16.0 Noise

Introduction

This chapter discusses potential impacts to the neighborhood noise environment as a result of the Proposed Actions. Approval of the Proposed Actions would generate additional mobile sources (i.e., vehicular traffic) in the Project Area. Therefore, a noise analysis is prepared to evaluate the potential effect of the Proposed Actions at projected and potential development sites and nearby noise sensitive locations in the Project Area. Existing noise levels in the Project Area are predominantly the result of vehicular traffic and train noise. Noise sensitive locations include residential, commercial, and open space uses.

In order to assess the potential for significant adverse noise impacts, the noise analysis considers changes in noise due to increases in traffic, existing train activity from Metropolitan Transit Authority (MTA) Franklin Avenue Shuttle and Long Island Railroad service, and the introduction of sensitive receptors into an area with high existing noise levels. The noise analysis addresses two factors: (1) the change in noise levels from the Existing condition in the area as a result of the Proposed Actions; and (2) the location of new sensitive receptors and the degree to which window/wall attenuation would provide acceptable interior noise levels.

Principal Conclusions

The noise analysis concludes that the Proposed Actions would not generate sufficient traffic to have the potential to cause a significant noise impact. At all noise receptor locations, the maximum noise level increase would be below 3 dBA between No-Action and With-Action conditions. Therefore, the noise analysis concludes that the traffic generated by the Proposed Actions would not have the potential to produce significant increases to noise levels at any sensitive receptors within the Project Area.

The Proposed Actions would introduce new sensitive receptors at projected and potential development sites with the Project Area. Ambient noise levels adjacent to the projected and potential development sites were examined to determine whether building noise attenuation requirements for maintaining interior noise levels would be necessary due to increase in traffic and proximity to train activity from the MTA's Franklin Avenue Shuttle and the Long Island Railroad (LIRR). That assessment finds that noise levels would range between the

"marginally unacceptable" and "clearly unacceptable" exterior CEQR noise exposure categories, resulting in a noise attenuation requirement range of 28 to 38 dBA to ensure noise levels within the projected and potential development sites would comply with all applicable requirements. As a result, the Proposed Actions includes (E) designations for all of the projected and potential development sites. The window/wall attenuation levels required under the (E) designation (E-810) would avoid the potential for significant adverse noise impacts due to the Proposed Actions; see **Appendix G** for the proposed (E) designation.

Noise chapter and analyses will be revised based on more detailed evaluation between Draft and Final EIS.

Acoustical Fundamentals

Sound is a fluctuation in air pressure, and sound pressure levels are measured in units called decibels (dB). The particular character of the sound that we hear (a whistle compared with a French horn, for example) is determined by the speed, or "frequency," at which the air pressure fluctuates, or "oscillates." Frequency defines the oscillation of sound pressure in terms of cycles per second. One cycle per second is known as 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

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 16-1**, 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 16-1: Typical Noise Values

Sound Source	dBA
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Freight train at 30 meters	95
Train horn at 30 meters	90
Heavy truck at 15 meters	80-90
Busy city street, loud shout	80
Busy traffic intersection	70-80

Sound Source	dBA
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

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

In considering these values, it is important to note that the dBA scale is logarithmic, meaning that each increase of 10 dBA describes a doubling of perceived loudness. Thus, the background noise in an office, at 50 dBA, is perceived as twice as loud as a library at 40 dBA. For most people to perceive an increase in noise, it must be at least three dBA. At five dBA, the change will be readily noticeable.

Noise Descriptors used in Impact Assessment

Because the sound pressure level unit of dBA describes a noise level at just one moment and very few noises are constant, other ways of describing noise over extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific time period as if it had been a steady, unchanging sound. For this condition, a descriptor called the "equivalent sound level," L_{eq}, can be computed. L_{eq} is the constant sound level that, in a given situation and time period (e.g., 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 (i.e., L_{dn}) refers to a 24−hour average noise level with a 10 dB penalty applied to the noise levels during the hours between 10:00 p.m. and 7:00 a.m., due to increased sensitivity to noise levels during these hours. Statistical sound level descriptors such as L_{10}, L_{50}, L_{90}, and L_x, are used to indicate noise levels that are exceeded 10, 50, 90, and x percent of the time, respectively.

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

character of the noise. In community noise measurements, it has been observed that the L_{eq} is generally between L_{10} and L_{50}.

The L_{dn} is the average noise level over a 24-hour period. The hourly noise level measurements between the hours of 10:00 p.m. and 7:00 a.m. are adjusted by 10 dB before averaging. This noise is weighted to take into account the decrease in community background noise of 10 dB during this period and accounts for the extra sensitivity people have to noise during typical sleeping hours. According to *CEQR Technical Manual* standards, it is recommended that the L_{dn} be used in the analysis of train noise. In some cases, assessing train noise using $L_{eq(1)}$ may be necessary, particularly when assessing peak hour levels or when determining cumulative effects of several noise sources, i.e., in combination with vehicle, aircraft, and/or industrial process noise.

For purposes of this noise assessment, the maximum one-hour equivalent sound level (i.e., $L_{eq(1)}$) 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. Depending on the dominant source of noise, L_{dn} or one-hour L_{10} is the noise descriptor used in the *CEQR Technical Manual* noise exposure guidelines for city environmental impact review classification.

Noise Exposure Standards and Criteria

In 1983, the New York City Department of Environmental Protection (DEP) adopted noise standards for exterior noise levels. These standards are used to classify noise exposure into four categories: Acceptable, Marginally Acceptable, Marginally Unacceptable, and Clearly Unacceptable (see **Table 16-2**).

