Chapter 17: NOISE

17.1 Introduction

This chapter discusses potential impacts to the neighborhood noise environment as a result of the operation of the proposed Fountain Avenue Land Use Improvement and Residential Development project. The analysis was performed in accordance with guidelines contained in the *CEQR Technical Manual.*

The *CEQR Technical Manual* requires that if an action could result in the generation of additional mobile or stationary source noise, then the potential for significant adverse impacts should be evaluated. Therefore, an analysis was prepared to evaluate the potential effect of the proposed action on noise levels at existing and potential future noise sensitive locations in the area surrounding the proposed action. Existing noise levels are predominantly the result of vehicular traffic. Future noise sensitive locations include areas that would be developed for residential, commercial, and open space uses.

In order to assess the potential for significant adverse noise impacts, an analysis is conducted that considers changes in noise due to increases in traffic and the introduction of sensitive receptors into an area with maximum existing ambient noise levels classified as "marginally unacceptable," as defined in the *CEQR Technical Manual*. The noise analysis addresses two factors: 1) the change in noise levels from the existing conditions in the area as a result of the proposed action; and 2) the location of new sensitive receptors and the degree to which window/wall attenuation would provide acceptable interior noise levels.

No dominant stationary sources of noise are identified within the study area. As a result, further analysis of existing stationary source noise is not conducted.

17.2 Principal Conclusions

The proposed action would not result in significant adverse impacts related to mobile or stationary source noise. None of the studied locations would experience perceptible increases to exterior noise levels related to a doubling of traffic volumes. The resulting maximum increase in the With Action noise level compared to the No Action noise level would be only 1.4 A-weighted decibels ("dBA"). In addition, loud stationary noise sources are not identified within the project study area, and all project-related

mechanical systems would adhere to the requirements contained within the revised 2005 NYC Noise Code.

As part of the proposed action, the Restrictive Declaration would include project requirements to avoid the potential for significant adverse noise impacts to interior locations identified along the facades of the proposed development parcels. The proposed action would be required to provide sufficient window attenuation to maintain the CEQR interior noise level requirement of 45 dBA or lower. These proposed window-wall attenuation requirements would be included in the project's Restrictive Declaration. Consequently, these requirements would preclude the potential for the proposed action to result in significant adverse noise impacts.

17.3 Acoustical Fundamentals

Noise in a community can come from man-made sources, such as automobiles, trucks, buses, aircraft, and construction equipment, as well as industrial, commercial, transportation, and manufacturing facilities. Environmental noise can also originate from natural sources, such as animals, insects and wind. Table 17-1, "Typical Noise Levels," lists some typical activities, their noise levels, and the effects that they have on humans.

Noise levels, which are measured in units called decibels ("dB"), relate the magnitude of the sound pressure to a standard reference value. While the noise values of certain activities can approach 135 dB, normally encountered sounds lie in the range of 40 to 120 dB.

Table 17-1: Typical Noise Levels

Common Outdoor Noises	Sound Pressure Level (dBA)	Common Indoor Noises
	110	Rock Band at 15 feet
Jet flyover at 1000 feet		
	100	
		Inside NYC Subway Train
Gas lawnmower at 3 feet		
	90	
Diesel truck at 50 feet		Food blender at 3 feet
		Garbage disposal at 3 feet
Noisy urban setting - daytime	80	
		Shouting at 3 feet
Gas lawnmower at 100 feet	70	Vacuum cleaner at 10 feet
Commercial area		Normal speech at 3 feet
	60	
		Large business office
Quiet urban setting - daytime	50	Dishwasher - next room
		Small theater
Quiet urban setting - nighttime	40	Large conference room and library
Quiet suburban setting - nighttime		
	30	
Quiet rural - nighttime		Bedroom at night
		Large concert hall (background)
	20	
		Broadcast and recording studio
	10	
		Threshold of hearing
	0	

Source: CALTRANS/STV Incorporated, 2016.

"A" – WEIGHTED SOUND LEVEL (dBA)

Noises contain sound energy at different frequencies whose range depends on the individual noise source. Human hearing does not register the sound levels of all noise frequencies equally, and reduces the impression of high- and low-pitched sounds. Over the normal range of hearing, humans are most sensitive to sounds with frequencies in the range of 20 to 10,000 hertz ("Hz"). To replicate the response of the human ear to noise, the noise levels at different frequencies must be adjusted. Utilizing this practice, the resulting level, commonly expressed as dBA, is said to be an A-weighted sound level, and enables these noise levels to be more representative of what a human would actually hear.

