# Chapter 19: 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, 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 noise sources (i.e., increased vehicular traffic and stationary noise sources) that would result from the operation of the proposed project, and the acceptability of ambient noise levels in the proposed park. Noise effects during construction of the proposed project are analyzed and discussed in Chapter 20, "Construction."

## B. NOISE FUNDAMENTALS

Quantitative information on the effects of airborne noise on people is well-documented. If sufficiently loud, 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, taking into consideration such factors as loudness, duration, time of occurrence, and changes in noise level with time. However, it must be noted 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 19-1.

### ABILITY TO PERCEIVE CHANGES IN NOISE LEVELS

The average ability of an individual to perceive changes in noise levels is well-documented (see Table 19-2). Generally, changes in noise levels of less than 3 dBA are barely perceptible to most listeners, whereas changes in noise levels of 10 dBA are normally perceived as doubling (or

halving) of noise loudness. These guidelines permit direct estimation of an individual's probable perception of changes in noise levels.

**Table 19-1**
**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.
**Sources:** Cowan, James P. *Handbook of Environmental Acoustics,* Van Nostrand Reinhold, New York, 1994. Egan, M. David, Architectural Acoustics. McGraw-Hill Book Company, 1988.

**Table 19-2**
**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 Newman, Inc., *Fundamentals and Abatement of Highway Traffic Noise*, Report No. PB-222-703. Prepared for Federal Highway Administration, June 1973.

*NOISE DESCRIPTORS USED IN IMPACT ASSESSMENT*

Because the sound pressure level unit of dBA describes a noise level at just one moment, and because very few noises are constant, other ways of describing noise over more extended periods have been developed. One way 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 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 this 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 1-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 CONTROL CODE

The New York City Noise Control Code, amended in December 2005, 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 19-3 at the specified receiving properties.

**Table 19-3**
**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, and required attenuation values to achieve acceptable interior noise levels. These values are shown in Tables 19-4 and 19-5. 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 19-4
## 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 |
|---|---|---|---|---|---|---|---|---|---|
| Outdoor area requiring serenity and quiet[2] | | $L_{10} \leq 55$ dBA | ---- Ldn ≤ 60 dBA ---- | NA | NA | NA | NA | NA | NA |
| Hospital, nursing home | | $L_{10} \leq 55$ dBA | | 55 < $L_{10} \leq 65$ dBA | ---- 60 < Ldn ≤ 65 dBA ---- | 65 < $L_{10} \leq 80$ dBA | (i) 65 < Ldn ≤ 70 dBA, (II) 70 ≤ Ldn | $L_{10} > 80$ dBA | ---------- Ldn ≤ 75 dBA ---------- |
| Residence, residential hotel, or motel | 7 AM to 10 PM | $L_{10} \leq 65$ dBA | | 65 < $L_{10} \leq 70$ dBA | | 70 < $L_{10} \leq 80$ dBA | | $L_{10} > 80$ dBA | |
| | 10 PM to 7 AM | $L_{10} \leq 55$ dBA | | 55 < $L_{10} \leq 70$ dBA | | 70 < $L_{10} \leq 80$ dBA | | $L_{10} > 80$ dBA | |
| School, museum, library, court, house of worship, transient hotel or motel, public meeting room, auditorium, outpatient 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) | |
| 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) | |
| 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 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 19-5
## 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)

### NEW YORK STATE DEPARTMENT OF TRANSPORTATION ENVIRONMENTAL PROCEDURES MANUAL

The guidelines of the *City Environmental Quality Review (CEQR) Technical Manual* will be used to determine appropriate intersection locations for the proposed noise receptors. In addition to being a destination for new vehicle trips to and from the park, the proposed project would also provide connections to and from the West Shore Expressway, a state highway (Route 440). Although environmental analysis of state roadways under the jurisdiction of the New York State Department of Transportation (NYSDOT) normally follows the procedures contained in the NYSDOT *Environmental Procedures Manual (EPM)*, the *CEQR Technical Manual* procedures and guidance are generally more stringent and are considered more appropriate for this analysis.

## D. IMPACT DEFINITION

As recommended in the *CEQR Technical Manual*, this study uses 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

### INTRODUCTION

The noise impact assessment predicted separately the effects of noise from increased traffic and noise from stationary noise sources in the proposed park. Total noise levels with the proposed project (Build values) were obtained by adding noise due to project-generated traffic and stationary noise sources to noise levels without the proposed project (No Build values). The methodologies used to determine noise effects from these two types of noise are discussed below. Impacts were determined based upon the combined effects of both of these noise sources.

### MOBILE NOISE SOURCES

At all of the receptor sites in the study area, the dominant operational noise sources are vehicular traffic on adjacent and nearby streets and roadways. Noise from other sources, such as local or nearby industrial or institutional uses, are limited and do not contribute significantly to local ambient noise levels. To screen area roadways for the potential for a significant project impact, a proportional modeling technique was used to determine approximate increases in noise levels. To calculate noise from traffic on adjacent and nearby streets and roadways, the Federal Highway Administration [FHWA] *Traffic Noise Model* (TNM, version 2.5) was used. The noise

analysis examined three weekday conditions: AM, midday, and PM time periods, and two Saturday conditions: midday and PM time periods. The selected time periods are when the proposed project would have maximum traffic generation and/or the maximum potential for significant adverse noise impacts based on the traffic studies presented in Chapter 16, "Traffic and Parking." The proportional modeling and TNM procedures used for analysis are described below.

*PROPORTIONAL MODELING*

Proportional modeling was used to determine locations with the potential for having significant noise 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. Using this methodology, vehicular traffic volumes were 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; 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

With this methodology, assuming 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.

*TNM MODEL*

The TNM is a computerized model developed for the FHWA that 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.

## STATIONARY NOISE SOURCES

There would be various non-mobile noise sources in the proposed park which are potential noise generators. These stationary noise sources include sitting areas, picnic areas, outdoor classrooms, sport fields, parking lots, outdoor amphitheater, etc. After evaluating the magnitude of noise generated by activities within these areas, noise from the outdoor amphitheater was

determined as the stationary noise source producing the highest noise level. In addition to the proposed outdoor amphitheater, a proposed parking lot and a proposed softball field would be located near a vehicle entrance on Melvin Avenue, which would have the potential for causing a significant increase in noise levels at nearby residences on Melvin Avenue. Consequently, noise sources for the outdoor amphitheater, the parking lot, and the softball field were selected for the project noise impact assessment purposes. Noise from other activities would be limited and would not contribute significantly to total ambient noise levels.

The emission noise levels for amphitheater were determined by measured data on a similar amphitheater. Based on measured results from Chastain Park Amphitheater (6,000-seat)[1], average $L_{eq(1)}$ noise levels were 86 dBA at 300 feet away from the amphitheater stage. The emission noise levels for softball field were determined by measured data at a series of New York City high school playgrounds for the New York City School Construction Authority (SCA)[2], and the measured hourly $L_{eq(1)}$ noise level were 68.2 dBA at the playground boundary. It is noted that using these measured noise levels for this noise impact analysis would be conservative. Noise levels with stationary noise sources at receptor sites were calculated based on the measured noise levels using the following formula:

$$L_{eq1} = L_{eq2} - 20 * LOG (d_1/d_2) - A_{screen}$$

where:

$L_{eq1}$ is the noise level at the receptor location;

$L_{eq2}$ is the measured noise level;

$d_1$ is the distance from the source to the receptor;

$d_2$ is the distance at which the measured level is known; and

$A_{screen}$ is the attenuation due to screening.

