Chapter 18: Construction

18.1 Introduction

This chapter assesses the potential impacts associated with the construction of Projected Development Sites located within the proposed East Midtown Subdistrict. It is assumed that construction of buildings on these sites would result from the Proposed Action's Reasonable Worst-Case Development Scenario (RWCDS) described in Chapter 1, "Project Description."

The significance of construction impacts and associated need for mitigation is generally based upon the duration and magnitude of the impacts. According to the *2014 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, impacts resulting from such short-term construction typically do not require detailed construction impact analyses.

For the Proposed Action, it is estimated that the total construction duration of the Projected Development Sites would take approximately 20 years. It is estimated that the development sites could take from 3-1/2 to more than five years to construct, from the start of demolition to new building occupancy. Since construction activities associated with the Proposed Action would occur on multiple 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 guidelines of the *CEQR Technical Manual*.

The inconvenience and disruption arising from the construction of the Projected Development Sites could likely include temporary diversion of pedestrians, vehicles, and construction truck traffic to other streets. The findings of the preliminary assessment identified the need to undertake more detailed construction impact assessments for traffic, air quality and noise. To conduct that detailed assessment, this chapter also describes the conceptual construction phasing and schedule for the RWCDS. The projected overlap of construction activities at Projected Development Sites 4 and 5 is evaluated, as is a separate analysis of Projected Development Site 15.

Principal Conclusions

Transportation

Construction of the Proposed Action is expected to result in significant adverse traffic impacts, as described below. No significant adverse impacts to parking, transit, or pedestrian conditions are anticipated.

Traffic

During construction activities, traffic to the Projected Development Sites would be generated by truck deliveries and by construction workers arriving at the construction site. The results of a detailed traffic analysis show that the Proposed Action would result in significant adverse impacts at four intersections during the construction AM peak hour (6:00–7:00 AM) and 14 intersections during the construction PM peak hour (3:00-4:00 PM). Measures to address these impacts are described in Chapter 19, "Mitigation."

Transit

The construction sites are located in an area that is well served by public transportation. A total of eight subway stations/complexes, 16 local bus routes, 65 express bus routes, and one commuter rail station are located in the vicinity of the rezoning area. Given the extent of public transit services in the study area, trips made using public transit during the construction peak hours would be spread among several Projected Development Sites within the proposed rezoning area and distributed between numerous subway stations, bus routes and commuter rail at Grand Central Terminal. As this would result in nominal increases in transit demand at individual station entrances and bus routes outside of the typical commuter peak periods, it is not expected that peak construction activities would result in a potential for significant adverse impact to transit services. However, construction of new subway station entrances and fare control areas at the 42nd Street Bryant Park-Fifth Avenue subway station complex, Lexington Avenue-51st/53rd Streets subway station complex, and the Fifth Avenue-53rd Street subway station would necessitate closing sidewalks during the subway entrance construction period, requiring pedestrians to either use a temporary walkway or be diverted to walk on the opposite side of the street.

Pedestrians

Incremental pedestrian trips during construction activities would be widely dispersed among sidewalks, corners, and crosswalks in the area and would not coincide with commuter peak hours. No significant adverse impacts to pedestrian conditions are anticipated during construction. At locations where temporary sidewalk closures are required during construction activities, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with New York City Department of Transportation (DOT) requirements.

Parking

The parking demand associated with construction workers commuting via private automobiles during construction activities within the proposed rezoning area, and due to completed projects after, would be adequately accommodated by available parking spaces in off-street parking facilities within a quarter-mile radius of the rezoning area.

Air Quality

The Proposed Action would not result in significant adverse impacts to air quality from construction activities. Construction activities could affect local air quality because of engine emissions generated by on-site construction equipment and trucks entering/exiting each site during construction, and due to fugitive dust emissions resulting from construction activities. An analysis of emissions from on-site construction activities and off-site (trucks and employee vehicles) was undertaken to quantify the potential effects of emissions from the proposed project.

The analysis initially estimated the short-term (24-hour) $PM_{2.5}$ emission profiles generated for each phase of construction for all Projected Development Sites on a quarterly basis from 2019 to 2036. The period with the highest cumulative short-term emissions was the fourth quarter of 2029. In addition, potential cumulative effects were assessed for three clusters of Projected Development Sites, where multiple Projected Development Sites are located in close proximity to one another and where construction activities would overlap. Short-term and annual $PM_{2.5}$ emission profiles were generated for each of the three clusters, which indicated that the highest annual $PM_{2.5}$ emissions would occur in the same peak year (2029) (from cluster 2, Projected Development Sites 4 and 5, located between Madison and Fifth Avenues and East 44th to East 46th Streets). As such 2029 was identified as the worst-case peak period and cluster 2 was selected for construction air quality assessment, which predicted the cumulative effect of the emissions for each one of these two sites, including on-site and off-site sources, on public spaces and elevated receptors (i.e., operable windows and potential building air intakes).

This quantitative air quality analysis indicated that the construction activities of the Proposed Action would not result in any concentrations of NO_2, PM_{10}, and CO that exceed the National Ambient Air Quality Standards (NAAQS). In addition, the maximum predicted incremental concentrations of CO or $PM_{2.5}$ would not exceed the City's *de minimis* criteria. Therefore, no significant adverse air quality impacts are expected from the construction-related sources.

Noise and Vibration

The Proposed Action would result in significant adverse construction noise impacts. The findings indicate that noise levels above the CEQR impact threshold are expected at several existing adjacent buildings to Projected Development Sites 4, 5 and 15. For Projected Development Sites 4 and 5, the highest noise levels are projected to be at ground level and at elevated receptor locations at existing commercial and residential buildings on East 44th, 45th and 46th Streets between Madison and Fifth Avenues. Receivers along 44th and 46th Streets border Projected Development Sites 4 and 5, respectively. Receivers along 45th Street border both Projected Development Sites 4 and 5. For Projected Development Site 15, the highest noise levels are projected to be at receptor locations at existing commercial and residential buildings on East 42nd and East 43rd Streets between Second and Third Avenues.

Although these locations are expected to experience exterior noise levels significantly above CEQR limits, for those buildings with double-paned glazed-glass windows and a closed ventilation system, interior noise levels for those buildings would be near or below the CEQR 50-dBA L_{10} impact threshold for commercial buildings and the CEQR 45-dBA L_{10} impact threshold for residential buildings. The interior noise levels of these adjacent buildings would likely approach or marginally exceed the CEQR L_{10} impact thresholds for short periods of time. The same potential for noise impacts also exist for similar noise-level increases at these and/or other receptor locations in the immediate vicinity of Project Development Sites 4, 5, and 15 during other construction quarters bordering the peak construction period analyzed for the two worst-case scenarios. Therefore, if the peak construction scenario conservatively assumed for simultaneous construction on Projected Development Sites 4 and 5, and for pile driving activity at Projected Development Site 15 is realized, the Proposed Action would result in a significant adverse construction noise impact. Mitigation measures that may address these impacts are discussed in Chapter 19, "Mitigation."

The buildings of most concern with regard to potential damage from vibration generated during construction are those buildings located immediately adjacent or across the street from a Projected Development Site. At Projected Development Sites 4 and 5, commercial buildings between Madison and Fifth Avenues and adjacent to the Projected Development Sites could experience elevated vibration levels. The types of construction activities expected to occur during the peak construction period would utilize equipment—vibratory roller, hoe ram, bulldozer and loaded trucks—with the largest peak-particle velocity (PPV) of 0.20 inch per second, which is well below the 0.50 inch per second PPV vibration limit for structural damage. At Projected Development Site 15, vibration levels may exceed 0.5 inches per second PPV within 30 feet of the pile driving equipment. PPV levels between 0.50 and 1.52 inches per second, which is generally considered acceptable for a building or structure, may occur at the adjacent buildings west of the Projected Development Site as the preliminary construction analysis indicates impact pile driving would be required within 30 feet of their facades. Vibration perception above the 65 VdB annoyance limit is anticipated at 500 feet extending outward from the impact pile driving activity. However, the pile driving would generate vibration for limited periods of time only at a particular locations and therefore would not result in any significant adverse impact.

Other Technical Areas

Land Use and Neighborhood Character

Construction of the 16 Projected Development Sites would be spread throughout the 78-block proposed rezoning area over a period of approximately 20 years. During the construction period, access to residences, businesses and institutions in the area surrounding the Projected Development Sites would be maintained, as required by City regulations. 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 and other requirements as dictated by the New York City Construction Noise Code. Since none of these impacts would be continuous or permanent, they would not create significant impacts on land use patterns or neighborhood character. While construction of any new buildings resulting from the Proposed Action 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 would not create a neighborhood character impact. Therefore, no significant construction impacts to land use and neighborhood character are expected.

Socioeconomics

During the construction period, construction activities would be dispersed throughout the 78-block proposed rezoning area and access to particular businesses for deliveries, employees and patrons would be maintained for the duration of construction. Therefore, construction impacts to socioeconomic conditions are not expected.

Open Space

No open space resources would be disrupted during construction resulting from the Proposed Action, and during construction, access to publicly accessible open space would be maintained within the proposed rezoning 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. While construction of any new buildings resulting from the Proposed Action 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. Therefore, no significant construction impacts to open space are expected.

Historic and Cultural Resources

The New York City Landmarks Preservation Commission (LPC), at DCP's request, reviewed the identified projected and potential development sites that could experience new/additional in-ground disturbance as a result of the Proposed Action, and concluded that none of the lots comprising those sites have any archaeological significance. As such, the Proposed Action is not expected to result in any significant adverse impacts to archaeological resources.

The Proposed Action would result in development on both Projected and Potential Development Sites that are located within 90 feet of a designated or listed historic resource; however, these resources would not be adversely impacted by construction activities because they would be subject to protection from construction-related damage under the New York City Department of Buildings' (DOB) Technical Policy and Procedure Notice (TPPN) #10/88. However, there are also 12 NYCL-eligible and/or S/NR-eligible resources located within 90 feet of the Projected and Potential Development Sites for which TPPN #10/88 would not apply, and therefore the Proposed Action could potentially result in construction-related impacts to these eligible resources. Possible measures that may address these impacts are discussed in Chapter 19, "Mitigation."

Hazardous Materials

A preliminary screening of potential hazardous materials impacts was performed for all 16 Projected and 14 Potential Development Sites. The hazardous materials assessment identified that each of the Projected and Potential Development Sites has some associated concern regarding environmental conditions. As a result, the Proposed Zoning Map modification actions include (E) designations for all of the Projected and Potential Development Sites.

With the requirements of the (E) designation on the Projected and Potential Development Sites, there would be no impact from the potential presence of contaminated materials. The potentially adverse impacts of hazardous materials resulting from construction on the Projected and Potential Development Sites in the Proposed Action would be avoided by the implementation of the preventative and remedial measures required under the (E) designation. Therefore, the Proposed Action is not expected to result in significant adverse impacts related to hazardous materials.

18.2 Methodology

Conceptual Construction Schedule and Activities

Since construction activities associated with the Proposed Action would occur on multiple development sites within the same geographic area, there is the potential for several construction timelines to overlap. For example, it is anticipated that during the years 2031 to 2032 for construction activities to overlap at Projected Development Sites 3, 4, and 5, which are generally located along Madison Avenue between East 43rd and East 45th Streets.

This chapter presents a description of the construction process for the purposes of quantification of environmental-effect causing activities only. It is not intended to describe the precise construction schedule or methods that may ultimately be applied, nor is it intended to dictate or confine the construction process. Actual construction methods and materials may vary, depending in part on how construction contractors choose to cost effectively implement their work within the requirements set forth in bid, contract, and construction documents. Construction specifications will require that construction contractors comply with applicable environmental regulations and obtain necessary permits for the duration of construction. Construction of the project will follow applicable federal, state, and local laws for building and safety, as well as local noise ordinances, as appropriate.

The following sections provide a description of the anticipated sequencing of construction activities at the Projected Development Sites. Also provided is a description of likely working hours, staging and laydown areas, sidewalk and lane closures, and construction worker parking that could be associated with construction activities at the Projected Development Sites.

Construction Sequencing

Information regarding the anticipated schedule of proposed construction activities and phases was provided by DCP. As shown on Figure 18-1a and 18-1b, construction of the Proposed Action is anticipated to begin in 2019, and it is conservatively assumed that construction of all Projected Development Sites would be completed by the end of the 2036 analysis year. Construction of various components of the Projected Development Sites would occur over multiple years, with construction activities and intensities dependent upon which components of the overall development sites are underway at a given time. For construction projects that extend over multiple years, a peak year is identified to isolate the greatest potential for adverse effects.

Typical Construction Activities

The anticipated phases and duration of construction activities at a typical projected development site are summarized below:

- Phase 1 – Site Clearance, including demolition or deconstruction of existing buildings.
- Phase 2 – Excavation and pouring of foundation. Activities during these months would include excavation for the foundation, any required dewatering and reinforcing and pouring of the foundations and structures below street level.
- Phase 3 – Erection of building core, including steel framework, decking, concrete slabs, shear walls, façade, roof construction and cladding.
- Phase 4 – Interior fit-out and finishing including mechanical installation. The final months of construction would include the installation of heating ventilation and air conditioning (HVAC) equipment and ductwork; installation of elevator, utility and life safety systems; and work on interior walls and finishes.

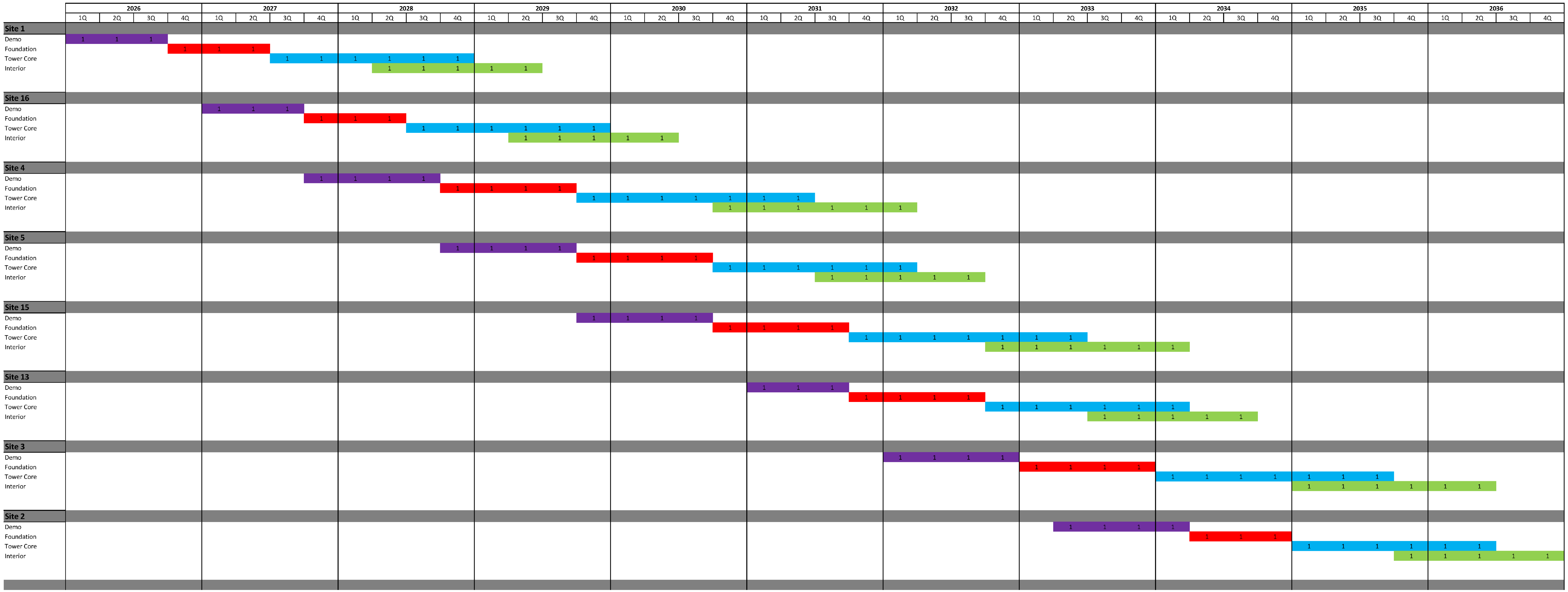
These phases, plus conceptual duration and overlap of construction activities for each Projected Development Site, are identified on Figure 18-1a and 18-1b. It should be noted that the actual duration of such activities could vary based upon which site is developed. For example, the time necessary for 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 location and condition of nearby surface and subsurface structures.

Table 18.1 identifies the total daily estimates of workers and trucks for each quarter through the duration of construction activities at the Projected Development Sites. The number of workers would peak during the first quarter of 2032, with up to approximately 2,674 workers per day. During the same

Greater East Midtown Rezoning
Manhattan, New York

Construction Schedule: 2019 - 2028

Figure 18-1a



Greater East Midtown Rezoning
Manhattan, New York

Construction Schedule:
2026 - 2036

Figure
18-1b

time period there would be a peak of 67 trucks per day associated with project construction activities. As discussed below, this peak quarter was analyzed for potential impacts to traffic and transportation; the analysis periods for air quality and noise are presented in those sections.

The types of equipment that would be used for construction activities include various earth-moving apparatus (excavators, graders, bulldozers, loaders, etc.), cranes, pile drivers, augers, drilling equipment, compaction rollers and tampers, concrete trucks, pumping equipment, generators/compressors, and various types of trucks (flat bed, dumps, trailers, etc.).

Estimate of Construction Period Trucks and Construction Workers

Using information for similar construction projects in Manhattan, "production rates" were established to identify an estimate and forecast of trucks and workers required that would be required per unit of gross square feet or gross cubic yards of new site development. These "production rates" were adjusted with a "time correction factor" and a "construction magnitude factor" to accommodate the different durations and site sizes.[1] Refer to Table 18.1 for estimate of the number of trucks and workers per quarter for each site.

