and would not affect access to particular business(es) over an extended duration. Therefore, construction impacts to socioeconomic conditions are not expected.

COMMUNITY FACILITIES

According to the *CEQR Technical Manual*, construction impacts to community facilities are possible if a community facility would be directly affected by construction (e.g., if construction would disrupt services provided at the facility or close the facility temporarily, etc.). While there are community facilities throughout the Project Area, as discussed in Chapter 4, "Community Facilities and Services," the Proposed Actions would not result in the direct displacement of any community facilities, as defined in the *CEQR Technical Manual*. While construction of the Projected Development Sites would result in temporary increases in traffic during the construction period, access to and from any community facilities in the Project Area would not be affected during the construction period. In addition, each construction site would be surrounded by construction fencing and barriers as required by DOB, which would limit the effects of construction on nearby facilities. Construction workers would not place any burden on public schools and would have minimal, if any, demands on libraries, child care facilities, and health care services. NYPD and FDNY emergency services and response times would not be materially affected by construction due to the geographic distribution of the police and fire facilities and their respective coverage areas. Therefore, no construction impacts would be expected to community facilities in the area, and a further preliminary assessment is not needed for the disclosure of potential construction impacts to community facilities.

OPEN SPACE

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

HISTORIC AND CULTURAL RESOURCES

According to *CEQR Technical Manual* guidance, construction impacts may occur on historic and cultural resources (including both archaeological and architectural resources) if in-ground disturbances or vibration associated with the project's construction could undermine the foundation or structural integrity of nearby resources. Chapter 7, "Historic and Cultural Resources," provides a detailed assessment of potential impacts on architectural and archaeological resources. This section summarizes potential impacts on historic and cultural resources during construction.

ARCHAEOLOGICAL RESOURCES

For the purposes of this analysis, the study area for archaeological resources is limited to sites that may be developed within the Project Area and include both Projected and Potential Development Sites. LPC reviewed the Projected and Potential Development Sites and determined that there is potential for the recovery of remains from nineteenth century occupation at Projected Development Site 5 (Block 488, Lot 65) (refer to comment LPC letters dated July 27, 2016 and April 3, 2107 in Appendix J).

A Phase 1A study of Projected Development Site 5 was completed in May 2017 (see Appendix E). The Phase 1A study concluded that the archaeological area of potential effects (APE) has a moderate to high sensitivity for prehistoric resources on the western margin in the limited area of fast land, and a moderate to high sensitivity for nineteenth- to early-twentieth-century waterfront features (docks or piers) in the remainder of the southern archaeological-APE. The northern, narrow portion of the archaeological-APE was identified as having no to low sensitivity for shoreline features. Based on these findings, the Phase 1A study concluded that Phase 1B archaeological testing is necessary in advance of any future ground disturbing developments within the two areas of archaeological sensitivity on the site to determine the absence or presence of these potential buried resources.

Projected Development Site 5 is owned by a private entity. There is no mechanism in place to require a developer to conduct archaeological testing or require the preservation or documentation of archaeological resources, should they exist. Therefore, a significant adverse effect related to archaeological resources may occur on Projected Development Site 5. Because there is no mechanism to avoid or mitigate potential impacts at the privately-owned Projected Development Site 5, the significant adverse impact would be unavoidable in the future with the Proposed Actions. It should be noted, however, that if human remains are encountered during the construction of an as-of-right project, it is expected that the developer would contact the NYPD and the New York City Office of the Chief Medical Examiner.

ARCHITECTURAL RESOURCES

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

Adjacent historic resources, as defined in the procedure notice, only include designated New York City Landmarks (NYCLs), properties within LPC historic districts, and listed S/NR properties that are within 90 feet of a lot under development or alteration. They do not include S/NR-eligible, NYCL-eligible, potential, or unidentified architectural resources. Construction period impacts on any designated historic resources would be minimized, and the historic structures would be protected, by ensuring that adjacent development projected as a result of the Proposed Actions adheres to all applicable construction guidelines and follows the requirements laid out in TPPN #10/88. This would apply to construction activities on Projected Development Site 2 (located within 90 feet of the LPC-designated; S/NR- eligible Tompkinsville [Joseph H. Lyons] Pool), and City Disposition Site 1 (located within 90 feet of LPC-designated; S/NR-eligible 120th Police Precinct Station House and LPC-designated; S/NR-eligible Staten Island Family Courthouse. As these designated and/or listed resources are subject to construction protection under DOB's TPPN #10/88, development resulting from the Proposed Actions would not cause any significant adverse construction-related impacts to these resources.

As summarized in Table 20-7, below, there is one Projected Development Site and one Potential Development Site where construction under the Proposed Actions could potentially result in construction-related impacts to two eligible historic resources located near (i.e., within 90 feet) of the sites. The two eligible historic resources (the S/NR-eligible 292 Van Duzer Street and the LPC-eligible and S/NR-eligible Stapleton Branch of the New York City Public Library) would be afforded standard protection under DOB regulations applicable to all buildings located adjacent to construction sites; however, as these resources are not S/NR-listed or NYCL-designated, they are not afforded the added special protections under DOB's TPPN #10/88. Additional protective measures afforded under DOB TPPN #10/88, which include a monitoring program to reduce the likelihood of construction damage to adjacent S/NR-listed or NYCL-designated resources, would only become applicable if the eligible resource is designated or listed in the future prior to the initiation of construction. If 292 Van Duzer Street and the Stapleton Branch of the New York City Public Library are not designated or listed, however, neither building would be subject to TPPN #10/88 and may therefore be adversely impacted by construction of developments within 90 feet (on Potential Development Site Q and Projected Development Site 20), resulting from the Proposed Actions.

Table 20-7: Eligible Historic Resources Located within 90 Feet of a Projected/Potential Development Site(s)

Eligible Historic Resource[1]	Sites within 90 Linear Feet	
	Projected Development Sites	Potential Development Sites
292 Van Duzer Street (S/NR-eligible)		Q
Stapleton Branch of New York City Public Library (LPC-eligible; S/NR-eligible)	20	

Notes:

[1] While City Disposition Site 1 is within 90 feet of the S/NR-eligible State Island Museum, as discussed in Chapter 7, "Historic and Cultural Resources," this Projected Development Site is anticipated to be reoccupied or converted in both the futures without and with the Proposed Actions. As such, the Proposed Actions would not result in construction-related impacts to the S/NR-eligible Staten Island Museum as compared to No-Action conditions.

It should be noted that City Disposition Site 1 is also located within 90 feet of S/NR-eligible historic resources. However, as detailed in Chapter 7, the Projected Development Site is anticipated to be reoccupied or converted in the future without the Proposed Actions. Therefore, redevelopment of City Disposition Site 1 under With-Action conditions would not result in significant adverse construction-related impacts as a consequence of the Proposed Actions.

HAZARDOUS MATERIALS

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

As stated in Chapter 10, "Hazardous Materials," the hazardous materials assessment identified that 27 of the 30 Projected Development Sites and all 23 Potential Developments Sites possess, in some capacity, a concern regarding their environmental conditions. As a result, under the Proposed Actions, all privately held Projected and Potential Development Sites (25 Projected Development Sites and 23 Potential Development Sites) would include (E) designations requiring that a hazardous materials assessment be performed including, but not limited to, a Phase I Environmental Site Assessment and any subsequent appropriate assessment or action. In addition, on for two of the three City-owned sites identified for disposition (City Disposition Sites 1 and 2), the environmental requirements with respect to hazardous materials would be incorporated into the LDA between the City of New York and the future developer.[4] For the two Stapleton Waterfront Phase III Projected Development Sites, human exposure to known on-site hazardous materials on both of the sites would be reduced or eliminated during and after remediation/construction by following the health and safety protocols and implementing the remedial measures outlined in the Phase II Environmental Site Investigation (ESI) Report and Remedial Action Work Plan (RAWP). Implementation of the RAWP would be required pursuant to a Memorandum of Understanding (MOU) between EDC and NYCDEP. Through the implementation of the preventative and remedial measures outlined in the (E) designations applied to the 25 eligible Projected Development Sites and the 23 eligible Potential Developments Sites, and comparable measures applied to City Disposition Sites 1 and 2, and the Stapleton Phase III Sites, the Proposed Actions would not result in significant adverse impacts from hazardous materials).

As detailed in Chapter 10, (E) designations would be mapped on 25 Projected Development Sites and 23 Potential Development Sites, and other comparable measures would be applied to City Disposition Sites 1 and 2 and the Stapleton Phase III Sites, as part of the Proposed Actions. Through the implementation of the preventative and remedial measures outlined in the (E) designations and other comparable measures, the Proposed Actions would not result in significant adverse impacts from hazardous materials. An (E)-designated site is designated on a zoning map within which no change of use or development requiring a DOB permit may be issued without approval of the Mayor's Office of Environmental Remediation (OER). These sites require OER's review to ensure the protection of human health and the environment from any known or suspected hazardous materials associated with the site. The (E) designation requires that the fee owner conduct a testing and sampling protocol and remediation, where appropriate, to the satisfaction of OER before the issuance of a permit by DOB. The environmental requirements for the (E) designation also include a mandatory CHASP, which must be approved by OER.

[4] The remaining City-owned site proposed for disposition (City Disposition Site 3 [Block 6, Lot 2]) is not anticipated to require environmental restrictions.

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

F. DETAILED ANALYSES

The findings of the preliminary assessment identified the need to undertake more detailed construction impact assessments for air quality and noise. To conduct these detailed assessments, this chapter describes the City, state, and federal regulations and policies that govern construction, followed by the conceptual construction schedule and the types of activities likely to occur during construction of the 53 Projected and Potential development sites. The types of construction equipment are also discussed, along with the expected number of workers and truck deliveries. Finally, the potential impacts from construction activity are assessed and the methods that may be employed to avoid significant adverse construction impacts are described.

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 potential impacts of the construction activities under the Proposed Actions includes a quantitative analysis of both on-site and off-site mobile sources of air emissions, and the overall combined impact of both sources, where applicable.

In general, much of the heavy equipment used in construction is powered by diesel engines that have the potential to produce relatively high levels of nitrogen oxides (NOx) and particulate matter (PM). Fugitive dust generated by construction activities is also a source of PM. Gasoline engines produce relatively high levels of carbon monoxide (CO). Since ULSD fuel would be used for all diesel engines used in the construction under the Proposed Actions, sulfur oxides (SOx) emitted from those construction activities would be negligible, and an assessment of the resultant sulfur dioxide (SO2) levels was not included in the detailed assessment. Chapter 15, "Air Quality," contains a review of these pollutants; applicable regulations, standards, and benchmarks; and general methodology for stationary source air quality analyses. The general methodology for stationary source modeling (regarding model selection, receptor placement, and meteorological data) presented in Chapter 15, "Air Quality" was followed for modeling dispersion of pollutants from on-site sources during the construction period. Table 20-8 shows the pollutants analyzed in the construction air quality analysis and the corresponding averaging periods. Additional modeling details relevant only to the construction air quality analysis methodology are presented and discussed herein.

Table 20-8: Pollutants for Analysis and Averaging Periods

Pollutant	Averaging Period
$PM_{2.5}$	24-hour
	Annual Local
NO_2	Annual
CO	1-hour
	8-hour

EMISSIONS CONTROL MEASURES

As is typical with construction projects, construction activities have the potential to adversely 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):

- Dust Control - All necessary measures will be implemented to ensure that the New York City Air Pollution Control Code regulating construction-related dust emissions is followed. For example, truck routes within the site would be watered as needed to avoid the re-suspension of dust. All trucks hauling loose material will be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the construction site. Water sprays will be used to ensure that materials are dampened as necessary to avoid the suspension of dust into the air.
- Idling Restrictions - In addition to adhering to the local law restricting unnecessary idling on roadways, on- site vehicle idle time will also be restricted to three minutes for all equipment and vehicles that are not using their engines to operate a loading, unloading, or processing device (e.g., concrete mixing trucks) or otherwise required for the proper operation of the engine.

In addition to the required laws and regulations, 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, consisting of the following components (commitments relating to the items set forth below will be included as part of construction contract specifications, where necessary):

- Use of Newer Equipment - The United States Environmental Protection Agency (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 considerably lower than uncontrolled engines. All non-road engines in the project rated less than 50 hp would meet at least the Tier 2 emissions standard.
- Best Available Tailpipe Reduction Technologies - Non-road diesel engines with a power rating of 50 horsepower (hp) or greater and controlled truck fleets (i.e., truck fleets under long-term contract with the project) including but not limited to concrete mixing and pumping trucks would utilize the best available tailpipe (BAT) technology for reducing diesel particulate matter emissions. Diesel particulate filters (DPFs) have been identified as being the tailpipe technology currently proven to have the highest reduction capability. Construction contracts would specify that all diesel non-road engines rated at 50 hp or greater would utilize 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 or other technologies proven to achieve an equivalent reduction may also be used.

Overall, the proposed emission reduction measures described above are expected to greatly reduced air pollutant emissions related to construction activities.

METHODOLOGY

To determine which construction periods constitute the worst-case periods for the pollutants of concern (PM, CO, NO2), construction-related emissions were calculated throughout the duration of construction from all of the Projected Development Sites on an annual average and peak day average basis for $PM_{2.5}$ for the entire study period (2019-2030). $PM_{2.5}$ was selected for determining the worst-case periods, because the ratio of predicted $PM_{2.5}$ incremental concentrations to impact criteria due to construction activities is higher than for other pollutants. Therefore, initial estimates of $PM_{2.5}$ emissions throughout the construction years were used for determining the worst-case periods for the analysis of all pollutants. Generally, emission patterns of NO_2 would follow $PM_{2.5}$ emissions, since their emission rates are related to the sizes of diesel engines. CO emissions may have a somewhat different pattern but generally would also be highest during periods when the most construction activity would occur.

The *CEQR Technical Manual* states that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[5] In terms of the magnitude of air quality impacts, any action predicted to increase the concentration of a criteria air pollutant to a level that that would exceed the concentrations defined by the NAAQS would be deemed to have a potential significant adverse impact. In addition, to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse impact, even in cases where violations of the NAAQS are not predicated.

In accordance with the construction schedule (Table 20-1), a total of 30 Projected Development Sites have been identified for air quality analysis purposes. However, only seven of the Projected Development Sites are anticipated to be under construction for more than two years. In general, where the construction is expected to be short-term, any impacts resulting from such short-term construction generally do not require detailed assessment. However, as construction activities associated with the Proposed Actions may occur on multiple development sites in proximity with each other, there is a potential for cumulative construction impacts. Therefore, an emissions profiles was generated for all 30 Projected Development Sites, to determine the construction periods with the highest potential to affect air quality.

Based on the resulting multi-year profiles of peak day average emissions of $PM_{2.5}$, and the proximity of the construction activities at each Projected Development Site to each other and to nearby sensitive receptor locations (*i.e.,* residences, publicly accessible open spaces, etc.), worst-case short-term periods for construction were identified for the detailed dispersion modeling. The modeling was then conducted to predict the annual and 24-hour $PM_{2.5}$, one-hour and eight-hour CO, and annual

[5] New York City. *CEQR Technical Manual*. Chapter 1, section 222. March 2014; and New York State Environmental Quality Review Regulations, 6 NYCRR § 617.7

NO_2 concentrations. For prediction of the annual levels, the worst-case monthly emissions were assumed to occur for the entire year. This is a conservative approach. Dispersion of the relevant air pollutants from the construction sites during these periods was then analyzed, and the highest resulting concentrations are presented in the following sections. Broader conclusions regarding potential pollutant concentrations during other periods, which were not modeled, are presented as well, based on the multi-year emissions profiles and the reasonable worst-case period results.

Engine Emissions

The sizes, types, and number of units of construction equipment were estimated based on the construction activity schedule. 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 emission model. A list of the nonroad construction equipment that would likely be operated during construction, is provided below in Table 20-9, along with the equipment engine type and estimated engine size. With respect to trucks, emission rates for NO_X, CO, and $PM_{2.5}$ for truck engines were developed using the MOVES emission model. Traffic data for the air quality analysis were derived from the construction estimates presented in Table 20-2 and information developed as part of the construction traffic analysis for the Proposed Actions as presented above under "Transportation."

