Chapter 15: Noise

15.1 Introduction

Noise pollution in an urban area comes from many sources. Some sources are activities essential to the health, safety and welfare of the city's inhabitants, such as noise from emergency vehicle sirens, sanitation trucks, construction and maintenance equipment. Other sources, such as train and traffic noise, are essential by-products of maintaining the viability of the city as a place for people to live and do business. Although all these noise-producing activities are necessary, the noise they generate is largely undesirable and detracts from the quality of life of the living environment. Furthermore, there is increasing evidence that excessive noise is a threat to the general public health.

This chapter assesses the potential for the Proposed Action to result in significant adverse noise impacts as a result of the proposed East Midtown Rezoning project. In accordance with the guidelines of the *2014 CEQR Technical Manual*, ambient noise levels were measured at representative locations within the Proposed Action's noise study area and where future Project-generated traffic could have the potential to cause a significant traffic noise impact. This chapter has been updated since the Draft Environmental Impact Statement (DEIS) to include the noise analysis of the Public Realm Improvements (PRI).

Principal Conclusions

The Proposed Action would not generate sufficient traffic to have the potential to cause a significant noise impact (i.e., it would not result in a doubling of the noise passenger car equivalents which would be necessary to cause a three dBA increase in noise levels). Therefore, the noise analysis concludes that the traffic generated by the Proposed Action would not have the potential to produce significant increases to noise levels at any sensitive receptors within the rezoning area. As part of the Proposed Action, a public realm improvement (PRI) fund would provide the ability to finance above-grade improvements such as pedestrian plazas, shared streets, and widening of the Park Avenue median. As described in Section 12.3 of Chapter 12, "Transportation," the PRI would result in changes to the traffic volumes. Noise from mobile sources has been assessed for both the Proposed Action without PRI and the Proposed Action with PRI. Similar to the Proposed Action, the Proposed Action with PRI would not result in significant adverse mobile noise impacts.

Ambient noise levels adjacent the Projected and Potential Development Sites were examined to determine if building noise attenuation requirements for maintaining interior noise level would be necessary. That assessment found noise levels would be in the "marginally unacceptable" or "clearly unacceptable" exterior noise exposure category, resulting in a minimum noise attenuation requirement of 31-38 dBA to ensure noise levels within the proposed development sites would comply with all applicable requirements. As a result, the Proposed Action includes an (E) designation for all of the Projected and Potential Development Sites (E-408). The window/wall attenuation levels required under the (E) designation would avoid the potential for significant adverse noise impacts due to the Proposed Action, and the Proposed Action with PRI; refer to Appendix K for the proposed (E) designation.

15.2 Methodology

Acoustic Fundamentals

Noise in a community can come from man-made sources, such as automobiles, trucks, buses, aircraft, and construction equipment, as well as industrial, commercial, transportation, and manufacturing facilities. Environmental noise can also originate from natural sources, such as animals, insects and wind. Table 15.1 lists some common activities and their noise levels as a reference.

Noise levels, which are measured in units called decibels (dB), relate the magnitude of the sound pressure to a standard reference value. While the noise values of certain activities can approach 135 dB, normally encountered sounds lie in the range of 40 to 120 dB.

Table 15.1: Common Noise Levels

Sound Source	dBA
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Train horn at 30 meters	90
Busy city street, loud shout	80
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Background noise in an office	50
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0

Source: *Cowan, James P.* Handbook of Environmental Acoustics. *Van Nostrand Reinhold, New York, 1994; Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.*
Notes:
A 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.

"A"- Weighted Sound Level (dBA)

In order to establish a uniform noise measurement that simulates peoples' perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human hearing range. This is known as the A-weighted sound level (dBA) and it is the descriptor of noise levels most often used for community noise. As shown in Table 15.1 above, the threshold of human hearing is defined as approximately 0 dBA; very quiet conditions (as in a library, for example) are approximately 40 dBA; levels between 50 dBA and 70 dBA define the range of noise levels generated by normal daily activity; levels above 70 dBA would be considered noisy, and then loud, intrusive and deafening as the scale approaches 130 dBA.

Sound Level Descriptors

Noise levels from human activities also vary widely over time. The equivalent noise level (L_{eq}) represents the time-varying noise level produced over a period of time as a single number over that same period of time. This represents the equivalent steady noise level which, over a given period,

contains the same energy as the time-varying noise during the same period (i.e. noise from a building ventilation fan vs. a train passage or a pile driving event). The period of time used in most noise assessments is the noise over one hour, represented as $L_{eq}(h)$. This descriptor is commonly used to express results from noise measurements, predictions and impact assessments. Another useful descriptor often used in the assessment of noise is L_{10}. L_{10} is defined as the sound pressure level exceeded 10 percent of the time, and is often used to describe noise generated from traffic sources. L_{10} is usually regarded as an indication of traffic noise exposure with a steady flow of evenly-spaced vehicles. Either descriptor may be used in the analysis of highway noise, but as the Proposed Action is situated in a community environment, the L_{eq} noise descriptor was determined to be the most appropriate. In community noise measurements, L_{eq} generally lies between L_{10} and L_{50}, but is often closer to L_{10} where fluctuating traffic noise is the dominant noise source. Another descriptor, L_{dn}, is the day-night equivalent sound level defined as a 24-hour continuous L_{eq} with a 10 dB adjustment added to all hourly noise levels recorded between the hours of 10 PM and 7 AM. This descriptor was also used in this analysis to describe the existing noise environment over a full 24-hour period.

