Chapter 15: 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 a 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 a 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 noise analysis presented in this chapter focuses on the noise-generated changes in traffic that would result from the operation of the proposed project (i.e., when construction of Phase I and Phase II have been completed in the years 2010 and 2016, respectively). Noise effects during construction of the proposed project are analyzed and discussed in Chapter 17, "Construction Impacts." Cumulative effects of Phase I operation and Phase II construction are also discussed in Chapter 17.

PRINCIPAL CONCLUSIONS

The analysis concludes that the proposed project would result in significant adverse noise impacts at a number of locations along feeder roadways to and from the project site, including residential locations adjacent to the project site. Specifically, excluding the effects of construction, in 2010, when construction of Phase I of the proposed project would be completed, noise levels due to project-generated traffic would exceed the 2001 *City Environmental Quality Review (CEQR) Technical Manual* impact criteria and result in significant adverse noise impacts during one or more time periods on Flatbush Avenue in the area near Dean Street, on Dean Street from approximately Flatbush to Vanderbilt Avenues (including the Dean Playground), 6th and Carlton Avenues from approximately Dean Street to Atlantic Avenue. These locations are the principal feeder streets to and from the parking facilities for Phase I project elements. The impacts would be localized and occur on street segments immediately adjacent to the project site (Flatbush Avenue, Dean Street, and 6th and Carlton Avenues). On Dean Street, existing and No Build noise levels are relatively low and project-generated traffic would cause significant increases in noise levels on this street, but would still result in noise levels that fall in the CEQR "marginally unacceptable" range, which is not unusual for New York City residential areas.

In 2016, when construction of the proposed project would be complete, noise levels due to project-generated traffic would exceed the *CEQR Technical Manual* impact criteria and result in significant adverse noise impacts during one or more time periods at the same locations as in 2010—on Flatbush Avenue near Dean Street, on Dean Street from approximately Flatbush to Vanderbilt Avenues (including the Dean Playground), and on 6th and Carlton Avenues from approximately Dean Street to Atlantic Avenue.

In addition, noise levels within the new open space areas created on-site as part of the proposed project would be above the 55 dBA $L_{10(1)}$ noise level for outdoor areas requiring serenity and quiet contained in the *CEQR Technical Manual* noise exposure guidelines. While noise levels in these new areas would be above the 55 dBA $L_{10(1)}$ guideline noise level, they would be comparable to noise levels in a number of open space areas and parks in New York City, including Hudson River Park, Riverside Park, Bryant Park, Fort Greene Park, and other urban open space areas.

B. 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. 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. However, it must be remembered that all the stated effects of noise on people vary greatly with each individual.

"A"-WEIGHTED SOUND LEVEL (dBA)

Noise is typically measured in units called decibels (dB), which are 10 times the logarithm of the ratio of the sound pressure squared to a standard reference presence 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. 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, in the measurement system to simulate the 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 the current study, all measured noise levels are reported in A-weighted decibels (dBA). Common noise levels in dBA are shown in Table 15-1.

ABILITY TO PERCEIVE CHANGES IN NOISE LEVELS

The average ability of an individual to perceive changes in noise levels is well documented (see Table 15-2). Generally, changes in noise levels less than 3 dBA are barely perceptible to most listeners, whereas changes in noise levels of 10 dBA are normally perceived as doublings (or halvings) of noise loudness. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

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 more extended periods have been developed. One way of describing fluctuating sound is to describe the fluctuating noise heard over a specific 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 period (e.g., 1 hour, denoted by $L_{eq(1)}$, or 24 hours, denoted by $L_{eq(24)}$), conveys the same sound energy as the actual time-varying sound. Statistical sound level

Table 15-1
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	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 10 dBA increase in level appears to double the loudness, and a 10 dBA decrease halves the apparent loudness.

Source: Cowan, Jampes P. *Handbook of Environmental Acoustics,* Van Nostrand Reinhold, New York, 1994.
Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

Table 15-2
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.

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_{01} levels.

For purposes of the proposed project, 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 recommended for use in the *CEQR Technical Manual* for vehicular traffic and construction noise impact evaluation, and is used to provide an indication of highest expected

sound levels. The one-hour L_{10} is the noise descriptor used in the *CEQR Technical Manual* noise exposure guidelines for City environmental impact review classification.

C. NOISE STANDARDS AND CRITERIA

Noise levels associated with the construction and operation of the proposed project would be subject to the emission source provisions of the New York City Noise Control Code and to noise criteria set for the CEQR process. Other standards and guidelines promulgated by federal agencies do not apply to project noise control, but are useful to review in that they establish measures of impacts. Construction equipment is regulated by the Noise Control Act of 1972.

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; and specific noise standards, including plainly audible criteria for specific noise sources. In addition, the amended code specifies 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 15-3 at the specified receiving properties.

Table 15-3
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 CRITERIA

The *CEQR Technical Manual* contains noise exposure guidelines for use in City environmental impact review, as well as required attenuation values to achieve acceptable interior noise levels. These values are shown in Tables 15-4 and 15-5. Noise exposure is classified into four categories—acceptable, marginally acceptable, marginally unacceptable, and clearly unacceptable. The *CEQR Technical Manual* criteria are based on maintaining an interior noise level for the worst-case hour L_{10} or less than or equal to 45 A-weighted decibels (dBA).

Table 15-4
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	---------- Ldn ≤ 60 dBA ----------	**NA**	**NA**	**NA**	(i) 65 < Ldn ≤ 70 dBA, (II) 70 ≤ Ldn	**NA**	**NA**
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		55 < L_{10} ≤ 65 dBA	---------- 60 < Ldn ≤ 65 dBA ----------	65 < L_{10} ≤ 80 dBA		L_{10} > 80 dBA	---------- Ldn ≤ 75 dBA ----------
3. Residence, residential hotel, or motel	7 AM to 10 PM	$L_{10} \leq 65$ dBA		65 < L_{10} ≤ 70 dBA		70 < L_{10} ≤ 80 dBA		L_{10} > 80 dBA	
	10 PM to 7 AM	$L_{10} \leq 55$ dBA		55 < L_{10} ≤ 70 dBA		70 < L_{10} ≤ 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-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)	
5. Commercial or office		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 PM)		Same as Residential Day (7 AM-11 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; (ii) *CEQR Technical Manual* noise criteria for train noise are similar to the above aircraft noise standards: the noise category for train noise is found by taking the L_{dn} value for such train noise to be an L^{y}_{dn} (L_{dn} contour) value.

