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Noise

The goal of this chapter is to determine whether the Proposed Actions would have a significant adverse impact on the environment at existing noise-sensitive receptors and whether noise levels at any new receptors at the Development Site would exceed applicable New York City noise limits.

Introduction

The Proposed Actions would facilitate the development of a mixed-use community on the campus of the CCC, which would be comprised of income-based affordable housing; retail spaces; new publicly accessible open space; a garage with recreational space on the roof, and a variety of community facilities including a performing arts center (PAC) (the Proposed Project). The Proposed Project would be constructed in phases over a planned 10-year period, with 12 buildings ranging from two to 15 stories. The buildings would be occupied as they are constructed in the phased development.

The Proposed Actions would introduce new noise-sensitive receptors including residences, community facility spaces, and the PAC. Retail space is not considered to be sensitive to noise and according to the *2021 CEQR Technical Manual*. Publicly accessible space or open space is only sensitive to noise if serenity and quiet are an extraordinarily important part of their purpose and serve as important public need. Quiet and serenity are not expected to be a key element to the proposed publicly accessible space. The Proposed Actions would generate noise from mobile sources and stationary equipment such as rooftop mechanical equipment which has the potential to increase noise at noise sensitive receptors. The

Proposed Actions would introduce outdoor recreational areas, including a playground for the new childcare facility on the southeast area of Proposed Building 4 and a playground with a basketball court on the rooftop of the proposed parking garage to the east of Proposed Building 9/10. The proposed playground would replace an existing ground-level basketball court. Per the *2021 CEQR Technical Manual*, a noise analysis is appropriate if an action would generate mobile or stationary sources of noise or would be located in an area with high ambient noise levels. The purpose of the noise assessment under CEQR is to determine if:

- The Proposed Actions would have a significant adverse environmental impact by significantly increasing sound levels from mobile and stationary sources at existing sensitive noise receptors adjacent to the Development Site, including residential and commercial land uses; and
- New noise receptors introduced at the Development Site would be in an acceptable ambient sound level environment ~~as defined in applicable provisions of the City's noise code.~~

The noise assessment includes the following:

- Background on metrics used to describe noise;
- The methodology and criteria used to assess potential impacts;
- An assessment of the potential for the Proposed Actions to significantly affect existing receptors due to the introduction of new mobile or stationary sources;
- Results from ambient sound level monitoring in the Project Area; and
- An evaluation of the ambient sound levels at new receptor locations.

This noise analysis considers two receptor types when evaluating noise: existing and new receptor(s). Since the Proposed Project would introduce new buildings with residential and community facility spaces, these are considered "new receptors." The analysis also considers "existing receptors" which are the current noise-sensitive uses such as commercial and residential properties surrounding the Development Site. The following describes the results of the noise assessment for these two types of receptors.

Principal Conclusions

A noise assessment was conducted to determine whether the Proposed Actions would significantly increase sound levels from mobile and stationary sources at existing noise receptors, and if new noise receptors that would be introduced would be in an acceptable ambient sound level environment ~~as defined in applicable provisions of the City's noise code.~~

Existing Noise Receptors

The Project Area includes existing residential and community facility receptors. The Proposed Actions would introduce new stationary and mobile sources of noise.

The increase in noise due to mobile sources with the No-Action and With-Action conditions have been determined with proportional noise modeling at 13 intersections and 6 monitoring locations throughout the study area. Mobile source noise levels would increase

by up to 1.2 dBA for the With-Action condition compared to No-Action condition due to traffic generated by the Proposed Actions. Mobile source noise levels would increase up to 1.8 dBA for the With-Action condition compared to existing conditions due to background traffic growth and traffic generated by the Proposed Actions.

The closest existing noise-sensitive building is a New York City Housing Authority (NYCHA) property at 1 Vandalia Avenue southeast of the Project Area. The building includes a 10-story portion approximately 108 feet from the Project Site and the proposed rooftop basketball court. No-Action noise levels at this receptor would range from 56.5 dBA to 66.7 dBA (Leq). With-Action noise levels at this receptor including stationary and mobile sources would range from 58.0 to 67.6 dBA (Leq). The Proposed Actions would result in an increase up to 1.6 dBA (Leq) in noise. Since noise levels would not increase by 3 dBA or more at these receptors, there would be no significant adverse impacts due to mobile and stationary sources.

The residential building at 1180 Pennsylvania Avenue is approximately 80 feet from the Project Site and proposed daycare recreational area. No-Action noise levels at this receptor would range from 52.8 to 66.5 dBA (Leq). With-Action noise levels at this receptor including stationary and mobile sources would range from 59.4 to 67.7 dBA (Leq). The Proposed Actions would result in an increase up to 6.5 dBA (Leq) in noise. Since noise levels would increase by 5 dBA or more at these receptors, there would be a significant adverse noise impacts due to mobile and stationary sources.

New Noise Receptors

The noise analysis for new receptors evaluates whether receptors would be introduced into an environment with acceptable ambient noise conditions. With-Action noise levels have been evaluated at new receptors based on ambient noise measurements, mobile source proportional noise modeling, and modeling of noise from proposed recreation areas. Between Draft and Final EIS, CadnaA model (TNM module) analysis was conducted to determine if Sunday peak hour vehicles coming in and out of the Project Site would cause a need for more attenuation at Project Buildings.

The With-Action noise level at the northern and eastern facades of Building 1 including mobile and stationary sources would be up to 78.6 dBA (L_{10}). Therefore, the eastern façade along Pennsylvania Avenue, the northern façade along Flatlands Avenue, the western façade within 50 feet of Flatlands Avenue, and the southern façade within 50 feet of Pennsylvania Avenue would require a minimum composite window/wall of 35 OITC.

The With-Action noise level at the eastern façade of Building 2 including mobile and stationary sources would be up to 78.6 dBA (L_{10}). Therefore, the eastern façade along Pennsylvania Avenue and the northern and southern façades within 50 feet of Pennsylvania Avenue would require a minimum composite window/wall of 35 OITC.

The With-Action noise level at the northern façade of Building 3 including mobile and stationary sources would be up to 72.4 dBA (L_{10}). Therefore, the northern façade along Flatlands Avenue and the eastern and western façades within 50 feet of Flatlands Avenue would require a minimum composite window/wall sound attenuation of 28 OITC.

The With-Action noise level at the southern façade of Building 4 including mobile and stationary sources and the new childcare facility playground would be up to 75.9 dBA (L_{10}). Therefore, the southern ~~façade~~, eastern, and western façades of Building 4 within 50 feet of the proposed childcare facility playground would require a minimum composite window/wall sound attenuation of 31 OITC.

The With-Action noise level at the northern façade of Buildings 5 including mobile and stationary sources would be up to 72.4 dBA (L_{10}). Therefore, the northern façade along Flatlands Avenue and the eastern and western façades within 50 feet of Flatlands Avenue would require a minimum composite window/wall sound attenuation of 28 OITC.

The With-Action noise level at the northern façade of Buildings 6 including mobile and stationary sources would be up to 72.4 dBA (L_{10}). Therefore, the northern façade along Flatlands Avenue and the eastern and western façades within 50 feet of Flatlands Avenue would require a minimum composite window/wall sound attenuation of 28 OITC.

The With-Action noise level at the northern, western, and southern façades of Building 7/8 including mobile and stationary sources would be up to 74.5 dBA (L_{10}). Therefore, the northern, western, and southern façades of Building 7/8 would require a minimum composite window/wall sound attenuation of 31 OITC.

The With-Action noise level at all façades of Building 9/10 including mobile and stationary sources and the proposed rooftop basketball court would be up to 75.5 dBA (L_{10}). Therefore, all façades of Building 9/10 would require a minimum composite window/wall sound attenuation of 31 OITC.

Other facades of the proposed buildings and the PAC are setback from Louisiana Avenue, Flatlands Avenue, and Pennsylvania Avenue where With-Action noise levels would be below 70 dBA (L_{10} or L_{eq}). Therefore, there would be no need for a minimum composite window/wall sound attenuation requirement at these locations.

To implement these attenuation requirements, an (E) designation (E-679) would be applied to the Development Site specifying the appropriate amount of window/wall attenuation and an alternate means of ventilation. With these commitments, the Proposed Project would not result in any significant adverse noise impacts.

Noise Background

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work, or recreation. How people perceive sound depends on several measurable physical characteristics. These factors include:

- **Level:** Sound level is based on the amplitude of sound pressure fluctuations and is often equated to perceived loudness.
- **Frequency:** Sounds are comprised of acoustic energy distributed over a variety of frequencies. Acoustic frequencies, commonly referred to as tone or pitch, are typically measured in Hertz (Hz). Pure tones have energy concentrated in a narrow frequency range and can be more audible to humans than broadband sounds. Sound levels are most often measured on a logarithmic scale of decibels (dB). The decibel scale compresses the audible acoustic pressure levels which can vary from the threshold of hearing (0 dB) to the threshold of pain (120 dB). Because sound levels are measured in

dB, the addition of two sound levels is not linear. Adding two equal sound levels results in a 3 dB increase in the overall level. Research indicates the following general relationships between sound level and human perception:

- A 3-dB increase is a doubling of acoustic energy and is the threshold of perceptibility to the average person.
- A 10-dB increase is a tenfold increase in acoustic energy and is perceived as a doubling in loudness to the average person.

