# Chapter 13: Noise

## A. INTRODUCTION

Noise in an urban area comes from many sources. Some sources are activities essential to the health, safety, and welfare of a city's inhabitants, such as noise from emergency vehicle sirens, garbage collection operations, and construction and maintenance equipment. Other sources, such as traffic, stem from the movement of people and goods, activities that are essential to the viability of a city as a place to live and do business. Although these and other noise-producing activities are necessary to a city, the noise they create is, at times, undesirable. Urban noise detracts from the quality of the living environment, and there is increasing evidence that excessive noise may represent a threat to public health.

The noise analysis for the proposed actions and the proposed One Vanderbilt development consists of three parts:

- An analysis at locations where traffic generated by the proposed One Vanderbilt development would have the potential to result in significant adverse noise impacts to determine the magnitude of the increase in noise level;
- An analysis to determine the level of building attenuation necessary to ensure that interior noise levels within the proposed building would satisfy applicable interior noise criteria; and
- An analysis to examine whether the public place on Vanderbilt Avenue created by the proposed actions would meet City Environmental Quality Review (CEQR) noise level guidelines for open spaces.

### PRINCIPAL CONCLUSIONS

The mobile source analysis concludes that the proposed One Vanderbilt development would not result in any significant adverse noise impacts due to operation of the future development.

The building attenuation analysis concludes that in order to meet 2014 *CEQR Technical Manual* interior noise level requirements, up to 34 dB(A) of building attenuation would be required for the proposed One Vanderbilt building. Because these specifications would be required by (E) designation (E-357) with the requested special permit, there would be no significant adverse noise impacts with respect to CEQR building attenuation requirements.

The analysis of noise levels in the proposed public place concludes that noise levels in the proposed public place would be greater than the 55 dB(A) $L_{10(1)}$ CEQR guideline, but would be comparable to other parks around New York City. Therefore, the future projected noise levels would not constitute a significant adverse noise impact due to the proposed public place.

## B. ACOUSTICAL FUNDAMENTALS

Sound is a fluctuation in air pressure. Sound pressure levels are measured in units called "decibels" ("dB"). The particular character of the sound that we hear (a whistle compared with a French horn, for example) is determined by the speed, or "frequency," at which the air pressure fluctuates, or "oscillates." Frequency defines the oscillation of sound pressure in terms of cycles per second. One cycle per second is known as 1 Hertz ("Hz"). People can hear over a relatively limited range of sound frequencies, generally between 20 Hz and 20,000 Hz, and the human ear does not perceive all frequencies equally well. High frequencies (e.g., a whistle) are more easily discernible and therefore more intrusive than many of the lower frequencies (e.g., the lower notes on the French horn).

### "A"-WEIGHTED SOUND LEVEL (DBA)

In order to establish a uniform noise measurement that simulates people's perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human ear. This is known as the A-weighted sound level, or "dBA," and it is the descriptor of noise levels most often used for community noise. As shown in **Table 13-1**, the threshold of human hearing is defined as 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.

**Table 13-1**
**Common Noise Levels**

| Sound Source | (dBA) |
|---|---|
| Military jet, air raid siren | 130 |
| Amplified rock music | 110 |
| Jet takeoff at 500 meters | 100 |
| Freight train at 30 meters | 95 |
| Train horn at 30 meters | 90 |
| Heavy truck at 15 meters | 80–90 |
| Busy city street, loud shout | 80 |
| Busy traffic intersection | 70–80 |
| Highway traffic at 15 meters, train | 70 |
| Predominantly industrial area | 60 |
| Light car traffic at 15 meters, city or commercial areas, or residential areas close to industry | 50–60 |
| Background noise in an office | 50 |
| Suburban areas with medium-density transportation | 40–50 |
| Public library | 40 |
| Soft whisper at 5 meters | 30 |
| Threshold of hearing | 0 |

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

In considering these values, 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. 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. Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners.

### SOUND LEVEL DESCRIPTORS

Because the sound pressure level unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise over extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level," $L_{eq}$, can be computed. $L_{eq}$ is the constant sound level that, in a given situation and time period (e.g., 1 hour, denoted by $L_{eq(1)}$, or 24 hours, denoted as $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. Statistical sound level descriptors such as $L_1$, $L_{10}$, $L_{50}$, $L_{90}$, and $L_x$, are used to indicate noise levels that are exceeded 1, 10, 50, 90 and x percent of the time, respectively.

The relationship between $L_{eq}$ and levels of exceedance is worth noting. Because $L_{eq}$ is defined in energy rather than straight numerical terms, it is not simply related to the levels of exceedance. If the noise fluctuates very little, $L_{eq}$ will approximate $L_{50}$ or the median level. If the noise fluctuates broadly, the $L_{eq}$ will be approximately equal to the $L_{10}$ value. If extreme fluctuations are present, the $L_{eq}$ will exceed $L_{90}$ or the background level by 10 or more decibels. Thus the relationship between $L_{eq}$ and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the $L_{eq}$ is generally between $L_{10}$ and $L_{50}$.

