Chapter 17: Noise

A. INTRODUCTION

Noise pollution in an urban area comes from many sources. Some sources are activities essential to the health, safety, and welfare of the city's inhabitants, such as noise from emergency vehicle sirens, garbage collection operations, and construction and maintenance equipment. Other sources, such as traffic, stem from the movement of people and goods, activities that are essential to the viability of the city as a place to live and do business. Although these and other noise-producing activities are necessary to a city, the noise they produce is undesirable. Urban noise detracts from the quality of the living environment and there is increasing evidence that excessive noise represents a threat to public health.

The proposed and future actions for the Melrose Commons Urban Renewal Area (URA) are expected to change traffic volumes in the general vicinity. Since traffic is the main source of ambient noise, this could lead to changes in the ambient noise level. An analysis was designed and conducted to identify and quantify any such impacts.

The noise analysis for the proposed and future actions consisted of three parts:

- A screening analysis to determine locations where traffic generated by the proposed and future actions would have the potential to cause significant noise impacts;
- A detailed analysis at any location where traffic generated by the proposed and future actions would have the potential to result in significant adverse noise impacts, to determine the magnitude of the increase in noise level; and
- An analysis to determine the level of building attenuation necessary to ensure that interior noise levels throughout the URA satisfy applicable interior noise criteria.

In summary, the analysis concludes that the traffic generated by the Proposed Action would not be expected to produce significant increases in noise levels at any location near and/or adjacent to the URA. In addition, with the proposed building design measures, noise levels within the proposed buildings would comply with all applicable requirements. Therefore, the proposed and future actions would not result in any significant adverse noise impacts.

NOISE FUNDAMENTALS

Quantitative information on the effects of airborne noise on people is well documented. If sufficiently loud, noise may adversely affect people in several ways. For example, noise may interfere with human activities, such as sleep, speech communication, and tasks requiring concentration or coordination. It may also cause annoyance, hearing damage, and other physiological problems. Although it is possible to study these effects on people on an average or statistical basis, it must be remembered that all the stated effects of noise on people vary greatly with the individual. Several noise scales and rating methods are used to quantify the effects of noise on people. These scales and methods consider such factors as loudness, duration, time of occurrence, and changes in noise level with time.

"A"-WEIGHTED SOUND LEVEL (dBA)

Noise is typically measured in units called decibels (dB), which are ten times the logarithm of the ratio of the sound pressure squared to a standard reference pressure squared. Because loudness is important in the assessment of the effects of noise on people, the dependence of loudness on frequency must be taken into account in the noise scale used in environmental assessments. Frequency is the rate at which sound pressures fluctuate in a cycle over a given quantity of time, and is measured in Hertz (Hz), where 1 Hz equals 1 cycle per second. Frequency defines sound in terms of pitch components. In the measurement system, one of the simplified scales that accounts for the dependence of perceived loudness on frequency is the use of a weighting network—known as A-weighting—that simulate response of the human ear. For most noise assessments the A-weighted sound pressure level in units of dBA is used in view of its widespread recognition and its close correlation with perception. In this analysis, all measured noise levels are reported in dBA or A-weighted decibels. Common noise levels in dBA are shown in Table 17-1.

Table 17-1
Common 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	
Busy city street, loud shout	80
Busy traffic intersection	
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	
Background noise in an office	50
Suburban areas with medium density transportation	
Public library	40
Soft whisper at 5 meters	30
Threshold of hearing	0

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

COMMUNITY RESPONSE TO CHANGES IN NOISE LEVELS

The average ability of an individual to perceive changes in noise levels is well documented (see Table 17-2). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas 10 dBA changes are normally perceived as doublings (or halvings) of noise levels. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

It is also possible to characterize the effects of noise on people by studying the aggregate response of people in communities. The rating method used for this purpose is based on a statistical analysis of the fluctuations in noise levels in a community, and integrates the fluctuating sound energy over a known period of time, most typically during 1 hour or 24 hours. Various government and research institutions have proposed criteria that attempt to relate changes in noise levels to community response. One commonly applied criterion for estimating this response is incorporated into the community response scale proposed by the International Standards Organization (ISO) of the United Nations (see Table 17-3). This scale relates changes in noise level to the degree of community response and permits direct estimation of the probable response of a community to a predicted change in noise level.