NOISE DESCRIPTORS USED IN EIS

Noise levels from human activities also vary widely over time. The equivalent noise level ("L_{eq}") represents the time-varying noise level produced over a period of time as a single number over that same period of time. This represents the equivalent steady noise level which, over a given period, contains the same energy as the time-varying noise during the same period (i.e. noise from a building ventilation fan vs. a train passage or a pile driving event). The period of time used in most noise assessments is the noise over one hour, represented as $L_{eq}(h)$. This descriptor is commonly used to express results from noise measurements, predictions and impact assessments. Another useful descriptor often used in the assessment of noise is L_{10}. L_{10} is defined as the sound pressure level exceeded 10 percent of the time, and is often used to describe noise generated from traffic sources. L_{10} is usually regarded as an indication of traffic noise exposure with a steady flow of evenly-spaced vehicles. Either descriptor may be used in the analysis of highway noise, but as the proposed action is situated in a community environment, the L_{eq} noise descriptor was determined to be the most appropriate. The L_{10} has been found over the years to be a useful descriptor of road traffic noise as it correlates quite well with the disturbance people feel when close to busy roads, as well as more rural situations. The L_{10} descriptor may be considered an average of the peak noise levels at a given location. In community noise measurements, L_{eq} generally lies between L_{10} and L_{50}, but is often closer to L_{10} where fluctuating traffic noise is the dominant noise source. Another descriptor, L_{dn}, is the day-night equivalent sound level defined as a 24-hour continuous L_{eq} with a 10 dB adjustment added to all hourly noise levels recorded between the hours of 10 PM and 7 AM. This descriptor was also used in this analysis to describe the existing noise environment over a full 24-hour period.

A few general relationships with respect to noise levels may be helpful in understanding the dB scale:

- Doubling of the noise energy produces a three dB increase in noise level. A three dB increase is normally the smallest change in sound levels that are perceptible to the human ear.
- A ten dB increase in noise level corresponds to a tenfold increase in noise energy; however, a listener would only judge a ten dB increase as being twice as loud.
- A 20 dB increase would result in a "dramatic change" in how a listener would perceive the sound.

17.4 Noise Standards and Criteria

CEQR TECHNICAL MANUAL NOISE STANDARDS

The New York City Department of Environmental Protection ("NYCDEP") has established standards for noise exposure at sensitive receptors resulting from the implementation of a project. During daytime hours (between 7 AM and 10 PM), nuisance levels for noise are generally considered to be more than 45 dBA indoors and 70 to 75 dBA outdoors. Indoor activities are subject to task interference above this level, and 70 to 75 dBA is the level at which speech interference occurs outdoors. Typical construction techniques used in the past (including typical single-glazed windows) provide a minimum of approximately 20 dBA of noise attenuation from outdoor to indoor areas. As a result, CEQR noise standards are based on a daytime threshold noise level of 65 dBA, which should not be significantly exceeded. The impact thresholds are described below:

- An increase of five dBA $L_{eq(1)}$ or greater over the No Action noise level would be a significant adverse impact if the No Build noise level is 60 dBA $L_{eq(1)}$ or less.
- If the No Action noise level is 61 dBA $L_{eq(1)}$, a four dBA $L_{eq(1)}$ increase would be considered significant.
- If the No Action noise level is 62 dBA $L_{eq(1)}$ or more, a three dBA $L_{eq(1)}$ increase or greater would be considered significant.
- A significant adverse impact would occur during the nighttime period (defined by CEQR standards as being between 10 PM and 7 AM) if there is a change in noise levels of three dBA $L_{eq(1)}$ or more.

Much of NYC, including portions of the proposed action study area, experience ambient noise levels that are currently more than 65 dB. In these cases, a significant increase would occur if the No Action noise level is increased by three dbA $L_{eq(1)}$ or greater.

CEQR Noise Exposure Standards

NYCDEP has also promulgated standards that apply to a proposed project if it is also a sensitive receptor, such as a residence, hospital, or school. In addition, NYCDEP has established four categories of acceptability based on receptor type and land use for vehicular traffic, rail, and aircraft-related noise sources. The categories include "generally acceptable," "marginally acceptable," "marginally

unacceptable," and "clearly unacceptable." Table 17-2, "Noise Exposure Standards for Use in City Environmental Quality Review," shows attenuation values and external noise exposure standards as they relate to traffic, aircraft, and rail noise.

Table 17-2: Noise Exposure Standards for Use in City Environmental Quality Review[1]

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

Notes:

In addition, any new activity shall not increase the ambient noise level by 3 dBA or more:

1. Measurements and projections of noise exposures are to be made at appropriate heights above site boundaries as given by 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 of 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 Land 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: NYCDEP (adopted by DEP for use in CEQR 1983)

NEW YORK CITY NOISE CODE

Specific noise standards for the proposed development site would be governed by the 2005 New York City Noise Code. Table 17-3, "2005 New York City Noise Code," shows the permitted sound levels for sources operating in connection with any residential, commercial or business enterprises. Acceptable levels are shown for designated octave bands as displayed in Table 17-3. These noise levels do not apply to construction activities or equipment, but do apply to mechanical systems which may be related to the proposed action's operation.