Audible sound is comprised of acoustic energy over a range of frequencies typically from 20 to 20,000 Hz. The human ear does not perceive sound levels at each frequency as equally loud. To compensate for this phenomenon in perception, a frequency filter known as A-weighting (dBA) is used to evaluate environmental noise levels. **Table 16-1** presents a list of common outdoor and indoor sound levels.

Table 16-1 Common Indoor and Outdoor Sound Levels

Outdoor Sound Levels	Sound Pressure μPa		Sound Level dBA	Indoor Sound Levels
	6,324,555	-	110	Rock Band at 5 m
Jet Over-Flight at 300 m		-	105	
	2,000,000	-	100	Inside New York Subway Train
Gas Lawn Mower at 1 m		-	95	
	632,456	-	90	Food Blender at 1 m
Diesel Truck at 15 m		-	85	
Noisy Urban Area—Daytime	200,000	-	80	Garbage Disposal at 1 m
		-	75	Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	-	70	Vacuum Cleaner at 3 m
Suburban Commercial Area		-	65	Normal Speech at 1 m
	20,000	-	60	
Quiet Urban Area—Daytime		-	55	Quiet Conversation at 1 m
	6,325	-	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		-	45	
	2,000	-	40	Empty Theater or Library
Quiet Suburb—Nighttime		-	35	
	632	-	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime		-	25	Empty Concert Hall
Rustling Leaves	200	-	20	
		-	15	Broadcast and Recording Studios
	63	-	10	
		-	5	
Reference Pressure Level	20	-	0	Threshold of Hearing

μPA MicroPascals describe pressure. The pressure level is what sound level monitors measure
dBA A-weighted decibels describe pressure logarithmically with respect to 20 μPa (the reference pressure level)
Source: Highway Noise Fundamentals, Federal Highway Administration, September 1980

Because sound levels change over time, a variety of sound level metrics can be used to describe environmental noise. The following is a list of sound level descriptors that are used in the noise analysis:

- L_{10} is the sound level which is exceeded for 10 percent of the time during a given time period. Therefore, it represents the higher end of the range of sound levels. The unit is commonly used in the *2021 CEQR Technical Manual* to evaluate acceptable thresholds for noise exposure for new receptors that would be introduced by a proposed development.
- L_{eq} is the energy-average A-weighted sound level. The L_{eq} is a single value that is equivalent in sound energy to the fluctuating levels over a period of time. Therefore, the L_{eq} considers how loud noise events are during the period, how long they last, and how many times they occur. L_{eq} is commonly used to describe environmental noise and relates well to human annoyance. In accordance with the *2021 CEQR Technical Manual*, the L_{eq} sound level is used to assess the potential for significant increases in noise due to a proposed development at existing receptors in the study area.

Noise Assessment for Existing Receptors

Noise impact at existing nearby sensitive receptors is assessed according to the relative increase between No-Action and With-Action sound levels. Noise impact is assessed according to the increase in the L_{eq} sound level in accordance with the *2021 CEQR Technical Manual*. If mobile or stationary sources associated with the proposed project would increase L_{eq} sound levels by 3 dB or more and absolute levels would exceed 65 dBA L_{eq}, the proposed project would cause a significant adverse impact prior to mitigation. Additionally, if No-Action condition noise levels are 60 dBA L_{eq} or less, a 5-dB increase would be considered a significant adverse noise impact.

Mobile Sources

As described in **Chapter 13, Transportation**, a detailed traffic analysis has been conducted at 13 intersections to evaluate Existing, No-Action, and With-Action traffic volumes for the weekday AM, midday, PM, and Saturday PM periods, and seven intersections for Sunday AM periods near the Development Site including the following:

- Pennsylvania Avenue and Seaview Avenue
- Pennsylvania Avenue and Twin Pines Dr
- Pennsylvania Avenue and Vandalia Avenue
- Pennsylvania Avenue and Flatlands Avenue
- Pennsylvania Avenue and Cozine Avenue
- Pennsylvania Avenue and Wortman Avenue
- Pennsylvania Avenue and Stanley Avenue
- Pennsylvania Avenue and Linden Boulevard
- Louisiana Avenue and Vandalia Avenue
- Louisiana Avenue and Flatlands Avenue
- Flatlands Avenue and Georgia Avenue/Site Driveway

- Flatlands Avenue and East 108th Street
- Flatlands Avenue and Rockaway Parkway

The traffic analysis evaluated vehicle classification counts as part of the turning movement counts at these intersections. The increase in noise for the No-Action and With-Action conditions has been evaluated at existing receptors based on proportional noise modeling of noise passenger-car equivalents (PCEs) for these 13 intersections and 6 monitoring locations. Existing, No-Action, and With-Action noise conditions at new receptors have been determined based on ambient sound monitoring and proportional noise modeling at roadway segments or intersections nearest the noise monitoring locations. Between Draft and Final EIS, additional Sunday noise monitoring locations were measured at the Project Site and With-Action noise levels at these additional monitoring locations were calculated using CadnaA model (TNM module) analysis.

If the proposed project would result in a doubling or more of PCEs, it would result in a 3 dBA or greater increase in noise levels. If PCEs would not double due to the proposed project, there would not be a significant adverse vehicular noise impact, and no further mobile source noise analysis is warranted. The *2021 CEQR Technical Manual* describes the process to determine PCEs. Vehicle classes are defined to have the following PCEs based on typical vehicles speeds:

- Each automobile or light truck: 1 noise PCE
- Each medium truck: 13 noise PCEs
- Each bus: 18 noise PCEs
- Each heavy truck: 47 noise PCEs

Future With-Action noise increases are calculated using the following equation:

$$With\ Action\ L_{eq}\ Increase = 10 * \log\left(\frac{With\ Action\ PCE}{No\ Action\ PCE}\right)$$

Table 16-2 presents the Existing, No-Action, and With-Action PCE values at study area intersections and the sound increment between conditions. This table shows that traffic noise would increase by up to 0.6 dBA in the No-Action condition compared to the Existing condition. The highest increase in noise would be at the Flatlands Avenue and Georgia Avenue/Site Driveway intersection. Traffic noise would increase up to 1.2 dBA at all intersections in the With-Action condition compared to the No-Action condition. The total increase in noise in the With-Action condition compared to the Existing condition would be up to 1.8 dBA.

The Proposed Actions would not result in a doubling of PCEs compared to the No-Action condition, and noise levels would increase by less than 3 dB at all intersections. Therefore, there would not be significant adverse noise impact at these intersections or receptors at the intersections. Potential mobile source impact for existing receptors farther from the intersections has been assessed in the following sections.