For purposes of analysis, the 1-hour $L_{10}$ descriptor ($L_{10(1)}$) has been selected as the noise descriptor to be used in this noise impact evaluation. The 1-hour $L_{10}$ is the noise descriptor used in the *CEQR Technical Manual* noise exposure guidelines for city environmental impact review classification.

## C. NOISE STANDARDS AND CRITERIA

### NEW YORK *CEQR* NOISE STANDARDS

The *CEQR Technical Manual* sets external noise exposure standards; these standards are shown in **Table 13-2**. Noise exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable.

The *CEQR Technical Manual* defines attenuation requirements for buildings based on exterior noise levels (see **Table 13-3**). Recommended noise attenuation values for buildings are designed to maintain interior noise levels of 50 dBA or lower for commercial uses (45 dBA or lower for residential uses), and are determined based on exterior $L_{10(1)}$ noise levels.

### IMPACT DEFINITION

The determination of significant adverse noise impacts in this analysis is informed by the use of both absolute noise level limits and relative impact criteria. The 2014 *CEQR Technical Manual* states that "it is reasonable to consider 65 dBA $L_{eq(1)}$ as an absolute noise level that should not be significantly exceeded." Therefore, the determination of impacts first considers whether a projected noise increase would result in noise levels exceeding 65 dBA $L_{eq(1)}$. Where appropriate, this study also consults the following relative impact criteria to define a significant adverse noise impact, as recommended in the *CEQR Technical Manual*:

**Table 13-2**
**Noise Exposure Guidelines For Use in City Environmental Impact Review**

| Receptor Type | Time Period | Acceptable General External Exposure | Airport[3] Exposure | Marginally Acceptable General External Exposure | Airport[3] Exposure | Marginally Unacceptable General External Exposure | Airport[3] Exposure | Clearly Unacceptable General External Exposure | Airport[3] Exposure |
|---|---|---|---|---|---|---|---|---|---|
| Outdoor area requiring serenity and quiet[2] | | $L_{10} \le 55$ dBA | | NA | NA | NA | NA | NA | NA |
| Hospital, nursing home | | $L_{10} \le 55$ dBA | ---------- Ldn ≤ 60 dBA ---------- | $55 < L_{10} \le 65$ dBA | ---------- 60 < Ldn ≤ 65 dBA ---------- | $65 < L_{10} \le 80$ dBA | (i) 65 < Ldn ≤ 70 dBA, (II) 70 ≤ Ldn | $L_{10} > 80$ dBA | ---------- Ldn ≤ 75 dBA ---------- |
| Residence, residential hotel, or motel | 7 AM to 10 PM | $L_{10} \le 65$ dBA | | $65 < L_{10} \le 70$ dBA | | $70 < L_{10} \le 80$ dBA | | $L_{10} > 80$ dBA | |
| | 10 PM to 7 AM | $L_{10} \le 55$ dBA | | $55 < L_{10} \le 70$ dBA | | $70 < L_{10} \le 80$ dBA | | $L_{10} > 80$ dBA | |
| School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, outpatient public 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) | |
| 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) | |
| Industrial, public areas only[4] | Note 4 | Note 4 | | Note 4 | | Note 4 | | Note 4 | |

**Notes:**
(i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more; (ii) *CEQR Technical Manual* noise criteria for train noise are similar to the above aircraft noise standards: the noise category for train noise is found by taking the $L_{dn}$ value for such train noise to be an $L_{dn}^{y}$ ($L_{dn}$ contour) value.

**Table Notes:**
1 Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (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 $L_{dn}$ 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).

**Source:** New York City Department of Environmental Protection (adopted policy 1983).

**Table 13-3**
**Required Attenuation Values to Achieve Acceptable Interior Noise Levels**

| | Marginally Acceptable | | | | Clearly Unacceptable |
|---|---|---|---|---|---|
| Noise Level With Proposed Development | $70 < L_{10} \le 73$ | $73 < L_{10} \le 76$ | $76 < L_{10} \le 78$ | $78 < L_{10} \le 80$ | $L_{10} < 80$ |
| Attenuation* | (I) 28 dBA | (II) 31 dBA | (III) 33 dBA | (IV) 35 dBA | $36 + (L_{10} - 80)^{B}$ dBA |

**Notes:** [A] The above composite window-wall attenuation values are for residential dwellings. Commercial office spaces and meeting rooms would be 5 dB(A) less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation.
Required attenuation values increase by 1 dB(A) increments for $L_{10}$ values greater than 80 dBA.

**Source:** New York City Department of Environmental Protection

- An increase of 5 dBA, or more, in With-Action condition, or “Build” $L_{eq(1)}$ noise levels at sensitive receptors (including residences, play areas, parks, schools, libraries, and houses of worship) over those calculated for the No-Action condition, or “No Build” condition, if the No Build levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.