Table 17-3: 2005 New York City Noise Code

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

Source: NYC Noise Code, 2005

17.5 Existing Noise Levels

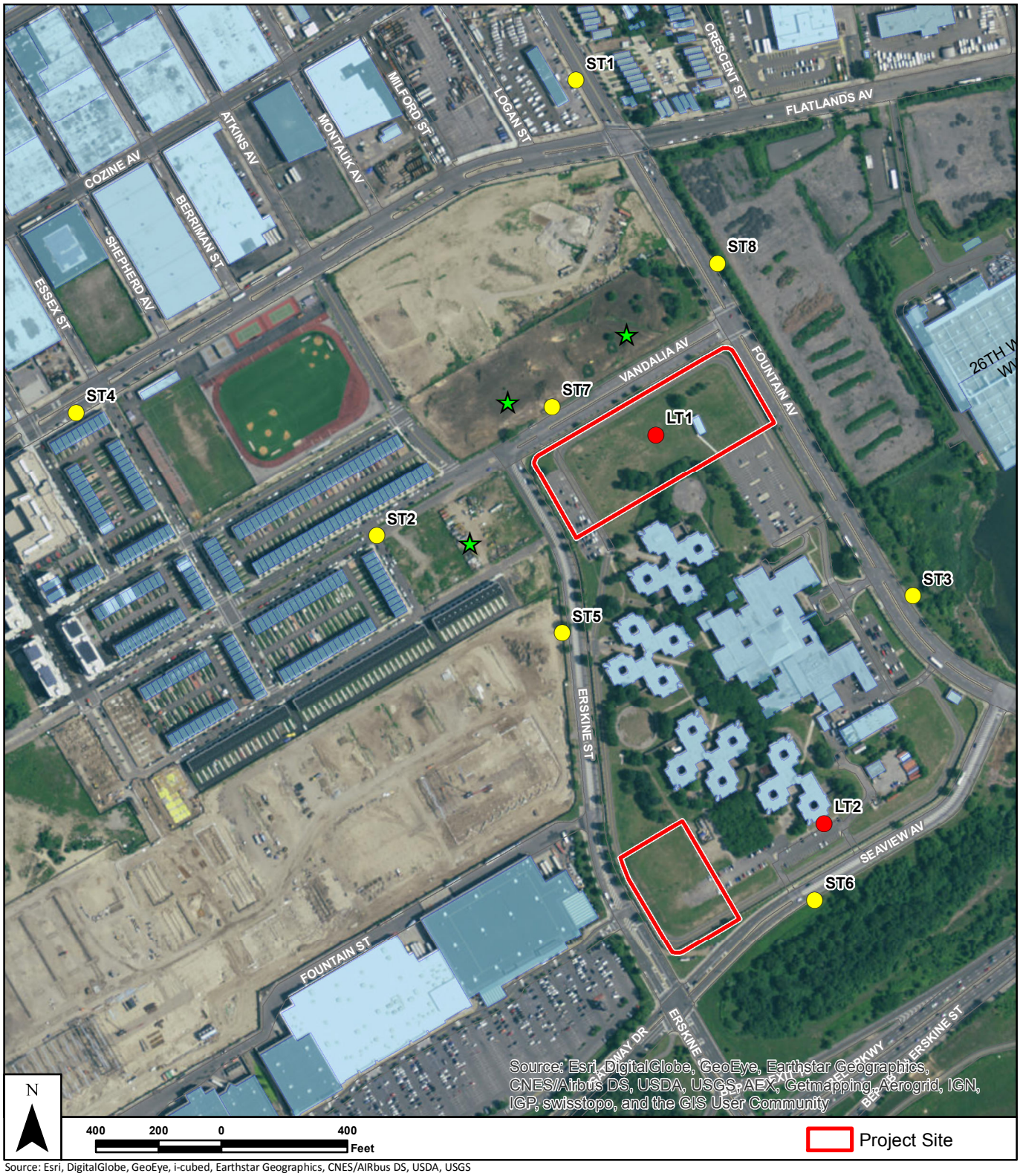
The proposed action is located in an area that is exposed to numerous sources of noise. These sources include vehicular traffic from local streets, airplanes taking off and landing at the nearby John F. Kennedy International Airport ("JFK Airport"), and highway noise from the Belt Parkway situated to the south of the two development parcels. The dominant source of neighborhood noise comes from local vehicular traffic and aircraft noise. The principal traffic corridors in the vicinity of the proposed action include Fountain Avenue, Seaview Avenue, Erskine Street and Vandalia Avenue. Of these traffic routes, the northern portion of Fountain Avenue and Seaview Avenue are the noisiest, as volumes along these roadways tend to be the greatest. Because of the proximity of the project site to JFK Airport, and the frequency of airplane flyovers, noise from air traffic represents a substantial portion of the normal background noise experienced by neighborhood residents.