Table 16-2 Mobile Source Noise Analysis at Intersections for Existing Receptors

Intersection	Period	Existing PCEs	No-Action PCEs	No-Action Sound Increment (dBA)[1]	With-Action PCEs	With-Action minus No-Action Sound Increment[2] (dBA)	With-Action minus Existing Sound Increment[3] (dBA)
1 Flatlands Avenue and Rockaway Parkway	Morning	7,536	8,220	0.4	8,602	0.2	0.6
	Afternoon	5,830	6,497	0.5	6,735	0.2	0.6
	Evening	5,830	6,488	0.5	6,780	0.2	0.7
	Saturday	3,652	4,057	0.5	4,284	0.2	0.7
2 Flatlands Avenue and East 108th Street	Morning	6,687	7,350	0.4	7,894	0.3	0.7
	Afternoon	5,695	6,398	0.5	6,775	0.2	0.8
	Evening	5,967	6,620	0.5	7,048	0.3	0.7
	Saturday	3,796	4,202	0.4	4,548	0.3	0.8
3 Louisiana Avenue and Flatlands Avenue	Morning	6,196	6,818	0.4	7,637	0.5	0.9
	Afternoon	5,216	5,870	0.5	6,518	0.5	1.0
	Evening	5,331	5,907	0.4	6,600	0.5	0.9
	Saturday	3,666	4,051	0.4	4,627	0.6	1.0
	Sunday	5,368	5,915	0.4	6,553	0.4	0.9
4 Flatlands Avenue and Georgia Avenue/Site Driveway	Morning	4,418	4,954	0.5	6,079	0.9	1.4
	Afternoon	3,770	4,329	0.6	5,055	0.7	1.3
	Evening	4,467	5,062	0.5	6,164	0.9	1.4
	Saturday	2,680	3,026	0.5	4,032	1.2	1.8
	Sunday	4,097	4,548	0.5	5,206	0.6	1.0
5 Pennsylvania Avenue and Flatlands Avenue	Morning	9,318	10,176	0.4	10,770	0.2	0.6
	Afternoon	8,612	9,477	0.4	9,885	0.2	0.6
	Evening	7,600	8,375	0.4	8,787	0.2	0.6
	Saturday	4,995	5,485	0.4	5,905	0.3	0.7
	Sunday	5,518	6,075	0.4	6,542	0.3	0.7
6 Pennsylvania Avenue and Linden Boulevard	Morning	16,753	17,697	0.2	18,078	0.1	0.3
	Afternoon	17,092	17,922	0.2	18,178	0.1	0.3
	Evening	13,374	14,086	0.2	14,319	0.1	0.3
	Saturday	6,357	6,691	0.2	6,924	0.1	0.4
7 Pennsylvania Avenue and Stanley Avenue	Morning	7,829	8,340	0.3	8,733	0.2	0.5
	Afternoon	7,281	7,672	0.2	7,948	0.2	0.4
	Evening	5,059	5,376	0.3	5,612	0.2	0.5
	Saturday	3,570	3,778	0.2	4,037	0.3	0.5
8 Pennsylvania Avenue and Wortman Avenue	Morning	7,125	7,591	0.3	7,956	0.2	0.5
	Afternoon	6,251	6,587	0.2	6,847	0.2	0.4
	Evening	4,903	5,206	0.3	5,449	0.2	0.5
	Saturday	3,510	3,714	0.2	3,979	0.3	0.5

Table 16-2 Mobile Source Noise Analysis at Intersections for Existing Receptors

Intersection	Period	Existing PCEs	No-Action PCEs	No-Action Sound Increment (dBA)[1]	With-Action PCEs	With-Action minus No-Action Sound Increment[2] (dBA)	With-Action minus Existing Sound Increment[3] (dBA)
9 Pennsylvania Avenue and Cozine Avenue	Morning	7,327	7,797	0.3	8,149	0.2	0.5
	Afternoon	6,938	7,304	0.2	7,577	0.2	0.4
	Evening	5,048	5,353	0.3	5,608	0.2	0.5
	Saturday	3,678	3,887	0.2	4,149	0.3	0.5
10 Pennsylvania Avenue and Vandalia Avenue	Morning	5,177	5,388	0.2	5,619	0.2	0.4
	Afternoon	4,637	4,826	0.2	4,987	0.1	0.3
	Evening	3,880	4,035	0.2	4,221	0.2	0.4
	Saturday	2,802	2,915	0.2	3,089	0.3	0.4
	Sunday	3,115	3,240	0.2	3,397	0.2	0.4
11 Pennsylvania Avenue and Twin Pines Drive	Morning	4,638	4,827	0.2	5,041	0.2	0.4
	Afternoon	3,801	3,956	0.2	4,110	0.2	0.3
	Evening	3,603	3,749	0.2	3,939	0.2	0.4
	Saturday	2,668	2,776	0.2	2,958	0.3	0.4
	Sunday	3,033	3,156	0.2	3,331	0.2	0.4
12 Pennsylvania Avenue and Seaview Avenue	Morning	5,901	6,142	0.2	6,371	0.2	0.3
	Afternoon	4,262	4,433	0.2	4,591	0.2	0.3
	Evening	3,877	4,034	0.2	4,206	0.2	0.4
	Saturday	2,839	2,954	0.2	3,110	0.2	0.4
	Sunday	2,989	3,111	0.2	3,264	0.2	0.4
13 Louisiana Avenue and Vandalia Avenue	Morning	1,321	1,375	0.2	1,532	0.5	0.6
	Afternoon	1,170	1,220	0.2	1,374	0.5	0.7
	Evening	1,137	1,181	0.2	1,349	0.6	0.7
	Saturday	993	1,034	0.2	1,175	0.6	0.7
	Sunday	1,040	1,082	0.2	1,195	0.4	0.6

[1] Sound increment represents No-Action sound levels minus Existing sound levels

[2] Sound increment represents With-Action sound levels minus No-Action sound levels

[3] Sound increment represents With-Action sound levels minus Existing sound levels

Source: VHB, 2022

Stationary Sources

The Proposed Project is not anticipated to include any substantial stationary source noise generators, such as unenclosed cooling or ventilation equipment, loudspeaker systems, stationary diesel engines, or other similar types of uses. The Proposed Project would introduce outdoor recreational areas, including a playground for the new childcare facility on the southeast area of Proposed Building 4 and a basketball court on the rooftop of the

proposed parking garage to the east of Proposed Building 9/10. The basketball court would replace an existing ground-level basketball court.

The design and specifications for mechanical equipment – such as heating, ventilation, and air conditioning – would incorporate sufficient noise reduction to comply with applicable noise regulations and standards, including the standards contained in the revised New York City Noise Control Code, Subchapter 5, §24-227, the New York City Department of Building Code. This would ensure that mechanical equipment does not result in any significant increase in noise levels, either by itself or cumulatively with other project noise sources.

Noise from the proposed recreational areas have been evaluated based on the 1992 SCA Playground Noise Study that is referenced in the CEQR TM. The evaluation assumes sound from the basketball court based on a middle school which is 71.0 dBA (L_{eq}) at the playground boundary and sound from the childcare facility based on an early childhood center which is 71.5 dBA (L_{eq}). Sound levels at receptors farther than the playground boundary are reduced by 4.8 dBA at 20 feet, 6.8 dBA at 30 feet, 9.1 dBA at 40 feet, and a 4.5-dB per doubling of distance between 40 and 300 feet.

Potential noise impact has been assessed for existing and new receptors including the noise from the recreational areas in the following sections.

Noise Assessment for Monitoring Locations and New Receptors

With-Action noise conditions at new sensitive receptors that would be introduced by the Proposed Project are evaluated according to absolute exterior sound level. The noise exposure guidelines for acceptable ambient conditions depend on the type of land use; for residential and community facility spaces, the goal is to maintain interior noise levels of 45 dBA or lower. With-Action exterior sound levels are evaluated to determine if receptors would be in an acceptable ambient sound level environment. It is generally assumed that without specific information on a building's window and wall construction, the outdoor-to-indoor noise reduction of the building is 25 decibels. As shown in **Table 16-3**, exterior ambient sound levels exceeding 70 dBA (L_{10}) during the daytime (7 AM to 10 PM) are considered Marginally Unacceptable. Exterior sound levels exceeding 80 dBA (L_{10}) are considered Clearly Unacceptable. If there would be Marginally Unacceptable or Clearly Unacceptable ambient noise conditions, there is a need to provide window/wall sound attenuation that is sufficient to reduce interior sound levels to acceptable levels.

Since the Proposed Actions would introduce new residential and community facility spaces, the highest L_{10} or L_{eq} sound level among all of the peak transportation periods (i.e., weekday morning, midday, and afternoon, Saturday afternoon, and Sunday morning) is used to evaluate whether the Proposed Project would introduce new receptors into an acceptable noise environment.

Noise Exposure Guidelines

The *2021 CEQR Technical Manual* provides noise exposure guidelines for assessing ambient noise conditions at new residential and community facility receptors, as shown in **Table 16-3**.

Table 16-3 Noise Exposure Guidelines for Use in City Environmental Impact Review

Receptor Type	Time Period	Acceptable External Exposure	Marginally Acceptable External Exposure	Marginally Unacceptable External Exposure	Clearly Unacceptable External Exposure
Residential	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
Residential and Community Facility	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

Source: Table 19-2, *2021 CEQR Technical Manual*

Existing Noise Levels

To characterize existing conditions, noise measurements were conducted at six locations throughout the Development Site as shown in **Figure 16-1**. Noise measurements have been conducted for 20-minutes in duration during the weekday morning (7:00 to 9:00 AM), midday (11:00 AM to 2:00 PM), and evening (4:00 to 6:00 PM), Saturday afternoon (12:00 to 4:00 PM), and Sunday morning (9:00 to 11:00 AM) peak periods including simultaneous traffic counts. Measurements were conducted on June 2, 2021 (weekday), June 7, 2021 (Saturday), and September 26, 2021 (Sunday) which are dates approved by NYCDOT for traffic counts and were not subject to a measurement pause due to COVID-related traffic effects. Existing noise measurements were adjusted based on the difference between the vehicle counts conducted during noise measurement and the existing vehicle counts collected and summarized in **Chapter 13, Transportation**.