Table Notes:
[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 nursing 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 15-5
Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Acceptable	Marginally Unacceptable		Clearly Unacceptable		
Noise level with proposed action	65<L_{10}<70	70<L_{10}<75	75<L_{10}<80	80<L_{10}<85	85<L_{10}<90	90<L_{10}<95
Attenuation[1]	25 dB(A)	30dB(A)	35 dB(A)	40 dB(A)	45 dB(A)	50 dB(A)

Note: [1] 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 (DEP)

D. IMPACT DEFINITION

As recommended in the *CEQR Technical Manual*, this study utilizes the following criteria to define a significant adverse noise impact:

- An increase of 5 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors (including residences, play areas, parks, schools, libraries, and houses of worship) over those calculated for the No Build condition, if the No Build levels are less than 60 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.
- An increase of 4 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition, if the No Build levels are 61 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.
- An increase of 3 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition, if the No Build levels are greater than 62 dBA $L_{eq(1)}$ and the analysis period is not a nighttime period.
- An increase of 3 dBA, or more, in Build $L_{eq(1)}$ noise levels at sensitive receptors over those calculated for the No Build condition, if the analysis period is a nighttime period (defined by the *CEQR Technical Manual* criteria as being between 10 PM and 7 AM).

E. NOISE PREDICTION METHODOLOGY

GENERAL METHODOLOGY

At most receptor sites in the study area the dominant operational noise source is traffic on adjacent and nearby streets. Operational noise from project-generated traffic was calculated using the TNM model (the Federal Highway Administration's [FHWA] *Traffic Noise Model* version 2.5). The TNM model calculates the noise contribution of each roadway segment to a given noise receptor. The noise from each vehicle type is determined as a function of the reference energy-mean emission level, corrected for vehicle volume, speed, roadway grade, roadway segment length, and source-receptor distance. Further considerations included in modeling the propagation path include identifying the shielding provided by rows of buildings, analyzing the effects of different ground types, identifying source and receptor elevations, and analyzing the effects of any intervening noise barriers.

Noise from crowds attending events in the arena would not be expected to be a significant noise source that would affect ambient noise levels. The arena would be an indoor facility and no noise would emanate directly from it. Most event attendees would access the arena via Flatbush Avenue (a busy street which has limited residential land uses), Atlantic Avenue (another busy street), or the Urban Room. The only entrance on Dean Street would be for access to preferred seating. People attending events would not be expected to congregate in any significant numbers on Dean Street or other relatively quiet streets. There would be no planned activities or sidewalk vending associated with the arena use on Dean Street. No queuing would occur on the streets, since all security screening activity would take place internally. In general, any crowd noise surrounding the arena would be expected to be masked by noise from vehicles on adjacent streets, and would not be a major noise source requiring quantification.

The noise analysis examined seven conditions: weekday AM, midday (MD), PM, early evening (EV), and late-night (LN) time periods; and weekend (Saturday) midday and PM time periods. The weekday EV and LN, and the weekend MD and PM time periods were specifically chosen to include effects of arena events which would generate additional traffic during these time periods. The selected time periods are the time periods when the proposed project would have maximum traffic generation and/or the maximum potential for significant adverse noise impacts based on the data presented in Chapter 12, "Traffic and Parking."

ANALYSIS PROCEDURE

In general the following procedure was used in performing the noise analysis:

- Existing noise levels were determined at each analysis (receptor) site, for each analysis time period, by performing field measurements;
- Existing noise levels were calculated at each analysis (receptor) site, for each analysis time period, using the TNM model and traffic data for existing conditions;
- Calculated TNM existing noise levels at each analysis (receptor) site, for each analysis time period, were subtracted from measured existing noise levels. The remainder was assumed to be a correction factor which accounts for noise from parking lots, unaccounted for street noise, and modeling inaccuracies;
- Future noise levels for No Build, and Build conditions for each analysis (receptor) site, for each analysis time period, were determined as the sum of calculated TNM model results and the calculated correction factor based on projected traffic conditions.

Summary tables showing the specific components of the noise analysis are provided in Appendix E, "Noise."

F. EXISTING CONDITIONS

SITE DESCRIPTION

The project is located in the Atlantic Terminal area of Brooklyn, adjacent to Downtown Brooklyn. The proposed project would occupy an approximately 22-acre area, roughly bounded by Flatbush and 4th Avenues to the west, Vanderbilt Avenue to the east, Atlantic Avenue to the north, and Dean and Pacific Streets to the south. The western portion of the project site would contain a new arena for the Nets basketball team, along with commercial office and retail, hotel, and residential uses. The eastern portion of the project site would be primarily residential and would provide at least seven acres of publicly accessible open space along with a number of local retail and community services. The proposed project would also expand, platform over, and substantially improve the Metropolitan Transportation Authority/Long Island Rail Road (MTA/LIRR) Vanderbilt Yard, which, together with a New York City Transit (NYCT) storage yard for retired buses, occupies approximately eight acres of the project site in an open cut. The area immediately adjacent to the project site includes some major roadways, such as Flatbush and Atlantic Avenues, and a number of fairly quiet streets, such as Dean and Pacific Streets.

SELECTION OF NOISE RECEPTOR LOCATIONS

Twelve receptor sites in the project area were selected for project impact assessment purposes. Table 15-6 lists the locations of each of the noise receptor sites, as well as the surrounding land use. Figure 15-1 contains a map of the area showing the location of each of the noise receptor sites. Each of the receptor sites in the project area was selected because it was representative of a noise-sensitive, principally residential use, and because it was a location where maximum project impacts would be expected.

Table 15-6
Noise Receptor Locations

Receptor	Location	Associated Land Use
1	Pacific Street between Flatbush and 4th Avenues	Residential/library
2	Flatbush Avenue at Dean Street	Residential with ground-floor retail
3	Dean Street between Flatbush and 6th Avenues	Residential/playground
4	Pacific Street between Carlton and 6th Avenues	Residential
5	Dean Street between Vanderbilt and Carlton Avenues	Residential
6	Vanderbilt Avenue between Pacific and Dean Streets	Residential
7	Atlantic Avenue between Clermont and Carlton Avenues	School and residential
8	4th Avenue between Atlantic Avenue and Pacific Street	Residential/church
9	Dean Street between 4th and 5th Avenues	Residential
10	6th Avenue between Pacific and Dean Streets	Residential
11	Bergen Street between Carlton and 6th Avenues	Residential/playground
12	Carlton Avenue between Pacific and Dean Streets	Residential

NOISE MONITORING

Noise monitoring at the 12 receptor locations was performed using a combination of continuous and spot measurements. For weekday conditions, continuous noise measurements were made at receptors 1 through 7 on March 20, 21, 22, 23, 29, and 30, 2006. Weekday 20-minute noise measurements were made at receptors 8 through 12 on March 23, 24, 25, 27, and 30, 2004. For weekend conditions, continuous noise measurements were made at receptors 2 and 5 on April 9 and 10, 2006; and 20-minute measurements were made on April 9, 2006 at receptors 1, 3, 4, 5, 6 and 7, and on March 27 and April 3, 2004 at receptors 8 through 12.

