

# West 108<sup>th</sup> Street WSFSSH Development

## Chapter 9: Noise

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### A. INTRODUCTION

This chapter assesses the potential for the Proposed Actions to result in significant adverse noise impacts. As described in Chapter 1, “Project Description,” the proposal involves an application by the City of New York City – Department of Housing Preservation and Development (HPD) and the project sponsor, the West Side Federation for Senior and Supportive Housing (WSFSSH), for approval of several discretionary actions subject to City Planning Commission (CPC) approval (collectively, the “Proposed Actions”) to facilitate the construction of two new buildings consisting of affordable housing and community facility uses on West 108<sup>th</sup> Street in the Manhattan Valley neighborhood of Manhattan Community District (CD) 7.

The Proposed Actions would facilitate the development of an estimated combined 277 affordable dwelling units (DUs), an approximately 31,000 gross square foot (gsf) transitional housing facility for older adults with 110 shelter beds, and approximately 6,400 gsf of community facility space (the “Proposed Project”). The Proposed Project would consist of two buildings: the approximately 193,000 gsf Building 1 to be located on Lots 5, 10, and 13 of Manhattan Block 1863, and the approximately 45,000 gsf Building 2 to be located on Lot 26.

The noise analysis presented in this chapter focuses on the operational noise effects of the Proposed Actions and includes an analysis to determine the level of building attenuation necessary to ensure that the Proposed Project would satisfy applicable interior noise criteria.

The Environmental Assessment Statement (EAS) prepared for the Proposed Actions, dated May 23, 2017, determined that the Proposed Actions would not result in a doubling of Noise passenger car equivalents (PCEs) at any sensitive receptors along West 108<sup>th</sup> Street, and in accordance with *City Environmental Quality Review* (CEQR) *Technical Manual* guidelines, a detailed mobile source noise analysis is not warranted. In addition, there are no major stationary sources of noise within 400 feet of the Project Area, and, therefore, a stationary source noise analysis is not warranted.

Noise effects during construction of the Proposed Project are analyzed and discussed separately in Chapter 12, “Construction.”

### B. PRINCIPAL CONCLUSIONS

Noise from traffic generated by the Proposed Project would not cause significant adverse noise impacts. As the Proposed Actions would result in a net reduction in vehicle volumes in the weekday PM peak hour, compared to the No-Action condition, noise levels would decrease slightly during this peak hour (by 0.03 to 0.04 dBA), with minor increases anticipated in the weekday AM and midday peak hours (0.09 to 0.11 and 0.11 to 0.19, respectively).

Based on predicted future With-Action exterior noise levels and *CEQR Technical Manual* criteria, With-Action noise levels at all noise receptor locations would remain in the “Marginally Acceptable” CEQR noise

exposure category, and, as such, no special noise attenuation measures beyond standard construction practices would be required for residential or community facility uses on any of the Proposed Project's frontages in order to achieve the required residential or community facility interior noise level of 45 dBA or lower.

However, should funding from HUD be sought at a later date, based on the building attenuation analysis, in order to meet U.S. Department of Housing and Urban Development (HUD) interior noise level guidelines, a minimum composite Sound Transmission Class (STC) rating of 25 dB of building attenuation would be required on any future residential/community facility uses on Building 1's southern (West 108<sup>th</sup> Street) and eastern (Anibal Aviles Playground) frontages. An alternate means of ventilation would also be required in all habitable rooms along these frontages, to allow for an acceptable interior noise level under closed-window conditions. No additional noise attenuation measures above standard construction practices would be required for the northern and western frontages of Building 1, nor for any frontages for Building 2, in order to achieve interior noise levels of 45 dBA or lower for residential/community facility uses.

The attenuation and alternate means of ventilation requirements outlined above would be required through provisions in the land disposition agreement (LDA) between HPD and the project sponsor. With implementation of these measures as part of the Proposed Project, the Proposed Actions would not result in any significant adverse noise impacts related to building attenuation requirements.

## 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 9-1**, 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 9-1**  
**Common Noise Levels**

Sound Source	Noise Level (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 ten dBA increase in level appears to double the loudness, and a ten dBA decrease halves the apparent loudness.

**Source:** 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 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.

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 Project, 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 may include federal sources of funding in the future, the required attenuation levels to meet both CEQR and HUD 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 9-2**. 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 9-2** 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 9-3**). 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 uses, and are determined based on exterior  $L_{10(1)}$  noise levels.

### HUD Development Guidelines

The *HUD Noise Guidebook* sets exterior noise standards for housing construction projects based  $L_{dn}$  values (see **Table 9-4**). The  $L_{dn}$  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. If the exterior noise level is 65  $L_{dn}$  to 70  $L_{dn}$ , 25 dBA of noise attenuation must be provided; if the exterior noise level is 70  $L_{dn}$  to 75  $L_{dn}$ , 30 dBA of noise attenuation is required; and if the exterior noise level exceeds 75  $L_{dn}$ , sufficient attenuation must be provided to bring interior levels down to 45  $L_{dn}$  or lower for residential uses.