Table 20-9: Construction Equipment List

Construction Task	Equipment	Engine Type	Engine Size (HP)
Demolition/Excavation/Foundation	excavator	diesel	200
Demolition/Excavation/Foundation	jackhammer/pavement breaker	air	-
Demolition/Excavation/Foundation	rebar bender	electric	-
Demolition/Excavation/Foundation	welding machines	electric	-
Demolition/Excavation/Foundation	generator	diesel	30
Demolition/Excavation/Foundation	vibratory pile driver	diesel	450
Demolition/Excavation/Foundation	portable water pump	electric	-
Demolition/Excavation/Foundation	dozer	diesel	310
Demolition/Excavation/Foundation	wheeled front end loader	diesel	200
Demolition/Excavation/Foundation	crane (crawler crane)	diesel	300
Demolition/Excavation/Foundation	grader	diesel	200
Demolition/Excavation/Foundation	compressor	diesel	300
Demolition/Excavation/Foundation	backhoe	diesel	300
Building Superstructure/Exterior	rebar bender	electric	-
Building Superstructure/Exterior	welding machines	electric	-
Building Superstructure/Exterior	generator	diesel	30
Building Superstructure/Exterior	troweling machine	gasoline	11
Building Superstructure/Exterior	concrete vibrator	electric	-
Building Superstructure/Exterior	portable cement mixer	electric	-
Building Superstructure/Exterior	crane (crawler crane)	diesel	300
Building Superstructure/Exterior	dual hoist - high rise	electric	-
Interior Fit-Out	lift (scissor lift)	electric	-
Interior Fit-Out	lift (forklift)	propane	25
Interior Fit-Out	Pneumatic tools	Air	-
Interior Fit-Out	concrete saw	electric	-
Interior Fit-Out	(crawler crane)	diesel	300
Interior Fit-Out	dual hoist - high rise	electric	-

On-Site Dust Emissions

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 to ensure that the New York City Air Pollution Control Code regulating construction-related dust emissions are followed. It was estimated that the planned control of fugitive emissions would reduce PM emissions from such operations by 50 percent.

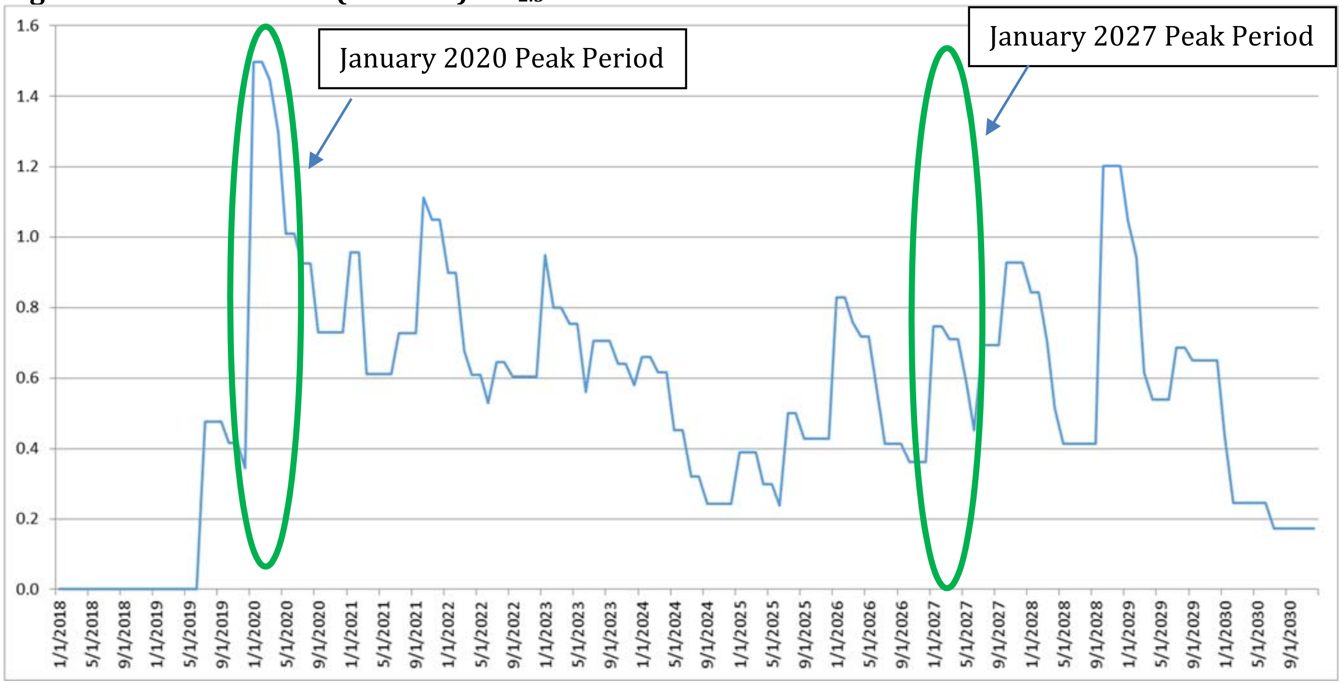
Analysis Periods

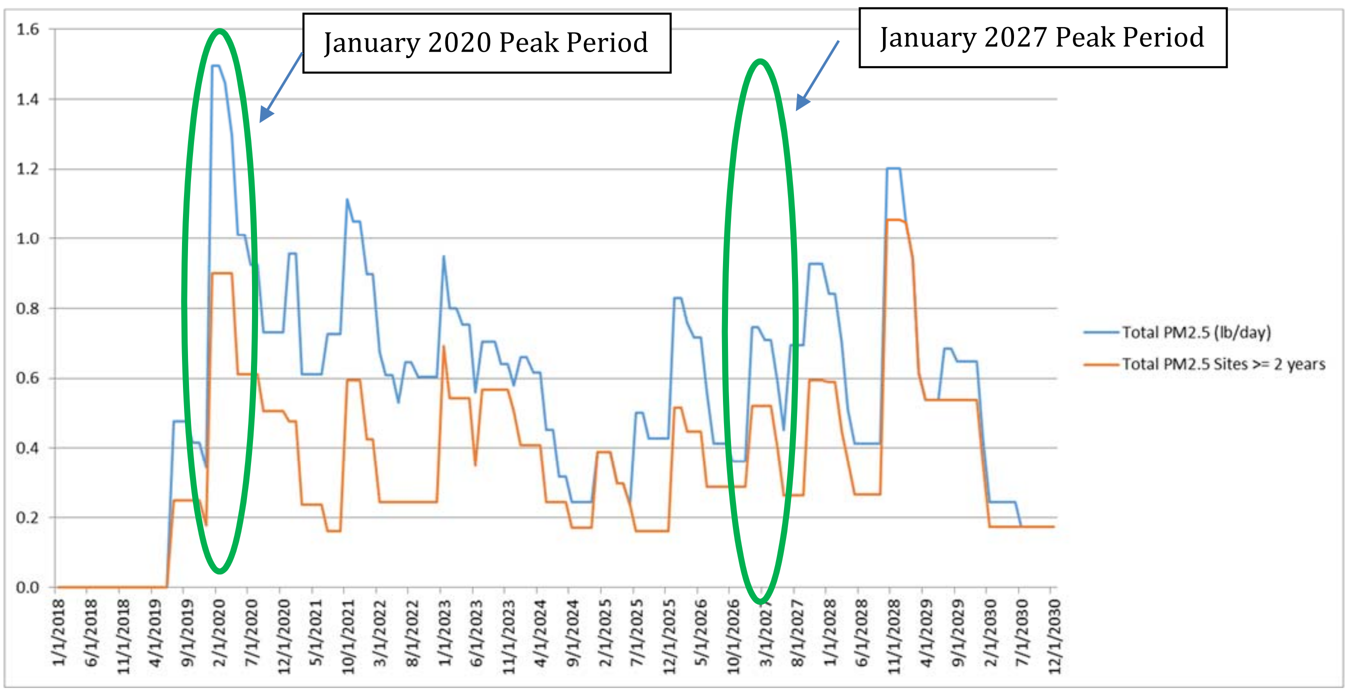
The resulting emission factors were used for the emissions and dispersion analyses. Short-term (24-hour average) $PM_{2.5}$ engine emissions profiles were prepared by multiplying the emission rates for each piece of equipment by the number of engines, the work hours per day, and fraction of the day each engine would be expected to work during each month of construction. The resulting overall short-term emission profile is presented in Figure 20-2.

As shown in Figure 20-2, based on the short-term $PM_{2.5}$ construction emissions profile, January 2020 and January 2029 were identified as the short-term periods with the highest project-wide emissions. However, the construction activities during the January 2029 period would occur at Projected Development Sites that are scattered throughout the rezoning area and therefore would not represent the overall worst-case cumulative construction impact for air quality. Therefore, this period is not considered representative of the overall worst case analysis periods and were not selected for analysis. Instead, in addition to January 2020, January 2027 was identified as the worse-case short-term analysis period because activities during these periods would occur at larger development sites that are in close proximity with each other. As discussed above, for prediction of the annual levels, the worst-case monthly emissions were assumed to occur for the entire year.

The dispersion of pollutants during the worst-case short-term and annual periods was then modeled in detail to predict resulting maximum concentration increments from construction activities and total concentrations (including background concentrations) 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, since 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 in the development area, but would not persist in any single location, since emission sources would not be located continuously at any single location throughout construction, but rather construction equipment would move throughout the site as construction work progresses. Overall, the modeled peak construction periods are considered representative of worst-case construction activities associated with the Proposed Actions.

Figure 20-2: Short Term (24-hour) $PM_{2.5}$ Construction Emissions Profile





<u>Source Simulation</u>

For the short-term model scenarios (predicting concentration averages for periods of 24 hours or less), all stationary sources, such as cranes, concrete pumps, or generators, which idle in a single location while unloading, 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 to various locations at the site throughout the year.

Meteorological Data

The meteorological data set consists of five consecutive years of latest available meteorological data: surface data collected at the nearest representative National Weather Service Station (Newark Liberty International Airport) from 2013 to 2017 and concurrent upper air data collected at Brookhaven, New York. The meteorological data provide hour-by-hour wind speeds and directions, stability states, and temperature inversion elevation over the five-year period. These data were processed using the EPA AERMET program to develop data in a format which can be readily processed by the AERMOD model.

Receptor Locations

Receptors (locations in the model where concentrations are predicted) were placed along sensitive uses at both ground-level and along building facades of elevated locations (e.g., residential windows), at publically accessible open spaces, and at completed and occupied project buildings where applicable.

On-Road Mobile Sources

As discussed above in "Transportation" the traffic conditions during construction peak hours would generally be similar, or better than during the operational peak hours with full build-out of the Proposed Actions. Therefore, construction of the Projected Development Sites would not result in significant adverse air quality impacts related to vehicular traffic, and a standalone mobile-source analysis is not required. Since emissions from on-site construction equipment and on-road construction-related vehicles may contribute to concentration increments concurrently, on-road construction vehicle emissions adjacent to the construction sites were included with the on-site dispersion analysis (in addition to on-site truck and engine activity) in order to address all local project-related emissions cumulatively.

RESULTS

Maximum predicted concentration increments from the construction periods selected for analysis, and maximum overall concentrations including background concentrations, are presented in Tables 20-10 and 20-11. For $PM_{2.5}$, monitored background concentrations are not added to modeled concentrations from sources, since 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 20-10: Maximum Predicted Pollutant Concentrations from Construction Site Sources—January 2020 Peak Analysis Period

Pollutant	Averaging Period	Background (μg/m³)	Maximum Modeled Increment (μg/m³)	Total Concentration (μg/m³)	De Minimis Criteria/ NAAQS (μg/m³)
$PM_{2.5}$	24-hour	-	-	5.7 μg/m³	7.90 μg/m³
	Annual Local	-	-	0.27μg/m³	0.3 μg/m³
NO_2[1]	Annual	32.9	4.6	37.5 μg/m³	100 μg/m³
CO	One-hour	1.9 ppm	3.0 ppm	4.9 ppm	35 ppm
	Eight-hour[2]	1.4 ppm	0.5 ppm	1.9 ppm	9 ppm

Notes:
1. Includes a 1-hour conversion ratio of NO2 to NOx of 75 percent.

As described above under "Analysis Periods," based on the $PM_{2.5}$ construction emissions profiles, the following worst-case periods were analyzed:

- January 2020 to capture the effects of two large buildings (3 and 17) in demolition stage across the street from each other, and other large buildings on relatively small sites; and
- January 2027 to capture the effect of Site 2 undergoing the superstructure stage and Site 7 undergoing the demolition/excavation/foundation stages.

As shown in Table 20-11, the maximum predicted total concentrations of 1-hour and 8-hour CO, the annual-average NO_2,, and the 24-hour and annual $PM_{2.5}$ concentrations for the 2020 peak period are below the applicable NAAQS and de minimis criteria.

Table 20-11: Maximum Predicted Pollutant Concentrations from Construction Site Sources - January 2027 Peak Analysis Period

Pollutant	Averaging Period	Background (μg/m³)	Maximum Modeled Increment (μg/m³)	Total Concentration (μg/m³)	De Minimis Criteria/ NAAQS (μg/m³)
$PM_{2.5}$	24-hour	-	-	3.3 μg/m³	7.90 μg/m³
	Annual Local	-	-	0.19 μg/m³	0.3 μg/m³
NO_2[1]	Annual	32.9	2.2	35.1 μg/m³	100 μg/m³
CO	One-hour	1.9 ppm	1.4 ppm	3.3 ppm	35 ppm
	Eight-hour	1.4 ppm	0.2 ppm	1.6 ppm	9 ppm

Notes:
1. Includes a 1-hour conversion ratio of NO_2 to NO_x of 75 percent.

As shown in Table 20-11, the maximum predicted total concentrations of 1-hour and 8-hour CO, annual-average NO_2, and the 24-hour and annual $PM_{2.5}$ concentrations for the 2027 peak period are below the applicable NAAQS and de minimis criteria.

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 best available tailpipe reduction technologies and utilization of newer equipment would be implemented for Projected Development Sites with construction durations of more than two years. 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 that the annual-average NO_2, one-hour and 8-hour CO and 24-hour and annual $PM_{2.5}$ concentrations would be below their corresponding NAAQS and de-minimus thresholds for both time periods evaluated. Therefore, construction under the Proposed Actions would not result in significant adverse air quality impacts due to construction sources.

NOISE

Impacts on community noise levels during construction under the proposed actions could result from noise from construction equipment operation and from construction and delivery vehicles traveling to and from the construction site. Noise and vibration levels at a given location would be dependent on the type and number of pieces of construction equipment in operation, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating at full power), the distance from the construction site, and any shielding effects from structures such as buildings, walls, or barriers. Noise levels caused by construction activities vary widely and depend on the stage of construction and the location of the construction relative to receptor locations. The most noise-intensive construction activities are typically intermittent and would not occur throughout the workday or the duration of the construction task. During hours when the loudest pieces of construction equipment would not be in use, receptors would experience lower construction noise levels. Construction noise levels would fluctuate during the construction period at each receptor, with the greatest levels of construction noise occurring for limited periods during construction. The most significant construction noise sources are expected to be the operation of impact equipment such as pile rigs and tower cranes as well as movements of trucks to and from each project site. Noise from construction activities and some construction equipment is regulated by the New York City Noise Control Code and DEP Notice of Adoption of Rules for Citywide Construction Noise Mitigation (also known as Chapter 28) and by EPA. These requirements mandate that specific construction equipment and motor vehicles must meet specified noise emission standards; that construction activities be limited to weekdays between the hours of 7 AM and 6 PM; and that those construction materials be handled and transported in such a manner as not to create unnecessary noise. Permits would be required to be obtained, as specified in the New York City Noise Control Code, for weekend and after-hour work if they become necessary. As required under the New York City Noise Control Code, a site-specific noise mitigation plan for the Proposed Actions would be developed and implemented that may include source controls, path controls, and receiver controls.

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

Construction Noise Impact Criteria

Chapter 22, Section 100 of the *CEQR Technical Manual* divides construction duration into "short-term (less than two years) and long-term (two or more years)" and states that impacts resulting from short-term construction generally do not require detailed assessment. Consequently, the construction noise analysis considers both the potential for construction to create high noise levels (the "intensity"), and whether construction noise would occur for an extended period of time (the "duration") in evaluating potential construction noise effects. Chapter 19, Section 421 of the *CEQR Technical Manual* states that the impact criteria for vehicular sources, using the No-Action noise level as the baseline, should be used for assessing construction noise impacts. As recommended in Chapter 19, Section 410 of the *CEQR Technical Manual*, this study uses the following criteria to define a significant adverse noise impact from mobile and on-site construction activities:

- If the No-Action noise level is less than 60 dBA Leq(1), a 5 dBA Leq(1) or greater increase would be considered significant.
- If the No-Action noise level is between 60 dBA Leq(1) and 62 dBA Leq(1), a resultant Leq(1) of 65 dBA or greater would be considered a significant increase.
- If the No-Action noise level is equal to or greater than 62 dBA Leq(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 incremental significant impact threshold would be three dBA Leq(1).

The construction noise analysis also considered additional criteria related to predicted noise level increases. Any noise receptors sites experiencing an increase of 15 dBA or more due to construction noise would be considered to have the potential to experience a significant adverse construction noise impact.

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

Noise Analysis Fundamentals

Construction activities for the Proposed Actions would be expected to result in increased noise levels as a result of: (1) the operation of construction equipment on-site; and (2) the movement of construction-related vehicles (i.e., worker trips, and material and equipment trips) on the surrounding roadways. The effect of each of these noise sources was evaluated. The results presented below 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 impacts due to operational effects (caused by project-generated vehicular trips) and construction effects (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;
- The distance between the piece of equipment and the receptor;
- A usage factor, which accounts for the percentage of time the equipment is operating at full power;
- 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;
- Volume of vehicular traffic on each roadway segment;
- Topography and ground effects; and
- Shielding

CONSTRUCTION NOISE MODELING

Noise effects from construction activities were evaluated using the CadnaA model, a computerized model developed by DataKustik 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, etc. 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 input data used with the CadnaA model included drawings that define site work areas, adjacent building footprints and heights, locations of streets, and 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 the Projected Development Sites, as well as noise control measures—were input to the model. In addition, reflections and shielding by barriers erected on the construction site, and shielding from both adjacent buildings and project buildings as they are constructed, were accounted for in the model. The model produced A-weighted Leq(1) noise levels at each receptor location for each analysis period, as well as the contribution from each noise source.