Table 16-2: CEQR Noise Exposure Guidelines for Use in City Environmental Impact Review[1]

Receptor Type	Time Period	Acceptable General External Exposure	Airport Exposure[3]	Marginally Acceptable General External Exposure	Airport Exposure[3]	Marginally Unacceptable General External Exposure	Airport Exposure[3]	Clearly Unacceptable General External Exposure	Airport Exposure[3]
1. Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	DNL ≤ 60 dBA						
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		$55 < L_{10} \leq 65$ dBA	60 < DNL ≤ 65 dBA	$65 < L_{10} \leq 80$ dBA	65 < DNL ≤ 75 dBA	$L_{10} > 80$ dBA	DNL > 75 dBA
3. Residence, residential hotel or motel	7 a.m.-10 p.m.	$L_{10} \leq 65$ dBA		$65 < L_{10} \leq 70$ dBA		$70 < L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
	10 p.m.-7 a.m.	$L_{10} \leq 55$ 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		Same as Residential Day (7 a.m.		Same as Residential Day (7 a.m.–		Same as Residential Day (7 a.m.–		Same as Residential Day (7 a.m.	

Receptor Type	Time Period	Acceptable General External Exposure	Airport Exposure[3]	Marginally Acceptable General External Exposure	Airport Exposure[3]	Marginally Unacceptable General External Exposure	Airport Exposure[3]	Clearly Unacceptable General External Exposure	Airport Exposure[3]
hotel or motel, public meeting room, auditorium, out-patient health facility		–10 p.m.)		10 p.m.)		10 p.m.)		–10 p.m.)	
5. Commercial or office		Same as Residential Day (7 a.m.–10 p.m.)		Same as Residential Day (7 a.m.–10 p.m.)		Same as Residential Day (7 a.m.–10 p.m.)		Same as Residential Day (7 a.m.–10 p.m.)	
6. Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Source: New York City DEP (1983).
Notes:
In addition, any new activity shall not increase the ambient noise level by 3 dBA or more:
Note 1. Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by ANSI Standards; all values are for the worst hour in the time period.
Note 2. Tracts of land where serenity and quiet are extraordinarily important and serve an important public need and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanatoriums and nursing homes.
Note 3. One may use Federal Aviation Administration (FAA)-approved land contours supplied by the Port Authority, or the noise contours may be computed from the Federally approved Integrated Noise Model ("INM") Computer Model using flight data supplied by the Port Authority of New York and New Jersey.
Note 4. External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

The *CEQR Technical Manual* defines attenuation requirements for buildings based on exterior noise levels (see **Table 16-3**). For dominant traffic noise, recommended noise attenuation values for buildings are designed to maintain interior L_{10} noise levels of 45 dBA or lower for residential and community facility uses and 50 dBA or lower for commercial office uses. For dominant train noise, recommended noise attenuation values for buildings are designed to maintain interior L_{dn} noise levels of 40 dBA or lower for residential uses.

Table 16-3: Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				Clearly Unacceptable
Vehicular Traffic	$70 < L_{10} \leq 73$	$73 < L_{10} \leq 76$	$76 < L_{10} \leq 78$	$78 < L_{10} \leq 80$	80 < L10
Aircraft[a]	65 < DNL ≤ 68	68 < DNL ≤ 71	71 < DNL ≤ 73	73 < DNL ≤ 75	75 < DNL
Train	$65 < L_{dn} \leq 68$	$68 < L_{dn} \leq 71$	$71 < L_{dn} \leq 73$	$73 < L_{dn} \leq 75$	75 < Ldn

	Marginally Unacceptable				Clearly Unacceptable
Attenuation[b]	(I) 28 dB(A)	(II) 31 dB(A)	(III) 33 dB(A)	(IV) 35 dB(A)	See note[c]

Source: New York City DEP (1983).
Notes:
[a] DNL descriptor based on average values of Ldn over a year period.
[b] he above composite window-wall attenuation values are for residential dwellings and community facility development. Commercial office spaces and meetings rooms would be 5 dB(A) less in each category. All of the above categories require a closed-window situation and hence an alternate means of ventilation.
[C] The required attenuation value is the difference between Lbuild and Linterior, using the appropriate noise descriptor Where: Lbuild is the projected noise level under the build condition rounded up to the whole number, and Linterior is the designed interior noise level (45 dB(A) for vehicular noise, 40 dB(A) for aircraft and train noise)

New York City Noise Control Code

Specific noise standards for theprojected development site would be governed by the 2005 New York City Noise Code. **Table 16-4** shows the permitted sound levels for sources operating in connection with any residential, commercial, or business enterprises. These noise levels do not apply to construction activities or equipment but do apply to mechanical systems which may be related to the Proposed Actions' operation.

Table 16-4: New York City Noise Code

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

Source: New York City Noise Code, 2005.

Environmental Conditions for Buildings In MX Districts

The Proposed Actions would change the zoning in the Project Area to a Special Mixed-Use District (MX) consisting of M1-1A/R6B, M1-2A/R6A, M1-3A/R7D, **and** M1-4A/R9A districts that allow manufacturing and residential uses. Zoning Resolution (ZR) Section 123-32-Environmental Conditions requires that all new dwelling units (DUs) in Special Mixed-Use Districts be provided with a minimum of 35 dBA window-wall attenuation to maintain an interior noise level of 45 dBA or less. The 35 dBA window-wall attenuation is for a closed-window condition; consequently, a means of alternate ventilation that does not degrade the acoustical performance of the building facade is required for all residential developments. However, it is possible to review and alter the minimum attenuation requirements via a process overseen by the New York City Mayor's Office of Environmental Remediation (OER), which could be undertaken at a later time.