As shown in **Figure 16-1**, additional measurements were conducted at Locations 7 and 8 between Draft and Final EIS in order to assess attenuation requirement at interior facades of proposed buildings as a result of vehicles coming out and going into the Project Site during the Sunday church service peak hour (9:00 to 11:00 AM). Noise measurements were conducted on June 5th, 2022 (Sunday) and have been conducted for 20-minutes at Monitoring Location 7 and for 1-hour at Monitoring Location 8. Monitoring Locations 7 and 8 were analyzed with detailed CadnaA modeling analysis to determine the potential need for attenuation requirement at project buildings at interior facades during the Sunday church service and are not used to determine significant noise increases at existing receptors.

Measurements were conducted using Type I sound level meters at ground level and followed the procedures outlined in the *2021 CEQR Technical Manual*, which include documenting significant sources of sound, conducting spot counts of traffic by vehicle classification. The noise monitors were placed with a minimum of four feet between the microphone and nearby reflecting surfaces. Data collected included A-weighted overall and one-third octave band sound levels including minimum (L_{min}), maximum (L_{max}), statistics (L_{xx}), and energy-average noise levels (L_{eq}). Atmospheric conditions including air temperature, wind speed, wind direction, relative humidity, and precipitation were recorded from a nearby weather station. The atmospheric conditions were within acceptable ranges and did not influence the measurement results.

Table 16-4 presents the measured L_{eq}, L_{10}, L_{50}, and L_{90} sound level at each of the measurement locations and each time period. Existing sound levels ranged from 52.5 to 75.1 dBA (L_{eq}) and from 53.8 to 75.6 dBA (L_{10}).

Table 16-4 Sound Level Measurement Results

Site	Monitoring Location	Time Period	L_{eq}	L_{10}	L_{50}	L_{90}
1	Louisiana Avenue at Proposed Building 7/8	Morning	66.3	69.1	62.9	57.7
		Midday	67.9	72.3	64.7	58.4
		Evening	65.3	68.3	62.7	57.9
		Saturday	66.9	68.7	64.2	59.6
		Sunday	64.1	67.5	61.7	56.4
2	Louisiana Avenue at Proposed Building 9/10	Morning	62.8	63.9	60.6	56.0
		Midday	59.0	61.9	56.3	53.3
		Evening	54.8	56.0	53.5	51.6
		Saturday	61.5	65.5	57.9	53.8
		Sunday	57.5	60.1	55.9	53.5
3	Flatlands Avenue between Alabama Avenue and Georgia Avenue	Morning	64.6	68.2	61.4	55.2
		Midday	66.6	67.4	62.2	57.9
		Evening	67.5	69.8	62.8	56.9
		Saturday	66.3	68.9	62.2	55.6
		Sunday	66.0	68.6	64.2	59.0
4	Project Site near Existing Receptors West of 1180 Pennsylvania Avenue	Morning	52.5	54.1	51.5	50.4
		Midday	64.6	65.2	61.6	50.0
		Evening	52.8	53.8	52.2	51.3
		Saturday	54.0	55.2	53.6	52.6
		Sunday	55.3	56.8	54.3	52.6
5	Corner of Flatlands Avenue and Pennsylvania Avenue	Morning	72.2	74.6	69.8	64.4
		Midday	75.1	75.6	70.3	66.0
		Evening	71.6	73.8	69.9	65.0
		Saturday	71.7	74.5	69.3	65.2
		Sunday	70.3	72.6	67.2	61.5
6	Pennsylvania Avenue	Morning	62.0	59.9	55.2	52.4
		Midday	62.1	64.2	59.3	56.1
		Evening	62.9	59.9	54.1	50.1
		Saturday	57.7	59.8	56.6	54.0
		Sunday	59.8	62.2	58.9	55.6

Source: VHB, 2022

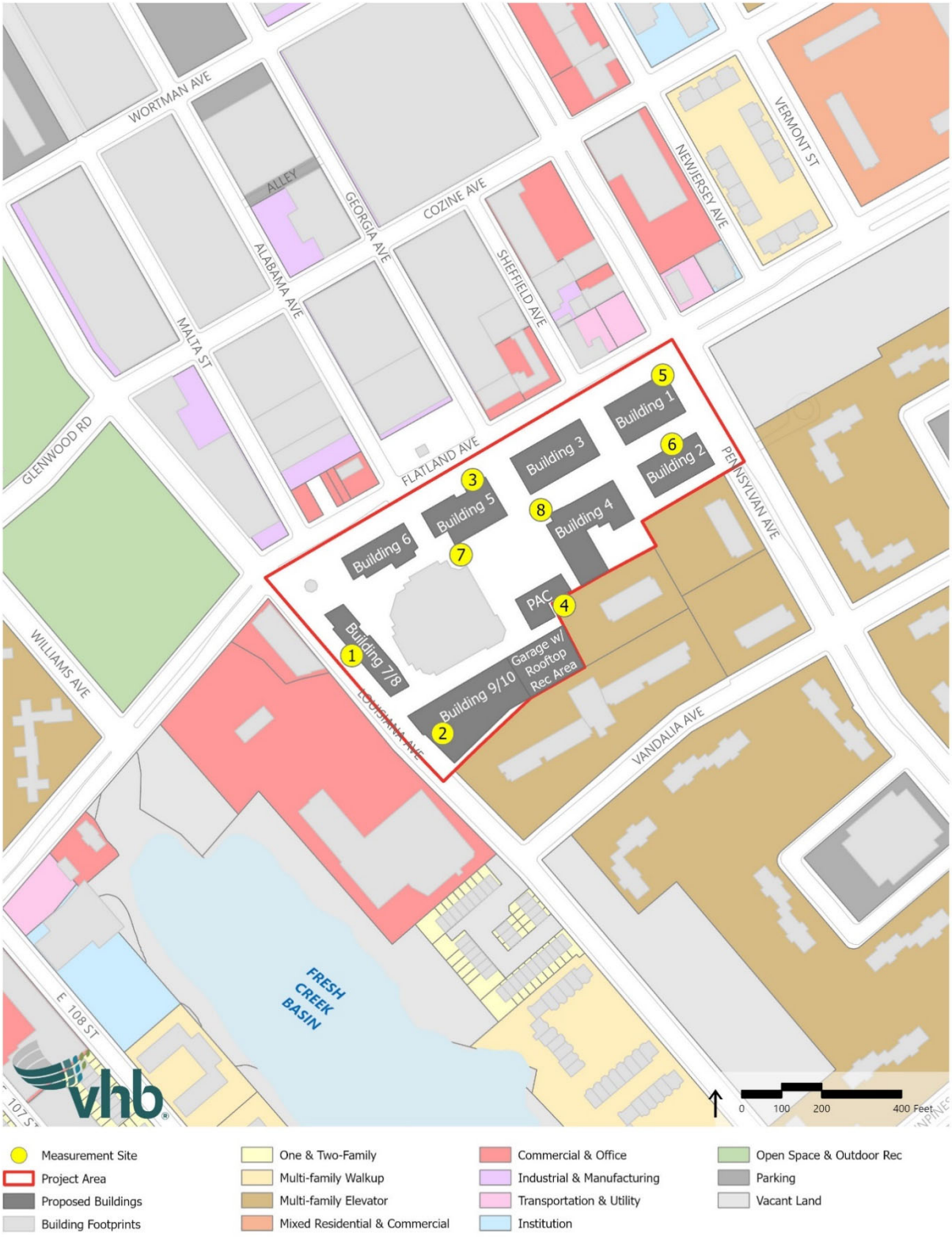
Table 16-5 presents the measured L_{eq}, L_{10}, L_{50}, and L_{90} sound level at the two measurement locations for Sunday church service period. Existing sound levels ranged from 56.0 to 58.2 dBA (L_{eq}) and from 58.6 to 60.3 dBA (L_{10}).

Table 16-5 Sound Level Measurement Results for Sunday AM

Site	Monitoring Location	Time Period	L_{eq}	L_{10}	L_{50}	L_{90}
7	South façade of Proposed Building 5	Sunday	58.2	60.3	57.1	54.4
8	South façade of Proposed Building 3	Sunday	56.0	58.6	53.9	50.6

Source: VHB, 2022

Figure 16-1 Noise Monitoring Locations



Source: VHB, 2022

Mobile Source Noise Analysis

A mobile source analysis has been conducted for existing receptors at corresponding roadway segments and new receptors based on proportional noise modeling to determine the traffic adjusted Existing, No-Action, and With-Action noise levels, and noise increases at monitored locations. Traffic volumes and vehicle classifications along the roadway segments contributing to the noise measurements have been used.