EQUIPMENT USED DURING NOISE MONITORING

Measurements were performed using Brüel & Kjær Noise Level Meters Type 2260, Brüel & Kjær Sound Level Calibrators Type 4231, and Brüel & Kjær ½-inch microphones Type 4189. The instruments were mounted at a height of 5 feet above the ground on a tripod. The meters were calibrated before and after readings using Brüel & Kjær Type 4231 sound level calibrators using the appropriate adaptors. The data were digitally recorded by the sound meters 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}. Windscreens were used during all sound measurements except for calibration. All measurement procedures conformed to the requirements of ANSI Standard S1.13-1971 (R1976).

RESULTS OF BASELINE MEASUREMENTS

Table 15-7 summarizes the results of the baseline measurements. Values are shown for specific monitored weekday and weekend time periods. In general, noise levels are directly related to the volume of traffic on the immediately adjacent street. Noise levels along major roadways, such as Flatbush Avenue and Atlantic Avenue are relatively high, particularly during peak travel hours, whereas noise levels along lightly trafficked streets, such as Dean Street and Pacific Street, are relatively low during most hours.

Table 15-7
Measured Existing Noise Levels (in dBA)

Receptor	Location	Day	Time	L_{eq}	L_1	L_{10}	L_{50}	L_{90}
1	Pacific Street between Flatbush and 4th Avenues	Weekday	AM	62.3	68.7	65.0	61.0	58.5
		Weekday	MD	60.8	67.3	63.5	59.5	56.7
		Weekday	PM	62.3	70.7	64.8	60.2	57.6
		Weekday	EV	61.1	69.6	63.5	58.9	56.2
		Weekday	LN	60.8	70.5	62.5	58.2	53.5
		Weekend	MD	63.3	71.0	66.0	61.6	56.4
		Weekend	PM	63.1	71.4	66.0	60.9	57.7
2	Flatbush Avenue at Dean Street	Weekday	AM	73.4	80.8	76.5	71.7	66.4
		Weekday	MD	73.6	80.8	75.0	69.4	64.6
		Weekday	PM	71.0	79.1	73.9	69.2	63.9
		Weekday	EV	70.4	78.3	72.7	68.6	61.9
		Weekday	LN	70.6	77.3	73.7	69.6	60.9
		Weekend	MD	70.7	80.2	73.6	68.4	61.6
		Weekend	PM	70.6	80.4	72.4	67.5	62.1
3	Dean Street between Flatbush and 6th Avenues	Weekday	AM	65.4	76.5	68.0	61.1	56.7
		Weekday	MD	66.1	75.9	68.9	62.7	56.2
		Weekday	PM	66.1	77.2	68.3	61.6	57.2
		Weekday	EV	63.5	73.8	65.5	59.4	55.3
		Weekday	LN	61.6	74.6	63.0	55.6	50.0
		Weekend	MD	64.7	76.0	65.0	57.4	53.6
		Weekend	PM	66.3	78.7	66.4	58.8	54.2
4	Pacific Street between Carlton and 6th Avenues	Weekday	AM	65.2	73.8	68.1	62.5	58.8
		Weekday	MD	64.9	74.3	66.7	61.4	58.1
		Weekday	PM	66.5	74.8	70.0	62.6	58.9
		Weekday	EV	64.3	73.5	68.2	60.8	57.1
		Weekday	LN	61.7	71.9	65.2	57.9	52.7
		Weekend	MD	60.7	71.0	64.0	56.2	53.2
		Weekend	PM	60.6	69.8	64.8	55.3	51.6
5	Dean Street between Vanderbilt and Carlton Avenues	Weekday	AM	68.5	79.1	70.6	64.5	60.3
		Weekday	MD	67.7	78.4	70.2	62.8	56.9
		Weekday	PM	67.8	78.4	69.3	64.0	59.5
		Weekday	EV	65.3	75.4	66.9	61.2	54.6
		Weekday	LN	63.7	74.8	65.8	58.4	50.8
		Weekend	MD	61.9	71.4	65.2	59.0	53.2
		Weekend	PM	63.1	72.4	65.2	59.0	54.4
6	Vanderbilt Avenue between Pacific and Dean Streets	Weekday	AM	71.0	79.6	73.7	68.5	62.3
		Weekday	MD	71.0	77.6	71.7	65.4	57.7
		Weekday	PM	70.3	77.7	73.7	68.0	60.9
		Weekday	EV	69.2	77.5	72.8	65.6	58.2
		Weekday	LN	66.5	76.3	70.5	60.4	52.8
		Weekend	MD	66.9	74.6	70.6	63.2	57.0
		Weekend	PM	66.7	74.6	70.4	63.8	57.0
7	Atlantic Avenue between Clermont and Carlton Avenues	Weekday	AM	74.0	80.8	77.1	72.4	61.7
		Weekday	MD	74.7	81.9	77.2	70.2	58.3
		Weekday	PM	73.9	81.4	77.3	71.3	62.4
		Weekday	EV	72.8	79.5	76.7	70.1	60.5
		Weekday	LN	72.2	80.2	76.7	66.7	53.0
		Weekend	MD	73.4	79.8	76.4	70.6	53.2
		Weekend	PM	72.6	80.2	76.4	69.8	56.0
8	4th Avenue between Atlantic Avenue and Pacific Street	Weekday	AM	72.7	83.4	75.6	68.2	63.6
		Weekday	MD	72.3	81.8	75.8	68.8	64.6
		Weekday	PM	70.3	81.4	71.8	66.8	63.4
		Weekday	EV	69.7	80.8	71.2	66.2	62.8
		Weekday	LN	64.4	71.4	67.8	62.2	58.0
		Weekend	MD	68.1	75.4	71.2	65.8	60.2
		Weekend	PM	66.1	74.8	68.4	62.0	57.6

Table 15-7 (cont'd)
Measured Existing Noise Levels (in dBA)

Receptor	Location	Day	Time	L_{eq}	L_1	L_{10}	L_{50}	L_{90}
9	Dean Street between 4th and 5th Avenues	Weekday	AM	64.0	77.2	64.6	57.8	54.6
		Weekday	MD	62.2	73.6	65.2	57.0	52.6
		Weekday	PM	62.6	73.6	64.8	58.0	53.4
		Weekday	EV	60.9	70.4	64.7	57.1	51.1
		Weekday	LN	61.7	70.8	64.4	55.8	50.6
		Weekend	MD	61.2	71.8	63.8	56.8	52.0
		Weekend	PM	61.3	69.8	64.2	54.8	49.8
10	6th Avenue between Pacific and Dean Streets	Weekday	AM	66.7	78.6	65.8	59.8	56.0
		Weekday	MD	61.2	69.6	64.0	59.0	56.4
		Weekday	PM	61.7	70.6	64.4	59.2	56.4
		Weekday	EV	59.0	67.9	61.7	56.5	53.7
		Weekday	LN	57.0	66.2	60.2	54.2	50.6
		Weekend	MD	59.5	67.6	63.2	56.4	53.2
		Weekend	PM	58.1	66.6	61.6	54.8	51.2
11	Bergen Street between Carlton and 6th Avenues	Weekday	AM	63.1	73.1	66.6	56.2	50.6
		Weekday	MD	62.6	74.6	65.4	55.4	51.0
		Weekday	PM	64.4	75.4	68.2	58.8	51.2
		Weekday	EV	63.1	74.1	66.9	57.5	49.9
		Weekday	LN	59.8	70.0	61.8	51.4	46.8
		Weekend	MD	61.9	73.0	65.6	55.2	50.6
		Weekend	PM	59.4	70.4	61.8	50.8	46.8
12	Carlton Avenue between Pacific and Dean Streets	Weekday	AM	62.9	74.2	65.6	58.4	54.6
		Weekday	MD	63.2	73.2	65.6	58.6	54.2
		Weekday	PM	63.9	71.6	67.2	61.2	54.2
		Weekday	EV	61.8	71.3	65.8	58.3	54.8
		Weekday	LN	58.5	68.6	61.6	54.2	49.6
		Weekend	MD	64.4	75.8	66.0	58.2	53.2
		Weekend	PM	58.9	69.0	62.4	54.2	50.2

