Chapter 16: Noise

16.1 Introduction

As described in Chapter 1, "Project Description," the New York City Department of City Planning is proposing a series of land use actions (collectively, the "Proposed Actions"), including zoning map amendments, zoning text amendments (including mapping a special zoning district and designating a Mandatory Inclusionary Housing area), and changes to the City Map that would facilitate the implementation of a multi-year planning process conducted in the Parkchester, Van Nest, and Morris Park neighborhoods of the Bronx in partnership with local stakeholders, City agencies, and the Metropolitan Transportation Authority (MTA). The Proposed Actions would affect an approximately 46-block area primarily along major corridors — East Tremont Avenue, White Plains Road, Bronxdale Avenue, Eastchester Road, and Stillwell Avenue — near the future Parkchester/Van Nest and Morris Park Metro-North stations in Bronx Community Districts 9, 10 and 11 (the "Affected Area"). The approximately 28-block area closest to the future Parkchester/Van Nest station is generally bound by Baker Avenue and Van Nest Avenue to the north, Silver Street to the east, East Tremont Avenue to the south, and St. Lawrence Avenue to the west. The approximately 18-block area closest to the future Morris Park station is generally bound by Pelham Parkway to the north, Marconi Street to the east, Williamsbridge Road to the south, and Tenbroeck Avenue to the west (the "Affected Area"). The Proposed Actions are intended to leverage the planned Metro-North Railroad service to promote economic growth, facilitate the development of housing, including affordable housing, as well as guide investment in the public realm around new Metro-North Railroad stations, encouraging safety and comfort.

This chapter discusses potential impacts to the neighborhood noise environment as a result of the Proposed Actions. 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 Affected Area. Existing noise levels in the Affected 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, increases in train activity from the planned Metro-North 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 in the future analysis year of 2033; and 2) the location of new sensitive receptors and the degree to which window/wall attenuation would provide acceptable interior noise levels.

16.2 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 Affected Area.

Proposed Actions would introduce new sensitive receptors at projected and potential development sites with the Affected Area. Ambient noise levels adjacent to the projected and potential development sites were examined to determine if building noise attenuation requirements for maintaining interior noise levels would be necessary due to increase in traffic and train activity from the planned Metro-North Railroad service. That assessment finds that noise levels would range between the "marginally unacceptable" and "clearly unacceptable" exterior noise exposure categories, resulting in a noise attenuation requirement range of 28 to 37 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 but three of the projected and potential development sites. The window/wall attenuation levels required under the (E) designations would avoid the potential for significant adverse noise impacts due to the Proposed Actions; refer to Appendix H, "Noise," for the proposed (E) designations.

16.3 Acoustical Fundamentals

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

"A" WEIGHTED SOUND LEVEL (DBA)

In order to establish a uniform noise measurement that simulates people's perception of loudness and annoyance, the decibel measurement is weighted to account for those frequencies most audible to the human ear. This is known as the A-weighted sound level, or dBA, and it is the descriptor of noise levels most often used for community noise. As shown in Table 16-1, "Typical Noise Levels," 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 Levels

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

Sources: Cowan, James P. H*andbook of Environmental Acoustics*, Van Nostrand Reinhold, New York, 1994; Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

In considering these values, it is important to note that the dBA scale is logarithmic, meaning that each increase of ten dBA describes a doubling of perceived loudness. Thus, the background noise in an office, at 50 dBA, is perceived as twice as loud as a library at 40 dBA. For most people to perceive an increase in noise, it must be at least three dBA. At 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 PM and 7 AM, due to increased sensitivity to noise levels during these hours. Statistical sound level descriptors such as L_1, L_{10}, L_{50}, L_{90}, and L_x, are used to indicate noise levels that are exceeded 1, 10, 50, 90, and x percent of the time, respectively.

The relationship between L_{eq} and levels of exceedance is worth noting. Because L_{eq} is defined in energy rather than straight numerical terms, it is not simply related to the levels of exceedance. If the noise fluctuates very little, L_{eq} will approximate L_{50} or the median level. If the noise fluctuates broadly, the L_{eq}

will be approximately equal to the L_{10} value. If extreme fluctuations are present, the L_{eq} will exceed L_{90} or the background level by ten or more decibels. Thus, the relationship between L_{eq} and the levels of exceedance will depend on the character of the noise. In community noise measurements, it has been observed that the L_{eq} is generally between L_{10} and L_{50}.

The day-night average sound level (L_{dn}) is the average noise level over a 24-hour period. The hourly noise level measurements between the hours of 10 PM and 7 AM 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. The Federal Transit Administration (FTA) uses $L_{eq(1)}$ and/or L_{dn} as its principal noise descriptors for mass transit noise for residential receptors. Noise assessments require the use of the daily L_{dn} for impact assessment. Because of these 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 *City Environmental Quality Review 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.

16.4 Noise 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, "CEQR Noise Exposure Guidelines for Use in City Environmental Impact Review").

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

Receptor Type	Time Period	Acceptable General External Exposure	Airport[3] Exposure	Marginally Acceptable General External Exposure	Airport[3] Exposure	Marginally Unacceptable General External Exposure	Airport[3] Exposure	Clearly Unacceptable General External Exposure	Airport[3] Exposure
1. Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	----------DNL ≤ 60 dBA----------		----------60 < DNL ≤ 65 dBA----------		(I) 65 < DNL ≤ 75 dBA		---------- 75 dBA < DNL ----------
2. Hospital, nursing home		$L_{10} \leq 55$ dBA		55 < $L_{10} \leq 65$ dBA		65 < $L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
3. Residence, residential hotel, or motel	(7 AM to 10 PM)	$L_{10} \leq 65$ dBA		65 < $L_{10} \leq 70$ dBA		70 < $L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
	(10 PM to 7 AM)	$L_{10} \leq 55$ dBA		55 < $L_{10} \leq 70$ dBA		70 < $L_{10} \leq 80$ dBA		$L_{10} > 80$ dBA	
4. School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, out-patient public health facility		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)	
5. Commercial or office		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)	
6. Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Table 16-2: CEQR Noise Exposure Guidelines for Use in City Environmental Impact Review (cont.)