NOISE ANALYSIS METHODOLOGY

In general, the CadnaA methodology involved the following process:

1. Establish noise levels at receptors in study area using the CadnaA model for the development sites for all analysis periods.
2. Receptors were either located directly adjacent to the construction site or streets where construction trucks would pass. Each receptor was the located at a residence or other noise-sensitive use. The receptors are representative of other noise receptors in the immediate area;
3. The construction duration is determined by the conceptual schedule;
4. Based on the CadnaA model, determine receptor locations that would experience noise levels that exceed the noise impact threshold criteria during each analysis period;
5. Determine receptor locations where noise level increases could last longer than 24 months;

DETERMINATION OF NO-ACTION AND NON-CONSTRUCTION NOISE LEVELS

Noise generated by construction activities is compared to noise generated by non-construction traffic on adjacent roadways in order to determine the total noise levels at each receptor location. Existing noise levels were conservatively used as the baseline noise levels for determining construction-generated noise level increases.

Existing noise levels at the analysis receptors were determined by:

- Performing noise measurements at various at-grade locations;
- Assigning measured noise levels to analysis receptors at similar locations;

ANALYSIS PERIODS

Construction activity associated with the Proposed Action would be spread out over an approximately 12-year period and be dispersed throughout the rezoning area. The construction activities would take place between 2019 and 2030. All analysis periods were reviewed. The number of workers, types and number of pieces of equipment and number of construction vehicles anticipated to be operating during each month of the construction period was determined. To be conservative, the construction activity screening analysis for each analysis period assumed that both on-site construction activities and off-site construction related traffic movements occurred simultaneously.

NOISE REDUCTION MEASURES

Construction associated with the Proposed Action would be required to follow the requirements of the New York City Noise Control Code (NYC Noise Code) for construction noise control measures. Specific noise control measures will be described in a noise mitigation plan required under the NYC Noise Code. These measures could include a variety of source and path controls.

In terms of source controls (i.e., reducing noise levels at the source or during the most sensitive time periods), the following measures 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 utilized from the start of construction. Table 20-11 shows the noise levels for typical construction equipment and the mandated noise levels for the equipment that would be used for construction of the Proposed Actions.

- 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 sites would be configured to minimize back-up alarm noise. In addition, all trucks would not be allowed to idle more than three minutes at the construction site based upon Title 24, Chapter 1, Subchapter 7, Section 24-163 of the *NYC Administrative Code*.
- Contractors and subcontractors would be required to properly maintain their equipment and mufflers.
- A properly secured impact cushion (either a commercially available model or one fabricated from scrap wood, leather, or rubber at the job site) shall be installed on top of piles that are being driven by an impact hammer.

In terms of path controls (e.g., placement of equipment, implementation of barriers or enclosures between equipment and sensitive receptors), the following measures for construction, which go beyond typical construction techniques, would be implemented to the extent feasible and practical:

- 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 utilized to provide shielding (e.g., the construction sites would have a minimum eight-foot barrier and, where logistics allow, truck deliveries would take place behind these barriers once building foundations are completed); 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 to the extent feasible and practical based on the results of the construction noise calculations, i.e., generators, jack hammers, pile drivers and pumps. These barriers were assumed based on guidance from NYCDEP's Rules for Citywide Construction Noise Mitigation to offer a ten dBA reduction in noise levels for each piece of equipment to which they are applied, as shown in Table 20-12. The details to construct portable noise barriers, enclosures, tents, etc. are also shown in NYCDEP's Rules for Citywide Construction Noise Mitigation.

Table 20-12: Typical Construction Equipment Noise Emission Levels (dBA)

Equipment List	DEP & FTA Typical L_{max} Noise Level at 50 feet[1]
Backhoe/Loader	80
Compressor	58
Concrete Saw	90
Concrete Vibrator	80
Cranes (Crawler Cranes)	85
Dozer	85
Dumpster/Rubbish Removal Truck	78
Excavator	85
Generators	82
Jack Hammer	73
Lift	85
Pneumatic Tools	85
Vibratory Pile Driver	95
Warning Horn	85
Welding Machines	73

Notes:
[1] ***Sources****: Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007. Transit Noise and Vibration Impact Assessment, FTA, 2006. New York City Local Law 113, 2005. Sections 24-226 (Air compressors) and 24-230 (Paving breakers or jack hammers).*
Certain pieces of equipment (i.e., hoist, rebar bender, troweling machine, grader, and portable water pump) were not included in the construction noise analysis as these pieces of equipment are not anticipated to be the dominant noise sources at any typical receptor.

RECEPTOR SITES

Noise measurement locations were used to determine the baseline existing noise levels, and 398 receptor locations close to the Projected Development Sites were selected as discrete noise receptor sites for the construction noise analysis. Noise measurement locations match the existing noise level measurement locations in Chapter 17, "Noise." These receptors were either located directly adjacent to the one of the Projected Development Sites included in the detailed construction analysis. Each receptor site was the location of a residence or other noise-sensitive use. At some buildings, multiple building façades and 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 maximum With-Action impacts due to construction would occur. Noise level increases were predicted for these representative noise receptor locations, and the geographic extent of potential noise impacts was determined. The geographic extent of potential noise impacts was used to determine the lots that would experience construction noise levels that exceed the noise impact threshold criteria. The conceptual construction schedule was used to determine duration of the construction noise levels and aided in determining which receptors would experience construction noise levels that exceed the noise impact threshold criteria for two consecutive years or more. The construction noise receptor locations are shown in Figure 20-3 and listed in Table 20-13 along with the associated land use at each site.

Figure 20-3: Construction Noise Receptor Locations

Table 20-13: Construction Noise Receptor Locations

Location	Land Use
1 Central Avenue	Institutional
1 Tompkins Avenue	Commercial
10 Hamilton Avenue	Institutional
100 Stuyvesant Place	Mixed Use Residential and Commercial
101 Brook Street	Mixed Use Residential and Commercial
105 Brook Street	Mixed Use Residential and Commercial
106 Broad Street	Residential
107 Brook Street	Mixed Use Residential and Commercial
108A Broad Street	Residential
108B Broad Street	Residential
109 Montgomery Avenue	Parking
11 Wright Street	Residential
110A Broad Street	Residential
110B Broad Street	Residential
111 Brook Street	Residential
112A Broad Street	Residential
112B Broad Street	Residential
114 Van Duzer Street	Parking
115 Brook Street	Residential
115 Montgomery Avenue	Parking
116 Canal Street	Commercial
117 Boyd Street	Residential
117 Montgomery Avenue	Residential
118 Broad Street	Mixed Use Residential and Commercial
119 Brook Street	Residential
119 Montgomery Avenue	Parking
121 Brook Street	Residential
121 Montgomery Avenue	Residential
13 Slossom Terrace	Residential
130 Bay Street	Commercial
135 Canal Street	Commercial
136 Bay Street	Commercial
136 Central Avenue	Residential
140 Bay Street	Commercial
140 Richmond Terrace	Commercial
15 Margo Loop	Residential
15 Prospect Street	Industrial
15 Tappen Court	Residential
155 Bay Street	Park
16 Congress Street	Residential
160 Broad Street	Commercial
17 Central Avenue	Residential
17 Margo Loop	Residential
17 Tappen Court	Residential
171 Broad Street	Mixed Use Residential and Commercial
172 Van Duzer Street	Residential
176 Van Duzer Street	Residential
180 Van Duzer Street	Residential
182 Van Duzer Street	Residential
19 Margo Loop	Residential
19 Tappen Court	Residential
190 Bay Street	Mixed Use Residential and Commercial
191 Van Duzer Street	Mixed Use Residential and Commercial
192 Bay Street	Mixed Use Residential and Commercial

Table 20-13 (con't): Noise Receptor Locations

Location	Land Use
192 Van Duzer Street	Residential
194 Bay Street	Mixed Use Residential and Commercial
195 Van Duzer Street	Residential
196 Bay Street	Mixed Use Residential and Commercial
198 Bay Street	Mixed Use Residential and Commercial
198 Van Duzer Street	Residential
199 Van Duzer Street	Residential
2 Quinn Street	Residential
2 Tompkins Avenue	Industrial
20 Cedar Street	Residential
20 Congress Street	Residential
200 Bay Street	Mixed Use Residential and Commercial
201 Van Duzer Street	Residential
202 Bay Street	Mixed Use Residential and Commercial
202 Van Duzer Street	Residential
203 Van Duzer Street	Residential
204 Bay Street	Mixed Use Residential and Commercial
204 Van Duzer Street	Residential
205 Van Duzer Street	Residential
206 Bay Street	Mixed Use Residential and Commercial
206 Van Duzer Street	Residential
208 Bay Street	Mixed Use Residential and Commercial
208 Van Duzer Street	Residential
21 Brewster Street	Residential
21 Margo Loop	Residential
21 Tappen Court	Residential
210 Van Duzer Street	Residential
212 Bay Street	Mixed Use Residential and Commercial
212 Van Duzer Street	Residential
214 Bay Street	Residential
214 Van Duzer Street	Residential
216 Bay Street	Residential
216 Van Duzer Street	Residential
218 Bay Street	Mixed Use Residential and Commercial
218 Van Duzer Street	Residential
22 Cedar Street	Residential
22 Sands Street	Industrial
228 St Marks Place	Residential
23 Brewster Street	Residential
23 Margo Loop	Residential
23 Tappen Court	Residential
230 St Marks Place	Residential
234 St Marks Place	Residential
23-45 Sands Street	Industrial
24 Cedar Street	Residential
24 Tappen Court	Residential
240 Van Duzer Street	Residential
244 Van Duzer Street	Residential
246 Van Duzer Street	Residential
247 Van Duzer Street	Residential
25 Brewster Street	Residential
25 Margo Loop	Residential
25 Tappen Court	Residential
25 Victory Boulevard	Commercial

Table 20-13 (con't): Noise Receptor Locations

Location	Land Use
25 Wright Street	Residential
251 Victory Boulevard	Residential
253 Van Duzer Street	Residential
255 Van Duzer Street	Residential
257 Van Duzer Street	Residential
26 Cedar Street	Residential
26 Tappen Court	Residential
264 Van Duzer Street	Residential
67 Brewster Street	Residential
27 Brewster Street	Residential
27 Margo Loop	Residential
27 Tappen Court	Residential
27 Wright Street	Residential
273 St Marks Place	Residential
278 Van Duzer Street	Residential
28 Cedar Street	Residential
282 Van Duzer Street	Residential
286 Van Duzer Street	Residential
29 Brewster Street	Residential
29 Margo Loop	Residential
29 Tappen Court	Residential
29 Wright Street	Residential
292 Van Duzer Street	Vacant Land
297 Van Duzer Street	Residential
3 Victory Boulevard	Commercial
30 Bay Street	Commercial
30 Margo Loop	Residential
300 Van Duzer Street	Residential
304 Van Duzer Street	Residential
304-308 Van Duzer Street	Residential
30-48 Wall Street	Residential
305 Van Duzer Street	Residential
308 Front Street	Commercial
31 Tappen Court	Residential
31 Victory Boulevard	Commercial
31 Wright Street	Residential
311 Van Duzer Street	Residential
314 Van Duzer Street	Residential
315 Van Duzer Street	Residential
316 Van Duzer Street	Residential
318 Van Duzer Street	Residential
319 Van Duzer Street	Residential
32 Margo Loop	Residential
320 Van Duzer Street	Residential
322 Van Duzer Street	Residential
324 Van Duzer Street	Residential
328 Van Duzer Street	Residential
33 Brewster Street	Residential
33 Tappen Court	Residential
33 Van Duzer Street	Parking
33 Wright Street	Residential
330 Van Duzer Street	Residential
34 Academy Place	Residential
34 Margo Loop	Residential

Table 20-13 (con't): Noise Receptor Locations

Location	Land Use
35 Brewster Street	Residential
35 Tappen Court	Residential
35 Victory Boulevard	Mixed Use Residential and Commercial
35 Wright Street	Residential
36 Hamilton Avenue	Residential
36 Margo Loop	Residential
37 Tappen Court	Residential
37 Victory Boulevard	Mixed Use Residential and Commercial
38 Margo Loop	Residential
38 Tappen Court	Residential
39 Tappen Court	Residential
39 Victory Boulevard	Residential
4 Baltic Street	Residential
4 Stanley Avenue	Residential
40 Cedar Street	Residential
40 Margo Loop	Residential
40 Tappen Court	Residential
40-54 Grant Street	Residential
406 St Marks Place	Place of Worship
41 Tappen Court	Residential
41 Van Duzer Street	Residential
41 Victory Boulevard	Residential
410 St Marks Place	Commercial
412 St Marks Place	Residential
418 St Marks Place	Commercial
42 Cedar Street	Residential
42 Margo Loop	Residential
420 St Marks Place	Residential
422 St Marks Place	Residential
426 St Marks Place	Vacant Land
428 St Marks Place	Vacant Land
43 Tappen Court	Residential
43 Van Duzer Street	Residential
430 St Marks Place	Residential
436 St Marks Place	Residential
438 St Marks Place	Residential
44 Tappen Court	Residential
44 Victory Boulevard	Commercial
440 St Marks Place	Residential
444 St Marks Place	Commercial
45 St Pauls Avenue	Residential
45 Swan Street	Residential
45 Tappen Court	Residential
45 Van Duzer Street	Industrial
45 Victory Boulevard	Residential
450 St Marks Place	Institutional
46 Tappen Court	Residential
467 Saint Marks Place	Institutional
469 Saint Marks Place	Mixed Use Residential and Commercial
47 Clinton Street	Residential
47 Tappen Court	Residential
47 Van Duzer Street	Residential
473 Saint Marks Place	Mixed Use Residential and Commercial
475 Saint Marks Place	Mixed Use Residential and Commercial

Table 20-13 (con't): Noise Receptor Locations

Location	Land Use
48 Belmont Place	Residential
49 Grant Street	Residential
49 Tappen Court	Residential
49 Van Duzer Street	Place of Worship
50 Margo Loop	Residential
50 Tappen Court	Residential
50 Wall Street	Residential
506 Jersey Street	Residential
508 Jersey Street	Residential
51 Clinton Street	Residential
51 Grant Street	Residential
51 St Pauls Avenue	Residential
51 Swan Street	Residential
51 Tappen Court	Residential
51 Wall Street	Residential
510 Jersey Street	Residential
512 Jersey Street	Residential
517 Jersey Street	Residential
518 Jersey Street	Residential
52 Margo Loop	Residential
52 Tappen Court	Residential
52 Van Duzer Street	Commercial
520 Bay Street	Mixed Use Residential and Commercial
53 Grant Street	Residential
53 Tappen Court	Residential
53 Victory Boulevard	Mixed Use Residential and Commercial
53 Wall Street	Residential
534 Jersey Street	Residential
538 Bay Street	Mixed Use Residential and Commercial
54 Clinton Street	Mixed Use Residential and Commercial
54 Margo Loop	Residential
54 Van Duzer Street	Residential
54 Wall Street	Residential
540 Jersey Street	Residential
541 Bay Street	Mixed Use Residential and Commercial
542 Jersey Street	Mixed Use Residential and Commercial
544 Jersey Street	Residential
546 Jersey Street	Residential
548 Jersey Street	Residential
55 Clinton Street	Residential
55 Grant Street	Residential
55 Tappen Court	Residential
55 Victory Boulevard	Mixed Use Residential and Commercial
55 Wall Street	Residential
552 Jersey Street	Residential
554 Jersey Street	Residential
56 Belmont Place	Residential
56 Margo Loop	Residential
56 Van Duzer Street	Residential
57 Broad Street	Residential
57 Clinton Street	Residential
57 Grant Street	Residential
57 Swan Street	Residential
57 Victory Boulevard	Commercial

Table 20-13 (con't): Noise Receptor Locations

Location	Land Use
57 Wall Street	Residential
58 Grant Street	Residential
58 Margo Loop	Residential
58 Sands Street	Parking
58 Van Duzer Street	Residential
59 Brewster Street	Residential
59 Brook Street	Residential
59 Grant Street	Residential
59 Van Duzer Street	Residential
59 Victory Boulevard	Residential
59 Wall Street	Residential
60 Hannah Street	Residential
60 Margo Loop	Residential
60 Van Duzer Street	Mixed Use Residential and Commercial
61 Central Avenue	Commercial
61 Grant Street	Residential
61 Van Duzer Street	Residential
61 Wall Street	Residential
61 William Street	Residential
62 Belmont Place	Residential
62 Hannah Street	Vacant Land
62 Margo Loop	Residential
62 Richmond Terrace	Commercial
62 Tappen Court	Residential
62 Wall Street	Residential
63 Brook Street	Residential
63 Van Duzer Street	Residential
63 William Street	Residential
64 Hannah Street	Parking
64 Margo Loop	Residential
64 Sands Street	Residential
64 Tappen Court	Residential
65 Hannah Street	Parking
65 Sands Street	Residential
65 St Pauls Avenue	Residential
66 Broad Street	Industrial
66 Tappen Court	Residential
66 Van Duzer Street	Residential
67 Brook Street	Residential
67 Hannah Street	Parking
67 Sands Street	Residential
67 St Pauls Avenue	Residential
67 Van Duzer Street	Residential
68 Belmont Place	Residential
68 Broad Street	Industrial
68 Sands Street	Residential
68 Tappen Court	Residential
69 Sands Street	Residential
70 Brewster Street	Residential
70 Broad Street	Residential
70 Sands Street	Residential
70 Tappen Court	Residential
70 Van Duzer Street	Residential
71 Central Avenue	Commercial