Note: Field measurements were performed by AKRF, Inc. on March 23, 24, 25, 27, and 30 2004; April 3, 2004; March 20, 21, 22, 23, 29, and 30, 2006; and April 9 and 10, 2006.

In terms of CEQR noise exposure guidelines, during the hour with the highest-measured noise levels, existing noise levels at receptors 2, 5, 6, 7, and 8 are in the "Marginally Unacceptable" category, and existing noise levels at receptors 1, 3, 4, 9, 10, 11, and 12 are in the "Marginally Acceptable" category. These values are based on the measured L_{10} values.

G. FUTURE WITHOUT THE PROPOSED PROJECT—2010

Using the methodology previously described, future noise levels without the proposed project were calculated for the 12 receptor sites for the 2010 analysis year. These No Build values are shown in Table 15-8.

In 2010, at most locations and during most time periods, the increase in $L_{eq(1)}$ noise levels would be less than 1.0, an imperceptible change. The maximum increase in $L_{eq(1)}$ noise levels, comparing 2010 No Build noise levels with existing noise levels, would be 2.7 dBA. This would occur at noise receptor 5, located at Dean Street between Vanderbilt and Carlton Avenues, during the weekday MD time period. A change of this magnitude would be barely perceptible.

Table 15-8
2010 No Build Noise Levels

Receptor	Location	Day	Time Period	Existing $L_{eq(1)}$	No Build $L_{eq(1)}$	Increase
1	Pacific Street between Flatbush and 4th Avenues	Weekday	AM	62.3	62.6	0.3
			MD	60.8	61.2	0.4
			PM	62.3	62.9	0.6
			EV	61.1	61.5	0.4
			LN	60.8	61.2	0.4
		Saturday	MD	63.3	63.9	0.6
			PM	63.1	63.9	0.8
2	Flatbush Avenue at Dean Street	Weekday	AM	73.4	73.9	0.5
			MD	73.6	74.0	0.4
			PM	71.0	71.5	0.5
			EV	70.4	71.0	0.6
			LN	70.6	70.7	0.1
		Saturday	MD	70.7	71.6	0.9
			PM	70.6	72.4	1.8
3	Dean Street between Flatbush and 6th Avenues	Weekday	AM	65.4	66.0	0.6
			MD	66.1	66.5	0.4
			PM	66.1	66.5	0.4
			EV	63.5	63.9	0.4
			LN	61.6	61.9	0.3
		Saturday	MD	64.7	64.8	0.1
			PM	66.3	66.7	0.4
4	Pacific Street between Carlton and 6th Avenues	Weekday	AM	65.2	65.5	0.3
			MD	64.9	65.5	0.6
			PM	66.5	66.8	0.3
			EV	64.3	64.6	0.3
			LN	61.7	62.4	0.7
		Saturday	MD	60.7	61.2	0.5
			PM	60.6	61.0	0.4
5	Dean Street between Vanderbilt and Carlton Avenues	Weekday	AM	68.5	69.2	0.7
			MD	67.7	70.4	2.7
			PM	67.8	68.0	0.2
			EV	65.3	65.7	0.4
			LN	63.7	64.3	0.6
		Saturday	MD	61.9	63.6	1.7
			PM	63.1	63.0	-0.1
6	Vanderbilt Avenue between Pacific and Dean Streets	Weekday	AM	71.0	71.4	0.4
			MD	71.0	71.3	0.3
			PM	70.3	70.8	0.5
			EV	69.2	69.5	0.3
			LN	66.5	67.1	0.6
		Saturday	MD	66.9	67.3	0.4
			PM	66.7	67.2	0.5
7	Atlantic Avenue between Clermont and Carlton Avenues	Weekday	AM	74.0	74.3	0.3
			MD	74.7	75.2	0.5
			PM	73.9	74.2	0.3
			EV	72.8	73.0	0.2
			LN	72.2	72.4	0.2
		Saturday	MD	73.4	74.3	0.9
			PM	72.6	73.1	0.5

Table 15-8 (cont'd)
2010 No Build Noise Levels

Receptor	Location	Day	Time Period	Existing $L_{eq(1)}$	No Build $L_{eq(1)}$	Increase
8	4th Avenue between Atlantic Avenue and Pacific Street	Weekday	AM	72.7	73.0	0.3
			MD	72.3	72.6	0.3
			PM	70.3	70.9	0.6
			EV	69.7	70.8	1.1
			LN	64.4	64.6	0.2
		Saturday	MD	68.1	68.4	0.3
			PM	66.1	66.5	0.4
9	Dean Street between 4th and 5th Avenues	Weekday	AM	64.0	64.1	0.1
			MD	62.2	62.3	0.1
			PM	62.6	62.7	0.1
			EV	60.9	61.1	0.2
			LN	61.7	61.9	0.2
		Saturday	MD	61.2	61.3	0.1
			PM	61.3	61.6	0.3
10	6th Avenue between Pacific and Dean Streets	Weekday	AM	66.7	67.4	0.7
			MD	61.2	61.7	0.5
			PM	61.7	62.3	0.6
			EV	59.0	59.6	0.6
			LN	57.0	57.6	0.6
		Saturday	MD	59.5	60.0	0.5
			PM	58.1	58.7	0.6
11	Bergen Street between Carlton and 6th Avenues	Weekday	AM	63.1	63.5	0.4
			MD	62.6	62.8	0.2
			PM	64.4	64.5	0.1
			EV	63.1	63.3	0.2
			LN	59.8	60.0	0.2
		Saturday	MD	61.9	61.9	0.0
			PM	59.4	59.7	0.3
12	Carlton Avenue between Pacific and Dean Streets	Weekday	AM	62.9	63.9	1.0
			MD	63.2	63.9	0.7
			PM	63.9	64.3	0.4
			EV	61.8	62.2	0.4
			LN	58.5	60.0	1.5
		Saturday	MD	64.4	65.0	0.6
			PM	58.9	59.4	0.5

In terms of CEQR noise exposure guidelines, future 2010 noise levels without the proposed project would remain in the "Marginally Unacceptable" category for receptors 2, 5, 6, 7, and 8; and future 2010 noise levels without the proposed project would remain in the "Marginally Acceptable" category for receptors 1, 3, 9, 10, 11, and 12. Future 2010 noise levels without the proposed project would now be in the "Marginally Unacceptable" category for receptor 4. These values are based on the calculated L_{10} values (see Appendix E, "Noise").