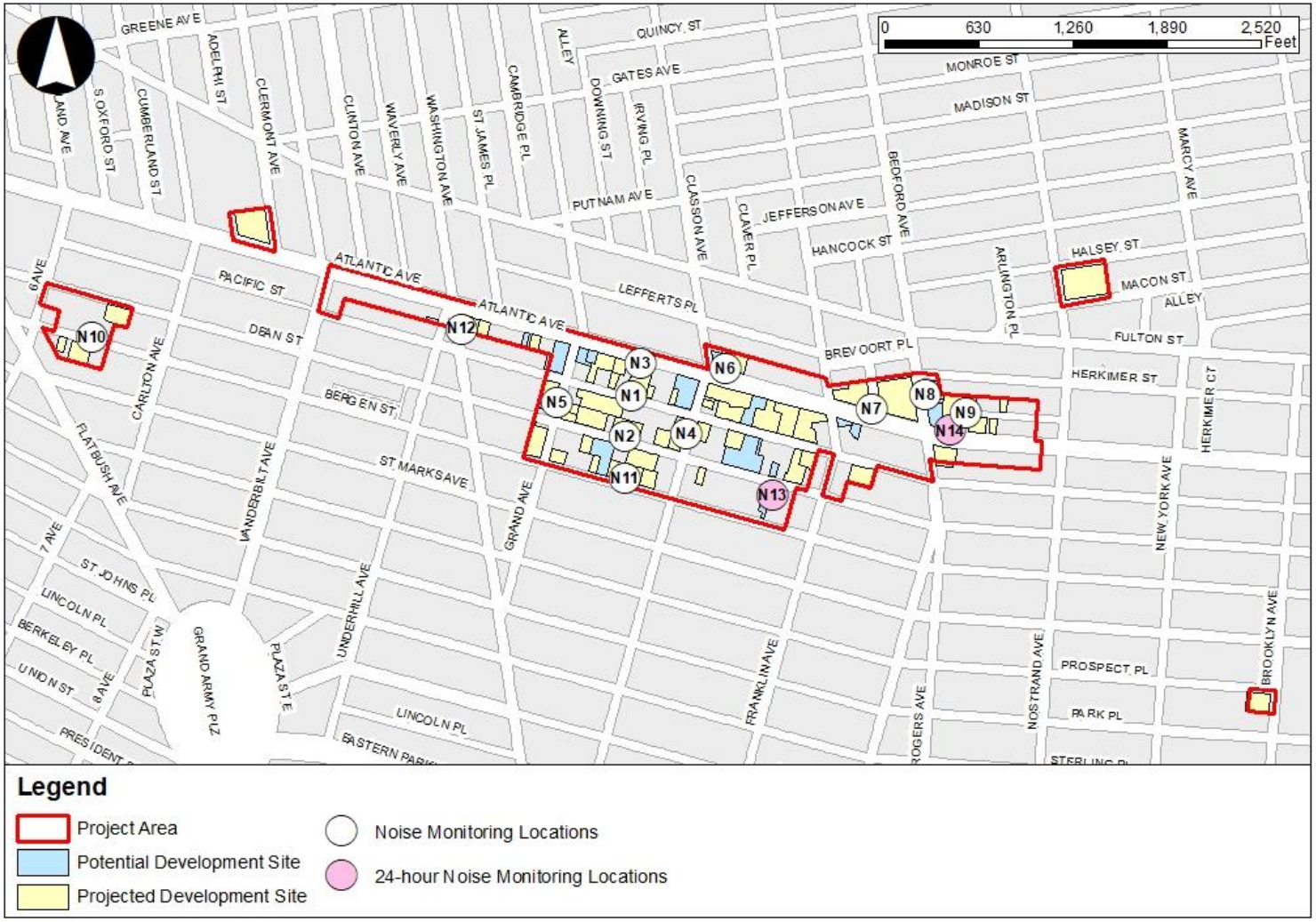
Noise from Manufacturing Use in the Same Building

Projected Development Site 49 may include uses with sleeping accommodations in the same building with manufacturing use. In order to avoid potential noise impacts from manufacturing use in the same building, specific zoning text (ZR 146-11) would require a restrictive declaration to be executed and recorded that would require the owners to provide any building design or other requirements which are acceptable to DEP and consistent with the underlying zoning to protect occupants of the building and surrounding properties from air contaminants, odors, vibrations or noise. No building permit for Projected Development Site 49 shall be issued without DEP's approval and no certificate of occupancy for Projected Development Site 49 shall be issued until submission of a DEP approved professionally certified report of the as-built conditions. Therefore, there would not be significant adverse noise impact related to manufacturing uses in the same building.

Existing Noise Levels

Selection of Noise Receptor Locations

Information concerning specific land usage in and around the study area site, as well as trip assignments for potential future uses, are reviewed to select monitoring sites and assess future noise impacts on existing and future sensitive land uses. The 14 monitoring sites depicted in **Table 16-5** and shown on **Figure 16-1** are nearby sites of projected and potential development and are representative of the sensitive land uses in the Project Area.



Atlantic Avenue Mixed-Use Plan

Figure 16-1
Noise Monitoring Locations

Table 16-5: Noise Receptor Locations

Receptor	Location
N1	Pacific Street Between Grand and Classon Avenues
N2	Dean Street Between Grand and Classon Avenues
N3	Atlantic Avenue Between Grand and Classon Avenues
N4	Classon Avenue Between Dean and Pacific Streets
N5	Grand Avenue Between Dean and Pacific Streets
N6	Atlantic Avenue Between Franklin and Classon Avenues
N7	Atlantic Avenue and Bedford Place
N8	Bedford Avenue Between Atlantic Avenue and Herkimer Street
N9	Herkimer Place and Perry Place
N10	Bergen Street Between 6th and Carlton Avenues
N11	Bergen Street Between Grand and Classon Avenues
N12	Washington Avenue Between Atlantic and Pacific Avenues
N13*	Franklin Avenue Shuttle Between Dean and Bergen Streets
N14*	Atlantic Avenue Between Perry Place and Bedford Avenue

Source: CSA Group, 2024.
Note: *Location of 24-hour measurement.

