A. INTRODUCTION

The applicant is proposing a mixed-use development at 770 Eleventh Avenue, a 94,463 sf property bounded by Eleventh Avenue on the west, W. 54th Street on the north, and W. 53rd Street on the south. The project site, comprised of Block 1082, Lot 1, is located in the Clinton section of Manhattan Community District 4. Figures 1-1 and 1-2 in Chapter 1, "Project Description," show the project location.

The proposed action would facilitate approximately 1.3 million gross square feet (gsf) of mixed-use development rising to a maximum of 32 stories, including two mechanical levels above the top residential story, plus three cellar levels. It would include the following uses (all approximate): 900 dwelling units (DUs) (on floors 3 through 30), 8,800 gsf of retail, intended to be an 8,000 sf food market and a separate 800 sf retail space (on ground floor); 20,000 gsf of health club space (on the third floor); 330,000 gsf of automobile sales, preparation, and repairs space (on the ground floor, mezzanine above it, and in three cellar levels); 36,000 gsf of NYPD Mounted Unit facility, including stable and related space (on the ground floor); and 225 accessory parking spaces (on the second floor).

This section evaluates the potential noise level impacts for the Project Build Year of 2011. Noise is a source of concern because the project will add additional traffic to surrounding roadways and because the proposed action would introduce noise sensitive uses (residential units) to the site. The noise analysis includes a presentation of monitored noise levels at the site, an assessment of 2008 Existing Conditions (baseline noise), an assessment of projected noise levels due to increased traffic volumes, an analysis of noise from HVAC units, and a determination of the level of building attenuation necessary to ensure that interior noise levels satisfy applicable interior noise criteria for residential and commercial uses.

B. NOISE FUNDAMENTALS

Noise is measured in sound pressure level (SPL), which is converted to a decibel scale. The decibel is a relative measure of the sound level pressure with respect to a standardized reference quantity. Decibels on the A-weighted scale are termed "dBA." The A-weighted scale is used for evaluating the effects of noise in the environment because it most closely approximates the response of the human ear. On this scale, the threshold of discomfort is 120 dB, and the threshold of pain is about 140. Table 16-1 shows the range of noise levels for a variety of indoor and outdoor noise levels.

Because the scale is logarithmic, a relative increase of 10 decibels represents a sound pressure level that is 10 times higher. However, humans don't perceive a 10 dBA increase as 10 times or louder; they perceive it as twice as loud. The following is typical of human response to relative changes in noise level:

- 3 dBA change is the threshold of change detectable by the human ear,
- 5 dBA change is readily noticeable, and
- 10 dBA increase is perceived as a doubling of noise level.

Table 16-1, Sound Pressure Level and Loudness of Typical Noises in Indoor and Outdoor Environments

Noise Level (dBA)	Subjective Impression	Typical Sources		Relative Loudness (Human Response)
		Outdoor	Indoor	
120-130	Uncomfortably Loud	Air raid siren at 50 feet (threshold of pain)	Oxygen torch	32 times as loud
110-120	Uncomfortably Loud	Turbo-fan aircraft at take-off power at 200 feet	Riveting machine Rock band	16 times as loud
100-110	Uncomfortably Loud	Jackhammer at 3 feet		8 times as loud
90-100	Very Loud	Gas lawn mower at 3 feet Subway train at 30 feet Train whistle at crossing Wood chipper shredding trees Chain saw cutting trees at 10 feet	Newspaper press	4 times as loud
80-90	Very Loud	Passing freight train at 30 feet Steamroller at 30 feet Leaf blower at 5 feet Power lawn mower at 5 feet	Food blender Milling machine Garbage disposal Crowd noise at sports event	2 times as loud
70-80	Moderately Loud	NJ Turnpike at 50 feet Truck idling at 30 feet Traffic in downtown urban area	Loud stereo Vacuum cleaner Food blender	Reference loudness (70 dBA)
60-70	Moderately Loud	Residential air conditioner at 100 feet Gas lawn mower at 100 feet Waves breaking on beach at 65 feet	Cash register Dishwasher Theater lobby Normal speech at 3 feet	2 as loud
50-60	Quiet	Large transformers at 100 feet Traffic in suburban area	Living room with TV on Classroom Business office Dehumidifier Normal speech at 10 feet	1/4 as loud
40-50	Quiet	Bird calls, Trees rustling, Crickets, Water flowing in brook	Folding clothes Using computer	1/8 as loud
30-40	Very quiet		Walking on carpet Clock ticking in adjacent room	1/16 as loud
20-30	Very quiet		Bedroom at night	1/32 as loud
10-20	Extremely quiet		Broadcast and recording studio	
0-10	Threshold of hearing			