Table 17-2
Average Ability to Perceive Changes in Noise Levels

Change (dBA)	Human Perception of Sound
2-3	Barely perceptible
5	Readily noticeable
10	A doubling or halving of the loudness of sound
20	A dramatic change
40	Difference between a faintly audible sound and a very loud sound

Source: Bolt Beranek and Neuman, Inc., *Fundamentals and Abatement of Highway Traffic Noise*, Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.

Table 17-3
Community Response to Increases in Noise Levels

Change (dBA)	Category	Description
0	None	No observed reaction
5	Little	Sporadic complaints
10	Medium	Widespread complaints
15	Strong	Threats of community action
20	Very strong	Vigorous community action

Source: International Standards Organization, Noise Assessment with Respect to Community Responses, ISO/TC 43 (New York: United Nations, November 1969).

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., 1 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. Statistical sound level descriptors such as L_1, L_{10}, L_{50}, L_{90}, and L_x, are sometimes used to indicate noise levels that are exceeded 1, 10, 50, 90 and x percent of the time, respectively. Discrete event peak levels are given as L_1 levels. L_{eq} is used in the prediction of future noise levels, by adding the contributions from new sources of noise (i.e., increases in traffic volumes) to the existing levels and in relating annoyance to increases in noise levels.

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 relationship between L_{eq} and exceedance levels has been used in this analysis to characterize the noise sources and to determine the nature and extent of their impact at all receptor locations.

For the purposes of this analysis, the maximum 1-hour equivalent sound level ($L_{eq(1)}$) has been selected as the noise descriptor to be used in the noise impact evaluation. $L_{eq(1)}$ is the noise descriptor used in the *New York City Environmental Quality Review (CEQR) Technical Manual* for noise impact evaluation, and is used to provide an indication of highest expected sound levels. $L_{10(1)}$ is the noise descriptor used in the *CEQR Technical Manual* for building attenuation. Hourly statistical noise levels (particularly L_{10} and L_{eq} levels) were used to characterize the relevant noise sources and their relative importance at each receptor location.

B. NOISE PREDICTION METHODOLOGY

PROPORTIONAL MODELING

Proportional modeling was used to determine locations which had the potential for having significant noise impacts and to quantify the magnitude of those potential impacts. Proportional modeling is one of the techniques recommended in the New York City *CEQR Technical Manual* for mobile source analysis.

Using this technique, the prediction of future noise levels, where traffic is the dominant noise source, is based on a calculation using measured existing noise levels and predicted changes in traffic volumes to determine No Build and Build levels. Vehicular traffic volumes are converted into Passenger Car Equivalent (PCE) values, for which one medium-duty truck (having a gross weight between 9,900 and 26,400 pounds) is assumed to generate the noise equivalent of 13 cars, and one heavy-duty truck (having a gross weight of more than 26,400 pounds) is assumed to generate the noise equivalent of 47 cars, and one bus (vehicles designed to carry more than nine passengers) is assumed to generate the noise equivalent of 18 cars. Future noise levels are calculated using the following equation:

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

where:

F NL = Future Noise Level

E NL = Existing Noise Level

F PCE = Future PCEs

E PCE = Existing PCEs

Sound levels are measured in decibels and therefore increase logarithmically with sound source strength. In this case, the sound source is traffic volumes measured in PCEs. For example, assume that traffic is the dominant noise source at a particular location. If the existing traffic volume on a street is 100 PCE and if the future traffic volume were increased by 50 PCE to a total of 150 PCE, the noise level would increase by 1.8 dBA. Similarly, if the future traffic were increased by 100 PCE, or doubled to a total of 200 PCE, the noise level would increase by 3.0 dBA.

This procedure was used as first as a screening tool—i.e., to identify whether there were any locations in the vicinity of the proposed and future actions where there is the potential for an increase of 3 dBA or more in vehicle-related noise levels from No Build to Build conditions (i.e., locations where there would be a doubling of PCEs) and, consequently, where there is the potential for significant noise impacts..

Analyses were conducted for three time periods: the weekday AM, weekday midday (MD), and weekday PM peak hours. These time periods are the hours when the maximum traffic generation is expected and, therefore, the hours when the Build conditions are most likely to result in maximum noise impacts.

