A. INTRODUCTION

This chapter assesses the potential for the Proposed Action to result in significant adverse noise impacts. As described in **Chapter 1, "Project Description,"** the Proposed Action includes a zoning map amendment to facilitate the construction of a mixed-use development comprising approximately 238,104 gross square feet (gsf) of commercial/manufacturing uses (the "Proposed Project") at 1160 Flushing Avenue (Block 3167, Lots 18 and 24), a 37,928-sf rectangular-shaped lot ("Projected Development Site 1") with frontage on Flushing Avenue and Jefferson Street in the Bushwick neighborhood of Brooklyn Community District 4. The Proposed Project would consist of a single-story building and a nine-story building separated by a pedestrian alleyway. The single-story structure and first two floors and cellar floor of the nine-story building would contain a combined total of approximately 75,586 gsf of retail uses; the second and third floors of the proposed nine-story building would contain approximately 40,732 gsf of light industrial uses; and the remaining floors (three through nine) of the proposed nine-story building would contain approximately 121,786 gsf of commercial office uses. In addition to the Applicant-owned Projected Development Site 1, the proposed zoning map amendment would rezone three additional sites not under the control of the Applicant (Block 3167, Lots 26, 29, and 40), two of which (Lots 29 and 40) are anticipated to be redeveloped with approval of the Proposed Action. It is anticipated that Lot 29 ("Projected Development Site 2") would be redeveloped with a six-story commercial building comprising approximately 79,821 gsf of office space and 16,730 gsf of retail space, and Lot 40 ("Projected Development Site 3") would be redeveloped with a five-story commercial building comprising approximately 32,547 gsf of office space and 6,250 gsf of retail space.

As discussed in **Chapter 4, "Transportation,"** approval of the Proposed Action would change traffic patterns and volumes in the general vicinity of the Project Area. As local vehicular traffic is a major source of ambient noise in the area, this could lead to changes in the ambient noise levels. According to the 2021 *CEQR Technical Manual*, if existing noise passenger car equivalent (PCE) values are increased by 100 percent or more due to a proposed action (which is equivalent to an increase of 3.0 dBA or more) a detailed analysis is generally warranted. Conversely, if existing noise PCE values are not increased by 100 percent or more it is likely that a proposed action would not cause a significant adverse vehicular noise impact, and therefore no further vehicular noise analysis is needed.

The noise analysis for the Proposed Action was carried out in compliance with *CEQR Technical Manual* guidelines and has two components:

1. A screening analysis to determine whether traffic generated by the Proposed Action would have the potential to result in significant adverse noise impacts on existing sensitive receptors;

2. An analysis to determine the level of building attenuation necessary to ensure that interior noise levels for the projected developments satisfy applicable interior noise criteria. This attachment does not include an analysis of mechanical equipment because such mechanical equipment would be designed to meet all applicable noise regulations and, therefore, would not result in adverse noise impacts.

B. PRINCIPAL CONCLUSIONS

Noise from the increased traffic volumes generated by the Proposed Action and resultant reasonable worst-case development scenario (RWCDS) would not cause significant adverse noise impacts as the relative increase in noise levels would fall below the applicable *CEQR Technical Manual* significant adverse impact threshold (3.0 dBA).

Based on the calculated With-Action L_{10} noise levels, the following composite window/wall attenuations were determined for future community facility uses as well as commercial office uses at the projected development sites:

- A minimum of 28 dBA composite window/wall attenuation must be provided on all facades facing Flushing Avenue and all facades facing Wyckoff Avenue and Irving Avenue within 50 feet of Flushing Avenue to maintain an interior noise level not greater than 45 dBA for community facility uses or not greater than 50 dBA for commercial office uses at Projected Development Site 1.
- A minimum of 31 dBA composite window/wall attenuation must be provided on all facades facing Wyckoff Avenue and all facades facing Flushing Avenue and Jefferson Street within 50 feet of Wyckoff Avenue, and a minimum of 28 dBA composite window/wall attenuation on all facades facing Flushing Avenue beyond 50 feet of Wyckoff Avenue and all facades facing Irving Avenue within 50 feet of Flushing Avenue to maintain an interior noise level not greater than 45 dBA for community facility uses or not greater than 50 dBA for commercial office uses at Projected Development Site 2.
- A minimum of 31 dBA composite window/wall attenuation must be provided on all facades facing Wyckoff Avenue and all facades facing Flushing Avenue and Jefferson Street within 50 feet of Wyckoff Avenue to maintain an interior noise level not greater than 45 dBA for community facility uses or not greater than 50 dBA for commercial office uses at Projected Development Site 3.
- No special attenuation measures beyond standard construction practices would be required for community facility uses or commercial office uses on any other frontages within the Project Area.

The composite window/wall noise attenuations described above would be required through the assignment of an (E) designation (E-674). With implementation of the attenuation levels outlined above and described in **Table 6-7**, the projected development sites would provide sufficient attenuation to achieve the *CEQR Technical Manual* interior noise level guidelines. Therefore, the Proposed Action would not result in any significant adverse impacts related to noise attenuation.

C. ACOUSTICAL FUNDAMENTALS

Sound is a fluctuation in air pressure. Sound pressure levels (SPLs) 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 one 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 6-1**, 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.

In considering these values, it is important to note that the dBA scale is logarithmic, meaning that each increase of ten 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 three dBA. At three dBA, the change will be readily noticeable.

Noise Descriptors Used In Impact Assessment

As the SPL 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., one 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. The Day-Night Sound Level (L_{dn}) refers to a 24-hour average noise level with a ten dB penalty applied to the noise levels during the hours between 10 PM and 7 AM, due to increased sensitivity to noise levels during these hours. 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 one, ten, 50, 90, and x percent of the time, respectively.