H. PROBABLE IMPACTS OF THE PROPOSED PROJECT—2010

Using the methodology previously described, future noise levels with the proposed project were calculated for the 12 receptor sites for the 2010 analysis year. These Build values are shown in Table 15-9. The results in Table 15-9 show noise impacts due to operational noise after the completion of the Phase I construction only.

Table 15-9
2010 Build Noise Levels

Receptor	Location	Day	Time Period	No Build $L_{eq(1)}$	Build $L_{eq(1)}$	Increase
1	Pacific Street between Flatbush and 4th Avenues	Weekday	AM	62.6	63.1	0.5
			MD	61.2	62.4	1.2
			PM	62.9	63.2	0.3
			EV	61.5	62.3	0.8
			LN	61.2	61.9	0.7
		Saturday	MD	63.9	64.5	0.6
			PM	63.9	63.7	-0.2
2	Flatbush Avenue at Dean Street	Weekday	AM	73.9	74.8	0.9
			MD	74.0	74.9	0.9
			PM	71.5	75.3	**3.8**
			EV	71.0	73.3	2.3
			LN	70.7	70.6	-0.1
		Saturday	MD	71.6	73.9	2.3
			PM	72.4	72.3	-0.1
3	Dean Street between Flatbush and 6th Avenues	Weekday	AM	66.0	68.6	2.6
			MD	66.5	68.8	2.3
			PM	66.5	69.9	**3.4**
			EV	63.9	70.6	**6.7**
			LN	61.9	65.7	**3.8**
		Saturday	MD	64.8	72.0	**7.2**
			PM	66.7	72.8	**6.1**
4	Pacific Street between Carlton and 6th Avenues	Weekday	AM	65.5	64.6	-0.9
			MD	65.5	64.2	-1.3
			PM	66.8	65.9	-0.9
			EV	64.6	63.9	-0.7
			LN	62.4	62.9	0.5
		Saturday	MD	61.2	60.2	-1.0
			PM	61.0	59.3	-1.7
5	Dean Street between Vanderbilt and Carlton Avenues	Weekday	AM	69.2	70.4	1.2
			MD	70.4	71.0	0.6
			PM	68.0	71.8	**3.8**
			EV	65.7	67.2	1.5
			LN	64.3	67.8	**3.5**
		Saturday	MD	63.6	65.8	2.2
			PM	63.0	66.2	**3.2**
6	Vanderbilt Avenue between Pacific and Dean Streets	Weekday	AM	71.4	72.7	1.3
			MD	71.3	71.7	0.4
			PM	70.8	71.4	0.6
			EV	69.5	70.4	0.9
			LN	67.1	68.9	1.8
		Saturday	MD	67.3	67.9	0.6
			PM	67.2	69.0	1.8
7	Atlantic Avenue between Clermont and Carlton Avenues	Weekday	AM	74.3	74.9	0.6
			MD	75.2	75.4	0.2
			PM	74.2	74.6	0.4
			EV	73.0	73.3	0.3
			LN	72.4	73.5	1.1
		Saturday	MD	74.3	74.2	-0.1
			PM	73.1	73.3	0.2
8	4th Avenue between Atlantic Avenue and Pacific Street	Weekday	AM	73.0	74.1	1.1
			MD	72.6	72.8	0.2
			PM	70.9	70.9	0.0
			EV	70.8	71.3	0.5
			LN	64.6	65.0	0.4
		Saturday	MD	68.4	69.0	0.6
			PM	66.5	66.8	0.3

Table 15-9 (cont'd)
2010 Build Noise Levels

Receptor	Location	Day	Time Period	No Build $L_{eq(1)}$	Build $L_{eq(1)}$	Increase
9	Dean Street between 4th and 5th Avenues	Weekday	AM	64.1	63.7	-0.4
			MD	62.3	62.3	0.0
			PM	62.7	63.1	0.4
			EV	61.1	62.5	1.4
			LN	61.9	61.4	-0.5
		Saturday	MD	61.3	63.4	2.1
			PM	61.6	61.8	0.2
10	6th Avenue between Pacific and Dean Streets	Weekday	AM	67.4	73.0	**5.6**
			MD	61.7	66.6	**4.9**
			PM	62.3	66.4	**4.1**
			EV	59.6	65.2	**5.6**
			LN	57.6	64.4	**6.8**
		Saturday	MD	60.0	64.9	**4.9**
			PM	58.7	63.7	**5.0**
11	Bergen Street between Carlton and 6th Avenues	Weekday	AM	63.5	63.8	0.3
			MD	62.8	62.9	0.1
			PM	64.5	64.9	0.4
			EV	63.3	63.9	0.6
			LN	60.0	62.1	2.1
		Saturday	MD	61.9	62.5	0.6
			PM	59.7	60.8	1.1
12	Carlton Avenue between Pacific and Dean Streets	Weekday	AM	63.9	65.0	1.1
			MD	63.9	65.4	1.5
			PM	64.3	65.8	1.5
			EV	62.2	63.8	1.6
			LN	60.0	63.6	3.6
		Saturday	MD	65.0	66.1	1.1
			PM	59.4	67.7	**8.3**

Note: Bolded values indicate a significant adverse impact.

Excluding the effects of construction, in 2010, when construction of Phase I of the proposed project would be completed, $L_{eq(1)}$ noise levels due to project-generated traffic would exceed the CEQR impact criteria and result in significant adverse noise impacts during one or more time periods at receptor 2 (on Flatbush Avenue), receptor 3 (on Dean Street), receptor 5 (on Dean Street), receptor 10 (on 6th Avenue), and receptor 12 (on Carlton Avenue).