Notes:

(i) In addition, any new activity shall comply with Impact Thresholds detailed in Section 410.

[1] Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by American National Standards Institute (ANSI) Standards; all values are for the worst hour in the time period.

[2] Tracts of land where serenity and quiet are extraordinarily important and serve as important public need, and where the preservation of these qualities is essential for the area to serve its intended purpose. Such areas could include amphitheaters, particular parks or portions of parks, or open spaces dedicated or recognized by appropriate local officials for activities requiring special qualities of serenity and quiet. Examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and nursing homes.

[3] One may use the FAA-approved DNL contours supplied by the Port Authority of New York and New Jersey (PANYNJ), or the noise contours may be computed from the federally approved Aviation Environmental Design Tool (AEDT) Computer Model using flight data supplied by the PANYNJ.

[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 listed by octave bands).

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

The *CEQR Technical Manual* defines attenuation requirements for buildings based on exterior noise levels (see Table 16-3, "Required Attenuation Values to Achieve Acceptable Interior Noise Levels"). 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	$70 < L_{10} \leq 73$	$73 < L_{10} \leq 76$	$76 < L_{10} \leq 78$	$78 < L_{10} \leq 80$	$80 < L_{10}$
Aircraft[A]	$65 < DNL \leq 68$	$68 < DNL \leq 71$	$71 < DNL \leq 73$	$73 < DNL \leq 75$	$75 < DNL$
Train	$65 < L_{dn} \leq 68$	$68 < L_{dn} \leq 71$	$71 < L_{dn} \leq 73$	$73 < L_{dn} \leq 75$	$75 < L_{dn}$
Attenuation[B]	(I) 28 dB(A)	(II) 31 dB(A)	(III) 33 dB(A)	(IV) 35 dB(A)	See note[C]

Notes:

[A] DNL descriptor based on average values of L_{dn} over a year period.

[B] The above composite window-wall attenuation values are for residential dwellings and community facility development. Commercial office spaces and 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 L_{build} and $L_{interior}$, using the appropriate noise descriptor

Where:

L_{build} is the projected noise level under the build condition rounded up to the whole number

$L_{interior}$ is the designed interior noise level (45 dB(A) for vehicular noise, 40 dB(A) for aircraft and train noise)

Source: New York City Department of Environmental Protection (DEP).

NEW YORK CITY NOISE CONTROL CODE

Specific noise standards for the proposed development site would be governed by the 2005 New York City Noise Code. Table 16-4, "New York City Noise Code," 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: NYC Noise Code, 2005.