**TABLE 9-2**  
**Noise Exposure Guidelines for Use in City Environmental Impact Review<sup>1</sup>**

Receptor Type	Time Period	Acceptable General External Exposure	Airport <sup>3</sup> Exposure	Marginally Acceptable General External Exposure	Airport <sup>3</sup> Exposure	Marginally Unacceptable General External Exposure	Airport <sup>3</sup> Exposure	Clearly Unacceptable General External Exposure	Airport <sup>3</sup> Exposure
1. Outdoor area requiring serenity and quiet <sup>2</sup>		$L_{10} \leq 55$ dBA	----- $L_{dn} \leq 60$ dBA -----						
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ dBA	----- $60 < L_{dn} \leq 65$ dBA -----	$65 < L_{10} \leq 80$ dBA	(1) $65 < L_{dn} \leq 70$ dBA, (II) $70 \leq L_{dn}$	$L_{10} > 80$ dBA	----- $L_{dn} \leq 75$ dBA -----
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-10 PM)	
6. Industrial, public areas only <sup>4</sup>	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 not increase the ambient noise level by three dBA or more.

<sup>1</sup> 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.

<sup>2</sup> 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.

<sup>3</sup> 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.

<sup>4</sup> 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 9-3**  
**Required Attenuation Values to Achieve Acceptable Interior Noise Level**

	Marginally Unacceptable				Clearly Unacceptable
Noise level with proposed development	$70 < L_{10} \leq 73$	$73 < L_{10} \leq 76$	$76 < L_{10} \leq 78$	$78 < L_{10} \leq 80$	$80 < L_{10}$
Attenuation <sup>A</sup>	(I) 28 dB(A)	(II) 31 dB(A)	(III) 33 dB(A)	(IV) 35 dB(A)	$36 + (L_{10} - 80)^B$ dB(A)

Source: DEP; 2014 CEQR Technical Manual, Table 19-3.

**Notes:**

<sup>A</sup> The above composite window-wall attenuation values are for residential dwellings. 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.

<sup>B</sup> Required attenuation values increase by 1.0 dB(A) increments for  $L_{10}$  values greater than 80 dBA.

**TABLE 9-4**  
**HUD Exterior Noise Standards**

	Acceptable	Normally Unacceptable	Unacceptable
Noise Level With Proposed Actions	$L_{dn} \leq 65$	$65 < L_{dn} \leq 75$	$75 < L_{dn}$
Source: U.S. Department of Housing and Urban Development (HUD)			

For this analysis,  $L_{dn}$  levels were estimated using the following equation:

$$L_{dn} = L_{10} - 3$$

The method used to determine  $L_{dn}$  values is to measure the loudest hourly  $L_{10}$  for a typical day and then to estimate the  $L_{dn}$  from this loudest hourly  $L_{10}$ , which is consistent with the *HUD Noise Guidebook*.

## 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 Project (the No-Action condition) and with the Proposed Project (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:

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

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 2025 No-Action PCE values at the Project Area, an annual background growth rate of 0.25 percent for years one through five, and 0.125 percent for year six and beyond, was applied to the counted PCE values.<sup>1</sup> To calculate the 2025 With-Action PCE values, the number of incremental trips generated by the Proposed Project was added to the No-Action PCE values. As presented in the *West 108<sup>th</sup> Street WSFSSH Development Transportation Planning Factors and Travel Demand Forecast (TPF/TDF) Technical Memorandum* provided in Appendix III, the total vehicles generated per hour (in and out trips combined) by the Proposed Project were estimated at 36 for the AM peak hour, 32 for the midday peak hour, and 31 for the PM peak hour.

However, as previously mentioned in Chapter 1, “Project Description,” there are currently three parking garages located at the Development Site (Block 1863, Lots 5, 13, and 26). As presented in the *TPF/TDF Technical Memorandum*, in order to assess the existing conditions at the Development Site, vehicle counts were conducted at the entrances to each of the three parking garages during the weekday AM, midday, and PM peak periods in November 2016. The vehicle counts showed that a total of 29, 25, and 33 vehicle trips (in and out combined) were generated by the three parking garages during the weekday AM, midday, and PM peak hours, respectively. Accounting for these existing vehicle trips that would be displaced in the With-Action condition, the Proposed Actions would result in a net reduction of two vehicle trips in the weekday PM peak hour, and a net increase of seven vehicle trips in both the weekday AM and midday peak hours.