Table 20-13(con't): Noise Receptor Locations

Location	Land Use
71 Margo Loop	Residential
71 Sands Street	Residential
71 Van Duzer Street	Residential
72 Brewster Street	Residential
72 Sands Street	Residential
73 Margo Loop	Residential
74 Brewster Street	Residential
74 Broad Street	Institutional
74 Van Duzer Street	Residential
75 Margo Loop	Residential
75 Stuyvesant Place	Institutional
76 Belmont Place	Residential
76 Brewster Street	Residential
76 Margo Loop	Residential
76 Sands Street	Residential
76 Van Duzer Street	Mixed Use Residential and Commercial
77 Margo Loop	Residential
80 Brewster Street	Residential
78 Broad Street	Residential
78 Margo Loop	Residential
78 Richmond Terrace	Institutional
78 Van Duzer Street	Residential
79 Brook Street	Residential
79 Margo Loop	Residential
79 Wave Street	Residential
8 Pike Street	Residential
80 Belmont Place	Residential
80 Broad Street	Residential
80 Brook Street	Residential
80 Margo Loop	Residential
80 Sands Street	Residential
80 Van Duzer Street	Residential
81 Brook Street	Mixed Use Residential and Commercial
81 Margo Loop	Residential
82 Brook Street	Residential
82 Sands Street	Residential
82 Van Duzer Street	Residential
83 Brook Street	Mixed Use Residential and Commercial
83 Prospect Street	Place of Worship
83 Wave Street	Residential
84 Broad Street	Residential
84 Brook Street	Residential
84 Sands Street	Residential
84 Van Duzer Street	Commercial
85 Boyd Street	Residential
85 Montgomery Avenue	Mixed Use Residential and Commercial
85 Prospect Street	Residential
85 Stuyvesant Place	Commercial
86 Belmont Place	Residential
86 Hamilton Avenue	Residential
86 Van Duzer Street	Parking
87 Brook Street	Residential
87 Montgomery Avenue	Residential
87 Wave Street	Residential

Table 20-13 (con't): Noise Receptor Locations

Location	Land Use
87-133 Central Avenue	Vacant Land
88 Brewster Street	Residential
88 Broad Street	Residential
89 Brook Street	Residential
89 Montgomery Avenue	Residential
90 Brewster Street	Residential
90 Broad Street	Residential
91 Brook Street	Residential
91 Sands Street	Residential
92 Brewster Street	Residential
93 Boyd Street	Residential
94 Brewster Street	Residential
95 Boyd Street	Residential
95 Montgomery Avenue	Industrial
95 Wave Street	Residential
97 Boyd Street	Residential
15 Pike Street	Place of Worship
199 Victory Boulevard	Place of Worship
100 Richmond Terrace	Institutional
75 Richmond Terrace	Recreational

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 specified above, cumulative noise analyses were performed to determine maximum one-hour equivalent (Leq(1)) noise levels that would be expected to occur during one worst-case quarter for each phase of construction (excavation/foundation, superstructure, and interior fit-out) at each Projected Development Site selected for analysis. This resulted in a predicted range of peak hourly construction noise levels throughout the construction period.

Projected Development Site 4

In addition to analyzing all Projected Development Sites throughout the construction period, Projected Development Site 4 was selected as a representative construction site to determine typical construction noise levels from one site under construction on other nearby Projected Development Sites.

Construction of Projected Development Site 4 is predicted to result in noise level increases at future noise-sensitive receptors close to the construction area at some times during the construction period. Areas immediately adjacent to construction work areas would experience the highest levels of construction noise (while construction is ongoing immediately adjacent), whereas receptors located further from the development area would experience less noise because of the greater distance from the on-site construction equipment. The results of the detailed construction noise analysis for Projected Development Site 4 are summarized in Table 20-14.

Table 20-14: Project Development Site 4 Construction Noise Analysis Results in dBA

Projected Development Site	Total L_{eq}	
	Min	Max
1	29.2	62.5
2	30.1	54.7
3	40.1	81.7
5	NA	NA
6	34.6	49.6
7	31.2	40.6
8	22.7	53.4
9	23.8	52.0
10	25.6	54.3
11	30.3	64.3
12	37.2	66.8
13	34.7	67.8
14	36.0	68.9
15	42.3	76.4
16	NA	NA
17	36.1	77.4
18	22.5	49.1
19	20.7	49.0
20	NA	NA
21	21.6	44.1
22	21.7	49.7
23	21.3	47.7
24	21.1	47.2
25	20.1	45.9

The maximum predicted noise levels shown in Table 20-14 would occur during the most noise-intensive activities of construction, which typically do not occur every day, and do not occur during every hour on days during which those activities are conducted. During hours when the loudest pieces of construction equipment (e.g., impact pile driver) are not in use, receptors would experience lower construction noise levels. As described below, construction noise levels would fluctuate during the construction period at each receptor, with the greatest levels of construction noise occurring for limited periods during construction.

Demolition, Excavation, and Foundation

During demolition, excavation, and foundation construction at Projected Development Site 4, the primary noise sources would include vibratory pile drivers, excavators, and bulldozers. The pile drivers would operate intermittently during a portion of the approximately five months of this construction period. Excavators and bulldozers would operate on the site regularly during demolition activities and excavation activities, but infrequently during foundation activities; there would be relatively little time during which both of these sources would overlap on the site. The construction noise analysis, however, is conservatively based on a worst-case time period including all of these sources. A summary of noise levels predicted to occur during the demolition, excavation, and foundation construction phase for Projected Development Site 4 is presented in Table 20-15.

Table 20-15: Projected Development Site 4 Demolition, Excavation, and Foundation Noise Levels

Projected Development Sites	Predicted Construction Noise Levels
3	Up to 74
13,14, 15, 17	60 to 70
1, 11	50 to 60
All Others	Less than 50

Superstructure

During building superstructure construction at Projected Development Site 4, the primary noise sources would include emergency generators, concrete mixers, and pneumatics tools and would be expected to operate over a period of approximately 11 months. All of this equipment would be expected to operate on the site throughout superstructure activities. The construction noise analysis is conservatively based on a worst-case time period including all of these sources. A summary of noise levels predicted to occur during the superstructure construction phase for Projected Development Site 4 is presented in Table 20-16.

Table 20-16: Projected Development Site 4 Superstructure Noise Levels

Projected Development Sites	Predicted Construction Noise Levels
3	Up to 82
15, 17	70 to 80
1, 11, 12, 13, 14	60 to 70
2, 8, 9, 10	50 to 60
All Others	Less than 50

Interiors

During interiors construction at Projected Development Site 4, the primary noise sources would include cranes and man lifts and would be expected to operate over a period of approximately 11 months. All of the equipment would be expected to operate on the site throughout interiors construction. The construction noise analysis is conservatively based on a worst-case time period including all of these sources. A summary of noise levels predicted to occur during the interiors construction phase for Projected Development Site 4 is presented in Table 20-17.

Table 20-17: Projected Development Site 4 Interiors Noise Levels

Projected Development Sites	Predicted Construction Noise Levels
3, 15, 17	Up to 68
11, 12, 13, 14	50 to 60
All Others	Less than 50

Projected Development Site 22

In addition to analyzing all Projected Development Sites throughout the construction period, Projected Development Site 22 was selected as a representative construction site to determine typical construction noise levels from one site under construction.

Construction of Projected Development Site 22 is predicted to result in noise level increases at noise-sensitive receptors close to the construction area at some times during the construction period. Areas immediately adjacent to construction work areas would experience the highest levels of construction noise (while construction is ongoing immediately adjacent), whereas receptors located further from the development area would experience less noise because of the greater distance from the on-site construction equipment. The results of the detailed construction noise analysis for Projected Development Site 22 are summarized in Table 20-18.

The maximum predicted noise levels shown in Table 20-18 would occur during the most noise-intensive activities of construction, which typically do not occur every day, and do not occur during every hour on days during which those activities are conducted. During hours when the loudest pieces of construction equipment (e.g., impact pile driver) are not in use, receptors would experience lower construction noise levels. As described below, construction noise levels would fluctuate during the construction period at each receptor, with the greatest levels of construction noise occurring for limited periods during construction.

Demolition, Excavation, and Foundation

During demolition, excavation, and foundation construction at Projected Development Site 22, the primary noise sources would include vibratory pile drivers, excavators, and bulldozers. The pile drivers would operate intermittently during a portion of the approximately five months of this construction period. Excavators and bulldozers would operate on the site regularly during demolition activities and excavation activities, but infrequently during foundation activities; there would be relatively little time during which both of these sources would overlap on the site. The construction noise analysis, however, is conservatively based on a worst-case time period including all of these sources. A summary of noise levels predicted to occur during the demolition, excavation, and foundation construction phase for Projected Development Site 22 is presented in Table 20-19.

Superstructure

During building superstructure construction at Projected Development Site 22, the primary noise sources would include emergency generators, concrete mixers, and pneumatics tools and would be expected to operate over a period of approximately 9 months. All of this equipment would be expected to operate on the site throughout superstructure activities. The construction noise analysis is conservatively based on a worst-case time period including all of these sources. A summary of noise levels predicted to occur during the superstructure construction phase for Projected Development Site 22 is presented in Table 20-20.

Table 20-18: Project Development Site 22 Construction Noise Analysis Results in dBA

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
1 Central Avenue	62.0	62.0	62.0	0.0	0.0
1 Tompkins Avenue	60.1	60.1	63.2	0.0	3.1
10 Hamilton Avenue	78.6	78.6	78.6	0.0	0.0
100 Stuyvesant Place	78.6	78.6	78.6	0.0	0.0
101 Brook Street	63.0	63.0	63.0	0.0	0.0
105 Brook Street	63.0	63.0	63.0	0.0	0.0
106 Broad Street	60.1	60.1	63.6	0.0	3.5
107 Brook Street	63.0	63.0	63.0	0.0	0.0
108A Broad Street	60.1	60.1	66.4	0.0	6.3
108B Broad Street	60.1	60.1	66.4	0.0	6.3
109 Montgomery Avenue	63.0	63.0	63.0	0.0	0.0
11 Wright Street	63.1	63.1	68.1	0.0	5.0
110A Broad Street	60.1	60.1	66.4	0.0	6.3
110B Broad Street	60.1	60.1	66.3	0.0	6.2
111 Brook Street	63.0	63.0	63.0	0.0	0.0
112A Broad Street	60.1	60.1	66.3	0.0	6.2
112B Broad Street	60.1	60.1	66.2	0.0	6.1
114 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
115 Brook Street	63.0	63.0	63.0	0.0	0.0
115 Montgomery Avenue	63.0	63.0	63.0	0.0	0.0
116 Canal Street	63.1	63.1	66.2	0.0	3.1
117 Boyd Street	63.1	63.3	79.2	0.2	16.1
117 Montgomery Avenue	63.0	63.0	63.0	0.0	0.0
118 Broad Street	60.1	60.1	66.4	0.0	6.3
119 Brook Street	63.0	63.0	63.0	0.0	0.0
119 Montgomery Avenue	63.0	63.0	63.0	0.0	0.0
121 Brook Street	63.0	63.0	63.0	0.0	0.0
121 Montgomery Avenue	63.0	63.0	63.0	0.0	0.0
13 Slossom Terrace	62.0	62.0	62.0	0.0	0.0
130 Bay Street	71.1	71.1	71.1	0.0	0.0
135 Canal Street	63.1	63.2	73.6	0.1	10.5
136 Bay Street	71.1	71.1	71.1	0.0	0.0
136 Central Avenue	62.0	62.0	62.0	0.0	0.0
140 Bay Street	71.1	71.1	71.1	0.0	0.0
140 Richmond Terrace	71.1	71.1	71.1	0.0	0.0
15 Margo Loop	62.9	62.9	63.0	0.0	0.1
15 Prospect Street	64.8	64.8	64.8	0.0	0.0
15 Tappen Court	56.9	57.0	67.8	0.1	10.9
155 Bay Street	71.1	71.1	71.1	0.0	0.0
16 Congress Street	71.0	71.0	71.0	0.0	0.0
160 Broad Street	60.1	60.1	62.2	0.0	2.1
17 Central Avenue	62.0	62.0	62.0	0.0	0.0
17 Margo Loop	62.9	62.9	62.9	0.0	0.0
17 Tappen Court	56.9	57.0	68.2	0.1	11.3
171 Broad Street	60.1	60.1	65.6	0.0	5.5
172 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
176 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
180 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
182 Van Duzer Street	62.9	62.9	62.9	0.0	0.0
19 Margo Loop	62.9	62.9	63.0	0.0	0.1
19 Tappen Court	56.9	57.0	68.9	0.1	12.0
190 Bay Street	71.1	71.1	71.1	0.0	0.0
191 Van Duzer Street	62.9	62.9	62.9	0.0	0.0

Table 20-18 (con't): Project Development Site 22 Construction Noise Analysis Results in dBA

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
192 Bay Street	71.1	71.1	71.1	0.0	0.0
192 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
194 Bay Street	71.1	71.1	71.1	0.0	0.0
195 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
196 Bay Street	71.1	71.1	71.1	0.0	0.0
198 Bay Street	71.1	71.1	71.1	0.0	0.0
198 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
199 Van Duzer Street	62.9	62.9	62.9	0.0	0.0
2 Quinn Street	60.1	60.1	66.8	0.0	6.7
2 Tompkins Avenue	60.1	60.1	62.3	0.0	2.2
20 Cedar Street	56.9	56.9	58.3	0.0	1.4
20 Congress Street	71.0	71.0	71.0	0.0	0.0
200 Bay Street	71.1	71.1	71.1	0.0	0.0
201 Van Duzer Street	62.9	62.9	63.1	0.0	0.2
202 Bay Street	71.1	71.1	71.1	0.0	0.0
202 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
203 Van Duzer Street	62.9	62.9	63.1	0.0	0.2
204 Bay Street	71.1	71.1	71.1	0.0	0.0
204 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
205 Van Duzer Street	62.9	62.9	63.1	0.0	0.2
206 Bay Street	71.1	71.1	71.1	0.0	0.0
206 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
208 Bay Street	71.1	71.1	71.1	0.0	0.0
208 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
21 Brewster Street	83.6	83.6	83.6	0.0	0.0
21 Margo Loop	62.9	62.9	63.0	0.0	0.1
21 Tappen Court	56.9	57.1	69.5	0.2	12.6
210 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
212 Bay Street	71.1	71.1	71.1	0.0	0.0
212 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
214 Bay Street	71.1	71.1	71.1	0.0	0.0
214 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
216 Bay Street	71.1	71.1	71.1	0.0	0.0
216 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
218 Bay Street	71.1	71.1	71.1	0.0	0.0
218 Van Duzer Street	62.9	62.9	63.0	0.0	0.1
22 Cedar Street	56.9	56.9	59.2	0.0	2.3
22 Sands Street	64.8	64.8	64.8	0.0	0.0
228 St Marks Place	78.6	78.6	78.6	0.0	0.0
23 Brewster Street	83.6	83.6	83.6	0.0	0.0
23 Margo Loop	62.9	62.9	63.0	0.0	0.1
23 Tappen Court	56.9	57.1	70.2	20.2	13.3
230 St Marks Place	78.6	78.6	78.6	0.0	0.0
234 St Marks Place	78.6	78.6	78.6	0.0	0.0
23-45 Sands Street	64.8	64.8	64.8	0.0	0.0
24 Cedar Street	56.9	57.0	66.4	0.1	9.5
24 Tappen Court	63.1	63.1	66.2	0.0	3.1
240 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
244 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
246 Van Duzer Street	83.6	83.6	83.6	0.0	0.0

Table 20-18 (con't): Project Development Site 22 Construction Noise Analysis Results in dBA