A few general relationships with respect to noise levels may be helpful in understanding the dB scale. In general terms, it is important to note that the dBA scale is logarithmic, meaning that each increase of 10 dBA describes a doubling of perceived loudness. Thus, the background noise in an office, at 50 dBA, is perceived as twice as loud as a library, at 40 dBA. In addition:

- Doubling of the noise energy produces a three dB increase in noise level. A three dB increase is normally the smallest change in sound levels that are perceptible to the human ear, and for most people to perceive an increase in noise, it must be at least 3 dBA. At 5 dBA, the change will be readily noticeable.
- A ten dB increase in noise level corresponds to a tenfold increase in noise energy; however, a listener would only judge a ten dB increase as being twice as loud.
- A 20 dB increase would result in a "dramatic change" in how a listener would perceive the sound.

Noise Standards and Impact Criteria

New York CEQR Noise Standards

The New York City Department of Environmental Protection (DEP) has established standards for noise exposure at sensitive receptors resulting from the implementation of a project. During daytime hours (between 7 AM and 10 PM), nuisance levels for noise are generally considered to be more than 45 dBA indoors and 70 to 75 dBA outdoors. Indoor activities are subject to task interference above this level, and 70 to 75 dBA is the level at which speech interference occurs outdoors. Typical construction techniques used in the past (including typical single-glazed windows) provide a minimum of approximately 20 dBA of noise attenuation from outdoor to indoor areas. As a result, CEQR noise standards are based on a daytime threshold noise level of 65 dBA, which should not be significantly exceeded. The impact thresholds are described below:

- An increase of five dBA $L_{eq}(1)$ or greater over the No-Action Condition noise level would be a significant impact if the No-Action Condition noise level is 60 dBA $L_{eq}(1)$ or less.
- If the No-Action Condition noise level is 61 dBA $L_{eq}(1)$, a four dBA $L_{eq}(1)$ increase would be considered significant.

- If the No-Action Condition noise level is 62 dBA $L_{eq}(1)$ or more, a three dBA $L_{eq}(1)$ increase or greater would be considered significant.
- A significant impact would occur during the nighttime period (defined by CEQR standards as being between 10 PM and 7 AM) if there is a change in noise levels of three dBA $L_{eq}(1)$ or more.

Much of New York City, including portions of the Proposed Action's study area, experience ambient noise levels that are currently more than 65 dB. In these cases, a significant increase would occur if the No-Action Condition noise level is increased by three dbA $L_{eq}(1)$ or greater.

CEQR Noise Exposure Standards

DEP has promulgated standards that apply to a proposed project if it is also a sensitive receptor, such as a residence, hospital, or school. In addition, DEP has established four categories of acceptability based on receptor type and land use for vehicular traffic, rail, and aircraft-related noise sources. The categories include "generally acceptable," "marginally acceptable," "marginally unacceptable," and "clearly unacceptable." Tables 15.2 and 15.3, show noise exposure guidelines for use in New York City environmental impact review, and required attenuation values to achieve acceptable interior noise levels.

Table 15.2: Noise Exposure Guidelines for Use in City Environmental Quality Review[1]

Receptor type	Time Period	Acceptable General External Exposure	Airport Exposure[3]	Marginally Acceptable General External Exposure	Airport Exposure[3]	Marginally Unacceptable General External Exposure	Airport Exposure[3]	Clearly Unacceptable General External Exposure	Airport Exposure[3]
1. Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	$L_{dn} \leq 60$ dBA		$60 < L_{dn} \leq 65$ dBA		(I) $65 < L_{dn} \leq 70$ dBA, (II) 70 dBA $\leq L_{dn}$		$L_{dn} \leq 75$ dBA
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ dBA		$65 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
3. Residence, residential hotel or motel	7 AM – 10 PM	$L_{10} \leq 65$ dBA		$65 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
	10 PM – 7 AM	$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
4. School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, out-patient health facility		Same as Residential Day (7 AM – 10 PM)		Same as Residential Day (7 AM – 10 PM)		Same as Residential Day (7 AM – 10 PM)		Same as Residential Day (7 AM – 10 PM)	
5. Commercial or office		Same as Residential Day (7 AM – 10 PM)		Same as Residential Day (7 AM – 10 PM)		Same as Residential Day (7 AM – 10 PM)		Same as Residential Day (7 AM – 10 PM)	
6. Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Notes:
In addition, any new activity shall not increase the ambient noise level by 3 dBA or more:

1. Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by ANSI Standards; all values are for the worst hour in the time period.
2. Tracts of land where serenity and quiet are extraordinarily important and serve an important public need and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and nursing homes.
3. One may use FAA-approved Land contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey.
4. External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

New York City Noise Control Code

Specific noise standards for the proposed development site would be governed by the 2005 New York City Noise Code. Table 15.3, "2005 New York City Noise Code," shows the permitted sound levels for sources operating in connection with any residential, commercial or business enterprises. These noise levels do not apply to construction activities or equipment, but do apply to mechanical systems which may be related to the Proposed Action's operation.