Noise Monitoring

Noise monitoring was performed on several weekdays and weekends from December 7, 2023, to February 3, 2024. Time periods chosen for monitoring include the weekday a.m. (7:30–9:30 a.m.), Midday (noon–2:00 p.m.), p.m. (4:30–6:30 p.m.), and Saturday Midday (noon–3:00 p.m.) peak hours for locations near destination retail stores to account for vehicular traffic noise. Additionally, 24-hour noise monitoring was also performed at two locations (N13 and N14) to account for existing train noise from MTA's Franklin Avenue Shuttle and the LIRR. These time periods represent the peak hours when the majority of existing and future project-generated traffic would be passing these locations. The peak hour noise monitoring took into account the peak weekday office, commercial, and school-related traffic, and the peak weekend commercial traffic. Measurements were conducted for a 20-minute time period so that the typical fluctuations in peak hour traffic could be properly accounted for.

In addition to $L_{eq}(h)$ and L_{10} noise levels, other statistical noise descriptors (L_{50}, L_{90}, L_{max}, and L_{min}) were also sampled at all locations for all time periods. For the Proposed Actions, the

analysis of potential noise impacts utilizes the L_{10} and $L_{eq}(h)$ descriptors. The other noise descriptors collected during the monitoring program are utilized to assist in the characterization of the existing noise environment. Typically, L_{50} tends to describe the statistical median noise value, while the L_{90} typically describes the residual background noise level in an environment.

Equipment Used During Noise Monitoring

Noise measurements were taken with Larson Davis Model LXT Class I Sound Level Meters (SLMs). A windscreen was placed over the microphone for all measurements. The SLMs had laboratory calibration dates within the past year at the time of use, as is standard practice. The SLMs were also properly field calibrated for all measurements using Larson Davis Cal200 calibrators. There were no significant variances between the beginning and ending calibration measurements. To avoid interference with sound propagation, the measuring microphone was placed approximately six feet away from any reflecting surfaces and at a height of approximately five feet from the ground surface. Weather conditions during the measurement periods, with respect to temperature and wind conditions, were conducive to obtaining valid noise readings, per guidelines outlined in ANSI Standard S1.13-2005.

Existing Noise Levels at Noise Receptor Locations

Measured Noise Levels

The Project Area is exposed to noise from vehicular traffic on local streets, as well as train activity from MTA elevated Franklin Avenue Shuttle and LIRR service line between Bedford and Nostrand Avenues.

The dominant source of neighborhood noise comes from local and highway vehicular traffic and train noise. Receptors which are exposed to the most noise are those which are in close proximity to principal and minor arterial streets such as Atlantic Avenue, Washington Avenue and Bedford Avenue during both weekday and weekend peak periods, and the elevated Franklin Avenue Shuttle and the at grade LIRR. Based on the guidance of the *CEQR Technical Manual* noise exposure criteria, receptors N1, N9 and N10 would be within the “Marginally Acceptable” category. Receptors N2, N3, N4, N5, N6, N7, N8, N11, N12 and N13 would be within the “Marginally Unacceptable” category. The remaining site N14 is in the “Clearly Unacceptable” category. The results of the measurements of existing noise levels are summarized in **Table 16-6**.

Table 16-6: Measured Existing Noise Levels (in dBA)

Receptor	Measurement Location	Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{dn}	CEQR Category
N1	Pacific Street Between Grand and Classon Avenues	a.m.	62.8	66.7	56.5	53.5	-	Marginally Acceptable
		MD	64.5	65.1	58.7	55.7	-	Marginally Acceptable
		p.m.	64.6	67.3	58.3	54.0	-	Marginally Acceptable
		SAT	60.8	64.9	57.5	52.5	-	Acceptable
N2	Dean Street Between Grand and Classon Avenues	a.m.	65.0	68.6	61.1	58.5	-	Marginally Acceptable
		MD	64.5	67.3	60.2	56.4	-	Marginally Acceptable
		p.m.	66.6	70.1	62.2	57.5	-	Marginally Unacceptable
		SAT	61.2	64.7	58.1	53.8	-	Acceptable
N3	Atlantic Avenue Between Grand and Classon Avenues	a.m.	71.3	74.7	69.3	61.3	-	Marginally Unacceptable
		MD	69.5	72.8	67.6	61.6	-	Marginally Unacceptable
		p.m.	69.9	73.2	69.0	60.4	-	Marginally Unacceptable
		SAT	71.3	74.6	68.4	57.4	-	Marginally Unacceptable
N4	Classon Avenue Between Dean and Pacific Streets	a.m.	67.0	69.3	65.1	61.8	-	Marginally Acceptable
		MD	69.2	70.9	67.2	64.7	-	Marginally Unacceptable
		p.m.	68.6	71.3	65.6	61.4	-	Marginally Unacceptable
		SAT	65.2	68.4	61.5	56.0	-	Marginally Acceptable
N5	Grand Avenue Between Dean and Pacific Streets	a.m.	67.7	69.2	63.8	58.5	-	Marginally Acceptable
		MD	65.8	67.1	61.0	57.8	-	Marginally Acceptable
		p.m.	68.4	70.0	65.8	62.9	-	Marginally Unacceptable
		SAT	63.7	67.2	61.8	55.7	-	Marginally Acceptable
N6	Atlantic Avenue Between Franklin and Classon Avenues	a.m.	71.0	73.1	68.5	65.7	-	Marginally Unacceptable
		MD	71.4	74.3	68.5	65.3	-	Marginally Unacceptable
		p.m.	70.1	72.2	67.2	62.3	-	Marginally Unacceptable
		SAT	70.5	73.0	67.3	59.5	-	Marginally Unacceptable
N7	Atlantic Avenue and Bedford Place	a.m.	70.5	71.3	65.8	62.2	-	Marginally Unacceptable
		MD	68.5	71.1	66.9	62.2	-	Marginally Unacceptable
		p.m.	67.7	70.1	64.4	58.9	-	Marginally Unacceptable
		SAT	72.5	71.8	66.9	60.6	-	Marginally Unacceptable
N8	Bedford Avenue Between Atlantic Avenue and Herkimer Street	a.m.	70.3	73.3	67.6	61.1	-	Marginally Unacceptable
		MD	71.8	75.3	68.0	61.8	-	Marginally Unacceptable
		p.m.	69.4	71.8	65.2	61.0	-	Marginally Unacceptable
		SAT	70.6	71.8	66.5	60.6	-	Marginally Unacceptable