Noise assessment was performed for the parking lot using the methodology contained in the Federal Transit Administration (FTA) guidance manual[3]. At 50 feet from the center of the parking lot noise levels were calculated using the following formula:

$$L_{eq(1)} = SEL_{ref} + C_N - 35.6$$

Where:

$C_N = 10 \log (N_A/2000+N_B/24)$ for parking & ride lot

$N_A$ = Number of automobiles per hour,

$N_B$ = Number of buses per hour (N/A)

$SEL_{ref}$ = 101for park & ride lot

For this assessment a maximum of 40 autos during the peak hour was assumed. The closest residences from the parking lot would be approximately 150 feet away. Noise levels with the parking lot at noise receptors were calculated using the FTA methodology previously described.

[1] Another "New" Metric for Outdoor Amphitheater Criteria, Noise-Con 2005, Minneapolis, Minnesota.

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

[3] Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.

### ANALYSIS PROCEDURE

To determine potential noise impacts from project-generated traffic and stationary noise sources, the following procedure was used in performing the noise analysis:

- Determine sensitive receptors within the adjacent study area where the maximum project noise levels would be likely to occur;
- Perform field noise measurements to determine the existing ambient noise levels at the selected receptors;
- Calculate Build noise levels using the methods previously described; and
- Determine total Build noise levels by cumulating noise due to project-generated traffic and stationary noise sources.

## F. EXISTING CONDITIONS

### SITE DESCRIPTION

The project site (described in detail in Chapter 1, "Project Description") is all City-owned land (the majority of which is managed by DSNY and DPR) and consists of landfill and open space or parkland/natural areas. The project site fronts the Arthur Kill waterfront to the west and Richmond Avenue to the east. The project site is bisected by the West Shore Expressway. To the north is the William T. Davis Wildlife Refuge. The southern boundary is generally defined by Arthur Kill Road. The project study area consists primarily of open space (City parks and wildlife preserves), and commercial, residential, and industrial uses.

### SELECTION OF NOISE RECEPTOR LOCATIONS

Thirteen receptor sites in the study area were selected for project impact assessment purposes due to the project-generated traffic and the stationary noise sources, and one additional receptor site (on the dead end of Melvin Avenue) adjacent to the proposed softball field was selected for analyses due to noise from the softball field, the proposed parking lot, and the project-generated traffic. Table 19-6 lists the locations of each noise receptor site and their associated existing surrounding land uses. Figure 19-1 shows the receptor site locations and existing land uses. The thirteen receptor sites (sites 1-13) used for project-generated traffic and stationary noise sources include representative noise-sensitive locations, principally locations with residential, open space, and institutional land uses, and locations where maximum project impacts would be expected. The additional receptor site, (receptor A) is located at the closest residences adjacent to the proposed softball field, where the existing traffic is limited. At all other locations, particularly locations outside the study area, either project-generated traffic or stationary sources would be less and/or would constitute a small portion to total noise levels, and consequently would not have the potential for causing a significant increase in noise levels.

### NOISE MONITORING

With the exception of receptor 13, at each receptor location, 20-minute noise measurements were made for five time periods to determine existing noise levels. For weekday conditions, noise measurements were taken on October 23 and 31, 2007; on November 27, 2007; on February 27 and 28, 2008; and on March 4 and 5, 2008. For weekend conditions, noise measurements were taken on November 3 and 17, 2007; and on March 1 and 15, 2008. At receptor 13 the existing noise levels were calculated based upon the TNM values.

**Table 19-6**
**Noise Receptor Locations**

| Receptor | Location | Associated Land Use |
|---|---|---|
| 1 | West Shore Expressway Southbound Service Road at Muldoon Avenue | Fresh Kills Project Area Open Space |
| 2 | Arden Avenue between Forest Green and Bunnell Street | Residential/Open Space |
| 3 | Arthur Kill Road East of Muldoon Avenue, between Muldoon Avenue and Shopping Center | Residential/Open Space |
| 4 | Forest Hill Road between Independence and Richmond Avenues | Open Space |
| 5 | Forest Hill Road at Stone Lane | Residential/Open Space |
| 6 | Richmond Hill Road between Merry Mount Street and Racal Court | Residential |
| 7 | Victory Boulevard between Melvin and Wild Avenues | Residential/School |
| 8 | West Shore Expressway Southbound Service Road, South of Victory Boulevard | Residential |
| 9 | Arthur Kill Road between Arden Avenue and Carlyle Green | Residential |
| 10 | Arthur Kill Road between Cortelyou and Ridgewood Avenues | Residential/Open Space |
| 11 | Travis Avenue between Freedom and Mulberry Avenues | Residential/Open Space |
| 12 | Victory Boulevard between Travis and Shenandoah Avenues | Residential/Open Space |
| 13 | Wild Avenue between Alberta and Roswell Avenues | Residential |
| A* | Dead end of Melvin Avenue adjacent to the proposed park | Residential/Open Space |

**Note:** * Receptor A was selected for assessing noise from the proposed softball field and parking lot.

## 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 Brüel & Kjær meters are Type 1 noise meters. The instruments were mounted on a tripod at a height of 5 feet above the ground. The meters were calibrated before and after readings using Brüel & Kjær Type 4231 sound level calibrators with 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 S1.13-2005.

## RESULTS OF BASELINE MEASUREMENTS

Table 19-7 summarizes the results of the baseline measurements for the Weekday AM, midday, and PM and the Saturday midday and PM analysis hours. In general, noise levels are moderate to relatively high and reflect the level of vehicular activity on the adjacent streets.

In terms of CEQR noise exposure guidelines, during the hour with the highest measured noise levels, based on the measured $L_{10}$ values, existing noise levels at receptors from 1 through 12 are in the "marginally unacceptable" category, and existing noise levels at receptor sites 13 and A are in the "acceptable" category.