Table 15.3: New York City Noise Code

Octave Band	Maximum Sound Pressure Levels (dB) as measured within a receiving property, as specified below	
Frequency (Hz)	Residential receiving property for mixed use buildings and residential buildings (as measured within any room of the residential portion of the building with windows open, if possible).	Commercial receiving Property (as measured within any room containing offices within the building with windows open, if possible).
31.5	70	74
63	61	64
125	53	56
250	46	50
500	40	45
1000	36	41
2000	34	39
4000	33	38
8000	32	37
Source: NYC Noise Code, 2005		

Noise Prediction Methodology

General Methodology

Proportional Modeling

In order to predict the noise levels in the future without the Proposed Action, monitored noise levels were projected by using a proportional modeling procedure, as per *CEQR Technical Manual* guidelines. This procedure takes into account the changes in noise levels due to increases in traffic associated with area growth. An analysis was conducted for both the With-Action and With-Action with PRI traffic scenarios. First, future traffic volumes were obtained by adding future 2026 traffic volumes to the existing baseline conditions. Then, vehicular traffic volumes under the existing and future conditions were converted into Passenger Car Equivalent ("PCE") values. For this conversion, one medium truck was estimated to generate the noise equivalent of 13 cars, one bus was estimated to generate the noise equivalent of 18 cars, and one heavy truck was estimated to generate the noise equivalent of 47 cars. Future noise levels were calculated using the following equation:

$$\text{Future Noise Level} = 10 * \log\left(\frac{\text{Future PCE}}{\text{Existing PCE}}\right) + \text{Existing Noise Level}$$

The calculation is conducted using the L_{eq} noise measurement results. L_{10} values are calculated by adding the difference between the L_{10} and L_{eq} descriptors found to exist in the measurement program to the calculated future L_{eq} noise level.