NOISE MONITORING LOCATIONS

Information concerning specific land usage in and around the project site, as well as trip assignments for potential future uses, were reviewed to select monitoring sites and assess future noise impacts on existing and future sensitive land uses. The eight monitoring sites depicted on Figure 17-1, "Noise Monitoring Sites," are representative of the sensitive land uses in the area and locations where additional new vehicle trips are expected and, therefore, could potentially result in an increase in future noise levels. Measured noise levels represent the existing noise exposure conditions experienced by sensitive receptors at these locations.

Noise monitoring was performed on several weekdays from May 4th to May 20th, 2015. The time periods chosen for noise monitoring include the AM, Midday and PM peak traffic periods. These time periods are the peak hours when the majority of existing and future project-generated traffic would be passing these locations. Weekday AM, Midday and PM monitoring take into account the peak work week, commercial, and school-related traffic. Measurements were conducted for 20 minutes, during which simultaneous traffic counts were taken.

In addition to $L_{eq}(h)$ and L_{10} noise levels, other statistical noise descriptors (L_{50}, L_{90}, L_{max} and L_{min}) were also sampled at all locations for all time periods. For the proposed action, the analysis of potential significant adverse noise impacts utilized the L_{10} and $L_{eq}(h)$ descriptors. The other noise descriptors collected during the monitoring program are utilized to assist in the characterization of the existing noise environment. Typically, L_{50} tends to describe the statistical median noise value, while the L_{90} typically describes the residual background noise level in an environment.



Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/AIRbus DS, USDA, USGS AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community.

- Under Construction (Gateway Estates II)
- Short-term Monitoring Site
- Long-term Monitoring Site
- Building

Figure 17-1

NOISE MONITORING SITES

Fountain Avenue Land Use Improvement and Residential Project

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EQUIPMENT USED DURING NOISE MONITORING

Noise measurements were taken with a Larson & Davis Model LXT Type I sound level meter ("SLM"). A windscreen was placed over the microphone for all measurements. The SLM had a laboratory calibration date within the past year at the time of use, as is standard practice. The meter was also properly field calibrated for all measurements using a Larson & Davis Model Cal250 calibrator. There were no significant variances between the beginning and ending calibration measurements. To avoid distortion, the measuring microphone was placed a minimum of 3 to 4 feet away from any reflecting surfaces, including the ground, walls, and the body of the person performing the measurements. Weather conditions during the measurement periods, with respect to temperature and wind conditions, were conducive to obtaining valid noise readings as per guidelines outlined in ANSI Standard S1.13-2005.

EXISTING NOISE LEVELS AT NOISE RECEPTOR LOCATIONS

Short-Term Noise Monitoring

The results of baseline short-term noise measurements are presented in Table 17-4, "Existing Short-Term Noise Levels at Monitoring Sites ST1 through ST8." Daytime noise levels at all of the receptor sites are fairly typical of noise levels throughout the study area. A steady background noise exists at all locations due to consistent traffic movement on nearby streets and aircraft landings and takeoffs. The background noise level L_{90} is in the range of 49.2 to 61.1 dBA. The highest L_{10} monitored noise level was measured during the Midday peak period at site ST6 (Seaview Avenue between Erskine Street and Fountain Avenue), where a noise level of 73.3 dBA was measured. This level of exposure places this site, along with ST1, ST3, ST4, ST7 and ST8, under the CEQR defined "marginally unacceptable" category. The remaining two noise locations, ST2 and ST5, are under the CEQR defined "marginally acceptable" category. The categorization of these monitoring sites is based on the results of baseline noise monitoring and *CEQR Technical Manual* noise exposure standards, also shown in Table 17-2, "Noise Exposure Standards for Use in City Environmental Quality Review."