Determining Peak Year for Cumulative Construction and Operational Effects

According to the *CEQR Technical Manual*, if a project involves multiple development sites over varying construction timelines, a preliminary assessment must be undertaken to determine if the operational trips from completed portions of the project and construction trips associated with construction activities could overlap. For the purposes of establishing a reasonable worst case for construction assessment, based on the conceptual construction schedule presented on Figure 18-1a and 18-1b, the first quarter of 2032 was selected as the construction peak year for assessment in this chapter. As shown on Figure 18-1a and 18-1b, there would be ten sites that are already completed and operational (Project Development Sites 1, 6, 7, 8, 9, 10, 11, 12, 14, and 16) and five sites under construction (Project Development Sites 3, 4, 5, 13, and 15).

Construction Working Hours

In accordance with City laws and regulations, construction work at the Projected Development Sites would be undertaken Monday through Friday and would generally begin at 7:00 AM, with workers arriving to prepare work areas between 6:00 AM and 7:00 AM. Construction work activities would typically finish around 3:30 PM, but on some occasions, the workday could be extended to 6:00 PM, depending upon the need to complete some specific tasks beyond normal work hours.

Construction work on the weekends would require a permit from the DOB. The approval of a noise mitigation plan from the DEP would also be required, since the New York City Noise Control Code, in addition to setting noise limits for pieces of construction equipment, limits construction to weekdays between the hours of 7:00 AM and 6:00 PM. If there would be weekend work, the level of activity is often less than a normal workday and would likely occur on Saturday from 7:00 AM to 5:00 PM.

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[1] "Production rates" refers to quantity of material demolished, built or transported per unit time.
"Time correction factor" refers to the ratio between the schedule of the "known project" and schedule of each site on the proposed rezoning.
"Construction magnitude factor" refers to the ratio between the magnitude of the "known project" and magnitude of each site on the proposed rezoning.

Table 18.1: Quarterly Peak Numbers of Daily Construction Workers and Delivery Trucks (16 Projected Development Sites with New Construction)

	2019				2020				2021			
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Total Workers	210	210	210	210	506	506	506	276	626	626	862	1604
Total Truck Trips	5	5	5	5	19	19	19	22	25	25	35	43
	2022				2023				2024			
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Total Workers	1604	1857	1786	1786	2044	1476	1476	1004	1768	1612	1677	1619
Total Truck Trips	43	52	45	45	52	37	37	38	52	50	40	47
	2025				2026				2027			
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Total Workers	1774	2169	1790	1961	1412	1412	1016	1644	1990	1990	2056	2232
Total Truck Trips	53	58	48	51	39	39	33	48	56	56	44	61
	2028				2029				2030			
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Total Workers	2232	1660	2103	1846	1363	1783	1461	2345	1715	1715	1295	1844
Total Truck Trips	61	46	46	55	42	48	43	63	46	46	40	59
	2031				2032				2033			
Quarter	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Total Workers	1968	1968	1665	2343	2674	1727	1727	2348	2190	2410	1775	1775
Total Truck Trips	62	62	49	59	67	47	47	54	61	66	45	45
	2034				2035				2036			
Quarter	Q1	Q2	Q3	47	54	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Total Workers	2270	1131	1131	822	1622	1622	1622	1302	1302	1302	348	348
Total Truck Trips	48	36	36	32	37	37	37	24	24	24	5	5

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 for other construction-related activities. Work zones are those areas where the construction is occurring. Field offices for contractors and construction managers would be situated in temporary job site trailers at staging areas or existing office space near the work areas. Staging areas would typically be fenced and lit for security, and would adhere to New York City building codes.

Staging areas of adequate size and proximity to a construction site are essential to minimizing construction traffic through the Greater East Midtown Rezoning area and to providing adequate space and access for construction activities. Because of the dense urban environment of the Greater East Midtown Rezoning area, there are essentially no vacant parcels available in close proximity to the Proposed Development Sites that could be used as staging areas. As such, construction staging would most likely occur on the Projected Development Sites themselves—and may in some cases extend to the curb, travel lanes and sidewalks of public streets adjacent the construction site.

Except for the No-Action condition permanent closure of a street segment for a pedestrian plaza on Vanderbilt Avenue between East 42nd and East 43rd Streets, no rerouting of traffic is anticipated during construction activities, and moving lanes on streets are expected to be available to traffic at all times. Other potential street closures or limits to street usage to accommodate at-grade public realm improvements are not accounted for in this analysis since their expected construction and completion are not known; refer to Chapter 1, Project Description for an overview of the types of improvements that are included in the Concept Plan.

It is anticipated that some sidewalks immediately adjacent to construction sites would be closed to accommodate heavy loading areas for at least several months of the construction period for each site. Pedestrians would either use a temporary walkway in a sectioned-off portion of the street or be diverted to walk on the opposite side of the street. Detailed Maintenance and Protection of Traffic (MPT) plans for each construction site would be submitted for approval to the DOT Office of Construction Mitigation and Coordination (OCMC). 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.

18.3 Preliminary Assessment

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

Transportation

Construction activities at Projected Development Sites from 2019 to 2036 would generate construction worker and truck traffic. An evaluation of construction sequencing and worker/truck projections was undertaken to assess potential transportation-related impacts associated with construction. As demonstrated below, projected construction activities are not expected to result in significant adverse impacts to parking, transit, or pedestrians. However, a detailed assessment is required to determine the potential for significant adverse traffic impacts.

Traffic

Trip Generation Projections

The average daily workforce and truck trip estimates in Table 18.1 were used to determine the peak quarter and worst-case scenario for potential traffic-related impacts during construction. These projections were further refined to account for worker modal splits, vehicle occupancy rates, and trip ends (arrivals and departures). Given the proximity to construction sites to mass transit services, most of the construction workers (approximately 70 percent) would be expected to use public transportation in their commute to and from work within Manhattan. The remaining 30 percent of workers would travel by personal automobile at an average occupancy rate of approximately two persons per vehicle. These assumptions were utilized in the *Vanderbilt Corridor and One Vanderbilt FEIS* and are based on a

2006 survey at the construction site of the New York Times Building on Eighth Avenue near Times Square.

Estimates of daily construction-vehicle trips were developed for each calendar year and quarter and are summarized in Table 18.2. These represent the sum of trips by personal autos used by construction workers and trucks making deliveries to construction sites. Each worker vehicle was assumed to arrive in the morning and depart in the afternoon or evening; whereas, each truck delivery was assumed to result in two truck trips during the same hour (one inbound and one outbound). For comparison purposes, truck trips were converted into Passenger Car Equivalents (PCEs) assuming that one truck is equal to two PCEs. Table 18.2 shows that the peak of total vehicle trips and total PCE trips would both occur in the first quarter of 2032.

Table 18.2: Total Daily Vehicle Trips During Construction by Quarter

	2019				2020				2021				2022				2023				2024			
Vehicle Type	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Autos	60	60	60	60	144	144	144	78	177	177	244	454	454	526	506	506	579	418	418	285	501	457	475	459
Trucks	10	10	10	10	37	37	37	43	49	49	70	85	85	103	89	89	104	74	74	76	103	99	80	93
Total Vehicles	70	70	70	70	181	181	181	121	226	226	314	539	539	629	595	595	683	492	492	361	604	556	555	552
Total PCEs	80	80	80	80	218	218	218	164	275	275	384	624	624	732	684	684	787	566	566	437	707	655	635	645

	2025				2026				2027				2028				2029				2030			
Vehicle Type	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Autos	503	615	507	556	400	400	288	466	564	564	583	632	632	470	596	523	386	505	414	664	486	486	367	523
Trucks	106	116	96	101	77	77	67	95	112	112	88	121	121	93	93	110	84	95	87	126	92	92	81	118
Total Vehicles	609	731	603	657	477	477	355	561	676	676	671	753	753	563	689	633	470	600	501	790	578	578	448	641
Total PCEs	715	847	699	758	554	554	422	656	788	788	759	874	874	656	782	743	554	695	588	916	670	670	529	759

	2031				2032				2033				2034				2035				2036			
Vehicle Type	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q	1Q	2Q	3Q	4Q
Autos	558	558	472	664	758	489	489	665	621	683	503	503	643	320	320	233	460	460	460	369	369	369	99	99
Trucks	124	124	98	117	133	94	94	107	122	133	91	91	95	72	72	63	75	75	75	49	49	49	9	9
Total Vehicles	682	682	570	781	891	583	583	772	743	816	594	594	738	392	392	296	535	535	535	418	418	418	108	108
Total PCEs	806	806	668	898	1,024	677	677	879	865	949	685	685	833	464	464	359	610	610	610	467	467	467	117	117

Notes:
PCE = Passenger Car Equivalent
Shading indicates peak vehicle trips

Peak-Hour Construction Worker Vehicle and Truck Trips

Most site activities would take place during the typical construction shift of 7:00 AM to 3:30 PM. However, some construction tasks, such as foundation and superstructure work, would extend to 6:00 PM, requiring a portion of the construction workforce to remain for an extended shift. A nominal number of truck deliveries may also be expected during these later hours. Construction truck trips would be made throughout the day (with more trips made during the early morning), and most trucks would remain in the area for short durations. Activities such as construction worker travel would typically take place during the hours before and after the work shift. For analysis purposes, each worker vehicle was assumed to arrive in the morning and depart in the afternoon or evening; whereas, each truck delivery was assumed to result in two truck trips during the same hour.

The estimated daily vehicle trips were distributed throughout the workday based on projected work shift allocations and conventional arrival/departure patterns of construction workers and trucks. For construction workers, the majority (80 percent) of the arrival and departure trips would take place during the hour before and after each shift (6:00–7:00 AM for arrival and 3:30–4:30 PM for departure on a normal day shift or 6:00–7:00 PM for days with extended shifts). For construction trucks, deliveries would occur throughout the day when the construction site is active. However, to avoid traffic congestion, some construction truck deliveries would also often peak during the hour before the regular day shift (25 percent of shift total), overlapping with construction worker arrival traffic. Based on these assumptions, hourly construction-vehicle trip projections (in PCEs) for the first quarter of 2032 were estimated and are summarized in Table 18.3. The table shows that overall construction-vehicle trips would peak during the hours of 6:00–7:00 AM and 3:00–4:00 PM.

Table 18.3: 2032 First Quarter Construction-Vehicle Trip Projections (in PCEs)

	Construction Auto Trips			Construction Truck Trips			Incremental Operational Trips			Displaced Trips			Total Trips		
Time Period	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
6:00 AM - 7:00 AM	303	0	303	34	34	68	-5	-15	-20	0	-1	-1	332	18	350
7:00 AM - 8:00 AM	76	0	76	13	13	26	52	-10	42	-54	-26	-80	87	-23	64
8:00 AM - 9:00 AM	0	0	0	13	13	26	707	195	902	-547	-174	-721	173	34	207
9:00 AM - 10:00 AM	0	0	0	13	13	26	648	261	909	-564	-281	-845	97	-7	90
10:00 AM - 11:00 AM	0	0	0	13	13	26	285	316	601	-265	-287	-552	33	42	75
11:00 AM - 12:00 PM	0	0	0	13	13	26	251	260	511	-241	-248	-489	23	25	48
12:00 PM - 1:00 PM	0	0	0	13	13	26	282	293	575	-365	-366	-731	-70	-60	-130
1:00 PM - 2:00 PM	0	0	0	13	13	26	364	336	700	-379	-360	-739	-2	-11	-13
2:00 PM - 3:00 PM	0	38	38	7	7	14	388	313	701	-361	-310	-671	34	48	82
3:00 PM - 4:00 PM	0	303	303	0	0	0	218	222	440	-213	-218	-431	5	307	312
4:00 PM - 5:00 PM	0	38	38	0	0	0	109	392	501	-123	-332	-455	-14	98	84
5:00 PM - 6:00 PM	0	0	0	0	0	0	103	703	806	-123	-548	-671	-20	155	135
TOTALS	379	379	758	132	132	264	3,402	3,266	6,668	-3,235	-3,151	-6,386	678	626	1,304

As shown in Table 18.3, during the 6:00-7:00 AM construction peak hour, a total of 371 construction-vehicle trips (total auto and truck trips in PCEs) are anticipated; during the 3:00-4:00 PM construction peak hour, a total of 303 construction-vehicle trips are anticipated. By comparison, there would be 26 construction-vehicle trips during the 8:00-9:00 AM operational peak hour and no construction-vehicle trips are anticipated during the 5:00-6:00 PM operational peak hour.

During peak construction in the first quarter of 2032, five Projected Development Sites would be under construction (Sites 3, 4, 5, 13, and 15) and ten Projected Development Sites would be completed and in operation (Sites 1, 6, 7, 8, 9, 10, 11, 12, 14, and 16). The peak construction-vehicle trip projections in Table 18.3 also account for existing trips to land uses that would be displaced by construction sites and incremental operational trips from completed projects in the rezoning area. As shown in the table, there would be a net increase of 350 PCEs during the 6:00–7:00 AM construction peak hour and a net increase of 312 PCEs during the 3:00-4:00 PM construction peak hour. As these levels of trip generation would exceed the CEQR threshold of 50 peak-hour vehicle trips, a quantitative traffic analysis was prepared for the weekday 6:00-7:00 AM and 3:00-4:00 pm construction peak hours and is provided in the Detailed Assessment section. By comparison, during the 8:00-9:00 AM and 5:00-6:00 PM operational peak hours, combined construction, displaced, and operational vehicle trips would total 207 and 135 PCEs, respectively. During these operational peak hours, construction-vehicle trips could only account for 26 of the combined trips in the AM and none in the PM.

Curb Lane Closures and Staging

Temporary curb lane and sidewalk closures are anticipated adjacent to construction sites, similar to other construction projects in New York City, and these would be expected to have dedicated gates, driveways, or ramps for access by trucks making deliveries. At each construction site, flaggers would be present to manage the access and movements of trucks. Moving lanes of traffic are expected to be available at all times along streets adjacent to construction sites. As described above, detailed MPT plans for each construction site would be submitted for approval to DOT OCMC.

Transit

As described previously, the majority of the construction workers would be expected to use public transit to travel to and from work. The construction sites are located in an area that is well served by public transportation. A total of eight subway stations/complexes, 16 local bus routes, 65 express bus routes, and one commuter rail station are located in the vicinity of the rezoning area. During peak construction activities in the first quarter of 2032, new transit trips would be generated by construction workers and completed projects in the rezoning area. Table 18.4 and Table 18.5 summarize the incremental transit trips during peak construction activities in the first quarter of 2032 for the weekday 6:00–7:00 AM and 3:00–4:00 PM construction peak hours, respectively. The incremental trips during the peak construction activities include incremental operational trips from completed projects in the rezoning area and accounts for existing trips to land uses that would be displaced by construction sites.

Table 18.4: 2032 First Quarter Construction Weekday AM Transit Trips

Projected Site #	Construction Workers			Incremental Operational Sites			Displaced Existing Land Uses			Total		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
1				0	0	0				0	0	0
3	188	0	188				-1	-5	-6	187	-5	182
4	241	0	241				0	0	0	241	0	241
5	497	0	497				0	0	0	497	0	497
6				0	0	0				0	0	0
7				0	0	0				0	0	0
8				0	0	0				0	0	0
9				0	0	0				0	0	0
10				-5	-28	-33				-5	-28	-33
11				-3	-21	-24				-3	-21	-24
12				0	0	0				0	0	0
13	59	0	59				0	0	0	59	0	59
14				0	-1	-1				0	-1	-1
15	536	0	536				0	0	0	536	0	536
16				0	0	0				0	0	0
TOTALS	1,521	0	1,521	-8	-50	-58	-1	-5	-6	1,512	-55	1,457

Table 18.5: 2032 First Quarter Construction Weekday PM Transit Trips

Projected Site #	Construction Workers			Incremental Operational Sites			Displaced Existing Land Uses			Total		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
1				72	79	151				72	79	151
3	0	188	188				-170	-183	-353	-170	5	-165
4	0	241	241				-273	-292	-565	-273	-51	-324
5	0	497	497				-133	-144	-277	-133	353	220
6				71	77	148				71	77	148
7				63	68	131				63	68	131
8				53	57	110				53	57	110
9				125	136	261				125	136	261
10				230	243	473				230	243	473
11				134	141	275				134	141	275
12				56	59	115				56	59	115
13	0	59	59				-49	-51	-100	-49	8	-41
14				59	69	128				59	69	128
15	0	536	536				-289	-312	-601	-289	224	-65
16				141	153	294				141	153	294
TOTALS	0	1,521	1,521	1,004	1,082	2,086	-914	-982	-1,896	90	1,621	1,711

As shown in the tables above, there would be a net increase of 1,457 and 1,711 transit trips during the 6:00-7:00 AM and 3:00-4:00 PM construction peak hours, respectively. These trips would be spread among the 16 Projected Development Sites within the rezoning area and therefore would be distributed between numerous subway stations, bus routes and commuter rail at Grand Central Terminal. By comparison, transit trips with full build-out of the Proposed Action in 2036 would be substantially greater in number, totaling 11,527 and 13,528 during the 8:00-9:00 AM and 5:00-6:00 PM operational peak hours, respectively, when overall demand on area transit facilities and services typically peaks. Therefore, transit conditions during the 6:00-7:00 AM and 3:00-4:00 PM construction peak hours are expected to be generally better during the analyzed operational peak hours with full build-out of the Proposed Action in 2036. Consequently, there would be less likelihood of significant adverse transit impacts during the construction peak hours in the first quarter of 2032 than during the operational peak hours with full build-out of the Proposed Action in 2036.

Construction of the subway station improvements described in Chapter 12, "Transportation," could result in existing street stairways or other station elements being temporarily closed, which could affect conditions at transit elements during peak commuter periods. The transit improvements would be expected to take place throughout the projected 20-year construction period of Proposed Action. More specifically, a suite of improvements at the 42nd Street Bryant Park-Fifth Avenue subway station complex, the Lexington Avenue-51st/53rd Streets subway station complex, and the Fifth Avenue-53rd Street subway station have been identified to receive funding from the Transit Improvement Zone (TIZ) FAR bonus mechanism (see Chapter 1, "Project Description"), which would also include construction at the street level. Proposed improvements at the 42nd Street Bryant Park-Fifth Avenue subway station complex include a new street entrance to the Flushing Line mezzanine on the north sidewalk of West 42nd Street, midblock between Fifth and Sixth Avenues and the provision of elevators between the mezzanine and platform levels to make the station fully accessible. Proposed improvements at the Lexington Avenue-51st/53rd Streets subway station complex include a new street entrance to the uptown No. 6 platform on the south sidewalk of East 50th Street east of Lexington Avenue, a widened staircase at the north end of the downtown No. 6 platform providing access to the underpass, and a widened escalator connecting the mezzanine to the E/M platform. Proposed improvements at the Fifth Avenue-53rd Street Station include new street entrances on the north and south sidewalks of East 53rd Street west of Madison Avenue, a new mezzanine and fare control area, new vertical circulation elements to the upper and lower platform levels, and elevators to make the station fully accessible. While many of these improvements involve work within the stations, the addition of the new stairs and fare control areas could result in potential impacts to traffic and pedestrian conditions, due to the sidewalks, and potentially the adjacent moving lanes of traffic, closing during the construction period.