Receptor	Measurement Location	Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{dn}	CEQR Category
N9	Herkimer Place and Perry Place	a.m.	63.7	66.9	60.8	57.1	-	Marginally Acceptable
		MD	63.0	65.6	60.7	56.3	-	Marginally Acceptable
		p.m.	64.6	65.6	58.6	55.3	-	Marginally Acceptable
		SAT	60.9	65.2	56.9	53.4	-	Marginally Acceptable
N10	Bergen Street Between 6th and Carlton Avenues	a.m.	65.1	67.4	58.5	52.1	-	Marginally Acceptable
		MD	65.1	69.5	58.8	52.3	-	Marginally Acceptable
		p.m.	66.0	69.3	60.9	55.3	-	Marginally Acceptable
		SAT	63.7	67.1	58.8	54.4	-	Marginally Acceptable
N11	Bergen Street Between Grand and Classon Avenues	a.m.	64.7	67.6	62.1	58.5	-	Marginally Acceptable
		MD	69.8	73.9	64.3	56.0	-	Marginally Unacceptable
		p.m.	63.4	67.4	56.8	52.2	-	Marginally Acceptable
		SAT	64.3	68.5	58.7	50.9	-	Marginally Acceptable
N12	Washington Avenue Between Atlantic and Pacific Avenues	a.m.	71.0	72.8	67.5	64.3	-	Marginally Unacceptable
		MD	68.1	70.8	66.6	61.7	-	Marginally Unacceptable
		p.m.	68.4	69.4	65.4	62.2	-	Marginally Acceptable
		SAT	69.9	71.3	67.6	65.2	-	Marginally Unacceptable
N13	Franklin Avenue Shuttle Between Dean and Bergen Streets	24-Hour	-	-	-	-	73.5	Marginally Unacceptable
N14	Atlantic Avenue Between Perry Place and Bedford Avenue	24-Hour	-	-	-	-	78	Clearly Unacceptable

Source: CSA Group (2023/2024).

Methodology

Traffic Noise

In order to predict noise levels in the future with and without the Proposed Actions (No-Action and With-Action conditions), monitored noise levels are projected by using a proportional modeling procedure, per the guidance of the *CEQR Technical Manual* guidelines. This procedure takes into account the changes in noise levels due to increases in traffic associated with area growth. First, future traffic volumes are obtained by adding future traffic volumes to the existing baseline conditions. Then, vehicular traffic volumes under the baseline and future conditions are converted into Passenger Car Equivalent (PCE) values. For this conversion, one medium truck is estimated to generate the noise equivalent of 13 cars, one bus is estimated to generate the noise equivalent of 18 cars, and one heavy

truck is estimated to generate the noise equivalent of 47 cars. Future noise levels are calculated using the following equation:

Future Noise Level = 10 * log ($Future\ PCE/Existing\ PCE$) + Baseline Noise Level

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

Train Noise

For those development sites whose primary noise exposure would be from train noise, 24-hour noise measurements were taken to determine baseline noise exposure. As shown in **Table 16-6**, 24-hour noise measurements were taken at locations N13 and N14. Site N13 is representative of train noise exposure from the elevated Franklin Avenue Shuttle that would affect Projected Development Sites 10, 33, 44, and 45, as well as potential development sites J and K. Site N14 is representative of train noise from the LIRR along Atlantic Avenue as it transitions from the tunnel to an at grade position between Bedford and Nostrand Avenues, would affect Projected Development Sites 16, 19, 20 and 50, as well as potential development site N. Based on the noise measurements taken, the noise exposure (L_{dn}) at Receptor N13 was 73.5 dBA. Similarly, the monitored noise exposure (L_{dn}) at Receptor N14 was 78.0 dBA. These L_{dn} measurements were conservatively used to represent noise exposure for the development sites noted above. For those development sites influenced by train noise it was assumed that the existing L_{dn} would not change in the future as future rail volumes are not projected to change significantly in the future. As a result, the existing noise levels were also utilized to determine the required attenuation for affected development sites.

Playground Noise

The only development sites that would be potentially affected by playground noise would be Projected Development Sites 46, 47, 52, and 55 located adjacent to the Dean Playground. Typically, playground noise associated with any nearby playground is estimated using the Early Childhood playground boundary noise level (to conservatively represent children of any age using the playground). These values are based upon measurements made at a series of New York City school playgrounds for the New York City School Construction Authority (SCA).[1]

The Future without the Proposed Actions (No-Action Condition)

Noise Impact Identification

Using the methodologies described in the methodology section, No-Action condition noise levels for the 2034 analysis year are calculated at the 12 noise receptor locations. The dominant source of neighborhood noise comes from local vehicular traffic or train activity. As

[1] SCA Playground Noise Study, AKRF, Inc., October 23, 1992.

such, these No-Action noise levels are shown in **Table 16-7** where vehicular traffic is dominant noise source (in dBA)..