Table 17-4: Existing Short-Term Noise Levels at Monitoring Sites ST1 through ST8

Site #	Location	Peak Period Measurement Times	Existing Noise Level				CEQR Noise Exposure Category*
			L_{EQ}	L_{10}	L_{50}	L_{90}	
ST1	Fountain Avenue between Cozine Avenue & Flatlands Avenue	AM	69.5	72.2	64.4	57.5	Marginally Unacceptable
		Midday	70.9	70.9	63.5	57.7	
		PM	68.9	72.2	65.5	59.6	
ST2	Vandalia Avenue between Essex Street & Atkins Avenue	AM	63.4	66.4	57.6	50.7	Marginally Acceptable
		Midday	62.7	64.4	54.8	51.2	
		PM	61.1	65.1	54.8	49.2	
ST3	Fountain Avenue between Vandalia Avenue & Seaview Avenue	AM	66.9	70.7	63.4	54.5	Marginally Unacceptable
		Midday	66.1	70.4	62.4	54.9	
		PM	68.0	72.1	65.1	60.3	
ST4	Flatlands Avenue between Essex Street & Linwood Street	AM	69.1	72.9	62.3	54.8	Marginally Unacceptable
		Midday	68.4	71.5	60.6	52.5	
		PM	67.9	72.0	63.3	53.4	
ST5	Erskine Street between Schroeders Avenue & Seaview Avenue	AM	65.3	68.7	63.8	59.0	Marginally Acceptable
		Midday	64.4	67.7	61.8	54.0	
		PM	66.0	69.3	64.3	57.3	
ST6	Seaview Avenue between Erskine Street & Fountain Avenue	AM	67.9	72.1	63.5	54.9	Marginally Unacceptable
		Midday	69.0	73.3	65.7	55.6	
		PM	70.5	72.5	65.7	61.1	
ST7	Vandalia Avenue between Erskine Street & Fountain Avenue	AM	67.2	69.6	62.8	59.8	Marginally Unacceptable
		Midday	64.2	67.3	59.4	50.6	
		PM	67.2	70.2	62.5	54.1	
ST8	Fountain Avenue between Flatlands Avenue & Vandalia Avenue	AM	67.5	70.7	62.9	56.4	Marginally Unacceptable
		Midday	69.4	72.3	65.6	59.9	
		PM	68.4	71.2	64.6	59.0	

Notes:
***** Noise exposure category classification was based on the highest noise level measured during any of the four time periods for each site

Source: STV Incorporated, 2016

Long-Term Noise Monitoring

In addition to the short-term noise measurements, two twenty-four hour noise measurements were also taken within the proposed study area. These measurements take into account existing noise, not only during the peak-hour periods, but also during off-peak periods. The measured noise levels are

primarily representative of noise conditions within the interior of the Brooklyn Developmental Center ("BDC") site, as well as residual noise from exterior vehicular and air traffic. As such, noise levels consist of existing traffic noise along neighborhood streets, as well as other ambient noise sources, such as overhead flights to and from JFK Airport and other random local off-peak noise sources from within the existing BDC site. The *CEQR Technical Manual* identifies 45 dBA as the acceptable limit for interior noise levels. As a result, when monitored noises levels would result in the 45 dBA interior noise limit being exceeded, appropriate attenuation at the project site must be considered. Measurements were taken at BDC buildings near the southern and northern site boundaries on May 18th and June 24th, 2015, respectively. These sites were chosen due to their proximity to the development parcels, as these locations would be representative of the proposed action's sensitive land uses.

As indicated in Table 17-5, "Monitored 24-hour L_{eq} & L_{10} Noise Measurements," a maximum L_{10} noise level of 61.6 dBA was recorded at Site LT1, between 3:00PM and 4:00PM. This noise level falls within the CEQR threshold range of "acceptable" noise exposure for residential uses. The remaining monitored noise levels during the 24-hour period all fall within either the "acceptable" or "marginally acceptable" CEQR threshold ranges.

The second 24-hour noise measurement, taken at Site LT2, resulted in a maximum L_{10} noise level of 69.9 dBA, recorded between 9:00PM and 10:00PM. This noise level falls just within the CEQR threshold range of "marginally acceptable" noise exposure for residential uses. The remaining monitored noise levels, during the 24-hour period, all fall within either the "acceptable" or "marginally acceptable" CEQR threshold ranges.

Figure 17-1, "Noise Monitoring Sites," shows the locations of both the 1-hour and the 24-hour measurement sites.