TABLE 6-1
Noise Levels of Common Sources

Sound Source	SPL (dBA)
Air raid siren at 50 feet	120
Maximum Levels at Rock Concerts (Rear Seats)	110
On Platform by Passing Subway Train	100
On Sidewalk by Passing Heavy Truck or Bus	90
On Sidewalk by Typical Highway	80
On Sidewalk by Passing Automobiles with Mufflers	70
Typical Urban Area	60-70
Typical Suburban Area	50-60
Quiet Suburban Area at Night	40-50
Typical Rural Area at Night	30-40
Isolated Broadcast Studio	20
Audiometric (Hearing Testing) Booth	10
Threshold of hearing	0

Note: A change n 3 dBA is a just noticeable change in SPL. A change in 10 dBA is perceived as a doubling or halving of SPL.
Source: Cowan, James P. *Handbook of Environmental Acoustics,* Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

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 ten 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 the Proposed Action and resultant RWCDS, the maximum one-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in this noise impact evaluation. $L_{eq(1)}$ is the noise descriptor recommended for use in the *CEQR Technical Manual* for vehicular traffic and is used to provide an indication of highest expected sound levels. The one-hour L_{10} is the noise descriptor used in the *CEQR Technical Manual* noise exposure guidelines for city environmental impact review classification. The L_{dn} is the noise descriptor used in the *HUD Noise Guidebook* and sets exterior noise standards for housing construction projects receiving federal funds. As the Proposed Project and non-Applicant-owned projected development sites are not anticipated to include federal sources of funding in the future, only the required attenuation levels to meet CEQR noise guidelines are provided in this chapter.

D. APPLICABLE NOISE CODES AND NOISE STANDARDS AND CRITERIA

New York City Noise Code

The New York City Noise Control Code, which was enacted in December 2005 and became effective July 2007, defines "unreasonable and prohibited noise standards and decibel levels" for the City of New York. The Noise Code generally seeks to reduce ambient noise, prohibiting all unreasonable and unnecessary noise and addressing construction hours and activities. It also (1) establishes sound level standards for specific noise sources, such as motor vehicles, air compressors, and construction activities; (2) requires that all exhausts be muffled; and (3) prohibits all unnecessary noise adjacent to schools, hospitals, or courts. It specifies maximum allowable SPLs for designated octave bands emanating from a commercial or business enterprise as measured within a receiving property (such as a mixed-use and residential property). The Noise Code's enforcement is driven by complaints of violations.

New York CEQR Technical Manual Noise Standards

The *CEQR Technical Manual* sets external noise exposure standards, which are shown in **Table 6-2** below. Noise exposure is classified into four categories based on the L_{10}: Acceptable, Marginally Acceptable, Marginally Unacceptable, and Clearly Unacceptable. The *CEQR Technical Manual* Noise Exposure Guidelines shown in **Table 6-2** are guidelines, not a law. However, City reviewing agencies use the guidelines in determining potential impacts when a project comes under their review.

The *CEQR Technical Manual* also defines attenuation requirements for buildings based on exterior noise levels (see **Table 6-3**). Recommended noise attenuation values for buildings are designed to maintain interior noise levels of 45 dBA or lower for residential, hotel, or community facility uses and interior noise levels of 50 dBA or lower for commercial office uses, and are determined based on exterior $L_{10(1)}$ noise levels.

TABLE 6-2
Noise Exposure Guidelines for Use in City Environmental Impact Review[1]

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
1. Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	---------- DNL $\leq$ 60 dBA ----------						
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		55 < $L_{10} \leq$ 65 dBA	---------- 60 < DNL $\leq$ 65 dBA ----------	65 < $L_{10} \leq$ 80 dBA	(1) 65 < DNL $\leq$ 75 dBA,	L_{10} > 80 dBA	---------- 75 dBA < DNL ----------
3. Residence, residential hotel or motel	7 AM to 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 to 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 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)	
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-10PM)	
6. Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

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

Notes:

(i) In addition, any new activity shall comply with the Impact Thresholds detailed in Section 410 of Chapter 19, "Noise," of the *CEQR Technical Manual*.

[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 old-age homes.

[3] One may use the 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).

TABLE 6-3
Required Attenuation Values to Achieve Acceptable Interior Noise Level

	Marginally Unacceptable				Clearly Unacceptable
Vehicular Traffic	$70<L_{10}\leq73$	$73<L_{10}\leq76$	$76<L_{10}\leq78$	$78<L_{10}\leq80$	$80<L_{10}$
Aircraft[A]	65<DNL≤68	68<DNL≤71	71<DNL≤73	73<DNL≤75	75<DNL
Train	$65<L_{dn}\leq68$	$68<L_{dn}\leq71$	$71<L_{dn}\leq73$	$73<L_{dn}\leq75$	$75<L_{dn}$
Attenuation[B]	(I) 28 dB(A)	(II) 31 dB(A)	(III) 33 dB(A)	(IV) 35 dB(A)	See note[C]

Source: DEP; 2021 *CEQR Technical Manual*, Table 19-3.
Notes:
[A] DNL descriptor based on average values of L_{dn} over a year period.
[B] The above composite window-wall attenuation values are for residential dwellings and community facility development. Commercial office spaces and meeting rooms would be 5.0 dB(A) less in each category. All the above categories require a closed window situation and, hence, an alternate means of ventilation.
[C] The required attenuation value is the difference between L_{huild} and $L_{interior}$, using the appropriate noise descriptor
Where:
L_{build} is the projected noise level under the build condition rounded up to the whole number
$L_{interior}$ is the designed interior noise level (45 dBA for vehicular noise, 40 dBA for aircraft and train noise)

E. METHODOLOGY

Noise Prediction Methodology

Future No-Action and With-Action noise levels were calculated using a proportional modeling technique, which is used as a screening tool to estimate changes in noise levels. The proportional modeling technique is an analysis methodology recommended for analysis purposes in the *CEQR Technical Manual.*

Using the proportional modeling 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 Action (the No-Action condition) and with the Proposed Action (the With-Action condition). Vehicular traffic volumes are converted into 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, 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:

F NL - E NL = 10 * log10 (F PCE / E PCE)

where:

F NL = Future Noise Level
E NL = Existing Noise Level
F PCE = Future PCEs
E PCE = Existing 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 PCEs. For example, assume that traffic is the dominant noise source at a particular location. If the existing traffic volume on a street is 100 PCEs and if the future traffic volume were increased by 50 PCEs (to a total of 150 PCEs), the noise level would increase by 1.8 dBA. Similarly, if the future traffic were increased by 100 PCEs, or doubled to a total of 200 PCEs, the noise level would increase by 3.0 dBA.