15.3 Assessment

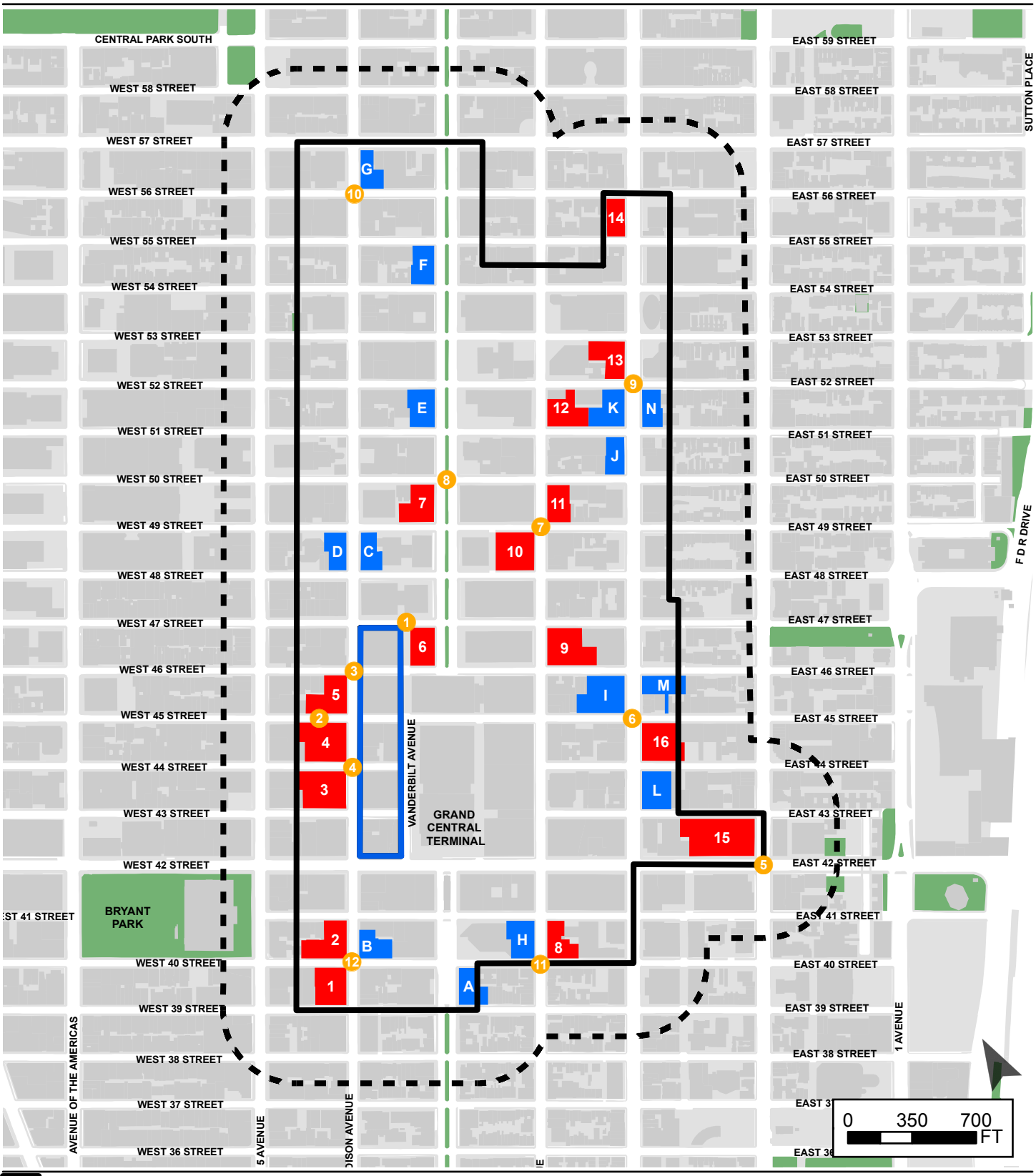
Existing Noise Levels

The Proposed Action is located in an area of midtown Manhattan that is consistently exposed to loud sources of noise, typical of activities within the Manhattan midtown core district. The dominant source of noise is a result of motor vehicles traveling along the north/south avenues and the east/west side streets. Due to the large volume of bus traffic within the study area, buses traveling along the avenues contribute significantly to the surrounding neighborhood noise levels. Overall noise levels are noticeably lower along Park Avenue where there are no bus routes. Other sources of noise which contribute to the overall background include various on-street activities and occasional helicopter flyovers. The principal traffic corridors of the Proposed Action include Madison Avenue, Park Avenue, Lexington Avenue, Third Avenue and Second Avenue. Topographical factors also play a role in the local noise environment, as most of the study area contains tall and large buildings along the avenue corridors which cause multiple noise reflections that can potentially increase the local sound level.

Noise Monitoring Locations

Information concerning specific land usage in and around the project site, as well as trip assignments for potential future uses, were reviewed to select monitoring sites and assess future noise impacts on existing and future sensitive land uses. The twelve monitoring sites shown in Table 15.4 and depicted on Figure 15-1, "Noise Monitoring Site Locations," are representative of the sensitive land uses in the area and locations where additional new vehicle trips are expected and, therefore, could potentially result in an increase in future noise levels. Measured noise levels represent the existing noise exposure conditions experienced by sensitive receptors at these locations.

Noise monitoring was performed during weekdays between the dates of September 13 and September 29, 2016. The time periods chosen for noise monitoring included the a.m., midday and p.m. peak traffic periods. These time periods are the hours when the majority of existing and future project-generated traffic would be passing these locations. Weekday a.m., midday and p.m. monitoring take into account the peak work week, commercial, and school-related traffic. Measurements were conducted for 20 minutes. Traffic counts were also conducted to determine the mix of vehicle types that travel along roadways nearby the monitored locations.



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Noise Receptor Locations

Figure 15-1

Table 15.4: Noise Monitoring Site Locations

Receptor	Location
1	Vanderbilt Avenue between East 45th and East 46th Streets
2	East 45th Street between Madison and Vanderbilt Avenues
3	Madison Avenue and East 46th Streets
4	East 44th Street and Madison Avenue
5	Second Avenue and East 42nd Street
6	Third Avenue and East 45th Street
7	Lexington Avenue and East 49th Street
8	Park Avenue and East 50th Street
9	Third Avenue and East 52nd Street
10	Madison Avenue and East 56th Street
11	Lexington Avenue and East 41st Street
12	Madison Avenue between East 40th and East 41st Streets
Source: STV Incorporated, 2016	

In addition to $L_{eq}(h)$ and L_{10} noise levels, other statistical noise descriptors (L_{50}, L_{90}, L_{max} and L_{min}) were also sampled at all locations for all time periods. For the Proposed Action, the analysis of potential noise impacts utilized the L_{10} and $L_{eq}(h)$ descriptors. The other noise descriptors collected during the monitoring program were utilized to assist in the characterization of the existing noise environment. Typically, L_{50} tends to describe the statistical median noise value, while the L_{90} typically describes the residual background noise level in an environment.

Noise Monitoring Equipment

Noise measurements were taken with a Larson & Davis Model LXT Type I sound level meter (SLM). A windscreen was placed over the microphone for all measurements. The SLM had a laboratory calibration date within the past year at the time of use, as is standard practice. The meter was also properly field calibrated for all measurements using a Larson & Davis Model Cal250 calibrator. There were no significant variances between the beginning and ending calibration measurements. To avoid distortion, the measuring microphone was placed away from any reflecting surfaces, including the ground, walls, and the body of the person performing the measurements. Weather conditions during the measurement periods, with respect to temperature and wind conditions, were conducive to obtaining valid noise readings as per guidelines outlined in ANSI Standard S1.13-2005.