For receptors locations where traffic is the dominant noise source, the maximum L_{eq} noise level increase under the 2034 No-Action condition relative to the Existing condition would be 2.4 dBA at Receptor N9. All other receptor locations would encounter an increase between 0.3 and 2.4 dBA.

Table 16-7: 2034 No-Action Condition Noise Levels where traffic is dominant noise source (dBA)

Site	Measurement Location	Period	Existing L_{eq}	No Action L_{eq}	No Action-Existing Delta	No Action L_{10}	CEQR NOISE EXPOSURE
N1	Pacific Street Between Grand and Classon Avenues	a.m.	62.8	63.3	0.5	67.2	Marginally Acceptable
		MD	64.5	65.4	0.9	66.0	Marginally Acceptable
		p.m.	64.6	65.6	1.0	68.3	Marginally Acceptable
		SAT	60.8	61.9	1.1	66.0	Marginally Acceptable
N2	Dean Street Between Grand and Classon Avenues	a.m.	65.0	66.0	1.0	69.6	Marginally Acceptable
		MD	64.5	65.6	1.1	68.4	Marginally Acceptable
		p.m.	66.6	67.6	1.0	71.1	Marginally Unacceptable
		SAT	61.2	62.5	1.3	66.0	Marginally Acceptable
N3	Atlantic Avenue Between Grand and Classon Avenues	a.m.	71.3	71.9	0.6	75.3	Marginally Unacceptable
		MD	69.5	70.2	0.7	73.5	Marginally Unacceptable
		p.m.	69.9	70.6	0.7	73.9	Marginally Unacceptable
		SAT	71.3	72.0	0.7	75.3	Marginally Unacceptable
N4	Classon Avenue Between Dean and Pacific Streets	a.m.	67.0	67.6	0.6	69.9	Marginally Acceptable
		MD	69.2	70.2	1.0	71.9	Marginally Unacceptable
		p.m.	68.6	69.8	1.2	72.5	Marginally Unacceptable
		SAT	65.2	66.3	1.1	69.5	Marginally Acceptable
N5	Grand Avenue Between Dean and Pacific Streets	a.m.	67.7	68.6	0.9	70.1	Marginally Unacceptable
		MD	65.8	66.8	1.0	68.1	Marginally Acceptable
		p.m.	68.4	69.1	0.7	70.7	Marginally Unacceptable
		SAT	63.7	64.8	1.1	68.3	Marginally Acceptable
N6	Atlantic Avenue Between Franklin and Classon Avenues	a.m.	71.0	71.7	0.7	73.8	Marginally Unacceptable
		MD	71.4	72.2	0.8	75.1	Marginally Unacceptable
		p.m.	70.1	70.8	0.7	72.9	Marginally Unacceptable
		SAT	70.5	71.3	0.8	73.8	Marginally Unacceptable
N7	Atlantic Avenue and Bedford Place	a.m.	70.5	71.1	0.6	71.9	Marginally Unacceptable
		MD	68.5	69.2	0.7	71.8	Marginally Unacceptable
		p.m.	67.7	68.4	0.7	70.8	Marginally Unacceptable
		SAT2	72.5	73.2	0.7	72.5	Marginally Unacceptable
N8	Bedford Avenue between Atlantic Avenue and Herkimer Street	a.m.	70.3	70.6	0.3	73.6	Marginally Unacceptable
		MD	71.8	72.2	0.4	75.7	Marginally Unacceptable
		p.m.	69.4	69.7	0.3	72.1	Marginally Unacceptable

Site	Measurement Location	Period	Existing L_{eq}	No Action L_{eq}	No Action-Existing Delta	No Action L_{10}	CEQR NOISE EXPOSURE
		SAT	70.6	71.0	0.4	72.2	Marginally Unacceptable
N9	Herkimer Place and Perry Place	a.m.	63.7	66.1	2.4	69.3	Marginally Acceptable
		MD	63.0	64.6	1.6	67.2	Marginally Acceptable
		p.m.	64.6	66.1	1.5	67.1	Marginally Acceptable
		SAT	60.9	62.9	2.0	67.2	Marginally Acceptable
N10	Bergen Street between 6th and Carlton Avenues	a.m.	65.1	65.8	0.7	68.1	Marginally Acceptable
		MD	65.1	65.5	0.4	69.9	Marginally Acceptable
		p.m.	66.0	66.7	0.7	70.0	Marginally Unacceptable
		SAT	63.7	64.1	0.4	67.5	Marginally Acceptable
N11	Bergen Street Between Grand and Classon Avenues	a.m.	64.7	65.0	0.3	67.9	Marginally Acceptable
		MD	69.8	70.5	0.7	74.6	Marginally Unacceptable
		p.m.	63.4	64.1	0.7	68.1	Marginally Acceptable
		SAT	64.3	65.1	0.8	69.3	Marginally Acceptable
N12	Washington Avenue Between Atlantic and Pacific Avenues	a.m.	71.0	71.4	0.4	73.2	Marginally Unacceptable
		MD	68.1	68.5	0.4	71.2	Marginally Unacceptable
		p.m.	68.4	68.9	0.5	69.9	Marginally Acceptable
		SAT	69.9	70.5	0.6	71.9	Marginally Unacceptable

Source: CSA Group 2024.