Sources: Noise Assessment Guidelines Technical Background, by Theodore J. Schultz, Bolt Beranek and Newman, Inc., prepared for the US Department of Housing and Urban Development, Office of Research and Technology, Washington, D.C., undated; Sandstone Environmental Associates, Inc.; Highway Noise Fundamentals, prepared by the Federal Highway Administration, US Department of Transportation, September 1980; Handbook of Environmental Acoustics, by James P. Cowan, Van Nostrand Reinhold, 1994.

The SPL that humans experience typically varies from moment to moment. Therefore, a variety of descriptors are used to evaluate environmental noise levels over time. Some typical descriptors are defined below:

- L_{eq} is the continuous equivalent sound level. The sound energy from the fluctuating SPLs is averaged over time to create a single number to describe the mean energy or intensity level. High noise levels during a monitoring period will have a greater effect on the L_{eq} than low noise levels. The L_{eq} has an advantage over other descriptors because L_{eq} values from different noise sources can be added and subtracted to determine cumulative noise levels.

- L_{max} is the highest SPL measured during a given period of time. It is useful in evaluating L_{eq}s for time periods that have an especially wide range of noise levels.

- L_{10} is the SPL exceeded 10% of the time. Similar descriptors are the L_{50}, L_{01}, and L_{90}.

Vehicular traffic volumes can be 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 bus (capable of carrying more than nine passengers) is assumed to generate the noise equivalent of 18 cars, and one heavy-duty truck (having a gross weight of more that 26,400 pounds) is assumed to generate the noise equivalent of 47 cars, as summarized below from the *NYC CEQR Technical Manual*.

- autos and light trucks = 1 passenger car,
- medium trucks = 13 passenger cars,
- heavy trucks = 47 passenger cars, and
- public buses = 18 passenger cars.

Thus, Passenger Car Equivalents (PCEs) are the numbers of autos that would generate the same noise level as the observed vehicular mix of autos, medium trucks, and heavy trucks. PCEs are useful for comparing the effects of traffic noise on different roadways or for different future scenarios.

Where traffic volumes are projected to change, proportional modeling techniques, as described in the *NYC CEQR Technical Manual,* typically are used to project incremental changes in traffic noise levels. This technique in particular uses the relative changes in traffic volumes to project changes between No-Build and Build noise levels. The change in future noise levels is calculated using the following equation:

$$FNL = ENL + 10 \times \log_{10} (FPCE/EPCE)$$

where:

- FNL = Future Noise Level

- ENL = Existing Noise Level
- FPCE = Future PCEs
- EPCE = Existing PCEs

Because sound levels use a logarithmic scale, this model proportions logarithmically with traffic change ratios. For example, assume that traffic is the dominant noise source at a particular location. If the existing traffic volume on a street is 100 PCEs, and if the future traffic volume were increased by 50 PCEs to a total of 150 PCEs, the noise level would increase by 1.8 dBA. If the future traffic were increased by 100 PCEs, (i.e., doubled to a total of 200 PCEs), the noise level would increase by 3.0 dBA.

C. NOISE STANDARDS AND GUIDELINES

In 1983, the New York City Department of Environmental Protection (NYCDEP) adopted the City Environmental Quality Review (CEQR) noise exposure guidelines for exterior noise levels. These guidelines are the basis for classifying noise exposure into four categories based on the L_{10}: Acceptable, Marginally Acceptable, Marginally Unacceptable, and Clearly Unacceptable, as shown in Table 16-2.

Table 16-3 shows the required attenuation for sensitive uses within the last three categories. For example, an L_{10} may approach 80 dBA provided that buildings are constructed of materials that reduce exterior to interior noise levels by at least 35 dBA.

D. NOISE MONITORING

Noise monitoring was carried out midblock at three sites to establish existing noise levels in the vicinity of the project site during the peak AM, Midday, and PM traffic periods. These locations, listed below and shown in Figure 16-1, were chosen because they represent the site's frontages on the adjacent roadways.