Existing Noise Levels at Receptor Locations

The results of baseline short-term noise measurements are presented in Table 15.5, "Existing Short-Term Noise Levels." Daytime noise levels at all of the receptor sites are fairly typical of noise levels throughout the study area. A steady background noise exists at all locations due to consistent traffic movement on nearby streets. The background noise level L_{90} is in the range of 64.1 to 75.1 dBA. The highest L_{10} monitored noise level was measured during the midday peak period at site S5 (Second Avenue and East 42nd Street), where a noise level of 80.9 dBA was measured. This level of exposure places this site under the CEQR defined "clearly unacceptable" category. One additional site, S10, had an L_{10} monitored noise level of 80.1 dBA which is also within the CEQR defined "clearly unacceptable" category. However, the remaining 10 sites would be within the CEQR defined "marginally unacceptable" category. The categorization of these monitoring sites is based on the results of baseline

noise monitoring and *CEQR Technical Manual* noise exposure standards, also shown in Table 15.2, "Noise Exposure Guidelines for Use in City Environmental Quality Review," above.

Table 15.5: Existing Short-Term Noise Levels (dBA)

Site	Description	Time Period	L_{eq}	L_{10}	L_{50}	L_{90}
S1	Vanderbilt Avenue between East 45th and East 46th Streets	AM	70.4	72.1	68.8	67.5
		Midday	70.8	73.3	69.2	66.9
		PM	69.2	70.0	67.3	66.4
S2	East 45th Street between Madison and Vanderbilt Avenues	AM	71.6	73.8	69.6	67.8
		Midday	71.2	72.2	68.8	67.2
		PM	69.1	71.2	67.9	66.3
S3	Madison Avenue and East 46th Street	AM	75.0	77.8	73.9	70.3
		Midday	73.3	76.0	72.2	70.0
		PM	73.6	76.7	71.8	68.7
S4	East 44th Street and Madison Avenue	AM	75.2	78.2	73.0	69.7
		Midday	73.1	75.8	71.6	69.5
		PM	73.9	76.7	72.2	68.7
S5	Second Avenue and East 42nd Street	AM	75.7	79.0	72.9	70.1
		Midday	80.9	80.9	72.1	69.1
		PM	74.8	75.7	71.5	68.9
S6	Third Avenue and East 45th Street	AM	77.4	79.0	72.0	68.9
		Midday	74.8	77.0	71.8	69.5
		PM	75.2	77.7	72.3	68.5
S7	Lexington Avenue and East 49th Street	AM	73.9	76.4	71.3	68.5
		Midday	74.0	76.4	71.6	67.6
		PM	75.7	78.1	72.9	68.6
S8	Park Avenue and East 50th Street	AM	72.0	74.0	70.0	66.6
		Midday	72.0	74.5	69.4	66.9
		PM	71.2	73.7	70.0	67.6
S9	Third Avenue and East 52nd Street	AM	74.8	74.8	68.0	64.1
		Midday	69.5	72.5	67.8	65.2
		PM	71.7	73.8	69.3	66.2
S10	Madison Avenue and East 56th Street	AM	72.5	75.5	70.1	67.9
		Midday	73.1	75.5	70.5	67.7
		PM	79.7	80.1	72.2	68.6
S11	Lexington Avenue and East 41st Street	AM	75.6	78.3	72.1	67.9
		Midday	74.6	76.3	72.8	69.1
		PM	74.1	77.1	71.1	67.9
S12	Madison Avenue between East 40th and East 41st Streets	AM	74.0	76.6	72.4	69.2
		Midday	77.5	79.4	76.5	75.1
		PM	76.5	79.1	74.6	72.3

Source: STV Incorporated, 2016

Future without the Proposed Action (No-Action Condition)

Using the Noise PCE methodology previously described, future noise levels without the Proposed Action (No-Action conditions) were calculated for the three analysis periods in the year 2036 at representative noise sensitive receptor locations identified within the East Midtown Rezoning study area. Table 15.6 provides a summary of the calculated noise levels.