## 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 2025 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 Development Site;
- Existing noise levels were determined through field measurements of ambient noise adjacent to the Development Site;
- Future (2025) noise levels without the Proposed Actions 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;
- Future (2025) noise levels with the Proposed Actions were predicted using the PCE-based proportionality equation (per *CEQR Technical Manual* guidelines) based on the Proposed Project’s trip generation estimates;
- Future (2025) noise levels with the Proposed Actions were compared with future noise levels without the Proposed Actions to determine, by applying *CEQR Technical Manual* impact criteria, whether the Proposed Actions have the potential to result in a significant adverse impact;

<sup>1</sup> Calculation according to Table 16-4 in the *CEQR Technical Manual*.

- Noise levels were determined at exterior building façades in the Project Area; and
- In compliance with CEQR and HUD requirements to determine an acceptable interior space noise environment, façade-based composite window/wall attenuation specifications for the Proposed Project were estimated based on future projected maximum exterior noise exposure at the Development Site; CEQR requirements are based on the maximum  $L_{10}$  values, whereas HUD requirements are based on maximum  $L_{dn}$  values.

## F. EXISTING NOISE LEVELS

The Project Area is located midblock on the north side of West 108<sup>th</sup> street between Amsterdam Avenue (to the west) and Columbus Avenue (to the east) and is comprised of Block 1863, Lots 5, 10, 13, 17, and 26. Lot 17, while located within the Project Area, is not a part of the Development Site and is not proposed for any redevelopment under the Proposed Actions. The Development Site (Block 1863, Lots 5, 10, 13, and 26) fronts the northern side of West 108<sup>th</sup> Street. The Building 1 site (Block 1863, Lots 5, 10, and 13) has a lot area of approximately 30,276 sf and is currently occupied by two City-owned four- and five-story parking garages (combined floor area of approximately 91,190 gsf, with a total capacity of 550 spaces), and the approximately 18,730 gsf project sponsor-owned five-story Valley Lodge shelter, which provides transitional housing for homeless older adults. The Building 2 site (Block 1863, Lot 26) has a lot area of approximately 7,569 sf and is currently occupied by a City-owned approximately 21,800 gsf three-story parking garage, with a capacity of 125 spaces.

### Noise Monitoring Locations

Existing noise levels in the Project Area were measured at three locations along West 108<sup>th</sup> Street – the Project Area’s only street frontage. These locations are described in **Table 9-5** and shown in **Figure 9-1**.

**TABLE 9-5**  
**Receptor Locations**

Receptor <sup>1</sup>	Receptor Frontages	Receptor Location
1	West 108 <sup>th</sup> Street (near Amsterdam Avenue)	Approximately 100 feet east of Amsterdam Avenue along the Development Site’s West 108 <sup>th</sup> Street frontage.
2	West 108 <sup>th</sup> Street (midblock)	Approximately 400 feet east of Amsterdam Avenue along the Development Site’s West 108 <sup>th</sup> Street frontage.
3	West 108 <sup>th</sup> Street (near Columbus Avenue)	Approximately 100 feet west of Columbus Avenue along the Development Site’s West 108 <sup>th</sup> Street frontage.