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
247 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
25 Brewster Street	83.6	83.6	83.6	0.0	0.0
25 Margo Loop	62.9	62.9	63.0	0.0	0.1
25 Tappen Court	56.9	57.1	70.9	0.2	14.0
25 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
25 Wright Street	63.1	63.1	68.5	0.0	5.4
251 Victory Boulevard	72.3	72.3	72.3	0.0	0.0
253 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
255 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
257 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
26 Cedar Street	56.9	57.0	66.8	0.1	9.9
26 Tappen Court	63.1	63.1	67.0	0.0	3.9
264 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
67 Brewster Street	83.6	83.6	83.6	0.0	0.0
27 Brewster Street	83.6	83.6	83.6	0.0	0.0
27 Margo Loop	62.9	62.9	63.0	0.0	0.1
27 Tappen Court	56.9	57.2	71.6	0.3	14.7
27 Wright Street	63.1	63.1	68.6	0.0	5.5
273 St Marks Place	78.6	78.6	78.6	0.0	0.0
278 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
28 Cedar Street	56.9	56.9	66.9	0.0	10.0
282 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
286 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
29 Brewster Street	83.6	83.6	83.6	0.0	0.0
29 Margo Loop	62.9	62.9	63.0	0.0	0.1
29 Tappen Court	56.9	57.2	71.9	0.3	15.0
29 Wright Street	63.1	63.1	68.6	0.0	5.5
292 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
297 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
3 Victory Boulevard	74.1	74.1	74.1	0.0	0.0
30 Bay Street	71.1	71.1	71.1	0.0	0.0
30 Margo Loop	62.9	62.9	62.9	0.0	0.0
300 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
304 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
304-308 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
30-48 Wall Street	78.6	78.6	78.6	0.0	0.0
305 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
308 Front Street	64.8	64.8	64.9	0.0	0.1
31 Tappen Court	65.9	65.9	73.4	0.0	7.5
31 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
31 Wright Street	63.1	63.1	68.7	0.0	5.6
311 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
314 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
315 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
316 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
318 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
319 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
32 Margo Loop	62.9	62.9	62.9	0.0	0.0
320 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
322 Van Duzer Street	83.6	83.6	83.6	0.0	0.0

Table 20-18 (con't): Project Development Site 22 Construction Noise Analysis Results in dBA

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
324 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
328 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
33 Brewster Street	83.6	83.6	83.6	0.0	0.0
33 Tappen Court	65.9	65.9	74.1	0.0	8.2
33 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
33 Wright Street	63.1	63.1	68.8	0.0	5.7
330 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
34 Academy Place	78.6	78.6	78.6	0.0	0.0
34 Margo Loop	62.9	62.9	62.9	0.0	0.0
35 Brewster Street	83.6	83.6	83.6	0.0	0.0
35 Tappen Court	65.9	65.9	74.5	0.0	8.6
35 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
35 Wright Street	63.1	63.1	68.8	0.0	5.7
36 Hamilton Avenue	78.6	78.6	78.6	0.0	0.0
36 Margo Loop	62.9	62.9	62.9	0.0	0.0
37 Tappen Court	65.9	66.0	75.2	0.1	9.3
37 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
38 Margo Loop	62.9	62.9	62.9	0.0	0.0
38 Tappen Court	65.9	65.9	70.0	0.0	4.1
39 Tappen Court	65.9	66.0	76.0	0.1	10.1
39 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
4 Baltic Street	69.1	69.1	69.1	0.0	0.0
4 Stanley Avenue	72.3	72.3	72.3	0.0	0.0
40 Cedar Street	56.9	56.9	66.3	0.0	9.4
40 Margo Loop	62.9	62.9	62.9	0.0	0.0
40 Tappen Court	65.9	65.9	70.7	0.0	4.8
40-54 Grant Street	62.9	62.9	62.9	0.0	0.0
406 St Marks Place	63.0	63.0	63.0	0.0	0.0
41 Tappen Court	65.9	66.0	76.5	0.1	10.6
41 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
41 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
410 St Marks Place	63.0	63.0	63.0	0.0	0.0
412 St Marks Place	63.0	63.0	63.0	0.0	0.0
418 St Marks Place	63.0	63.0	63.0	0.0	0.0
42 Cedar Street	56.9	56.9	65.9	0.0	9.0
42 Margo Loop	62.9	62.9	62.9	0.0	0.0
420 St Marks Place	63.0	63.0	63.0	0.0	0.0
422 St Marks Place	63.0	63.0	63.0	0.0	0.0
426 St Marks Place	63.0	63.0	63.0	0.0	0.0
428 St Marks Place	63.0	63.0	63.0	0.0	0.0
43 Tappen Court	65.9	66.0	77.2	0.1	11.3
43 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
430 St Marks Place	63.0	63.0	63.0	0.0	0.0
436 St Marks Place	63.0	63.0	63.0	0.0	0.0
438 St Marks Place	63.0	63.0	63.0	0.0	0.0
44 Tappen Court	65.9	65.9	71.6	0.0	5.7
44 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
440 St Marks Place	63.0	63.0	63.0	0.0	0.0
444 St Marks Place	63.0	63.0	63.0	0.0	0.0
45 St Pauls Avenue	66.0	66.0	66.0	0.0	0.0

Table 20-18 (con't): Project Development Site 22 Construction Noise Analysis Results in dBA

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
45 Swan Street	66.0	66.0	66.0	0.0	0.0
45 Tappen Court	65.9	66.0	78.0	0.1	12.1
45 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
45 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
450 St Marks Place	63.0	63.0	63.0	0.0	0.0
46 Tappen Court	65.9	66.0	72.1	0.1	6.2
467 Saint Marks Place	63.0	63.0	63.0	0.0	0.0
469 Saint Marks Place	63.0	63.0	63.0	0.0	0.0
47 Clinton Street	80.2	80.2	80.2	0.0	0.0
47 Tappen Court	65.9	66.0	78.5	0.1	12.6
47 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
473 Saint Marks Place	63.0	63.0	63.0	0.0	0.0
475 Saint Marks Place	63.0	63.0	63.0	0.0	0.0
48 Belmont Place	78.6	78.6	78.6	0.0	0.0
49 Grant Street	62.9	62.9	63.0	0.0	0.1
49 Tappen Court	65.9	66.0	79.3	0.1	13.4
49 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
50 Margo Loop	62.9	62.9	62.9	0.0	0.0
50 Tappen Court	65.9	66.8	72.8	0.9	6.9
50 Wall Street	78.6	78.6	78.6	0.0	0.0
506 Jersey Street	72.3	72.3	72.3	0.0	0.0
508 Jersey Street	72.3	72.3	72.3	0.0	0.0
51 Clinton Street	80.2	80.2	80.2	0.0	0.0
51 Grant Street	62.9	62.9	62.9	0.0	0.0
51 St Pauls Avenue	66.0	66.0	66.0	0.0	0.0
51 Swan Street	66.0	66.0	66.0	0.0	0.0
51 Tappen Court	65.9	66.0	80.1	0.1	14.2
51 Wall Street	78.6	78.6	78.6	0.0	0.0
510 Jersey Street	72.3	72.3	72.3	0.0	0.0
512 Jersey Street	72.3	72.3	72.3	0.0	0.0
517 Jersey Street	72.3	72.3	72.3	0.0	0.0
518 Jersey Street	72.3	72.3	72.3	0.0	0.0
52 Margo Loop	62.9	62.9	62.9	0.0	0.0
52 Tappen Court	65.9	66.0	73.9	0.1	8.0
52 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
520 Bay Street	71.0	71.0	71.0	0.0	0.0
53 Grant Street	62.9	62.9	63.0	0.0	0.1
53 Tappen Court	65.9	66.1	80.7	0.2	14.8
53 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
53 Wall Street	78.6	78.6	78.6	0.0	0.0
534 Jersey Street	72.3	72.3	72.3	0.0	0.0
538 Bay Street	71.0	71.0	71.0	0.0	0.0
54 Clinton Street	83.6	83.6	83.6	0.0	0.0
54 Margo Loop	62.9	62.9	62.9	0.0	0.0
54 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
54 Wall Street	78.6	78.6	78.6	0.0	0.0
540 Jersey Street	72.3	72.3	72.3	0.0	0.0
541 Bay Street	71.0	71.0	71.0	0.0	0.0
542 Jersey Street	72.3	72.3	72.3	0.0	0.0
544 Jersey Street	72.3	72.3	72.3	0.0	0.0

Table 20-18 (con't): Project Development Site 22 Construction Noise Analysis Results in dBA

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
546 Jersey Street	72.3	72.3	72.3	0.0	0.0
548 Jersey Street	72.3	72.3	72.3	0.0	0.0
55 Clinton Street	80.2	80.2	80.2	0.0	0.0
55 Grant Street	62.9	62.9	62.9	0.0	0.0
55 Tappen Court	65.9	66.1	81.4	0.2	15.5
55 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
55 Wall Street	78.6	78.6	78.6	0.0	0.0
552 Jersey Street	72.3	72.3	72.3	0.0	0.0
554 Jersey Street	72.3	72.3	72.3	0.0	0.0
56 Belmont Place	78.6	78.6	78.6	0.0	0.0
56 Margo Loop	62.9	62.9	62.9	0.0	0.0
56 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
57 Broad Street	60.1	60.1	66.4	0.0	6.3
57 Clinton Street	80.2	80.2	80.2	0.0	0.0
57 Grant Street	62.9	62.9	62.9	0.0	0.0
57 Swan Street	66.0	66.0	66.0	0.0	0.0
57 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
57 Wall Street	78.6	78.6	78.6	0.0	0.0
58 Grant Street	62.9	62.9	62.9	0.0	0.0
58 Margo Loop	62.9	62.9	62.9	0.0	0.0
58 Sands Street	71.0	71.0	71.0	0.0	0.0
58 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
59 Brewster Street	83.6	83.6	83.6	0.0	0.0
59 Brook Street	63.0	63.0	63.0	0.0	0.0
59 Grant Street	62.9	62.9	62.9	0.0	0.0
59 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
59 Victory Boulevard	71.1	71.1	71.1	0.0	0.0
59 Wall Street	78.6	78.6	78.6	0.0	0.0
60 Hannah Street	66.0	66.0	66.0	0.0	0.0
60 Margo Loop	62.9	62.9	62.9	0.0	0.0
60 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
61 Central Avenue	62.0	62.0	62.0	0.0	0.0
61 Grant Street	62.9	62.9	62.9	0.0	0.0
61 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
61 Wall Street	78.6	78.6	78.6	0.0	0.0
61 William Street	83.6	83.6	83.6	0.0	0.0
62 Belmont Place	78.6	78.6	78.6	0.0	0.0
62 Hannah Street	66.0	66.0	66.0	0.0	0.0
62 Margo Loop	62.9	62.9	63.0	0.0	0.1
62 Richmond Terrace	71.1	71.1	71.1	0.0	0.0
62 Tappen Court	63.1	63.3	75.7	0.2	12.6
62 Wall Street	78.6	78.6	78.6	0.0	0.0
63 Brook Street	63.0	63.0	63.0	0.0	0.0
63 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
63 William Street	83.6	83.6	83.6	0.0	0.0
64 Hannah Street	66.0	66.0	66.0	0.0	0.0
64 Margo Loop	62.9	62.9	63.0	0.0	0.1
64 Sands Street	71.0	71.0	71.0	0.0	0.0
64 Tappen Court	63.1	63.3	76.2	0.2	13.1
65 Hannah Street	66.0	66.0	66.0	0.0	0.0

Table 20-18 (con't): Project Development Site 22 Construction Noise Analysis Results in dBA

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
65 Sands Street	71.0	71.0	71.0	0.0	0.0
65 St Pauls Avenue	66.0	66.0	66.0	0.0	0.0
66 Broad Street	60.1	60.1	62.8	0.0	2.7
66 Tappen Court	63.1	63.3	76.7	0.2	13.6
66 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
67 Brook Street	63.0	63.0	63.0	0.0	0.0
67 Hannah Street	66.0	66.0	66.0	0.0	0.0
67 Sands Street	71.0	71.0	71.0	0.0	0.0
67 St Pauls Avenue	66.0	66.0	66.0	0.0	0.0
67 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
68 Belmont Place	78.6	78.6	78.6	0.0	0.0
68 Broad Street	60.1	60.1	65.8	0.0	5.7
68 Sands Street	71.0	71.0	71.0	0.0	0.0
68 Tappen Court	63.1	63.3	77.1	0.2	14.0
69 Sands Street	71.0	71.0	71.0	0.0	0.0
70 Brewster Street	83.6	83.6	83.6	0.0	0.0
70 Broad Street	60.1	60.1	66.0	0.0	5.9
70 Sands Street	71.0	71.0	71.0	0.0	0.0
70 Tappen Court	63.1	63.3	77.7	0.2	14.6
70 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
71 Central Avenue	62.0	62.0	62.0	0.0	0.0
71 Margo Loop	62.9	62.9	62.9	0.0	0.0
71 Sands Street	71.0	71.0	71.0	0.0	0.0
71 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
72 Brewster Street	83.6	83.6	83.6	0.0	0.0
72 Sands Street	71.0	71.0	71.0	0.0	0.0
73 Margo Loop	62.9	62.9	62.9	0.0	0.0
74 Brewster Street	83.6	83.6	83.6	0.0	0.0
74 Broad Street	60.1	60.1	66.1	0.0	6.0
74 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
75 Margo Loop	62.9	62.9	62.9	0.0	0.0
75 Stuyvesant Place	78.6	78.6	78.6	0.0	0.0
76 Belmont Place	78.6	78.6	78.6	0.0	0.0
76 Brewster Street	83.6	83.6	83.6	0.0	0.0
76 Margo Loop	62.9	62.9	63.0	0.0	0.1
76 Sands Street	71.0	71.0	71.0	0.0	0.0
76 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
77 Margo Loop	62.9	62.9	62.9	0.0	0.0
80 Brewster Street	83.6	83.6	83.6	0.0	0.0
78 Broad Street	60.1	60.1	66.3	0.0	6.2
78 Margo Loop	62.9	62.9	63.0	0.0	0.1
78 Richmond Terrace	71.1	71.1	71.1	0.0	0.0
78 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
79 Brook Street	63.0	63.0	63.0	0.0	0.0
79 Margo Loop	62.9	62.9	62.9	0.0	0.0
79 Wave Street	71.0	71.0	71.0	0.0	0.0
8 Pike Street	63.0	63.0	63.0	0.0	0.0
80 Belmont Place	78.6	78.6	78.6	0.0	0.0
80 Broad Street	60.1	60.1	66.4	0.0	6.3
80 Brook Street	63.0	63.0	63.0	0.0	0.0

Table 20-18 (con't): Project Development Site 22 Construction Noise Analysis Results in dBA

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
80 Margo Loop	62.9	62.9	62.9	0.0	0.0
80 Sands Street	83.6	83.6	83.6	0.0	0.0
80 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
81 Brook Street	63.0	63.0	63.0	0.0	0.0
81 Margo Loop	62.9	62.9	62.9	0.0	0.0
82 Brook Street	63.0	63.0	63.0	0.0	0.0
82 Sands Street	83.6	83.6	83.6	0.0	0.0
82 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
83 Brook Street	63.0	63.0	63.0	0.0	0.0
83 Prospect Street	71.0	71.0	71.2	0.0	0.2
83 Wave Street	71.0	71.0	71.0	0.0	0.0
84 Broad Street	60.1	60.1	66.6	0.0	6.5
84 Brook Street	63.0	63.0	63.0	0.0	0.0
84 Sands Street	83.6	83.6	83.6	0.0	0.0
84 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
85 Boyd Street	63.1	63.2	72.6	0.1	9.5
85 Montgomery Avenue	63.0	63.0	63.0	0.0	0.0
85 Prospect Street	71.0	71.0	71.2	0.0	0.2
85 Stuyvesant Place	78.6	78.6	78.6	0.0	0.0
86 Belmont Place	78.6	78.6	78.6	0.0	0.0
86 Hamilton Avenue	78.6	78.6	78.6	0.0	0.0
86 Van Duzer Street	66.0	66.0	66.0	0.0	0.0
87 Brook Street	63.0	63.0	63.0	0.0	0.0
87 Montgomery Avenue	63.0	63.0	63.0	0.0	0.0
87 Wave Street	71.0	71.0	71.0	0.0	0.0
87-133 Central Avenue	62.0	62.0	62.0	0.0	0.0
88 Brewster Street	83.6	83.6	83.6	0.0	0.0
88 Broad Street	60.1	60.1	66.6	0.0	6.5
89 Brook Street	63.0	63.0	63.0	0.0	0.0
89 Montgomery Avenue	63.0	63.0	63.0	0.0	0.0
90 Brewster Street	83.6	83.6	83.6	0.0	0.0
90 Broad Street	60.1	60.1	66.6	0.0	6.5
91 Brook Street	63.0	63.0	63.0	0.0	0.0
91 Sands Street	83.6	83.6	83.6	0.0	0.0
92 Brewster Street	83.6	83.6	83.6	0.0	0.0
93 Boyd Street	63.1	63.2	76.6	0.1	13.5
94 Brewster Street	83.6	83.6	83.6	0.0	0.0
95 Boyd Street	63.1	63.2	77.0	0.1	13.9
95 Montgomery Avenue	63.0	63.0	63.0	0.0	0.0
95 Wave Street	71.0	71.0	71.0	0.0	0.0
97 Boyd Street	63.1	63.3	78.1	0.2	15.0
15 Pike Street	72.3	72.3	72.3	0.0	0.0
199 Victory Boulevard	72.3	72.3	72.3	0.0	0.0
100 Richmond Terrace	72.3	72.3	72.3	0.0	0.0
75 Richmond Terrace	72.3	72.3	72.3	0.0	0.0

Table 20-19: Projected Development Site 22 Demolition, Excavation, and Foundation Noise Levels