Construction of the new street entrances at the 42nd Street Bryant Park-Fifth Avenue subway station complex and the Lexington Avenue-51st/53rd Streets subway station complex would each have an estimated construction duration of less than two years based on preliminary engineering estimates. While no closures of moving lanes of traffic would be anticipated, it is expected that the portions of sidewalks adjacent to the new subway entrances would be closed for the entirety of the construction duration and pedestrians would either use a temporary walkway or be diverted to walk on the opposite side of the street. As such, construction activities may result in short-term disruption of pedestrian movements during work around the new subway entrances.

Based on preliminary engineering estimates, construction of the new street entrances, mezzanine, and fare control area at the Fifth Avenue-53rd Street Station would have an estimated construction duration of more than two years. While these station improvements would require longer-term construction, the construction of the mezzanine, stairs, escalators, and elevator could be phased to minimize disruptions to traffic and pedestrian flows during the construction period so that only half of East 53rd Street and one sidewalk would need to be closed at a time, allowing for one moving lane and one sidewalk to be kept open for traffic and pedestrians at all times. It is expected that the portion of sidewalk next to each new subway entrance would be closed for the entirety of its construction duration and pedestrians would either use a temporary walkway or be diverted to walk on the opposite side of the street. As such, construction activities may result in short-term disruption of pedestrian movements during work around each new subway entrance.

Construction of these improvements would be subject to detailed Maintenance and Protection of Traffic (MPT) plans approved by the DOT OCMC. At locations where temporary sidewalk closures are required during construction activities, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with DOT requirements. If certain subway station elements need to be closed to the public for extended durations, adequate circulation and access to transit services would be maintained through the coordination of the Metropolitan Transportation Authority (MTA), New York City Transit (NYCT) and the DOT. Additionally, any temporary relocation of bus stops adjacent to construction sites would be coordinated with and approved by the DOT and MTA NYCT to ensure that proper access is maintained.

Pedestrians

During peak construction activities in the first quarter of 2032, new pedestrian trips would be generated by construction workers and completed projects in the rezoning area. Table 18.6 and Table 18.7 summarize the incremental transit trips during peak construction activities in the first quarter of 2032 for the weekday 6:00-7:00 AM and 3:00-4:00 PM construction peak hours, respectively. The incremental trips during the peak construction activities include incremental operational trips from completed projects in the rezoning area and accounts for existing trips to land uses that would be displaced by construction sites.

Table 18.6: 2032 First Quarter Construction Weekday AM Pedestrian Trips

Projected Site #	Construction Workers			Incremental Operational Sites			Displaced Existing Land Uses			Total		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
1				0	0	0				0	0	0
3	265	0	265				-2	-17	-19	263	-17	246
4	338	0	338				0	0	0	338	0	338
5	699	0	699				0	0	0	699	0	699
6				0	0	0				0	0	0
7				0	0	0				0	0	0
8				0	0	0				0	0	0
9				0	0	0				0	0	0
10				-19	-104	-123				-19	-104	-123
11				-12	-78	-90				-12	-78	-90
12				0	0	0				0	0	0
13	82	0	82				0	0	0	82	0	82
14				0	-2	-2				0	-2	-2
15	754	0	754				0	0	0	754	0	754
16				0	0	0				0	0	0
TOTALS	2,138	0	2,138	-31	-184	-215	-2	-17	-19	2,105	-201	1,904

Table 18.7: 2032 First Quarter Construction Weekday PM Pedestrian Trips

Projected Site #	Construction Workers			Incremental Operational Sites			Displaced Existing Land Uses			Total		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
1				99	106	205				99	106	205
3	0	265	265				-366	-383	-749	-366	-118	-484
4	0	338	338				-749	-783	-1,532	-749	-445	-1,194
5	0	699	699				-248	-263	-511	-248	436	188
6				154	160	314				154	160	314
7				86	91	177				86	91	177
8				57	62	119				57	62	119
9				185	202	387				185	202	387
10				337	338	675				337	338	675
11				210	206	416				210	206	416
12				124	128	252				124	128	252
13	0	82	82				-171	-173	-344	-171	-91	-262
14				62	77	139				62	77	139
15	0	754	754				-490	-518	-1,008	-490	236	-254
16				193	211	404				193	211	404
TOTALS	0	2,138	2,138	1,507	1,581	3,088	-2,024	-2,120	-4,144	-517	1,599	1,082

As shown in the tables above, there would be a net increase of 1,904 and 1,802 pedestrian trips during the 6:00-7:00 AM and 3:00-4:00 PM construction peak hours, respectively. These trips would be spread among the 16 Projected Development Sites within the study area and occur outside of the typical commuter peak periods. By comparison, pedestrian trips with full build-out of the Proposed Action in 2036 would be substantially greater in number, totaling 13,715 and 16,500, respectively, during the 8:00-9:00 AM and 5:00-6:00 PM operational peak hours. Therefore, pedestrian conditions during the 6:00-7:00 AM and 3:00-4:00 PM construction peak hours are expected to be generally better during the analyzed operational peak hours with full build-out of the Proposed Actions in 2036. Consequently, there would be less likelihood of significant adverse impacts during the construction peak hours in the first quarter of 2032 than during the operational peak hours with full build-out of the Proposed Action in 2036. It is expected that the mitigation measures identified in Chapter 19, "Mitigation," would also be effective at mitigating any potential impacts from construction and operational pedestrian trips during the first quarter of 2032. At locations where temporary sidewalk closures are required during construction activities, adequate protection or temporary sidewalks and appropriate signage would be provided in accordance with DOT requirements.

Parking

It is expected that most of the workers (approximately 70 percent) would travel to construction sites via public transit. For those workers who would drive, it is not anticipated that workers would be able to park on streets in the vicinity of construction sites given that on-street parking for the general public is highly restricted. However, off-street parking is available at a number of nearby lots and garages in the Greater East Midtown Rezoning area. During the first quarter of 2032, when peak construction activities are expected, With-Action construction conditions would generate a net increase in demand of approximately 512 parking spaces during the weekday Midday period. This represents an increase in demand of 380 parking spaces from construction workers, a reduction in demand of 664 parking spaces from existing buildings that would be displaced during construction, and an increase in demand of 796 parking spaces from completed projects within the rezoning area (Appendix H includes a summary of parking demand on a site-by-site basis). During this same timeframe, parking capacity within the study area would be reduced by a total of 564 spaces compared to the No-Action Condition due to the displacement of public parking facilities by Projected Development Sites that would be under construction or that would be operational at this analysis period.

As discussed in Chapter 12, "Transportation," within a quarter-mile radius of the rezoning area, there would be 3,881 available spaces, 2,583 available spaces, and 587 available spaces during the weekday Midday period in the 2016 Existing, 2036 No-Action operational, and 2036 With-Action operational conditions, respectively. Based on the extent of available parking spaces, there would be sufficient off-street parking capacity to accommodate all projected demand during the weekday Midday period. As such, construction activities 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 meet the following criteria:

1. Construction is 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 construction of multiple buildings where there is a potential for cumulative effects.

If a project does not meet one or more of the criteria above, a quantitative air quality assessment would be considered.

The construction of proposed development sites would meet certain of the criteria indicated above:

- Construction activities could exceed two years' duration for each site, as the projected construction period is projected to last from 3-1/2 to five years for each building.
- There is a potential for cumulative effects from several buildings under simultaneous construction.
- Presence of nearby sensitive receptors.

As a result, a quantitative air quality assessment was performed. The methodologies and results of this analysis are described in detail in Section 18.6.2.

Noise and Vibration

The criteria enumerated for air quality assessment consideration are the same used for determination of need for an assessment of noise for construction activities. As for air quality, the Proposed Action does not screen out any of these points—since construction activities at multiple sites could last from 3-1/2 to five years at each proposed development building—and therefore has the potential for cumulative noise impacts from several buildings under simultaneous construction. As a result, a quantitative construction noise assessment was performed. The methodologies and results of this analysis are described in detail in Section 18.7.

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 construction 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 16 Projected Development Sites would be spread out over a period of 20 years, throughout an approximately 78-block rezoning area. 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 Action 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 not create a neighborhood character impact. Therefore, no significant 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 project 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. During the construction period, construction activities would be dispersed throughout the 78-block proposed rezoning area and would not affect access to particular businesses over an extended duration. Access to businesses would be maintained for patrons, employees and service functions such as deliveries throughout construction, in accordance with New York City codes and requirements. Therefore, construction impacts to socioeconomic conditions are not expected.

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. No open space resources would be disrupted during the construction resulting from the Proposed Action, nor would any access to publicly accessible open space be impeded during construction within the proposed rezoning area. In addition, measures would be implemented to control noise, vibration, emissions and dust on construction sites, including 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 Action 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 not create an open space impact. Therefore, no significant construction impacts to open space are expected.

Historic and Cultural Resources

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

As discussed in Chapter 6, "Historic and Cultural Resources," at DCP's request, LPC reviewed the identified Projected and Potential Development Sites that could experience new/additional in-ground disturbance as a result of the Proposed Action, and concluded that none of the lots comprising those sites have any archaeological significance. As such, the Proposed Action is not expected to result in any significant adverse impacts to archaeological resources.

The Proposed Action would result in development on both Projected and Potential Development Sites that are located within 90 feet of a designated or listed historic resource; however, these resources would not be adversely impacted by construction activities because they would be subject to protection from construction-related damage under the New York City Department of Buildings' (DOB) Technical Policy and Procedure Notice (TPPN) #10/88. However, there are also 12 NYCL-eligible and/or S/NR-eligible resources located within 90 feet of the Projected and Potential Development Sites for which

TPPN #10/88 would not apply, and therefore the Proposed Action could potentially result in construction-related impacts to these eligible resources.

Possible measures that may address these impacts are discussed in Chapter 19, “Mitigation.”

Hazardous Materials

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

Any potential construction-related hazardous materials impacts would be avoided by the inclusion of (E) designations for all the RWCDS development sites, which are not under the control of the applicant. As detailed in Chapter 8, “Hazardous Materials,” to ensure that the Proposed Action would not result in significant, adverse hazardous materials impacts, (E) designations would be mapped on all 16 Projected Development Sites and 14 Potential Development Sites as part of the Proposed Action. As discussed in Chapter 8, an (E)-designated site is designated on a zoning map within which no change of use or development requiring a DOB permit may be allowed without approval of the New York City Office of Environmental Remediation (OER). These sites require the OER’s review to ensure 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 the OER before the issuance of the permit by the DOB. The environmental requirements for the (E) designation also include a mandatory construction-related health and safety plan, which must be approved by the OER.

In addition, demolition of interiors, portions of buildings or entire buildings are regulated by the DOB, which requires abatement of asbestos prior to any intrusive construction activities—including demolition. Occupational Safety and Health Administration (OSHA) regulates construction activities to prevent excessive exposure of workers to contaminants in the building materials, such as lead paint. New York State Solid Waste regulations control where demolition debris and contaminated materials associated with construction are handled and disposed. Adherence to these existing regulations would prevent impacts from construction activities at any of the Projected Development Sites in the proposed rezoning area.

18.4 Probable Impacts of the Proposed Action

Transportation

Traffic

Traffic volumes for the 6:00–7:00 AM and 3:00-4:00 PM construction peak hours were developed from Automatic Traffic Recorder (ATR) and manual turning movement counts collected in 2016. These data indicate that background traffic volumes from 6:00–7:00 AM are approximately 27 percent lower than 8:00–9:00 am volumes, which is the AM peak hour analyzed in Chapter 12, “Transportation,”, and that background traffic volumes from 3:00-4:00 PM are approximately five percent lower than 5:00-6:00 PM volumes, which is the PM peak hour analyzed in Chapter 12, "Transportation." Baseline traffic volumes during peak construction activities in the first quarter of 2032 were then established by applying a background growth rate and traffic volumes associated with No-Action development projects.

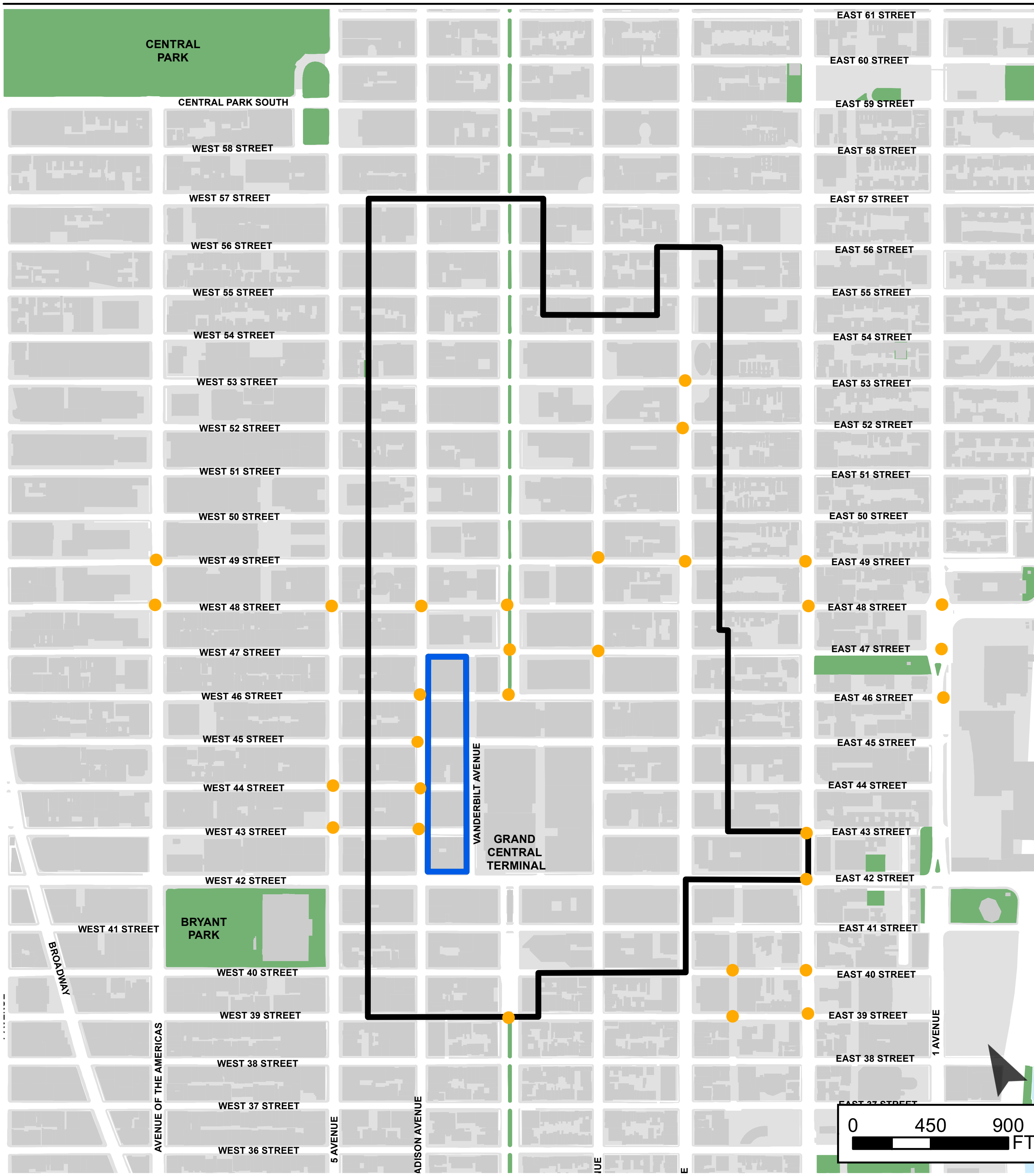
Vehicles generated by construction activities were assigned to the street network to determine the critical intersections most likely to be used by concentrations of project-generated trips. Autos used by workers to commute to construction sites were assigned to nearby off-street parking facilities with available spaces, and trucks making deliveries to construction sites were assigned using DOT-designated truck routes in the area, which include First, Second, Third, and Lexington Avenues, and 42nd, 57th, 59th, and 60th Streets. Vehicle trips associated with existing buildings that would be displaced during construction and completed projects within the rezoning area were also included in the project-generated traffic volumes.

Based on the net change between 2032 No-Action and 2032 Construction traffic volumes, intersections that would experience an increase of 50 or more PCEs from construction-related traffic (personal autos used by construction workers and trucks making deliveries to construction sites) during the 6:00–7:00 AM and 3:00-4:00 PM construction peak hours or are located adjacent to construction sites and could be affected by lane closures were selected for analysis. As shown on Figure 18-2, a total of 30 intersections were selected for analysis, which are located within an area bounded on the north by 53rd Street, on the south by 39th Street, on the east by First Avenue, and on the west by Sixth Avenue. These intersections were analyzed using the traffic analysis methodology and impact criteria described in Chapter 12, "Transportation." Significant adverse impacts from project-generated trips were identified at 17 intersections in one or more analyzed peak hours (see Table 18.8); specifically, the impact locations comprise of four approach movements at four intersections during the construction AM peak hour and 21 approach movements at 14 intersections during the construction PM peak hour. Chapter 19, "Mitigation" addresses practicable measures to address these impacts.