Table 17-5: Monitored 24-hour L_{eq} & L_{10} Noise Measurements*

Site LT1			**Site LT2**		
North End			**South End**		
Brooklyn Developmental Center			**Brooklyn Developmental Center**		
Start Hour	L_{eq}	L_{10}	Start Hour	L_{eq}	L_{10}
12:00 PM	56.3	59.3	12:00 PM	60.3	61.8
1:00 PM	56.9	59.9	1:00 PM	62.1	64.2
2:00 PM	55.8	58.8	2:00 PM	63.5	66.0
3:00 PM	58.6	61.6	3:00 PM	65.6	68.8
4:00 PM	58.3	61.3	4:00 PM	63.5	66.4
5:00 PM	58.1	61.1	5:00 PM	64.7	68.5
6:00 PM	55.6	58.6	6:00 PM	66.1	69.5
7:00 PM	57.8	60.8	7:00 PM	65.2	69.0
8:00 PM	57.8	60.8	8:00 PM	64.9	68.5
9:00 PM	57.6	60.6	9:00 PM	66.7	69.9
10:00 PM	57.5	60.5	10:00 PM	67.8	69.2
11:00 PM	55.1	58.1	11:00 PM	63.6	66.0
12:00 AM	51.3	54.3	12:00 AM	63.3	64.1
1:00 AM	48.9	51.9	1:00 AM	60.9	65.2
2:00 AM	49.8	52.8	2:00 AM	55.4	56.8
3:00 AM	48.4	51.4	3:00 AM	56.3	60.0
4:00 AM	47.9	50.9	4:00 AM	54.7	56.5
5:00 AM	51.4	54.4	5:00 AM	58.8	60.0
6:00 AM	55.0	58.0	6:00 AM	60.4	62.4
7:00 AM	54.0	57.0	7:00 AM	60.5	63.0
8:00 AM	54.6	57.6	8:00 AM	61.5	65.4
9:00 AM	57.5	60.5	9:00 AM	62.0	64.8
10:00 AM	58.2	61.2	10:00 AM	61.6	65.1
11:00 AM	56.9	59.9	11:00 AM	64.8	67.8

Notes:
*An existing L_{dn} for these two sites was calculated from the hourly 24-hour L_{eq} values. The resulting L_{dn}'s were 60.3dBA for Site LT1 and 68.8dBA for Site LT2.

Source: STV Incorporated, 2016

17.6 Noise Prediction Methodology

GENERAL METHODOLOGY

Proportional Modeling

In order to predict the noise levels in the future without the proposed action, monitored noise levels are projected by using a proportional modeling procedure, as per *CEQR Technical Manual* guidelines. This procedure takes into account the changes in noise levels due to increases in traffic associated with area growth. First, future traffic volumes are obtained by adding future 2028 traffic volumes to the existing baseline conditions. Then, vehicular traffic volumes under the existing and future conditions are converted into Passenger Car Equivalent ("PCE") values. For this conversion, one medium truck is estimated to generate the noise equivalent of 13 cars, one bus is estimated to generate the noise equivalent of 18 cars, and one heavy truck is estimated to generate the noise equivalent of 47 cars. Future noise levels are calculated using the following equation:

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

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

17.7 The Future Without The Proposed Action ("No Action" Conditions)

No Action noise levels are calculated utilizing the *CEQR Technical Manual* procedures previously described. These predicted noise levels are shown below in Table 17-6, "2028 No Action Noise Levels (dBA)."

Table 17-6: 2028 No Action Noise Levels (dBA)

Noise Site	Site Description	Peak Traffic Time Period	Existing $L_{eq(1)}$	No Action $L_{eq(1)}$	Change in L_{eq}	No Action $L_{10(1)}$	Impact?
ST1	Fountain Avenue (north of Flatlands Avenue)	AM	69.5	70.1	0.6	72.8	No
		MD	70.6	71.2	0.6	72.1	No
		PM	68.9	69.6	0.7	72.9	No
ST2	Vandalia Avenue (west of Erskine Street)	AM	63.4	65.1	1.7	68.1	No
		MD	62.7	63.7	1.0	65.4	No
		PM	61.1	62.8	1.7	66.8	No
ST3	Fountain Avenue (north of Seaview Avenue)	AM	66.9	67.8	0.9	71.6	No
		MD	66.1	66.3	0.2	70.6	No
		PM	68.0	68.2	0.2	72.3	No
ST4	Flatlands Avenue and Essex Street	AM	69.1	69.7	0.6	73.5	No
		MD	68.4	68.7	0.3	71.8	No
		PM	67.9	68.3	0.4	72.4	No
ST5	Erskine Street (south of Schroeders Avenue)	AM	65.3	66.6	1.3	70.0	No
		MD	64.4	65.3	0.9	68.6	No
		PM	66.0	67.6	1.6	70.9	No
ST6	Seaview Avenue (west of Fountain Avenue)	AM	67.9	68.1	0.2	72.3	No
		MD	69.0	69.2	0.2	73.5	No
		PM	70.5	70.7	0.2	72.7	No
ST7	Vandalia Avenue (east of Erskine Street)	AM	67.2	68.1	0.9	70.5	No
		MD	64.2	65.1	0.9	68.2	No
		PM	67.2	68.3	1.1	71.3	No
ST8	Fountain Avenue (north of Vandalia Avenue)	AM	67.5	67.8	0.3	71.0	No
		MD	69.4	69.9	0.5	72.8	No
		PM	68.4	69.0	0.6	71.8	No

Source: STV Incorporated, 2016

As indicated in Table 17-4, "Existing Short-Term Noise Levels at Monitoring Sites ST1 through ST8," the peak period individual existing L_{10} noise levels would fall under the "marginally acceptable" and "marginally unacceptable" category for residential uses at the studied locations. Future No Action L_{eq} noise levels at all of the studied locations, as shown in Table 17-6, would be higher than the existing

noise levels, with increases in the range of 0.2 to 1.7 dBA. Changes of this magnitude are considered to be below the threshold of human perception.