For the purpose of this analysis, during the noise recording, vehicles were counted and classified. To calculate the 2027 No-Action PCE values, an annual background growth rate of 0.5 percent for years one through five and a growth rate of 0.25 percent for year six, plus the estimated incremental travel demand from new development within the vicinity of the Project Area (refer to **Table 2-3** and **Figure 2-4** in **Chapter 2, "Land Use, Zoning, and Public Policy"**) was applied to the counted PCE values based on the existing and No-Action vehicle volumes presented in **Chapter 4, "Transportation."**[1] In order to obtain the necessary 2027 With-Action PCE values to calculate the With-Action noise levels, the 2027 With-Action traffic increment assignments presented in **Chapter 4, "Transportation,"** were converted into PCE values and added to the calculated No-Action PCE values.

Building Attenuation Analysis Procedure

In general, the following procedure was used in performing the *CEQR Technical Manual* building attenuation analysis:

- Noise-sensitive receptor locations that have the greatest potential for being adversely affected by action-generated noise in the 2027 analysis year and the location of dominant sources of ambient noise were identified;
- Noise receptor locations were selected based on the following criteria: (1) locations where the highest noise levels are likely to occur based upon the consideration of existing land use patterns (e.g., locations near major commercial roadways, industrial uses, or stationary sources, etc.); and (2) along future street frontages of the projected development sites;
- Existing noise levels were determined through field measurements of ambient noise adjacent to the projected development sites;
- Future (2027) noise levels without the Proposed Action were predicted using the PCE-based proportionality equation (per *CEQR Technical Manual* guidelines) for all locations where local traffic is the dominant source of noise and were based on the 2027 No-Action vehicle trip assignments presented in **Chapter 4, "Transportation**";
- Future (2027) noise levels with the Proposed Action were predicted using the PCE-based proportionality equation (per *CEQR Technical Manual* guidelines) based on the 2027 With-Action vehicle trip assignments presented in **Chapter 4, "Transportation"**;
- Future (2027) noise levels with the Proposed Action were compared with future noise levels without the Proposed Action to determine, by applying *CEQR Technical Manual* impact criteria, whether the Proposed Action and resultant RWCDS would have the potential to result in a significant adverse impact;
- Noise levels were determined for exterior building façades at the projected development sites; and
- In compliance with CEQR requirements to determine an acceptable interior space noise environment, façade-based composite window/wall attenuation specifications for the projected development sites were estimated based on future projected maximum exterior noise exposure at the projected development sites; CEQR requirements are based on the maximum L_{10} values.

[1] Calculation according to Table 16-4 in the *CEQR Technical Manual.*

F. EXISTING NOISE LEVELS

According to the RWCDS, three projected development sites have been identified within the Project Area and no other development is anticipated. Projected Development Site 1 (Block 3167, Lots 18 and 24) is an Applicant-owned through-lot located on the mid-block with frontage on two streets, including approximately 221.5 feet along Flushing Avenue to the west and approximately 216 feet along Jefferson Street to the east (see **Figure 6-1**). The approximately 37,928-sf development site is currently occupied by one single-story vacant industrial (warehouse) building and a small portion (approximately 3,750-sf) of vacant, underdeveloped land on the northernmost portion of the site.

As shown in **Figure 6-1**, Projected Development Site 2 (Block 3167, Lot 29) is a corner lot located on the northwestern portion of the block and is not owned or controlled by the Applicant. The approximately 18,530-sf lot contains frontages on both Flushing Avenue (to the west) and Wyckoff Avenue (to the north) and is currently occupied by a single-story building that, according to New York City Department of Buildings (DOB) records, is currently undergoing a conversion from industrial (warehouse) uses to commercial retail uses (DOB job no. 340525300), which will result in a building containing approximately 20,475 gsf of commercial retail space. Projected Development Site 3 (Block 3167, Lot 40) is a corner lot located on the northeastern portion of the block and is also not owned or controlled by the Applicant. The approximately 7,450-sf lot contains frontages on both Wyckoff Avenue (to the north) and Jefferson Street (to the east) and is currently occupied by a single-story warehouse building containing approximately 7,613 gsf of industrial uses. In addition, a small, northeastern portion of Lot 40 is encumbered by a Real Estate of Utility Companies (REUC) easement due to the location of street stairs serving the L-line's Jefferson Street Station.