Table 18.8: Summary of Significant Adverse Traffic Impacts

Intersection	Peak Hour	
	6:00-7:00 AM	3:00-4:00 PM
1st Ave. & E. 46th St.		EB-L
1st Ave. & E. 48th St.	EB-L (West Side)	
2nd Ave. & E. 40th St.		EB-R
2nd Ave. & E. 42nd St.		SB-LT
2nd Ave. & E. 48th St.		EB-TR
2nd Ave. & E. 49th St.		WB-L
Tunnel Exit St. & E. 39th St.	WB-TR	
Lexington Ave. & E. 47th St.		WB-L, WB-T, SB-T
Park Ave. & E. 39th St.	WB-LT (West Side)	NB-LT, SB-T
Park Ave. & E. 46th St.		SB-L, SB-T, EB-T (East Side)
Park Ave. & E. 47th St.		SB-TR
Park Ave. & E. 48th St.		SB-L
Madison Ave. & E. 44th St.		EB-T
5th Ave. & 43rd St.		SB-R
5th Ave. & 48th St.		EB-T, EB-R
6th Ave. & W. 48th St.	EB-T	
6th Ave. & W. 49th St.		WB-T, WB-R

Notes: EB = Eastbound; WB = Westbound; NB = Northbound; SB = Southbound; L = Left-turn; T = Through; R= Right-turn



Proposed Greater East Midtown Rezoning Boundary

Vanderbilt Corridor (Existing Regulations Apply)

Traffic Analysis Location

Greater East Midtown Rezoning
Manhattan, New York

Traffic Analysis Locations

Figure 18-2

Air Quality

Construction activities could affect air quality because of engine emissions from on-site construction equipment and dust-generating activities. In general, much of the heavy equipment used in construction has diesel-powered engines, which produce relatively high levels of nitrogen oxides and particulate matter. Gasoline engines produce relatively high levels of carbon monoxide. Construction activities also generate fugitive dust emissions. As a result, the air pollutants analyzed for construction activities include nitrogen dioxide (NO_2), particulate matter with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}), particulate matter with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$), and carbon monoxide (CO).

Since ultra-low-sulfur diesel (ULSD) would be used for all diesel engines related to construction activities under the Proposed Action, sulfur oxides (SO_x) emitted from those construction activities would be negligible, and an analysis of SOx emissions is not warranted. For more details on a description of air pollutants and standards, see Chapter 13, "Air Quality."

As stated above, construction activity in general, and large-scale construction in particular, has the potential to adversely affect air quality as a result of diesel emissions. The main component of diesel exhaust that has been identified as having an adverse effect on human health is fine particulates. To ensure that the construction of the proposed project results in the lowest feasible diesel particulate (DPM) emissions, an emissions reduction program would have to be implemented.

The evaluation performed in this section assumes a combination of emission reduction measures that are mandated by law and are common practice in large-scale New York City construction projects, and follow the requirements included in NYC Law 77 and the NYC Air Pollution Control Code. These include the following:

- **Fugitive dust control plans** – In compliance with the NYC Air Pollution Control Code regarding control of fugitive dust, contractors would be required to ensure that all trucks carrying loose material use water as a dust suppression measure, that wheel-washing stations be established for all trucks exiting the construction site; that trucks hauling loose material be equipped with tight-fitting tailgates and their loads securely covered prior to leaving the site, that streets adjacent to the site be cleaned as frequently as needed by the construction contractor, and that water sprays be used for all transfer of spoils to ensure that materials are dampened as necessary to avoid the suspension of dust into the air. These measures would be expected to reduce dust generation by more than 50 percent.
- **Clean Fuel –** Ultra Low Sulfur Diesel (ULSD) would be used exclusively for all diesel engines related to construction activities under the Proposed Action. This is a federal requirement since 2010, which enables the use of tailpipe reduction technologies that reduce diesel particulate matter (DPM) and SOx emissions.
- **Diesel Equipment Reduction –** Hoists and small equipment such as lifts, compressors, welders, and pumps would be expected to use electric engines that operate on grid power instead of diesel power engines. This is a common practice that has been achieving wider use as technology improves.
- **Restrictions on Vehicle Idlin**g – This would be required in compliance with the local law restricting unnecessary idling. On-site vehicle idle time would 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, the evaluation assumes the following measure:

- **Best Available Tailpipe Reduction Technologies for Diesel Engines –** NYC Local Law 77 (which currently only applies to publicly funded City projects), requires nonroad diesel engines with a power rating of 50 horsepower (hp) or greater, and controlled truck fleets (i.e., truck fleets under long-term contract, such as concrete mixing and pumping trucks) to utilize the best available tailpipe technology for reducing DPM emissions. The use of diesel particulate filters (DPF) in Tier 3 (model year 2000-2008 or newer) construction diesel equipment achieves the same emission reductions as a newer Tier 4 engine. Given the timeframe of the developments to be constructed under the Proposed Action (2019-2036), equipment meeting the more restrictive Tier 4 standards (model year 2008–2015 or newer) would be expected to be in wide use and comprise the majority of contractors' fleets. The combination of Tier 4 and Tier 3 engines with DPF would achieve DPM reductions of approximately 90 percent when compared to older uncontrolled engines.

Overall, these emissions control measures would be expected to significantly reduce DPM emissions, and as recommended in the *CEQR Technical Manual*, all the necessary measures would be implemented to ensure that the New York City Air Pollution Control Code regulating construction-related dust emissions is followed.

Air Quality Analysis Methodologies

Using the conceptual construction phasing plan developed by NYCDCP (see Figure 18-1a and Figure 18-1b), the analysis evaluated the peak cumulative short-term $PM_{2.5}$ emissions for each Projected Development Site during the full 2019–2036 construction period by quarter. The quarter with the highest $PM_{2.5}$ emissions from all development sites under construction was selected as the period with the highest potential $PM_{2.5}$ effects. This analysis, called the intensity assessment, was used to identify the critical quarter and year to be selected for the dispersion impact modeling analysis.

A dispersion analysis—considering the PM_{10}, $PM_{2.5}$, NO_x and CO emissions from on-site (construction equipment and fugitive dust) and off-site (trucks and other motor vehicles) source was performed to determine potential air quality effects during the peak emission construction period for the proposed building sites in close proximity under simultaneous construction.

The following sections provide additional details relevant only to the construction air quality analysis methodology. For a review of the applicable regulations, standards and criteria, and benchmarks for stationary and mobile source air quality analyses, refer to Chapter 13, "Air Quality."

The analysis was performed following the EPA and *CEQR Technical Manual* suggested procedures and analytical tools (as further discussed below) to determine source emission rates. The estimated emission rates were then used as input to an air quality dispersion model to determine potential impacts.

Emission Estimation Process

The construction analyses used an emission estimation method and a modeling approach previously developed for evaluating air quality impacts of construction projects in New York City in consultation with DCP. Because the level and types of construction activities would vary from month to month, the approach includes a determination of worst-case emission periods based on an estimated quarterly construction work schedule, the number of on-site construction equipment types, and rated horsepower of each unit, quantities of materials to be demolished and excavated, and number of trucks arriving, working and leaving the site.

As there is neither a specific project, developer, nor detailed construction data for the Projected Development Sites, the worst-case short-term emissions (e.g., maximum daily emissions) and the maximum annual emissions (based on a 12-month rolling average) were determined by construction specialists based on the construction schedule activities, and equipment projected to be required for the development of Projected Development Site 6, which was used as a benchmark and prototype for the other development sites. Projected Development Site 6 was selected as the prototype as its projected size falls in the approximate mid-range of the 16 Projected Development Sites.

Using the estimated quantities of construction activities, equipment and trucks needed for the construction of Projected Developed Site 6, the magnitude and duration of each phase of construction for each of the other Projected Development Sites was scaled to this prototypical building by the magnitude of construction, projected square footage of each building, and duration of activities for each phase of each Projected Development Site relative to this one. The scaling system considered and evaluated the four main phases of construction: demolition, excavation-foundations, tower core/exterior, and interior finishes.

For each Projected Development Site, the magnitude of demolition, excavation-foundation, tower core construction, and interior finishes was determined by considering the existing buildings at the site (demolition) and the With-Action (development) envelope. The coefficient relating to each proposed site was developed based on the magnitude, square footage, and schedule of the prototypical Projected Development Site 6 building, and these coefficients were applied to the emissions estimates for each building.

The specific construction information used to calculate emissions generated from the construction process of the prototypical Projected Development Site 6 building included, but is not limited to, the following:

- The number of units and fuel-type of construction equipment to be used
- Rated horsepower for each piece of equipment
- Utilization rates for equipment
- Hours of operation on-site
- Excavation, demolition and processing rates
- Average distance traveled on-site by dump trucks.

Engine Exhaust Emissions

Emission factors for NO_x, PM_{10}, $PM_{2.5}$, and CO from the combustion of ULSD fuel for on-site construction equipment were developed using the latest EPA MOVES2014a-NONROAD Emission Model (Version 2009 of NONROAD is embedded into MOVES).

The MOVES2014a-NONROAD model can generate unitary emission factors, in grams per horsepower/hour (g-hp/hr) by engine size (hp), equipment type, engine technology type, fuel type, and year of analysis. The model estimates emissions as the average emission factor by year for the county fleet sorted by the above-mentioned parameters. As an example, if New York County and the year 2029 were selected for diesel engines, the output generates emissions (g-hp/hr) for each type of equipment from 3 hp to 3,000 hp rating for each one of the years of the County fleet going back up to 40 years. The model calculates how many pieces of equipment for each engine technology group (emission Tiers) and model year are present in the County fleet, and produces the yearly average emission factor.

Emission rates from combustion of ULSD fuel for on-site dump trucks, concrete trucks, and other heavy trucks were developed using the EPA MOVES2014a Emission Model. New York City restrictions placed on idling times were applied for dump trucks and other heavy trucks. Short-term and annual emission rates were adjusted from the peak-hour emissions by applying usage factors for each equipment unit. Usage factors were determined using the construction equipment schedule.

Fugitive Emission Sources

Road dust (PM_{10} and $PM_{2.5}$) emissions from trucks moving inside the construction sites were calculated using equations from EPA's AP-42, Section 13.2.2 for unpaved roads. Average vehicle weights (i.e., unloaded going in and loaded going out) were used in the analysis and a reasonably conservative round trip distance was estimated for on-site travel. Dust control measures (described previously) would provide at least a 50-percent reduction in PM_{10} and $PM_{2.5}$ emissions. Also, since on-site travel speeds would be restricted to five miles per hour, on-site travel for trucks would not be a significant contributor to $PM_{2.5}$ fugitive emissions.

Particulate matter emissions could also be generated by material handling activities (i.e., transfer-loading/drop operations for debris and soil). Estimates of PM_{10} and $PM_{2.5}$ emissions from these activities were developed using EPA's AP-42 Sections 13.2.4. Excavation rates used for the analysis were based on information obtained from the prototypical Projected Development Site 6-development site used as a basis for all others.

Construction Activity Emissions Intensity Assessment

Overall, construction of the Proposed Action is expected to occur over a period of almost two decades. To determine which construction period constitutes the worst-case periods for the pollutants of concern, construction-related emissions were calculated throughout the duration of construction on a quarterly basis using peak daily emissions for $PM_{2.5}$.

$PM_{2.5}$ was selected as the worst-case pollutant because, as compared to other pollutants, $PM_{2.5}$ has the highest ratio of emissions-to-effects. Therefore, $PM_{2.5}$ was used for determining the worst-case periods for analysis of all pollutants. Generally, emission patterns of other pollutants would follow $PM_{2.5}$ emissions, since most pollutant emissions are proportional to diesel engines by horsepower. Based on the resulting multiyear profiles by quarter, a worst-case period was identified for the modeling of annual and short-term averaging periods.

To determine the worst year and quarter, an emission intensity assessment (emission profiles) was conducted, the fourth quarter of 2029 and first quarter of 2024 were identified as the worst quarters considering the cumulative emissions from all Projected Development Sites. However, to better determine the worst quarter, three clusters were selected to more reasonably assess cumulative impacts from sites that are located near each other and have construction activities overlay. The fourth quarter of 2029 was identified as the quarter with the highest cumulative emissions from all Projected Development Sites, and the first quarter of 2024 produced cumulative emissions of the same magnitude.

Four of the Projected Development Sites are expected to be under different stages of construction during the fourth quarter of 2029: Projected Development Sites 4, 5, 15, and 16. Five of the Projected Development Sites are expected to be under construction during the first quarter of 2024; Projected Development Sites 8, 9, 10, 11 and 14.

In order to determine the worst scenario for the dispersion modeling analysis, the sites identified above were evaluated by proximity to each other. Since the highest cumulative effects would occur when sites are adjacent, or within a block of each other; the cumulative emissions from three clusters – Cluster 1 (Projected Development Sites 10 & 11), Cluster 2 (Projected Development Sites 4 & 5) and Cluster 3 (Projected Development Sites 15 & 16) – were analyzed and plotted with the total cumulative emissions for the 20-year period. Figure 18-3 provides the cumulative peak daily $PM_{2.5}$ emissions from all development sites from 2019 to 2036 by quarter, and the cumulative emissions from each one of these three clusters. Figure 18-4 provides the annual cumulative $PM_{2.5}$ emissions from all development sites as well as cumulative emissions from each one of these three clusters.

Based on this analysis, Cluster 2 (see Figure 18-5), including Projected Development Sites 4 and 5 (located between Madison and Fifth Avenues and East 44th to East 46th Streets) was selected for the modeling impact assessment. These two sites have the highest sustained daily $PM_{2.5}$ emissions during the first three quarters of 2029, and are in the closest proximity to each other. These two aspects would result in the highest potential air quality effects during a single year.

Impacts Assessment

The effects of construction emissions on the surrounding environment for the relevant air pollutants were quantified using dispersion computer models. As explained in the emission intensity assessment, the impact analysis included Project Development Sites 4 and 5 for the on-site dispersion analysis. The emissions from the construction activities during the peak quarters of 2029 for these two sites were used as the worst-case modeling scenario.

Based on the proposed schedule, for the year 2029, Projected Development Site 4 would be in the excavation-foundation phase during the first three quarters and tower core during the fourth one; while Projected Development Site 5 would be undergoing demolition during the first three quarters and excavation-foundation during the fourth quarter.

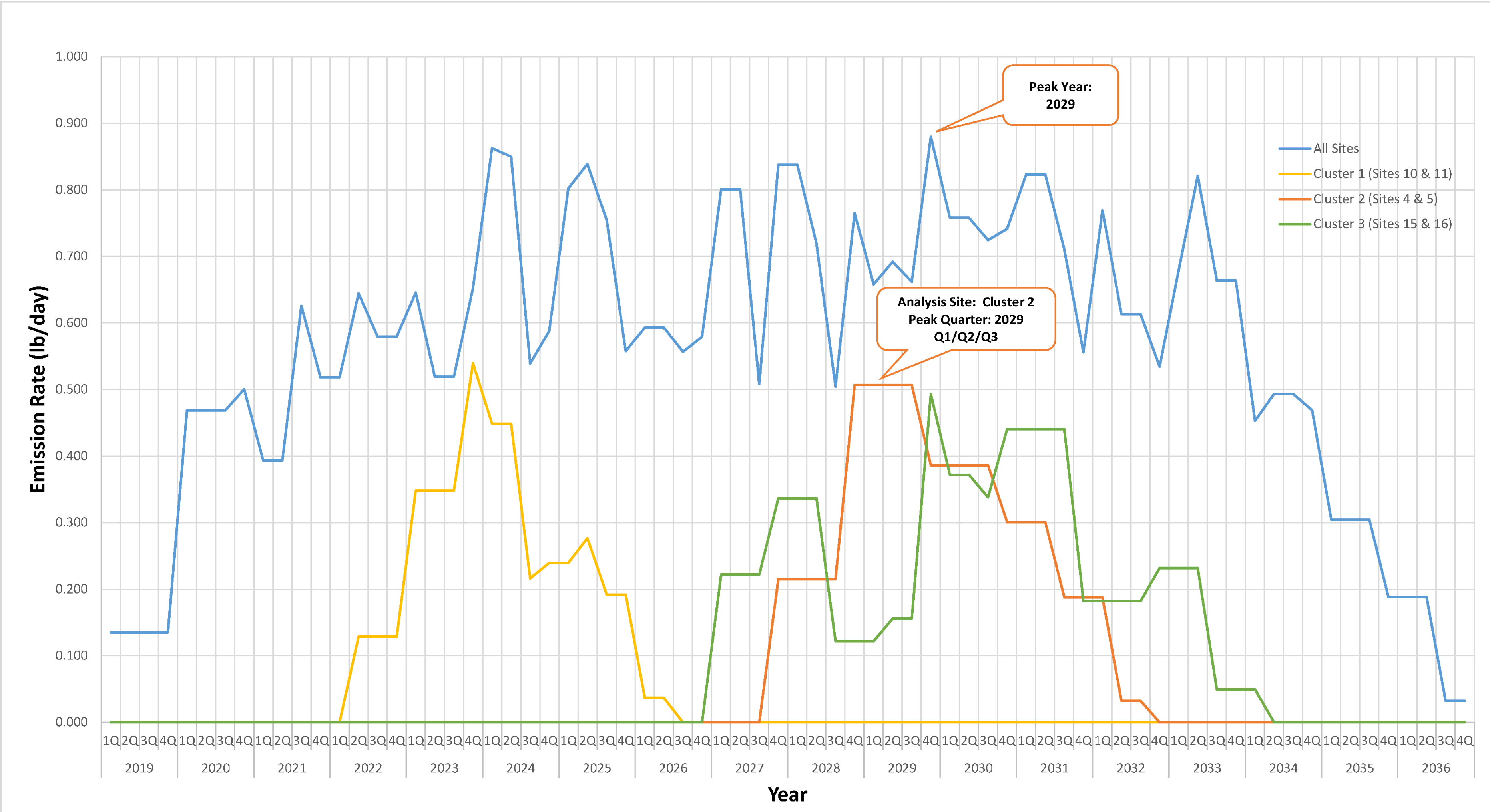
The peak daily emissions generated during the highest quarter were used for the short-term pollutant analysis, and the annual average emissions for the annual long-term pollutant analysis.

In order to address the potential cumulative effects from off-site emissions related to construction trucks, East 46th Street between Fifth Avenue and Madison Avenue was selected for the off-site modeling analysis. This link has the highest incremental truck volumes (four trucks) compared to the No-Action scenario, and it is located between the above-mentioned sites based on traffic assignments. The peak hour truck volumes which occur between 6-7 AM were used for this cumulative analysis.

The impact assessment results included the cumulative on-site and off-site effects of these two buildings.