Table 16-6 presents the results of the mobile source noise analysis for new receptors. This table includes the PCEs based on the traffic counts conducted during the noise measurements, the Existing, No-Action, and With-Action traffic conditions as well as the change in noise levels compared to the measured conditions. Adjusted Existing noise levels have been computed based on the sound increment between the vehicle counts conducted during the noise measurement and the existing vehicle counts collected and summarized in **Chapter 13, Transportation**. No-Action noise levels have been computed based on the sound increment between the No-Action PCEs and the Existing PCEs. Similarly, the With-Action noise levels have been computed based on the With-action PCEs and the No-Action PCEs. This table shows that With-Action noise levels would generally be 0 to 1 dBA and up to 1.1 dBA higher than the No-Action noise levels during the weekday morning, midday, and afternoon peak periods. With-Action noise levels would be up to 0.9 dBA compared to No-Action noise levels on Saturday and Sunday. According to the *2021 CEQR Technical Manual* guidelines, increases of less than 3 dBA would be barely perceptible. As Proposed Actions would not increase noise levels by 3 dBA or more compared to No-Action conditions, there would not be significant noise impact at existing receptors due to mobile sources.

Table 16-6 Mobile Source Noise Analysis at Roadway Segments for New Receptors

Measurement Site	Roadway Intersection / Segment	Time Period	Noise Measurement Traffic PCEs	Existing PCEs	Noise Increment from Existing Traffic Adjustment (dBA)	No-Action PCEs	With-Action PCEs	No-Action minus Existing Sound Levels (dBA)	With-Action minus No-Action Sound Levels (dBA)
1	Louisiana Avenue	Morning	1,314	1,293	-0.1	1,344	1,674	0.2	1.0
		Midday	867	1,128	1.1	1,175	1,447	0.2	0.9
		Evening	1,530	1,011	-1.8	1,053	1,301	0.2	0.9
		Saturday	1,101	965	-0.6	1,004	1,230	0.2	0.9
		Sunday	554	1,126	3.1	1,171	1,328	0.2	0.5
2	Louisiana Avenue	Morning	1,257	1,330	0.2	1,383	1,709	0.2	0.9
		Midday	483	1,128	3.7	1,175	1,447	0.2	0.9
		Evening	648	1,019	2.0	1,061	1,308	0.2	0.9
		Saturday	1,101	965	-0.6	1,004	1,230	0.2	0.9
		Sunday	396	1,126	4.5	1,171	1,328	0.2	0.5
3	Flatlands Avenue	Morning	3,858	4,303	0.5	4,859	5,488	0.5	0.5
		Midday	4,116	2,919	-1.5	3,368	3,855	0.6	0.6
		Evening	4,866	4,127	-0.7	4,697	5,343	0.6	0.6
		Saturday	2,427	2,555	0.2	2,894	3,377	0.5	0.7
		Sunday	1,856	3,464	2.7	3,898	4,460	0.5	0.6
4	Louisiana Avenue	Morning	1,131	1,163	0.1	1,209	1,552	0.2	1.1
		Midday	816	1,208	1.7	1,259	1,514	0.2	0.8
		Evening	1,032	1,464	1.5	1,525	1,753	0.2	0.6
		Saturday	1,101	973	-0.5	1,012	1,238	0.2	0.9
		Sunday	679	1,126	2.2	1,171	1,328	0.2	0.5
5	Flatlands Avenue and	Morning	6,918	9,318	1.3	10,176	10,770	0.4	0.2
		Midday	9,162	8,612	-0.3	9,477	9,885	0.4	0.2

Table 16-6 Mobile Source Noise Analysis at Roadway Segments for New Receptors

Measurement Site	Roadway Intersection / Segment	Time Period	Noise Measurement Traffic PCEs	Existing PCEs	Noise Increment from Existing Traffic Adjustment (dBA)	No-Action PCEs	With-Action PCEs	No-Action minus Existing Sound Levels (dBA)	With-Action minus No-Action Sound Levels (dBA)
	Pennsylvania Avenue	Evening	4,776	7,600	2.0	8,375	8,787	0.4	0.2
		Saturday	2,316	4,995	3.3	5,485	5,905	0.4	0.3
		Sunday	2,746	4,507	2.2	4,962	5,335	0.4	0.3
6	Pennsylvania Avenue	Morning	3,975	4,031	0.1	4,196	4,438	0.2	0.2
		Midday	4,665	3,189	-1.7	3,319	3,525	0.2	0.3
		Evening	2,913	2,951	0.1	3,070	3,300	0.2	0.3
		Saturday	2,370	2,208	-0.3	2,297	2,509	0.2	0.4
		Sunday	1,293	2,310	2.5	2,404	2,598	0.2	0.3

Source: VHB, 2022

As shown in **Table 16-7,** the adjusted Existing noise levels adjusted based on the difference between the vehicle counts conducted during noise measurement and the existing vehicle counts collected and summarized in **Chapter 13, Transportation**. These sound levels would range from 52.7 to 75.0 dBA L_{eq} levels and L_{10} levels would range from 54.2 to 77.8 dBA.

Table 16-7 Adjusted Existing Sound Levels

Site	Monitoring Location	Time Period	Intersection/ Segment	L_{eq}	L_{10}	L_{50}	L_{90}
1	Louisiana Avenue at Proposed Building 7/8	Morning	Louisiana Avenue	66.2	69.0	62.8	57.6
		Midday		69.1	73.4	65.8	59.5
		Evening		63.5	66.5	60.9	56.1
		Saturday		66.4	68.1	63.6	59.0
		Sunday		67.2	70.6	64.8	59.5
2	Louisiana Avenue at Proposed Building 9/10	Morning	Louisiana Avenue	63.0	64.1	60.8	56.2
		Midday		62.6	65.6	60.0	57.0
		Evening		56.8	58.0	55.5	53.6
		Saturday		60.9	64.9	57.3	53.2
		Sunday		62.0	64.6	60.4	58.0
3	Flatlands Avenue between Alabama Avenue and Georgia Avenue	Morning	Flatlands Avenue	65.1	68.7	61.9	55.7
		Midday		65.1	65.9	60.7	56.4
		Evening		66.8	69.1	62.1	56.2
		Saturday		66.5	69.1	62.4	55.8
		Sunday		68.7	71.3	66.9	61.7
4	Project Site near Existing Receptors West of 1180 Pennsylvania Avenue	Morning	Louisiana Avenue	52.7	54.2	51.6	50.5
		Midday		66.3	66.9	63.3	51.7
		Evening		54.3	55.3	53.7	52.8
		Saturday		53.5	54.7	53.1	52.1
		Sunday		57.5	59.0	56.5	54.8
5	Corner of Flatlands Avenue and Pennsylvania Avenue	Morning	Flatlands Avenue and Pennsylvania Avenue	73.5	75.9	71.1	65.7
		Midday		74.8	75.4	70.0	65.7
		Evening		73.6	75.8	71.9	67.0
		Saturday		75.0	77.8	72.6	68.5
		Sunday		72.4	74.8	69.4	63.7
6	Pennsylvania Avenue	Morning	Pennsylvania Avenue	62.0	60.0	55.3	52.5
		Midday		60.4	62.5	57.6	54.4
		Evening		62.9	60.0	54.2	50.2
		Saturday		57.4	59.5	56.3	53.7
		Sunday		62.4	64.7	61.4	58.1

Source: VHB, 2022

As shown in **Table 16-8,** the No-Action noise levels including the increase in mobile sources would range from 52.8 to 75.4 dBA L_{eq} levels and L_{10} levels would range from 54.4 to 78.2 dBA.

Table 16-8 No-Action Sound Levels

Site	Monitoring Location	Time Period	Intersection/ Segment	L_{eq}	L_{10}	L_{50}	L_{90}
1	Louisiana Avenue at Proposed Building 7/8	Morning	Louisiana Avenue	66.4	69.2	63.0	57.8
		Midday		69.2	73.6	66.0	59.7
		Evening		63.6	66.7	61.1	56.3
		Saturday		66.5	68.3	63.8	59.2
		Sunday		67.3	70.7	64.9	59.6
2	Louisiana Avenue at Proposed Building 9/10	Morning	Louisiana Avenue	63.2	64.3	61.0	56.4
		Midday		62.8	65.8	60.2	57.2
		Evening		57.0	58.1	55.6	53.7
		Saturday		61.1	65.1	57.5	53.4
		Sunday		62.2	64.8	60.6	58.2
3	Flatlands Avenue between Alabama Avenue and Georgia Avenue	Morning	Flatlands Avenue	65.6	69.2	62.4	56.2
		Midday		65.7	66.5	61.3	57.0
		Evening		67.3	69.6	62.6	56.7
		Saturday		67.1	69.7	63.0	56.4
		Sunday		69.2	71.8	67.4	62.2
4	Project Site near Existing Receptors West of 1180 Pennsylvania Avenue	Morning	Louisiana Avenue	52.8	54.4	51.8	50.7
		Midday		66.5	67.1	63.5	51.9
		Evening		54.5	55.5	53.9	53.0
		Saturday		53.7	54.8	53.2	52.2
		Sunday		57.7	59.2	56.7	55.0
5	Corner of Flatlands Avenue and Pennsylvania Avenue	Morning	Flatlands Avenue and Pennsylvania Avenue	73.9	76.2	71.4	66.1
		Midday		75.3	75.8	70.4	66.2
		Evening		74.0	76.2	72.3	67.4
		Saturday		75.4	78.2	73.0	68.9
		Sunday		72.8	75.2	69.8	64.1
6	Pennsylvania Avenue	Morning	Pennsylvania Avenue	62.2	60.1	55.4	52.6
		Midday		60.6	62.7	57.8	54.6
		Evening		63.1	60.1	54.3	50.3
		Saturday		57.6	59.7	56.5	53.9
		Sunday		62.5	64.9	61.6	58.3