16.5 Existing Noise Levels

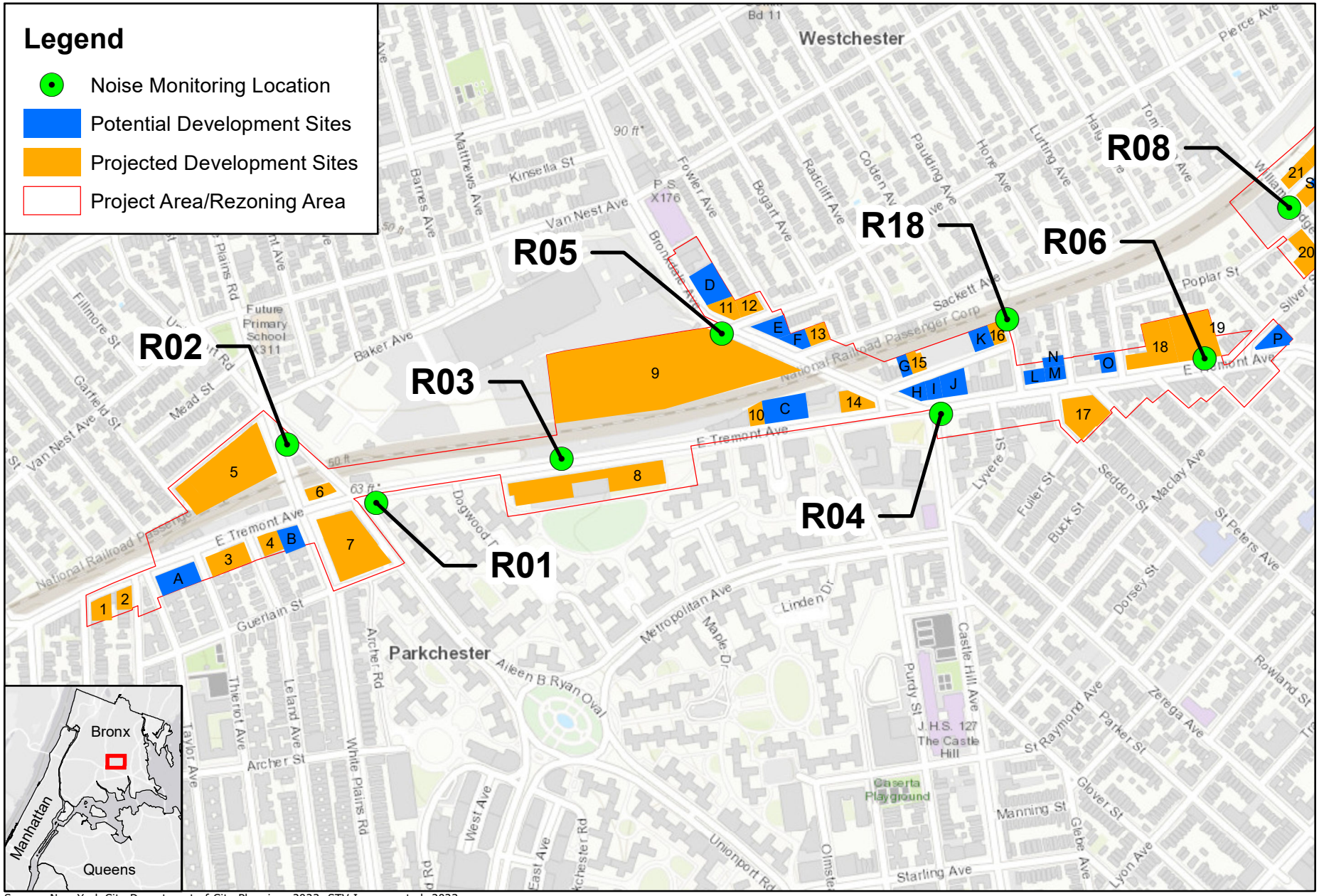
SELECTION OF NOISE RECEPTOR LOCATIONS

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 18 monitoring sites depicted in Table 16-5, "Noise Receptor Locations," and shown on Figure 16-1a and Figure 16-1b, "Noise Receptor Locations," are nearby sites of projected and potential development and are representative of the sensitive land uses in the Affected Area.

Table 16-5: Noise Receptor Locations

Receptor	Location
R01	Unionport Road & E. Tremont Avenue
R02	White Plains Road & Unionport Road
R03	2000 E. Tremont Avenue (Parkchester South Condominium)
R04	Castle Hill Avenue & E. Tremont Avenue
R05	Bronxdale Avenue & Pierce Avenue
R06	2547 E. Tremont Avenue (Westchester United Methodist Church)
R07	Williamsbridge Road & Silver Street/Eastchester Road
R08	Williamsbridge Road & Poplar Street
R09	Eastchester Road & Blondell Avenue
R10	Waters Place & Marconi Street
R11	Calvary Hospital along Bassett Avenue
R12	Eastchester Road & Morris Park Avenue
R13	1315 Loomis Street*
R14	Stillwell Avenue & McDonald Street
R15	Eastchester Road between Pelham Parkway South & Rhinelander Avenue
R16	Pelham Parkway South at the midpoint of Projected Development Site 58
R17	Eastchester Road & Waters Place*
R18	1526 Paulding Avenue*
Note: *Location of 24-hour measurement	

Source: HDR, 2023.



Source: New York City Department of City Planning, 2023; STV Incorporated, 2023.