Impacts at these site-specific locations are indicative of impacts at adjacent locations. Based upon these site specific results it can be concluded that in 2010 noise from project-generated traffic would exceed the *CEQR Technical Manual* impact criteria and result in significant adverse noise impacts during one or more time periods on Flatbush Avenue in the area near Dean Street, on Dean Street from approximately Flatbush to Vanderbilt Avenues (including the Dean Playground), 6th and Carlton Avenues from approximately Dean Street to Atlantic Avenue. These impacts would be localized and occur on street segments immediately adjacent to the project site (Flatbush Avenue, Dean Street, and 6th and Carlton Avenues). On Dean Street, existing and No Build noise levels are relatively low and project-generated traffic would cause significant increases on this street, but would still result in noise levels that fall in the *CEQR Technical Manual* "marginally unacceptable" range, which is not unusual for New York City residential areas. The impacts would be localized and would occur on street segments immediately adjacent to the project site (Flatbush Avenue, Dean Street, and 6th and Carlton Avenues). These locations would be the principal feeder streets to and from the proposed parking facilities for Phase I project elements. The maximum increase would be 8.3 dBA during the Saturday

Table 15-10
2016 No Build Noise Levels

Site	Location	Day	Time	Existing $L_{eq(1)}$	No Build $L_{eq(1)}$	Increase
1	Pacific Street between Flatbush and 4th Avenues	Weekday	AM	62.3	63.2	0.9
			MD	60.8	61.6	0.8
			PM	62.3	63.5	1.2
			EV	61.1	62.2	1.1
			LN	60.8	62.0	1.2
		Saturday	MD	63.3	64.4	1.1
			PM	63.1	64.2	1.1
2	Flatbush Avenue at Dean Street	Weekday	AM	73.4	74.4	1.0
			MD	73.6	74.7	1.1
			PM	71.0	72.6	1.6
			EV	70.4	71.5	1.1
			LN	70.6	71.3	0.7
		Saturday	MD	70.7	72.1	1.4
			PM	70.6	73.1	2.5
3	Dean Street between Flatbush and 6th Avenues	Weekday	AM	65.4	65.7	0.3
			MD	66.1	66.6	0.5
			PM	66.1	67.1	1.0
			EV	63.5	63.9	0.4
			LN	61.6	62.0	0.4
		Saturday	MD	64.7	65.1	0.4
			PM	66.3	68.2	1.9
4	Pacific Street between Carlton and 6th Avenues	Weekday	AM	65.2	65.7	0.5
			MD	64.9	65.6	0.7
			PM	66.5	67.3	0.8
			EV	64.3	64.9	0.6
			LN	61.7	62.4	0.7
		Saturday	MD	60.7	61.6	0.9
			PM	60.6	61.0	0.4
5	Dean Street between Vanderbilt and Carlton Avenues	Weekday	AM	68.5	69.4	0.9
			MD	67.7	70.5	2.8
			PM	67.8	68.1	0.3
			EV	65.3	65.8	0.5
			LN	63.7	64.4	0.7
		Saturday	MD	61.9	63.9	2.0
			PM	63.1	63.1	0.0
6	Vanderbilt Avenue between Pacific and Dean Streets	Weekday	AM	71.0	71.6	0.6
			MD	71.0	71.6	0.6
			PM	70.3	71.0	0.7
			EV	69.2	69.6	0.4
			LN	66.5	67.1	0.6
		Saturday	MD	66.9	67.5	0.6
			PM	66.7	67.3	0.6
7	Atlantic Avenue between Clermont and Carlton Avenues	Weekday	AM	74.0	75.0	1.0
			MD	74.7	75.6	0.9
			PM	73.9	75.0	1.1
			EV	72.8	73.4	0.6
			LN	72.2	73.2	1.0
		Saturday	MD	73.4	74.1	0.7
			PM	72.6	73.3	0.7
8	4th Avenue between Atlantic Avenue and Pacific Street	Weekday	AM	72.7	73.9	1.2
			MD	72.3	73.6	1.3
			PM	70.3	71.2	0.9
			EV	69.7	70.8	1.1
			LN	64.4	64.8	0.4
		Saturday	MD	68.1	69.2	1.1
			PM	66.1	66.9	0.8

Table 15-10 (cont'd)
2016 No Build Noise Levels

Site	Location	Day	Time	Existing $L_{eq(1)}$	No Build $L_{eq(1)}$	Increase
9	Dean Street between 5th and 6th Avenues	Weekday	AM	64.0	64.5	0.5
			MD	62.2	62.7	0.5
			PM	62.6	63.6	1.0
			EV	60.9	61.7	0.8
			LN	61.7	62.3	0.6
		Saturday	MD	61.2	62.0	0.8
			PM	61.3	63.1	1.8
10	6th Avenue between Pacific and Dean Streets	Weekday	AM	66.7	67.5	0.8
			MD	61.2	62.0	0.8
			PM	61.7	63.0	1.3
			EV	59.0	60.1	1.1
			LN	57.0	57.8	0.8
		Saturday	MD	59.5	60.2	0.7
			PM	58.1	59.3	1.2
11	Bergen Street between Carlton and 6th Avenues	Weekday	AM	63.1	63.7	0.6
			MD	62.6	63.4	0.8
			PM	64.4	64.8	0.4
			EV	63.1	63.5	0.4
			LN	59.8	60.2	0.4
		Saturday	MD	61.9	62.2	0.3
			PM	59.4	60.2	0.8
12	Carlton Avenue between Pacific and Dean Streets	Weekday	AM	62.9	64.1	1.2
			MD	63.2	64.0	0.8
			PM	63.9	64.6	0.7
			EV	61.8	62.4	0.6
			LN	58.5	59.2	0.7
		Saturday	MD	64.4	65.2	0.8
			PM	58.9	59.7	0.8

PM time period, which would occur at receptor 12, located on Carlton Avenue between Pacific and Dean Streets. At receptor 4 (on Pacific Street) there would be a decrease in noise levels due to the closure of the street and the resulting decrease in traffic volumes. At most locations there would be increases in noise levels due to project-generated traffic; however, these increases would be below the *CEQR Technical Manual* impact threshold and would not result in significant adverse noise impacts.

At most locations in the area where significant noise impacts are predicted to occur, most residences already have either double-glazed windows or storm windows, and many have some form of alternative ventilation (air conditioning). At all of the locations where significant noise impacts are predicted to occur the project sponsors would make these types of noise mitigation measures (i.e., storm windows and alternative ventilation) available, at no cost for purchase and installation, to owners of residences to the extent such measures are already not in place. These measures would mitigate project impacts for residential uses (see Chapter 19, "Mitigation"). At locations where owners elect not to take advantage of these mitigation measures, the proposed project would have unmitigated significant adverse impacts.

In terms of *CEQR Technical Manual* noise exposure guidelines, future 2010 noise levels with the proposed project (excluding the effects of Phase II construction) would remain in the "Marginally Unacceptable" category for receptors 2, 5, 6, 7, and 8, and future 2010 noise levels with the proposed project would remain in the "Marginally Acceptable" category for receptors 1, 9, and 11. Future 2010 noise levels with the proposed project would now be in the "Marginally Unacceptable" category for receptors 3, 10, and 12, and future 2010 noise levels with the proposed project would now be in the "marginally acceptable" category for receptor 4. These

values are based on the calculated L_{10} values (see Appendix E, "Noise"). These category classifications are based on the loudest hour L_{10} noise levels at each receptor location.

I. FUTURE WITHOUT THE PROPOSED PROJECT—2016

As in the 2010 analysis year, and using the methodology previously described, future noise levels without the proposed project in 2016 were calculated for the 12 receptor sites. These No Build values are shown in Table 15-10.