17.8 The Future With the Proposed Action ("With Action" Conditions)

NOISE IMPACT IDENTIFICATION

In order to predict noise levels in the future with the proposed action, the additional increase in traffic noise associated with the proposed action is added to the future No Action traffic noise conditions (see Table 17-7, "2028 With Action Noise Levels (dBA)"). Using the methodology cited above to calculate No Action traffic noise, there would be no perceptible differences in traffic noise levels at the project site as a result of project-related traffic. At site ST2, where the greatest difference in traffic volumes is expected, the difference in noise level conditions in the future With Action compared to the No Action conditions' noise levels is predicted to be 1.4 dB. The differences in noise level at the remaining sites are predicted to be in the range of 0.0 dB to 0.9 dB. The differences at these locations would be considered insignificant and imperceptible. As a result of the proposed action, the difference in the proposed action noise level over the No Action noise level would not exceed the three dBA CEQR threshold at any of the receptor sites. Therefore, significant adverse noise impacts from mobile sources are not predicted to occur.

Table 17-7: 2028 With Action Noise Levels (dBA)

Noise Site	Site Description	Peak Traffic Time Period	No Action $L_{eq(1)}$	With Action $L_{eq(1)}$	Change in L_{eq}	With Action $L_{10(1)}$	Impact?
ST1	Fountain Avenue (north of Flatlands Avenue)	AM	70.1	70.5	0.4	73.2	No
		MD	71.2	71.4	0.2	72.3	No
		PM	69.6	69.8	0.2	73.1	No
ST2	Vandalia Avenue (west of Erskine Street)	AM	65.1	66.0	0.9	69.0	No
		MD	63.7	65.0	1.3	66.7	No
		PM	62.8	64.2	1.4	68.2	No
ST3	Fountain Avenue (north of Seaview Avenue)	AM	67.8	68.2	0.4	72.0	No
		MD	66.3	66.6	0.3	70.9	No
		PM	68.2	68.7	0.5	72.8	No
ST4	Flatlands Avenue and Essex Street	AM	69.7	69.7	0.0	73.5	No
		MD	68.7	68.7	0.0	71.8	No
		PM	68.3	68.3	0.0	72.4	No
ST5	Erskine Street (south of Schroeders Avenue)	AM	66.6	67.4	0.8	70.8	No
		MD	65.3	65.6	0.3	68.9	No
		PM	67.6	68.0	0.4	71.3	No
ST6	Seaview Avenue (west of Fountain Avenue)	AM	68.1	68.8	0.7	73.0	No
		MD	69.2	69.9	0.7	74.2	No
		PM	70.7	71.6	0.9	73.6	No
ST7	Vandalia Avenue (east of Erskine Street)	AM	68.1	68.2	0.1	70.6	No
		MD	65.1	65.2	0.1	68.3	No
		PM	68.3	68.4	0.1	71.4	No
ST8	Fountain Avenue (north of Vandalia Avenue)	AM	67.8	68.4	0.6	71.6	No
		MD	69.9	70.2	0.3	73.1	No
		PM	69.0	69.3	0.3	72.1	No

Source: STV Incorporated, 2016

SENSITIVE RECEPTOR ASSESSMENT

The proposed action would introduce new sensitive receptors into an area with high existing ambient noise levels. Based on Table 17-8, "Required Attenuation Values to Achieve Acceptable Interior Noise Levels," the existing L_{10} noise levels with respect to CEQR acceptable interior noise levels are primarily within the "marginally unacceptable" range at the monitoring sites.

Table 17-8: Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Unacceptable				***Clearly Unacceptable***
Noise level with proposed action	$70< L_{10} \leq 73$	$73< L_{10} \leq 76$	$76< L_{10} \leq 78$	$78< L_{10} \leq 80$	$80< L_{10}$
Attenuation [A]	28 dBA	31 dBA	33 dBA	35 dBA	$36 + (L10 - 80)$ [B] dBA

Notes:
[A] The above composite window wall attenuation values are for residential dwellings and community facility development. Required attenuation for commercial office spaces and meeting rooms would be 5 dBA less in each category. All the above categories require a closed window situation and hence an alternate means of ventilation.
[B] Required attenuation values increase by 1 dBA increments for L_{10} values greater than 80 dBA.

Source: New York City Department of Environmental Protection.