- An increase of 4 dBA, or more, in Build Leq(1) noise levels at sensitive receptors over those calculated for the No Build condition, if the No Build levels are 61 dBA Leq(1) and the analysis period is not a nighttime period.
- An increase of 3 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition, if the No Build levels are greater than 62 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.
- An increase of 3 dBA, or more, in Build Leq(1) noise levels at sensitive receptors over those calculated for the No Build condition, if the analysis period is a nighttime period (defined by the CEQR Technical Manual criteria as being between 10 PM and 7 AM).

## D. EXISTING NOISE LEVELS

### SELECTION OF NOISE RECEPTOR LOCATIONS

A total of five receptor locations (1 through 4 and A) within the project area were selected for impact assessment and evaluation of noise attenuation requirements of the proposed One Vanderbilt development. Four additional receptor locations (5 through 8) were selected for impact assessment of the Vanderbilt Corridor (see Chapter 19, "Conceptual Analysis"). All nine of these locations are shown below in **Table 13-4** and shown in **Figure 13-1**.

**Table 13-4**
**Noise Receptor Locations**

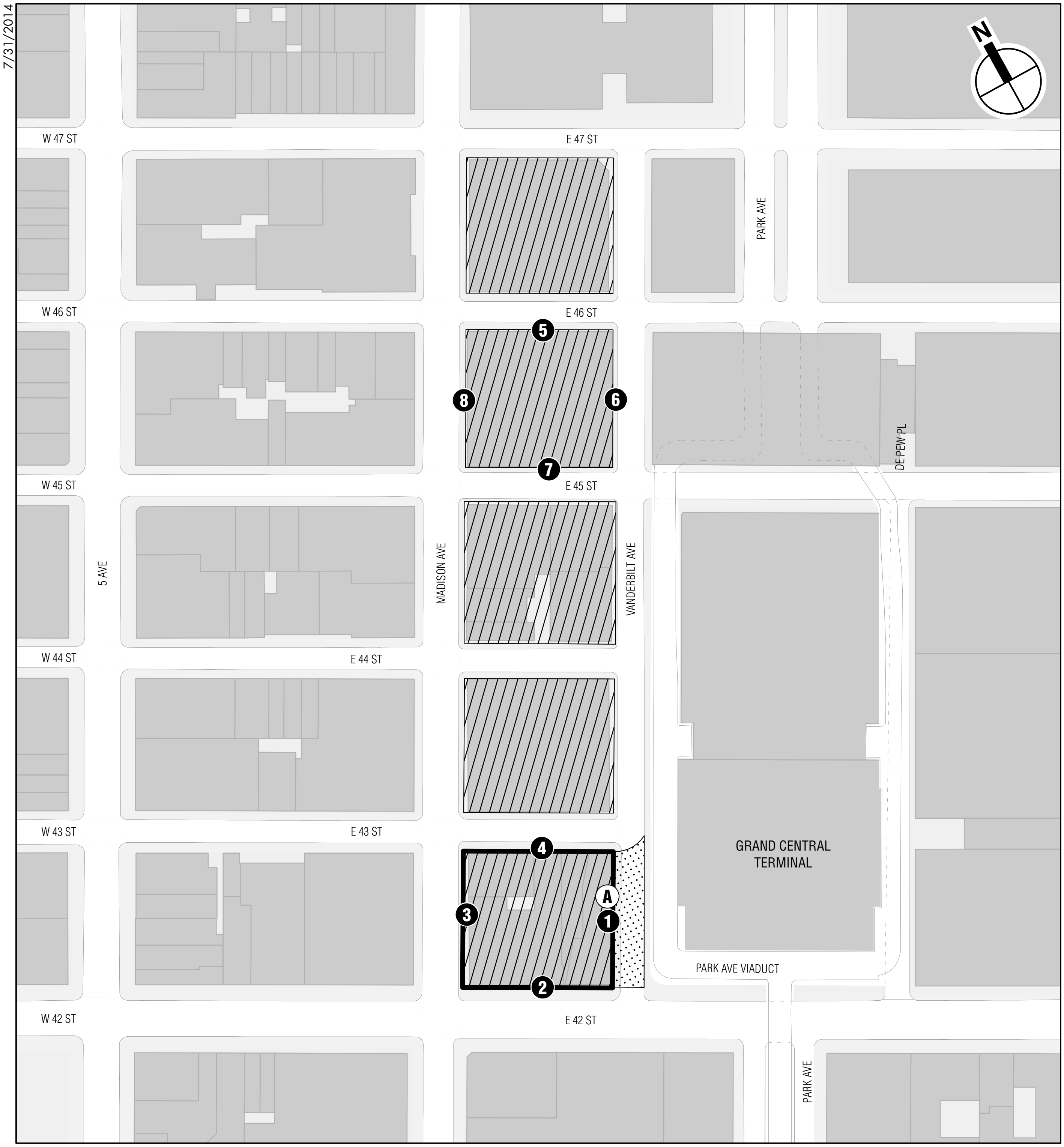
| Receptor | Location |
|---|---|
| 1 | Vanderbilt Avenue between East 42nd and East 43rd Streets |
| 2 | East 42nd Street between Madison and Vanderbilt Avenues |
| 3 | Madison Avenue between East 42nd and East 43rd Streets |
| 4 | East 43rd Street between Madison and Vanderbilt Avenues |
| 5 | East 46th Street between Madison and Vanderbilt Avenues |
| 6 | Vanderbilt Avenue between East 45th and East 46th Streets |
| 7 | East 45th Street between Madison and Vanderbilt Avenues |
| 8 | Madison Avenue between East 45th and East 46th Streets |
| A | Extended out 3 feet from a 3rd Floor window of 317 Madison Avenue facing Park Avenue |