TRAFFIC NOISE MODEL (TNM)

Proportional modeling techniques cannot be used at locations where traffic from the immediately adjacent street or roadway is not the dominant noise source, and at locations where there street or roadway configuration would change. Also proportional modeling is not accurate at locations where there would be a significant change in vehicle speeds. At such locations the *Traffic Noise* Model Version 2.5 (TNM) was be used. TNM is a computerized model developed for the Federal Highway Administration (FHWA) that takes into account various factors due to traffic flow, including traffic volumes, vehicle mix (i.e., percentage of autos, light duty trucks, heavy duty trucks, buses, etc.), sources/receptor geometry, and shielding (including barriers and terrain, ground attenuation, etc.). It is the current state-of-the-art model for traffic noise analysis.

APPLICABLE NOISE CODES AND IMPACT CRITERIA

NEW YORK CITY NOISE CODE

In December 2005 the New York City Noise Control Code was amended. The amended noise code contains: prohibitions regarding unreasonable noise; requirements for noise due to construction activities (including noise limits from specific pieces of construction equipment, noise limits on total construction noise, limits on hours of construction [weekdays between 7 AM and 6 PM], and requirements for adopting and implementing noise mitigation plans for each construction site prior to the start of construction); and specifies noise standards, including plainly audible criteria, for specific noise sources (i.e., refuse collection vehicles, air compressors, circulation devises, exhausts, paving breakers, commercial music, personal audio devises, sound reproduction devises, animals, motor vehicles including motorcycles and trucks, sound signal devises, burglar alarms, emergency signal devises, lawn care devises, snow blowers, etc.). In addition, the amended code specifies that that no sound source operating in connection with any commercial or business enterprise may exceed the decibel levels in the designated octave bands shown in Table 17-4 at the specified receiving properties.

Table 17-4
New York City Noise Codes

Octave Band Frequency (Hz)	Maximum Sound Pressure Levels (dB) as Measured Within a Receiving Property as Specified Below	
	Residential receiving property for mixed use building 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: Section 24-232 of the Administrative Code of the City of New York, as amended December 2005.

NEW YORK CEQR NOISE STANDARDS

The New York City Department of Environmental Protection (NYCDEP) has set external noise exposure standards. These standards are shown in Table 17-4 and 17-5. Noise Exposure is classified into four categories: acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable. The standards shown are based on maintaining an interior noise level for the worst-case hour L_{10} less than or equal to 45 dBA. Attenuation requirements are shown in Table 17-6.

Table 17-5
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]		$L_{10} \le 55$ dBA	---------- $Ldn \le 60$ dBA ----------						
2. Hospital, Nursing Home		$L_{10} \le 55$ dBA		$55 < L_{10} \le 65$ dBA	---------- $60 < Ldn \le 65$ dBA ----------	$65 < L_{10} \le 80$ dBA	(1) $65 < Ldn \le 70$ dBA, (II) $70 \le Ldn$	$L_{10} > 80$ dBA	---------- $Ldn \le 75$ dBA ----------
3. Residence, residential hotel or motel	7 AM to 10 PM	$L_{10} \le 65$ dBA		$65 < L_{10} \le 70$ dBA		$70 < L_{10} \le 80$ dBA		$L_{10} > 80$ dBA	
	10 PM to 7 AM	$L_{10} \le 55$ dBA		$55 < L_{10} \le 70$ dBA		$70 < L_{10} \le 80$ 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	

Notes:

(i) In addition, any new activity shall not increase the ambient noise level by 3 dBA or more;

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

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

[3] One may use the FAA-approved L_{dn} contours supplied by the Port Authority, or the noise contours may be computed from the federally approved INM Computer Model using flight data supplied by the Port Authority of New York and New Jersey.

[4] External Noise Exposure standards for industrial areas of sounds produced by industrial operations other than operating motor vehicles or other transportation facilities are spelled out in the New York City Zoning Resolution, Sections 42-20 and 42-21. The referenced standards apply to M1, M2, and M3 manufacturing districts and to adjoining residence districts (performance standards are octave band standards).