1) 770 11th Avenue between W. 53rd Street and W. 54th Street,
2) W. 53rd Street between 10th Avenue and 11th Avenue, and
3) W. 54th Street between 10th Avenue and 11th Avenue.

Noise monitoring for the AM peak (8:00 a.m. – 9:00 a.m.) occurred on Thursday, April 26, 2007. The Midday peak (12:00 p.m. – 1:00 p.m.) was monitored on Wednesday, April 11th, 2007 and October 7, 2008. The PM peak (5:00 p.m. – 6:00 p.m.) was monitored on Thursday, April 19th, 2007.

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

Receptor Type	Time Period	Acceptable General External Exposure	Airport[3] Exposure	Marginally Acceptable General External Exposure	Airport[3] Exposure	Marginally Unacceptable General External Exposure	Airport[3] Exposure	Clearly Unacceptable General External Exposure	Airport[3] Exposure
1.Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dBA	Ldn ≤ 60 dBA		Ldn ≤ 60 dBA		Ldn ≤ 60 dBA		Ldn ≤ 75 dBA
2. Hospital, Nursing Home		$L_{10} \leq 55$ dBA		$55<L_{10}\leq 65$ dBA		$65<L_{10}\leq 80$ dBA		$L_{10}>80$dBA	
3. Residence, residential hotel or motel	7 am to 10 pm	$L_{10}\leq 65$dBA		$65<L_{10}\leq 70$ dBA		$70<L_{10}\leq 80$ dBA		$L_{10}>80$dBA	
	10 pm to 7 am	L10≤55dBA		$55<L_{10}\leq 70$ dBA		$70<L_{10}\leq 80$ dBA		$L_{10}>80$dBA	
4. School, museum, library, court house of worship, transient hotel or motel, public meeting room, auditorium, out-patient public health facility		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM- 10 PM)		Same as Residential Day (7 AM –10 PM)	
5. Commercial or office		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM-10 PM)		Same as Residential Day (7 AM –10 PM)		Same as Residential Day (7 AM-10 PM)	
6. Industrial, public areas only[4]	Note 4	Note 4		Note 4		Note 4		Note 4	

Notes:

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

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

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

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

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

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

Table 16-3, Required Attenuation Values to Achieve Acceptable Interior Noise Levels

	Marginally Acceptable	Marginally Unacceptable		Clearly Unacceptable		
Noise level with proposed action	$65<L_{10}\leq 70$	$70<L_{10}\leq 75$	$75<L_{10}\leq 80$	$80<L_{10}\leq 85$	$85<L_{10}\leq 90$	$90<L_{10}\leq 95$
Attenuation	25 dBA	(I) 30 dBA	(II) 35 dBA	(I) 40 dB A	(II) 45 dBA	(III) 50 dBA

Source: New York City Department of Environmental Protection

The noise levels were monitored according to the procedures outlined in the *NYC CEQR Technical Manual*. The instrument used was a Bruel & Kjaer Noise Level Meter Type 2236, which was mounted on a tripod at a height of 5 feet above the ground. The noise monitor was calibrated before and after use. A wind screen was used during all sound measurements except for calibration. All measurement procedures conformed to the requirements of ANSI Standard S1.13-1971 (R1976). The temperatures were in the upper 50s (°F). The conditions were calm and clear. The primary source of noise was local vehicular traffic. Other sources of noise were pedestrian voices, aircraft flyovers, honking auto horns, and occasional car alarms and emergency sirens. Table 16-4 shows the monitored noise levels.

Table 16-4, Monitored Noise Levels (dBA)

ID	Site	Time of Day	L_{eq}	L_{10}	L_{max}	L_{min}	L_{01}	L_{90}
1	770 11th Avenue	8:00-8:20 a.m.	72.4	75.0	59.9	90.3	81.5	62.5
1	770 11th Avenue	12:30- 12:50 p.m.	72.5	74.0	58.7	90.0	84.5	62.0
1	770 11th Avenue	5:00-5:20 p.m.	72.0	74.0	59.1	93.0	82.5	63.5
2	W. 53rd Street	8:50-9:10 a.m.	69.1	73.0	57.7	86.5	79.5	60.0
2	W. 53rd Street	12:17-12:41 p.m.	71.5	73.5	63.6	88.6	79.5	66.5
2	W. 53rd Street	5:47-6:07 p.m.	67.1	68.5	57.1	81.7	78.5	60.0
3	W. 54th Street	8:25-8:45 a.m.	70.6	73.5	63.7	86.3	79.0	65.5
3	W. 54th Street	12:51-1:11 p.m.	70.1	72.5	61.3	86.6	79.0	64.0
3	W. 54th Street	5:20-5:40 p.m.	70.4	73.0	57.5	82.9	77.0	62.5

Source: Sandstone Environmental Associates, Inc.