In 2016, at most locations and during most time periods, the increase in $L_{eq(1)}$ noise levels would be less than 1.0—an imperceptible change. The maximum increase in $L_{eq(1)}$ noise levels, comparing 2016 No Build noise levels with existing noise levels, would be 2.8 dBA during the weekday MD time period. This would occur at receptor 5, located at Dean Street between Vanderbilt and Carlton Avenues. A change of this magnitude would be barely perceptible.

In terms of CEQR noise exposure guidelines, future 2016 noise levels without the proposed project would remain in the "Marginally Unacceptable" category for receptors 2, 5, 6, 7, and 8; and future 2016 noise levels without the proposed project would remain in the "Marginally Acceptable" category for receptors 1, 3, 9, 10, 11, and 12. Future 2016 noise levels without the proposed project would now be in the "Marginally Unacceptable" category for receptor 4. These values are based on the calculated L_{10} values (see Appendix E, "Noise").

J. PROBABLE IMPACTS OF THE PROPOSED PROJECT—2016

Using the methodology previously described, future noise levels with the project were calculated for the 12 receptor sites for the 2016 analysis year. These Build values are shown in Table 15-11. The results shown for 2016 assume completion of construction on the proposed project. Values that exceed *CEQR Technical Manual* impact criteria are shown in bold.

Table 15-11
2016 Build Noise Levels

Site	Location	Day	Time	No Build $L_{eq(1)}$	Build $L_{eq(1)}$	Increase
1	Pacific Street between Flatbush and 4th Avenues	Weekday	AM	63.2	64.1	0.9
			MD	61.6	61.8	0.2
			PM	63.5	64.1	0.6
			EV	62.2	63.2	1.0
			LN	62.0	61.7	-0.3
		Saturday	MD	64.4	65.4	1.0
			PM	64.2	64.3	0.1
2	Flatbush Avenue at Dean Street	Weekday	AM	74.4	76.1	1.7
			MD	74.7	78.1	**3.4**
			PM	72.6	76.1	**3.5**
			EV	71.5	74.8	**3.3**
			LN	71.3	71.3	0.0
		Saturday	MD	72.1	75.2	**3.1**
			PM	73.1	73.8	0.7
3	Dean Street between Flatbush and 6th Avenues	Weekday	AM	65.7	70.0	**4.3**
			MD	66.6	69.8	**3.2**
			PM	67.1	71.2	**4.1**
			EV	63.9	72.5	**8.6**
			LN	62.0	67.5	**5.5**
		Saturday	MD	65.1	73.6	**8.5**
			PM	68.2	74.3	**6.1**

Table 15-11 (cont'd)
2016 Build Noise Levels

Site	Location	Day	Time	No Build $L_{eq(1)}$	Build $L_{eq(1)}$	Increase
4	Pacific Street between Carlton and 6th Avenues	Weekday	AM	65.7	58.9	-6.8
			MD	65.6	58.7	-6.9
			PM	67.3	58.8	-8.5
			EV	64.9	55.3	-9.6
			LN	62.4	56.3	-6.1
		Saturday	MD	61.6	53.3	-8.3
			PM	61.0	55.0	-6.0
5	Dean Street between Vanderbilt and Carlton Avenues	Weekday	AM	69.4	69.8	0.4
			MD	70.5	70.6	0.1
			PM	68.1	71.9	**3.8**
			EV	65.8	67.2	1.4
			LN	64.4	66.4	2.0
		Saturday	MD	63.9	64.2	0.3
			PM	63.1	64.1	1.0
6	Vanderbilt Avenue between Pacific and Dean Streets	Weekday	AM	71.6	72.6	1.0
			MD	71.6	71.8	0.2
			PM	71.0	71.4	0.4
			EV	69.6	70.0	0.5
			LN	67.1	68.6	1.5
		Saturday	MD	67.5	67.7	0.2
			PM	67.3	69.0	1.7
7	Atlantic Avenue between Clermont and Carlton Avenues	Weekday	AM	75.0	76.0	1.0
			MD	75.6	76.0	0.4
			PM	75.0	75.7	0.7
			EV	73.4	73.5	0.1
			LN	73.2	73.8	0.6
		Saturday	MD	74.1	74.5	0.4
			PM	73.3	73.6	0.3
8	4th Avenue between Atlantic Avenue and Pacific Street	Weekday	AM	73.9	74.8	0.9
			MD	73.6	74.2	0.6
			PM	71.2	72.2	1.0
			EV	70.8	72.6	1.8
			LN	64.8	65.2	0.4
		Saturday	MD	69.2	69.7	0.5
			PM	66.9	67.3	0.4
9	Dean Street between 4th and 5th Avenues	Weekday	AM	64.5	64.7	0.2
			MD	62.7	64.1	1.4
			PM	63.6	63.9	0.3
			EV	61.7	63.8	2.1
			LN	62.3	61.6	-0.7
		Saturday	MD	62.0	64.2	2.2
			PM	63.1	63.0	-0.1
10	6th Avenue between Pacific and Dean Streets	Weekday	AM	67.5	73.4	**5.9**
			MD	62.0	67.5	**5.5**
			PM	63.0	67.5	**4.5**
			EV	60.1	65.4	**5.3**
			LN	57.8	64.6	**6.8**
		Saturday	MD	60.2	65.2	**5.0**
			PM	59.3	64.0	**4.7**

Table 15-11 (cont'd)
2016 Build Noise Levels

Site	Location	Day	Time	No Build $L_{eq(1)}$	Build $L_{eq(1)}$	Increase
11	Bergen Street between Carlton and 6th Avenues	Weekday	AM	63.7	63.6	-0.1
			MD	63.4	63.2	-0.2
			PM	64.8	64.5	-0.3
			EV	63.5	63.3	-0.2
			LN	60.2	61.8	1.6
		Saturday	MD	62.2	62.2	0.0
			PM	60.2	60.6	0.4
12	Carlton Avenue between Pacific and Dean Streets	Weekday	AM	64.1	64.9	0.8
			MD	64.0	65.6	1.6
			PM	64.6	66.0	1.4
			EV	62.4	64.0	1.6
			LN	59.2	63.2	**4.0**
		Saturday	MD	65.2	67.1	1.9
			PM	59.7	67.8	**8.1**

Note: Bolded values indicate a significant adverse impact.

In 2016, when construction of the proposed project would be completed, $L_{eq(1)}$ noise levels from project-generated traffic would exceed the *CEQR Technical Manual* impact criteria and result in significant adverse noise impacts during one or more time periods at receptor 2 (on Flatbush Avenue), receptor 3 (on Dean Street), receptor 5 (on Dean Street), receptor 10 (on 6th Avenue), and receptor 12 (on Carlton Avenue). These locations would be the principal feeder streets to and from the parking facilities for project elements. Impacts at these site-specific locations are indicative of impacts at adjacent locations. For example, the impacts at receptors 3 and 5 would be expected to occur on Dean Street from Flatbush to Vanderbilt Avenues (including at the Dean Playground).The maximum increase would be 8.6 dBA during the EV time period, which would occur at receptor 3, located on Dean Street between Flatbush and 6th Avenues.