N

0 0.09 0.18 Mile

Figure 16-1a

Bronx Metro-North Station Study

NOISE RECEPTOR LOCATIONS

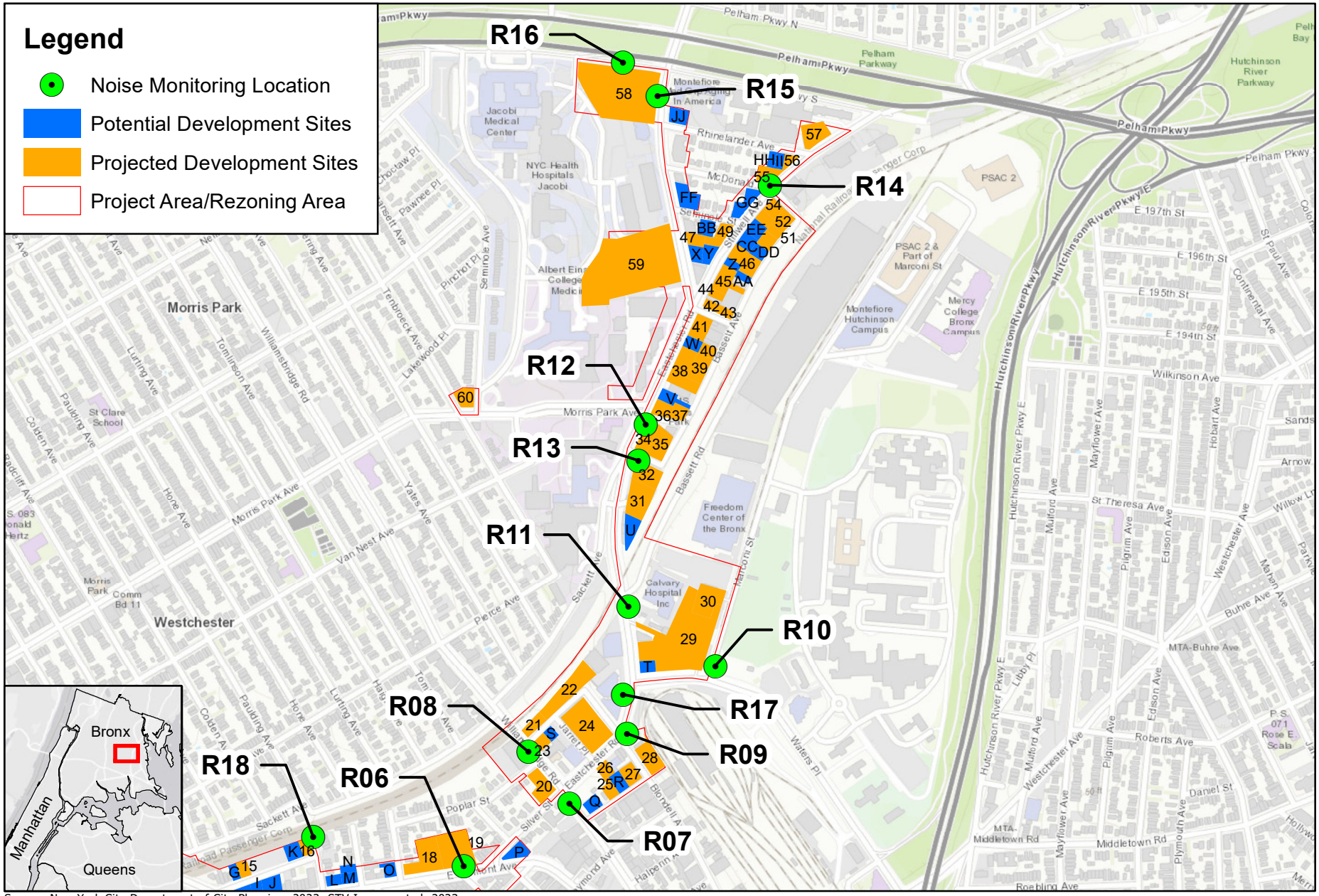


Figure 16-1b

Bronx Metro-North Station Study

NOISE RECEPTOR LOCATIONS

NOISE MONITORING

Noise monitoring was performed on several weekdays from June 6th to June 9th, June 20th to June 21st, and September 19th to September 21st, 2023, and weekends from June 10th, June 18th, 2023, and September 9th. Time periods chosen for monitoring include the weekday AM (7-9 AM), Midday (12-2 PM), PM (4-6 PM), and Saturday Midday (12-3 PM) peak hours for locations near destination retail stores to account for vehicular traffic noise. Additionally, 24-hour noise monitoring was also performed at three locations (R13, R17, and R18) to account for existing train noise from Amtrak's Hells Gate Line, which is the location of the planned Metro-North Railroad service. These time periods represent the peak hours when the majority of existing and future project-generated traffic would be passing these locations. The 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 two Larson Davis Model 831 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 Affected Area is exposed to noise from vehicular traffic on local streets, vehicular traffic on elevated highway from Bronx River Parkway to the west and Pelham Parkway to the north, and trains at-grade on Amtrak's Hells Gate Line within the entire project corridor.

Playground Noise

Noise receptor locations in the Affected Area are exposed to noise from multiple existing parks and playgrounds within 1,500-foot radius of the Affected Area. As such, playground noise was considered in the analysis. Recommended L_{eq} noise levels provided in the 1992 study performed for the School Construction Authority (SCA), as identified by the *CEQR Technical Manual,* was converted to L_{10} and utilized. As shown in Table 16-6, "Parks and Playgrounds within 1,500 feet of the Affected Area," noise levels from the following six existing parks and playgrounds were added cumulatively to the measured L_{10} noise levels to establish existing, No-Action, and With-Action noise levels:

Table 16-6: Parks and Playgrounds within 1,500 feet of the Affected Area

No.	Name	Address	Block	Lot
1	Taylor Playground	1883 Guerlain St.	3921	1
2	Van Nest Park	White Plains Rd., Van Nest Ave., & Unionport Rd.	4028	1
3	The STEAM Bridge School Playground	1684 White Plains Rd.	4037	1
4	Easter Seals Special Education School Playground	2433 E Tremont Ave.	4063	1
5	Icahn Charter School Four Playground	1500 Pelham Pkwy S.	4222	5
6	Bronxchester Little League Baseball Field	1500 Waters Pl.	4226	30

Source: HDR, 2023.

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 the elevated Pelham Parkway and principal and minor arterial streets such as, Eastchester Road and E. Tremont Avenue during weekday Midday and PM and weekend Midday periods. Per the guidance of the *CEQR Technical Manual* noise exposure criteria, receptors R01 – R04, R06 – R15, and R16 – R18 would be within the "marginally unacceptable" category. The remaining site, which includes receptor location R05, is in the "marginally acceptable" category. The results of the measurements of existing noise levels are summarized in Table 16-7, "Existing Noise Levels (in dBA)."

Table 16-7: Measured Existing Noise levels (in dBA)