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

Table 17-6
Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Acceptable	Marginally Unacceptable		Clearly Unacceptable		
Noise Level With Proposed Action	$65 < L_{10} \leq 70$	$70 < L_{10} \leq 75$	$75 < L_{10} \leq 80$	$80 < L_{10} \leq 85$	$85 < L_{10} \leq 90$	$90 < L_{10} \leq 95$
Attenuation*	25 dB(A)	(I) 30 dB(A)	(II) 35 dB(A)	(I) 40 dB(A)	(II) 45 dB(A)	(III) 50 dB(A)

Note: * The above composite window-wall attenuation values are for residential dwellings. Commercial office spaces and meeting rooms would be 5 dB(A) less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation.
Source: New York City Department of Environmental Protection

In addition, the *CEQR Technical Manual* uses the following criteria to determine whether proposed and future actions would result in a significant adverse noise impact. The impact assessments compare the projected Build condition $L_{eq(1)}$ noise levels to those calculated for the No Build condition, for receptors potentially affected by the proposed and future actions. If the No Build levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period, the threshold for a significant impact would be an increase of at least 5 dBA $L_{eq(1)}$. For the 5 dBA threshold to be valid, the resultant Build condition noise level would have to be equal to or less than 65 dBA. If the No Build noise level is equal to or greater than 62 dBA $L_{eq(1)}$, or if the analysis period is a nighttime period (defined in the CEQR standards as being between 10 PM and 7 AM), the incremental significant impact threshold would be 3 dBA $L_{eq(1)}$. (If the No Build noise level is 61 dBA $L_{eq(1)}$, the maximum incremental increase would be 4 dBA, since an increase higher than this would result in a noise level higher than the 65 dBA $L_{eq(1)}$ threshold.)

C. EXISTING CONDITIONS

STUDY AREA

The study area for this analysis is made up of about 30 blocks in the South Bronx roughly bounded by Park Avenue in the west, East 163rd Street in the north, St. Ann's Avenue in the East, and East 156th Street in the South. These blocks make up the URA, and are thus the areas with the highest potential for noise impacts.

SELECTION OF NOISE RECEPTOR LOCATIONS

Based upon a screening analysis, nine noise receptor locations were chosen within the URA (see Figure 17-1). Site 1 is located on East 157th Street between Courtlandt and Melrose Avenues. Site 2 is located on Third Avenue between East 163rd and East 161st Streets. Site 3 is located on East 161st Street between Courtlandt and Melrose Avenues. Site 4 is located on Courtlandt Avenue between East 162nd and East 161st Streets. Site 5 is located on East 163rd Street between Courtlandt and Melrose Avenues. Site 6 is located on Melrose Avenue between East 163rd Street and East 162nd Street. Site 7 is located on East 162nd Street between Melrose Avenue and the cul-de-sac at the east end of the street. Site 8 is located on Elton Avenue between Brook Avenue and East 163rd Street. Site 9 is located bon East 163rd Street between Washington Avenue and Third Avenue. These sites are representative of other locations in the immediate area, and are generally the locations where maximum impacts would be expected.