Receptor Grouping	CadnaA Receptors	Existing Noise Levels	Predicted Construction Noise Levels	Maximum Predicted Increment	CEQR Threshold Exceedance?
Within 100 feet	53, 55, 62, 64, 66, 68, 70 Tappen Court 95, 97, 117 Boyd Street	Low to Mid 60s	High 60s to Mid 70s	Up to 14	Yes
Between 100 feet to 400 feet away (with direct line-of-sight)	135 Canal Street 15, 17, 19, 21, 23, 25, 27, 29, 39, 41, 43, 45, 46, 47, 49, 50, 51, 52 Tappen Court 24, 26, 28, 40, 42 Cedar Street 85, 93 Boyd Street	Mid 50s to Mid 60s	Mid 50s to Mid 70s	Up to 10	Yes
Between 100 feet to 400 feet away (with no direct line-of-site)	108A, 108B, 110A, 110B, 112A, 112B, 118, 171, 57, 68, 70, 74, 78, 80, 84, 88, 90 Broad Street 11, 25, 27, 29, 31, 33, 35 Wright Street 2 Quinn Street 26, 31, 33, 35, 37, 38, 40, 44 Tappen Court	Low to Mid 60s	Mid 50s to High 60s	Up to 5	Yes
More than 400 feet away	All Others	Mid 50s to Mid 80s	Up to Low 60s	Less than 3	No

Table 20-20: Projected Development Site 22 Superstructure Noise Levels

Receptor Grouping	CadnaA Receptors	Existing Noise Levels	Predicted Construction Noise Levels	Maximum Predicted Increment	CEQR Threshold Exceedance?
Within 150 feet	135 Canal Street 15, 17, 19, 21, 23, 25, 27, 29, 39, 41, 43, 45, 47, 49, 51, 53, 55, 62, 64, 66, 68, 70 Tappen Court 28 Cedar Street 93, 95, 97, 117 Boyd Street	Mid 50s to Mid 60s	High 60s to Low 80s	Up to 16	Yes
Between 150 and 400 feet away (with direct line-of-sight)	108A, 108B, 110A, 110B, 112A, 112B, 118, 171, 57, 68, 70, 74, 78, 80, 84, 88, 90 Broad Street 11, 25, 27, 29, 31, 33, 35 Wright Street 2 Quinn Street 24, 26, 40, 42 Cedar Street 85 Boyd Street 31, 33, 35, 37, 44, 46, 50, 52 Tappen Court	Mid 50s to Mid 60s	High 50s to Mid 70s	Up to 10	Yes
Between 150 and 400 feet away (with no direct line-of-sight)	1 Tompkins Avenue 106 Broad Street 116 Canal Street 24, 26, 38, 40 Tappen Court	Low to Mid 60s	Mid 50s to High 60s	Up to 5	Yes
More than 400 feet away	All Others	Mid 50s to Mid 80s	Up to High 50s	Less than 3	No

Interiors

During interiors construction at Projected Development Site 22, the primary noise sources would include cranes and man lifts and would be expected to operate over a period of approximately 10 months. All of the equipment would be expected to operate on the site throughout interiors construction. The construction noise analysis is conservatively based on a worst-case time period including all of these sources. A summary of noise levels predicted to occur during the interiors construction phase for Projected Development Site 22 is presented in Table 20-21.

Table 20-21: Projected Development Site 22 Interiors Noise Levels

Receptor Grouping	CadnaA Receptors	Existing Noise Levels	Predicted Construction Noise Levels	Maximum Predicted Increment	CEQR Threshold Exceedance?
Any Distance	All Receptors	Mid 50s to Mid 80s	Mid 50s to Mid 80s	Less than 3	No

All Projected Development Sites

Construction of all Projected Development Sites is predicted to result in noise level increases at noise-sensitive receptors close to the construction areas at some times during the construction period. Areas immediately adjacent to construction work areas would experience the highest levels of construction noise (while construction is ongoing immediately adjacent), whereas receptors located further from the development area would experience less noise because of the greater distance from the on-site construction equipment. The results of the detailed construction noise analysis for all Projected Development Sites are summarized in Table 20-22.

The maximum predicted noise levels shown in Table 20-22 would occur during the most noise-intensive activities of construction, which typically do not occur every day, and do not occur during every hour on days during which those activities are conducted. During hours when the loudest pieces of construction equipment (e.g., impact pile driver) are not in use, receptors would experience lower construction noise levels. As described below, construction noise levels would fluctuate during the construction period at each receptor, with the greatest levels of construction noise occurring for limited periods during construction.

Table 20-22: Maximum Predicted Noise Levels

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
1 Central Avenue	62.0	62.0	77.1	0.0	15.1
1 Tompkins Avenue	60.1	60.1	68.1	0.0	8.0
10 Hamilton Avenue	78.6	78.6	79.1	0.0	0.5
100 Stuyvesant Place	78.6	78.6	78.6	0.0	0.0
101 Brook Street	63.0	63.0	73.1	0.0	10.1
105 Brook Street	63.0	63.0	73.0	0.0	10.0
106 Broad Street	60.1	60.1	70.6	0.0	10.5
107 Brook Street	63.0	63.0	72.4	0.0	9.4
108A Broad Street	60.1	60.1	72.1	0.0	12.0
108B Broad Street	60.1	60.1	72.0	0.0	11.9
109 Montgomery Avenue	63.0	63.0	63.9	0.0	0.9
11 Wright Street	63.1	63.1	68.9	0.0	5.8
110A Broad Street	60.1	60.1	71.9	0.0	11.8
110B Broad Street	60.1	60.1	71.7	0.0	11.6
111 Brook Street	63.0	63.0	71.3	0.0	8.3
112A Broad Street	60.1	60.1	71.5	0.0	11.4
112B Broad Street	60.1	60.1	71.2	0.0	11.1
114 Van Duzer Street	66.0	66.0	79.1	0.0	13.1
115 Brook Street	63.0	63.0	71.6	0.0	8.6
115 Montgomery Avenue	63.0	63.0	63.8	0.0	0.8
116 Canal Street	63.1	63.1	66.4	0.0	3.3
117 Boyd Street	63.1	63.1	79.3	0.0	16.2
117 Montgomery Avenue	63.0	63.0	68.2	0.0	5.2
118 Broad Street	60.1	60.1	71.3	0.0	11.2
119 Brook Street	63.0	63.0	70.8	0.0	7.8
119 Montgomery Avenue	63.0	63.0	64.9	0.0	1.9
121 Brook Street	63.0	63.0	70.2	0.0	7.2
121 Montgomery Avenue	63.0	63.0	65.7	0.0	2.7
13 Slossom Terrace	62.0	62.0	74.0	0.0	12.0
130 Bay Street	71.1	71.1	72.0	0.0	0.9
135 Canal Street	63.1	63.1	73.7	0.0	10.6
136 Bay Street	71.1	71.1	72.9	0.0	1.8

Table 20-22 (con't): Maximum Predicted Noise Levels

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
136 Central Avenue	62.0	62.0	64.1	0.0	2.1
140 Bay Street	71.1	71.1	72.9	0.0	1.8
140 Richmond Terrace	71.1	71.1	71.5	0.0	0.4
15 Margo Loop	62.9	62.9	67.1	0.0	4.2
15 Prospect Street	64.8	64.8	68.6	0.0	3.8
15 Tappen Court	56.9	56.9	72.4	0.0	15.5
155 Bay Street	71.1	71.1	77.6	0.0	6.5
16 Congress Street	71.0	71.0	81.2	0.0	10.2
160 Broad Street	60.1	60.1	67.9	0.0	7.8
17 Central Avenue	62.0	62.0	78.2	0.0	16.2
17 Margo Loop	62.9	62.9	66.7	0.0	3.8
17 Tappen Court	56.9	56.9	73.4	0.0	16.5
171 Broad Street	60.1	60.1	76.6	0.0	16.5
172 Van Duzer Street	62.9	62.9	69.8	0.0	6.9
176 Van Duzer Street	62.9	62.9	69.2	0.0	6.3
180 Van Duzer Street	62.9	62.9	68.6	0.0	5.7
182 Van Duzer Street	62.9	62.9	68.0	0.0	5.1
19 Margo Loop	62.9	62.9	67.3	0.0	4.4
19 Tappen Court	56.9	56.9	74.6	0.0	17.7
190 Bay Street	71.1	71.1	75.3	0.0	4.2
191 Van Duzer Street	62.9	62.9	69.6	0.0	6.7
192 Bay Street	71.1	71.1	75.6	0.0	4.5
192 Van Duzer Street	62.9	62.9	66.8	0.0	3.9
194 Bay Street	71.1	71.1	75.9	0.0	4.8
195 Van Duzer Street	62.9	62.9	71.4	0.0	8.5
196 Bay Street	71.1	71.1	76.1	0.0	5.0
198 Bay Street	71.1	71.1	76.3	0.0	5.2
198 Van Duzer Street	62.9	62.9	69.2	0.0	6.3
199 Van Duzer Street	62.9	62.9	69.2	0.0	6.3
2 Quinn Street	60.1	60.1	73.2	0.0	13.1
2 Tompkins Avenue	60.1	60.1	67.0	0.0	6.9
20 Cedar Street	56.9	56.9	68.0	0.0	11.1
20 Congress Street	71.0	71.0	80.5	0.0	9.5
200 Bay Street	71.1	71.1	76.6	0.0	5.5
201 Van Duzer Street	62.9	62.9	74.0	0.0	11.1
202 Bay Street	71.1	71.1	76.8	0.0	5.7
202 Van Duzer Street	62.9	62.9	71.5	0.0	8.6
203 Van Duzer Street	62.9	62.9	74.7	0.0	11.8
204 Bay Street	71.1	71.1	77.0	0.0	5.9
204 Van Duzer Street	62.9	62.9	72.1	0.0	9.2
205 Van Duzer Street	62.9	62.9	75.4	0.0	12.5
206 Bay Street	71.1	71.1	77.1	0.0	6.0
206 Van Duzer Street	62.9	62.9	72.5	0.0	9.6
208 Bay Street	71.1	71.1	77.3	0.0	6.2
208 Van Duzer Street	62.9	62.9	73.0	0.0	10.1
21 Brewster Street	83.6	83.6	83.6	0.0	0.0
21 Margo Loop	62.9	62.9	67.2	0.0	4.3
21 Tappen Court	56.9	56.9	75.9	0.0	19.0
210 Van Duzer Street	62.9	62.9	73.6	0.0	10.7
212 Bay Street	71.1	71.1	76.7	0.0	5.6

Table 20-22 (con't): Maximum Predicted Noise Levels

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
212 Van Duzer Street	62.9	62.9	73.9	0.0	11.0
214 Bay Street	71.1	71.1	76.7	0.0	5.6
214 Van Duzer Street	62.9	62.9	74.2	0.0	11.3
216 Bay Street	71.1	71.1	76.8	0.0	5.7
216 Van Duzer Street	62.9	62.9	70.9	0.0	8.0
218 Bay Street	71.1	71.1	76.5	0.0	5.4
218 Van Duzer Street	62.9	62.9	70.6	0.0	7.7
22 Cedar Street	56.9	56.9	68.9	0.0	12.0
22 Sands Street	64.8	64.8	69.2	0.0	4.4
228 St Marks Place	78.6	78.6	78.6	0.0	0.0
23 Brewster Street	83.6	83.6	83.6	0.0	0.0
23 Margo Loop	62.9	62.9	67.1	0.0	4.2
23 Tappen Court	56.9	56.9	77.1	0.0	20.2
230 St Marks Place	78.6	78.6	78.6	0.0	0.0
234 St Marks Place	78.6	78.6	78.6	0.0	0.0
23-45 Sands Street	64.8	64.8	69.4	0.0	4.6
24 Cedar Street	56.9	56.9	71.2	0.0	14.3
24 Tappen Court	63.1	63.1	68.1	0.0	5.0
240 Van Duzer Street	83.6	83.6	83.9	0.0	0.3
244 Van Duzer Street	83.6	83.6	83.8	0.0	0.2
246 Van Duzer Street	83.6	83.6	83.9	0.0	0.3
247 Van Duzer Street	83.6	83.6	84.1	0.0	0.5
25 Brewster Street	83.6	83.6	83.7	0.0	0.1
25 Margo Loop	62.9	62.9	67.1	0.0	4.2
25 Tappen Court	56.9	56.9	78.3	0.0	21.4
25 Victory Boulevard	71.1	71.1	76.6	0.0	5.5
25 Wright Street	63.1	63.1	68.9	0.0	5.8
251 Victory Boulevard	72.3	72.3	74.4	0.0	2.1
253 Van Duzer Street	83.6	83.6	84.1	0.0	0.5
255 Van Duzer Street	83.6	83.6	84.1	0.0	0.5
257 Van Duzer Street	83.6	83.6	84.0	0.0	0.4
26 Cedar Street	56.9	56.9	72.0	0.0	15.1
26 Tappen Court	63.1	63.1	68.6	0.0	5.5
264 Van Duzer Street	83.6	83.6	84.0	0.0	0.4
67 Brewster Street	83.6	83.6	83.7	0.0	0.1
27 Brewster Street	83.6	83.6	83.7	0.0	0.1
27 Margo Loop	62.9	62.9	66.1	0.0	3.2
27 Tappen Court	56.9	56.9	79.8	0.0	22.9
27 Wright Street	63.1	63.1	69.0	0.0	5.9
273 St Marks Place	78.6	78.6	78.6	0.0	0.0
278 Van Duzer Street	83.6	83.6	84.2	0.0	0.6
28 Cedar Street	56.9	56.9	73.0	0.0	16.1
282 Van Duzer Street	83.6	83.6	84.3	0.0	0.7
286 Van Duzer Street	83.6	83.6	84.3	0.0	0.7
29 Brewster Street	83.6	83.6	83.7	0.0	0.1
29 Margo Loop	62.9	62.9	66.2	0.0	3.3
29 Tappen Court	56.9	56.9	80.0	0.0	23.1
29 Wright Street	63.1	63.1	69.1	0.0	6.0
292 Van Duzer Street	83.6	83.6	84.0	0.0	0.4
297 Van Duzer Street	83.6	83.6	85.3	0.0	1.7

Table 20-22 (con't): Maximum Predicted Noise Levels

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
3 Victory Boulevard	74.1	74.1	75.0	0.0	0.9
30 Bay Street	71.1	71.1	72.6	0.0	1.5
30 Margo Loop	62.9	62.9	65.1	0.0	2.2
300 Van Duzer Street	83.6	83.6	84.0	0.0	0.4
304 Van Duzer Street	83.6	83.6	84.0	0.0	0.4
304-308 Van Duzer Street	83.6	83.6	83.7	0.0	0.1
30-48 Wall Street	78.6	78.6	78.6	0.0	0.0
305 Van Duzer Street	83.6	83.6	85.5	0.0	1.9
308 Front Street	64.8	64.8	69.9	0.0	5.1
31 Tappen Court	65.9	65.9	80.9	0.0	15.0
31 Victory Boulevard	71.1	71.1	75.8	0.0	4.7
31 Wright Street	63.1	63.1	69.1	0.0	6.0
311 Van Duzer Street	83.6	83.6	84.3	0.0	0.7
314 Van Duzer Street	83.6	83.6	83.8	0.0	0.2
315 Van Duzer Street	83.6	83.6	84.2	0.0	0.6
316 Van Duzer Street	83.6	83.6	83.8	0.0	0.2
318 Van Duzer Street	83.6	83.6	83.8	0.0	0.2
319 Van Duzer Street	83.6	83.6	83.9	0.0	0.3
32 Margo Loop	62.9	62.9	65.0	0.0	2.1
320 Van Duzer Street	83.6	83.6	83.7	0.0	0.1
322 Van Duzer Street	83.6	83.6	83.7	0.0	0.1
324 Van Duzer Street	83.6	83.6	83.7	0.0	0.1
328 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
33 Brewster Street	83.6	83.6	83.7	0.0	0.1
33 Tappen Court	65.9	65.9	81.6	0.0	15.7
33 Van Duzer Street	66.0	66.0	66.4	0.0	0.4
33 Wright Street	63.1	63.1	69.2	0.0	6.1
330 Van Duzer Street	83.6	83.6	83.6	0.0	0.0
34 Academy Place	78.6	78.6	78.6	0.0	0.0
34 Margo Loop	62.9	62.9	64.9	0.0	2.0
35 Brewster Street	83.6	83.6	83.7	0.0	0.1
35 Tappen Court	65.9	65.9	81.2	0.0	15.3
35 Victory Boulevard	71.1	71.1	75.2	0.0	4.1
35 Wright Street	63.1	63.1	69.4	0.0	6.3
36 Hamilton Avenue	78.6	78.6	79.0	0.0	0.4
36 Margo Loop	62.9	62.9	65.2	0.0	2.3
37 Tappen Court	65.9	65.9	81.4	0.0	15.5
37 Victory Boulevard	71.1	71.1	74.9	0.0	3.8
38 Margo Loop	62.9	62.9	65.3	0.0	2.4
38 Tappen Court	65.9	65.9	70.8	0.0	4.9
39 Tappen Court	65.9	65.9	81.1	0.0	15.2
39 Victory Boulevard	71.1	71.1	74.6	0.0	3.5
4 Baltic Street	69.1	69.1	75.6	0.0	6.5
4 Stanley Avenue	72.3	72.3	72.8	0.0	0.5
40 Cedar Street	56.9	56.9	76.1	0.0	19.2
40 Margo Loop	62.9	62.9	64.5	0.0	1.6
40 Tappen Court	65.9	65.9	71.4	0.0	5.5
40-54 Grant Street	62.9	62.9	66.1	0.0	3.2
406 St Marks Place	63.0	63.0	70.8	0.0	7.8
41 Tappen Court	65.9	65.9	80.5	0.0	14.6