Future maximum L_{10} noise levels would exceed 70 dBA at seven of the eight monitoring sites. As a result, significant adverse noise impacts related to acceptable interior noise levels, would be predicted to occur for these seven sites if facades of the proposed residential and commercial structures were located there, and construction materials providing standard window-wall attenuation were used. Conservatively, as part of the proposed action, the Restrictive Declaration would include project requirements in the form of materials providing enhanced attenuation would be included for the facades of project buildings located in proximity to these sites, so that they can be considered suitable for residential, commercial and community facility uses. These project requirements would result in a window-wall attenuation ranging from at least 28 dBA to 31 dBA for the affected exterior facades of the development would be required in order to achieve a 45 dBA interior noise level (refer to Table 17-8, "Required Attenuation Values to Achieve Acceptable Interior Noise Levels,"). Window/wall attenuation requirements based on future With Action noise levels are shown in Table 17-9, "Required Window Attenuation Values for Monitored Locations ST1 through ST8," if development were occurring at the eight noise monitoring sites.

Table 17-9: Required Window Attenuation Values for Monitored Locations ST1 through ST8

Noise Site	Peak Traffic Time Period	No Action $L_{10(1)}$ (dBA)	Change in L_{10} Noise Level due to Change in PCE's	With Action $L_{10(1)}$ (dBA)	CEQR Required Window Attenuation (dBA)
ST1	AM	72.8	0.4	73.2	31
ST2	AM	68.1	0.9	69.0	None
ST3	PM	72.3	0.5	72.8	28
ST4	AM	73.5	0.0	73.5	31
ST5	PM	70.9	0.4	71.3	28
ST6	MD	73.5	0.7	74.2	31
ST7	PM	71.3	0.1	71.4	28
ST8	MD	72.8	0.3	73.1	31

Source: STV Incorporated, 2016

To properly assess attenuation requirements for the proposed action, the attenuation requirements predicted for the monitoring sites are used and applied as shown in Table 17-10, "Required Attenuation Values for the Proposed Fountain Avenue Development Site." This represents a closed window condition at these sites, and therefore an alternate means of ventilation for the interior spaces would also be required.

Table 17-10: Required Attenuation Values for the Proposed Fountain Avenue Development Site [1,2,3]

Building Parcel	Affected Parcel Façade	Governing Noise Site	Build Year Maximum L_{10} Noise Level (dBA)	CEQR Required Window Attenuation (dBA)
A	North	ST5	71.3	28
	South	ST6	74.2	31
	East	ST6	74.2	31
	West	ST5	71.3	28
B (west)	North	ST7	71.4	28
	South	LT1 (24-Hour)	61.6	N/A
	East	ST7	71.4	28
	West	ST5	71.3	28
B (East)	North	ST7	71.4	28
	South	LT1 (24-Hour)	61.6	N/A
	East	ST8	73.1	31
	West	ST7	71.4	28

Notes:
[1] Attenuation values are shown for residential uses; attenuation required for commercial office and meeting room uses would be 5 dBA less.
[2] "N/A" indicates that the highest L_{10} noise level is below 70 dBA. The *CEQR Technical Manual* does not specify minimum attenuation guidance for exterior L_{10} values below this level.
[3] Where the parcel façade was not directly facing a street receptor, the nearest measured L_{10} noise level from the 24-hour monitoring program was used as a basis for the required window attenuation.

Source: STV Incorporated, 2016

As mentioned above, the proposed action would be exposed to exterior noise sources such as automobiles, overhead flights to and from JFK Airport, and other sounds typical to the local community. Where maximum hourly exterior levels are greater than 70 dBA, alternate means of ventilation would be required to be incorporated into buildings so that windows do not need to be opened at any time of the year. If windows were open, the effect of the window-wall attenuation would be reduced. An alternate means of ventilation would allow for a closed window condition, ensuring that acceptable interior noise levels are achieved. For the future receptors, all of the maximum exterior noise levels are less than 75 dBA. As a result, standard double-glazed and/or laminated windows are available that would provide adequate noise attenuation. As discussed in Chapter 20, "Construction," buildings on Parcel B that would be occupied while construction is ongoing at Parcel B would be constructed with double-glazed windows to provide 40 dBA of attenuation in order to maintain acceptable interior noise levels during construction. With the attenuation measures specified above, the proposed action would not be exposed to significant adverse noise impacts. The proposed window-wall attenuation requirements noted above, as well as the provision of alternative ventilation, would be included in the project's Restrictive Declaration.

17.9 Mechanical Equipment

Stationary noise sources associated with the proposed action would include building machinery or mechanical equipment related to its heating, ventilation and air conditioning or other interior/exterior operational systems. An example of these types of noise sources include rooftop mechanical systems. In order to ensure that these mechanical systems would not result in any significant increases in noise levels, equipment would be constructed so as to adhere to prevailing industry standards as well as noise decibel restrictions included in the revised 2005 NYC Noise Code.