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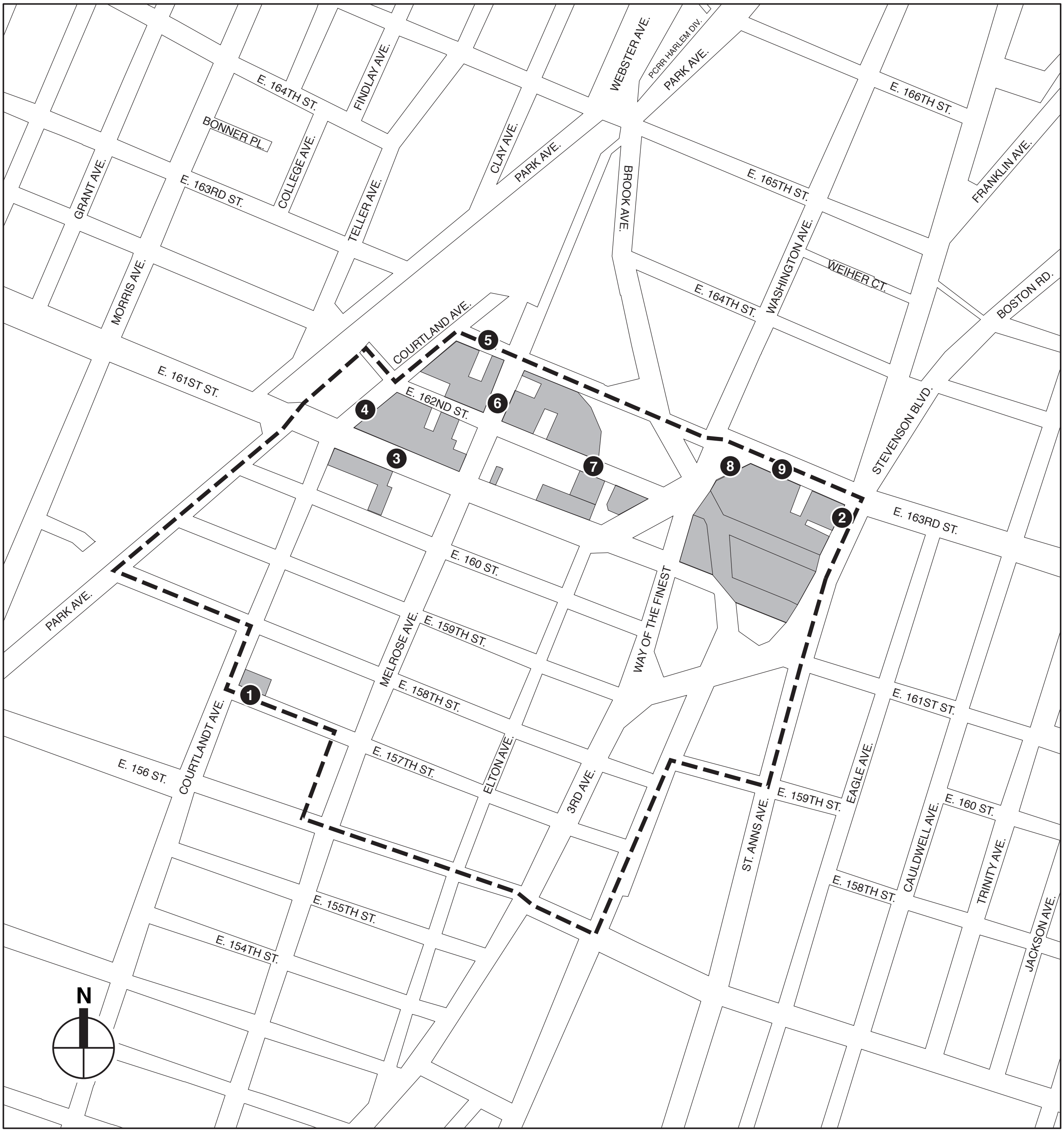

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SCALE

Development Sites

Melrose Commons Urban Renewal Area

1 *Noise Receptor Location*

Noise Receptor Location

Figure 17-1

These sites were used to assess the potential impacts due to traffic noise generated by the proposed and future actions.

NOISE MONITORING

At each receptor site existing noise levels were determined for each of the three noise analysis time periods by field measurements. Noise monitoring was performed at Sites 2, 8 and 9 on Tuesday, March 16, 2005; at Sites 1 and 7 on Thursday, November 10, 2005; and at Sites 3, 4, 5, and 6 on Thursday, November 17, 2005. At each of these sites, 20-minute spot measurements were taken during the three weekday periods that reflect peak hours of trip generation: AM weekday (8 AM to 9 AM), midday (MD) weekday (12 Noon to 1:30 PM), and PM weekday (5 PM to 6:30 PM).

EQUIPMENT USED DURING NOISE MONITORING

The instrumentation used for the 20-minute noise measurements was a Brüel & Kjær Type 4189 ½-inch microphone connected to a Brüel & Kjær Model 2260 Type 1 (according to ANSI Standard S1.4-1983) sound level meter. This assembly was mounted at a height of 5 feet above the ground surface on a tripod and at least 6 feet away from any large sound-reflecting surface to avoid major interference with sound propagation. The meter was calibrated before and after readings with a Brüel & Kjær Type 4231 sound-level calibrator using the appropriate adaptor. Measurements at each location were made on the A-scale (dBA). The data were digitally recorded by the sound level meter and displayed at the end of the measurement period in units of dBA. Measured quantities included L_{eq}, L_1, L_{10}, L_{50}, and L_{90}. A windscreen was used during all sound measurements except for calibration. Only traffic related noise was measured; noise from other sources (e.g. emergency sirens, aircraft flyovers, etc.) was excluded from the measured noise levels. Weather conditions were noted to ensure a true reading as followed: wind speed under 12 mph; relative humidity under 90 percent; and temperature above 14^{o}F and below 122^{o}F. All measurement procedures conformed to the requirements of ANSI Standard S1.13-1971 (R1976).

EXISTING NOISE LEVELS AT NOISE RECEPTOR LOCATIONS

MEASURED NOISE LEVELS

Noise monitoring results for the nine receptor locations are summarized in Table 17-7. Traffic was the dominant noise source at all nine sites, and the values shown in the Table 17-7 reflect the level of vehicular activity on the adjacent streets. Noise levels are generally moderate to relatively high, and reflect the high level of traffic in the area.