## Table 19-7
## Measured Existing Noise Levels (in dBA)

| Receptor | Location | | Time | $L_{eq(1)}$ | $L_1$ | $L_{10}$ | $L_{50}$ | $L_{90}$ |
|---|---|---|---|---|---|---|---|---|
| 1 | West Shore Expressway Southbound Service Road at Muldoon Avenue | Weekday | AM | 71.2 | 80.5 | 74.5 | 67.7 | 63.5 |
| | | | MD | 72.4 | 79.0 | 75.5 | 70.9 | 66.2 |
| | | | PM | 71.9 | 77.6 | 75.1 | 70.8 | 65.4 |
| | | Saturday | MD | 71.1 | 77.9 | 75.2 | 68.2 | 64.3 |
| | | | PM | 72.3 | 78.6 | 75.8 | 70.7 | 64.5 |
| 2 | Arden Avenue between Forest Green and Bunnell Street | Weekday | AM | 73.6 | 83.1 | 77.1 | 70.6 | 59.4 |
| | | | MD | 72.6 | 82.0 | 75.8 | 70.2 | 59.9 |
| | | | PM | 72.2 | 79.8 | 76.1 | 69.5 | 58.7 |
| | | Saturday | MD | 72.8 | 80.3 | 76.4 | 70.3 | 58.6 |
| | | | PM | 72.8 | 79.8 | 76.5 | 71.3 | 60.3 |
| 3 | Arthur Kill Road East of Muldoon Avenue, between Muldoon Avenue and Shopping Center | Weekday | AM | 72.6 | 82.5 | 76.0 | 68.3 | 57.8 |
| | | | MD | 71.1 | 80.2 | 74.7 | 68.5 | 59.8 |
| | | | PM | 70.5 | 76.8 | 73.8 | 68.9 | 59.7 |
| | | Saturday | MD | 70.3 | 77.4 | 73.4 | 68.8 | 59.8 |
| | | | PM | 69.7 | 76.9 | 72.8 | 68.3 | 58.7 |
| 4 | Forest Hill Road between Independence and Richmond Avenues | Weekday | AM | 71.7 | 79.3 | 75.1 | 70.0 | 59.5 |
| | | | MD | 71.3 | 79.7 | 74.7 | 69.1 | 58.1 |
| | | | PM | 71.7 | 80.5 | 75.1 | 69.0 | 58.2 |
| | | Saturday | MD | 70.1 | 77.8 | 73.9 | 67.9 | 60.3 |
| | | | PM | 69.2 | 75.9 | 72.3 | 68.0 | 59.2 |
| 5 | Forest Hill Road at Stone Lane | Weekday | AM | 73.8 | 81.2 | 77.7 | 71.8 | 59.5 |
| | | | MD | 74.1 | 80.2 | 77.6 | 72.9 | 63.1 |
| | | | PM | 73.6 | 80.1 | 77.1 | 72.4 | 61.6 |
| | | Saturday | MD | 73.7 | 79.2 | 76.9 | 72.9 | 64.2 |
| | | | PM | 72.3 | 78.6 | 75.9 | 71.2 | 58.2 |
| 6 | Richmond Hill Road between Merry Mount Street and Racal Court | Weekday | AM | 69.7 | 80.3 | 73.5 | 62.8 | 54.0 |
| | | | MD | 69.9 | 79.7 | 73.3 | 65.4 | 57.6 |
| | | | PM | 71.7 | 83.2 | 73.7 | 63.5 | 54.0 |
| | | Saturday | MD | 67.8 | 76.9 | 71.4 | 64.7 | 58.5 |
| | | | PM | 66.2 | 77.4 | 68.9 | 62.3 | 55.7 |
| 7 | Victory Boulevard between Melvin and Wild Avenues | Weekday | AM | 66.4 | 75.9 | 70.1 | 62.8 | 57.9 |
| | | | MD | 63.4 | 73.5 | 65.9 | 59.5 | 55.1 |
| | | | PM | 66.7 | 76.0 | 69.6 | 63.9 | 57.2 |
| | | Saturday | MD | 70.3 | 80.9 | 73.2 | 64.0 | 56.4 |
| | | | PM | 69.0 | 78.3 | 72.1 | 64.2 | 55.8 |
| 8 | West Shore Expressway Southbound Service Road, South of Victory Boulevard | Weekday | AM | 73.5 | 85.4 | 76.5 | 67.5 | 63.5 |
| | | | MD | 70.5 | 79.6 | 73.0 | 67.0 | 63.1 |
| | | | PM | 67.0 | 76.4 | 69.8 | 63.3 | 59.8 |
| | | Saturday | MD | 69.1 | 76.9 | 72.0 | 66.7 | 63.9 |
| | | | PM | 67.5 | 75.6 | 70.3 | 65.4 | 62.4 |
| 9 | Arthur Kill Road between Arden Avenue and Carlyle Green | Weekday | AM | 69.5 | 79.2 | 72.4 | 66.3 | 62.1 |
| | | | MD | 70.1 | 78.7 | 72.1 | 64.5 | 59.5 |
| | | | PM | 67.6 | 76.3 | 70.9 | 65.0 | 58.6 |
| | | Saturday | MD | 68.1 | 77.4 | 70.8 | 65.5 | 59.4 |
| | | | PM | 68.8 | 77.3 | 72.5 | 66.3 | 57.1 |
| 10 | Arthur Kill Road between Cortelyou and Ridgewood Avenues | Weekday | AM | 73.5 | 82.4 | 75.9 | 71.8 | 66.1 |
| | | | MD | 72.4 | 81.3 | 75.1 | 70.8 | 62.7 |
| | | | PM | 63.8 | 70.8 | 66.1 | 62.9 | 59.2 |
| | | Saturday | MD | 68.8 | 76.4 | 70.6 | 68.0 | 61.2 |
| | | | PM | 68.2 | 75.6 | 70.4 | 67.4 | 60.4 |
| 11 | Travis Avenue between Freedom and Mulberry Avenues | Weekday | AM | 74.6 | 82.1 | 77.2 | 71.6 | 59.5 |
| | | | MD | 72.8 | 81.4 | 76.2 | 70.4 | 54.8 |
| | | | PM | 71.7 | 78.3 | 75.1 | 70.1 | 55.1 |
| | | Saturday | MD | 70.4 | 76.0 | 73.9 | 69.5 | 56.9 |
| | | | PM | 70.7 | 77.2 | 74.3 | 69.3 | 57.0 |
| 12 | Victory Boulevard between Travis and Shenandoah Avenues | Weekday | AM | 70.7 | 81.1 | 73.3 | 67.8 | 62.1 |
| | | | MD | 70.9 | 81.9 | 72.8 | 66.9 | 60.8 |
| | | | PM | 71.4 | 82.5 | 72.3 | 67.2 | 61.9 |
| | | Saturday | MD | 64.2 | 69.8 | 67.1 | 63.2 | 58.7 |
| | | | PM | 65.0 | 71.3 | 67.7 | 64.1 | 58.4 |
| 13** | Wild Avenue between Alberta and Roswell Avenues | Weekday | AM | 57.9 | NA | 59.1 | NA | NA |
| | | | MD | 55.5 | NA | 57.1 | NA | NA |
| | | | PM | 56.2 | NA | 56.4 | NA | NA |
| | | Saturday | MD | 54.5 | NA | 56.3 | NA | NA |
| | | | PM | 54.5 | NA | 56.4 | NA | NA |
| A* | The dead end at Melvin Avenue adjacent to the proposed park | Weekday | AM | 54.6 | 66.0 | 55.8 | 51.3 | 49.7 |
| | | | MD | 51.7 | 56.5 | 53.3 | 50.9 | 49.4 |
| | | | PM | 52.7 | 60.1 | 52.9 | 50.7 | 49.4 |
| | | Saturday | MD | 53.1 | 58.0 | 54.9 | 52.5 | 51.2 |
| | | | PM | 54.1 | 61.3 | 56.0 | 52.8 | 50.6 |

**Notes:** Field measurements were performed by AKRF, Inc. on October 23 and 31, 2007; on November 3, 17, 27, 2007; on February 27 and 28, 2008; and on March 1, 4, 5 and 15, 2008.
* Receptor A was selected for assessing noise from the proposed softball field and the parking lot.
** Noise levels at receptor 13 were calculated based upon the TNM values.

### NOISE MODEL VALIDATION

Although TNM has been shown to be quite accurate predictor of noise levels for most situations, the model was validated for use at all receptor sites by comparing measured and modeled predicted noise levels. Using the inputs for the traffic volumes, speeds, roadway alignments, ground reflections, and existing buildings, the TNM model was run to predict the five period traffic noise levels for the existing condition. A difference of 3 dBA or less between the modeled noise levels and measured noise levels indicates that the TNM model can be used with confidence. Based upon the TNM predicted results, all of the modeled noise levels are within 3 dBA of the measured values (see 2. TNM Results in Appendix G).

## G. THE FUTURE WITHOUT THE PROPOSED PROJECT—2016 AND 2036

The future conditions without the proposed project were analyzed for two analysis years—2016 and 2036. Noise impacts were assessed based on increased traffic.

### 2016 NO BUILD ANALYSIS

Using the methodology previously described, future noise levels without the proposed action were calculated for all receptors for the 2016 analysis year. These No Build values are shown in Table 19-8.

In 2016, with the exception of receptor 13, the increase in $L_{eq(1)}$ noise levels would be less than 1.5 dBA at all receptor sites. Changes of these magnitudes would be barely perceptible and insignificant, and they would be below the CEQR threshold for a significant adverse impact. In terms of CEQR Noise Exposure Guidelines, noise levels at receptors from 1 through 12 would remain in the "marginally unacceptable" category, and noise levels at receptor A would remain in the "acceptable" category.