E. EXISTING CONDITIONS

The baseline year for analysis is 2008. Therefore, the monitored noise levels, most of which were obtained in 2007, were adjusted to reflect the traffic volumes developed for 2008 Existing Conditions. PCEs for projected 2008 Existing traffic volumes were calculated using both the vehicular mix observed during the monitoring periods and the provided traffic movement totals for Existing Conditions. The proportionality equation was used to compare PCEs for traffic observed during the monitoring periods with traffic volumes for Existing Conditions[1]. Table 16-5 shows the resulting traffic at the monitored sites, and Table 16-6 shows the noise levels for the monitored sites under Existing Conditions. The L_{10} values range from 68.7 dBA to 75.3 dBA. Currently, the site is vacant.

[1] In some cases, the observed traffic volumes during noise monitoring may be slightly higher than those used for the traffic study, but these differences usually are not significant and the resulting noise levels are substantially similar to those monitored.

Table 16-5, 1-Hour Existing Traffic Volumes and PCEs

Location	Autos	Medium Trucks	Heavy Trucks	Buses	Motor-cycles	Total Vehicles	Total PCEs
AM Peak							
770 11th Avenue	1,490	66	34	28	0	1,618	4,464
W. 54th Street	278	50	0	13	0	341	1,225
W. 53rd Street	228	32	11	14	4	278	1,308
Midday Peak							
770 11th Avenue	1,250	79	23	14	11	1,377	3,374
W. 54th Street	246	23	0	10	0	278	714
W. 53rd Street	254	17	8	8	0	288	1,025
PM Peak							
770 11th Avenue	1,358	72	12	29	9	1,479	3,464
W. 54th Street	298	19	0	14	0	331	801
W. 53rd Street	311	16	0	6	0	333	628

Source: Sandstone Environmental Associates, Inc.

Table 16-6, Existing Noise Levels (dBA)

ID	Site	Time of Day	L_{eq}	L_{10}
1	770 11th Avenue	AM	72.6	75.2
	770 11th Avenue	MID	72.2	73.7
	770 11th Avenue	PM	71.8	73.8
2	W. 53rd Street	AM	69.9	73.8
	W. 53rd Street	MID	73.3	75.3
	W. 53rd Street	PM	67.3	68.7
3	W. 54th Street	AM	71.0	73.9
	W. 54th Street	MID	70.4	72.8
	W. 54th Street	PM	70.0	72.6

Source: Sandstone Environmental Associates, Inc.

F. FUTURE WITHOUT THE PROPOSED ACTION

Although the site could be developed with light manufacturing and commercial uses, the analysis conservatively assumes that no new development of the site would occur in the absence of the proposed action. Therefore, the only increase in noise levels would be due to normal growth in traffic volumes. The proportionality equation was used to compare PCEs for Existing traffic with projected No Build traffic. Table 16-7 shows the projected traffic, and Table 16-8 shows the projected noise levels for No-Build Conditions. Calculated L_{10} values range from 69.1 dBA to 75.6 dBA.

Table 16-7, 1-Hour No-Build Traffic Equivalent and PCEs

Location	Time of Day	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Total Vehicles	Total PCEs
Site 1								
770 11th Avenue	AM	1,631	72	37	31	0	1,771	4,864
770 11th Avenue	MID	1,353	85	25	15	12	1,490	4,059
770 11th Avenue	PM	1,489	79	13	32	9	1,622	3,820
Site 2								
W. 53rd Street	AM	267	38	13	4	4	326	1,496
W. 53rd Street	MID	282	19	10	9	0	320	1,161
W. 53rd Street	PM	347	17	0	7	0	371	694
Site 3								
W. 54th Street	AM	294	52	0	14	0	360	1,222
W. 54th Street	MID	263	24	0	10	0	297	755
W. 54th Street	PM	320	21	0	15	0	356	863

Source: Sandstone Environmental Associates, Inc.