On-Site Dispersion Modeling

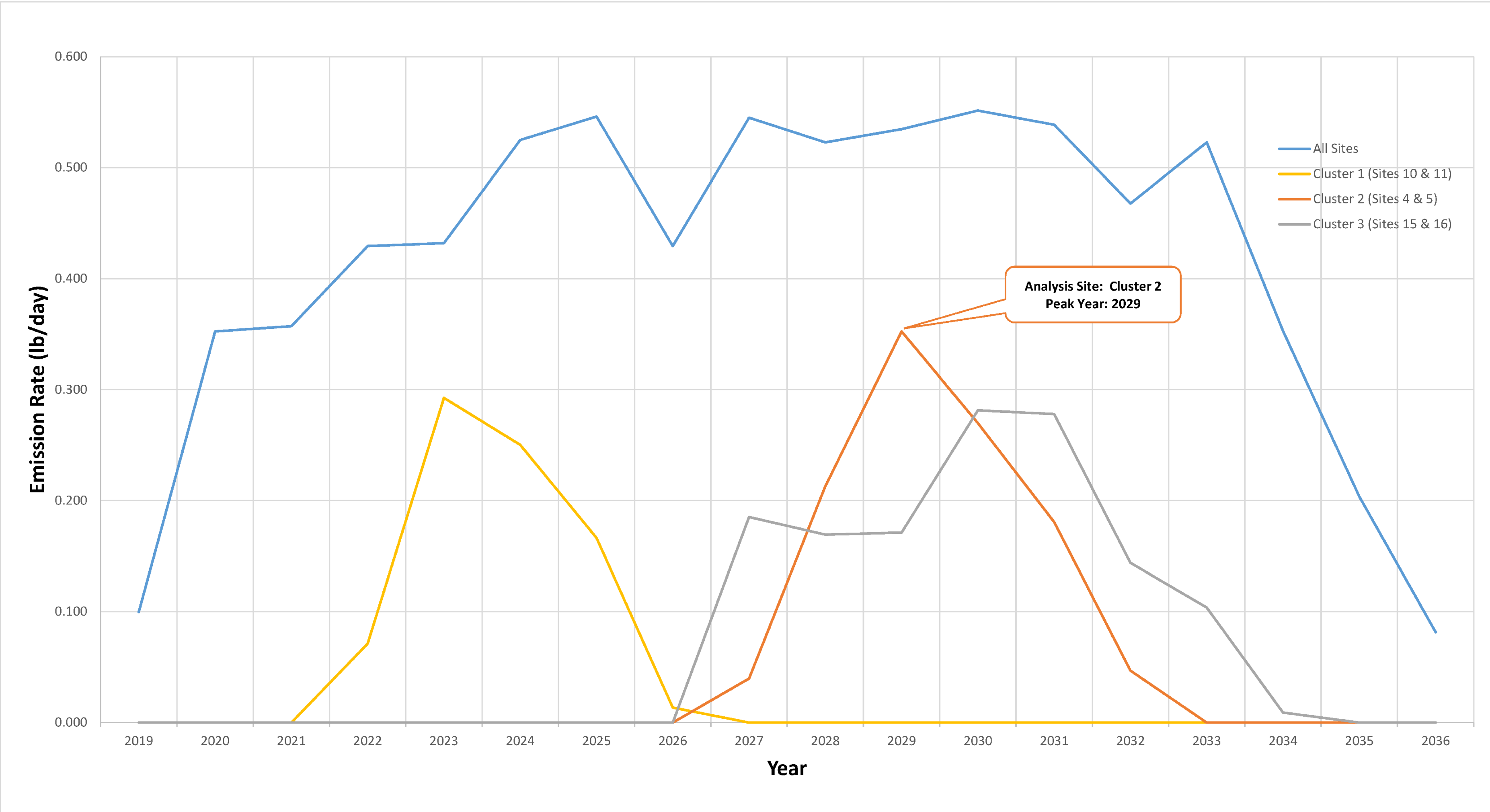
Potential impacts from on-site construction equipment, and off-site truck emissions were evaluated using the EPA most current version of the AERMOD dispersion model (version 15181), which became the EPA and the New York State Department of Environmental Conservation (NYSDEC) preferred



Greater East Midtown Rezoning
Manhattan, New York

Projected Peak Daily PM2.5 Construction Emissions Profile by Quarter

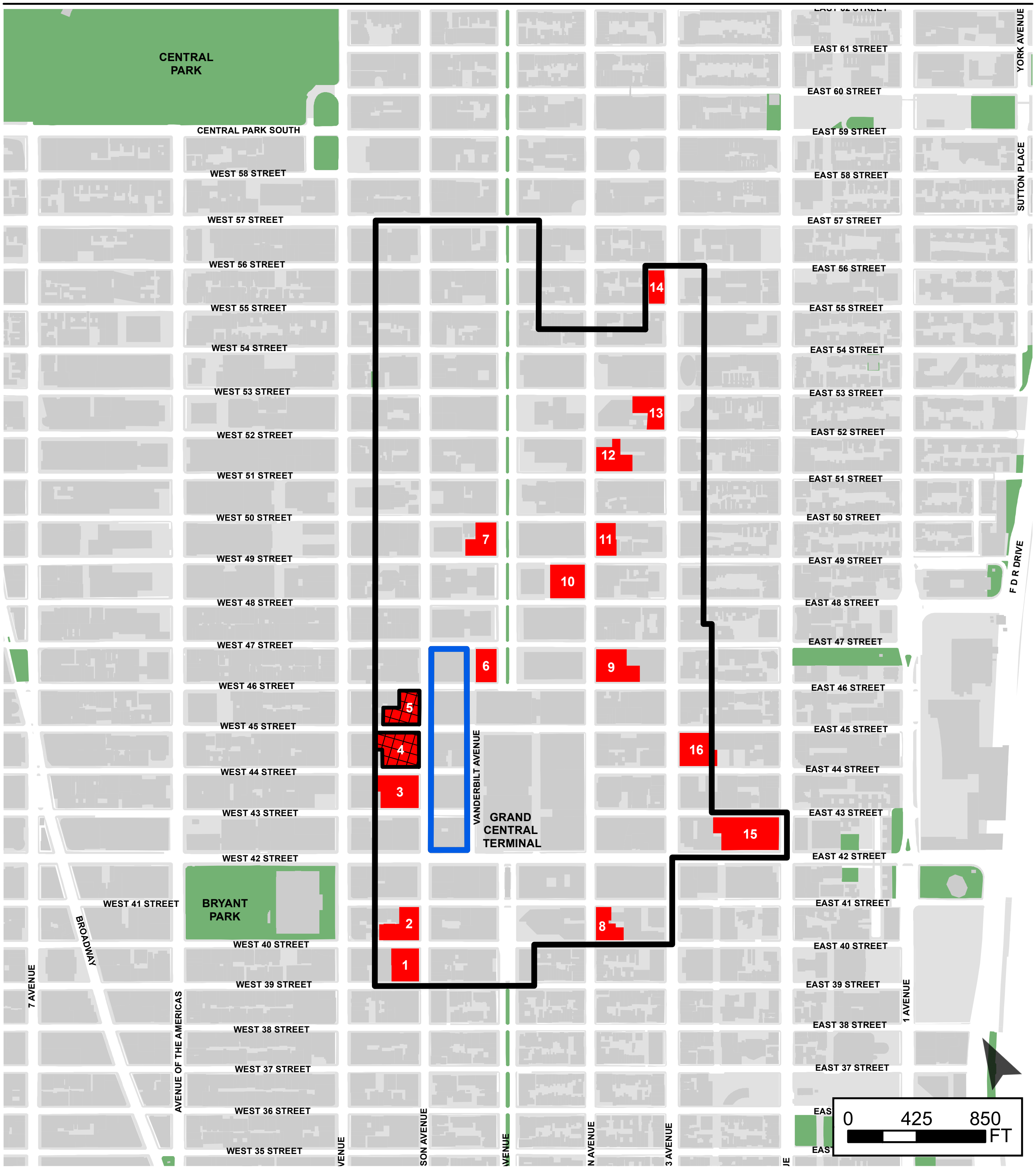
Figure 18-3



Greater East Midtown Rezoning
Manhattan, New York

Projected Annual PM2.5 Construction Emissions Profile

Figure 18-4



Proposed Greater East Midtown Rezoning Boundary

Vanderbilt Corridor (Existing Regulations Apply)

Projected Development Site (w/ I.D. Label)

Construction Air Quality Analysis Cluster

Greater East Midtown Rezoning
Manhattan, New York

Construction Air Quality Analysis Cluster

Figure 18-5

model on December 9, 2006. AERMOD is a steady-state plume model that incorporates current concepts about flow and dispersion in complex terrain, including updated treatments of the boundary layer theory, understanding of turbulence and dispersion; it also includes handling of terrain interactions.

The AERMOD model calculates pollutant concentration from one or more points (e.g., exhaust stacks) based on hourly meteorological data, and has the capability to calculate pollutant concentrations at locations where the plume from the exhaust stack is affected by the aerodynamic wakes and eddies (downwash) produced by nearby structures.

Source Simulation

During construction, various types of construction equipment would be used at different locations throughout the site. Some of the equipment is mobile and would operate throughout the site, while some would remain stationary on-site at distinct locations during short-term periods (i.e., daily and hourly). Stationary emission sources include (but are not limited to) air compressors, cranes, and concrete pumps. Equipment such as excavators, bobcats, concrete trowels, and dump trucks would operate throughout the site.

Since during the peak quarters of 2029 both sites emissions include demolition, excavation and foundations, all construction equipment sources were simulated as area sources for the purpose of the modeling analysis; their emissions were distributed evenly across each construction site. In the case of excavation, the source was assumed to be below grade at -1.4 meters, for Projected Development Site 4 and at-grade for Projected Development Site 5.

Receptor Locations

AERMOD was used to predict maximum pollutant concentrations at nearby locations of likely public exposure ("sensitive receptors"). Discrete receptors were placed along nearby sensitive receptor locations, such as public spaces, residential and commercial buildings (e.g., operable windows and air intakes), and other general-public use areas. These sensitive receptors were located from the second floor to the 10th floor of buildings facades in all affected directions of buildings adjacent to the proposed sites.

Additionally, the maximum predicted annual incremental $PM_{2.5}$ concentration was modeled using a one kilometer grid of receptors at a height of 1.8 meters for comparison with the City's *de minimis* criteria of 0.1 $\mu g/m^3$ for annual average neighborhood-scale grid modeling.

Meteorological Data

All analyses were conducted using the latest five consecutive years of meteorological data (2011-2015). Surface data were obtained from La Guardia Airport and upper air data were obtained from Brookhaven station, New York. Data will be processed using the current EPA AERMET version 15181 and the EPA procedure.

Off-Site Dispersion Modeling

The analysis of off-site mobile source impacts included the impacts of construction-phase vehicles on the roadway network as well as the effects of anticipated changes in street configurations as a result of lane closures during the peak construction year.

The peak hour construction trucks volume for 46th Street between Fifth and Madison Avenues was selected for the off-site modeling analysis. This link has the highest incremental truck volumes from the No-Action scenario, and it is located between the above-mentioned construction sites. The peak hour truck volumes (6-7 AM) were used for this cumulative analysis. The construction workers' incremental vehicles trips were assigned to the closest garages and are not in the direct vicinity of these two sites. As a result, the emissions from these vehicles were screened out of the cumulative analysis due to the relatively low $PM_{2.5}$ emissions and distance to the critical receptors affected by these off-site emissions.

The same AERMOD dispersion model (version 15181) was used to estimate the increments caused by off-site construction activities. In order to evaluate the potential cumulative effect of the on-site and off-site emissions, this off-site analysis placed receptors on the same locations used on the AERMOD on-site dispersion analysis.

Background Concentrations

Where needed to determine potential air quality impacts from the construction of the project, background ambient air quality data for criteria pollutants (Table 18.9) were added to the predicted off-site concentrations. The background data represent the latest available five years of data and were obtained from a nearby NYSDEC monitoring station that best represents the area surrounding the site. The latest available data from three-year period (2013-2015) were used for the 1-hour NO_2 concentration, the latest five-year period (2011-2015) data were used for annual average NO_2, and the latest (2013-2015) data were used for 24-hour PM_{10} background concentration.

The 24-hour average $PM_{2.5}$ background concentration of 26.2 μg/m^3 from the latest three-year period (2013-2015) were used to establish the *de minimis* value, consistent with the guidance provided in the *2014 CEQR TM*. The annual average $PM_{2.5}$ impacts were assessed on an incremental basis and compared with the $PM_{2.5}$ *de minimis* criteria thresholds, without considering the annual background.

Table 18.9: Ambient Background Concentrations

Pollutant	Averaging Time	Monitoring Location	Background Concentration
Carbon Monoxide (CO)	1-hour[1]	CCNY, Manhattan	2.3 ppm
	8-hour[1]	CCNY, Manhattan	1.5 ppm
Nitrogen Dioxide (NO_2)	1-hour[2]	IS 52, Bronx	120.9 μg/m^3
	Annual[3]	IS 52, Bronx	38.3 μg/m^3
Particulate Matter (PM_{10})	24-Hour[4]	Division Street, Manhattan	44 μg/m^3
Particulate Matter ($PM_{2.5}$)	24-Hour[5]	PS 19, Manhattan	26.2 μg/m^3

Source: NYSDEC Ambient Air Quality Report, 2015, http://www.dec.ny.gov/chemical/29310.html.
Notes:
1 1-hour CO and 8-hour CO background concentrations are based on the highest second max value from the latest five years (2011-2015) of available monitoring data from NYSDEC.
2 1-hour NO_2 background concentration is based on three-year (2013-2015) average of the 98th percentile of daily maximum 1-hour concentrations from available monitoring data from NYSDEC.
3 Annual NO_2 background concentration is based on the maximum annual average from the latest five years (2011-2015) of available monitoring data from NYSDEC.
4 24-hour PM_{10} is based on the highest second max value from the latest three years (2013-2015) of available monitoring data from NYSDEC.
5 The 24-hour $PM_{2.5}$ background concentration is based on maximum 98th percentile concentration averaged over three years (2013-2015) of data from NYSDEC.

Probable Impacts from Proposed Project

This section provides a summary of the construction air quality results from the construction activities of the proposed project. The impact analysis included the cluster of Projected Development Sites 4 and 5 located between Madison and Fifth Avenues and 44th to 46th Streets. The peak short-term emissions for CO, PM_{10} and $PM_{2.5}$ were predicted to occur during the first three quarters of 2029. The annual $PM_{2.5}$ and NO_2 emissions were based on the weighted average emissions for the four quarters of 2029.

Table 18.10 presents the maximum predicted total concentration (including background for appropriate pollutants) due to the proposed construction activities for the proposed project, including the on-site (construction equipment and activities) and off-site (construction trucks). The maximum concentrations from on-site construction sources were predicted at receptors near Projected Development Sites 4 and 5.

As indicated in Table 18.10, the maximum predicted total concentrations of 1-hour CO, 8-hour CO, annual NO_2, and 24-hour PM_{10} would not result in any concentrations that exceed the NAAQS. The maximum predicted 8-hour CO concentration is well below the City's *de minimis* criteria. The maximum predicted 24-hour and annual $PM_{2.5}$ incremental concentration (for a discrete receptor location) would not exceed the City's *de minimis* criteria of 4.4 $\mu g/m^3$ and 0.3 $\mu g/m^3$ respectively.

Table 18.10 Maximum Predicted Total Concentrations for Construction Activities

Pollutant $\mu g/m^3$	Averaging Period	Maximum Modeled Concentration	Background Concentration	Total Concentration	NAAQS / *De Minimis*/ $\mu g/m^3$
CO	1-Hour[1]	514	2634	3148	40075
	8-Hour[1]	179	1718	1896	10305
NO_2	Annual	3.11	38.3	41.41	100
PM_{10}	24-Hour	4.23	44	48.23	150
$PM_{2.5}$	24-Hour[2]	1.74	26.2	1.74	4.4
	Annual[3]	0.128	---	0.128	0.3
	Annual Neighborhood-Scale Grid[4]	0.020	---	0.020	0.1

Notes:
1 CO concentrations can be converted from ppm to $\mu g/m^3$ based on 1 ppm = 1145 $\mu g/m^3$.
2 The 24-hour $PM_{2.5}$ background concentration is used to develop the *de minimis* criteria.
3 Annual $PM_{2.5}$ impacts with discrete receptors modeling are compared with the $PM_{2.5}$ *de minimis* criteria of 0.3 $\mu g/m^3$, without considering the annual background.
4 Annual $PM_{2.5}$ impacts with neighborhood-scale grid receptors modeling are compared with the $PM_{2.5}$ *de minimis* criteria of 0.1 $\mu g/m^3$, without considering the annual background.

Additionally, the maximum predicted annual incremental $PM_{2.5}$ concentration was modeled using a one kilometer grid of receptors for comparison with the City's *de minimis* criteria of 0.1 $\mu g/m^3$ for annual average neighborhood-scale grid modeling and the analysis results found no exceedance of the threshold.

The results of this quantitative analysis indicated that the proposed project would not result in any concentrations of NO_2, PM_{10}, and CO that exceed the NAAQS. In addition, the maximum predicted incremental concentrations of $PM_{2.5}$ would not exceed the City's applicable interim guidance criteria. Therefore, no significant adverse air quality impacts are expected from the construction-related sources.

Noise

Noise exposure on adjacent uses during the construction of the Proposed Action could result from the operation of construction equipment and from construction delivery vehicles traveling to and from the various construction sites. Noise and vibration levels at a given location are dependent on the type and number of pieces of construction equipment being operated at one time, the acoustical utilization factor of the equipment (i.e., the percentage of time a piece of equipment is operating at full power), the distance between a noise sensitive receptor site and the construction activity and any shielding effects (from structures such as buildings, walls, or barriers) along the sound transmission path between each noise source and each receptor. Noise levels caused by construction activities could vary widely, depending on the construction phase and the location of the construction equipment relative to a given receptor location. Typically, the most significant construction related noise sources result from the operation of jackhammers, excavators with ram hoes, drill rigs, rock drills, impact wrenches, tower cranes, paving breakers and impact pile drivers. The on-street movement of heavy trucks can also result in significant noise levels.