Table 15.6: 2036 No-Action Weekday Noise Levels (dBA)

Site	Description	Time Period	2016 Noise Levels (dBA)		2036 No Action Noise Levels (dBA)		
			L_{eq}	L_{10}	L_{eq}	L_{10}	Change
S1	Vanderbilt Avenue between East 45th and East 46th Streets	AM	70.4	72.1	71.5	73.2	1.1
		Midday	70.8	73.3	71.7	74.2	0.9
		PM	69.2	70.0	70.1	70.9	0.9
S2	East 45th Street between Madison and Vanderbilt Avenues	AM	71.6	73.8	72.4	74.6	0.8
		Midday	71.2	72.2	71.7	72.7	0.5
		PM	69.1	71.2	69.8	71.9	0.7
S3	Madison Avenue and East 46th Street	AM	75.0	77.8	75.4	78.2	0.4
		Midday	73.3	76.0	73.9	76.6	0.6
		PM	73.6	76.7	74.3	77.4	0.7
S4	East 44th Street and Madison Avenue	AM	75.2	78.2	76.0	79.0	0.8
		Midday	73.1	75.8	73.9	76.6	0.8
		PM	73.9	76.7	74.8	77.6	0.9
S5	Second Avenue and East 42nd Street	AM	75.7	79.0	76.6	79.9	0.9
		Midday	80.9	80.9	81.5	81.5	0.6
		PM	74.8	75.7	75.6	76.5	0.8
S6	Third Avenue and East 45th Street	AM	77.4	79.0	77.8	79.4	0.4
		Midday	74.8	77.0	75.2	77.4	0.4
		PM	75.2	77.7	75.6	78.1	0.4
S7	Lexington Avenue and East 49th Street	AM	73.9	76.4	74.4	76.9	0.5
		Midday	74.0	76.4	74.3	76.7	0.3
		PM	75.7	78.1	76.0	78.4	0.3
S8	Park Avenue and East 50th Street	AM	72.0	74.0	72.2	74.2	0.2
		Midday	72.0	74.5	72.2	74.7	0.2
		PM	71.2	73.7	71.4	73.9	0.2
S9	Third Avenue and East 52nd Street	AM	74.8	74.8	75.1	75.1	0.3
		Midday	69.5	72.5	69.9	72.9	0.4
		PM	71.7	73.8	72.1	74.2	0.4
S10	Madison Avenue and East 56th Street	AM	72.5	75.5	72.8	75.8	0.3
		Midday	73.1	75.5	73.5	75.9	0.4
		PM	79.7	80.1	80.0	80.4	0.3
S11	Lexington Avenue and East 41st Street	AM	75.6	78.3	76.2	78.9	0.6
		Midday	74.6	76.3	75.0	76.7	0.4
		PM	74.1	77.1	74.9	77.9	0.8
S12	Madison Avenue between East 40th and East 41st Streets	AM	74.0	76.6	74.7	77.3	0.7
		Midday	77.5	79.4	78.1	80.0	0.6
		PM	76.5	79.1	77.4	80.0	0.9

Source: STV Incorporated, 2016

In the future without the Proposed Action, noise levels at and adjacent to the project area would be generally comparable to those in the existing conditions. The largest estimated increase in noise level from existing conditions is projected to occur at Site 1 where peak-hour AM noise levels are projected to increase by 1.1 dBA in the area adjacent to Projected Development Site 6. Peak-hour noise levels at other representative locations within the project study area show similar but smaller increases in noise levels. Increases of this magnitude would not be perceptible, and based on the CEQR criteria would be considered insignificant.

Future with the Proposed Action (With-Action Condition)

Using the Noise PCE methodology previously described, future noise levels with the Proposed Action (With-Action conditions) were calculated for the three analysis periods in the year 2036 at representative noise sensitive receptor locations identified within the East Midtown Rezoning study area. Table 15.7 provides a summary of the calculated noise levels. The With-Action sound levels presented in the table represent the worst-case scenario for each receptor when considering the presence or absence of the PRIs. In general, the presence of the PRIs resulted in higher sound levels, except for the midday period at Site 1 and the morning period at Site 2.

In the future with the Proposed Action, noise levels at and adjacent to the project area would be generally comparable to those under the future No-Action conditions. The largest estimated increase in noise level from future No-Action conditions is calculated to occur at Projected Development Site 1 where peak-hour noise levels are projected to increase by 0.6 dBA. Peak-hour noise levels at other representative locations within the project study area showed similar but smaller increases in noise levels. Increases of this magnitude would not be perceptible, and based on the CEQR criteria would be considered insignificant. The details of the Noise PCE screening at each of the representative noise monitoring locations and at all Projected and Potential Development Sites is provided in Appendix G. In terms of the CEQR noise exposure criteria, noise levels are projected to show very little change from the Future No-Action to With-Action condition. Noise levels at all receptors sites evaluated yield build noise exposure generally within the higher range of "marginally unacceptable" category condition or in the "clearly unacceptable" category.