Table 16-8, No-Build Noise Levels (dBA)

Site	Location	Time of Day	Existing Conditions		Noise Increment	No-Build Conditions	
			L_{eq}	L_{10}		L_{eq}	L_{10}
1	770 11th Avenue	AM	72.6	75.2	0.4	73.0	75.6
	770 11th Avenue	MID	72.2	73.7	0.4	72.6	74.1
	770 11th Avenue	PM	71.8	73.8	0.5	72.3	74.3
2	W. 53rd Street	AM	69.9	73.8	0.7	70.6	74.5
	W. 53rd Street	MID	73.3	75.3	0.5	73.8	75.8
	W. 53rd Street	PM	67.3	68.7	0.4	67.7	69.1
3	W. 54th Street	AM	71.0	73.9	0.2	71.2	74.1
	W. 54th Street	MID	70.4	72.8	0.3	70.7	73.1
	W. 54th Street	PM	70.0	72.6	0.4	70.4	73.0

Source: Sandstone Environmental Associates, Inc.

G. FUTURE WITH THE PROPOSED ACTION

The proposed action would facilitate approximately 1.3 million gross square feet (gsf) of mixed-use development in a uniquely-shaped building. Figure 1-5 in Chapter 1 shows a site plan and Figure 1-8 in the same chapter shows a rendering of the building from different viewpoints. It would extend to the property line on all sides for the first two levels. The three cellar levels and the first two levels above grade would feature commercial and accessory uses that would include an auto dealership, a parking deck, retail uses, a food market, and stables for the NYC Mounted Police.

Starting at the third level, the upper floors of the building would be constructed in an S-shape with the top and bottom of the S along the eastern and western boundaries and the diagonal portion of the S running from the southeast corner of the property on W. 53rd Street to the northwest corner on 11th Avenue and W. 54th Street. The highest section of the building

would be 348 feet at the southeast corner on W. 53rd Street, after which it would decrease, in a series of terraces, to 318 feet at the northeast corner, 126 feet at the southwest corner, and 106 feet at the northwest corner (11^{th} Avenue and W. 54th Street). A substantial portion of the roof over the second level that is not covered by the S-shaped construction would be landscaped and designed as an outdoor sitting area.

Although the facades along the north, west, east, and south sides of the building would be masonry construction from the third level up, the exterior walls that are set back from the street (i.e., the diagonal portion of the S), or that would face interior portions of the site, would be composed of a glass curtain wall. At ground level, the exterior walls for commercial space also would be composed primarily of glass.

Based on a review of available engineering and architectural plans, potential noise impacts associated with the proposed action include:

- Noise levels in the surrounding community associated with project-generated traffic,
- Noise levels at residential units and ground floor commercial uses associated with traffic at ground level, and
- Noise levels at residential units associated with HVAC systems at upper levels

1. Traffic Noise

Surrounding community. Since the L_{10} noise levels under No-Build Conditions exceed 65 dBA, the applicable criterion for a traffic noise impact would be a noise increment of 3 dBA. To achieve an increase of 3 dBA, traffic volumes would have to double. Data provided in Chapter 13, Traffic, showed that the relative increases in traffic would not result in a doubling of volumes. Thus, the project would not cause significant impacts to the surrounding community due to increases in traffic volume.

Commercial uses. Table 16-9 shows the traffic and PCEs at the monitored sites for Build Conditions, and Table 16-10 shows the projected sidewalk noise levels under Build Conditions. Peak projected L_{10} values at the monitored sites range from 69.6 dBA to 75.9 dBA. The maximum peak L_{10} value of 75.9 dBA would place the building's ground floor level in the Marginally Unacceptable II category, which typically would require an exterior to interior attenuation level of 35 dBA for a residential use (see Table 16-2). However, for a commercial use, the relevant degree of attenuation would be 25 dBA. As noted above, the configuration of glass walls at street level would have an attenuation rate of 30 dBA, which would provide more attenuation than required.