Source: VHB, 2022

As shown in **Table 16-9,** the With-Action L_{eq} levels would range from 53.9 to 75.8 dBA and the L_{10} levels would range from 55.5 to 78.6 dBA. With-Action sound levels would be below 70 dBA (L_{eq} or L_{10}) at measurement Site 2, Site 4, and Site 6 which are all setback 50 feet or

farther from Louisiana Avenue, Flatlands Avenue, or Pennsylvania Avenue. With-Action sound levels would exceed 70 dBA (L_{eq} or L_{10}) at measurement locations Site 1, Site 3, and Site 5, which are all representative of the mobile source sound level at façades of the proposed buildings nearest to Louisiana Avenue, Flatlands Avenue, Pennsylvania Avenue, or the proposed recreational facilities. It is noted that an additional noise measurement ~~is needed~~location was added, and subsequent analysis ~~should be~~was performed between the DEIS and FEIS in order to estimate noise levels generated by interior traffic patterns.

Table 16-9 With-Action Sound Levels

Site	Monitoring Location	Time Period	Intersection/ Segment	L_{eq}	L_{10}	L_{50}	L_{90}
1	Louisiana Avenue at Proposed Building 7/8	Morning	Louisiana Avenue	67.3	70.2	64.0	58.8
		Midday		70.2	74.5	66.9	60.6
		Evening		64.6	67.6	62.0	57.2
		Saturday		67.4	69.2	64.7	60.1
		Sunday		67.9	71.3	65.5	60.2
2	Louisiana Avenue at Proposed Building 9/10	Morning	Louisiana Avenue	64.1	65.2	61.9	57.3
		Midday		63.7	66.7	61.1	58.1
		Evening		57.9	59.1	56.6	54.7
		Saturday		62.0	66.0	58.4	54.3
		Sunday		62.7	65.4	61.2	58.8
3	Flatlands Avenue between Alabama Avenue and Georgia Avenue	Morning	Flatlands Avenue	66.1	69.7	62.9	56.7
		Midday		66.3	67.1	61.9	57.6
		Evening		67.9	70.2	63.2	57.3
		Saturday		67.7	70.3	63.6	57.0
		Sunday		69.8	72.4	68.0	62.8
4	Project Site near Existing Receptors on Vandalia Avenue	Morning	Louisiana Avenue	53.9	55.5	52.9	51.8
		Midday		67.3	67.9	64.3	52.7
		Evening		55.1	56.1	54.5	53.6
		Saturday		54.6	55.7	54.1	53.1
		Sunday		58.2	59.7	57.2	55.5
5	Corner of Flatlands Avenue and Pennsylvania Avenue	Morning	Pennsylvania Avenue and Flatlands Avenue	74.1	76.5	71.7	66.3
		Midday		75.4	76.0	70.6	66.3
		Evening		74.3	76.4	72.5	67.6
		Saturday		75.8	78.6	73.4	69.3
		Sunday		73.1	75.5	70.1	64.4
6	Pennsylvania Avenue	Morning	Pennsylvania Avenue	62.5	60.4	55.7	52.9
		Midday		60.9	63.0	58.1	54.9
		Evening		63.4	60.4	54.6	50.6
		Saturday		58.0	60.0	56.8	54.2
		Sunday		62.9	65.2	61.9	58.6

Source: VHB, 2022

Table 16-10 presents the results of the mobile source noise analysis for new receptors during the Sunday AM period. This table includes the comparison between the Cadna modeled noise level based on the traffic counts conducted during the noise measurements and the actual measured noise level. The difference between the measured and modeled results are up to 2.7 dBA, which is within the validation criteria of +/- 3 dB(A) identified in the *CEQR Technical Manual*. Therefore, the traffic noise model is validated and provides accurate results without the need for additional calibration procedure.

Table 16-10 Modeled Sound Level Results for Street A

Site	Monitoring Location	Time Period	Measured L_{eq}	Measured L_{10}	CadnaA Modeled L_{eq}	Difference L_{eq}
1	Louisiana Avenue at Proposed Building 7/8	Sunday Service Time	64.1	67.5	61.6	-2.5
3	Flatlands Avenue between Alabama Avenue and Georgia Avenue	Sunday Service Time	66.0	68.6	64.9	-1.1
5	Corner of Flatlands Avenue and Pennsylvania Avenue	Sunday Service Time	70.3	72.6	67.6	-2.7
7	Inside Gotham CCC South façade of Proposed Building 5	Sunday Service Time	58.2	60.3	59.0	0.8
8	Inside Gotham CCC South façade of Proposed Building 3	Sunday Service Time	56.0	58.6	58.6	2.6

Source: VHB, 2022

The model was then used to predict the With-Action noise levels for the Sunday AM period. The With-Action noise levels have been computed based on the vehicle volumes summarized in **Chapter 13, Transportation**. **Table 16-11** shows that With-Action L_{eq} levels would range from 53.6 to 63.6 dBA and the L_{10} levels would range from 56.6 to 66.6 dBA. With-Action sound levels would be below 70 dBA (L_{eq} or L_{10}) on all façades facing the proposed Street A between Louisiana Avenue and Street B.

Table 16-11 Modeled Sound Level Results for Street A

Buildings	Facade	Time Period	With-Action L_{eq}	With-Action L_{10}[A]
Building 3	South	Sunday	53.6	56.6
	West	Sunday	63.3	66.3
Building 4	West	Sunday	58.2	61.2
	North	Sunday	55.1	58.1
Building 5	East	Sunday	60.4	63.4
	South	Sunday	62.8	65.8
Building 7/8	South	Sunday	61.6	64.6
Building 9/10	North	Sunday	62.2	65.2
PAC	West	Sunday	63.6	66.6
	North	Sunday	55.1	58.1

Note: L_{10} was conservatively calculated assuming 3 dBA higher than L_{eq} noise levels.
Source: VHB, 2022

Stationary Source Noise Analysis

The Project Area includes existing residential and community facility receptors. The Proposed Actions would introduce new stationary and mobile sources of noise. Noise from recreational areas have been evaluated based on the 1992 SCA Playground Noise Study and the nearest measurement location, Measurement Location 4.

Existing Receptors

The closest existing noise-sensitive building to the existing ground-level recreational area is a New York City Housing Authority (NYCHA) property at 1 Vandalia Avenue southeast of the Project Area. This playground/basketball court will be relocated to the top of the proposed public parking garage, approximately 60 feet above ground level.

A 10-story portion of the building at 1 Vandalia is approximately 108 feet from the proposed playground boundary. As shown in **Table 16-12**, the With-Action sound levels including mobile and stationary sources would range from 58.0 to 67.6 dBA (L_{eq}). Therefore, With-Action noise levels including mobile and stationary sources would increase up to 1.6 dBA from the No-Action condition. Since With-Action noise levels including mobile and stationary sources would not increase by 3 dBA or more, there would be no significant adverse impact at 1 Vandalia Avenue due to the Proposed Actions.

~~Table 16-10~~Table 16-12 With-Action Sound Level at 1 Vandalia Avenue

Time Period	No-Action Sound Level, Site 4 (L_{eq})	No-Action + Street Level Playground Noise (L_{eq})	With-Action + Garage Roof Playground Noise (L_{eq})	Sound Level Increase (With-Action minus No-Action)
Morning	52.8	56.5	58.0	1.6
Midday	66.5	66.7	67.6	0.9
Afternoon	54.5	57.3	58.5	1.3
Saturday	53.7	56.9	58.3	1.5
Sunday	57.7	59.2	60.2	1.0

Source: VHB, 2022

The closest existing noise-sensitive building to the proposed childcare facility playground at Building 4 is the residential property at 1180 Pennsylvania Avenue approximately 80 feet from the proposed boundary of the childcare facility playground boundary. As shown in **Table 16-13**, the With-Action noise levels including mobile and stationary noise sources would range from 59.4 to 67.7 dBA (Leq). With-Action noise levels including mobile and stationary sources would increase up to 6.5 dBA from the No-Action condition. Since With-Action noise levels including mobile and stationary sources would increase more than 5 dBA, primarily resulting from the proposed childcare facility playground at Building 4, there would be significant adverse noise impact at 1180 Pennsylvania Avenue due to the Proposed Actions. However, the existing window and through-wall air conditioners would provide enough attenuation to maintain an interior noise level of 45 dBA or below. Therefore, interior noise to would be at an acceptable level and would result in a finding of no unavoidable significant adverse noise impacts at this location.