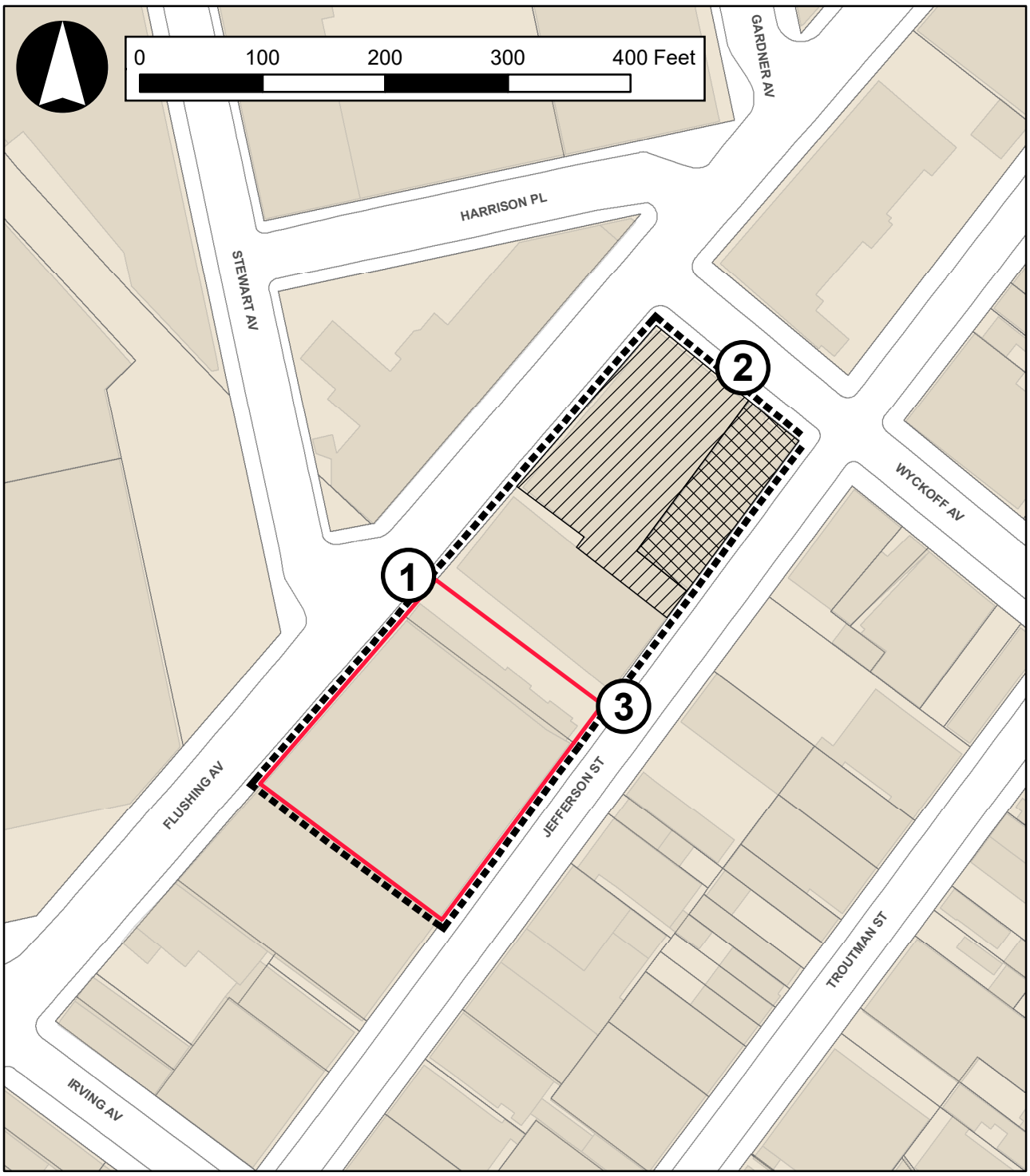
Noise Monitoring Locations

As traffic along Flushing Avenue, Wyckoff Avenue, and Jefferson Street is the dominant source of noise in the vicinity of the Project Area, the noise receptor locations were selected based upon the assumption that the future developments within the Proposed Rezoning Area would be built to their respective lot lines. As such, existing noise levels at the Project Area were measured at three locations along Flushing Avenue, Wyckoff Avenue, and Jefferson Street. These locations are shown in **Figure 6-1** described below:

- Receptor Location 1 – Future western frontage of Applicant-owned Projected Development Site 1 and non-Applicant-owned Projected Development Site 2 (Flushing Avenue); approximate midpoint of frontage (approximately 270 feet south of Wyckoff Avenue);
- Receptor Location 2 – Future northern frontage of non-Applicant-owned Projected Development sites 2 and 3 (Wyckoff Avenue); approximate midpoint of frontage (approximately 70 feet east of Flushing Avenue); and
- Receptor Location 3 – Future eastern frontage of Applicant-owned Projected Development Site and non-Applicant-owned Projected Development Site 3 (Jefferson Street); approximate midpoint of frontage (approximately 270 feet south of Wyckoff Avenue).

At all receptor locations, 20-minute spot noise measurements were performed during the weekday AM (7:30 – 8:30 AM), midday (1:00 – 2:00 PM), and PM (4:00 – 5:00 PM) peak periods. The noise monitoring occurred on Thursday, November 5, 2020. The weather was partly cloudy and in the high-50s°F on November 5, with a wind speed average of nine miles per hour. Additionally, vehicle classification counts

Noise Monitoring Locations



Legend

- Projected Development Site 1
- Projected Development Site 2
- Projected Development Site 3
- Project Area
- (1) Noise Receptor Location

were conducted during the 20-minute measurements, which were used in the proportional modeling analysis.

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 had a laboratory calibration date within one year of the time of use. For the three receptor locations, the microphones 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 SLMs were calibrated before and after readings with a Brüel & Kjær Type 4231 Sound Level Calibrator using the appropriate adaptor. Measurements at each location were made on the A-scale (dBA). 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, as well as ⅓-octave bands. 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

Noise monitoring results for Receptor Locations 1 through 3 are summarized in **Table 6-4**. Traffic was the dominant noise source and the values shown reflect the level of vehicular activity on the respective thoroughfares adjacent to the Project Area. Vehicular traffic volumes were counted during the noise recording for each peak period and converted into hourly PCE values.

TABLE 6-4
Existing Noise Levels (dBA)

Receptor[1]	Measurement Location	Time[2]	L_{eq}	L_1	L_{10}[3]	L_{50}	L_{90}	CEQR Noise Exposure Category[4]
1	Flushing Avenue	AM	66.54	75.99	69.64	63.68	55.69	Marginally Unacceptable (I)[5]
		MD	70.10	83.63	69.06	61.99	58.17	
		PM	72.44	79.56	**70.63**	63.39	54.95	
2	Wyckoff Avenue	AM	68.63	79.33	70.73	63.81	57.47	Marginally Unacceptable (II)
		MD	73.44	85.13	**73.46**	64.21	58.91	
		PM	68.05	79.18	69.85	64.21	60.55	
3	Jefferson Street	AM	56.47	65.35	59.37	53.04	50.76	Acceptable
		MD	56.98	65.94	60.62	53.63	50.97	
		PM	59.86	68.60	**63.22**	56.22	53.38	

Notes: Field measurements were performed by Philip Habib & Associates on Thursday, November 5, 2020.
[1] Receptor locations shown in **Figure 6-1**.
[2] AM = weekday AM peak period; MD = weekday midday peak period; PM = weekday PM peak period.
[3] The highest measured noise level at each receptor is indicated in **bold.**
[4] For consistency purposes, the CEQR noise exposure categories for existing, No-Action, and With-Action conditions are based on the community facility noise exposure guidelines; reflects the worst-case peak hour noise levels.
[5] As the highest existing L_{eq} noise levels at Receptor Location 1 (72.44 dBA) during the weekday PM peak period exceeds that of the corresponding highest existing L_{10} noise level (70.63 dBA), the higher L_{eq} noise levels were used in place of the highest L_{10} noise levels to determine the appropriate CEQR Noise Exposure category, and thus, any relevant noise attenuation requirements.