At receptor site 13, the maximum increase in $L_{eq(1)}$ noise levels would be 5.4 dBA. The major contributor for these increases in noise levels would be noise from No Build traffic increases. Changes of this magnitude would be noticeable, and they would exceed the CEQR threshold for a significant adverse impact. In terms of CEQR Noise Exposure Guidelines, noise levels at receptor site 13 would remain in the "acceptable" category.

### 2036 NO BUILD ANALYSIS

Using the methodology previously described, future noise levels without the proposed action were calculated for all receptors for the 2036 analysis year. These No Build values are shown in Table 19-9.

In 2036, with the exception of receptor sites 13 and A, the increase in $L_{eq(1)}$ noise levels would be less than 2.0 dBA at receptor sites from 1 through 12. Changes of these magnitudes would be barely perceptible and insignificant, and they would be below the CEQR threshold for a significant adverse impact. In terms of CEQR Noise Exposure Guidelines, noise levels at receptors from 1 through 12 would remain in the "marginally unacceptable" category.

## Table 19-8
## 2016 Future Noise Levels Without the Proposed Action (in dBA)

| Receptor | Location | | Time | Existing $L_{eq(1)}$ | No Build $L_{eq(1)}$ | $L_{eq(1)}$ Change | No Build $L_{10(1)}$ |
|---|---|---|---|---|---|---|---|
| 1 | West Shore Expressway Southbound Service Road at Muldoon Avenue | Weekday | AM | 71.2 | 71.9 | 0.7 | 75.2 |
| | | | MD | 72.4 | 73.1 | 0.7 | 76.2 |
| | | | PM | 71.9 | 72.6 | 0.7 | 75.8 |
| | | Saturday | MD | 71.1 | 71.9 | 0.8 | 76.0 |
| | | | PM | 72.3 | 73.0 | 0.7 | 76.5 |
| 2 | Arden Avenue between Forest Green and Bunnell Street | Weekday | AM | 73.6 | 74.4 | 0.8 | 77.9 |
| | | | MD | 72.6 | 73.4 | 0.8 | 76.6 |
| | | | PM | 72.2 | 73.2 | 1.0 | 77.1 |
| | | Saturday | MD | 72.8 | 73.6 | 0.8 | 77.2 |
| | | | PM | 72.8 | 73.7 | 0.9 | 77.4 |
| 3 | Arthur Kill Road East of Muldoon Avenue, between Muldoon Avenue and Shopping Center | Weekday | AM | 72.6 | 73.4 | 0.8 | 76.8 |
| | | | MD | 71.1 | 71.9 | 0.8 | 75.5 |
| | | | PM | 70.5 | 71.6 | 1.1 | 74.9 |
| | | Saturday | MD | 70.3 | 71.2 | 0.9 | 74.3 |
| | | | PM | 69.7 | 70.7 | 1.0 | 73.8 |
| 4 | Forest Hill Road between Independence and Richmond Avenues | Weekday | AM | 71.7 | 72.6 | 0.9 | 76.0 |
| | | | MD | 71.3 | 72.3 | 1.0 | 75.7 |
| | | | PM | 71.7 | 72.7 | 1.0 | 76.1 |
| | | Saturday | MD | 70.1 | 71.1 | 1.0 | 74.9 |
| | | | PM | 69.2 | 70.2 | 1.0 | 73.3 |
| 5 | Forest Hill Road at Stone Lane | Weekday | AM | 73.8 | 74.8 | 1.0 | 78.7 |
| | | | MD | 74.1 | 75.1 | 1.0 | 78.6 |
| | | | PM | 73.6 | 74.6 | 1.0 | 78.1 |
| | | Saturday | MD | 73.7 | 74.6 | 0.9 | 77.8 |
| | | | PM | 72.3 | 73.3 | 1.0 | 76.9 |
| 6 | Richmond Hill Road between Merry Mount Street and Racal Court | Weekday | AM | 69.7 | 70.5 | 0.8 | 74.3 |
| | | | MD | 69.9 | 70.7 | 0.8 | 74.1 |
| | | | PM | 71.7 | 72.4 | 0.7 | 74.4 |
| | | Saturday | MD | 67.8 | 68.6 | 0.8 | 72.2 |
| | | | PM | 66.2 | 66.9 | 0.7 | 69.6 |
| 7 | Victory Boulevard between Melvin and Wild Avenues | Weekday | AM | 66.4 | 67.3 | 0.9 | 71.0 |
| | | | MD | 63.4 | 64.3 | 0.9 | 66.8 |
| | | | PM | 66.7 | 67.7 | 1.0 | 70.6 |
| | | Saturday | MD | 70.3 | 71.3 | 1.0 | 74.2 |
| | | | PM | 69.0 | 70.0 | 1.0 | 73.1 |
| 8 | West Shore Expressway Southbound Service Road, South of Victory Boulevard | Weekday | AM | 73.5 | 74.4 | 0.9 | 77.4 |
| | | | MD | 70.5 | 71.3 | 0.8 | 73.8 |
| | | | PM | 67.0 | 67.8 | 0.8 | 70.6 |
| | | Saturday | MD | 69.1 | 70.0 | 0.9 | 72.9 |
| | | | PM | 67.5 | 68.4 | 0.9 | 71.2 |
| 9 | Arthur Kill Road between Arden Avenue and Carlyle Green | Weekday | AM | 69.5 | 70.4 | 0.9 | 73.3 |
| | | | MD | 70.1 | 70.9 | 0.8 | 72.9 |
| | | | PM | 67.6 | 68.4 | 0.8 | 71.7 |
| | | Saturday | MD | 68.1 | 68.9 | 0.8 | 71.6 |
| | | | PM | 68.8 | 69.6 | 0.8 | 73.3 |
| 10 | Arthur Kill Road between Cortelyou and Ridgewood Avenues | Weekday | AM | 73.5 | 74.2 | 0.7 | 76.6 |
| | | | MD | 72.4 | 73.2 | 0.8 | 75.9 |
| | | | PM | 63.8 | 64.5 | 0.7 | 66.8 |
| | | Saturday | MD | 68.8 | 69.7 | 0.9 | 71.5 |
| | | | PM | 68.2 | 69.2 | 1.0 | 71.4 |
| 11 | Travis Avenue between Freedom and Mulberry Avenues | Weekday | AM | 74.6 | 75.5 | 0.9 | 78.1 |
| | | | MD | 72.8 | 73.8 | 1.0 | 77.2 |
| | | | PM | 71.7 | 72.7 | 1.0 | 76.1 |
| | | Saturday | MD | 70.4 | 71.3 | 0.9 | 74.8 |
| | | | PM | 70.7 | 71.7 | 1.0 | 75.3 |
| 12 | Victory Boulevard between Travis and Shenandoah Avenues | Weekday | AM | 70.7 | 71.6 | 0.9 | 74.2 |
| | | | MD | 70.9 | 71.8 | 0.9 | 73.7 |
| | | | PM | 71.4 | 72.3 | 0.9 | 73.2 |
| | | Saturday | MD | 64.2 | 65.1 | 0.9 | 68.0 |
| | | | PM | 65.0 | 66.0 | 1.0 | 68.7 |
| 13 | Wild Avenue between Alberta and Roswell Avenues** | Weekday | AM | 57.9 | 60.3 | 2.4 | 61.5 |
| | | | MD | 55.5 | 59.7 | **4.2** | 61.3 |
| | | | PM | 56.2 | 59.7 | **3.5** | 59.9 |
| | | Saturday | MD | 54.5 | 59.9 | **5.4** | 61.7 |
| | | | PM | 54.5 | 59.3 | **4.8** | 61.2 |
| A* | The dead end at Melvin Avenue adjacent to the proposed park | Weekday | AM | 54.6 | 55.3 | 0.7 | 56.5 |
| | | | MD | 51.7 | 52.3 | 0.6 | 53.9 |
| | | | PM | 52.7 | 53.3 | 0.6 | 53.5 |
| | | Saturday | MD | 53.1 | 53.9 | 0.8 | 55.7 |
| | | | PM | 54.1 | 55.0 | 0.9 | 56.9 |