Sites 1 through 8 were located at grade. Site A was extended approximately 3 feet out a 3rd floor window of 317 Madison Avenue facing the elevated Park Avenue. Site A has a clear line of sight to the elevated Park Avenue, with no shielding from the vehicular traffic, and is representative of conditions at the building façade immediately adjacent to Park Avenue.

### NOISE MONITORING

At all receptor sites, existing noise levels were determined by field measurements. Noise monitoring was performed on June 20, 2013 and June 25, 2014. At receptor sites 1 through 8, 20-minute spot measurements were taken. At receptor site A, a continuous measurement was taken from approximately 7:30 AM until 6:30 PM. All measurements were performed during the weekday peak periods—AM (7:00 to 9:00 AM), midday (MD) [12:00 to 2:00 PM], and PM (4:30 to 6:30 PM), which is when the largest increases from traffic would be expected.

7/31/2014




*Proposed Vanderbilt Corridor*

*One Vanderbilt Development Site*

*Proposed Public Place*

*Noise Receptors*

*Elevated Noise Receptor*

0 400 FEET

Noise Receptor Locations

**Figure 13-1**

**Vanderbilt Corridor and One Vanderbilt**

## EQUIPMENT USED DURING NOISE MONITORING

Measurements were performed using Brüel & Kjær Sound Level Meters (SLM) Type 2250 and 2260, Brüel & Kjær ½-inch microphones Type 4189, and Brüel & Kjær Sound Level Calibrators Type 4231. The Brüel & Kjær SLMs are Type 1 instruments according to ANSI Standard S1.4-1983 (R2006). The SLMs have a laboratory calibration date within one year of the time of use, as is standard practice. The microphones at receptor sites 1 through 8 were mounted at a height of approximately five feet above the ground surface on a tripod and approximately six feet or more away from any large sound-reflecting surface to avoid major interference with sound propagation. The microphone at receptor site A was mounted on a pole extended approximately 3 feet away from the façade of 317 Madison Avenue on the 3rd floor. The SLMs were calibrated before and after readings with a Brüel & Kjær Type 4231 Sound Level Calibrator using the appropriate adaptor. The data were digitally recorded by the SLMs and displayed at the end of the measurement period in units of dBA. Measured quantities included the $L_{eq}$, $L_1$, $L_{10}$, $L_{50}$, and $L_{90}$ values. A windscreen was used during all sound measurements except for calibration. All measurement procedures were based on the guidelines outlined in ANSI Standard S1.13-2005.

## EXISTING NOISE LEVELS AT NOISE RECEPTOR LOCATIONS

### *MEASURED NOISE LEVELS*

The results of the measurements of existing noise levels are summarized in **Table 13-5**. Traffic was the dominant noise source for all receptor sites. Noise levels are moderate to high and reflect the level of vehicular traffic activity present adjacent to the receptors.