In terms of CEQR noise criteria, noise levels at Sites 1, 5, 6, and 7 are in the “marginally acceptable” category, and noise levels at Sites 2, 3, 4, and 8 are in the “marginally unacceptable” category.

Table 17-7
Existing Noise Levels at Sites 1 through 7
(in dBA)

Site	Measurement Location	Day	Time	L_{eq}	L_1	L_{10}	L_{50}	L_{90}
1	East 157th Street between Melrose and Courtlandt Avenues	Weekday	AM	61.3	69.2	63.8	59.4	55.6
		Weekday	MD	62.0	69.4	65.2	60.4	53.6
		Weekday	PM	56.9	63.4	59.6	55.4	52.2
2	3rd Avenue between East 163rd Street and East 161st Street	Weekday	AM	75.3	84.6	78.2	72.4	65.0
		Weekday	MD	73.7	82.6	77.0	70.6	64.2
		Weekday	PM	58.5	65.2	61.2	56.8	53.4
3	East 161st Street between Melrose and Courtlandt Avenues	Weekday	AM	69.8	79.2	72.8	66.4	61.4
		Weekday	MD	68.2	77.8	71.6	64.4	58.4
		Weekday	PM	66.3	74.6	69.6	64.0	58.8
4	Courtlandt Avenue between East 161st and East 162nd Streets	Weekday	AM	70.8	80.4	70.8	65.8	60.6
		Weekday	MD	65.6	73.4	68.6	63.0	58.4
		Weekday	PM	67.2	73.4	70.2	65.8	60.4
5	East 163rd Street between Melrose and Courtlandt Avenues	Weekday	AM	62.9	71.8	66.0	60.2	55.2
		Weekday	MD	64.7	74.2	67.2	60.4	56.0
		Weekday	PM	65.1	73.8	68.4	61.8	56.2
6	Melrose Avenue between East 162nd and East 163rd Streets	Weekday	AM	67.1	77.4	69.2	64.0	58.8
		Weekday	MD	66.4	77.6	68.4	62.4	58.0
		Weekday	PM	65.7	73.0	68.5	64.0	59.9
7	East 162nd Street between Elton and Melrose Avenues	Weekday	AM	63.8	74.2	66.0	60.6	58.0
		Weekday	MD	62.3	71.6	63.0	59.6	57.4
		Weekday	PM	59.0	65.8	61.6	57.4	55.2
8	Elton Avenue between Brook Avenue and 163rd Street	Weekday	AM	74.2	85.0	75.8	68.0	63.8
		Weekday	MD	69.8	80.0	73.4	65.6	60.6
		Weekday	PM	69.3	78.6	71.4	65.2	60.4
9	163rd Street between Washington Avenue and 3rd Avenue	Weekday	AM	75.1	86.2	76.4	70.0	65.2
		Weekday	MD	70.0	79.4	73.2	66.6	61.8
		Weekday	PM	71.4	81.2	74.2	67.6	62.4

Note: Field measurements were performed by AKRF, Inc. on March 16, 2005; November 10, 2005; and November 17, 2005.

D. THE FUTURE WITHOUT THE PROPOSED AND FUTURE ACTIONS

Using the methodology previously described, future noise levels without the proposed action (i.e., No Build conditions) were calculated for the three analysis periods in the year 2009. Table 17-8 shows the calculated noise levels. Except for Site 7 proportional modeling was used for the calculations for all of the receptor sites. At Site 7 a new street (Melrose Crescent) would be added in the future with the proposed actions, making the existing cul-de-sec at this location into a through street. Consequently, the TNM model was used to determine future noise levels at this location.