Receptor	Measurement Location	Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{dn}	CEQR Category
R01	Unionport Road & E. Tremont Avenue	AM	69.9	72.5	68.0	63.7		MU
		Midday	75.0	72.7	66.3	62.2		MU
		PM	76.3	73.2	67.3	62.1		MU
		Saturday	71.2	71.1	66.5	63.1		MU
R02	White Plains Road & Unionport Road	AM	66.4	69.7	62.9	56.3		MA
		Midday	64.7	67.7	61.7	54.9		MA
		PM	70.9	70.4	63.6	59.1		MU
		Saturday	70.2	71.5	65.4	60.0		MU
R03	2000 E. Tremont Avenue (Parkchester South Condominium)	AM	69.0	71.7	66.6	59.1		MU
		Midday	71.2	73.2	67.8	62.4		MU
		PM	69.5	72.1	66.7	58.4		MU
		Saturday	67.8	71.3	65.4	57.0		MU
R04	Castle Hill Avenue & E. Tremont Avenue	AM	72.1	74.9	67.7	60.5		MU
		Midday	70.4	72.3	66.5	60.2		MU
		PM	75.7	73.4	66.8	59.6		MU
		Saturday	69.5	71.8	65.6	59.3		MU
R05	Bronxdale Avenue & Pierce Avenue	AM	64.2	66.5	58.9	53.3		MA
		Midday	66.9	67.4	59.5	55.6		MA
		PM	67.9	66.7	60.3	54.0		MA
		Saturday	71.5	67.7	60.7	53.3		MA
R06	2547 E. Tremont Avenue (Westchester United Methodist Church)	AM	72.3	74.4	68.4	59.3		MU
		Midday	69.7	71.6	64.4	57.1		MU
		PM	71.3	70.6	65.2	58.8		MU
		Saturday	67.7	70.8	64.3	59.2		MU
R07	Williamsbridge Road & Silver Street/Eastchester Road	AM	70.4	73.6	67.5	63.1		MU
		Midday	72.3	74.0	66.8	61.7		MU
		PM	72.2	74.1	68.2	63.1		MU
		Saturday	70.2	70.5	65.7	62.5		MU
R08	Williamsbridge Road & Poplar Street	AM	70.2	72.2	64.6	56.4		MU
		Midday	69.1	72.3	66.4	58.8		MU
		PM	69.9	73.0	66.4	59.0		MU
		Saturday	67.2	70.7	63.1	54.6		MU
R09	Eastchester Road & Blondell Avenue	AM	69.1	71.2	66.1	59.8		MU
		Midday	70.9	71.5	65.9	61.4		MU
		PM	68.3	70.9	64.7	59.5		MU
		Saturday	67.1	71.0	64.4	57.6		MU

Table 16-7: Measured Existing Noise levels (in dBA) (cont.)

Receptor	Measurement Location	Time	L_{eq}	L_{10}	L_{50}	L_{90}	L_{dn}	CEQR Category
R10	Waters Place & Marconi Street	AM	73.1	76.5	69.6	65.3		MU
		Midday	68.5	75.1	66.8	62.5		MU
		PM	68.0	74.8	64.3	60.9		MU
		Saturday	73.1	76.5	64.7	65.3		MU
R11	Calvary Hospital along Bassett Avenue	AM	66.7	68.3	62.1	57.0		MA
		Midday	69.3	70.4	63.9	59.4		MU
		PM	67.3	68.5	61.9	57.9		MA
		Saturday	68.4	71.2	63.5	56.7		MU
R12	Eastchester Road & Morris Park Avenue	AM	67.2	69.9	64.5	60.2		MA
		Midday	71.7	72.9	67.0	62.0		MU
		PM	67.9	70.7	65.4	60.8		MU
		Saturday	76.5	69.7	63.6	59.9		MA
R13	1315 Loomis Street	24-hour					69.1	MU
R14	Stillwell Avenue & McDonald Street	AM	63.0	66.0	57.6	52.0		MA
		Midday	62.2	63.8	59.0	54.7		Acceptable
		PM	69.8	73.3	65.7	58.6		MU
		Saturday	62.9	66.5	58.6	51.1		MA
R15	Eastchester Road between Pelham Parkway & Rhinelander Avenue	AM	64.7	70.2	61.7	56.2		MU
		Midday	65.0	69.6	60.9	56.4		MA
		PM	65.1	70.6	62.3	57.5		MU
		Saturday	65.8	70.6	61.1	54.5		MU
R16	Pelham Parkway South at the midpoint of Site 58	AM	65.6	69.5	60.7	56.3		MA
		Midday	69.0	70.9	60.7	56.3		MU
		PM	71.8	73.3	66.8	59.4		MU
		Saturday	78.2	73.6	65.1	57.6		MU
R17	Eastchester Road & Waters Place	24-hour					72.4	MU
R18	1526 Paulding Avenue	24-hour					71.6	MU

Notes: CEQR category: MA = Marginally Acceptable; MU = Marginally Unacceptable; CU = Clearly Unacceptable.

Source: HDR, 2023.

16.6 Methodology

TRAFFIC NOISE

In order to predict the 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:

$$\textit{Future Noise Level} = 10 * \log\left(\frac{Future\ PCE}{Existing\ PCE}\right) + \textit{Baseline Noise Level}$$

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

The FTA's guidance manual details noise analysis methodology to calculate train noise. Using FTA methodologies, $L_{eq(1)}$ and L_{dn} values may be calculated as a function of a number of factors, including the distance between the track and receptor, shielding at the receptor, number of trains, average number of cars per train, train speed, track conditions, whether the track is on grade or on structure, etc.

According the 2021 Penn Station Access Project Environmental Impact Statement (PSA EIS), the planned Metro-North Railroad service would increase the number of trains on the Hells Gate Line by 101 trains per day by the year 2027. These 101 trains would not have been included in the existing noise measurements conducted. As such, noise levels from two receptor locations (Receptor Nos. 3.5 and 3.7) from the PSA EIS were utilized as reference points to gauge the anticipated noise exposure from the train activity to the noise receptor locations identified in this assessment (Table 16-4 of the PSA EIS). In Table 16-14 of the PSA EIS, the anticipated noise exposure (L_{dn}) at Receptor No. 3.5 at a distance of 36 feet from the nearest track is projected to be 66 dBA. Similarly, the anticipated noise exposure (L_{eq}) at Receptor No. 3.7 at a distance of 51 feet from the nearest track is anticipated to be 64 dBA.

Using these reference point noise levels and FTA's noise analysis methodology, as per the *CEQR Technical Manual,* noise levels were calculated at each noise receptor location based on its distance to the Hells Gate Line right-of-way (ROW) line. The ROW line was used instead of the closest track since exact track location is unavailable. The distance to the ROW line serves as a conservative estimate. The adjustment was incorporated in both the No-Action and With-Action conditions for all noise receptor locations.