Impacts at these site-specific locations are indicative of impacts at adjacent locations. Based upon these site specific results it can be concluded that in 2016, when construction of the project is completed, noise levels due to project-generated traffic would exceed the *CEQR Technical Manual* impact criteria and result in significant adverse noise impacts during one or more time periods on Flatbush Avenue in the area near Dean Street, on Dean Street from approximately Flatbush to Vanderbilt Avenues (including the Dean Playground and The Temple of Restoration), and 6th and Carlton Avenues from approximately Dean Street to Atlantic Avenue. These impacts would be localized and occur on street segments immediately adjacent to the project site (Flatbush Avenue, Dean Street, and 6th and Carlton Avenues). On Dean Street, existing and No Build noise levels are relatively low and project-generated traffic would cause significant increases on this street, but would still result in noise levels that fall in the *CEQR Technical Manual* "marginally unacceptable" range, which is not unusual for New York City residential areas. The impacts would be localized and occur on street segments immediately adjacent to the project site (Flatbush Avenue, Dean Street, and 6th and Carlton Avenues).

At receptor 4 (on Pacific Street) there would be a decrease in noise levels due to the closure of the street and the resulting decrease in traffic volumes. At most other locations there would be increases in noise levels due to project-generated traffic; however, these increases would be below the CEQR impact threshold and would not result in significant adverse noise impacts.

At most locations in the area where project impacts would be predicted to occur, most residences already have either double-glazed windows or storm windows, and many have some form of

alternative ventilation (air conditioning). At all of the impacted locations the project sponsors would make these types of noise mitigation measures available at no cost for purchase and installation to owners of residences (i.e., storm windows and alternative ventilation) to the extent the measures are not already in place. At the Temple of Restoration, the project sponsors will make available storm windows for windows on the second level of the building (above the Temple of Restoration sign), which face Dean Street, and do not currently either have double-glazed windows or storm windows. These measures would mitigate project impacts for the residential and church uses (see Chapter 19, "Mitigation"). At locations where owners elect not to take advantage of these mitigation measures, the proposed project would have unmitigated significant adverse impacts.

Noise levels within the new open space areas created on-site as part of the proposed project would be above the 55 dBA $L_{10(1)}$. This exceeds the noise level for outdoor areas requiring serenity and quiet contained in the *CEQR Technical Manual* noise exposure guidelines (see Table 15-5). One-hour L_{10} noise levels at open space locations adjacent to Atlantic Avenue would be in the low- to mid-70 dBA range. These high, predicted noise levels would result principally from the noise generated by traffic on Atlantic Avenue. Open space areas adjacent to Pacific Street and on the interior of the block bounded by Carlton and Vanderbilt Avenues would be in the mid-60 dBA range. One-hour L_{10} noise levels at open space areas located on the rooftop of the proposed Arena, adjacent to Atlantic and Flatbush Avenues, would be in the high 50 dBA to low-60 dBA range. These predicted noise levels would result principally from the noise generated by traffic on Atlantic and Flatbush Avenues. The open space, except for the portion immediately adjacent to Atlantic Avenue, would be in the "marginally acceptable" range for residential areas and would experience noise levels similar to those experienced throughout the surrounding residential neighborhoods under Existing, No Build, and Build conditions. However, based on *CEQR Technical Manual* criteria, the noise levels at these new open space areas would result in potentially significant adverse noise impacts on their users.

There are no practical and feasible mitigation measures that could be implemented to reduce noise levels to below the 55 dBA $L_{10(1)}$ guideline within the open space areas. Although noise levels in these new areas would be above the 55 dBA $L_{10(1)}$ guideline noise level, they would be comparable to noise levels in a number of open space areas that are also located adjacent to heavily trafficked roadways, including Hudson River Park, Riverside Park, Bryant Park, Fort Greene Park, and other urban open space areas. The 55 dBA $L_{10(1)}$ guideline is a worthwhile goal for outdoor areas requiring serenity and quiet. However, due to the level of activity present at most New York City open space areas and parks (except for areas far away from traffic and other typical urban activities) this relatively low noise level is often not achieved.

In terms of *CEQR Technical Manual* noise exposure guidelines, future 2016 noise levels with the proposed project would remain in the "Marginally Unacceptable" category for receptors 2, 5, 6, 7, and 8; and future 2016 noise levels with the proposed project would remain in the "Marginally Acceptable" category for receptors 1, 9, and 11. Future 2016 noise levels with the proposed project would now be in the "Marginally Unacceptable" category for receptors 3, 10, and 12; and future 2016 noise levels with the proposed project would now be in the "Marginally Acceptable" category for receptor 4. These values are based on the calculated L_{10} values (see Appendix E, "Noise"). These category classifications are based on the loudest hour L_{10} noise levels at each receptor location.

K. BUILDING ATTENUATION FOR PROJECT BUILDINGS

The *CEQR Technical Manual* also requires an analysis of the effect of bringing a sensitive use, such as a residential use, into an urban environment. As shown in Table 15-5, the *CEQR Technical Manual* has set noise attenuation values for new buildings that are to be constructed as part of the proposed project, 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 15-12 shows the minimum building attenuation required to comply with the CEQR 45 dBA L_{10} requirement. The Phase I building attenuation includes the effects of both project-generated traffic and construction. The proposed project buildings would include both double-glazed windows and central air-conditioning (e.g., alternative ventilation). These measures would provide a minimum of 35 dBA attenuation. With these measures, interior levels should be below 45 dBA L_{10}.

Table 15-12
Minimum Building Attenuation to Comply With CEQR Requirements

Project Building	Phase I		Phase II	
	Build L_{10} (dBA)	Building Attenuation (dBA)	Build L_{10} (dBA)	Building Attenuation (dBA)
Arena	78.2	30	79.2	30
Site 5	77.0	35	77.7	35
Building 1	78.2	35	79.2	35
Building 2	78.2	35	79.2	35
Building 3	72.7	30	73.4	35
Building 4	78.2	35	79.1	35
Building 5	N.A.	N.A.	79.1	35
Building 6	N.A.	N.A.	79.1	35
Building 7	N.A.	N.A.	79.1	35
Building 8	N.A.	N.A.	79.1	35
Building 9	N.A.	N.A.	79.1	35
Building 10	N.A.	N.A.	79.1	35
Building 11	N.A.	N.A.	75.3	35
Building 12	N.A.	N.A.	73.1	30
Building 13	N.A.	N.A.	73.1	30
Building 14	N.A.	N.A.	73.1	30
Building 15	N.A.	N.A.	73.4	35

L. MECHANICAL SYSTEMS

Design and specifications for mechanical equipment such as heating, ventilation, and air conditioning (HVAC) and elevator motors are currently underway. However, this equipment would be designed to incorporate sufficient noise reduction devices to comply with applicable noise regulations and standards, and to ensure that this equipment does not result in any significant increases in noise levels by itself or cumulatively with other project noise sources. ✷