Noise from construction activities and some construction equipment is regulated by the New York City Noise Control Code and by the EPA. The New York City Noise Control Code, as amended December 2005 and effective July 1, 2007, requires the adoption and implementation of a noise mitigation plan for each construction site; limits construction (absent special circumstances as described below) to weekdays between the hours of 7:00 AM and 6:00 PM; and sets noise limits for certain specific pieces of construction equipment. Construction activities occurring after hours (weekdays between 6:00 PM and 7:00 AM, and on weekends) may be authorized in the following circumstances: (1) emergency conditions; (2) public safety; (3) construction projects by or on behalf of City agencies; (4) construction activities with minimal noise impacts; and (5) where there is a claim of undue hardship resulting from unique site characteristics, unforeseen conditions, scheduling conflicts, and/or financial considerations. Furthermore, the EPA mandates that certain classifications of construction equipment meet specified noise emissions standards.

A construction noise analysis was performed to quantify the magnitude, time of occurrence, and duration of the potential exceedances of the CEQR impact criteria, and to determine the practicability and feasibility of implementing control measures that would reduce or eliminate any identified significant adverse noise impacts. This Final Environmental Impact Statement (FEIS) has been revised to include an additional analysis of Projected Development Site 15, including an analysis of potential effects from impact pile driving. The modeling of construction noise at Projected Development Site 15 was conducted with a similar methodology to the noise modeled at Projected Development Sites 4 and 5 in the DEIS.

Construction Noise Impact Criteria

The *CEQR Technical Manual* states that significant noise impacts due to construction would occur "only at sensitive receptors that would be subjected to high construction noise levels for an extensive period of time." For impact determination purposes, the significance of adverse noise impacts is based on duration, intensity, area of impact and whether predicted incremental noise levels at sensitive receptor locations would be greater than the impact thresholds shown in the *CEQR Technical Manual*. In addition, the *CEQR Technical Manual* states that the impact criteria for vehicular mobile noise sources, using existing noise levels as the baseline, should be used for assessing construction impacts. As recommended in the *CEQR Technical Manual*, this study uses these criteria to define a significant adverse noise impact as follows:

- 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 PM and 7:00 AM), the incremental significant impact threshold would be 3 dBA Leq(1).

The determination of a significant adverse noise impact is based on whether predicted incremental noise levels at sensitive receptor locations would be greater than the impact criteria in the *CEQR Technical Manual* for two consecutive years or more. While increases exceeding the *CEQR Technical Manual* criteria for one year or less may be noisy and intrusive, they are generally not considered to be significant adverse noise impacts. However, for the purposes of this analysis, very large noise level increases (i.e., 18 dBA or more), lasting between 12 and 24 months, were also considered to constitute a significant adverse noise impact due to the very large magnitude of the increases.

Noise Analysis Methodology

Construction activities for the proposed project 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 to and from the site (i.e., worker trips, and material and equipment trips) on the surrounding roadways. As a result, the effect of each of these noise sources was evaluated. The assessment methodology considers the effects of construction activities (i.e., noise due to both on-site construction equipment and construction-related vehicles 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 project).

Noise resulting from the operation of on-site construction equipment is calculated by computing the sum of the noise produced by all pieces of equipment in operation. For each piece of equipment, the on-site noise level at a nearby receptor site is a function of the following parameters:

- The noise emission level characteristics of each type of equipment operating at the site
- The total number of pieces of each type of equipment operating simultaneously
- A usage factor, which accounts for the percentage of time the equipment is operating at full power
- The distance between the piece of equipment and the receptor
- Shielding between the sound source path and the receptor.

Similarly, noise generated by off-site traffic moving to and from a given construction site is calculated by determining the sum of the noise generated by the movement of vehicles traveling past the noise sensitive receptor site. For each adjacent roadway, the off-site traffic noise is a function of the following parameters:

- The sound and general topography in the area
- Shielding by buildings or other obstructions along the sound source path which will reduce noise levels.

Noise Modeling

Noise effects from construction activities were evaluated using the CadnaA computerized model developed by DataKustik. CadnaA represents a state-of-the-art, highly flexible software tool for the calculation of noise emissions from various sources including roadway vehicles and construction equipment. The CadnaA model is approved for the use in CEQR projects and 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 model also utilizes algorithms that incorporate the FHWA's Traffic Noise Model (TNM) calculations utilized for roadway noise. The TNM is a computerized model developed for the FHWA that takes into account various factors due to traffic flow, including traffic volumes, vehicle mix (i.e., percentage of autos, light-duty trucks, heavy-duty trucks, buses), sources/receptor geometry, and shielding (buildings, berms, and sound walls) and access attenuation from pavement types.

Input data used with CadnaA were derived from drawings that defined site work areas, an assumed location of each piece of on-site equipment, adjacent building footprints, 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 equipment with full-horse power is used) and noise source heights (based on typical construction equipment) for each piece of construction equipment operating at the development site, as well as noise control measures, were input to the model. In addition, shielding from both adjacent buildings and the project building as it is constructed were accounted for in the model. The model produced A-weighted Leq(1) noise levels at each receptor location for the analysis period, which showed the noise level at each receptor location and the contribution from each noise source.

Table 18.11 summarizes the maximum noise emission limits of each type of construction equipment as described in DEP's Chapter 28 of the Citywide Construction Noise Mitigation and Subchapter 5 of the New York City Noise Control Code. Construction-noise level estimates using CadnaA were determined using these maximum sound emission levels and usage factors for all equipment operating on-site in the Projected Development Sites evaluated for construction noise impacts.

Table 18.11 Construction Equipment Noise Emission Levels (dBA)

Equipment Description List	Impact Device (Yes/No)	Usage Factor (%)	Spec. 721.560 Lmax @ 50 feet (dBA, slow)	Actual Measured Lmax @ 50 feet (dBA, slow)
All Other Equipment > 5HP	No	50	85	n/a
Auger Drill Rig	No	20	85	84
Backhoe	No	40	80	78
Bar Bender	No	20	80	80
Blasting	Yes	n/a	94	n/a
Boring Jack Power Unit	No	50	80	83
Chain Saw	No	20	85	84
Clam Shovel (dropping)	Yes	20	93	87
Compactor (ground)	No	20	80	83
Compressor (air)	No	40	80	78
Concrete Batch Plant	No	15	83	83
Concrete Mixer Truck	No	40	85	79
Concrete Pump Truck	No	20	82	81
Concrete Saw	No	20	90	90
Crane	No	16	85	81
Dozer	No	40	85	82
Drill Rig Truck	No	20	84	79
Drum Mixer	No	50	80	80
Dump Truck	No	40	84	76
Excavator	No	40	85	81
Flat Bed Truck	No	40	84	74
Front End Loader	No	40	80	79
Generator	No	50	82	81
Generator (<25KVA, VMS signs)	No	50	70	73
Gradall	No	40	85	83
Grader	No	40	85	85
Grapple (on backhoe)	No	40	85	87
Horizontal Boring Hydr. Jack	No	25	80	82
Hydra Break Ram	Yes	10	90	90
Impact Pile Driver	Yes	20	95	101
Jackhammer	Yes	20	85	89
Man Lift	No	20	85	75
Mounted Impact Hammer (hoe ram)	Yes	20	90	90
Pavement Scarifier	No	20	85	90
Paver	No	50	85	77
Pickup Truck	No	40	55	75
Pneumatic Tools	No	50	85	85
Pumps	No	50	77	81
Refrigerator Unit	No	100	82	73
Rivet Buster/chipping gun	Yes	20	85	79
Rock Drill	No	20	85	81
Roller	No	20	85	80
Sand Blasting	No	20	85	96

Table 18.11 Construction Equipment Noise Emission Levels (dBA) (Continued)

Equipment Description List	Impact Device (Yes/No)	Usage Factor (%)	Spec. 721.560 Lmax @ 50 feet (dBA, slow)	Actual Measured Lmax @ 50 feet (dBA, slow)
Scraper	No	40	85	84
Shears (on backhoe)	No	40	85	96
Slurry Plant	No	100	78	78
Slurry Trenching Machine	No	50	82	80
Soil Mix Drill Rig	No	50	80	80
Tractor	No	40	84	84
Vacuum Excavator (Vac-truck)	No	40	85	85
Vacuum Street Sweeper	No	10	80	82
Ventilation Fan	No	100	85	79
Vibrating Hopper	No	50	85	87
Vibratory Concrete Mixer	No	20	80	80
Warning Horn	No	5	85	83
Water Jet deleading	No	20	85	92
Welder / Torch	No	40	73	74

Sources: Citywide Construction Noise Mitigation, Chapter 28, Department of Environmental Protection of New York City, 2007; Transit Noise and Vibration Impact Assessment, Federal Transit Administration (FTA), May 2006; and Subchapter 5 of the New York City Noise Control Code.

Analysis Periods

Construction activity associated with the Proposed Action would be spread out over a 20-year period and be dispersed throughout the rezoning area and vicinity. Two worst-case locations were chosen for the noise analysis for their unique potential for significant adverse noise impacts when compared to other sites in the rezoning area. One worst-case location was selected where two adjacent Projected Development Sites would be under construction during the same time frame. The second worst-case location was selected where there would be impact pile driving during the foundation phase of construction.

The worst-case location near Projected Development Sites 4 and 5 was chosen for assessment based on the proximity of the two projected sites to each other, the proposed construction schedule and their combined size in terms of square footage. The two development sites would be located between East 44th and East 46th Streets and Madison and Fifth Avenues. A subsequent screening analysis was performed to determine the one analysis quarter with the greatest construction activity—and therefore the loudest construction period. While construction activities for the Proposed Action as a whole would take place from 2019 and 2036, the anticipated construction activities at Projected Development Sites 4 and 5 would occur across an approximate 6-year period between 2027 and 2032. The period was selected because the cumulative activities are anticipated to be noisiest during 2029 because one site would be undergoing demolition while another site would be undergoing foundation work. The number of workers; types and number of equipment; and number of construction vehicles anticipated to be operating during each quarter of the construction period was determined. No construction-related impact pile driving activities were assumed in the analysis since Projected Development Sites 4 and 5 would be located above the Metronorth Commuter Railroad shed. To be conservative, the construction activity screening analysis for each analysis quarter assumed that both on-site construction activities and off-site construction-related traffic movements occurred simultaneously. The analysis findings identified the second quarter of the year 2029 as the peak construction time period. Construction activities for each phase would be expected to overlap with the average construction completion time period of four years per development site. The construction noise impact assessment therefore was focused on noise sensitive land uses in the immediate vicinity of Projected Development Sites 4 and 5.

The second worst-case location was conducted for Projected Development Site 15, the largest site that is anticipated to utilize impact pile driving during the foundation work. The development site is located between East 42nd and East 43rd Streets and Second and Third Avenues. Overall construction activities at Projected Development Site 15 are expected to occur between 2029 and 2034, for a total duration of 4.5 years; however, impact pile driving would occur for approximately 20 weeks. The worst-case construction phase was analyzed for Projected Development Site 15 during the first quarter of 2031, when the foundations at the site are expected to be constructed and pile drivers would be used. The number of workers, types and number of equipment, and number of construction vehicles anticipated to be operating during the construction period was determined. To be conservative, the construction activity screening analysis for each analysis quarter assumed that both on-site construction activities and off-site construction-related traffic movements occurred simultaneously. The construction noise impact assessment of Project Development Site 15 focused on noise sensitive land uses in the immediate vicinity of the site.

Noise Reduction Measures

The construction noise analysis assumes that development constructed under the Proposed Action would commit to a proactive approach to minimize noise during construction activities by submitting a Noise Mitigation Plan prior to the start of construction (in accordance with the requirements of the New York City Noise Control Code). These requirements are promulgated by DEP, became effective in 2007 and are described in Chapter 28, Title 15 of the Rules of the City of New York. A construction contractor would be required to enclose the site with a portable free-standing noise barrier that would provide shielding from construction noise generated on the site. The barriers would break the line-of-sight between noise sources on the site. The barriers should have a minimum height of 8 feet and consist of ¾-inch plywood.

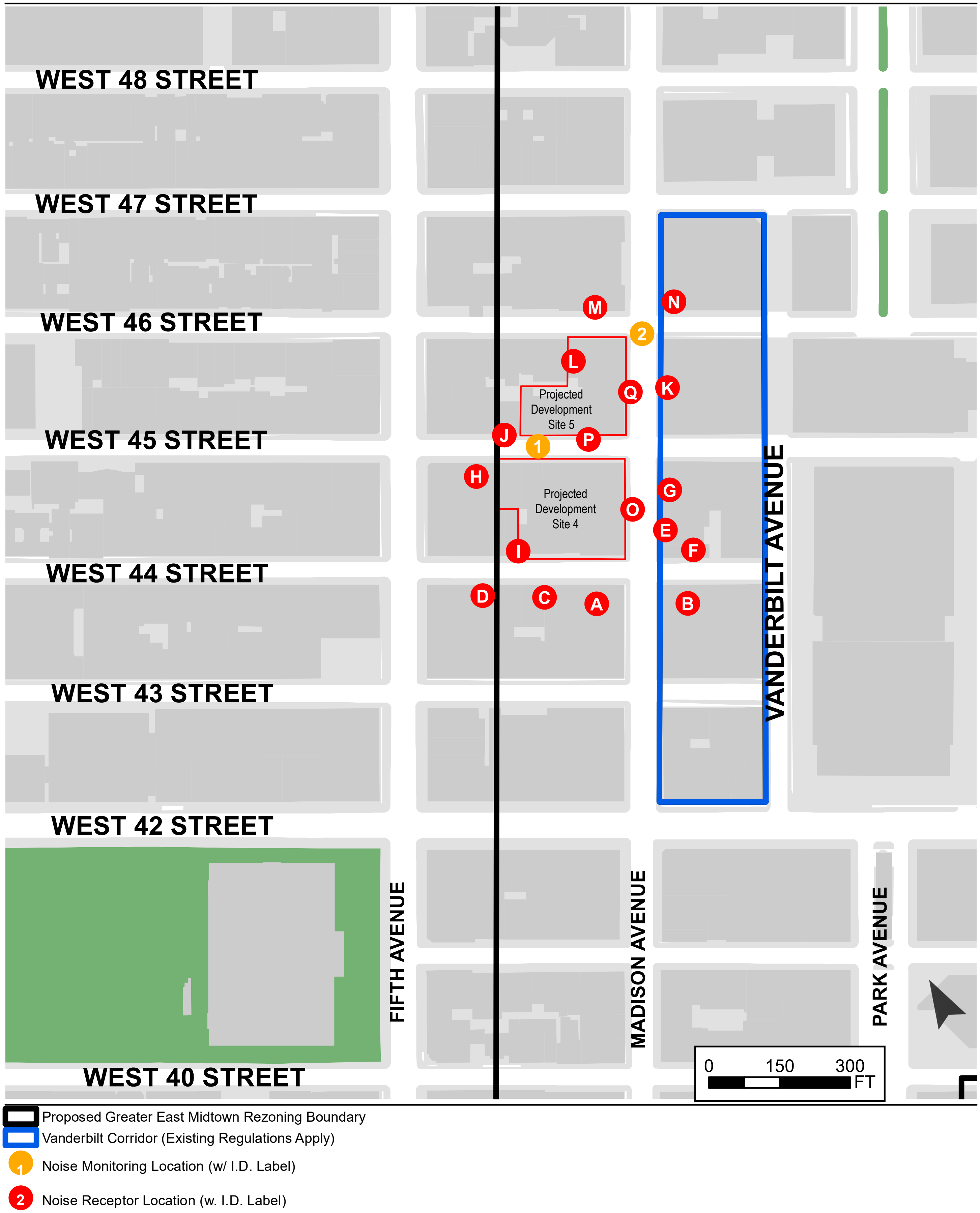
There are a wide variety of other measures that, when found to be feasible and practicable, would minimize construction noise exposure and therefore reduce potential noise impacts. For example, a construction contractor could use equipment that would produce maximum noise emission levels below the requirements of the New York City Noise Control Code. This construction noise analysis did not assume specific abatement measures beyond a perimeter barrier fence; however, potential noise-reducing measures, if found to be feasible, could include both source controls and path controls, as outlined below.

- Generally, construction contractors would schedule and perform noisy work during times of highest ambient noise levels (for example, between 7:00 AM and 10:00 AM).
- Dominant noisier equipment, such as tower cranes, loading and unloading trucks, concrete pumps, concrete trucks, and trash hauling trucks, would minimize banging, clattering, and buzzing.
- Minimize the use of impact devices, such as jackhammers, pavement breakers, impact wrenches, pneumatic tools, and hoe rams, and only necessary equipment would be on-site.
- Where practicable and feasible, construction sites would be configured to minimize back-up alarm noise.

- Contractors and subcontractors would properly maintain their equipment and have quality mufflers installed.
- Noisier equipment, such as tower cranes, concrete pumps, concrete trucks, and delivery trucks, would be located away from sensitive receptors.
- During the early construction phases of work, delivery and dump trucks would be located, and many construction equipment operations would take place, below grade in order to take advantage of shielding benefits.