Table 15.7: 2036 With-Action Weekday Noise Levels (dBA)

Site	Description	Time Period	2036 No-Action Noise Levels (dBA)		2036 With-Action Noise Levels (dBA)		
			L_{eq}	L_{10}	L_{eq}	L_{10}	Change
S1	Vanderbilt Avenue between East 45th and East 46th Streets	AM	71.5	73.2	72.1	73.8	0.6
		Midday*	71.7	74.2	71.9	74.4	0.2
		PM	70.1	70.9	70.3	71.1	0.2
S2	East 45th Street between Madison and Vanderbilt Avenues	AM*	72.4	74.6	72.6	74.8	0.2
		Midday	71.7	72.7	72.2	73.2	0.5
		PM	69.8	71.9	70.2	72.3	0.4
S3	Madison Avenue and East 46th Street	AM	75.4	78.2	75.7	78.5	0.3
		Midday	73.9	76.6	74.2	76.9	0.3
		PM	74.3	77.4	74.8	77.9	0.5
S4	East 44th Street and Madison Avenue	AM	76.0	79.0	76.3	79.3	0.3
		Midday	73.9	76.6	74.1	76.8	0.2
		PM	74.8	77.6	75.1	77.9	0.3
S5	Second Avenue and East 42nd Street	AM	76.6	79.9	76.8	80.1	0.2
		Midday	81.5	81.5	81.7	78.8	0.2
		PM	75.6	76.5	75.8	76.7	0.2
S6	Third Avenue and East 45th Street	AM	77.8	79.4	78.1	79.7	0.3
		Midday	75.2	77.4	75.4	77.6	0.2
		PM	75.6	78.1	75.8	78.3	0.2
S7	Lexington Avenue and East 49th Street	AM	74.4	76.9	74.7	77.2	0.3
		Midday	74.3	76.7	74.5	76.9	0.2
		PM	76.0	78.4	76.3	78.7	0.3
S8	Park Avenue and East 50th Street	AM	72.2	74.2	72.5	74.5	0.1
		Midday	72.2	74.7	72.4	74.9	0.1
		PM	71.4	73.9	71.7	74.2	0.2
S9	Third Avenue and East 52nd Street	AM	75.1	75.1	75.4	75.1	0.3
		Midday	69.9	72.9	70.2	73.2	0.3
		PM	72.1	74.2	72.3	74.4	0.2
S10	Madison Avenue and East 56th Street	AM	72.8	75.8	72.8	75.8	0.0
		Midday	73.5	75.9	73.6	76.0	0.1
		PM	80.0	80.4	80.1	80.5	0.1
S11	Lexington Avenue and East 41st Street	AM	76.2	78.9	76.6	79.3	0.4
		Midday	75.0	76.7	75.4	77.1	0.4
		PM	74.9	77.9	75.3	78.3	0.4
S12	Madison Avenue between East 40th and East 41st Streets	AM	74.7	77.3	75.2	77.8	0.5
		Midday	78.1	80.0	78.4	80.3	0.3
		PM	77.4	80.0	77.7	80.3	0.3

Source: STV Incorporated, 2016 and VHB, 2017
* Indicates worst case condition is With-Action without Public Realm Improvements.

Noise Attenuation Measures

The attenuation of a composite structure is a function of the attenuation provided by each of its component parts and how much of the area is made up of each part. In general, a building façade is composed of the wall, glazing, and any vents and louvers for the heating-ventilation-and-air-conditioning (HVAC) systems in various ratios of building surface area. The design for all buildings proposed to be located on the (E)-designated projected or potential development sites would be designed to provide a composite Outdoor-Indoor Transmission Class (OITC) rating greater than or equal to the attenuation requirements listed in Appendix G.2. The OITC classification is defined by the

American Society of Testing and Materials (ASTM E1332-90, Re-approved 2003) and provides a single-number rating that is used for designing a building façade including walls, doors, glazing and the combination thereof. The OITC rating is designed to evaluate building elements by their ability to reduce noise the overall loudness of ground and air transportation noise. Proposed development with an OITC rating of 30 or greater would require incorporating the following minimum building design elements to achieve these rating levels:

- To achieve a composite OITC rating of 30, a building façade would likely include well sealed insulating glass, as well as alternate means of ventilation such as well sealed through-the-wall air conditioning, package-terminal air conditioners, or central air conditioning.
- To achieve a composite OITC rating of 35, a building façade would likely include a well-sealed laminated insulating glass, as well as alternate means of ventilation such as central air conditioning.
- To achieve a composite OITC rating of 36 or higher, a building façade would likely include special design features that go beyond the normal double-glazed windows and may include using specially designed windows (i.e., windows with small sizes, windows with air gaps, windows with thicker glazing, etc.) and additional building attenuation, as well as alternate means of ventilation such as central air conditioning.

As indicated in Table 15.8, the NYC CEQR guidelines contain window/wall attenuation requirements for buildings based on maximum exterior L_{10} noise exposure levels. Recommended noise attenuation values for buildings are designed to maintain interior noise levels of 45 dBA or lower for residential uses and 50 dBA or lower for commercial uses.

Table 15.8: Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				Clearly Unacceptable
Noise level with proposed action	$70< L_{10} \leq 73$	$73< L_{10} \leq 76$	$76< L_{10} \leq 78$	$78< L_{10} \leq 80$	$80< L_{10}$
Attenuation [A]	28 dBA	31 dBA	33 dBA	35 dBA	36 + (L10 – 80)[B] dBA

Source: New York City Department of Environmental Protection.
Notes:
[A] The above composite window wall attenuation values are for residential dwellings and community facility development. Required attenuation for commercial office spaces and meeting rooms would be 5 dBA less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation.
[B] Required attenuation values increase by 1 dBA increments for L_{10} values greater than 80 dBA.