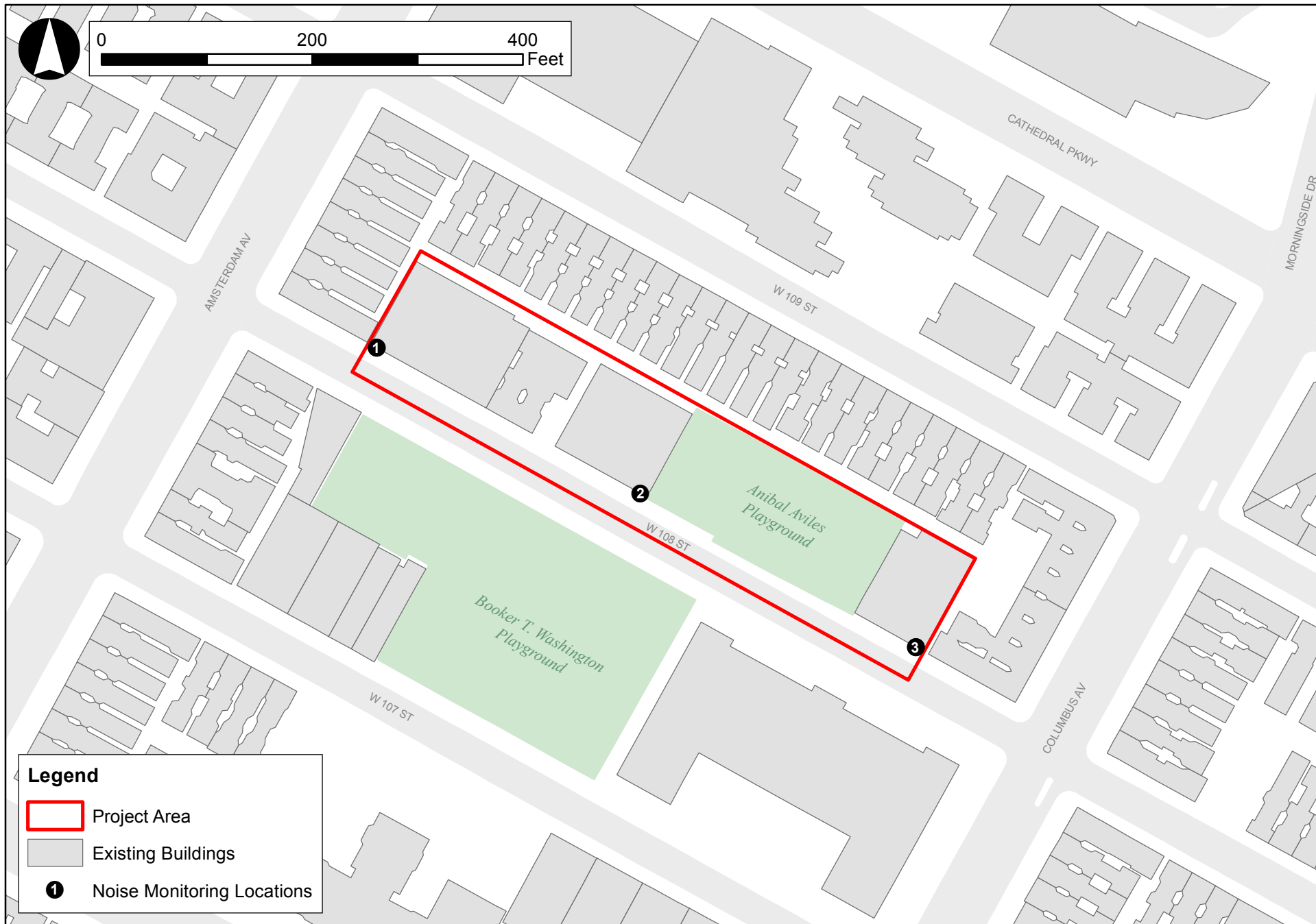
**Notes:**

<sup>1</sup> Receptor locations shown in **Figure 9-1**.

At all receptor locations, 20-minute spot noise measurements were performed during the weekday AM (8:00 – 9:00 AM), midday (12:00 – 1:00 PM), and PM (5:00 – 6:00 PM) peak periods. An additional 20-minute spot noise measurement was performed at Receptor Location 2 during the School PM peak period (2:30 – 3:30 PM), due to the location of two playgrounds in proximity to the Development Site (Booker T. Washington Playground across West 108<sup>th</sup> Street from the Project Area and Anabil Aviles Playground on Lot 17 adjacent to the Development Site), in order to determine whether ambient noise levels were higher during this period than during the other standard weekday peak periods.

The noise monitoring occurred on Wednesday, January 25, 2017; the weather was partly cloudy with an average temperature of 44°F and wind speed averages of seven miles per hour. Additionally, vehicle





West 108th Street WSFSSH Development

Figure 9-1  
Noise Monitoring Locations

classification counts 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***

The results of the measurements of existing noise levels are summarized in **Table 9-6**. As shown in the table, the Project Area is located in an area with relatively low ambient noise levels. Noise levels generally reflect the level of vehicle activity present on adjacent roadways, and although the Project Area is located in proximity to two busy roadways (Amsterdam and Columbus avenues), the roadway immediately adjacent to the Project Area (West 108<sup>th</sup> Street) experiences relatively light traffic. Therefore, the relatively low noise levels in the vicinity of the Project Area are a reflection of the relatively light traffic on West 108<sup>th</sup> Street.

As shown in **Table 9-6**, 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 69.67 dBA in the weekday midday peak period. Existing  $L_{10}$  noise levels at Receptor Location 1 ranged from 65.02 dBA to 68.78 dBA, placing it in the Marginally Acceptable CEQR noise exposure category. Existing  $L_{10}$  noise levels at Receptor Location 2 ranged from 63.97 dBA to 69.67 dBA, also placing it in the Marginally Acceptable CEQR noise exposure category. Existing  $L_{10}$  noise levels at Receptor Location 3 ranged from 61.60 dBA to 66.13 dBA, placing it in the Marginally Acceptable CEQR noise exposure category as well.

#### **Existing $L_{dn}$ Noise Levels**

As the Proposed Project may include federal sources of funding in the future,  $L_{dn}$  noise levels were calculated for the corresponding receptor locations, as described above in the “HUD Development Guidelines” section. According to the methodology described above, the  $L_{dn}$  for Receptor Location 1 was estimated to be 65.78 dB, the  $L_{dn}$  for Receptor Location 2 was estimated to be 66.67 dB, and the  $L_{dn}$  for Receptor Location 3 was estimated to be 63.13 dB. According to HUD criteria, the calculated existing  $L_{dn}$

noise level at receptor location 1 and 2 would be in the “normally unacceptable” category, whereas the calculated existing  $L_{dn}$  noise level at Receptor Location 3 would be in the “acceptable” category.