Table 16-9, 1-Hour Build Traffic Equivalent & PCEs

Location	Time of Day	Autos	Medium Trucks	Heavy Trucks	Buses	Motorcycles	Total Vehicles	Total PCEs
Site 1								
770 11th Avenue	AM	1,684	72	37	31	0	1,824	4,917
770 11th Avenue	MID	1,389	85	25	15	12	1,527	4,096
770 11th Avenue	PM	1,537	79	13	32	9	1,670	3,868
Site 2								
W. 53rd Street	AM	342	38	13	4	4	401	1,571
W. 53rd Street	MID	342	19	10	9	0	380	1,221
W. 53rd Street	PM	430	17	0	7	0	454	777
Site 3								
W. 54th Street	AM	323	52	0	14	0	389	1,241
W. 54th Street	MID	288	24	0	10	0	3221	780
W. 54th Street	PM	352	21	0	154	0	388	895

Source: Sandstone Environmental Associates, Inc.

Table 16-10, Build Noise Levels (dBA)

ID	Site	Time of Day	No Build Conditions		Noise Increment	Build Conditions	
			L_{eq}	L_{10}		L_{eq}	L_{10}
1	770 11th Avenue	AM	73.0	75.6	0.0	73.0	75.6
	770 11th Avenue		72.6	74.1	0.0	72.5	74.1
	770 11th Avenue		72.3	74.3	0.0	72.3	74.3
2	W. 53rd Street	MID	70.6	74.5	0.2	70.8	74.7
	W. 53rd Street		73.8	75.8	0.1	73.9	75.9
	W. 53rd Street		67.7	69.1	0.5	68.2	69.6
3	W. 54th Street	PM	71.2	74.1	0.1	71.3	74.2
	W. 54th Street		70.7	73.1	0.1	70.8	73.2
	W. 54th Street		70.4	73.0	0.2	70.6	73.2

Source: Sandstone Environmental Associates, Inc.

Residential uses. The mezzanine and residential units would begin at a height of 45 feet above street level. Compared to the location of the noise monitor, they would be 6 feet further from the street horizontally and 45 feet higher. Based on an attenuation rate for traffic noise of 3 decibels per distance doubling, the L_{10} traffic noise level would decrease from 75.8 dBA at a mid-sidewalk point to 67.0 dBA at a point on the building 45 feet above street. This would place the residential units nearest to the street in the Marginally Acceptable category, and the required exterior to interior attenuation to be provided by the building is 25 dBA. However, the L10 of 75.8 dBA at street level would require window/wall attenuation of 35 dBA, and the attenuation is assigned to a site without regard to the height of the receptors above ground level. Therefore, no credit can be taken for the height of the residential windows.

2.0 Heating, Ventilating, and Air Conditioning (HVAC)

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

The applicable Ambient Noise Quality Zone (ANQZ) standards for the proposed action (from noise emitted directly from stationary activities within the boundary of the project) are for High-Density Residential (R4 to R10) Land Uses. The daytime (7 a.m. – 10 p.m.) standards are 65 dBA, and the nighttime (10 p.m. – 7 a.m.) standards are 55 dBA. Therefore, since the mechanical systems for the proposed project all would be designed to avoid producing levels that would result in significant increases in ambient noise levels and to meet the ANQZ criteria, the proposed project would not be expected to result in any significant adverse noise impacts from the building's associated mechanical systems.

770 11th Avenue Cooling Towers. The only mechanical system in the building that could adversely affect residents would be the cooling towers for the auto dealership. They would be located at the third level along the eastern side of the building. Figure 16-2 shows the site plan. The proposed configuration would be for three units of 300 tons each. Two would be grouped together near the southern end of the building and one would be located towards the northern end of the building. Noise would be generated from the electric motors that spin the fans that exhaust the heat.

Appendix E shows the manufacturer's specifications for the model. The proposed coolers would be for Baltimore Air Coil Model FXVQ-661 manufactured by Baltimore Air Coil. Specification sheets for this cooler, which will include a Whisper Quiet Fan and sound intake attenuation, show that the highest noise levels would be 74 dBA at a distance of 5 feet from the top of the fan and 60 dBA at a distance of 50 feet. Due to the casing and other design features, the noise levels would be lower for an observer standing at the side of the fan.

AT&T Cooling Towers. The eastern boundary of the site is adjacent to the AT&T mechanical building at 789 10th Avenue. Since this building has no windows above the first floor, AT&T would not experience impacts from the cooling towers of the proposed project.