Receptor Sites

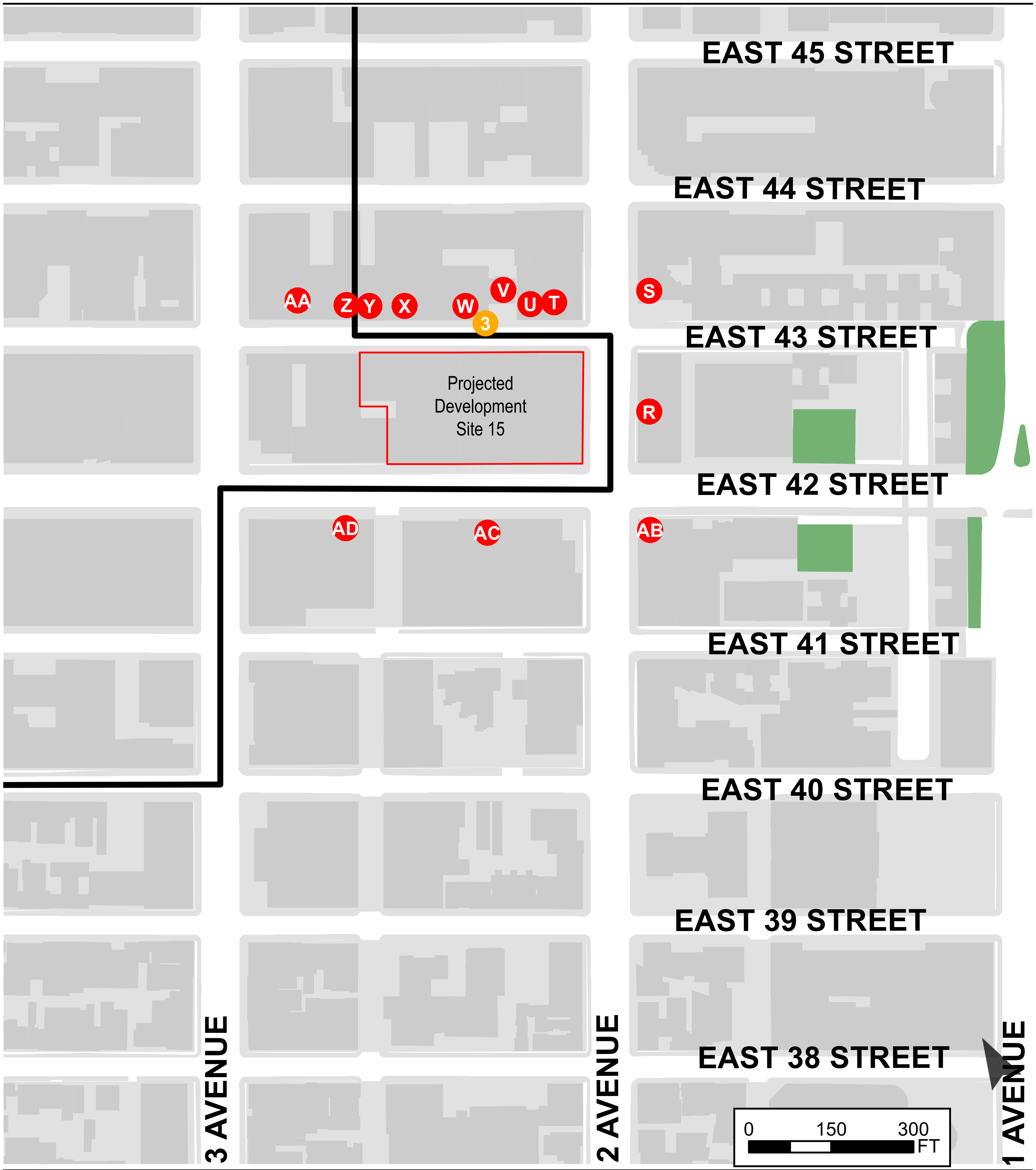
A total of 32 receptor sites were evaluated for construction noise impact assessment; 17 receptors at Projected Development Sites 4 and 5 and 15 receptors at Projected Development Site 15. Figures 18-6a and Figure 18-6b depict the noise receptor locations at ground level, and Table 18.12 lists the noise receptor sites, their associated land uses, and the associated construction site. The receptor sites selected for detailed analysis are representative of locations where maximum noise impact due to construction activity would be expected. The construction noise impact assessment was therefore focused on noise sensitive land uses in the immediate vicinity of Projected Development Sites 4, 5 and 15 which were identified as the areas where most of the construction activity is projected to occur during the second quarter of 2029 and during the first quarter of 2031, respectively.



Greater East Midtown Rezoning
Manhattan, New York

Noise Monitoring and Receptor Locations Site 4 and Site 5

Figure 18-6a



Proposed Greater East Midtown Rezoning Boundary
Vanderbilt Corridor (Existing Regulations Apply)
Noise Monitoring Location (w/ I.D. Label)
Noise Receptor Location (w. I.D. Label)

Greater East Midtown Rezoning
Manhattan, New York

Noise Monitoring and Receptor Locations Site 15

Figure 18-6b

Table 18.12: Construction Noise Receptor Locations

Receptor	Site	Location	Adjacent Land Use
A	S4/S5	340 Madison Avenue	Commercial
B	S4/S5	335 Madison Avenue	Commercial
C	S4/S5	10 East 44th Street	Commercial/Residential
D	S4/S5	529 5 Avenue	Commercial
E	S4/S5	343 Madison Avenue	Commercial
F	S4/S5	341 Madison Avenue	Commercial
G	S4/S5	347 Madison Avenue	Commercial
H	S4/S5	539 5 Avenue	Commercial
I	S4/S5	5 East 44 Street	Commercial/Residential
J	S4/S5	547 5 Avenue	Commercial
K	S4/S5	45 East 45 Street	Commercial
L	S4/S5	16 East 46 Street	Commercial/Residential
M	S4/S5	390 Madison Avenue	Commercial
N	S4/S5	379 Madison Avenue	Commercial
O	S4/S5	352 Madison Avenue	Commercial
P	S4/S5	Madison Avenue-Site 5	Sidewalk
Q	S4/S5	West 45th Street-Site 5	Sidewalk
R	S15	800 2nd Avenue	Commercial
S	S15	303 East 43rd Street	Commercial/Residential
T	S15	815 2nd Avenue	Commercial
U	S15	235 East 43rd Street	Residential
V	S15	231 East 43rd Street	Commercial
W	S15	225 East 43rd Street	Commercial
X	S15	217 East 43rd Street	Commercial
Y	S15	212 East 43rd Street	Residential
Z	S15	211 East 43rd Street	Commercial
AA	S15	685 3rd Avenue	Commercial
AB	S15	768 2nd Avenue	Commercial
AC	S15	220 East 42nd Street	Commercial
AD	S15	214 East 42nd Street	Commercial
AE	S15	Second Avenue	Sidewalk
AF	S15	East 42nd Street	Sidewalk

Source: STV incorporated 2016 and VHB, 2017.

Determining Existing Noise Levels

Existing noise measurements were collected at two locations adjacent to Development Sites 4 and 5 and one location adjacent to Projected Development Site 15. These measurement sites are identified as 1 through 3 in Figure 18-6a and Figure 18-6b (Noise Receptor Locations). All noise measurements were collected for 20-minute periods during the peak construction time period of 6:00 to 7:00 AM. The noise meter was mounted on a tripod at approximately five feet above the ground level. The measurement locations were used to represent existing noise levels at all building façades near or adjacent to Projected Development Sites. For the purposes of the construction noise assessment, existing noise levels for studied receptor locations along Madison Avenue were associated with noise measurement Site 1. Likewise, existing noise levels for studied receptor locations along East 44th, 45th and 46th

Streets, were associated with noise measurement Site 2. All receptor locations near Projected Development Site 15 were associated with noise measurement Site 3. It was conservatively assumed that the measured noise levels would be applicable for both ground level and elevated receptor locations, as it is anticipated that the difference between ground and elevated existing noise levels in the vicinity of the Projected Development Sites would not be significant.[2] The collected sound level measurement results are shown in Table 18.13.

Table 18.13: Existing Short-Term Noise Levels (dBA)

Site	Description	Time Period	L_{eq}	L_{10}	L_{50}	L_{90}
S1	West 45th Street between Fifth Avenue and Madison Avenue	6 - 7 AM	72.6	75.5	69.3	66.6
S2	West 46th Street and Madison Avenue	6 - 7 AM	75.7	78.5	74.3	68.0
S3	East 43rd Street between Second Avenue and Third Avenue	6 - 7 AM	69.9	71.8	69.2	68.0
Source: STV Incorporated, 2016 and VHB, 2017						

Construction Noise Analysis Results

Using the methodology described previously, and considering the noise abatement measures for source and path controls specified above, noise analyses were performed to determine maximum one-hour equivalent ($L_{eq(1)}$) noise levels that would be expected to occur during each day for the two worst-case analysis locations.

Table 18.14 provides a summary of the following:

- Maximum predicted total noise levels (i.e., cumulative noise levels), which are the sum of noise due to construction activities and street traffic movements at ground level and at intermediate elevations adjacent to existing buildings
- Maximum predicted increases in noise levels based upon comparing the total noise levels with existing noise levels and future No-Action noise levels (2029 for Projected Development Sites 4 and 5 and 2031 for Projected Development Site 15).
- A quantitative construction noise analysis was performed to quantify the magnitude of construction-related noise exposure for the peak-construction period (Quarter 2, 2029 for Projected Development Sites 4 and 5 and Quarter 1, 2031 for Projected Development Site 15).

Table 18.14 summarizes the construction noise analysis findings at the 30 representative sites. CEQR noise level exceedances are shown in bold text in Table 18.13. Projected noise-level exposure under construction activities were determined based on the difference between total noise levels at a particular site caused by construction activity and those estimated under existing and future No-Action conditions. Elevated receptor sites were modeled at locations where an existing building was identified across from or adjacent to one of the studied projected development sites.

[2] For the 2013 Proposed Action FEIS, the noise study indicates that the difference between the existing elevated and ground noise levels in this area of Manhattan were in most cases less than one dB

Table 18.14: Construction Noise Analysis Results (dBA)

Noise Site	Address	Land Use	Façade	Receptor Height (floor)	Receptor Height (feet)	Existing Leq(hr)	No Action Leq(hr)	With Action		
								Total Leq [1]	With Action Minus Existing Change	With Action Minus No Action Change
A	340 Madison Avenue	Commercial	East	Ground Floor	6	75.7	75.9	77.0	1.2	1.1
			North	Ground Floor	6	72.6	72.7	76.9	4.3	4.2
			East	Mid-Level Floor	118	75.7	75.9	78.0	2.3	2.2
			North	Mid-Level Floor	118	72.6	72.7	79.4	6.9	6.8
			East	Top Floor	236	75.7	75.9	77.6	1.9	1.8
			North	Top Floor	236	72.6	72.7	77.2	4.6	4.5
B	335 Madison Avenue	Commercial	North	Ground Floor	6	72.6	72.7	74.7	2.1	2.0
			West	Ground Floor	6	75.7	75.9	76.8	1.0	0.9
			North	Mid-Level Floor	177	72.6	72.7	76.2	3.6	3.5
			West	Mid-Level Floor	177	75.7	75.9	77.6	1.9	1.7
			North	Top Floor	354	72.6	72.7	75.1	2.5	2.4
			West	Top Floor	354	75.7	75.9	77.0	1.3	1.2
C	10 East 44th Street	Mixed Commercial/ Residential	North	Ground Floor	6	72.6	72.7	76.5	4.0	3.8
			North	Mid-Level Floor	46	72.6	72.7	80.0	7.4	7.3
			North	Top Floor	75	72.6	72.7	79.4	6.9	6.8
D	529 5 Avenue	Commercial	North	Mid-Level Floor	118	72.6	72.7	76.6	4.1	4.0
			North	Ground Floor	6	72.6	72.7	77.9	5.4	5.3
			North	Top Floor	236	72.6	72.7	75.9	3.4	3.3
E	343 Madison Avenue	Commercial	West	Ground Floor	6	75.7	75.9	78.1	2.3	2.2
			West	Mid-Level Floor	82	75.7	75.9	80.3	4.5	4.4
			West	Top Floor	161	75.7	75.9	79.3	3.5	3.4
F	341 Madison Avenue	Commercial	South	Ground Floor	6	72.6	72.7	75.3	2.7	2.6
			South	Mid-Level Floor	105	72.6	72.7	77.3	4.8	4.7
			South	Top Floor	213	72.6	72.7	76.4	3.8	3.7
G	347 Madison Avenue	Commercial	North	Ground Floor	6	72.6	72.7	76.1	3.6	3.5
			West	Ground Floor	6	75.7	75.9	78.4	2.6	2.5
			North	Mid-Level Floor	112	72.6	72.7	78.1	5.6	5.5
			West	Mid-Level Floor	112	75.7	75.9	80.2	4.5	4.3
			North	Top Floor	226	72.6	72.7	77.0	4.4	4.3
			West	Top Floor	226	75.7	75.9	78.8	3.1	3.0

Table 18.13: Construction Noise Analysis Results (dBA) (Continued)

Noise Site	Address	Land Use	Façade	Receptor Height (floor)	Receptor Height (feet)	Existing Leq(hr)	No Action Leq(hr)	With Action		
								Total Leq [1]	With Action Minus Existing Change	With Action Minus No Action Change
H	539 5 Avenue	Commercial	North	Ground Floor	6	72.6	72.7	80.7	8.1	8.0
			North	Mid-Level Floor	82	72.6	72.7	81.3	8.8	8.7
			North	Top Floor	167	72.6	72.7	79.3	6.8	6.7
I	5 East 44 Street	Mixed Commercial/ Residential	South	Ground Floor	6	72.6	72.7	82.0	9.5	9.4
			South	Mid-Level Floor	98	72.6	72.7	79.9	7.4	7.2
			South	Top Floor	200	72.6	72.7	77.7	5.2	5.1
J	547 5 Avenue	Commercial	South	Ground Floor	6	72.6	72.7	79.6	7.0	6.9
			East	Mid-Level Floor	200	72.6	72.7	82.6	10.0	9.9
			South	Mid-Level Floor	200	72.6	72.7	78.4	5.9	5.8
			East	Top Floor	400	72.6	72.7	78.1	5.6	5.5
			South	Top Floor	400	72.6	72.7	75.8	3.3	3.2
K	45 East 45 Street	Commercial	North	Ground Floor	6	72.6	72.7	77.5	4.9	4.8
			South	Ground Floor	6	72.6	72.7	76.3	3.7	3.6
			West	Ground Floor	6	75.7	75.9	79.3	3.6	3.5
			North	Mid-Level Floor	105	72.6	72.7	79.3	6.8	6.7
			South	Mid-Level Floor	105	72.6	72.7	78.4	5.9	5.8
			West	Mid-Level Floor	105	75.7	75.9	80.9	5.2	5.1
			North	Top Floor	210	72.6	72.7	77.7	5.2	5.1
			South	Top Floor	210	72.6	72.7	77.4	4.8	4.7
			West	Top Floor	210	75.7	75.9	79.0	3.3	3.2
L	16 East 46 Street	Mixed Commercial/ Residential	North	Ground Floor	6	72.6	72.7	82.1	9.6	9.5
			East	Mid-Level Floor	98	72.6	72.7	82.3	9.7	9.6
			North	Mid-Level Floor	98	72.6	72.7	81.9	9.4	9.3
			East	Top Floor	180	72.6	72.7	80.0	7.4	7.3
			North	Top Floor	180	72.6	72.7	79.5	7.0	6.8
M	390 Madison Avenue	Commercial	South	Ground Floor	6	72.6	72.7	80.9	8.4	8.2
			West	Ground Floor	6	75.7	75.9	79.9	4.2	4.1
			South	Mid-Level Floor	131	72.6	72.7	81.0	8.4	8.3
			West	Mid-Level Floor	131	75.7	75.9	80.9	5.1	5.0
			South	Top Floor	262	72.6	72.7	77.1	4.6	4.5
			West	Top Floor	262	75.7	75.9	78.3	2.6	2.4

Table 18.13: Construction Noise Analysis Results (dBA) (Continued)

Noise Site	Address	Land Use	Façade	Receptor Height (floor)	Receptor Height (feet)	Existing Leq(hr)	No Action Leq(hr)	With Action		
								Total Leq [1]	With Action Minus Existing Change	With Action Minus No Action Change
N	379 Madison Avenue	Commercial	East	Ground Floor	6	75.7	75.9	78.4	2.6	2.5
			South	Ground Floor	6	72.6	72.7	77.0	4.4	4.3
			East	Mid-Level Floor	341	75.7	75.9	79.3	3.5	3.4
			South	Mid-Level Floor	341	72.6	72.7	78.2	5.7	5.6
			Southeast	Mid-Level Floor	341	75.7	75.9	77.8	2.1	2.0
O	352 Madison Avenue	Commercial	East	Ground Level	6	75.7	75.9	79.0	3.3	3.2
P	360 Madison Avenue	Commercial	South	Ground Level	6	72.6	72.7	79.7	7.1	7.0
Q	366 Madison Avenue	Commercial	East	Ground Level	6	75.7	75.9	81.0	5.3	5.1
R	800 2nd Avenue	Commercial	West	Ground Floor	6	69.9	70.1	77.6	7.7	7.5
			North	Ground Floor	6	69.9	70.1	72.9	3.0	2.9
			South	Ground Floor	6	69.9	70.1	71.0	1.1	0.9
			West	Mid-Level Floor	165	69.9	70.1	85.6	15.7	15.6
			North	Mid-Level Floor	127	69.9	70.1	85.9	16.0	15.8
			South	Mid-Level Floor	133	69.9	70.1	85.7	15.8	15.6
			West	Top Floor	207	69.9	70.1	84.4	14.5	14.3
			North	Top Floor	207	69.9	70.1	84.1	14.2	14.0
			South	Top Floor	207	69.9	70.1	84.0	14.1	13.9
S	303 E 43rd Street	Residential/ Commercial	South	Ground Floor	6	69.9	70.1	75.9	6.0	5.8
			West	Ground Floor	6	69.9	70.1	75.5	5.6	5.4
			South	Mid-Level Floor	29	69.9	70.1	81.7	11.8	11.6
			West	Mid-Level Floor	29	69.9	70.1	81.0	11.1	10.9
			Southwest	Mid-Level Floor	118	69.9	70.1	84.3	14.4	14.2
			Southwest	Top Floor	236	69.9	70.1	82.9	13.0	12.9
T	815 2nd Avenue	Commercial	South	Ground Floor	6	69.9	70.1	80.9	11.0	10.8
			East	Ground Floor	6	69.9	70.1	71.4	1.5	1.3
			South	Mid-Level Floor	62	69.9	70.1	89.9	20.0*	19.9*
			East	Mid-Level Floor	62	69.9	70.1	75.2	5.3	5.1
			South	Top Floor	133	69.9	70.1	87.7	17.8	17.6
			East	Top Floor	133	69.9	70.1	72.8	2.9	2.7

Table 18.13: Construction Noise Analysis Results (dBA) (Continued)