As shown in **Table 6-4**, the results of the monitoring indicated that noise levels are generally highest during the weekday midday and PM peak periods. The highest L_{10} noise levels were observed at Receptor

Location 2, measuring 73.46 dBA in the weekday midday peak period. Existing L_{10} noise levels at Receptor Location 1 ranged from 69.06 dBA to 70.63 dBA, placing it in the "Marginally Unacceptable (I)" CEQR Noise Exposure category. Existing L_{10} noise levels at Receptor Location 2 ranged from 69.85 dBA to 73.46 dBA, placing it in the "Marginally Unacceptable (II)" CEQR Noise Exposure category. Existing L_{10} noise levels at Receptor Location 3 ranged from 59.37 dBA to 63.22 dBA, placing it in the "Acceptable" CEQR Noise Exposure category.

G. THE FUTURE WITHOUT THE PROPOSED ACTION (NO-ACTION CONDITION)

Mobile Source Noise Screening Analysis

In the 2027 future without the Proposed Action (the No-Action condition), it is assumed that while no new construction would be planned for the Applicant-owned Projected Development Site 1, the currently vacant, approximately 30,388 sf former industrial building on Lots 18 and 24 would be converted and reoccupied with commercial retail uses in the No-Action condition. As a result, the Projected Development Site 1 would be occupied by approximately 31,907 gsf (30,388 zsf) of commercial retail uses on a 37,928-sf lot (0.80 FAR). No other changes to the remaining Project Area lots are anticipated in the future without the Proposed Action. As such, traffic patterns and volumes under the No-Action condition are expected to differ slightly from existing conditions. As vehicle noise emissions on adjacent roadways are the dominant source of noise at Receptor Locations 1 through 3, the change in traffic patterns is expected to affect the levels of ambient noise at those locations. Using the noise prediction methodology described in Section E above, future noise levels in the No-Action condition were calculated for the three analysis periods for the 2027 analysis year. **Table 6-5** shows the measured existing noise levels and calculated future No-Action condition noise levels at the receptor locations.

TABLE 6-5
2027 No-Action Condition Noise Levels and PCE Values (dBA)

Noise Receptor Location[1]	Time[2]	Existing PCEs	No-Action PCEs	Existing L_{eq}	No-Action L_{eq}	Change in L_{eq}[3]	No-Action L_{10}[4]	CEQR Noise Exposure Category
1	AM	4122	4356	66.54	66.78	0.24	69.88	Marginally Unacceptable (I)[5]
	MD	6956	7453	70.10	70.40	0.30	69.36	
	PM	2585	2750	72.44	72.71	0.27	**70.90**	
2	AM	1193	1245	68.63	68.82	0.19	70.92	Marginally Unacceptable (II)
	MD	1429	1535	73.44	73.75	0.31	**73.77**	
	PM	351	386	68.05	68.46	0.41	70.26	
3	AM	232	261	56.47	56.98	0.51	59.88	Acceptable
	MD	266	305	56.98	57.57	0.59	61.21	
	PM	381	429	59.86	60.38	0.52	**63.74**	

Notes:
[1] Receptor locations shown in **Figure 6-1**.
[2] AM = weekday AM peak period; MD = weekday midday peak period; PM = weekday PM peak period.
[3] Change in L_{eq} = No-Action L_{eq} – Existing L_{eq}.
[4] The highest No-Action noise level at each receptor is indicated in **bold.**
[5] As the highest No-Action L_{eq} noise levels at Receptor Location 1 (72.71 dBA) during the weekday PM peak period exceeds that of the corresponding highest No-Action L_{10} noise level (70.90 dBA), the higher L_{eq} noise levels were used in place of the highest L_{10} noise levels to determine the appropriate CEQR Noise Exposure category, and thus, any relevant noise attenuation requirements.

Comparing future No-Action noise levels with existing noise levels, the increases in L_{eq} noise levels at the three receptor locations would be minimal, ranging from 0.19 dBA to 0.59 dBA for all analysis periods. According to *CEQR Technical Manual* guidelines, increases of less than 3.0 dBA would be barely

perceptible. The projected No-Action L_{10} noise levels at Receptor Location 1 would range from 69.36 dBA to 70.90 dBA and would remain in the "Marginally Unacceptable (I)" CEQR Noise Exposure category, as under existing conditions; projected L_{10} noise levels at Receptor Location 2 would range from 70.26 dBA to 73.77 dBA and would remain in the "Marginally Unacceptable (II)" CEQR Noise Exposure category; and projected L_{10} noise levels at Receptor Location 3 would range from 59.88 dBA to 63.74 dBA and would remain in the "Acceptable" CEQR Noise Exposure category.

H. THE FUTURE WITH THE PROPOSED ACTION (WITH-ACTION CONDITION)

In the 2027 future with the Proposed Action (the With-Action scenario), the proposed zoning map amendment would be approved, allowing the Applicant to construct the Proposed Project (5.0 FAR) at Projected Development Site 1. However, as discussed above, it is conservatively assumed that the Proposed Action would result in the development of a new mixed-use building with a built FAR of up to 6.5.

In addition, it is assumed that Projected Development Site 2 (Lot 29) and Projected Development Site 3 (Lot 40) would each be redeveloped in the 2027 With-Action scenario. It is anticipated that Projected Development Site 2 would be redeveloped with a six-story, 5.0 FAR predominantly commercial office building with ground-floor retail uses comprising approximately 79,821 gsf of office space and 16,730 gsf of retail space, and Projected Development Site 3 would be redeveloped with a five-story, 5.0 FAR predominantly commercial office building with ground-floor retail uses comprising approximately 32,547 gsf of office space and 6,250 gsf of retail space. As a result, the total With-Action development scenario for the Project Area would include approximately 234,154 gsf of commercial office uses, 98,566 gsf of retail uses, 40,732 gsf of light industrial uses, and 59,973 gsf of community facility (medical office) uses.