**Table 13-5**
**Existing Noise Levels (in dBA)**

| Receptor | Measurement Location | Time | $L_{eq}$ | $L_1$ | $L_{10}$ | $L_{50}$ | $L_{90}$ |
|---|---|---|---|---|---|---|---|
| 1 | Vanderbilt Avenue between East 42nd and East 43rd Streets | AM | 68.6 | 74.7 | 70.3 | 67.9 | 66.4 |
| | | MD | 70.2 | 78.8 | 71.5 | 69.2 | 67.8 |
| | | PM | 70.1 | 75.4 | 71.3 | 69.5 | 68.3 |
| 2 | East 42nd Street between Madison and Vanderbilt Avenues | AM | 74.8 | 84.3 | 77.1 | 72.5 | 70.3 |
| | | MD | 73.7 | 81.3 | 75.7 | 72.5 | 70.6 |
| | | PM | 75.3 | 84.5 | 77.5 | 73.1 | 70.6 |
| 3 | Madison Avenue between East 42nd and East 43rd Streets | AM | 79.0 | 88.3 | 82.3 | 76.3 | 71.2 |
| | | MD | 75.0 | 85.2 | 77.8 | 72.1 | 68.4 |
| | | PM | 75.9 | 84.7 | 78.7 | 74.1 | 68.2 |
| 4 | East 43rd Street between Madison and Vanderbilt Avenues | AM | 71.6 | 76.3 | 73.4 | 70.9 | 68.8 |
| | | MD | 70.0 | 76.0 | 71.7 | 69.1 | 68.0 |
| | | PM | 69.7 | 75.1 | 71.4 | 68.9 | 67.6 |
| 5 | East 46th Street between Madison and Vanderbilt Avenues | AM | 73.6 | 79.4 | 75.8 | 72.6 | 70.4 |
| | | MD | 73.5 | 79.0 | 76.4 | 72.0 | 70.2 |
| | | PM | 73.0 | 79.4 | 74.2 | 72.0 | 70.6 |
| 6 | Vanderbilt Avenue between East 45th and East 46th Streets | AM | 76.6 | 81.8 | 78.6 | 75.6 | 74.0 |
| | | MD | 74.5 | 79.8 | 76.0 | 73.8 | 72.4 |
| | | PM | 72.9 | 76.0 | 73.4 | 72.4 | 72.0 |
| 7 | East 45th Street between Madison and Vanderbilt Avenues | AM | 74.9 | 80.8 | 76.0 | 74.0 | 71.4 |
| | | MD | 72.6 | 77.4 | 74.4 | 71.8 | 70.0 |
| | | PM | 73.7 | 77.8 | 75.6 | 72.8 | 70.4 |
| 8 | Madison Avenue between East 45th and East 46th Streets | AM | 77.3 | 85.8 | 81.2 | 73.6 | 69.8 |
| | | MD | 76.5 | 85.2 | 79.8 | 73.8 | 69.6 |
| | | PM | 77.5 | 85.2 | 81.6 | 74.2 | 69.4 |
| A | 3rd Floor of 317 Madison Avenue facing Park Avenue | AM | 70.0 | 74.2 | 71.7 | 69.6 | 67.9 |
| | | MD | 73.0 | 84.8 | 73.0 | 69.5 | 68.1 |
| | | PM | 72.3 | 80.4 | 73.0 | 71.1 | 69.4 |

In terms of *CEQR Technical Manual* criteria, existing noise levels at receptor sites 1, 2, 4, 5, 6, 7, and A would be in the "marginally unacceptable" category, and existing noise levels at receptor sites 3 and 8 would be in the "clearly unacceptable" category.

## E. NOISE PREDICTION METHODOLOGY

### GENERAL METHODOLOGY

Future noise levels were calculated using either a proportional modeling technique or the Federal Highway Administration (FHWA) *Traffic Noise Model* (TNM) Version 2.5. Both the proportional modeling technique and the TNM are methodologies recommended for analysis purposes in the *CEQR Technical Manual*. The noise impact analysis examined the AM, MD, and PM peak hours for conditions at receptor sites 1 through 4 and A adjacent to the development site. The selected time periods are the periods expected to be the peak periods of traffic generation (based on the traffic studies presented in Chapter 10, "Transportation") for the proposed development and therefore result in the maximum potential for significant adverse noise impacts.

The proportional modeling procedure used for the noise analysis is described below.

*PROPORTIONAL MODELING*

Proportional modeling was used to determine locations with the potential for having significant noise impacts. Proportional modeling is one of the techniques recommended in the *CEQR Technical Manual* for mobile source analysis.

Using this technique, the prediction of future noise levels where traffic is the dominant noise source is based on a calculation using measured existing noise levels and predicted changes in traffic volumes to determine noise levels in the future without the proposed One Vanderbilt development (the No-Action condition) and with the proposed development (the With-Action condition). Vehicular traffic volumes are converted into Noise Passenger Car Equivalent (Noise PCE) values, for which one medium-duty truck (having a gross weight between 9,900 and 26,400 pounds) is assumed to generate the noise equivalent of 13 cars, and one heavy-duty truck (having a gross weight of more than 26,400 pounds) is assumed to generate the noise equivalent of 47 cars, and one bus (vehicles designed to carry more than nine passengers) is assumed to generate the noise equivalent of 18 cars. Future noise levels are calculated using the following equation:

$$\text{F NL} - \text{E NL} = 10 * \log_{10} (\text{F PCE} / \text{E PCE})$$

where:

F NL = Future Noise Level

E NL = Existing Noise Level

F PCE = Future Noise PCEs

E PCE = Existing Noise PCEs

Sound levels are measured in decibels and therefore increase logarithmically with sound source strength. In this case, the sound source is traffic volumes measured in Noise PCEs. For example, if the existing traffic volume on a street is 100 Noise PCE and if the future traffic volume were increased by 50 Noise PCE to a total of 150 PCE, the noise level would increase by 1.8 dBA (assuming that traffic is the dominant noise source at this particular location). Similarly, if the future traffic were increased by 100 Noise PCE, or doubled to a total of 200 Noise PCE, the noise level would increase by 3.0 dBA.