The estimated minimum building window/wall attenuation requirements at each of the 12 representative monitoring locations is provided in Table 15.9. Future L_{10} noise levels and associated window/wall attenuation requirements were established based on the PCE estimated peak-hour levels shown in Table 15.7. Future With-Action maximum L_{10} levels at the 12 representative sites, range from 70.7 to 81.7 dBA and are therefore in the "marginally unacceptable" or "clearly unacceptable" exterior noise exposure category, resulting in a minimum noise attenuation requirement of 28-38 dBA. A summary of the window/wall attenuation levels required at each Projected and Potential Development Site is provided in Table 15.10 and the applicable text for the (E) designation (E-408) by development site is located in Appendix K. Therefore, the Proposed Action and the Proposed Action with PRI would not result in any significant adverse noise impacts.

Table 15.9: 2036 With-Action Weekday Noise Levels (dBA)

Site #	Location	Maximum With- Action Condition L_{10} (dBA)	Minimum Attenuation Required[1] (dBA)
S1	Vanderbilt Avenue between East 45th and East 46th Streets	74.4	31
S2	East 45th Street between Madison and Vanderbilt Avenues	74.8	31
S3	Madison Avenue and East 46th Street	78.5	35
S4	East 44th Street and Madison Avenue	79.3	35
S5	Second Avenue and East 42nd Street	81.7	38
S6	Third Avenue and East 45th Street	79.7	35
S7	Lexington Avenue and East 49th Street	78.7	35
S8	Park Avenue and East 50th Street	74.9	31
S9	Third Avenue and East 52nd Street	75.4	31
S10	Madison Avenue and East 56th Street	80.5	37
S11	Lexington Avenue and East 41st Street	79.3	35
S12	Madison Avenue between East 40th and East 41st Streets	80.3	37

Notes:
[1] Attenuation values are shown for residential uses; commercial uses would be 5 dBA less.

To the extent permitted under ZR Section 11-15, the requirements of the (E) designation may be modified, or determined to be unnecessary, based on new information or technology, additional facts or updated standards that are relevant at the time the site is ultimately developed.

Mechanical Equipment

It is assumed that building mechanical systems, including emergency generators associated with the proposed development projects, would be designed with enclosures where necessary to meet all applicable noise regulations (i.e., Subchapter 5, §24-227 of the New York City Noise Control Code and the New York City Department of Buildings Code) and to avoid producing noise levels that would result in a significant increase in ambient noise levels. Therefore, the Proposed Action would not result in any significant increase in ambient noise levels.

Table 15.10: Building Attenuation Requirements for Projected and Potential Development Sites Requiring (E) Designation[1, 2]

Site	Block	Lots(s)	Projected Use	Nearest Noise Governing Measurement Location	Minimum Required Building Attenuation
Projected Development Sites					
1	869	16,58,61,64	Commercial	S12	37
2	1275	8,11,12,14,16,59,60	Commercial/Residential	S12	37
3	1278	8,14,62,63,64,65	Commercial	S4	35
4	1279	9,17,57,63,65	Commercial	S2/S4	31/35
5	1281	9,56,59,7501	Commercial	S2/S3	31/35
6	1282	34	Commercial	S1	31
7	1285	36	Commercial	S8	31
8	1295	20,23	Commercial	S11	35
9	1301	23	Commercial	S7	35
10	1303	14	Commercial	S7	35
11	1304	20	Commercial	S7	35
12	1306	23	Commercial	S7/S9	31/35
13	1307	43,7501	Commercial	S9	31
14	1310	33,34,35,36,37,38,39,40,133,140	Commercial/Residential	S9	31
15	1316	23,30,12	Commercial	S5	38
16	1318	1,43,44,143	Commercial	S6	35
Potential Development Sites					
Pot -A	895	1	Commercial	S11	35
Pot -B	1275	23	Commercial/Residential	S12	37
Pot -C	1284	21,52,152	Commercial	S3/S7	35
Pot -D	1284	14,17,55,56,59,60	Commercial	S3/S7	35
Pot -E	1287	33	Commercial	S8	31
Pot -F	1290	36,37	Commercial	S8	31
Pot -G	1292	52	Commercial	S10	37
Pot -H	1295	17,58	Commercial	S11	35
Pot -I	1300	26,33,42,44	Commercial	S6	35
Pot -J	1305	33,40	Commercial	S9	31
Pot -K	1306	33	Commercial	S9	31
Pot -L	1317	1	Commercial	S6	35
Pot -M	1319	47	Commercial/Residential	S6	35
Pot -N	1325	1	Commercial	S9	31

Notes:
[1] Attenuation values are shown for proposed residential developments; commercial developments would be 5 dBA less.
[2] The applicable text for the (E) designation by development site is located in Appendix K.