16.7 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 2033 analysis year are calculated at the 18 noise receptor locations. The dominant source of neighborhood noise comes from local and highway vehicular traffic or train activity from the planned Metro-North Railroad service. As such, these No-Action noise levels are shown in Table 16-8a and Table 16-8b, "2033 No-Action condition Noise Levels where traffic is dominant noise source (in dBA)," and "2033 No-Action condition Noise Levels where traffic is dominant noise source (in dBA)."

For receptors locations where traffic is the dominant noise source, the maximum L_{10} noise levels increase under the 2033 No-Action condition relative to the Existing condition would be 2.7 dBA at Receptor R11 near Calvary Hospital along Bassett Avenue. All other receptor locations would encounter an increase between 0.1 and 2.7 dBA.

Table 16-8a: 2033 No-Action Condition Noise Levels where traffic is dominant noise source (in dBA)

Receptor	Measurement Location	Time	Existing L_{10}	No-Action L_{10}	L_{10} Increment*	No-Action CEQR Category
R01	Unionport Road & E. Tremont Avenue	AM	72.5	73.1	0.6	MU
		Midday	72.7	73.5	0.7	MU
		PM	73.2	73.8	0.6	MU
		Saturday	71.1	71.9	0.8	MU
R02	White Plains Road & Unionport Road	AM	69.7	70.7	1.0	MU
		Midday	67.7	69.2	1.5	MA
		PM	70.4	71.3	1.0	MU
		Saturday	71.5	72.3	0.8	MU
R03	2000 E. Tremont Avenue (Parkchester South Condominium)	AM	71.7	73.1	1.3	MU
		Midday	73.2	74.4	1.2	MU
		PM	72.1	73.4	1.3	MU
		Saturday	71.3	72.9	1.6	MU
R04	Castle Hill Avenue & E. Tremont Avenue	AM	74.9	75.4	0.5	MU
		Midday	72.3	72.9	0.7	MU
		PM	73.4	73.8	0.4	MU
		Saturday	71.8	72.4	0.7	MU
R05	Bronxdale Avenue & Pierce Avenue	AM	66.5	67.2	0.8	MA
		Midday	67.4	68.1	0.6	MA
		PM	66.7	67.4	0.8	MA
		Saturday	67.7	68.4	0.6	MA
R06	2547 E. Tremont Avenue (Westchester United Methodist Church)	AM	74.4	75.3	0.9	MU
		Midday	71.6	72.9	1.3	MU
		PM	70.6	71.8	1.1	MU
		Saturday	70.8	72.3	1.4	MU
R07	Williamsbridge Road & Silver Street/Eastchester Road	AM	73.6	74.4	0.8	MU
		Midday	74.0	75.0	1.0	MU
		PM	74.1	75.1	1.0	MU
		Saturday	70.5	71.8	1.3	MU
R08	Williamsbridge Road & Poplar Street	AM	72.2	73.3	1.1	MU
		Midday	72.3	73.5	1.1	MU
		PM	73.0	74.0	0.9	MU
		Saturday	70.7	72.2	1.5	MU
R09	Eastchester Road & Blondell Avenue	AM	71.2	72.2	1.0	MU
		Midday	71.5	72.8	1.3	MU
		PM	70.9	72.2	1.3	MU
		Saturday	71.0	72.7	1.7	MU
R10	Waters Place & Marconi Street	AM	76.5	77.2	0.7	MU
		Midday	75.1	75.8	0.7	MU
		PM	74.8	75.6	0.8	MU
		Saturday	76.5	78.3	1.8	MU
R11	Calvary Hospital along Bassett Avenue	AM	68.3	71.0	2.7	MU
		Midday	70.4	72.6	2.3	MU
		PM	68.5	71.1	2.6	MU
		Saturday	71.2	73.7	2.5	MU
R12	Eastchester Road & Morris Park Avenue	AM	69.9	70.8	1.0	MU
		Midday	72.9	73.9	1.0	MU
		PM	70.7	71.7	1.0	MU
		Saturday	69.7	71.2	1.5	MU

Table 16-8a: 2033 No-Action Condition Noise Levels where traffic is dominant noise source (in dBA) (cont.)

Receptor	Measurement Location	Time	Existing L_{10}	No-Action L_{10}	L_{10} Increment*	No-Action CEQR Category
R14	Stillwell Avenue & McDonald Street	AM	66.0	66.9	0.9	MA
		Midday	63.8	65.2	1.4	MA
		PM	73.3	73.5	0.3	MU
		Saturday	66.5	67.4	0.9	MA
R15	Eastchester Road between Pelham Parkway & Rhinelander Avenue	AM	70.2	70.5	0.4	MU
		Midday	69.6	70.0	0.5	MA
		PM	70.6	71.1	0.5	MU
		Saturday	70.6	71.3	0.8	MU
R16	Pelham Parkway South at the midpoint of Site 58	AM	69.5	69.8	0.3	MA
		Midday	70.9	71.1	0.2	MU
		PM	73.3	73.5	0.1	MU
		Saturday	73.6	73.7	0.1	MU

Notes: CEQR category: MA = Marginally Acceptable; MU = Marginally Unacceptable; CU = Clearly Unacceptable.
*The increment may not equal to the difference between No-Action and Existing L_{10} because of rounding.

Source: HDR, 2023.