Table 20-22 (con't): Maximum Predicted Noise Levels

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
41 Van Duzer Street	66.0	66.0	66.4	0.0	0.4
41 Victory Boulevard	71.1	71.1	74.4	0.0	3.3
410 St Marks Place	63.0	63.0	72.4	0.0	9.4
412 St Marks Place	63.0	63.0	74.0	0.0	11.0
418 St Marks Place	63.0	63.0	76.2	0.0	13.2
42 Cedar Street	56.9	56.9	78.3	0.0	21.4
42 Margo Loop	62.9	62.9	64.3	0.0	1.4
420 St Marks Place	63.0	63.0	76.9	0.0	13.9
422 St Marks Place	63.0	63.0	71.6	0.0	8.6
426 St Marks Place	63.0	63.0	77.7	0.0	14.7
428 St Marks Place	63.0	63.0	77.8	0.0	14.8
43 Tappen Court	65.9	65.9	79.9	0.0	14.0
43 Van Duzer Street	66.0	66.0	66.2	0.0	0.2
430 St Marks Place	63.0	63.0	77.4	0.0	14.4
436 St Marks Place	63.0	63.0	75.8	0.0	12.8
438 St Marks Place	63.0	63.0	74.7	0.0	11.7
44 Tappen Court	65.9	65.9	72.1	0.0	6.2
44 Victory Boulevard	71.1	71.1	72.4	0.0	1.3
440 St Marks Place	63.0	63.0	72.7	0.0	9.7
444 St Marks Place	63.0	63.0	71.6	0.0	8.6
45 St Pauls Avenue	66.0	66.0	66.5	0.0	0.5
45 Swan Street	66.0	66.0	77.1	0.0	11.1
45 Tappen Court	65.9	65.9	79.0	0.0	13.1
45 Van Duzer Street	66.0	66.0	67.2	0.0	1.2
45 Victory Boulevard	71.1	71.1	73.4	0.0	2.3
450 St Marks Place	63.0	63.0	66.9	0.0	3.9
46 Tappen Court	65.9	65.9	72.6	0.0	6.7
467 Saint Marks Place	63.0	63.0	67.4	0.0	4.4
469 Saint Marks Place	63.0	63.0	66.4	0.0	3.4
47 Clinton Street	80.2	80.2	80.3	0.0	0.1
47 Tappen Court	65.9	65.9	78.7	0.0	12.8
47 Van Duzer Street	66.0	66.0	66.5	0.0	0.5
473 Saint Marks Place	63.0	63.0	65.5	0.0	2.5
475 Saint Marks Place	63.0	63.0	64.3	0.0	1.3
48 Belmont Place	78.6	78.6	78.6	0.0	0.0
49 Grant Street	62.9	62.9	65.8	0.0	2.9
49 Tappen Court	65.9	65.9	79.5	0.0	13.6
49 Van Duzer Street	66.0	66.0	66.6	0.0	0.6
50 Margo Loop	62.9	62.9	68.8	0.0	5.9
50 Tappen Court	65.9	65.9	73.2	0.0	7.3
50 Wall Street	78.6	78.6	78.6	0.0	0.0
506 Jersey Street	72.3	72.3	72.8	0.0	0.5
508 Jersey Street	72.3	72.3	72.8	0.0	0.5
51 Clinton Street	80.2	80.2	80.3	0.0	0.1
51 Grant Street	62.9	62.9	65.4	0.0	2.5
51 St Pauls Avenue	66.0	66.0	66.9	0.0	0.9
51 Swan Street	66.0	66.0	66.9	0.0	0.9
51 Tappen Court	65.9	65.9	80.2	0.0	14.3
51 Wall Street	78.6	78.6	78.6	0.0	0.0
510 Jersey Street	72.3	72.3	73.0	0.0	0.7

Table 20-22 (con't): Maximum Predicted Noise Levels

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
512 Jersey Street	72.3	72.3	73.0	0.0	0.7
517 Jersey Street	72.3	72.3	74.1	0.0	1.8
518 Jersey Street	72.3	72.3	73.4	0.0	1.1
52 Margo Loop	62.9	62.9	69.2	0.0	6.3
52 Tappen Court	65.9	65.9	74.1	0.0	8.2
52 Van Duzer Street	66.0	66.0	68.2	0.0	2.2
520 Bay Street	71.0	71.0	75.3	0.0	4.3
53 Grant Street	62.9	62.9	67.8	0.0	4.9
53 Tappen Court	65.9	65.9	80.8	0.0	14.9
53 Victory Boulevard	71.1	71.1	72.7	0.0	1.6
53 Wall Street	78.6	78.6	78.6	0.0	0.0
534 Jersey Street	72.3	72.3	74.9	0.0	2.6
538 Bay Street	71.0	71.0	73.1	0.0	2.1
54 Clinton Street	83.6	83.6	83.7	0.0	0.1
54 Margo Loop	62.9	62.9	69.2	0.0	6.3
54 Van Duzer Street	66.0	66.0	66.9	0.0	0.9
54 Wall Street	78.6	78.6	78.6	0.0	0.0
540 Jersey Street	72.3	72.3	75.1	0.0	2.8
541 Bay Street	71.0	71.0	73.7	0.0	2.7
542 Jersey Street	72.3	72.3	75.2	0.0	2.9
544 Jersey Street	72.3	72.3	75.3	0.0	3.0
546 Jersey Street	72.3	72.3	75.1	0.0	2.8
548 Jersey Street	72.3	72.3	75.4	0.0	3.1
55 Clinton Street	80.2	80.2	80.3	0.0	0.1
55 Grant Street	62.9	62.9	66.7	0.0	3.8
55 Tappen Court	65.9	65.9	81.5	0.0	15.6
55 Victory Boulevard	71.1	71.1	72.4	0.0	1.3
55 Wall Street	78.6	78.6	78.6	0.0	0.0
552 Jersey Street	72.3	72.3	75.2	0.0	2.9
554 Jersey Street	72.3	72.3	75.2	0.0	2.9
56 Belmont Place	78.6	78.6	78.6	0.0	0.0
56 Margo Loop	62.9	62.9	69.0	0.0	6.1
56 Van Duzer Street	66.0	66.0	68.9	0.0	2.9
57 Broad Street	60.1	60.1	67.9	0.0	7.8
57 Clinton Street	80.2	80.2	80.3	0.0	0.1
57 Grant Street	62.9	62.9	66.4	0.0	3.5
57 Swan Street	66.0	66.0	66.8	0.0	0.8
57 Victory Boulevard	71.1	71.1	72.1	0.0	1.0
57 Wall Street	78.6	78.6	78.6	0.0	0.0
58 Grant Street	62.9	62.9	64.7	0.0	1.8
58 Margo Loop	62.9	62.9	67.8	0.0	4.9
58 Sands Street	71.0	71.0	72.2	0.0	1.2
58 Van Duzer Street	66.0	66.0	68.5	0.0	2.5
59 Brewster Street	83.6	83.6	83.8	0.0	0.2
59 Brook Street	63.0	63.0	63.7	0.0	0.7
59 Grant Street	62.9	62.9	64.1	0.0	1.2
59 Van Duzer Street	66.0	66.0	72.4	0.0	62.4
59 Victory Boulevard	71.1	71.1	72.1	0.0	1.0
59 Wall Street	78.6	78.6	78.6	0.0	0.0
60 Hannah Street	66.0	66.0	79.9	0.0	13.9

Table 20-22 (con't): Maximum Predicted Noise Levels

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
60 Margo Loop	62.9	62.9	67.0	0.0	4.1
60 Van Duzer Street	66.0	66.0	68.9	0.0	2.9
61 Central Avenue	62.0	62.0	68.5	0.0	6.5
61 Grant Street	62.9	62.9	64.1	0.0	1.2
61 Van Duzer Street	66.0	66.0	71.9	0.0	5.9
61 Wall Street	78.6	78.6	78.6	0.0	0.0
61 William Street	83.6	83.6	83.9	0.0	0.3
62 Belmont Place	78.6	78.6	78.6	0.0	0.0
62 Hannah Street	66.0	66.0	67.8	0.0	1.8
62 Margo Loop	62.9	62.9	68.5	0.0	5.6
62 Richmond Terrace	71.1	71.1	71.1	0.0	0.0
62 Tappen Court	63.1	63.1	75.7	0.0	12.6
62 Wall Street	78.6	78.6	78.6	0.0	0.0
63 Brook Street	63.0	63.0	64.1	0.0	1.1
63 Van Duzer Street	66.0	66.0	71.8	0.0	5.8
63 William Street	83.6	83.6	83.9	0.0	0.3
64 Hannah Street	66.0	66.0	67.3	0.0	1.3
64 Margo Loop	62.9	62.9	70.0	0.0	7.1
64 Sands Street	71.0	71.0	72.5	0.0	1.5
64 Tappen Court	63.1	63.1	76.3	0.0	13.2
65 Hannah Street	66.0	66.0	67.0	0.0	1.0
65 Sands Street	71.0	71.0	76.9	0.0	5.9
65 St Pauls Avenue	66.0	66.0	66.6	0.0	0.6
66 Broad Street	60.1	60.1	64.1	0.0	4.0
66 Tappen Court	63.1	63.1	76.7	0.0	13.6
66 Van Duzer Street	66.0	66.0	69.5	0.0	3.5
67 Brook Street	63.0	63.0	64.6	0.0	1.6
67 Hannah Street	66.0	66.0	66.5	0.0	0.5
67 Sands Street	71.0	71.0	71.2	0.0	0.2
67 St Pauls Avenue	66.0	66.0	68.9	0.0	2.9
67 Van Duzer Street	66.0	66.0	72.6	0.0	6.6
68 Belmont Place	78.6	78.6	78.6	0.0	0.0
68 Broad Street	60.1	60.1	68.1	0.0	8.0
68 Sands Street	71.0	71.0	72.4	0.0	1.4
68 Tappen Court	63.1	63.1	77.2	0.0	14.1
69 Sands Street	71.0	71.0	71.2	0.0	0.2
70 Brewster Street	83.6	83.6	83.7	0.0	0.1
70 Broad Street	60.1	60.1	68.9	0.0	8.8
70 Sands Street	71.0	71.0	72.7	0.0	1.7
70 Tappen Court	63.1	63.1	77.8	0.0	14.7
70 Van Duzer Street	66.0	66.0	67.5	0.0	1.5
71 Central Avenue	62.0	62.0	73.3	0.0	11.3
71 Margo Loop	62.9	62.9	66.0	0.0	3.1
71 Sands Street	71.0	71.0	71.2	0.0	0.2
71 Van Duzer Street	66.0	66.0	73.9	0.0	7.9
72 Brewster Street	83.6	83.6	83.6	0.0	0.0
72 Sands Street	71.0	71.0	72.6	0.0	1.6
73 Margo Loop	62.9	62.9	66.6	0.0	3.7
74 Brewster Street	83.6	83.6	83.6	0.0	0.0
74 Broad Street	60.1	60.1	70.3	0.0	10.2

Table 20-22 (con't): Maximum Predicted Noise Levels

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
74 Van Duzer Street	66.0	66.0	70.5	0.0	4.5
75 Margo Loop	62.9	62.9	67.8	0.0	4.9
75 Stuyvesant Place	78.6	78.6	78.9	0.0	0.3
76 Belmont Place	78.6	78.6	78.6	0.0	0.0
76 Brewster Street	83.6	83.6	83.6	0.0	0.0
76 Margo Loop	62.9	62.9	71.6	0.0	8.7
76 Sands Street	71.0	71.0	73.0	0.0	2.0
76 Van Duzer Street	66.0	66.0	71.0	0.0	5.0
77 Margo Loop	62.9	62.9	72.0	0.0	9.1
80 Brewster Street	83.6	83.6	83.6	0.0	0.0
78 Broad Street	60.1	60.1	72.6	0.0	12.5
78 Margo Loop	62.9	62.9	72.2	0.0	9.3
78 Richmond Terrace	71.1	71.1	73.6	0.0	2.5
78 Van Duzer Street	66.0	66.0	71.5	0.0	5.5
79 Brook Street	63.0	63.0	66.2	0.0	3.2
79 Margo Loop	62.9	62.9	70.2	0.0	7.3
79 Wave Street	71.0	71.0	78.5	0.0	7.5
8 Pike Street	63.0	63.0	72.6	0.0	9.6
80 Belmont Place	78.6	78.6	78.6	0.0	0.0
80 Broad Street	60.1	60.1	73.7	0.0	13.6
80 Brook Street	63.0	63.0	67.4	0.0	4.4
80 Margo Loop	62.9	62.9	73.0	0.0	10.1
80 Sands Street	83.6	83.6	83.7	0.0	0.1
80 Van Duzer Street	66.0	66.0	72.0	0.0	6.0
81 Brook Street	63.0	63.0	67.4	0.0	4.4
81 Margo Loop	62.9	62.9	73.5	0.0	10.6
82 Brook Street	63.0	63.0	71.2	0.0	8.2
82 Sands Street	83.6	83.6	83.7	0.0	0.1
82 Van Duzer Street	66.0	66.0	72.8	0.0	6.8
83 Brook Street	63.0	63.0	69.5	0.0	6.5
83 Prospect Street	71.0	71.0	71.2	0.0	0.2
83 Wave Street	71.0	71.0	78.4	0.0	7.4
84 Broad Street	60.1	60.1	75.8	0.0	15.7
84 Brook Street	63.0	63.0	72.7	0.0	9.7
84 Sands Street	83.6	83.6	83.7	0.0	0.1
84 Van Duzer Street	66.0	66.0	71.0	0.0	5.0
85 Boyd Street	63.1	63.1	72.8	0.0	9.7
85 Montgomery Avenue	63.0	63.0	64.4	0.0	1.4
85 Prospect Street	71.0	71.0	71.4	0.0	0.4
85 Stuyvesant Place	78.6	78.6	78.6	0.0	0.0
86 Belmont Place	78.6	78.6	78.6	0.0	0.0
86 Hamilton Avenue	78.6	78.6	78.6	0.0	0.0
86 Van Duzer Street	66.0	66.0	72.5	0.0	6.5
87 Brook Street	63.0	63.0	70.3	0.0	7.3
87 Montgomery Avenue	63.0	63.0	63.8	0.0	0.8
87 Wave Street	71.0	71.0	78.0	0.0	7.0
87-133 Central Avenue	62.0	62.0	75.5	0.0	13.5
88 Brewster Street	83.6	83.6	83.6	0.0	0.0
88 Broad Street	60.1	60.1	75.5	0.0	15.4
89 Brook Street	63.0	63.0	70.9	0.0	7.9

Table 20-22(con't): Maximum Predicted Noise Levels

Location	Existing Leq	Total Leq		Change in Leq	
		Min	Max	Min	Max
89 Montgomery Avenue	63.0	63.0	63.7	0.0	0.7
90 Brewster Street	83.6	83.6	83.6	0.0	0.0
90 Broad Street	60.1	60.1	74.7	0.0	14.6
91 Brook Street	63.0	63.0	71.4	0.0	8.4
91 Sands Street	83.6	83.6	84.4	0.0	0.8
92 Brewster Street	83.6	83.6	83.7	0.0	0.1
93 Boyd Street	63.1	63.1	76.7	0.0	13.6
94 Brewster Street	83.6	83.6	83.7	0.0	0.1
95 Boyd Street	63.1	63.1	77.0	0.0	13.9
95 Montgomery Avenue	63.0	63.0	63.8	0.0	0.8
95 Wave Street	71.0	71.0	77.7	0.0	6.7
97 Boyd Street	63.1	63.1	78.1	0.0	15.0
15 Pike Street	72.3	72.3	76.1	0.0	3.8
199 Victory Boulevard	72.3	72.3	73.0	0.0	0.7
100 Richmond Terrace	72.3	72.3	78.4	0.0	6.1
75 Richmond Terrace	72.3	72.3	72.4	0.0	0.1