**TABLE 9-6**  
**Existing Noise Levels (dBA)**

Receptor <sup>1</sup>	Measurement Location	Time	$L_{eq}$	$L_1$	$L_{10}^2$	$L_{50}$	$L_{90}$	CEQR Noise Exposure Category <sup>3</sup>
1	West 108 <sup>th</sup> Street (near Amsterdam Avenue)	AM	63.10	72.68	65.68	59.93	55.10	Marginally Acceptable
		MD	66.95	77.87	<b>68.78</b>	63.54	60.29	
		PM	64.97	76.15	65.02	58.44	54.35	
2	West 108 <sup>th</sup> Street (midblock)	AM	60.98	69.95	63.97	58.01	54.40	Marginally Acceptable
		MD	66.96	74.76	<b>69.67</b>	65.33	61.91	
		PM	64.08	75.38	66.29	58.84	54.20	
3	West 108 <sup>th</sup> Street (near Columbus Avenue)	AM	62.91	71.80	65.78	60.17	55.32	Marginally Acceptable
		MD	59.09	69.26	61.60	55.44	52.49	
		PM	63.90	74.23	<b>66.13</b>	59.02	54.95	

**Notes:**

<sup>1</sup> Receptor locations shown in **Figure 9-1**.

<sup>2</sup> The highest measured noise level at each receptor is indicated in **bold**.

<sup>3</sup> For consistency purposes, the CEQR noise exposure categories for existing, No-Action, and With-Action conditions are based on the residential noise exposure guidelines; reflects the worst-case peak hour noise levels.

<sup>4</sup> The monitored  $L_{eq}$  during the school PM peak hour was measured to be 62.46 dBA, which is greater than the  $L_{eq}$  measured at Receptor Location 2 during the AM peak hour (60.98 dBA), but lower than the  $L_{eq}$  measured during the midday and PM peak hours (66.96 dBA and 64.08 dBA, respectively). As the noise levels monitored during the school PM peak hour do not represent worst-case conditions, they were not used for further noise analyses associated with Receptor Location 2.

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

### Mobile Source Noise Screening Analysis

In the 2025 future without the Proposed Project (the No-Action condition), traffic patterns and volumes 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, 2, and 3, the change in traffic patterns is expected to affect the levels of ambient noise at those locations. Pursuant to CEQR guidelines, as no major developments are anticipated in the immediate vicinity (or 400 foot radius) of the Project Area by the 2025 analysis year, future No-Action traffic volumes were estimated by applying an annual background growth rate to the vehicle volumes counted during monitoring. Per Table 16-4 of the *CEQR Technical Manual*, a 0.25 percent annual background growth rate was applied to years one through five, with a 0.125 percent annual background growth rate applied to years six and beyond. 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 2025 analysis year. **Table 9-7** shows the measured existing noise levels and calculated future No-Action condition noise levels at the receptor locations.

Comparing future No-Action noise levels with existing noise levels, the increases in  $L_{eq}$  noise levels would be minimal, with all three receptor locations experiencing a 0.07 dBA increase from existing to future No-Action noise levels. According to 2014 *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 65.09 dBA to 68.85 dBA, projected  $L_{10}$  noise levels at Receptor Location 2 would range from 64.04 dBA to 69.74 dBA, and projected  $L_{10}$  noise levels at Receptor Location 3 would range from 61.67 dBA to

66.2 dBA. No-Action  $L_{10}$  noise levels at all receptor locations would remain in the Marginally Acceptable CEQR noise exposure category in all analysis periods, as under existing conditions.

**TABLE 9-7**  
**2025 No-Action Condition Noise Levels (dBA)**

Receptor <sup>1</sup>	Time	Measurement Location	Existing		No-Action			CEQR Noise Exposure Category
			$L_{eq}$	$L_{10}$	$L_{eq}$	$L_{10}^2$	Existing to No-Action Change <sup>3</sup>	
1	AM	West 108 <sup>th</sup> Street (near Amsterdam Avenue)	63.10	65.68	63.17	65.75	0.07	Marginally Acceptable
	MD		66.95	68.78	67.02	<b>68.85</b>	0.07	
	PM		64.97	65.02	65.04	65.09	0.07	
2	AM	West 108 <sup>th</sup> Street (midblock)	60.98	63.97	61.05	64.04	0.07	Marginally Acceptable
	MD		66.96	69.67	67.03	<b>69.74</b>	0.07	
	PM		64.08	66.29	64.15	66.36	0.07	
3	AM	West 108 <sup>th</sup> Street (near Columbus Avenue)	62.91	65.78	62.98	65.85	0.07	Marginally Acceptable
	MD		59.09	61.60	59.16	61.67	0.07	
	PM		63.90	66.13	63.97	<b>66.20</b>	0.07	

<sup>1</sup> Receptor locations shown in **Figure 9-1**.