**Note:** * Receptor A was selected for assessing noise from the proposed softball field.

## Table 19-9
## 2036 Future Noise Levels Without the Proposed Action (in dBA)

| Receptor | Location | | Time | Existing $L_{eq(1)}$ | No Build $L_{eq(1)}$ | $L_{eq(1)}$ Change | No Build $L_{10(1)}$ |
|---|---|---|---|---|---|---|---|
| 1 | West Shore Expressway Southbound Service Road at Muldoon Avenue | Weekday | AM | 71.2 | 72.7 | 1.5 | 76.0 |
| | | | MD | 72.4 | 74.0 | 1.6 | 77.1 |
| | | | PM | 71.9 | 73.5 | 1.6 | 76.7 |
| | | Saturday | MD | 71.1 | 72.7 | 1.6 | 76.8 |
| | | | PM | 72.3 | 73.9 | 1.6 | 77.4 |
| 2 | Arden Avenue between Forest Green and Bunnell Street | Weekday | AM | 73.6 | 75.2 | 1.6 | 78.7 |
| | | | MD | 72.6 | 74.2 | 1.6 | 77.4 |
| | | | PM | 72.2 | 73.9 | 1.7 | 77.8 |
| | | Saturday | MD | 72.8 | 74.3 | 1.5 | 77.9 |
| | | | PM | 72.8 | 74.4 | 1.6 | 78.1 |
| 3 | Arthur Kill Road East of Muldoon Avenue, between Muldoon Avenue and Shopping Center | Weekday | AM | 72.6 | 74.2 | 1.6 | 77.6 |
| | | | MD | 71.1 | 72.7 | 1.6 | 76.3 |
| | | | PM | 70.5 | 72.3 | 1.8 | 75.6 |
| | | Saturday | MD | 70.3 | 72.0 | 1.7 | 75.1 |
| | | | PM | 69.7 | 71.4 | 1.7 | 74.5 |
| 4 | Forest Hill Road between Independence and Richmond Avenues | Weekday | AM | 71.7 | 73.4 | 1.7 | 76.8 |
| | | | MD | 71.3 | 73.1 | 1.8 | 76.5 |
| | | | PM | 71.7 | 73.4 | 1.7 | 76.8 |
| | | Saturday | MD | 70.1 | 71.8 | 1.7 | 75.6 |
| | | | PM | 69.2 | 71.0 | 1.8 | 74.1 |
| 5 | Forest Hill Road at Stone Lane | Weekday | AM | 73.8 | 75.5 | 1.7 | 79.4 |
| | | | MD | 74.1 | 75.8 | 1.7 | 79.3 |
| | | | PM | 73.6 | 75.3 | 1.7 | 78.8 |
| | | Saturday | MD | 73.7 | 75.4 | 1.7 | 78.6 |
| | | | PM | 72.3 | 74.1 | 1.8 | 77.7 |
| 6 | Richmond Hill Road between Merry Mount Street and Racal Court | Weekday | AM | 69.7 | 71.3 | 1.6 | 75.1 |
| | | | MD | 69.9 | 71.4 | 1.5 | 74.8 |
| | | | PM | 71.7 | 73.2 | 1.5 | 75.2 |
| | | Saturday | MD | 67.8 | 69.4 | 1.6 | 73.0 |
| | | | PM | 66.2 | 67.7 | 1.5 | 70.4 |
| 7 | Victory Boulevard between Melvin and Wild Avenues | Weekday | AM | 66.4 | 68.1 | 1.7 | 71.8 |
| | | | MD | 63.4 | 65.1 | 1.7 | 67.6 |
| | | | PM | 66.7 | 68.4 | 1.7 | 71.3 |
| | | Saturday | MD | 70.3 | 72.0 | 1.7 | 74.9 |
| | | | PM | 69.0 | 70.7 | 1.7 | 73.8 |
| 8 | West Shore Expressway Southbound Service Road, South of Victory Boulevard | Weekday | AM | 73.5 | 75.2 | 1.7 | 78.2 |
| | | | MD | 70.5 | 72.1 | 1.6 | 74.6 |
| | | | PM | 67.0 | 68.6 | 1.6 | 71.4 |
| | | Saturday | MD | 69.1 | 70.8 | 1.7 | 73.7 |
| | | | PM | 67.5 | 69.2 | 1.7 | 72.0 |
| 9 | Arthur Kill Road between Arden Avenue and Carlyle Green | Weekday | AM | 69.5 | 71.1 | 1.6 | 74.0 |
| | | | MD | 70.1 | 71.7 | 1.6 | 73.7 |
| | | | PM | 67.6 | 69.2 | 1.6 | 72.5 |
| | | Saturday | MD | 68.1 | 69.7 | 1.6 | 72.4 |
| | | | PM | 68.8 | 70.4 | 1.6 | 74.1 |
| 10 | Arthur Kill Road between Cortelyou and Ridgewood Avenues | Weekday | AM | 73.5 | 75.0 | 1.5 | 77.4 |
| | | | MD | 72.4 | 73.9 | 1.5 | 76.6 |
| | | | PM | 63.8 | 65.3 | 1.5 | 67.6 |
| | | Saturday | MD | 68.8 | 70.5 | 1.7 | 72.3 |
| | | | PM | 68.2 | 69.9 | 1.7 | 72.1 |
| 11 | Travis Avenue between Freedom and Mulberry Avenues | Weekday | AM | 74.6 | 76.3 | 1.7 | 78.9 |
| | | | MD | 72.8 | 74.5 | 1.7 | 77.9 |
| | | | PM | 71.7 | 73.4 | 1.7 | 76.8 |
| | | Saturday | MD | 70.4 | 72.1 | 1.7 | 75.6 |
| | | | PM | 70.7 | 72.4 | 1.7 | 76.0 |
| 12 | Victory Boulevard between Travis and Shenandoah Avenues | Weekday | AM | 70.7 | 72.4 | 1.7 | 75.0 |
| | | | MD | 70.9 | 72.6 | 1.7 | 74.5 |
| | | | PM | 71.4 | 73.0 | 1.6 | 73.9 |
| | | Saturday | MD | 64.2 | 65.9 | 1.7 | 68.8 |
| | | | PM | 65.0 | 66.8 | 1.8 | 69.5 |
| 13 | Wild Avenue between Alberta and Roswell Avenues** | Weekday | AM | 57.9 | 60.7 | 2.8 | 61.9 |
| | | | MD | 55.5 | 60.0 | **4.5** | 61.6 |
| | | | PM | 56.2 | 60.3 | **4.1** | 60.5 |
| | | Saturday | MD | 54.5 | 60.1 | **5.6** | 61.9 |
| | | | PM | 54.5 | 59.7 | **5.2** | 61.6 |
| A* | The dead end at Melvin Avenue adjacent to the proposed park | Weekday | AM | 54.6 | 59.2 | **4.6** | 60.4 |
| | | | MD | 51.7 | 56.2 | **4.5** | 57.8 |
| | | | PM | 52.7 | 57.2 | **4.5** | 57.4 |
| | | Saturday | MD | 53.1 | 55.3 | 2.2 | 57.1 |
| | | | PM | 54.1 | 55.8 | 1.7 | 57.7 |

**Note:** * Receptor A was selected for assessing noise from the proposed softball field.

At receptor sites 13 and A, the maximum increase in $L_{eq(1)}$ noise levels would be 5.6 dBA at receptor site 13 and 4.6 dBA at receptor site A. The major contributor for these increases in noise levels would be noise from the No Build traffic increases. Changes of this magnitude would be noticeable, and they would exceed the CEQR threshold for a significant adverse impact. In terms of CEQR Noise Exposure Guidelines, noise levels at receptor sites 13 and A would remain in the "acceptable" category.