~~Table 16-11~~Table 16-13 With-Action Sound Level at 1180 Pennsylvania Avenue

Time Period	No-Action Sound Level, Site 4 (L_{eq})	With-Action (With-Action plus Mobile Source Increment and New Playground Source) (L_{eq})	Sound Level Increase (With-Action minus No-Action)
Morning	52.8	59.4	6.5
Midday	66.5	67.7	1.3
Afternoon	54.5	59.7	5.2
Saturday	53.7	59.5	5.9
Sunday	57.7	61.1	3.4

Source: VHB, 2022

New Receptors

With-Action noise levels at new receptors that would be introduced by the Proposed Actions have been determined including mobile and stationary sources. The following summarizes the noise assessment at new receptors including mobile and stationary sources:

The With-Action noise level at the north and east facades of Building 1 and the east façade of Building 2 including mobile and stationary sources would be up to 78.6 dBA (L_{10}).

The With-Action noise level at the north facades of Buildings 3, 5 and 6 including mobile and stationary sources would be up to 72.4 dBA (L_{10}).

As shown in **Table 16-14**, the With-Action noise level at the south façade of Building 4 including mobile and stationary sources would be up to 75.9 dBA (L_{10}).

~~Table 16-12~~Table 16-14 With-Action Sound Levels at Building 4 Recreational Area

Recreational Area	Location	Baseline Sound Level at boundary (L_{eq})	Time Period	Total With-Action Sound Level	
				L_{eq}	L_{10}
Childcare Facility	Building 4 – south facade	71.5	Morning	71.6	74.6
			Midday	72.9	75.9
			Afternoon	71.6	74.6
			Saturday	71.6	74.6
			Sunday	71.7	74.7

Source: VHB, 2022.

The With-Action noise level at the north, west, and south facades of Buildings 7/8 including mobile and stationary sources would be up to 74.5 dBA (L_{10}).

As shown in **Table 16-15**, the With-Action noise level at all façades of Building 9/10 would be up to 75.5 dBA (L_{10}) including noise from the proposed rooftop basketball court.

~~Table 16-13~~Table 16-15 With-Action Sound Levels at Building 9/10 Recreational Area

Recreational Area	Location	Baseline Sound Level at boundary (L_{eq})	Time Period	Total With-Action Sound Level	
				L_{eq}	L_{10}
Basketball Court	Building 9/10 – north, west, and south facades	70.0	Morning	71.1	74.1
			Midday	72.5	75.5
			Afternoon	71.1	74.1
			Saturday	71.1	74.1
			Sunday	71.2	74.2

Source: VHB, 2022

Other facades of the proposed buildings farther (e.g., more than 50 feet) from the dominant noise source and the PAC are setback from Louisiana Avenue, Flatlands Avenue, and Pennsylvania Avenue where With-Action noise levels would be below 70 dBA (L_{10} or L_{eq}).

Acceptability Assessment

The *2021 CEQR Technical Manual* provides noise exposure guidelines for assessing ambient sound levels, as shown in **Table 16-3**. Based on these noise exposure guidelines, noise has been assessed to determine the level of acceptability for new sensitive receptors introduced by the Proposed Project. **Table 16-16** summarizes the maximum With-Action L_{10} or L_{eq} level at each proposed building for each façade based on results of the noise monitoring and cumulative noise analysis including mobile and stationary sources and whether the With-

Action sound levels are considered to be acceptable according to the *2021 CEQR Technical Manual*. At the interior facades of the proposed Buildings facing Street A, the modeled noise level for Sunday AM were used to determine the level of acceptability for the new receptors to account for existing and new mobile sources and the shielding provided by the proposed Buildings.

~~Table 16-14~~Table 16-16 Sound Level Acceptability, dBA

Building	Façade	Noise Site	Time Period	With-Action Sound Level (dBA)	Acceptability
Building 1	North	5	Saturday	**78.6 (L_{10})**	**Marginally Unacceptable**
	East	5	Saturday	**78.6 (L_{10})**	**Marginally Unacceptable**
	West	6	Sunday	65.2 (L_{10})	Marginally Acceptable
	South	6	Sunday	65.2 (L_{10})	Marginally Acceptable
Building 2	North	6	Sunday	65.2 (L_{10})	Marginally Acceptable
	East	5	Saturday	**78.6 (L_{10})**	**Marginally Unacceptable**
	West	6	Sunday	65.2 (L_{10})	Marginally Acceptable
	South	6	Sunday	65.2 (L_{10})	Marginally Acceptable
Building 3	North	3	Sunday	**72.4 (L_{10})**	**Marginally Unacceptable**
	East	6	Sunday	65.2 (L_{10})	Marginally Acceptable
	West	Modeled [A]	Sunday	66.3 (L_{10})	Marginally Acceptable
	South	Modeled [A]	Sunday	56.6 (L_{10})	Marginally Acceptable
Building 4	North	Modeled [A]	Sunday	58.1 (L_{10})	Marginally Acceptable
	East	6	Sunday	65.2 (L_{10})	Marginally Acceptable
	West	Modeled [A]	Midday	61.2 (L_{10})	Marginally Acceptable
	South	4[B]	Midday	**75.9 (L_{10})**	**Marginally Unacceptable**
Building 5	North	3	Sunday	**72.4 (L_{10})**	**Marginally Unacceptable**
	East	Modeled [A]	Sunday	63.4 (L_{10})	Marginally Acceptable
	West	6	Sunday	65.2 (L_{10})	Marginally Acceptable
	South	Modeled [A]	Sunday	65.8 (L_{10})	Marginally Acceptable
Building 6	North	3	Sunday	**72.4 (L_{10})**	**Marginally Unacceptable**
	East	6	Sunday	65.2 (L_{10})	Marginally Acceptable
	West	6	Sunday	65.2 (L_{10})	Marginally Acceptable
	South	6	Sunday	65.2 (L_{10})	Marginally Acceptable
Building 7/8	North	1	Midday	**74.5 (L_{10})**	**Marginally Unacceptable**
	East	2	Midday	66.7 (L_{10})	Marginally Acceptable
	West	1	Midday	**74.5 (L_{10})**	**Marginally Unacceptable**
	South	1	Midday	**74.5 (L_{10})**	**Marginally Unacceptable**
Building 9/10	North	1	Midday	**74.5 (L_{10})**	**Marginally Unacceptable**
	East (inset)	4[B]	Midday	**75.5 (L_{10})**	**Marginally Unacceptable**
	West	1	Midday	**74.5 (L_{10})**	**Marginally Unacceptable**
	South	1	Midday	**74.5 (L_{10})**	**Marginally Unacceptable**
PAC	North	4	Midday	67.9 (L_{10})	Marginally Acceptable
	East	4	Midday	67.9 (L_{10})	Marginally Acceptable
	West	4	Midday	67.9 (L_{10})	Marginally Acceptable
	South	4	Midday	67.9 (L_{10})	Marginally Acceptable

Note: Although not included in this table, additional facades within 50 feet of dominant noise source were considered with attenuation requirement based on Monitoring Location directly in front of Louisiana/Flatland/Pennsylvania Avenues as depicted in **Figure 16-2**

~~A~~A: Based on CadnaA modeling analysis described above.

B: Includes sound level from recreational area

Source: VHB, 2022

According to the noise exposure guidelines in the *CEQR Technical Manual*, With-Action sound levels would be Marginally Unacceptable on the facades of Buildings 1, 2, 3, 4, 5, 6, 7/8, and 9/10, which are closest to Louisiana Avenue, Flatlands Avenue, Pennsylvania Avenue, or the proposed recreational areas, since sound levels would be between 70 and 80 dBA. With-Action sound levels would be Marginally Acceptable at the facades of Buildings 1, 2, 3, 4, 5, 6, 7/8, and the PAC, which are set back 50 feet or farther from Louisiana Avenue, Flatlands Avenue, or Pennsylvania Avenue. Additional noise assessment ~~would be~~were conducted between DEIS and FEIS for more refined assessment.

Based on the finding of Marginally Unacceptable sound levels, sufficient outdoor-to-indoor sound attenuation of the window/wall must be specified to provide acceptable sound attenuation from the window/wall materials.

Noise Attenuation Measures

The most common measure for reducing interior noise from ambient sources is to specify sufficient outdoor-to-indoor sound attenuation for the proposed building. As shown in **Table 16-17**, the required level of attenuation varies based on the exterior sound levels and type of receptor.