*TRAFFIC NOISE MODEL (TNM)*

Preliminary modeling studies using the proportional modeling technique indicated that the future traffic may have the potential to cause noticeable increases in noise levels due to large increases in auto and truck traffic at receptor site 4. Therefore, at this location, a refined analysis was performed using the TNM (described below).

The TNM is a computerized model developed for the FHWA that calculates the noise contribution of each roadway segment to a given noise receptor. The noise from each vehicle type is determined as a function of the reference energy-mean emission level, corrected for vehicle volume, speed, roadway grade, roadway segment length, and source-receptor distance. Further considerations included in modeling the propagation path include identifying the shielding provided by rows of buildings, analyzing the effects of different ground types, identifying source and receptor elevations, and analyzing the effects of any intervening noise barriers. The existing TNM noise levels were subtracted from the measured existing noise levels and added to the predicted TNM No-Action and With-Action noise levels to account for background noise not attributable to vehicular traffic. The less refined proportional modeling technique does not account for the noise contributions from adjacent roadways, and thus, over predicts the project-generated traffic noise levels by attributing all of the noise due to traffic and traffic changes to the immediately adjacent street.

## F. THE FUTURE WITHOUT THE PROPOSED ACTIONS

Using the methodology previously described, noise levels in the No-Action condition were calculated at the five mobile source noise analysis receptors for the 2021 analysis year. These No-Action values are shown in **Table 13-6**.

**Table 13-6**
**2021 No-Action Condition Noise Levels (in dBA)**

| Receptor | Location | Time | Existing $L_{eq(1)}$ | No-Action $L_{eq(1)}$ | $L_{eq(1)}$ Change | No-Action $L_{10(1)}$ |
|---|---|---|---|---|---|---|
| 1 | Vanderbilt Avenue between East 42nd and East 43rd Streets | AM | 68.6 | 68.6 | 0.0 | 70.3 |
| | | MD | 70.2 | 70.3 | 0.1 | 71.6 |
| | | PM | 70.1 | 70.1 | 0.0 | 71.3 |
| 2 | East 42nd Street between Madison and Vanderbilt Avenues | AM | 74.8 | 75.1 | 0.3 | 77.4 |
| | | MD | 73.7 | 74.2 | 0.5 | 76.2 |
| | | PM | 75.3 | 76.1 | 0.8 | 78.3 |
| 3 | Madison Avenue between East 42nd and East 43rd Streets | AM | 79.0 | 79.4 | 0.4 | 82.7 |
| | | MD | 75.0 | 75.5 | 0.5 | 78.3 |
| | | PM | 75.9 | 76.3 | 0.4 | 79.1 |
| 4 | East 43rd Street between Madison and Vanderbilt Avenues | AM | 71.6 | 71.6 | 0.0 | 73.4 |
| | | MD | 70.0 | 70.1 | 0.1 | 71.8 |
| | | PM | 69.7 | 69.9 | 0.2 | 71.6 |
| A | 3rd Floor of 317 Madison Avenue facing Park Avenue | AM | 70.0 | 70.0 | 0.0 | 71.7 |
| | | MD | 73.0 | 73.1 | 0.1 | 73.1 |
| | | PM | 72.3 | 72.5 | 0.2 | 73.2 |

**Notes:**
Noise levels at Receptor Sites 1, 2, and 3 were calculated using proportional modeling.
Noise levels at Receptor Site 4 were calculated using TNM. At the request of the Lead Agency, noise level increases at Receptor Site A were calculated based on the TNM results at Receptor Site 4.

In 2021, the maximum increase in $L_{eq(1)}$ noise levels for the No-Action condition would be 0.8 dBA at all of the mobile source noise analysis receptors. Changes of this magnitude would be imperceptible. In terms of CEQR noise exposure guidelines, noise levels at receptor sites 1, 2, 4, and A would remain in the "marginally unacceptable" category and noise levels at receptor site 3 would remain in the "clearly unacceptable" category.

## G. THE FUTURE WITH THE PROPOSED ACTIONS

Using the methodology previously described, noise levels in the With-Action condition were calculated at the five mobile source noise analysis receptors for the 2021 analysis year. These With-Action condition values are shown in **Table 13-7**.