Table 17-8
Future No Build Noise Levels
(in dBA)

Site	Day	Time	Existing $L_{eq(1)}$	2009 No Build $L_{eq(1)}$	Change
1	Weekday	AM	61.3	63.2	1.9
	Weekday	MD	62.0	63.5	1.5
	Weekday	PM	56.9	58.2	1.3
2	Weekday	AM	75.3	76.0	0.7
	Weekday	MD	73.7	74.7	1.0
	Weekday	PM	75.3	76.2	0.9
3	Weekday	AM	69.8	70.1	0.3
	Weekday	MD	68.2	68.9	0.7
	Weekday	PM	66.3	67.0	0.7
4	Weekday	AM	70.8	71.3	0.5
	Weekday	MD	65.6	66.4	0.8
	Weekday	PM	67.2	67.6	0.4
5	Weekday	AM	62.9	63.0	0.1
	Weekday	MD	64.7	64.8	0.1
	Weekday	PM	65.1	65.2	0.1
6	Weekday	AM	67.1	67.4	0.3
	Weekday	MD	66.4	66.8	0.4
	Weekday	PM	65.7	66.1	0.4
7	Weekday	AM	63.8	64.3	0.5
	Weekday	MD	62.3	62.8	0.5
	Weekday	PM	59.0	59.1	0.1
8	Weekday	AM	74.2	74.7	0.5
	Weekday	MD	69.8	70.7	0.9
	Weekday	PM	69.3	70.2	0.9
9	Weekday	AM	75.1	75.6	0.3
	Weekday	MD	70.0	70.6	0.6
	Weekday	PM	71.4	72.1	0.7

Comparing future No Build noise levels with existing noise levels, the maximum increase in $L_{eq(1)}$ noise level would be less than 2 dBA. Increases of this magnitude would be barely perceptible, and based upon CEQR impact criteria would not be significant.

In terms of CEQR criteria, noise levels at Sites 1, 5, 6 and 7 would remain in the "marginally acceptable," category and noise levels at Sites 2, 3, 4, 8, and 9 would remain in the "marginally unacceptable" category.

E. THE FUTURE WITH THE PROPOSED AND FUTURE ACTIONS

Using the methodology previous described, noise levels with the proposed action (i.e., Build conditions) were calculated for the three peak analysis periods in the year 2009. Table 17-9 presents future noise levels with the proposed and future actions at the nine receptor locations in the year 2009. Except for Site 7 proportional modeling was used for the calculations for all of the receptor sites. At Site 7 the TNM model was used to determine future noise levels.

Table 17-9
Future Build Noise Levels
(in dBA)

Site	Day	Time	2009 No Build $L_{eq(1)}$	2009 Build $L_{eq(1)}$	Change
1	Weekday	AM	63.2	63.2	0.0
	Weekday	MD	63.5	63.5	0.1
	Weekday	PM	58.2	58.3	0.1
2	Weekday	AM	76.0	76.2	0.2
	Weekday	MD	74.7	74.8	0.1
	Weekday	PM	76.2	76.5	0.3
3	Weekday	AM	70.1	70.2	0.1
	Weekday	MD	68.9	69.4	0.5
	Weekday	PM	67.0	67.1	0.1
4	Weekday	AM	71.3	73.2	1.9
	Weekday	MD	66.4	69.2	2.8
	Weekday	PM	67.6	69.9	2.3
5	Weekday	AM	63.0	63.1	0.1
	Weekday	MD	64.8	64.9	0.1
	Weekday	PM	65.2	65.2	0.0
6	Weekday	AM	67.4	67.4	0.0
	Weekday	MD	66.8	66.9	0.1
	Weekday	PM	66.1	66.1	0.0
7	Weekday	AM	64.3	66.1	1.8
	Weekday	MD	62.8	63.5	0.7
	Weekday	PM	59.1	59.8	0.7
8	Weekday	AM	74.7	75.8	1.1
	Weekday	MD	70.7	71.5	0.8
	Weekday	PM	70.2	71.2	1.0
9	Weekday	AM	75.6	76.0	0.4
	Weekday	MD	70.6	71.0	0.4
	Weekday	PM	72.1	72.7	0.6

Comparing future Build noise levels with No Build noise levels, the maximum increase in $L_{eq(1)}$ noise level would be less than 2.8 dBA. Increases of this magnitude would not be perceptible, and based upon CEQR impact criteria would not be significant.

In terms of CEQR criteria, noise levels at Sites 1, 5, 6 and 7 will remain in the "marginally acceptable" category and noise levels at Sites 2, 3, 4, 8, and 9 would remain in the "marginally unacceptable" category.

F. OTHER NOISE CONCERNS

MECHANICAL EQUIPMENT

No detailed designs of the buildings' mechanical systems (i.e., heating, ventilation, and air conditioning systems) are available at this time. However, those systems will be designed to meet all applicable noise regulations and requirements, and would be designed to produce noise levels which would not result in any significant increases in ambient noise levels.