Mobile Source Noise Screening Analysis

Using the methodology described in Section E, future noise levels in the With-Action condition were calculated for the three analysis periods for the 2027 analysis year, which are presented in **Table 6-6**. As presented in the table, after accounting for additional traffic introduced by the Proposed Action, the maximum projected L_{10} noise level in the With-Action condition would be 73.99 dBA during the midday weekday peak period at Receptor Location 2. Therefore, the highest noise level would remain in the "Marginally Unacceptable (II)" CEQR Noise Exposure category. The maximum projected noise levels in the With-Action condition at Receptor Location 1 would be 72.96 dBA, and thus would remain in the "Marginally Unacceptable (I)" CEQR Noise Exposure category, as under existing and No-Action conditions. The maximum projected L_{10} noise levels in the With-Action condition at Receptor Location 3 would be 64.28 dBA, and thus, would remain in the "Acceptable" CEQR Noise Exposure category, as under existing and No-Action conditions.

Furthermore, comparing the future With-Action noise levels with No-Action noise levels, increases in L_{eq} noise levels would vary at the three receptor locations, ranging from 0.14 to 0.85 dBA. However, increases of these magnitudes would not be perceptible as they are less than 3.0 dBA, and based upon CEQR impact criteria would not be significant. As the noise levels at all receptor locations would experience changes of less than 3.0 dBA in all peak hours, the overall changes to noise levels as a result of the Proposed Action would not result in any significant adverse impacts.

TABLE 6-6
2027 No-Action and With-Action Condition Noise Levels and PCE Values (dBA)

Noise Receptor Location[1]	Time[2]	No-Action PCEs	With-Action PCEs	No-Action L_{eq}	With-Action L_{eq}	Change in L_{eq}[3]	With-Action L_{10}[4]	CEQR Noise Exposure Category
1	AM	4356	4668	66.78	67.08	0.30	70.18	Marginally Unacceptable (I)[5]
	MD	7453	7693	70.40	70.54	0.14	69.50	
	PM	2750	2915	72.71	72.96	0.25	**71.15**	
2	AM	1245	1399	68.82	69.32	0.51	71.42	Marginally Unacceptable (II)
	MD	1535	1615	73.75	73.97	0.22	**73.99**	
	PM	386	469	68.46	69.31	0.85	71.11	
3	AM	261	306	56.98	57.67	0.69	60.57	Acceptable
	MD	305	333	57.57	57.96	0.38	61.60	
	PM	429	486	60.38	60.92	0.54	**64.28**	

Notes:
[1] Receptor locations shown in **Figure 6-1**.
[2] AM = weekday AM peak period; MD = weekday midday peak period; PM = weekday PM peak period.
[3] Change in L_{eq} = With-Action L_{eq} – No-Action L_{eq}.
[4] The highest With-Action noise level at each receptor is indicated in **bold.**
[5] As the highest With-Action L_{eq} noise levels at Receptor Location 1 (72.96 dBA) during the weekday PM peak period exceeds that of the corresponding highest With-Action L_{10} noise level (71.15 dBA), the higher L_{eq} noise levels were used in place of the highest L_{10} noise levels to determine the appropriate CEQR Noise Exposure category, and thus, any relevant noise attenuation requirements.

I. NOISE ATTENUATION REQUIREMENTS

As shown in **Table 6-3**, the *CEQR Technical Manual* has noise attenuation guidance for buildings based on exterior noise levels. Recommended noise attenuation values for buildings are designed to maintain a maximum interior noise level of 45 dBA or lower for community facility uses and 50 dBA or lower for commercial office uses, and are determined based on exterior L_{10} noise levels. Results of the building attenuation analysis are summarized in **Table 6-7** and **Figure 6-2**.

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. Typically, a building façade is composed of the wall, windows, and any vents or louvers for HVAC systems in various ratios of area. Since the proposed project would most likely be of masonry construction, which typically provides a high level of sound attenuation, the attenuation requirements for CEQR purposes apply primarily to the windows, but may also represent a composite window/wall attenuation value. Window/Wall attenuation can be described in terms of sound transmission class (STC), transmission loss (TL), and outdoor-indoor transmission class (OITC). Although these terms are sometimes used interchangeably, they are unique from each other. Transmission loss refers to how many decibels of sound a façade (wall) or façade accessory (window or door) can stop at a given frequency. The TL for a given construction material varies with the individual frequencies of the noise.

To simplify the noise attenuation properties of a wall, the STC rating was developed. It is a single number that describes the sound isolation performance of a given material for the range of test frequencies between 125 and 4,000 Hz. These frequencies sufficiently cover the range of human speech. Higher STC values reflect greater efficiencies to block airborne sound. HUD uses the STC when identifying the required sound attenuation for a façade.

The OITC is similar to the STC, except that it is weighted more towards the lower frequencies associated with aircraft, rail, and truck traffic. The OITC classification is defined by the American Society of Testing

and Materials (ASTM E1332-90 (Reapproved 2003)) 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. NYCDEP uses the OITC when identifying the required sound attenuation for a façade.

TABLE 6-7
Required Attenuation Values for the Projected Development Sites under CEQR Criteria