For receptors locations N13 and N14, where train is the dominant noise source, the maximum L_{dn} noise levels increase under the 2034 No-Action condition relative to the Existing condition was assumed to be 0.0 dBA for all affected receptors. The absence of increment is attributable to the fact that the No-Action condition would not result in any increase in train services from the Existing condition.

The Future with the Proposed Actions (With-Action Condition)

Noise Impact Identification

Using the procedures described in the methodology section, With-Action noise levels are calculated at the 12 noise receptor locations for the 2034 analysis year. The With-Action noise levels for all receptors are shown in **Table 16-8** where traffic is the dominant noise source (in dBA).

For receptor locations where traffic is the dominant noise source, the maximum L_{10} noise levels increase under the 2034 With-Action condition relative to the No-Action condition would be 2.2 dBA at Receptor N2 during the a.m. Peak Period. All other receptor locations would encounter an increase between 0 and 2.2 dBA.

Table 16-8: 2034 With-Action Condition Noise Levels Where Traffic is the Dominant Noise Source (dBA)

Site	Measurement Location	Period	NB Leq	BD Leq	BD-NB Delta	BD L10	CEQR NOISE EXPOSURE
N1	Pacific Street Between Grand and Classon Avenues	a.m.	63.3	65.0	1.7	68.9	Marginally Acceptable
		MD	65.4	67.1	1.7	67.7	Marginally Acceptable
		p.m.	65.6	67.3	1.7	70.0	Marginally Unacceptable
		SAT	61.9	63.7	1.8	67.8	Marginally Acceptable
N2	Dean Street Between Grand and Classon Avenues	a.m.	66.0	68.2	2.2	71.8	Marginally Unacceptable
		MD	65.6	67.1	1.5	69.9	Marginally Acceptable
		p.m.	67.6	69.2	1.6	72.7	Marginally Unacceptable
		SAT	62.5	64.2	1.7	67.7	Marginally Acceptable
N3	Atlantic Avenue Between Grand and Classon Avenues	a.m.	71.9	72.3	0.4	75.7	Marginally Unacceptable
		MD	70.2	70.6	0.4	73.9	Marginally Unacceptable
		p.m.	70.6	71.0	0.4	74.3	Marginally Unacceptable
		SAT	72.0	72.4	0.4	75.7	Marginally Unacceptable
N4	Classon Avenue Between Dean and Pacific Streets	a.m.	67.6	68.7	1.1	71.0	Marginally Unacceptable
		MD	70.2	71.0	0.8	72.7	Marginally Unacceptable
		p.m.	69.8	71.4	1.6	74.1	Marginally Unacceptable
		SAT	66.3	67.4	1.1	70.6	Marginally Unacceptable
N5	Grand Avenue Between Dean and Pacific Streets	a.m.	68.6	70.1	1.5	71.6	Marginally Unacceptable
		MD	66.8	68.2	1.4	69.5	Marginally Acceptable
		p.m.	69.1	70.5	1.4	72.1	Marginally Unacceptable
		SAT	64.8	66.5	1.7	70.0	Marginally Unacceptable
N6	Atlantic Avenue Between Franklin and Classon Avenues	a.m.	71.7	72.1	0.4	74.2	Marginally Unacceptable
		MD	72.2	72.7	0.5	75.6	Marginally Unacceptable
		p.m.	70.8	71.3	0.5	73.4	Marginally Unacceptable
		SAT	71.3	71.8	0.5	74.3	Marginally Unacceptable
N7	Atlantic Avenue and Bedford Place	a.m.	71.1	71.5	0.4	72.3	Marginally Unacceptable
		MD	69.2	69.6	0.4	72.2	Marginally Unacceptable
		p.m.	68.4	68.9	0.5	71.3	Marginally Unacceptable
		SAT	73.2	73.7	0.5	73.0	Marginally Unacceptable
N8	Bedford Avenue between Atlantic Avenue and Herkimer Street	a.m.	70.6	70.8	0.2	73.8	Marginally Unacceptable
		MD	72.2	72.3	0.1	75.8	Marginally Unacceptable
		p.m.	69.7	69.9	0.2	72.3	Marginally Unacceptable
		SAT	71.0	71.2	0.2	72.4	Marginally Unacceptable
N9	Herkimer Place and Perry Place	a.m.	66.1	67.0	0.9	70.2	Marginally Unacceptable
		MD	64.6	65.2	0.6	67.8	Marginally Acceptable
		p.m.	66.1	66.6	0.5	67.6	Marginally Acceptable
		SAT	62.9	63.9	1.0	68.2	Marginally Acceptable
N10	Bergen Street between 6th and Carlton Avenues	a.m.	65.8	66.2	0.4	68.5	Marginally Acceptable
		MD	65.5	66.3	0.8	70.7	Marginally Unacceptable

Site	Measurement Location	Period	NB Leq	BD Leq	BD-NB Delta	BD L10	CEQR NOISE EXPOSURE
		p.m.	66.7	67.6	0.9	70.9	Marginally Unacceptable
		SAT	64.1	65.0	0.9	68.4	Marginally Acceptable
N11	Bergen Street Between Grand and Classon Avenues	a.m.	65.0	65.5	0.5	68.4	Marginally Acceptable
		MD	70.5	70.9	0.4	75.0	Marginally Unacceptable
		p.m.	64.1	64.6	0.5	68.6	Marginally Acceptable
		SAT	65.1	65.7	0.6	69.9	Marginally Acceptable
N12	Washington Avenue between Atlantic and Pacific Avenues	a.m.	71.4	71.6	0.2	73.4	Marginally Unacceptable
		MD	68.5	68.8	0.3	71.5	Marginally Unacceptable
		p.m.	68.9	69.2	0.3	70.2	Marginally Unacceptable
		SAT	70.5	70.9	0.4	72.3	Marginally Unacceptable

Source: CSA Group 2024.