For receptors locations where train is the dominant noise source, the maximum L_{dn} noise levels increase under the 2033 No-Action condition relative to the Existing condition would be 5.0 dBA at Receptor R18 near Paulding Avenue. The increment is attributable to the PSA train increment and the short distance between the noise source and receptors.

Table 16-8b: 2033 No-Action Condition Noise Levels where train is dominant noise source (in dBA)

Receptor	Measurement Location	Time	Existing L_{dn}	No-Action L_{dn}	L_{dn} Increment	No-Action CEQR Category
R13	1315 Loomis Street	24-hour	69.1	69.5	0.4	MU
R17	Eastchester Road & Waters Place	24-hour	72.4	72.5	0.1	MU
R18	1526 Paulding Avenue	24-hour	71.6	76.6	5.0	CU

Note: CEQR category: MA = Marginally Acceptable; MU = Marginally Unacceptable; CU = Clearly Unacceptable.
*The high L_{dn} noise level is due to the proximity of the receptor location to the PSA ROW line (approximately 5 feet), which was used as the train noise source location, conservatively, since exact location of the planned Metro-North Railroad service train tracks is unavailable.

Source: HDR, 2023.

In terms of CEQR noise exposure guidelines, noise levels at Receptors R05 would remain in the "marginally acceptable" category. All other receptor sites would remain in the "marginally unacceptable" category except for Receptor R18, which would change category to "clearly unacceptable" category. This significant change is due to the proximity of the receptor location to the ROW line (approximately five feet), which was used as the train noise source location, conservatively, since exact location of the planned Metro-North Railroad service train tracks is unavailable.

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

NOISE IMPACT IDENTIFICATION

Using the methodologies described in the methodology section, With-Action noise levels are calculated at the 18 noise receptor locations for the 2033 analysis year. The With-Action noise levels for all receptors are shown in Table 16-9a and Table 16-9b, "2033 With-Action Noise Levels where traffic is dominant noise source (in dBA)," and "2033 With-Action Noise Levels where train is dominant noise source (in dBA)."

For receptors locations where traffic is the dominant noise source, the maximum L_{10} noise levels increase under the 2033 With-Action condition relative to the No-Action condition would be 2.2 dBA at Receptor R03 near 2137 East Tremont Avenue during the midday Peak Period. All other receptor locations would encounter an increase between 0.1 and 1.9 dBA.

For receptors locations where train is the dominant noise source, the maximum L_{dn} noise levels increase under the 2033 With-Action condition relative to the No-Action condition would be 0 dBA. The absence of increment is attributable to the fact that the Proposed Actions would not increase train services from No-Action condition to With-Action condition.

In terms of CEQR noise exposure guidelines, noise levels at Receptor R05 and R18 are not expected to change and would remain in the "marginally acceptable" and "clearly unacceptable" categories, respectively; and all other receptor sites would remain in the "marginally unacceptable" category.

Table 16-9a: 2033 With-Action Condition Noise Levels where traffic is dominant noise source (in dBA)

Receptor	Measurement Location	Time	No-Action L_{10}	With-Action L_{10}	L_{10} Increment*	With-Action CEQR Category
R01	Unionport Road & E. Tremont Avenue	AM	73.1	74.4	1.3	MU
		Midday	73.5	75.3	1.9	MU
		PM	73.8	74.7	0.8	MU
		Saturday	71.9	72.9	1.0	MU
R02	White Plains Road & Unionport Road	AM	70.7	70.8	0.1	MU
		Midday	69.2	69.3	0.1	MA
		PM	71.3	71.4	0.1	MU
		Saturday	72.3	72.4	0.1	MU
R03	2000 E. Tremont Avenue (Parkchester South Condominium)	AM	73.1	74.5	1.5	MU
		Midday	74.4	76.6	2.2	MU
		PM	73.4	74.2	0.8	MU
		Saturday	72.9	74.1	1.2	MU
R04	Castle Hill Avenue & E. Tremont Avenue	AM	75.4	76.7	1.4	MU
		Midday	72.9	74.8	1.9	MU
		PM	73.8	75.0	1.1	MU
		Saturday	72.4	73.6	1.1	MU
R05	Bronxdale Avenue & Pierce Avenue	AM	67.2	67.2	0.0	MA
		Midday	68.1	68.1	0.0	MA
		PM	67.4	67.4	0.0	MA
		Saturday	68.4	68.4	0.0	MA
R06	2547 E. Tremont Avenue (Westchester United Methodist Church)	AM	75.3	76.4	1.1	MU
		Midday	72.9	74.5	1.6	MU
		PM	71.8	72.5	0.7	MU
		Saturday	72.3	73.2	1.0	MU
R07	Williamsbridge Road & Silver Street/Eastchester Road	AM	74.4	75.5	1.1	MU
		Midday	75.0	76.4	1.4	MU
		PM	75.1	75.8	0.7	MU
		Saturday	71.8	72.6	0.9	MU
R08	Williamsbridge Road & Poplar Street	AM	73.3	74.4	1.1	MU
		Midday	73.5	75.2	1.7	MU
		PM	74.0	74.7	0.8	MU
		Saturday	72.2	73.3	1.1	MU
R09	Eastchester Road & Blondell Avenue	AM	72.2	73.6	1.3	MU
		Midday	72.8	74.3	1.5	MU
		PM	72.2	72.9	0.7	MU
		Saturday	72.7	73.6	0.9	MU
R10	Waters Place & Marconi Street	AM	77.2	77.4	0.2	MU
		Midday	75.8	76.0	0.2	MU
		PM	75.6	75.6	0.1	MU
		Saturday	78.3	78.4	0.1	MU
R11	Calvary Hospital along Bassett Avenue	AM	71.0	72.0	1.0	MU
		Midday	72.6	73.9	1.2	MU
		PM	71.1	71.8	0.6	MU
		Saturday	73.7	74.5	0.8	MU
R12	Eastchester Road & Morris Park Avenue	AM	70.8	71.9	1.1	MU
		Midday	73.9	75.1	1.2	MU
		PM	71.7	72.3	0.6	MU
		Saturday	71.2	71.8	0.6	MU

Table 16-9a: 2033 With-Action Condition Noise Levels where traffic is dominant noise source (in dBA) (cont.)