**Table 13-7**
**2021 With-Action Condition Noise Levels (in dBA)**

| Receptor | Location | Time | No-Action $L_{eq(1)}$ | With-Action $L_{eq(1)}$ | $L_{eq(1)}$ Change | With-Action $L_{10(1)}$ |
|---|---|---|---|---|---|---|
| 1 | Vanderbilt Avenue between East 42nd and East 43rd Streets | AM | 68.6 | 68.6 | 0.0 | 70.3 |
| | | MD | 70.3 | 70.3 | 0.0 | 71.6 |
| | | PM | 70.1 | 70.1 | 0.0 | 71.3 |
| 2 | East 42nd Street between Madison and Vanderbilt Avenues | AM | 75.1 | 75.1 | 0.0 | 77.4 |
| | | MD | 74.2 | 74.3 | 0.1 | 76.3 |
| | | PM | 76.1 | 76.1 | 0.0 | 78.3 |
| 3 | Madison Avenue between East 42nd and East 43rd Streets | AM | 79.4 | 79.4 | 0.0 | 82.7 |
| | | MD | 75.5 | 75.6 | 0.1 | 78.4 |
| | | PM | 76.3 | 76.3 | 0.0 | 79.1 |
| 4 | East 43rd Street between Madison and Vanderbilt Avenues | AM | 71.6 | 72.4 | 0.8 | 74.2 |
| | | MD | 70.1 | 71.4 | 1.3 | 73.1 |
| | | PM | 69.9 | 70.4 | 0.5 | 72.1 |
| A | 3rd Floor of 317 Madison Avenue facing Park Avenue | AM | 70.0 | 70.8 | 0.8 | 72.5 |
| | | MD | 73.1 | 74.4 | 1.3 | 74.4 |
| | | PM | 72.5 | 73.0 | 0.5 | 73.7 |

**Notes:**
Noise levels at Receptor Sites 1, 2, and 3 were calculated using proportional modeling.
Noise levels at Receptor Site 4 were calculated using TNM. At the request of the Lead Agency, noise level increases at Receptor Site A were calculated based on the TNM results at Receptor Site 4.

In 2021, comparing the No-Action condition with the With-Action condition, the maximum increase in $L_{eq(1)}$ noise levels would be 1.3 dBA at all of the mobile source noise analysis receptors. Changes of this magnitude would be barely perceptible. In terms of CEQR noise exposure guidelines, noise levels at receptor sites 1, 2, 4, and A would remain in the "marginally unacceptable" category and noise levels at receptor site 3 would remain in the "clearly unacceptable" category. Changes in the predicted With-Action noise levels from those presented in the Draft Environmental Impact Statement (DEIS) resulted from changes in the No-Action condition traffic analysis. The No-Action and With-Action traffic levels increased slightly compared with the traffic levels reported in the DEIS. This resulted in a slight decrease in the ratio of With-Action to No-Action traffic levels, which in turn resulted in a slight decrease in predicted noise level increment.

### NOISE ATTENUATION MEASURES FOR THE PROPOSED DEVELOPMENT

The *CEQR Technical Manual* has set noise attenuation requirements for buildings based on exterior noise levels. Recommended noise attenuation values for buildings are designed to maintain interior noise levels of 50 dBA (45 dBA or lower for residential uses) or lower for commercial uses, and are determined based on exterior $L_{10(1)}$ noise levels. Based on measured exterior noise levels and *CEQR* criteria, the necessary attenuation for each façade of the proposed building has been calculated. The required attenuation levels at each of the receptor sites used for evaluation of noise attenuation requirements are shown in **Table 13-8**. The required attenuation levels are based on Weekday peak periods when noise increases due to vehicular traffic would be expected to be greatest.

**Table 13-8**
**Required Attenuation at Noise Measurement Locations under *CEQR* Criteria**

| Receptor # | Location | Highest Calculated With-Action $L_{10(1)}$ Value | Minimum Required Attenuation (dBA) |
|---|---|---|---|
| 1 | Vanderbilt Avenue between East 42nd and East 43rd Streets | 71.6 | 23 |
| 2 | East 42nd Street between Madison and Vanderbilt Avenues | 78.3 | 30 |
| 3 | Madison Avenue between East 42nd and East 43rd Streets | 82.7 | 34 |
| 4 | East 43rd Street between Madison and Vanderbilt Avenues | 74.2 | 26 |
| A | 3rd Floor of 317 Madison Avenue facing Park Avenue | 74.4 | 26 |

**Note:**
Attenuation values are shown for commercial uses; residential uses would require 5 dBA more.

Attenuation would be required at all receptor sites to achieve interior noise levels of 45 dBA or lower for residential and classroom uses and 50 dBA or lower for commercial uses. Based on the values shown in **Table 13-8**, required attenuation levels were determined for all building façades and elevations. The attenuation requirements for higher elevations were calculated by subtracting 3 dBA from the measured $L_{10}$ noise levels to calculated the $L_{10}$ noise levels at 101 feet above street level and then again for each doubling of height above street level. Then the minimum required attenuation under CEQR criteria was applied to these calculated $L_{10}$ noise levels. These values are shown in **Table 13-9**.