For receptor locations N13 and N14, where train is the dominant noise source, the maximum L_{dn} noise levels increase under the 2034 With-Action condition relative to the No-Action condition would be 0 dBA because the Proposed Actions would not increase train services from No-Action to With-Action conditions.

In accordance with the *CEQR Technical Manual* noise exposure guidelines, if a proposed project is within an area where the noise levels are expected to exceed the marginally acceptable limit, a significant impact would occur, and mitigation measures would be necessary to bring its interior noise levels down to a level of 25 dB(A) or more below the maximum marginally acceptable levels (by receptor type). As a result, noise attenuation requirements are proposed as identified in the following section.

Noise Attenuation Measures

The *CEQR Technical Manual* has set noise attenuation requirements for buildings based on exterior noise levels. For dominant traffic noise, recommended noise attenuation values for buildings are designed to maintain interior noise levels of 45 dBA or lower for residential uses and 50 dBA or lower for commercial office uses and are determined based on exterior $L_{10(1)}$ noise levels. As discussed above, the minimum 35 dBA of facade attenuation and the requirement for an alternate means of ventilation included in ZR Section 123-32, as enforced by the New York City Department of Buildings (DOB), would apply to all DUs. Further study under the purview of OER would be required to alter the attenuation requirements. Unless CEQR minimum required attenuation results in attenuation higher than 35 dBA (i.e., Site N14), requirements of ZR Section 123-32 would be sufficient to ensure acceptable interior noise levels at all DUs. As ZR Section 123-32 would be applicable to DUs only, other noise sensitive uses in the proposed MX districts would need to meet the sufficient attenuation requirement as described in the noise E-Designation below. **Table 16-9** shows the minimum window/wall attenuation necessary to meet *CEQR Technical Manual* requirements for internal noise levels at each of the noise measurement locations. The With-Action $L_{10(1)}$ noise levels are calculated using the existing noise measurements and the traffic noise analysis for

all receptor locations except noise sites N13 and N14, where the L_{dn} would not increase significantly from the current existing condition. Based on the values shown in **Table 16-9**, required attenuation levels are determined for all projected and potential development sites. These values are shown in **Appendix XX, Noise**.

Table 16-9: Required Attenuation at Noise Measurement Locations

Site	Measurement Location	Maximum Calculated Total L10(1) or L_{dn}* Noise Level in dBA	CEQR Minimum Required Attenuation in dBA[1]
N1	Pacific Street Between Grand and Classon Avenues	70.0	28.0
N2	Dean Street Between Grand and Classon Avenues	72.7	28.0
N3	Atlantic Avenue Between Grand and Classon Avenues	75.7	31.0
N4	Classon Avenue Between Dean and Pacific Streets	74.1	31.0
N5	Grand Avenue Between Dean and Pacific Streets	72.1	28.0
N6	Atlantic Avenue Between Franklin and Classon Avenues	75.6	31.0
N7	Atlantic Avenue and Bedford Place	73.0	31.0
N8	Bedford Avenue between Atlantic Avenue and Herkimer Street	75.8	31.0
N9	Herkimer Place and Perry Place	70.2	28.0
N10	Bergen Street Between 6th and Carlton Avenues	70.9	28.0
N11	Bergen Street Between Grand and Classon Avenues	75.0	31.0
N12	Washington Avenue Between Atlantic and Pacific Avenues	73.4	31.0
N13	Franklin Avenue Shuttle	73.5	35.0
N14	LIRR	78.0	38.0

Source: CSA Group 2024.
[a] Attenuation values are shown for residential or community facility uses; commercial office uses would require 5 dBA less
[b] Ldn noise levels used at locations where train noise was the dominant source.

The attenuation of a composite structure is a function of the attenuation provided by each of its component parts and the surface area of each part. Normally, a building facade consists of wall, glazing, and any vents or louvers associated with the building mechanical systems in various ratios of area. The designs for the projected and potential development site With-Action buildings would include acoustically rated windows and air conditioning (a means of alternate ventilation). The buildings would be designed, including these elements, to

provide a composite Outdoor−Indoor Transmission Class (OITC) rating[2] greater than or equal to the values listed in **Appendix G** along with an alternative means of ventilation in all habitable rooms of the residential units.

To implement the attenuation requirements shown in **Appendix G** an (E) Designation for noise would be applied to all privately held projected and potential development sites specifying the appropriate amount of window/wall attenuation. The text of Noise (E) Designation E-810 for window/wall attenuation would be as follows:

To ensure an acceptable interior noise environment, the building facade(s) or future development must provide minimum composite building facade attenuation as shown in **Appendix G**, to maintain an interior L_{10} noise level not greater than 45 dBA for residential and community facility uses or not greater than 50 dBA for commercial uses and to maintain an interior L_{dn} noise level not greater than 40 dBA for residential uses. To maintain a closed-window condition in these areas, an alternate means of ventilation that brings outside air into the building without degrading the acoustical performance of the building facade(s) must also be provided.

By adhering to the requirements specified in ZR 123-32 and the (E) Designation described above, buildings to be developed as a result of the Proposed Actions would provide sufficient attenuation to achieve the *CEQR Technical Manual* interior L10 noise level guidelines of 45 dBA L_{10} for residential or community facility uses and 50 dBA L_{10} for commercial office uses and interior Ldn noise level guideline of 40 dBA for residential uses.

Mechanical Equipment

It is assumed that building mechanical systems (i.e., HVAC systems) for all buildings associated with the Proposed Actions would be designed to meet all applicable noise regulations (i.e., Subchapter 5, §24−227 of the New York City Noise Control Code, the New York City Department of Buildings 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 related to building mechanical equipment.

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