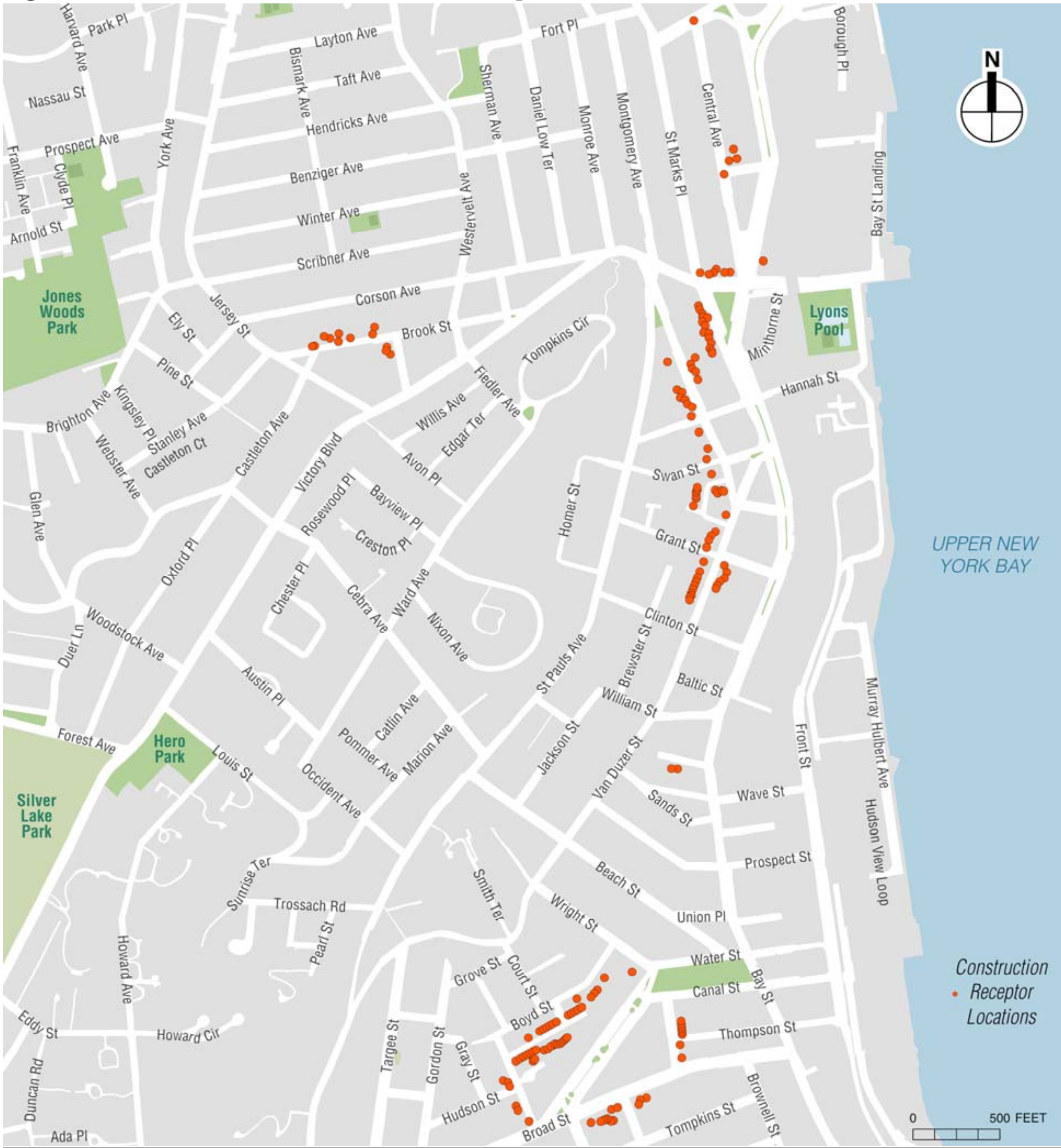
Construction Noise Analysis Discussion

For impact determination purposes, the significance of adverse noise impacts is determined based on whether predicted incremental noise levels at sensitive receptor locations would be greater than the noise impact threshold criteria for two consecutive years or more. While increases exceeding the noise impact threshold criteria for less than two years may be noisy and intrusive, they are not considered to be significant adverse noise impacts using the *CEQR Technical Manual* methodology. However, for the purpose of this analysis, noise level increases of 15 dBA or more would also be considered as significant adverse construction noise impacts.

Based on the construction stage predicted to occur at each development site according to the conceptual construction schedule during each of the selected analysis periods, each receptor expected to an experience exceedance of the *CEQR Technical Manual* noise impact threshold was determined for each period. One peak construction period per year was analyzed, from 2019 to 2030. Based on these determinations, receptors where noise level increases are predicted to exceed the noise impact threshold criteria for two or more consecutive years or receptors predicted to experience noise level increases of 15 dBA or more were identified.

The noise analysis results show that the predicted noise levels could exceed the *CEQR Technical Manual* impact criteria throughout the rezoning area. Figure 20-4 shows where receptor locations are predicted to experience noise level increases that exceed the noise impact threshold criteria for two or more consecutive years based or 15 dBA or more on the analysis discussed above.

Figure 20-4: Potential Construction Noise Impact Locations



CONSTRUCTION NOISE EXPOSURE AT COMPLETED/OCCUPIED PROPOSED BUILDINGS

Since, the proposed project buildings would include noise-sensitive uses (e.g., residential, community facility) that would have the potential to experience construction noise (i.e., when a building is completed and occupied, but remaining development associated with the proposed actions is still under construction), the amount of noise exposure at these buildings during construction is considered. Consistent with *CEQR Technical Manual* guidance, noise exposure is evaluated using the

$L_{10(1)}$ noise level. Table 20-23 shows the projected $L_{10(1)}$ noise levels at the buildings that would be completed and occupied prior to completion of all construction, under the construction schedule.

Table 20-23: Construction Noise Exposure at Project Buildings in dBA

Projected Development Site	Total L_{10}	
	Min	Max
1	72.3	87.8
2	74.1	75.7
3	72.3	83.4
4	72.1	79.9
5	NA	NA
6	72.3	72.4
7	73.9	77.8
8	72.7	77.1
9	73.0	82.0
10	73.0	74.8
11	72.3	84.8
12	72.7	83.5
13	81.3	88.4
14	81.3	84.1
15	72.1	80.5
16	NA	NA
17	84.4	85.4
18	70.1	72.7
19	70.1	79.6
20	NA	NA
21	63.9	91.5
22	70.1	89.5
23	70.1	79.5
24	70.1	73.0
25	70.1	78.0

Projected Development Site 1

The analysis assumes that Projected Development Site 1 would be completed and occupied during approximately nine years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 1, construction would result in $L_{10(1)}$ noise levels ranging from the low 70s to high 80s dBA with a maximum noise exposure of approximately 88 dBA. Based on the 33 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 10 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 1.

Projected Development Site 2

The analysis assumes that Projected Development Site 2 would be completed and occupied during approximately two years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 2, construction would result in $L_{10(1)}$ noise levels in the mid 70s dBA with a maximum noise exposure of approximately 76 dBA. Based on the 35 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to be less than 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 2.

Projected Development Site 3

The analysis assumes that Projected Development Site 3 would be completed and occupied during approximately nine years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 3, construction would result in $L_{10(1)}$ noise levels ranging from the low 70s to the mid 80s dBA with a maximum noise exposure of approximately 83 dBA. Based on the 33 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 5 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 3.

Projected Development Site 4

The analysis assumes that Projected Development Site 4 would be completed and occupied during approximately nine years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 4, construction would result in $L_{10(1)}$ noise levels ranging from the low to high 70s dBA with a maximum noise exposure less than 80 dBA. Based on the 33 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 2 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 4.

Projected Development Site 6

The analysis assumes that Projected Development Site 6 would be completed and occupied during approximately six years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 6, construction would result in $L_{10(1)}$ noise levels in the low 70s dBA with a maximum noise exposure of approximately 72 dBA. Based on the 33 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to be less than 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 6.

Projected Development Site 7

The analysis assumes that Projected Development Site 7 would be completed and occupied during approximately one year of construction on other Projected Development Sites. At the newly constructed Projected Development Site 7, construction would result in $L_{10(1)}$ noise levels in the mid to high 70s dBA with a maximum noise exposure of approximately 78 dBA. Based on the 35 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to be less than 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 7.

Projected Development Site 8

The analysis assumes that Projected Development Site 8 would be completed and occupied during approximately four years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 8, construction would result in $L_{10(1)}$ noise levels in the mid 70s dBA with a maximum noise exposure of approximately 77 dBA. Based on the 33 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to be less than 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 8.

Projected Development Site 9

The analysis assumes that Projected Development Site 9 would be completed and occupied during approximately ten years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 9, construction would result in $L_{10(1)}$ noise levels ranging from the low 70s to low 80s dBA with a maximum noise exposure of approximately 82 dBA. Based on the 33 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 4 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 9.

Projected Development Site 10

The analysis assumes that Projected Development Site 10 would be completed and occupied during approximately eight years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 10, construction would result in $L_{10(1)}$ noise levels in the mid 70s dBA with a maximum noise exposure of approximately 75 dBA. Based on the 33 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to be less than 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 10.

Projected Development Site 11

The analysis assumes that Projected Development Site 11 would be completed and occupied during approximately six years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 11, construction would result in $L_{10(1)}$ noise levels ranging from the low 70s to mid 80s dBA with a maximum noise exposure of approximately 85 dBA. Based on the 33 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 7 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 11.

Projected Development Site 12

The analysis assumes that Projected Development Site 12 would be completed and occupied during approximately two years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 12, construction would result in $L_{10(1)}$ noise levels ranging from the low 70s to mid 80s dBA with a maximum noise exposure of approximately 84 dBA. Based on the 33 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 6 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 12.

Projected Development Site 13

The analysis assumes that Projected Development Site 13 would be completed and occupied during approximately nine years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 13, construction would result in $L_{10(1)}$ noise levels ranging from the low to high 80s dBA with a maximum noise exposure of approximately 88 dBA. Based on the 41 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 2 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 13.

Projected Development Site 14

The analysis assumes that Projected Development Site 14 would be completed and occupied during approximately eight years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 14, construction would result in $L_{10(1)}$ noise levels ranging from the low to mid 80s dBA with a maximum noise exposure of approximately 84 dBA. Based on the 41 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to be less than 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 14.

Projected Development Site 15

The analysis assumes that Projected Development Site 15 would be completed and occupied during approximately four years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 15, construction would result in $L_{10(1)}$ noise levels ranging from the low 70s to the low 80s dBA with a maximum noise exposure of approximately 81 dBA. Based on the 33 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 3 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 15.

Projected Development Site 17

The analysis assumes that Projected Development Site 17 would be completed and occupied during approximately nine years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 17, construction would result in $L_{10(1)}$ noise levels in the mid 80s dBA with a maximum noise exposure of approximately 85 dBA. Based on the 42 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to be less than 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 17.

Projected Development Site 18

The analysis assumes that Projected Development Site 18 would be completed and occupied during approximately two years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 18, construction would result in $L_{10(1)}$ noise levels in the low to mid 70s dBA with a maximum noise exposure of approximately 73 dBA. Based on the 28 dBA window/wall attenuation expected to be included in the design for the façades of this building (see

Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to be approximately 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 18.

Projected Development Site 19

The analysis assumes that Projected Development Site 19 would be completed and occupied during approximately four years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 19, construction would result in $L_{10(1)}$ noise levels ranging from the low to high 70s dBA with a maximum noise exposure less than 80 dBA. Based on the 28 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 7 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 19.

Projected Development Site 21

The analysis assumes that Projected Development Site 21 would be completed and occupied during approximately four years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 21, construction would result in $L_{10(1)}$ noise levels ranging from the low 60s to low 90s dBA with a maximum noise exposure of approximately 92 dBA. Based on an estimated 25 dBA window/wall attenuation expected from standard construction and high quality windows, interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 22 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 21.

Projected Development Site 22

The analysis assumes that Projected Development Site 22 would be completed and occupied during approximately nine years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 22, construction would result in $L_{10(1)}$ noise levels ranging from the low 70s to high 80s dBA with a maximum noise exposure less than 90 dBA. Based on the 28 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 17 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 22.

Projected Development Site 23

The analysis assumes that Projected Development Site 23 would be completed and occupied during approximately eight years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 23, construction would result in $L_{10(1)}$ noise levels ranging from the low to high 70s dBA with a maximum noise exposure less than 80 dBA. Based on the 28 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 7 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 23.

Projected Development Site 24

The analysis assumes that Projected Development Site 24 would be completed and occupied during approximately three years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 24, construction would result in $L_{10(1)}$ noise levels ranging from the low to mid 70s dBA with a maximum noise exposure of approximately 73 dBA. Based on the 28 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to be approximately 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 24.

Projected Development Site 25

The analysis assumes that Projected Development Site 25 would be completed and occupied during approximately nine years of construction on other Projected Development Sites. At the newly constructed Projected Development Site 25, construction would result in $L_{10(1)}$ noise levels ranging from the low to high 70s dBA with a maximum noise exposure of approximately 78 dBA. Based on the 28 dBA window/wall attenuation expected to be included in the design for the façades of this building (see Table 17-6 in Chapter 17, "Noise"), interior noise levels at these buildings are predicted to exceed 45 dBA, which is the acceptable criterion for residential use according to CEQR noise exposure criteria, by up to approximately 5 dBA. These exceedances would be intermittent and temporary, and would not occur during the nighttime hour when residences are most sensitive to noise. Consequently, noise resulting from construction of the remaining Projected Development Sites would not result in a significant adverse impact at the completed Projected Development Site 25.

CONCLUSIONS

At locations predicted to experience an exceedance of the noise impact threshold criteria, the exceedances would be due principally to noise generated by on-site construction activities (rather than construction-related traffic). This noise analysis examined reasonable worst-case hourly noise levels that would result from construction in each analyzed period, and is therefore conservative in predicting significant increase in noise levels. Typically, the loudest hourly noise level during each month of construction would not persist throughout the entire month. Furthermore, this analysis is based on a conceptual site plan and construction schedule. It is possible that the actual construction may be of less magnitude, or that construction on multiple Projected Development Sites may not overlap, in which case construction noise would be less intense than the analysis predicts.

VIBRATION

INTRODUCTION

Construction activities have the potential to result in vibration levels that may in turn result in structural or architectural damage, and/or annoyance or interference with vibration-sensitive activities. In general, vibratory levels at a receiver are a function of the source strength (which in turn is dependent upon the construction equipment and methods utilized), the distance between the equipment and the receiver, the characteristics of the transmitting medium, and the construction of the receiver building. Construction equipment operation causes Chapter 19: Construction 19-35 ground vibrations that spread through the ground and decrease in strength with distance. Vehicular traffic, even in locations close to major roadways, typically does not result in perceptible vibration levels unless there are discontinuities in the roadway surface. With the exception of the case of fragile and possibly historically significant structures or buildings, generally construction activities do not reach the levels that can cause architectural or structural damage, but can achieve levels that may be perceptible in buildings close to a construction site. An assessment has been prepared to quantify potential vibration impacts of construction activities on structures and residences near the project sites.

CONSTRUCTION VIBRATION CRITERIA

For purposes of assessing potential structural or architectural damage, the determination of a significant impact was based on the vibration impact criterion used by LPC of a peak particle velocity (PPV) of 0.50 inches/second. For non- fragile buildings, vibration levels below 0.60 inches/second would not be expected to result in any structural or architectural damage. For purposes of evaluating potential annoyance or interference with vibration-sensitive activities, vibration levels greater than 65 VdB would have the potential to result in significant adverse impacts if they were to occur for a prolonged period of time.

ANALYSIS METHODOLOGY

For purposes of assessing potential structural or architectural damage, the following formula was used:

$$PPVequip = PPVref \times (25/D)^{1.5}$$

where: PPVequip is the peak particle velocity in in/sec of the equipment at the receiver location;

PPVref is the reference vibration level in in/sec at 25 feet; and

D is the distance from the equipment to the received location in feet.

For purposes of assessing potential annoyance or interference with vibration sensitive activities, the following formula was used:

$$Lv(D) = Lv(ref) - 30\log(D/25)$$

where: Lv(D) is the vibration level in VdB of the equipment at the receiver location;

Lv(ref) is the reference vibration level in VdB at 25 feet; and

D is the distance from the equipment to the receiver location in feet.

Table 20-24 shows vibration source levels for typical construction equipment.

Table 20-24: Vibration Source Levels for Construction Equipment

Equipment List	PPVref (in/sec)	Approximate LV (ref) (Vdb)
Pile Driver (impact)	0.664-1.518	104-112
Bulldozer	0.089	87
Loaded Trucks	0.076	86
Jackhammer	0.035	79
Source: *Transit Noise and Vibration Impact Assessment, FTA-VA-90-1003-06, May 2006.*		

Construction Vibration Analysis Results

The buildings and structures of most concern with regard to the potential for structural or architectural damage due to vibration would be buildings immediately adjacent to a Projected Development Site. Vibration levels at all of these buildings and structures would be expected to be below the 0.50 inches/second PPV limit. At locations further from Projected Development Sites, the distance between construction equipment and receiving buildings or structures is large enough to avoid vibratory levels that would approach the levels that would have the potential to result in architectural or structural damage.

In terms of potential vibration levels that would be perceptible and annoying, the pieces of equipment that would have the most potential for producing levels that exceed the 65 VdB limit are pile drivers. They would produce perceptible vibration levels (i.e., vibration levels exceeding 65 VdB) at receptor locations within a distance of approximately 230 feet. However, the operation would only occur for limited periods of time at a particular location and, therefore, would not result in any significant adverse impacts. In no case are significant adverse impacts from vibrations expected to occur.