Site	Facade	Associated Receptor Location[1]	Maximum With-Action L_{10} (in dBA)	CEQR Noise Exposure Category	CEQR Minimum Required Attenuation (in dBA)[2]
Projected Development Site 1 (Block 3167, Lots 18, 24)	Western (Flushing Ave)	1	72.96[3]	Marginally Unacceptable (I)	28
	Southern (Irving Ave ≤ 50 ft from Flushing Ave)	1	72.96[3]	Marginally Unacceptable (I)	28
	Eastern (Jefferson St)	3	64.28	Acceptable	N/A
	Northern (Wyckoff Ave ≤ 50 ft from Flushing Ave)	1	72.96[3]	Marginally Unacceptable (I)	28
Projected Development Site 2 (Block 3167, Lot 29)	Western (Flushing Ave)	1	72.96[3]	Marginally Unacceptable (I)	28
	Southern (Irving Ave ≤ 50 ft from Flushing Ave)	1	72.96[3]	Marginally Unacceptable (I)	28
	Eastern (Jefferson St ≤ 50 ft from Wyckoff Ave)	2	73.99	Marginally Unacceptable (II)	31
	Northern (Wyckoff Ave)	2	73.99	Marginally Unacceptable (II)	31
Projected Development Site 3 (Block 3167, Lot 40)	Western (Flushing Ave ≤ 50 ft from Wyckoff Ave)	2	73.99	Marginally Unacceptable (II)	31
	Southern (Irving Ave)	N/A	N/A	N/A	N/A
	Eastern (Jefferson St ≤ 50 ft from Wyckoff Ave)	2	73.99	Marginally Unacceptable (II)	31
	Eastern (Jefferson St > 50 ft from Wyckoff Ave)	3	64.28	Acceptable	N/A
	Northern (Wyckoff Ave)	2	73.99	Marginally Unacceptable (II)	31

Notes:

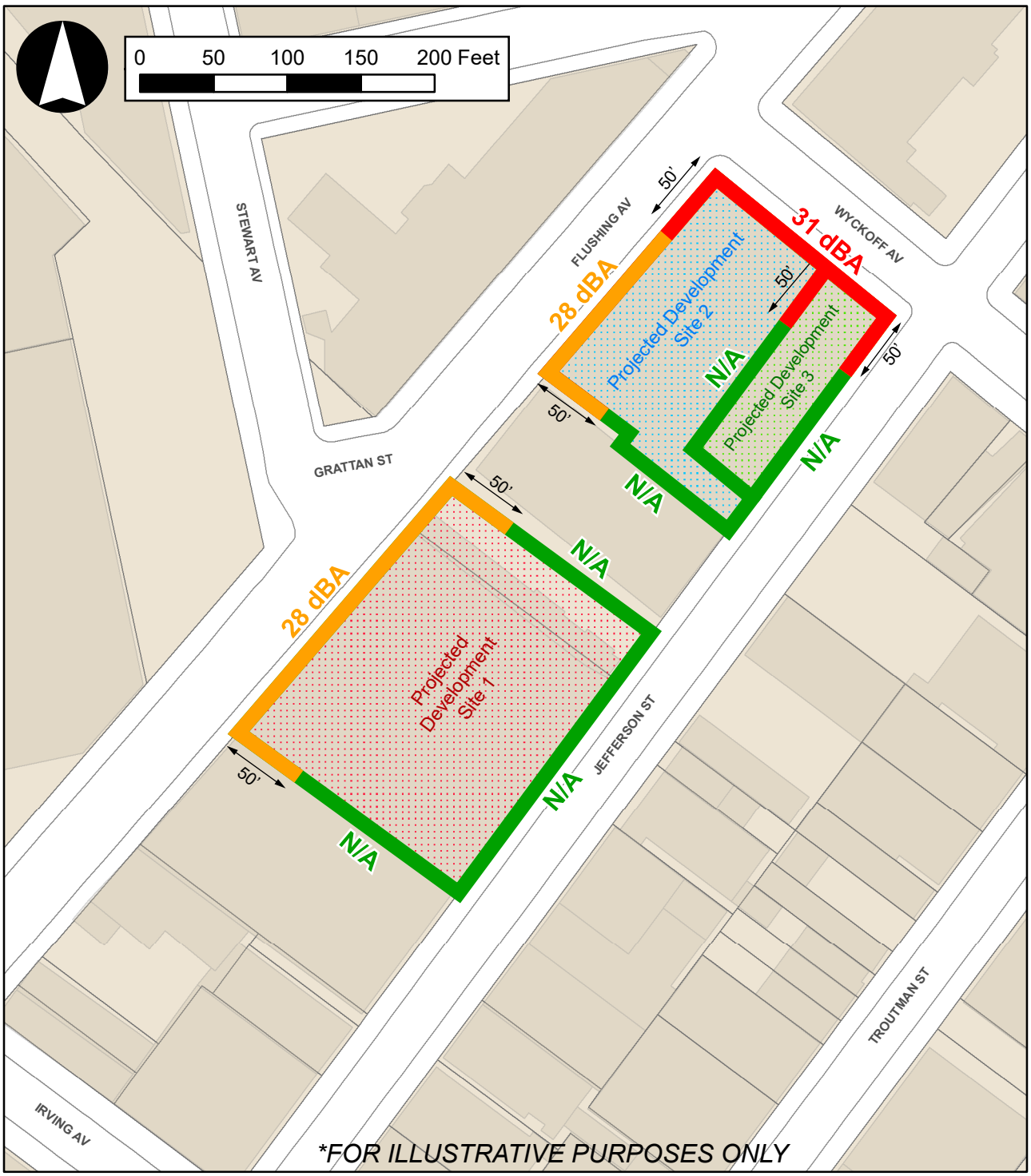
[1] Receptor locations shown in **Figure 6-1**; necessary attenuation levels shown in **Figure 6-2**.

[2] The above composite window-wall attenuation values are for community facility uses. Commercial office uses would be 5.0 dBA less in each category. All the above categories require a closed window situation and an alternate means of ventilation.

[3] As described in **Table 6-6** above, the highest With-Action L_{eq} noise levels at Receptor Location 1 (72.96 dBA) during the weekday PM peak period exceeds that of the corresponding highest With-Action L_{10} noise level (71.15 dBA). As such the higher L_{eq} noise levels were uses in place of the highest L_{10} noise levels to determine the appropriate CEQR Noise Exposure category, and thus, any relevant noise attenuation requirements.