<sup>2</sup> The highest No-Action noise level at each receptor is indicated in **bold**.

<sup>3</sup> No-Action  $L_{eq}$  - Existing  $L_{eq}$ .

### No-Action $L_{dn}$ Noise Levels

According to the methodology described above in the “HUD Development Guidelines” section, the  $L_{dn}$  for Receptor Location 1 was estimated to be 65.85 dB, the  $L_{dn}$  for Receptor Location 2 was estimated to be 66.74 dB, and the  $L_{dn}$  for Receptor Location 3 was estimated to be 63.20 dB. According to HUD criteria, the calculated No-Action  $L_{dn}$  noise levels at receptor locations 1 and 2 would remain in the “normally unacceptable” category, whereas the calculated No-Action  $L_{dn}$  noise level at Receptor Location 3 would remain in the “acceptable” category.

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

In the future with the Proposed Action (With-Action condition), an estimated combined 277 affordable DUs, an approximately 31,000 gsf transitional housing facility for older adults with 110 shelter beds, and approximately 6,400 gsf of community facility space would be built in place of the existing parking garages and shelter on the Development Site. As mentioned in Section E, while the Proposed Project would generate vehicle trips (36, 32, and 21 vehicle trips during the weekday AM, midday, and PM peak hours, respectively), accounting for the vehicle trips currently generated by the existing parking garages (29, 25, and 33 vehicle trips during the weekday AM, midday, and PM peak hours, respectively) that would be displaced in the With-Action condition, the Proposed Actions would result in a net reduction of two vehicle trips in the weekday PM peak hour, and a net increase of seven vehicle trips in both the weekday AM and midday peak hours.

### Mobile Source Noise Screening Analysis

Using the proportional modeling methodology previously described, noise levels in the future with the Proposed Actions were predicted, which are presented in **Table 9-8**. As presented in the table, due to the anticipated net decrease in vehicle volumes in the weekday PM peak hour in the future with the Proposed

Actions, noise levels at the three receptor locations would decrease during this peak hour (by 0.03 to 0.04 dBA), with minor increases in noise levels in the weekday AM and midday peak hours (0.09 to 0.11 and 0.11 to 0.19, respectively). With-Action  $L_{10}$  noise levels at Receptor Location 1 would range from 65.06 dBA to 68.96 dBA; noise levels at Receptor Location 2 would range from 64.15 dBA to 69.91 dBA; and noise levels at Receptor Location 3 would range from 61.86 dBA to 66.16 dBA.

**TABLE 9-8**  
**2025 No-Action and With-Action Condition Noise Levels (dBA)**

Receptor <sup>1</sup>	Time	Measurement Location	No-Action		With-Action			CEQR Noise Exposure Category
			$L_{eq}$	$L_{10}$	$L_{eq}$	$L_{10}^2$	No-Action to With-Action Change <sup>3</sup>	
1	AM	West 108 <sup>th</sup> Street (near Amsterdam Avenue)	63.17	65.75	63.27	65.85	+0.09	Marginally Acceptable
	MD		67.02	68.85	67.13	<b>68.96</b>	+0.11	
	PM		65.04	65.09	65.01	65.06	-0.03	
2	AM	West 108 <sup>th</sup> Street (midblock)	61.05	64.05	61.16	64.15	+0.11	Marginally Acceptable
	MD		67.03	69.74	67.20	<b>69.91</b>	+0.17	
	PM		64.15	66.36	64.12	66.33	-0.03	
3	AM	West 108 <sup>th</sup> Street (near Columbus Avenue)	62.98	65.85	63.09	65.96	+0.11	Marginally Acceptable
	MD		59.16	61.67	59.35	61.86	+0.19	
	PM		63.97	66.20	63.93	<b>66.16</b>	-0.04	

**Notes:**

<sup>1</sup> Receptor locations shown in **Figure 9-1**.

<sup>2</sup> The highest No-Action noise level at each receptor is indicated in **bold**.

<sup>3</sup> With-Action  $L_{eq}$  – No-Action  $L_{eq}$ .

In terms of *CEQR Technical Manual* criteria, With-Action noise levels at all noise receptor locations would remain in the “Marginally Acceptable” CEQR noise exposure category, and, as such, no special noise attenuation measures beyond standard construction practices would be required for residential or community facility uses on any of the Proposed Project’s frontages in order to achieve the required residential or community facility interior noise level of 45 dBA. Thus, no significant adverse noise impacts would occur as a result of the Proposed Action.