Receptor	Measurement Location	Time	No-Action L_{10}	With-Action L_{10}	L_{10} Increment*	With-Action CEQR Category
R14	Stillwell Avenue & McDonald Street	AM	66.9	67.6	0.7	MA
		Midday	65.2	66.1	0.9	MA
		PM	73.5	74.0	0.5	MU
		Saturday	67.4	68.0	0.6	MA
R15	Eastchester Road between Pelham Parkway & Rhinelander Avenue	AM	70.5	71.1	0.5	MU
		Midday	70.0	70.7	0.7	MU
		PM	71.1	71.7	0.6	MU
		Saturday	71.3	71.7	0.4	MU
R16	Pelham Parkway South at the midpoint of Site 58	AM	69.8	70.1	0.3	MU
		Midday	71.1	71.4	0.3	MU
		PM	73.5	73.6	0.1	MU
		Saturday	73.7	73.8	0.1	MU

Notes: CEQR category: MA = Marginally Acceptable; MU = Marginally Unacceptable; CU = Clearly Unacceptable.
*The increment may not equal to the difference between No-Action and Existing L_{10} because of rounding

Source: HDR, 2023.

Table 16-9b: 2033 With-Action Condition Noise Levels where train is dominant noise source (in dBA)

Receptor	Measurement Location	Time	No-Action L_{dn}	With-Action L_{dn}	L_{dn} Increment	With-Action CEQR Category
R13	1315 Loomis Street	24-hour	69.5	69.5	0.0	MU
R17	Eastchester Road & Waters Place	24-hour	72.5	72.5	0.0	MU
R18	1526 Paulding Avenue	24-hour	76.6*	76.6*	0.0	CU

Note: CEQR category: MA = Marginally Acceptable; MU = Marginally Unacceptable; CU = Clearly Unacceptable.
*The high L_{dn} noise level is due to the proximity of the receptor location to the PSA ROW line (approximately 5 feet), which was used as the train noise source location, conservatively, since exact location of the planned Metro-North Railroad service train tracks is unavailable.

Source: HDR, 2023.

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 have been proposed as identified in the section below.

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 uses and are determined based on exterior $L_{10(1)}$ noise levels. Table 16-10, "Required Attenuation at Noise Measurement Locations," 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, playground noise, train noise, and the traffic noise analysis for all receptor locations except Receptors 13, 17, and 18. These receptor locations have a higher noise level due to the proposed train. Based on the values shown in Table 16-8, required attenuation levels are determined for all projected and potential development sites. These values are shown in Appendix H, "Noise".

Table 16-10: Required Attenuation at Noise Measurement Locations

Receptor	Measurement Location	Maximum Calculated Total $L_{10(1)}$ or L_{dn}* Noise Level in dBA	CEQR Minimum Required Attenuation in dBA[1,2]
1	Unionport Road & E. Tremont Avenue	75.3	31.0
2	White Plains Road & Unionport Road	72.4	28.0
3	2000 E. Tremont Avenue (Parkchester South Condominium)	76.6	33.0
4	Castle Hill Avenue & E. Tremont Avenue	76.7	33.0
5	Bronxdale Avenue & Pierce Avenue	68.4	N/A
6	2547 E. Tremont Avenue (Westchester United Methodist Church)	76.4	33.0
7	Williamsbridge Road & Silver Street/Eastchester Road	76.4	33.0
8	Williamsbridge Road & Poplar Street	75.2	31.0
9	Eastchester Road & Blondell Avenue	74.3	31.0
10	Waters Place & Marconi Street	78.4	35.0
11	Calvary Hospital along Bassett Avenue	74.5	31.0
12	Eastchester Road & Morris Park Avenue	75.1	31.0
13	1315 Loomis Street	69.5*	31.0
14	Stillwell Avenue & McDonald Street	74.0	31.0
15	Eastchester Road between Pelham Parkway & Rhinelander Avenue	71.7	28.0
16	Pelham Parkway South at the midpoint of Site 58	73.8	31.0
17	Eastchester Road & Waters Place	72.5*	33.0
18	1526 Paulding Avenue	76.6*	37.0

Notes: [1]Attenuation values are shown for residential uses; commercial office uses would be 5 dBA less.
[2]"N/A" Indicates that the highest calculated L_{10} is below 70 dBA. The *CEQR Technical Manual* does not specify minimum attenuation guidance for exterior L_{10} values below this level.
*L_{dn} noise levels used at locations where train noise was the dominant source.

Source: HDR, 2023.

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 façade 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[1]

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

greater than or equal to the values listed in Appendix H, "Noise" along with an alternative means of ventilation in all habitable rooms of the residential units.

To implement the attenuation requirements shown in Appendix H, "Noise" 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-750 for window/wall attenuation would be as follows:

To ensure an acceptable interior noise environment, the building façade(s) or future development must provide minimum composite building façade attenuation as shown in Appendix H, "Noise" of the Bronx Metro-North Station Study Environmental Impact Statement in order 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 façade(s) must also be provided.

16.9 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.