*BUILDING ATTENUATION IMPLEMENTATION*

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. Normally, a building façade consists of wall, glazing, and any vents or louvers associated with the building mechanical systems in various ratios of area. Currently, the proposed design for the building includes acoustically rated windows and air conditioning as an alternate means of ventilation. The proposed building's façades, including these elements, would be designed to provide a composite Outdoor-Indoor Transmission Class (OITC) rating[1] greater than or equal to those listed in above in **Tables 13-8 and 13-9**, along with an alternative means of ventilation. By adhering to these design specifications, the proposed building will thus provide sufficient attenuation to achieve the CEQR interior noise level guideline of 50 dBA or lower for commercial uses, which would be considered acceptable according to CEQR interior noise level guidelines.

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[1] The OITC classification is defined by ASTM International (ASTM E1332) and provides a single-number rating that is used for designing a building façade including walls, doors, glazing, and combinations thereof. The OITC rating is designed to evaluate building elements by their ability to reduce the overall loudness of ground and air transportation noise.

**Table 13-9**
**Required Attenuation for Proposed One Vanderbilt Development**

| Façade(s) | Representative Receptor Site | Elevation (in feet) | Calculated $L_{10(1)}$ Noise Levels | CEQR Minimum Required Attenuation (in dBA)[1] |
|---|---|---|---|---|
| North | 4 | 0 to 100 | 74.2 | 26 |
| | | 101 to 200 | 71.2 | 23 |
| | | 201 to top | 68.2 | N/A[2] |
| East | 1, A | 0 to 100 | 74.4 | 26 |
| | | 101 to 200 | 71.4 | 23 |
| | | 201 to top | 68.4 | N/A[2] |
| South | 2 | 0 to 100 | 78.3 | 30 |
| | | 101 to 200 | 75.3 | 26 |
| | | 201 to 400 | 72.3 | 23 |
| | | 401 to top | 69.3 | N/A[2] |
| West | 3 | 0 to 100 | 82.7 | 34 |
| | | 101 to 200 | 79.7 | 30 |
| | | 201 to 400 | 76.7 | 28 |
| | | 401 to 800 | 73.7 | 26 |
| | | 801 to top | 70.7 | 23 |

**Note:**
[1]Attenuation values are shown for commercial uses; residential or community facility uses would require 5 dBA more.
[2]"N/A" indicates that the maximum measured $L_{10}$ is below 70 dBA. The *CEQR Technical Manual* does not address noise levels this low, therefore there is no minimum attenuation guidance.

The required CEQR building attenuation levels would be mandated by (E) designations specifying the appropriate amount of window/wall attenuation. The text of the (E) designation (E-357) for the One Vanderbilt building (located on Block 1277, Lots 20, 27, 46, and 52) would be as follows:

"In order to ensure an acceptable interior noise environment, future commercial uses must provide up to 34 dB(A) of window/wall attenuation with windows closed, in order to achieve interior noise levels of 50 dB(A). The minimum required window/wall attenuation for future residential uses would be 5 dB(A) more than that for commercial uses. To maintain a closed window condition, an alternate means of ventilation that brings outside air into the building without degrading the acoustical performance of the building façade(s) must also be provided. The specific attenuation requirements to be implemented throughout the project's building façades are provided in the *Vanderbilt Corridor and One Vanderbilt EIS*, **Table 13-9**."

## NOISE LEVELS AT THE PUBLIC PLACE ON VANDERBILT AVENUE

Based on the predicted noise levels at receptor site 2, noise levels within the public place on Vanderbilt Avenue created by the proposed actions and improved as part of the One Vanderbilt development are expected to be above 55 dB(A) $L_{10(1)}$. This exceeds the recommended noise level for outdoor areas requiring serenity and quiet contained in the *CEQR Technical Manual* noise exposure guidelines (see **Table 13-2**). In the With-Action condition, $L_{10(1)}$ values at the proposed open space would be in the 70s dB(A). Because the dominant noise at the development site would be from traffic noise, there are no practical and feasible mitigation measures that could be implemented to reduce noise levels to below the CEQR 55 dB(A) $L_{10(1)}$ guidelines within the proposed public space. Although noise levels in this area would be above the guideline noise levels, they would be comparable to noise levels in a number of existing open space areas that are located adjacent to roadways, including Bryant Park, Hudson River Park, Riverside Park, Fort Greene Park, and other urban open space areas. The guidelines are a worthwhile goal for outdoor areas requiring serenity and quiet. However, due to the level of activity present at most New York City open space areas and parks, a relatively low noise level is often not achieved. Therefore, the future projected noise levels would not constitute a significant adverse noise impact to the proposed public place on Vanderbilt Avenue.

## MECHANICAL EQUIPMENT

It is assumed that the building's mechanical systems (i.e., HVAC systems) would be designed to meet all applicable noise regulations (i.e., Subchapter 5, §24-227 of the New York City Noise Control Code, the New York City Department of Buildings [DOB] Code) and to avoid producing levels that would result in any significant increase in ambient noise levels. Therefore, the proposed development would not result in any significant adverse noise impacts related to building mechanical equipment. ✷