### With-Action $L_{dn}$ Noise Levels

According to the methodology described above in the “HUD Development Guidelines” section, the  $L_{dn}$  for Receptor Location 1 was estimated to be 65.96 dB, the  $L_{dn}$  for Receptor Location 2 was estimated to be 66.91 dB, and the  $L_{dn}$  for Receptor Location 3 was estimated to be 63.16 dB. According to HUD criteria, the calculated With-Action  $L_{dn}$  noise level at receptor locations 1 and 2 would remain in the “normally unacceptable” category, whereas the calculated With-Action  $L_{dn}$  noise level at Receptor Location 3 would remain in the “acceptable” category.

## I. NOISE ATTENUATION MEASURES FOR THE PROPOSED PROJECT

### CEQR

As shown in **Table 9-3**, the *CEQR Technical Manual* has set noise attenuation guidelines for buildings based on exterior  $L_{10}$  noise levels in order to maintain interior noise levels of 45 dBA or lower for residential/community facility uses. Based on predicted future With-Action exterior noise levels and *CEQR*

*Technical Manual* criteria, With-Action noise levels at all noise receptor locations would remain in the “Marginally Acceptable” CEQR noise exposure category, and, as noted above, no special noise attenuation measures beyond standard construction practices would be required for residential or community facility uses on any of the Proposed Project’s frontages in order to achieve the required residential or community facility interior noise level of 45 dBA. Thus, according to *CEQR* guidelines, no significant adverse noise impacts would occur as a result of the Proposed Action.