~~Table 16-15~~Table 16-17 Required Attenuation Values

	Marginally Unacceptable				Clearly Unacceptable
With-Action Sound Level Based on Vehicular Traffic	$70<L_{10}\leq73$	$73<L_{10}\leq76$	$76<L_{10}\leq78$	$78<L_{10}\leq80$	$80<L_{10}$
Attenuation A	(I) 28 dBA	(II) 31 dBA	(III) 33 dBA	(IV) 35 dBA	Attenuation required to achieve an interior level of 45 dBA

Note: [A] The above composite window-wall attenuation values are for residential dwellings and community facility development. Commercial office spaces and meeting rooms would be 5 dBA less in each category. All of the above categories require a closed window situation and hence an alternate means of ventilation.
Source: New York City Department of Environmental Protection (*2021 CEQR Technical Manual*, Table 19-3)

The results show new residential and community facility spaces would require a minimum composite window/wall sound attenuation to maintain an interior noise level not greater than 45 dBA. In order to maintain acceptable interior noise conditions an alternative means of ventilation must be included such as, but not limited to, central air conditioning, to provide ventilation during the closed window condition.

The composite OITC value of the window-wall structure is used to determine the necessary sound attenuation. The OITC classification is defined by ASTM International (ASTM E1331-10a) and provides a single number rating that is used for designing a building façade, including walls, doors, glazing, and combinations thereof. Sound attenuation measures would be achieved through construction materials and techniques with sufficient OITC-rated windows and walls.

The With-Action sound levels presented in **Table 16-16** were compared to the required attenuation values in **Table 16-17** to determine the sound attenuation needed. As shown in **Figure 16-2**, a minimum composite window/wall sound attenuation would be required on the facades of Buildings 1, 2, 3, 4, 5, 6, 7/8, and 9/10 which are closest to Louisiana Avenue, Flatlands Avenue, Pennsylvania Avenue, or the proposed recreational areas.

The With-Action noise level at the northern and eastern facades of Building 1 including mobile and stationary sources would be up to 78.6 dBA (L_{10}). Therefore, the eastern façade along Pennsylvania Avenue, the northern façade along Flatlands Avenue, the western façade within 50 feet of Flatlands Avenue, and the southern façade of within 50 feet of Pennsylvania Avenue would require a minimum composite window/wall of 35 OITC.

The With-Action noise level at the eastern façade of Building 2 including mobile and stationary sources would be up to 78.6 dBA (L_{10}). Therefore, the eastern façade along Pennsylvania Avenue and the northern and southern façades within 50 feet of Pennsylvania Avenue would require a minimum composite window/wall of 35 OITC.

The With-Action noise level at the northern façade of Building 3 including mobile and stationary sources would be up to 72.4 dBA (L_{10}). Therefore, the northern façade along Flatlands Avenue and the eastern and western façades within 50 feet of Flatlands Avenue would require a minimum composite window/wall sound attenuation of 28 OITC.

The With-Action noise level at the southern façade of Building 4 including mobile and stationary sources and the new childcare facility playground would be up to 75.9 dBA (L_{10}). Therefore, the southern ~~façade~~, eastern, and western façades of Building 4 within 50 feet of the proposed childcare facility playground would require a minimum composite window/wall sound attenuation of 31 OITC.

The With-Action noise level at the northern façade of Buildings 5 including mobile and stationary sources would be up to 72.4 dBA (L_{10}). Therefore, the northern façade along Flatlands Avenue and the eastern and western façades within 50 feet of Flatlands Avenue would require a minimum composite window/wall sound attenuation of 28 OITC.

The With-Action noise level at the northern façade of Buildings 6 including mobile and stationary sources would be up to 72.4 dBA (L_{10}). Therefore, the northern façade along Flatlands Avenue and the eastern and western façades within 50 feet of Flatlands Avenue would require a minimum composite window/wall sound attenuation of 28 OITC.

The With-Action noise level at the northern, western, and southern façades of Building 7/8 including mobile and stationary sources would be up to 74.5 dBA (L_{10}). Therefore, the northern, western, and southern façades of Building 7/8 would require a minimum composite window/wall sound attenuation of 31 OITC.

The With-Action noise level at all façades of Building 9/10 including mobile and stationary sources and the proposed rooftop basketball court would be up to 75.5 dBA (L_{10}). Therefore, all façades of Building 9/10 would require a minimum composite window/wall sound attenuation of 31 OITC.

Other facades of the proposed buildings and the PAC are setback from Louisiana Avenue, Flatlands Avenue, and Pennsylvania Avenue where With-Action noise levels would be below 70 dBA (L_{10} or L_{eq}). Therefore, there would be no need for a minimum composite window/wall sound attenuation requirement at these locations.

To implement these attenuation requirements, an (E) designation (E-679) would be applied to the Development Site specifying the appropriate amount of window/wall attenuation and an alternate means of ventilation. With these commitments, the Proposed Project would not result in any significant adverse noise impacts.

~~Figure 16-1~~Figure 16-2Composite Window/Wall Sound Attenuation Requirements



Source: VHB, 2022

To implement these attenuation requirements, it is anticipated that an (E) Designation (E-679) for noise would be applied to the Development Site specifying the appropriate amount of window/wall attenuation and an alternate means of ventilation. The text for the (E) Designation (E-679) would be as follows:

Block 4434, Lot 10 (Building 1)

In order to ensure an acceptable interior noise environment, future residential uses must provide a closed-window condition with a minimum of 35 dBA window/wall attenuation on the facades facing Flatland Avenue and the facades facing Pennsylvania Avenue and the facades facing Vandalia Avenue within 50 feet of Pennsylvania Avenue and the facades facing Louisiana Avenue within 50 feet of Flatland Avenue to maintain an interior noise level not greater than 45 dBA for residential uses as illustrated in the EIS. 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 4434, Lot 10 (Building 2)

In order to ensure an acceptable interior noise environment, future residential uses must provide a closed-window condition with a minimum of 35 dBA window/wall attenuation on the facades facing Pennsylvania Avenue and the facades facing Flatland Avenue within 50 feet of Pennsylvania Avenue and the facades facing Vandalia Avenue within 50 feet of Pennsylvania Avenue to maintain an interior noise level not greater than 45 dBA for residential uses as illustrated in the EIS. 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 4434, Lot 1 (Building 3)

In order to ensure an acceptable interior noise environment, future residential uses must provide a closed-window condition with a minimum of 28 dBA window/wall attenuation on the facades facing Flatland Avenue and the facades facing Pennsylvania Avenue within 50 feet of Flatland Avenue and the facades facing Louisiana Avenue within 50 feet of Flatland Avenue to maintain an interior noise level not greater than 45 dBA for residential uses as illustrated in the EIS. 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 4434, Lot 1 (Building 4)

In order to ensure an acceptable interior noise environment, future residential and community facility uses must provide a closed-window condition with a minimum of 31 dBA window/wall attenuation on ~~the southern facade of Building 4 and the eastern~~all facades ~~of Building 4~~ within 50 feet of the proposed childcare facility playground to maintain an interior noise level not greater than 45 dBA for residential and community facility uses as illustrated in the EIS. 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 ~~4432~~4430, Lot 1 (Building 5)

In order to ensure an acceptable interior noise environment, future residential and community facility uses must provide a closed-window condition with a minimum of 28 dBA window/wall attenuation on the facades facing Flatland Avenue and the facades facing Pennsylvania Avenue within 50 feet of Flatland Avenue and the facades facing Louisiana Avenue within 50 feet of Flatland Avenue to maintain an interior noise level not greater than 45 dBA for residential and community facility uses as illustrated in the EIS. 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 ~~4431~~4430, Lot 1 (Building 6)

In order to ensure an acceptable interior noise environment, future residential uses must provide a closed-window condition with a minimum of 28 dBA window/wall attenuation on the facades facing Flatland Avenue and the facades facing Pennsylvania Avenue within 50 feet of Flatland Avenue and the facades facing Louisiana Avenue within 50 feet of Flatland Avenue to maintain an interior noise level not greater than 45 dBA for residential uses as illustrated in the EIS. 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 4430, Lot 1 ~~& Block 4431, Lots 1 and 200~~ (Buildings 7/8)

In order to ensure an acceptable interior noise environment, future residential uses must provide a closed-window condition with a minimum of 31 dBA window/wall attenuation on the facades facing Louisiana Avenue and the facades facing Flatland Avenue and the facades facing Vandalia Avenue to maintain an interior noise level not greater than 45 dBA for residential uses as illustrated in the EIS. 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 ~~4431, Lots~~4430, Lot 1 ~~and 200~~ (Buildings 9/10)

In order to ensure an acceptable interior noise environment, future residential and community facility uses must provide a closed-window condition with a minimum of 31 dBA window/wall attenuation on all facades to maintain an interior noise level not greater than 45 dBA for residential and community facility uses as illustrated in the EIS. 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.