## H. THE FUTURE WITH THE PROPOSED PROJECT—2016 AND 2036

The future conditions with the proposed project were analyzed for two analysis years—2016 and 2036. Noise impacts were assessed based on increased traffic and stationary noise sources.

### 2016 BUILD ANALYSIS

Using the methodology previously described, future noise levels with the proposed action were calculated for the 2016 analysis year. These Build values are shown in Table 19-10.

In 2016, comparing Build with No Build values, the increase in $L_{eq(1)}$ noise levels would be less than 1.0 dBA at receptor sites from 1 through 13. At receptor sites 3, 7, 9, 10, 11, and 12 a decrease in noise levels was predicted to occur for Build conditions due to a decrease of 2016 traffic volume at Arthur Kill Road, Richmond Hill Road, Victory Boulevard, and Travis Avenue. The Build traffic would be expected to decrease at these locations due to the reverse travel pattern caused by the new park roads (see Chapter 16: Traffic and Parking). At those locations where the proposed project would result in an increase in noise levels, the changes would not be perceptible, would be insignificant, and they would be below the CEQR threshold for a significant adverse impact. In terms of CEQR Noise Exposure Guidelines, noise levels at receptors from 1 through 12 would remain in the "marginally unacceptable" category, and noise levels at receptor 13 would remain in the "acceptable" category.

At receptor A (i.e., the closest residence adjacent to the proposed softball field) the maximum increase in $L_{eq(1)}$ noise levels would be 3.1 dBA. Changes of this magnitude would be perceptible, but they would be below the CEQR threshold for a significant adverse impact. Because of low No Build noise levels (less than 60 dBA) at this location, the CEQR threshold for a significant adverse noise impact would be 5 dBA. In terms of CEQR Noise Exposure Guidelines, noise levels at receptor A would remain in the "acceptable" category.

### 2036 BUILD ANALYSIS

Using the methodology previously described, future noise levels with the proposed action were calculated for the 2036 analysis year. These Build values are shown in Table 19-11.

In 2036, comparing Build with No Build values, the increase in $L_{eq(1)}$ noise levels would be less than 1.5 dBA at receptor sites from 1 through 13. At receptors 3, 7, 9, 10, 11, and 12 a decrease in noise levels was predicted to occur for Build conditions due to a decrease of 2036 traffic volume at Arthur Kill Road, Victory Boulevard, and Travis Avenue. The Build traffic would be expected to decrease at these locations due to the reverse travel pattern caused by the new park roads (see Chapter 16: Traffic and Parking). At those locations where the proposed project would result in an increase in noise levels, the changes would not be perceptible, would be insignificant, and they would be below the CEQR threshold for a significant adverse impact. In terms of CEQR Noise Exposure Guidelines, noise levels at receptors from 1 through 12 would remain in the "marginally unacceptable" category, and noise levels at receptor 13 would remain in the "acceptable" category.

## Table 19-10
## 2016 Future Noise Levels With the Proposed Action (in dBA)

| Receptor | Location | | Time | No Build $L_{eq(1)}$ | Build $L_{eq(1)}$ | $L_{eq(1)}$ Change | Build $L_{10(1)}$ |
|---|---|---|---|---|---|---|---|
| 1 | West Shore Expressway Southbound Service Road at Muldoon Avenue | Weekday | AM | 71.9 | 72.3 | 0.4 | 75.6 |
| | | | MD | 73.1 | 73.6 | 0.5 | 76.7 |
| | | | PM | 72.6 | 73.0 | 0.4 | 76.2 |
| | | Saturday | MD | 71.9 | 72.2 | 0.3 | 76.3 |
| | | | PM | 73.0 | 73.3 | 0.3 | 76.8 |
| 2 | Arden Avenue between Forest Green and Bunnell Street | Weekday | AM | 74.4 | 74.4 | 0.0 | 77.9 |
| | | | MD | 73.4 | 73.4 | 0.0 | 76.6 |
| | | | PM | 73.2 | 73.2 | 0.0 | 77.1 |
| | | Saturday | MD | 73.6 | 73.7 | 0.1 | 77.3 |
| | | | PM | 73.7 | 73.7 | 0.0 | 77.4 |
| 3 | Arthur Kill Road East of Muldoon Avenue, between Muldoon Avenue and Shopping Center | Weekday | AM | 73.4 | 72.8 | -0.6 | 76.2 |
| | | | MD | 71.9 | 71.5 | -0.4 | 75.1 |
| | | | PM | 71.6 | 71.1 | -0.5 | 74.4 |
| | | Saturday | MD | 71.2 | 70.8 | -0.4 | 73.9 |
| | | | PM | 70.7 | 70.3 | -0.4 | 73.4 |
| 4 | Forest Hill Road between Independence and Richmond Avenues | Weekday | AM | 72.6 | 72.9 | 0.3 | 76.3 |
| | | | MD | 72.3 | 72.8 | 0.5 | 76.2 |
| | | | PM | 72.7 | 73.0 | 0.3 | 76.4 |
| | | Saturday | MD | 71.1 | 71.4 | 0.3 | 75.2 |
| | | | PM | 70.2 | 70.6 | 0.4 | 73.7 |
| 5 | Forest Hill Road at Stone Lane | Weekday | AM | 74.8 | 75.0 | 0.2 | 78.9 |
| | | | MD | 75.1 | 75.6 | 0.5 | 79.1 |
| | | | PM | 74.6 | 75.0 | 0.4 | 78.5 |
| | | Saturday | MD | 74.6 | 75.0 | 0.4 | 78.2 |
| | | | PM | 73.3 | 73.7 | 0.4 | 77.3 |
| 6 | Richmond Hill Road between Merry Mount Street and Racal Court | Weekday | AM | 70.5 | 70.5 | 0.0 | 74.3 |
| | | | MD | 70.7 | 70.7 | 0.0 | 74.1 |
| | | | PM | 72.4 | 72.4 | 0.0 | 74.4 |
| | | Saturday | MD | 68.6 | 68.6 | 0.0 | 72.2 |
| | | | PM | 66.9 | 66.9 | 0.0 | 69.6 |
| 7 | Victory Boulevard between Melvin and Wild Avenues | Weekday | AM | 67.3 | 66.9 | -0.4 | 70.6 |
| | | | MD | 64.3 | 63.4 | -0.9 | 65.9 |
| | | | PM | 67.7 | 67.1 | -0.6 | 70.0 |
| | | Saturday | MD | 71.3 | 70.7 | -0.6 | 73.6 |
| | | | PM | 70.0 | 69.4 | -0.6 | 72.5 |
| 8 | West Shore Expressway Southbound Service Road, South of Victory Boulevard | Weekday | AM | 74.4 | 74.7 | 0.3 | 77.7 |
| | | | MD | 71.3 | 71.9 | 0.6 | 74.4 |
| | | | PM | 67.8 | 68.0 | 0.2 | 70.8 |
| | | Saturday | MD | 70.0 | 70.3 | 0.3 | 73.2 |
| | | | PM | 68.4 | 68.8 | 0.4 | 71.6 |
| 9 | Arthur Kill Road between Arden Avenue and Carlyle Green | Weekday | AM | 70.4 | 67.7 | -2.7 | 70.6 |
| | | | MD | 70.9 | 68.3 | -2.6 | 70.3 |
| | | | PM | 68.4 | 65.8 | -2.6 | 69.1 |
| | | Saturday | MD | 68.9 | 65.7 | -3.2 | 68.4 |
| | | | PM | 69.6 | 66.5 | -3.1 | 70.2 |
| 10 | Arthur Kill Road between Cortelyou and Ridgewood Avenues | Weekday | AM | 74.2 | 74.2 | 0.0 | 76.6 |
| | | | MD | 73.2 | 73.2 | 0.0 | 75.9 |
| | | | PM | 64.5 | 64.5 | 0.0 | 66.8 |
| | | Saturday | MD | 69.7 | 69.4 | -0.3 | 71.2 |
| | | | PM | 69.2 | 68.9 | -0.3 | 71.1 |
| 11 | Travis Avenue between Freedom and Mulberry Avenues | Weekday | AM | 75.5 | 75.3 | -0.2 | 77.9 |
| | | | MD | 73.8 | 73.3 | -0.5 | 76.7 |
| | | | PM | 72.7 | 72.5 | -0.2 | 75.9 |
| | | Saturday | MD | 71.3 | 71.0 | -0.3 | 74.5 |
| | | | PM | 71.7 | 71.4 | -0.3 | 75.0 |
| 12 | Victory Boulevard between Travis and Shenandoah Avenues | Weekday | AM | 71.6 | 71.4 | -0.2 | 74.0 |
| | | | MD | 71.8 | 71.5 | -0.3 | 73.4 |
| | | | PM | 72.3 | 72.1 | -0.2 | 73.0 |
| | | Saturday | MD | 65.1 | 64.8 | -0.3 | 67.7 |
| | | | PM | 66.0 | 65.8 | -0.2 | 68.5 |
| 13 | Wild Avenue between Alberta and Roswell Avenues** | Weekday | AM | 60.3 | 60.5 | 0.2 | 61.7 |
| | | | MD | 59.7 | 60.0 | 0.3 | 61.6 |
| | | | PM | 59.7 | 60.0 | 0.3 | 60.2 |
| | | Saturday | MD | 59.9 | 60.3 | 0.4 | 62.1 |
| | | | PM | 59.3 | 59.8 | 0.5 | 61.7 |
| A* | The dead end at Melvin Avenue adjacent to the proposed park | Weekday | AM | 55.3 | 56.1 | 0.8 | 57.3 |
| | | | MD | 52.3 | 53.8 | 1.5 | 55.4 |
| | | | PM | 53.3 | 54.7 | 1.4 | 54.9 |
| | | Saturday | MD | 53.9 | 56.7 | 2.8 | 58.5 |
| | | | PM | 55.0 | 58.1 | 3.1 | 60.0 |