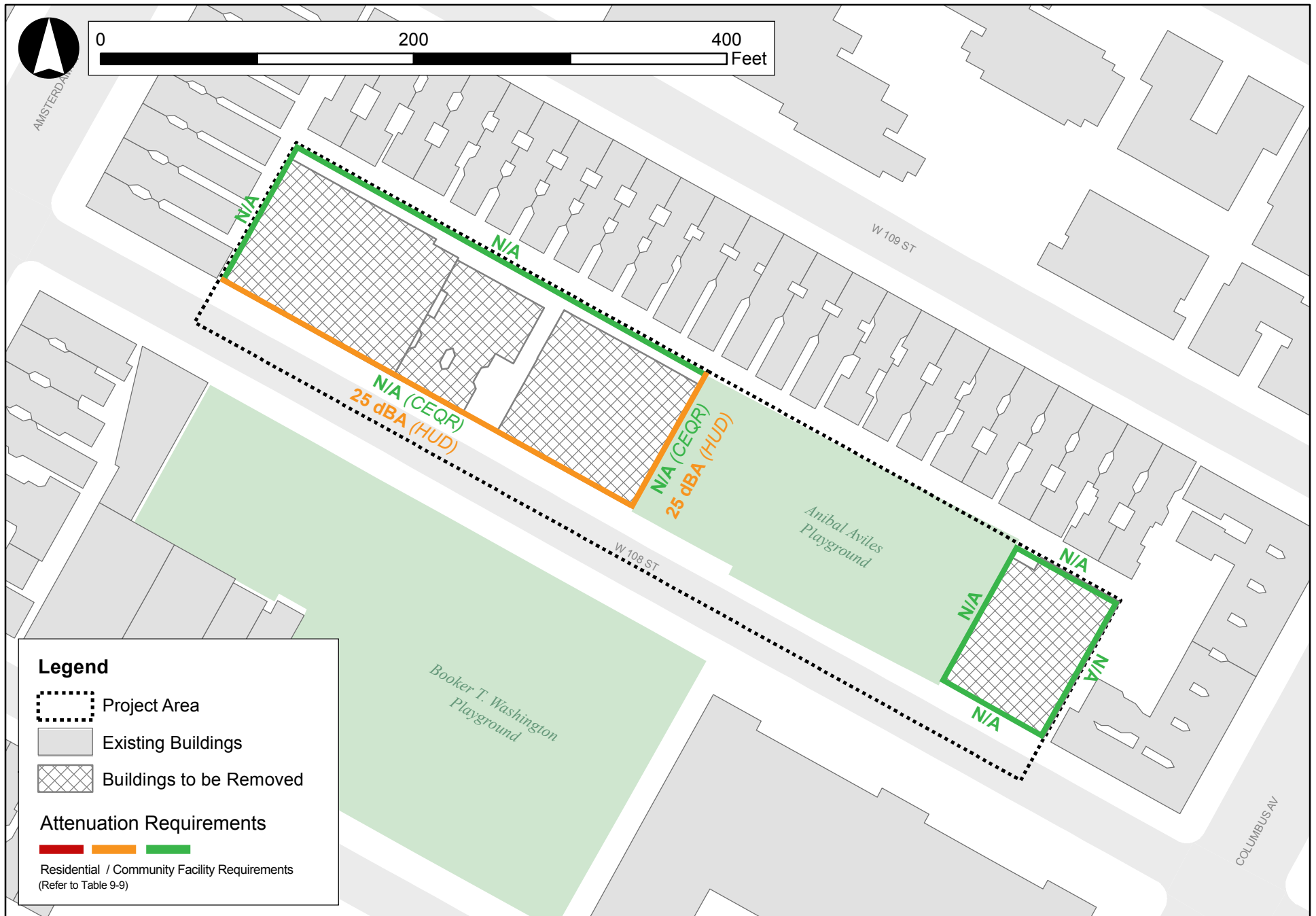
## HUD

As described above in the “HUD Development Guidelines” section, the  $L_{dn}$  for all three receptor locations were estimated using the worst-case With-Action  $L_{10}$  noise levels (65.96 dB at Receptor Location 1, 66.91 dB at Receptor Location 2, and 63.16 dBA at Receptor Location 3). Based on the methodology for estimating the  $L_{dn}$  value described above in the “HUD Development Guidelines” section, the  $L_{dn}$  for any future development on Building 1 with frontage facing West 108<sup>th</sup> Street was determined to be 66.91 dB, which would require a minimum 25 dB of building attenuation to satisfy HUD development guidelines, should funding from HUD be sought at a later date.

As presented in **Table 9-9**, the maximum With-Action  $L_{dn}$  noise levels experienced along the street frontage of Building 1 would occur in the weekday midday peak period at Receptor Location 2 (66.91 dB). For conservative analysis purposes, the noise levels at this location were used to determine the attenuation requirements for the southern and eastern frontages of Building 1. As presented in **Table 9-9**, the southern and eastern frontages of any future development on the Building 1 site (Block 1863, Lots 5, 10, and 13) would require a minimum composite window/wall attenuation of 25 dB for residential/community facility uses, should funding from HUD be sought at a later date. An alternate means of ventilation would also be required in all habitable rooms along these frontages, to allow for an acceptable interior noise level under closed-window conditions. With the implementation of the attenuation levels outlined above, the Proposed Project would provide sufficient attenuation to achieve the HUD interior noise level guidelines of 45 dB or less for residential/community facility uses. As shown in **Table 9-9**, no additional noise attenuation measures above standard construction practices would be required for the northern and western frontages of Building 1, nor for any frontages for Building 2, in order to achieve interior noise levels of 45 dB or lower for residential/community facility uses.

Should funding from HUD be sought at a later date, based on the building attenuation analysis, in order to meet HUD interior noise level guidelines, attenuation and alternate means of ventilation requirements would be required through the LDA between HPD and the project sponsor. According to **Table 9-9**, any new residential/community facility development located on Parcel 1 utilizing HUD federal funding must provide a minimum composite Sound Transmission Class (STC) rating of 25 dB on Parcel 1’s southern (fronting West 108 Street) and eastern (fronting Block 1863, Lot 17) facades (refer to **Figure 9-2**). An alternate means of ventilation would also be required in all habitable rooms along these frontages, to allow for an acceptable interior noise level under closed-window conditions.

With implementation of the attenuation levels outlined above and in **Table 9-9**, the Proposed Actions would provide sufficient attenuation to achieve the *CEQR Technical Manual* and HUD interior noise level guidelines. In addition, the building mechanical system (i.e., heating and ventilation systems) would be designed 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 levels that would result in any significant increase in ambient noise levels. Therefore, the Proposed Actions would not result in any significant adverse noise impacts.



West 108th Street WSFSSH Development

Figure 9-2  
Noise Attenuation Requirements

**TABLE 9-9**  
**Required Attenuation within the Project Area under CEQR Criteria**

Site	Frontage	Associated Receptor Location <sup>1</sup>	Maximum With-Action L <sub>10</sub> (in dBA)	CEQR Noise Exposure Category	CEQR Minimum Required Attenuation (in dBA)	Maximum With-Action L <sub>dn</sub> (in dB)	HUD Noise Exposure Category	HUD Minimum Required Attenuation (in dB)
Building 1 (Lots 5, 10, & 13)	Southern (West 108 <sup>th</sup> Street)	2	69.91	Marginally Acceptable	N/A <sup>2</sup>	66.91	Normally Unacceptable	25
	Eastern (Anibal Aviles Playground)	2	69.91	Marginally Acceptable	N/A	66.91	Normally Unacceptable	25
Building 2 (Lot 26)	Southern (West 108 <sup>th</sup> Street)	3	66.16	Marginally Acceptable	N/A	63.16	Acceptable	N/A
	Western (Anibal Aviles Playground)	3	66.16	Marginally Acceptable	N/A	63.16	Acceptable	N/A

**Notes:**

<sup>1</sup> Receptor locations shown in **Figure 9-1**; necessary attenuation levels shown in **Figure 9-2**.

<sup>2</sup> N/A = Not Applicable. Additional noise attenuation measure above standard construction practices is not required to achieve interior noise levels of 45 dBA or lower for residential/community facility uses.