Based on predicted future With-Action exterior noise levels and *CEQR Technical Manual* criteria, maximum With-Action L_{10} noise levels at Receptor Location 3 would be less than 70 dBA and would remain in the "Acceptable" CEQR Noise Exposure category, and, as noted above, would not require special noise attenuation measures beyond standard construction practices for community facility uses on any of Projected Development Site 1's eastern frontages or Projected Development Site 3's eastern frontages beyond 50 feet from Wyckoff Avenue in order to achieve the required community facility interior noise level of 45 dBA (refer to **Figure 6-2**). Likewise, any future commercial uses would also not require any special noise attenuation measure beyond standard construction practices on Projected Development

Building Attenuation Requirements



Legend

- Projected Development Site 1
- Projected Development Site 2
- Projected Development Site 3

CEQR Noise Attenuation Requirement for Community Facility Uses

28 dBA | 31 dBA | N/A

*Attenuation requirements are 5 dBA less for commercial office uses

Site 1's eastern frontages or Projected Development Site 3's eastern frontages beyond 50 feet from Wyckoff Avenue in order to achieve the required commercial interior noise level of 50 dBA or lower.

As maximum With-Action noise levels at Receptor Location 1 and 3 would be 72.96 dBA and 73.99 dBA, respectively, a minimum 31 dBA of composite window/wall attenuation would be required for community facility uses on any northern-facing (Wyckoff Avenue) frontages at Projected Development Sites 2 and 3, as well as any western- (Flushing Avenue) or eastern-facing (Jefferson Street) frontages within 50 feet from Wyckoff Avenue at Projected Development Sites 2 and 3; and a minimum of 28 dBA of composite window/wall attenuation would be required for community facility uses on any western-facing (Flushing Avenue) frontages beyond 50 feet from Wyckoff Avenue at Projected Development Sites 1 and 2, any northern-facing (Wyckoff Avenue) frontages within 50 feet of Flushing Avenue at Projected Development Site 1, and any southern-facing (Irving Avenue) frontages within 50 feet of Flushing Avenue at Projected Development Sites 1 and 2. By providing the attenuation described above and presented in **Table 6-7** and illustrated in **Figure 6-2**, the projected development sites would achieve the required community facility interior noise level of 45 dBA or lower. Any future commercial office uses would be required to provide an attenuation rating of 5 dBA less than the community facility requirement in order to maintain an interior noise level 50 dBA or lower.

(E) Designation

The composite window/wall noise attenuation described above would be required through the assignment of an (E) designation for noise to Projected Development Site 1 (Block 3167, Lots 18 and 24), Projected Development Site 2 (Block 3167, Lot 29), and Projected Development Site 3 (Block 3167, Lot 40) in conjunction with the Proposed Action. With the implementation of this composite window/wall noise attenuation, no significant adverse noise impacts would occur as a result of the Proposed Action.

The text of the (E) designation (E-674) is as follows:

> **Block: 3167, Lots: 18, 24 (Projected Development Site 1)**
>
> **To ensure an acceptable interior noise environment, future community facility and commercial office uses must provide a closed-window condition with a minimum of 28 dBA window/wall attenuation on all facades facing Flushing Avenue and all facades facing Wyckoff Avenue and Irving Avenue within 50 feet of Flushing Avenue to maintain an interior noise level not greater than 45 dBA for community facility uses or not greater than 50 dBA for commercial office uses, as illustrated in the EAS. To maintain a closed-window condition, an alternate means of ventilation must also be provided. Alternate means of ventilation includes, but is not limited to, air conditioning.**
>
> **Block: 3167, Lot: 29 (Projected Development Site 2)**
>
> **To ensure an acceptable interior noise environment, future community facility and commercial office uses must provide a closed-window condition with a minimum of 31 dBA window/wall attenuation on all facades facing Wyckoff Avenue and all facades facing Flushing Avenue and Jefferson Street within 50 feet of Wyckoff Avenue, and a minimum of 28 dBA window/wall attenuation on all facades facing Flushing Avenue beyond 50 feet of Wyckoff Avenue and all facades facing Irving Avenue within 50 feet of Flushing Avenue to maintain an interior noise level not greater than 45 dBA for community facility uses or not greater than 50 dBA for**

commercial office uses, as illustrated in the EAS. To maintain a closed-window condition, an alternate means of ventilation must also be provided. Alternate means of ventilation includes, but is not limited to, air conditioning.

Block: 3167, Lot: 40 (Projected Development Site 3)

To ensure an acceptable interior noise environment, future community facility and commercial office uses must provide a closed-window condition with a minimum of 31 dBA window/wall attenuation on all facades facing Wyckoff Avenue and all facades facing Flushing Avenue and Jefferson Street within 50 feet of Wyckoff Avenue to maintain an interior noise level not greater than 45 dBA for community facility uses or not greater than 50 dBA for commercial office uses, as illustrated in the EAS. To maintain a closed-window condition, an alternate means of ventilation must also be provided. Alternate means of ventilation includes, but is not limited to, air conditioning.

With implementation of the attenuation levels outlined above and described in **Table 6-7**, the projected development sites would provide sufficient attenuation to achieve *CEQR Technical Manual* interior noise level guidelines of 45 dBA for community facility uses and 50 dBA for commercial office uses. Therefore, the Proposed Action and associated RWCDS would not result in any significant adverse noise impacts.

J. OTHER NOISE CONCERNS

Mechanical Equipment

The Proposed Action would not include any unenclosed mechanical equipment for building ventilation purposes, and would not include any active outdoor recreational space that could result in stationary source noise impacts to the surrounding area. All mechanical equipment would be located either inside the building or would be enclosed on the roof of the structures, and should be designed to meet all applicable noise regulations and requirements (i.e., Subchapter 5, §24-227 of the New York City Noise Control Code, the New York City Department of Buildings Code). Therefore, the Proposed Action would not result in any significant increase in ambient noise levels in the vicinity of the Applicant-owned Development Site, the Project Area, or the surrounding study area.

Train Noise

An initial train noise impact screening analysis could be warranted if a new receptor would be located within 1,500 feet of existing rail activity and have a direct line of sight to that activity. As the Project Area is not within 1,500 feet of an existing rail line nor does the site have a direct line of sight to a rail activity, no initial train noise impact screening analysis is warranted.

Aircraft Noise

An initial aircraft noise impact screening analysis would be warranted if the new receptor would either generate or reroute aircraft or introduce a new receptor that is within a 65 dBA DNL contour. Since the Proposed Action would not generate or reroute aircraft, and as the Project Area is not within a 65 dBA DNL contour, no initial aircraft noise impact screening analysis is warranted.