**Note:** * Receptor A was selected for assessing noise from the proposed softball field.

## Table 19-11
## 2036 Future Noise Levels With the Proposed Action (in dBA)

| Receptor | Location | | Time | No Build $L_{eq(1)}$ | Build $L_{eq(1)}$ | $L_{eq(1)}$ Change | Build $L_{10(1)}$ |
|---|---|---|---|---|---|---|---|
| 1 | West Shore Expressway Southbound Service Road at Muldoon Avenue | Weekday | AM | 72.7 | 73.2 | 0.5 | 76.5 |
| | | | MD | 74 | 74.7 | 0.7 | 77.8 |
| | | | PM | 73.5 | 74.1 | 0.6 | 77.3 |
| | | Saturday | MD | 72.7 | 73.4 | 0.7 | 77.5 |
| | | | PM | 73.9 | 74.5 | 0.6 | 78 |
| 2 | Arden Avenue between Forest Green and Bunnell Street | Weekday | AM | 75.2 | 75.2 | 0.0 | 78.7 |
| | | | MD | 74.2 | 74.2 | 0.0 | 77.4 |
| | | | PM | 73.9 | 74 | 0.1 | 77.9 |
| | | Saturday | MD | 74.3 | 74.4 | 0.1 | 78 |
| | | | PM | 74.4 | 74.6 | 0.2 | 78.3 |
| 3 | Arthur Kill Road East of Muldoon Avenue, between Muldoon Avenue and Shopping Center | Weekday | AM | 74.2 | 73.6 | -0.6 | 77 |
| | | | MD | 72.7 | 72.4 | -0.3 | 76 |
| | | | PM | 72.3 | 71.9 | -0.4 | 75.2 |
| | | Saturday | MD | 72 | 71.8 | -0.2 | 74.9 |
| | | | PM | 71.4 | 71.1 | -0.3 | 74.2 |
| 4 | Forest Hill Road between Independence and Richmond Avenues | Weekday | AM | 73.4 | 73.6 | 0.2 | 77 |
| | | | MD | 73.1 | 73.6 | 0.5 | 77 |
| | | | PM | 73.4 | 73.5 | 0.1 | 76.9 |
| | | Saturday | MD | 71.8 | 72.1 | 0.3 | 75.9 |
| | | | PM | 71 | 71.3 | 0.3 | 74.4 |
| 5 | Forest Hill Road at Stone Lane | Weekday | AM | 75.5 | 75.7 | 0.2 | 79.6 |
| | | | MD | 75.8 | 76.4 | 0.6 | 79.9 |
| | | | PM | 75.3 | 75.5 | 0.2 | 79 |
| | | Saturday | MD | 75.4 | 75.7 | 0.3 | 78.9 |
| | | | PM | 74.1 | 74.4 | 0.3 | 78 |
| 6 | Richmond Hill Road between Merry Mount Street and Racal Court | Weekday | AM | 71.3 | 71.7 | 0.4 | 75.5 |
| | | | MD | 71.4 | 72 | 0.6 | 75.4 |
| | | | PM | 73.2 | 73.7 | 0.5 | 75.7 |
| | | Saturday | MD | 69.4 | 69.9 | 0.5 | 73.5 |
| | | | PM | 67.7 | 68.1 | 0.4 | 70.8 |
| 7 | Victory Boulevard between Melvin and Wild Avenues | Weekday | AM | 68.1 | 67.7 | -0.4 | 71.4 |
| | | | MD | 65.1 | 64.4 | -0.7 | 66.9 |
| | | | PM | 68.4 | 68.1 | -0.3 | 71 |
| | | Saturday | MD | 72 | 71.5 | -0.5 | 74.4 |
| | | | PM | 70.7 | 70.3 | -0.4 | 73.4 |
| 8 | West Shore Expressway Southbound Service Road, South of Victory Boulevard | Weekday | AM | 75.2 | 75.6 | 0.4 | 78.6 |
| | | | MD | 72.1 | 72.9 | 0.8 | 75.4 |
| | | | PM | 68.6 | 69.1 | 0.5 | 71.9 |
| | | Saturday | MD | 70.8 | 71.4 | 0.6 | 74.3 |
| | | | PM | 69.2 | 69.9 | 0.7 | 72.7 |
| 9 | Arthur Kill Road between Arden Avenue and Carlyle Green | Weekday | AM | 71.1 | 68.5 | -2.6 | 71.4 |
| | | | MD | 71.7 | 69.2 | -2.5 | 71.2 |
| | | | PM | 69.2 | 66.6 | -2.6 | 69.9 |
| | | Saturday | MD | 69.7 | 66.7 | -3.0 | 69.4 |
| | | | PM | 70.4 | 67.2 | -3.2 | 70.9 |
| 10 | Arthur Kill Road between Cortelyou and Ridgewood Avenues | Weekday | AM | 75 | 75.1 | 0.1 | 77.5 |
| | | | MD | 73.9 | 74.1 | 0.2 | 76.8 |
| | | | PM | 65.3 | 65.5 | 0.2 | 67.8 |
| | | Saturday | MD | 70.5 | 70.2 | -0.3 | 72 |
| | | | PM | 69.9 | 69.6 | -0.3 | 71.8 |
| 11 | Travis Avenue between Freedom and Mulberry Avenues | Weekday | AM | 76.3 | 76 | -0.3 | 78.6 |
| | | | MD | 74.5 | 74.1 | -0.4 | 77.5 |
| | | | PM | 73.4 | 73.2 | -0.2 | 76.6 |
| | | Saturday | MD | 72.1 | 71.8 | -0.3 | 75.3 |
| | | | PM | 72.4 | 72.1 | -0.3 | 75.7 |
| 12 | Victory Boulevard between Travis and Shenandoah Avenues | Weekday | AM | 72.4 | 72.2 | -0.2 | 74.8 |
| | | | MD | 72.6 | 72.3 | -0.3 | 74.2 |
| | | | PM | 73 | 72.9 | -0.1 | 73.8 |
| | | Saturday | MD | 65.9 | 65.7 | -0.2 | 68.6 |
| | | | PM | 66.8 | 66.6 | -0.2 | 69.3 |
| 13 | Wild Avenue between Alberta and Roswell Avenues** | Weekday | AM | 60.7 | 61.1 | 0.4 | 62.3 |
| | | | MD | 60.0 | 60.7 | 0.7 | 62.3 |
| | | | PM | 60.3 | 61.0 | 0.7 | 61.2 |
| | | Saturday | MD | 60.1 | 61.1 | 1.0 | 62.9 |
| | | | PM | 59.7 | 60.8 | 1.1 | 62.7 |
| A* | The dead end at Melvin Avenue adjacent to the proposed park | Weekday | AM | 59.2 | 60.4 | 1.2 | 61.6 |
| | | | MD | 56.2 | 58.2 | 2.0 | 59.8 |
| | | | PM | 57.2 | 59.3 | 2.1 | 59.5 |
| | | Saturday | MD | 55.3 | 58.9 | 3.6 | 60.7 |
| | | | PM | 55.8 | 60.0 | 4.2 | 61.9 |