ATTENUATION REQUIREMENTS

As shown in Table 17-6, the *CEQR Technical Manual* has set noise attenuation requirements for buildings, based on exterior noise levels. Recommended noise attenuation values for buildings are designed to maintain interior noise levels of 45 dBA or lower, and are determined based on exterior $L_{10(1)}$ noise levels.

Table 17-10 shows the highest calculated L_{10} noise levels (for the three analysis time periods) at the 9 receptor locations in the study area. Based upon these calculated L_{10} noise levels, the minimum level of building attenuation necessary to achieve acceptable interior noise levels, complying with CEQR requirements, for each URA parcel was determined (see Table 17-11).

Table 17-10
Minimum Building Attenuation to Comply With CEQR Requirements at Each Receptor Site

Site	Location	Time	$L_{10(1)}$ (dBA)	Required Building Attenuation (dBA)
1	E. 157th St. betw. Melrose & Courtlandt Aves.	MD	66.7	25
2	3rd Ave. betw. E. 163rd & E. 161st Sts.	AM	79.4	35
3	E. 161st St. betw. Melrose & Courtlandt Aves.	AM	73.2	30
4	Courtlandt Ave. betw. E. 161st & East 162nd Sts.	AM	73.2	30
5	E. 163rd St. betw. Melrose & Courtlandt Aves.	PM	68.5	25
6	Melrose Ave. betw. E. 162nd & E. 163rd Sts.	AM	69.5	25
7	E. 162nd St. betw. Elton & Melrose Aves.	AM	68.3	25
8	Elton Ave. betw. Brook Ave. & E. 163rd St.	AM	77.4	35
9	163rd St. betw. Washington & 3rd Aves.	AM	77.1	35

Attenuation would be required at certain sites due to the high existing background noise levels in order to achieve interior residential noise levels of 45 dBA or lower in residential zoning districts. This zoning attenuation would be mandated for both the projected and potential development sites in one of in two ways: 1) through the zoning resolution, which requires noise attenuation in mixed-use districts; and 2) through the use of an (E) designation.

Table 17-11
Minimum Building Attenuation Required to Comply With CEQR Requirements on Each URA Parcel

URA Parcel(s)	Block/Lot(s)	Required Building Attenuation (dBA)
48, 49, 59, 60 (Boricua Village)	Block 2366, Lots 1, 21-23, 25, 27, 32-34, 37-39, 40; Block 2367, Lots 1, p/o 3, p/o 6, p/o 8, p/o 10, p/o 11, p/o 12, 14-16, 20-22, 24, 26, 28, 29-32, 33-38, p/o 50, 55, 60	35
45, 46, 56, 57 (Courtlandt Corners)	Block 2407, Lots 5, 8, 10, 11, 12, 31, 32; Block 2408, Lots 1, 2, 5, 6-9, 10, 12, 13, 14, p/o 16, 20, 25, 27-29, 31	30
15	Block 2404, Lots 1, 2	30
52	Block 2383, Lot p/o 19	25
53	Block 2383, Lots p/o 33, p/o 35, 37, 39	30
54	Block 2383, Lot 48	30
62	Block 2384, Lots 1, 5, p/o 7, 9, 10, 12, p/o 13, p/o 14, p/o 16, p/o 20, p/o 48, 51, 53, 54, 57-60	25
64	Block 2408, Lots p/o 35, p/o 41, 45, 46, 49, 51, 52, 53	30
51	Block 2383, Lots p/o 24, 25, 27, 29, p/o 30, p/o 31	35

To achieve 25 dBA of building attenuation, double glazed windows with good sealing properties as well as an alternate means of ventilation such as well sealed window air conditioning, would be necessary; to achieve 30 dBA of building attenuation, double glazed windows with good sealing properties as well as alternate means of ventilation such as well sealed through-the-wall air conditioning, would be necessary; and, to achieve 35 dBA of building attenuation, double glazed windows with good sealing properties as well as alternate ventilation such as central air conditioning, would be necessary.

Designs for buildings on the streets listed above would be required to provide at least the level of building attenuation specified in Table 17-10. Buildings on other streets that are part of this action would be required to provide either a minimum of 35 dBA attenuation, or to provide noise analyses which show that sufficient building attenuation would be provided to satisfy CEQR building attenuation requirements as shown in Table 17-6. With these measures there would be no significant adverse noise impacts. ✷