Noise Site	Address	Land Use	Façade	Receptor Height (floor)	Receptor Height (feet)	Existing Leq(hr)	No Action Leq(hr)	With Action		
								Total Leq [1]	With Action Minus Existing Change	With Action Minus No Action Change
U	235 E 43rd Street	Residential	South	Ground Floor	6	69.9	70.1	81.5	11.6	11.5
			South	Mid-Level Floor	58	69.9	70.1	90.6	20.7*	20.6*
			South	Mid-Level Floor	167	69.9	70.1	86.8	16.9	16.7
			South	Top Floor	272	69.9	70.1	84.4	14.5	14.3
V	231 E 43rd Street	Commercial	South	Ground Floor	6	69.9	70.1	79.4	9.5	9.4
			South	Mid-Level Floor	112	69.9	70.1	88.2	18.3*	18.1*
			South	Top Floor	216	69.9	70.1	85.6	15.7	15.6
W	225 E 43rd Street	Commercial	South	Ground Floor	6	69.9	70.1	81.0	11.1	10.9
			South	Mid-Level Floor	36	69.9	70.1	90.7	20.8*	20.7*
			South	Top Floor	64	69.9	70.1	89.9	20.0*	19.9*
X	217 E 43rd Street	Commercial	South	Ground Floor	6	69.9	70.1	80.0	10.1	9.9
			South	Mid-Level Floor	59	69.9	70.1	89.5	19.6*	19.5*
			South	Top Floor	108	69.9	70.1	82.7	12.8	12.7
			South	Top Floor	169	69.9	70.1	83.1	13.2	13.0
Y	212 E 43rd Street	Residential	South	Ground Floor	6	69.9	70.1	75.7	5.8	5.6
			South	Mid-Level Floor	6	69.9	70.1	83.2	13.3	13.1
			South	Top Floor	6	69.9	70.1	79.3	9.4	9.3
Z	211 E 43rd Street	Commercial	South	Ground Floor	6	69.9	70.1	77.2	7.3	7.2
			South	Mid-Level Floor	71	69.9	70.1	86.5	16.6	16.4
			South	Mid-Level Floor	179	69.9	70.1	83.9	14.0	13.8
			South	Top Floor	265	69.9	70.1	76.8	6.9	6.8
AA	685 3rd Avenue	Commercial	Southeast	Ground Floor	6	69.9	70.1	75.8	5.9	5.8
			Southeast	Mid-Level Floor	175	69.9	70.1	82.1	12.2	12.0
			Southeast	Top Floor	303	69.9	70.1	80.9	11.0	10.8
AB	768 2nd Avenue	Commercial	North	Ground Floor	6	69.9	70.1	75.3	5.4	5.3
			West	Ground Floor	6	69.9	70.1	75.1	5.2	5.0
			North	Mid-Level Floor	157	69.9	70.1	83.5	13.6	13.4
			West	Mid-Level Floor	157	69.9	70.1	83.1	13.2	13.0
			North	Top Floor	203	69.9	70.1	82.6	12.7	12.6
			West	Top Floor	203	69.9	70.1	82.5	12.6	12.4

Table 18.13: Construction Noise Analysis Results (dBA) (Continued)

Noise Site	Address	Land Use	Façade	Receptor Height (floor)	Receptor Height (feet)	Existing Leq(hr)	No Action Leq(hr)	With Action		
								Total Leq [1]	With Action Minus Existing Change	With Action Minus No Action Change
AC	220 E 42nd Street	Commercial	East	Ground Floor	6	69.9	70.1	70.9	1.0	0.9
			North1	Ground Floor	6	69.9	70.1	77.6	7.7	7.5
			North2	Ground Floor	6	69.9	70.1	77.4	7.5	7.3
			West	Ground Floor	6	69.9	70.1	71.9	2.0	1.8
			East	Mid-Level Floor	121	69.9	70.1	77.5	7.6	7.4
			North1	Mid-Level Floor	39	69.9	70.1	86.6	16.7	16.5
			North2	Mid-Level Floor	126	69.9	70.1	86.6	16.7	16.5
			West	Mid-Level Floor	213	69.9	70.1	82.3	12.4	12.2
			East	Top Floor	231	69.9	70.1	74.9	5.0	4.8
			North1	Mid-Level Floor	141	69.9	70.1	85.5	15.6	15.5
			North2	Mid-Level Floor	285	69.9	70.1	83.3	13.4	13.2
			West	Top Floor	412	69.9	70.1	79.6	9.7	9.5
			North1	Top Floor	231	69.9	70.1	84.1	14.2	14.0
			North2	Top Floor	433	69.9	70.1	81.0	11.1	10.9
AD	214 E 42nd Street	Commercial	North	Ground Floor	6	69.9	70.1	75.8	5.9	5.7
			East	Ground Floor	6	69.9	70.1	75.3	5.4	5.2
			North	Mid-Level Floor	200	69.9	70.1	83.3	13.4	13.2
			East	Mid-Level Floor	200	69.9	70.1	83.5	13.6	13.4
			North	Top Floor	384	69.9	70.1	80.7	10.8	10.6
			East	Top Floor	384	69.9	70.1	80.9	11.0	10.8
AE	2nd Avenue	Sidewalk	East	Ground Floor	6	69.9	70.1	82.4	12.5	12.3
AF	E 42nd Street	Sidewalk	South	Ground Floor	6	69.9	70.1	80.9	11.0	10.8

Note:
Total noise level from both traffic and construction activities. Shaded cells represent locations where there is a projected impact
* Indicates sound level increases greater than 18 dBA

Projected Development Sites 4 and 5

At Projected Development Sites 4 and 5, the noise analysis findings show no significant differences when comparing 2029 With-Action noise levels against either the existing or future 2029 No-Action conditions. Under both scenarios, noise level increases of 5 dBA or greater are projected at receptor sites A, C, D, G, H, I, J, K, L, M, N, P and Q. At the 17 locations, noise levels above the CEQR limits were determined to be caused principally from noise generated by on-site construction activities rather than from off-site traffic movements. Projected noise-level increases during the peak construction period (i.e., second quarter of 2029) are projected to range from 0.9 to 10.0 dBA. The greatest noise level increase of 10.0 dBA would occur at receptor site J for the east facing mid-level floor location.

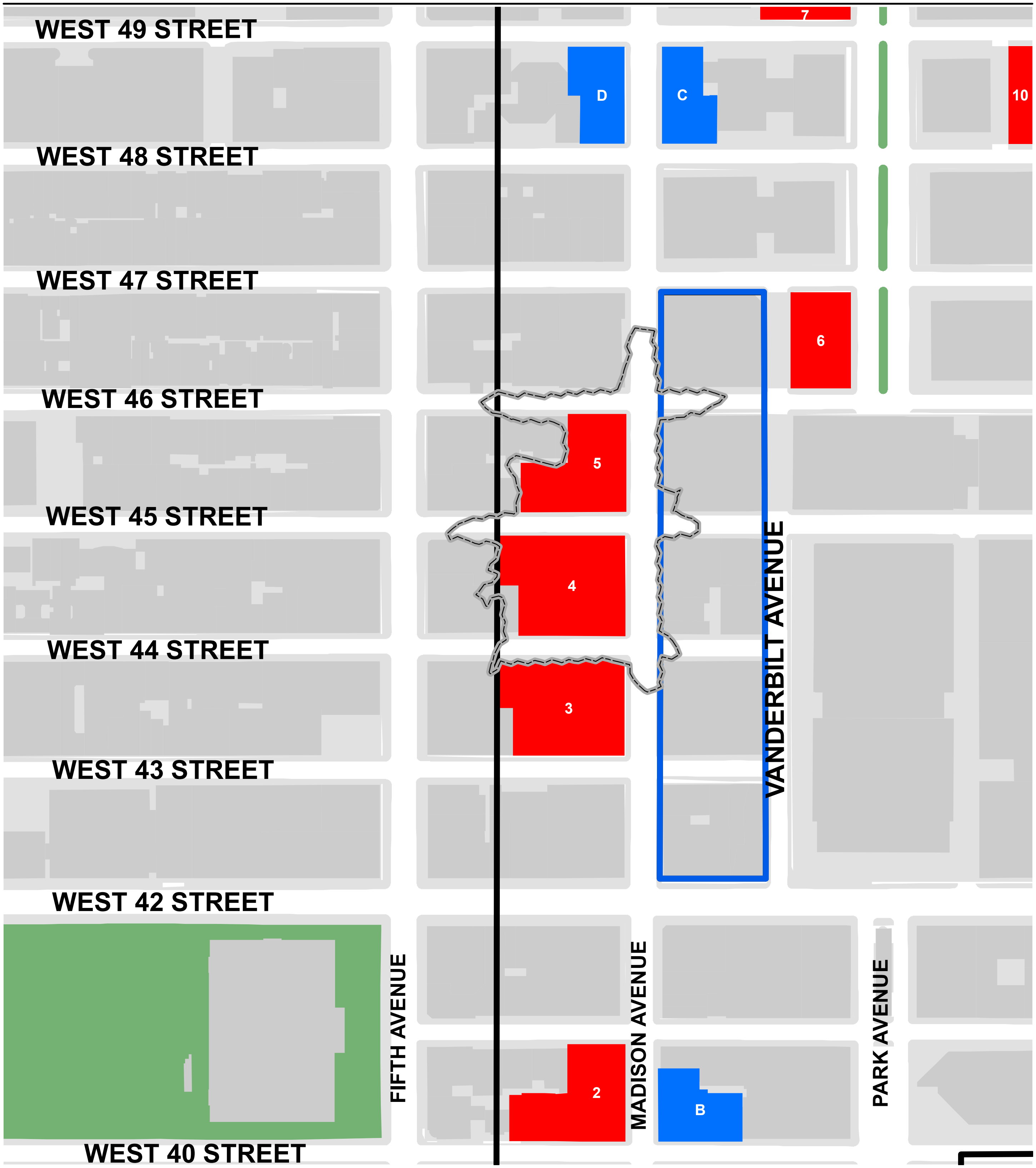
At receptor sites C, H, I, J, K, and L, noise level increases for upper floor locations would be above the CEQR limits, with increases ranging from 5.1 to 7.4 dBA. However, as the majority of these receptor locations represent commercial buildings, the existing double pane glass windows and closed ventilation systems at these commercial buildings would provide substantial sound attenuation, thereby maintaining interior noise levels below or near the CEQR 50 dBA L_{10} impact threshold. Occupants inside these existing commercial buildings could from time to time experience minor annoyance; however, its limited duration would not constitute a significant adverse impact. The exceptions to this would be for receptor sites C, I and L, which represent mixed commercial/residential land uses. At these locations, the required CEQR interior noise impact threshold would be 45dBA. As a result, significant increases in noise levels could occur for limited time periods if window wall attenuation for residential portions of the buildings are not sufficient.

For ground floor receptor locations, CEQR impacts would occur at eight of the 17 studied receptor sites where impacts do occur. Impacts at mid floor locations occur at 10 of the 13 receptor sites. For ground level sidewalk receptors, two of the three ground level sidewalk receptor sites studied—P and Q—would result in noise level increases ranging from 5.1 to 7.1 dBA. Since exterior noise exposure would be appreciably above the CEQR impact limits at many receptor sites, the potential does exist for similar noise-level increases at these and/or other receptor locations in the immediate vicinity of Project Development Sites 4 and 5 during other construction quarters bordering this peak construction period of the second quarter of 2029. Mitigation measures that may address these impacts are discussed in Chapter 19, "Mitigation."

Figure 18-7a shows the 70 dBA contour line for construction noise sources related to Projected Development Sites 4 and 5. As indicated in the figure, the geographic extent of the 70 dBA contour line does not extend more than one block from the construction center of the two development sites

Projected Development Site 15

Proportional modeling of noise PCEs conducted for the 2031 No-Action condition at Projected Development Site 15 shows no significant difference when compared against the existing sound levels. In the first quarter of 2031, during pile driving activities that would last for approximately 20 weeks, With-Action sound levels at all receptor sites at all elevations adjacent to Projected Development Site 15 are expected to experience noise level increases of 5 dBA or greater. At locations R through AF, noise levels above the CEQR limits were determined to be caused principally from noise generated by on-site construction activities, including pile driving, rather than from off-site traffic movements. Noise-level increases during the peak construction period of Projected Development Site 15 are projected to range from 0.9 to 20.7 dBA. The greatest noise level increase of 20.7 dBA would occur at the south-



70 dBA Construction Noise Contour
Proposed Greater East Midtown Rezoning Boundary
Vanderbilt Corridor (Existing Regulations Apply)
Projected Development Site (w/ I.D. Label)
Potential Development Site (w/ I.D. Label)

0 150 300 FT

Greater East Midtown Rezoning
Manhattan, New York

Worst Case Extent of Construction Noise Impact

Figure 18-7a

vhb

facing mid-level floor location at receptor site W. The primary source of construction noise at this location is piling driving activity occurring on the site.

Similar to Projected Development Sites 4 and 5, the majority of these receptor locations represent commercial buildings, the existing double pane glass windows and closed ventilation systems at these commercial buildings would provide substantial sound attenuation, thereby maintaining interior noise levels below or near the CEQR 50 dBA L_{10} impact threshold. Occupants inside these existing commercial buildings could from time to time experience annoyance during piling driving activity; however, since pile driving is projected to have a duration of 20 weeks, it would be less than 12 months would not constitute a significant adverse impact. The exceptions to this would be for receptor sites S, U and Y, which represent mixed commercial/residential land uses. At these locations, the required CEQR interior noise impact threshold would be 45dBA. As a result, significant increases in noise levels could occur for limited time periods if window wall attenuation for residential portions of the buildings are not sufficient. Mitigation measures to address the impacts at Projected Development Site 15 are also discussed in Chapter 19, "Mitigation."

Figure 18-7b shows the 70 dBA contour line for construction noise sources related to Projected Development Site 15. As indicated in the figure, the geographic extent of the 70 dBA contour line does not extend more than one block from the construction center of the development site.

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, vibration levels at a location 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 location, the characteristics of the transmitting medium, and the building construction type at the location. Construction equipment operation causes 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, construction activities generally do not reach levels that can cause architectural or structural damage, but can achieve levels that may be perceptible and annoying in buildings very close to a construction site. An assessment has been prepared to quantitatively assess potential vibration impacts of construction activities on structures and residences near the Projected Development Sites.

Construction Vibration Criteria

Potential impacts related to construction vibration for the Proposed Action would be for a finite duration. Therefore, the primary concern regarding construction vibration would be related to potential damage to buildings. The damage criteria are based on the peak particle velocity (PPV) levels for different types of construction equipment. For structural damage, the FTA identifies criteria for several categories of buildings which could be potentially affected, the most sensitive of which include fragile and historic structures. Historic buildings have been identified within 90 feet of the construction zones in the Proposed Action. In areas adjacent to the construction activities, the most common

Greater East Midtown Rezoning
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Worst Case Extent of Construction Noise Impact

Figure 18-7b

buildings found are reinforced concrete or steel structures. For these buildings, the FTA considers that damage would occur at a vibration level of 0.50 ips. The New York City Department of Buildings (NYC DOB) construction guidance for historical structures, "Technical Policy and Procedure Notice #10/88" (TPPN # 10/88) also recognizes the building damage threshold as 0.50 ips. 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 per second. For non-fragile buildings, vibration levels below 0.60 inches per 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 vibration decibels (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:

$$PPV_{equip} = PPV_{ref} \times (25/D)^{1.5}$$

where: PPV_{equip} is the peak particle velocity in inches per second of the equipment at the receiver location;
PPV_{ref} is the reference vibration level in inches per second 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:

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

where: $L_v(D)$ is the vibration level in VdB of the equipment at the receiver location;
$L_v(ref)$ 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 18.15 shows vibration source levels for typical construction equipment.

Table 18.15: Vibration Source Levels for Construction Equipment

Equipment		PPV (ref) (in/sec)	Approximate Lv (ref) (VdB)
Pile Driver (impact)	upper range	1.518	112
	Typical	0.644	104
Pile Driver (sonic)	upper range	0.734	105
	Typical	0.170	93
Hydromill (slurrywall)	In soil	0.008	66
	In rock	0.017	75
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drilling		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

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 are those immediately adjacent to or across the street from a Projected Development Site. Four receptor sites identified as I, H, J and L on Figure 18-6 are all existing commercial or mixed use commercial/residential buildings located immediately adjacent to Projected Development Sites 4 and 5, and therefore a vibration monitoring program would be implemented to ensure that the 0.50 inches/second PPV threshold limit for structural damage to occur is not exceeded. At receptor sites A, C, D, E, F, G, K, M and N, the distance between construction equipment and receiving buildings or structures is large enough to avoid vibratory levels that would result in architectural or structural damage.

Commercial buildings adjacent to Projected Development Sites 4 and 5, between Madison and Fifth Avenues, would be the nearest structures that could experience elevated vibration levels. No pile driving or blasting is expected as part of construction of most Potential and Projected Development Sites including Sites 4 and 5. The types of construction activities that are expected to occur during the peak construction time period at Projected Development Sites 4 and 5 are on the lower end of vibration generating equipment. These include vibratory roller, hoe ram, bulldozer and loaded trucks which generated peak particle velocity (PPV) of 0.20 inches per second or less at 25 feet, which is well below the 0.50 inches per second PPV vibration limit for structural damage. Based on the relatively low-level vibration generated by equipment anticipated to be used for the proposed action, vibration causing activities that would occur within approximately 15 feet of a neighboring property (such as the use of a vibratory roller) would be monitored closely as stated above.

The closest building west of Projected Development Site 15, between East 42nd and 43rd Streets, would be the nearest structure that could experience elevated vibration levels due to pile driving. Based on the typical PPV of impact pile driving, vibration levels may exceed 0.5 inches per second PPV within 30 feet of the equipment. The preliminary construction analysis indicates that piles may be needed within 30 feet of the closest building west of Projected Development Site 15 and may result in PPV levels between between 0.50 and 1.52 inches per second, which is generally considered acceptable for a building or structure. Using other construction methods, such as vibratory (sonic) pile driving, at locations within 30 feet of structures may be needed to minimize potential risk of structural damage.

In terms of potential annoyance, the vibration generated from impact pile driving would have the most potential to produce vibration levels above the 65 VdB threshold limit. The affected area would include a radius of approximately 500 feet extending outward from the source. However, this type of construction activity would generate vibration for limited periods of time at a particular location and therefore would not result in any significant adverse impact.