**Note:** * Receptor A was selected for assessing noise from the proposed softball field.

At receptor A (i.e., the closest residence adjacent to the proposed parking lot and softball field) the maximum increase in $L_{eq(1)}$ noise levels would be 4.2 dBA. The major contributor for these increases in noise levels would be noise from the project-generated traffic. Changes of these magnitudes would be noticeable, but they would not exceed the CEQR threshold for a significant adverse impact. In terms of CEQR Noise Exposure Guidelines, noise levels at receptor A would remain in the "acceptable" category.

## ACCEPTABILITY OF AMBIENT NOISE LEVELS IN THE PROPOSED PARK

Noise levels within Fresh Kills Park 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 19-5). Maximum $L_{10(1)}$ noise levels would be the high 80s dBA at locations near the outdoor amphitheater (when events are taking place in the amphitheatre), maximum $L_{10(1)}$ noise levels would be the high 70s dBA at locations near the West Shore Expressway, and average $L_{10(1)}$ noise levels would be the mid 60s dBA at the center area of proposed park. These predicted noise levels would result from the noise generated by traffic on the nearby West Shore Expressway and new park roadways, as well as activities in the new park. 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. However, the noise levels in the new park would be comparable to noise levels in portions of other parks that are also located adjacent to trafficked roadways, including South Shore Golf Course Park, Arden Heights Woods Park, LaTourette Park, and Willowbrook Park. Although the 55 dBA $L_{10(1)}$ guideline is a worthwhile goal for outdoor areas requiring serenity and quiet, this relatively low noise level is typically not achieved in parks and open space areas in New York City. Consequently, noise levels in the Fresh Kills Park, while exceeding the 55 dBA $L_{10(1)}$ CEQR guideline value, would not result in a significant adverse noise impact.

### *PROPOSED COMMERCIAL WIND TURBINES*

Commercial wind turbines have the potential to provide many environmental benefits, but if not properly designed and sited, can result in noise impacts. The program for the Fresh Kills Park project may include up to five commercial wind turbines.[1] At this time, design and locations for these wind turbines have not been finalized. Therefore, a detailed analysis of potential environmental impacts, including noise and vibration, cannot be performed for this FGEIS. However, some general conclusions can be made regarding potential noise impacts from these sources.

While the specific make and model of the wind turbines to be installed at the Fresh Kills Park is not yet determined, as described in Chapter 1, "Project Description," the commercial wind turbines are expected to have a rotor diameter between approximately 250 and 320 feet and a maximum ground-to-hub height of approximately 300 feet. Consequently, the maximum height for the proposed wind turbines would be approximately 460 feet (a 300-foot tower combined with a 320-foot rotor). Each wind turbine is expected to have an electrical output in the range of 1.5 to 2.5 megawatts (MW).

Sound emissions from wind turbines of this size typically have two different origins: (1) mechanical noise, or noise associated with the metal components making contact with each other in the gearbox, drive train, and/or the generator, and (2) aerodynamic noise, or noise associated with the wind hitting

[1] Alternative 1 in the BQ Energy feasibility study conducted for Fresh Kills included two wind turbines in West Park for a total of seven; it was the conclusion of DPR that wind turbines in West Park would be incompatible with City plans for the proposed 9-11/WTC Monument at this location. This five-turbine design is consistent with Alternative 2 in the BQ Energy study.

the rotor blades at a certain speed or setting a surface in vibration. Sound power levels for 1.5 to 2.5 MW wind turbines vary widely, but commonly range from approximately 90 dBA to 115 dBA depending on the make/model of the wind turbine and the wind speed. Wind turbine sound power levels are directly related to wind speed (i.e., a higher wind speed produces a higher sound power level). For point sources, such as a single wind turbine, the sound level decreases by approximately 6 dBA (for hard ground conditions) every time the distance between the source and the receiver is doubled. The estimated sound pressure level from a single wind turbine can be calculated at a receiving property using the following equation:

$$SPL=PWL - 20 * LOG (d) + 2.5$$

Where:

PWL is the sound power level in dBA

d is the distance (in meters) between the wind turbine and the receiving property

SPL is the sound pressure level in dBA from a wind turbine with a certain PWL at distance (d)

Using the above equation, the estimated sound pressure level at approximately 1,000 feet (300 meters) was calculated for five commercial wind turbines with a sound power level of 90 dBA and 115 dBA. The results of this calculation are shown in Table 19-12. A determination of impacts on noise sensitive receptors, such as residential uses and schools, would therefore need to consider these distances for these types of commercial wind turbines in order to avoid noise impacts surrounding uses.

**Table 19-12**
**Assessment of Potential Noise Impacts from Commercial Wind Turbines (distance of approximately 1,000 feet)**

| Sound Power Level (dBA) | Estimated Sound Pressure Level at Receiving Property (dBA) |
|---|---|
| 90 | 41 |
| 115 | 66 |

As the project design progresses and more details regarding the turbine design are developed as part of a site-specific project, detailed analyses, including noise and vibration, would be performed as part of a site-specific environmental review in order to ensure that the siting of the commerical wind turbines would not result in any significant adverse impacts on local residences, community receptors, or existing parks.

**CONCLUSIONS**

The proposed project would not result in significant adverse noise impacts from increased traffic or stationary noise sources.

Although noise levels within Fresh Kills Park would be above the *CEQR Technical Manual* noise exposure guideline of 55 dBA $L_{10(1)}$ for outdoor areas requiring serenity and quiet, they would be comparable to noise levels in several other New York City parks, including South Shore Golf Course Park, Arden Heights Woods Park, LaTourette Park, and Willowbrook Park, and would not result in a significant adverse noise impact.

Potential impacts regarding commercial wind turbines are presented above as a generic impact assessment. As described above, the general parameters for noise impact evaluation are presented that could be addressed as part of a site-specific evaluation of noise impacts from a commercial wind turbine project. ✷