Noise levels from the cooling towers on the rooftop of the AT&T building would be a source of noise for residents on the east side of 770 11th Avenue. Aerial photos show two groups of four 700-ton units (2800 tons per group) along the southern side of the AT&T roof and three groups of two 700-ton units (1400 tons per group) on the northern side of the rooftop. These units were manufactured by Marley (now SPX) and installed in 1999. They are no longer manufactured. However, an SPX representative provided information on a 4-cell cooling tower that operates as a single 2800-ton tower. The specifications (shown in Appendix E) indicate that the noise levels would be 79 dBA at the distance of five feet from the top of the

tower and 65 dBA at the distance of 50 feet from top of the tower. As a worst-case assumption, all five of the AT&T cooling towers were assumed to be 2800-ton SPX towers.

The AT&T building is 30 feet from the eastern façade of the proposed building. The three northernmost AT&T cooling towers are set back about 14 feet from the edge of the roof. There are two of the cooling units at the south end of the building along W. 53rd Street. One of the cooling units is 5 feet from the western edge of the building, and one is about 38 feet from the western edge of the building.

Noise Analysis. Table 16-11 summarizes the manufacturers' specifications for the BAC towers and the SPX cooling towers, which represent the closest available match to the AT&T towers.

Table 16-11
Manufacturers' Specifications, Cooling Tower Noise Levels

	Noise Level at Distance (dBA)	
Typical Unit	**5 feet**	**50 feet**
Baltimore Air Coil 300 Ton Coolers	76.0	65.0
SPX 2,800 Ton Coolers	74.0	60.0

Sources: Baltimore Air Coil and SPX Technologies

The BAC cooling towers would be approximately 10 feet from the apartment windows on the east facade of the building. Because noise levels within 50 feet of an industrial source may not show the attenuation patterns expected of a point source, NYCDEP's preferred approach is to treat all noise levels between 5 and 50 feet as if they were at a five-foot distance. Beyond 50 feet, the equation based on 6 dBA per distance doubling can be used.

Table 16-12 shows the distances between an apartment window and the two cooling towers on the eastern façade. Figure 16-3 shows a vertical view from W. 53rd Street and Figure 16-4 shows a birds eye view. Figure 16-5 shows a north-south section facing the east side of the building. The cumulative noise level from all three cooling towers at this worst-case apartment window would be 77.1 dBA. This is due primarily to the two closest cooling towers. For the worst-case window at the northern end of the building, the noise level would be 74 dBA. As shown in Figure 16-4, no operable windows would be within 20 feet of the cooling towers.

As a worst case assumption, all windows within 50 feet of the cooling towers would have similar noise levels. On the southern end of the eastern façade of the building, Figure 16-4 shows that a total of 11 windows in three apartment units on Level 3 could experience a noise level of 77.1 dBA. Figure 16-5 shows that this also would be true of the apartments similarly located on Levels 4, 5, 6, and 7. Thus, noise levels at 55 windows in 15 apartments potentially could exceed 75 dBA due to the two southernmost BAC coolers. At 50 feet and beyond, noise levels from each of the two cooling towers would be calculated as 60 dBA or lower, and the maximum cumulative noise level from these two sources would be 63 dBA. At the northern end of the eastern façade of the building, about 8 windows in three apartments on each of

Levels 3, 4, 5, 6, and 7 would experience 74 dBA from the single BAC cooler at this location because they would be within 50 feet of it.

The AT&T cooling towers also would contribute to the noise levels at the proposed apartments. They are shown in Figure 16-6. Again, the windows within 50 feet the towers were assigned a noise level equivalent to a 5-foot distance from the towers, while greater distances were calculated using 6 dBA of distance doubling. Table 16-12 shows the distances between the AT&T coolers and the southernmost windows on the eastern façade of 770 11th Avenue, as these windows would constitute a worst case. The worst-case noise level from the cumulative effect of the AT&T coolers alone would be 76.6 dBA.

Table 16-12
Worst-Case Noise levels for Window Adjacent to BAC Cooling Towers

Cooler ID	Location	Distance from Window (ft)	Noise Level at Window (dBA)
BAC1	South end of 770 11th Avenue	12	74.0
BAC2	South end of 770 11th Avenue	12	74.0
BAC3	North end of 770 11th Avenue	160	57.1
Subtotal			**77.1**
ATT1	53rd Street, easternmost unit	69	62.2
ATT2	53rd Street 5 feet from western parapet	35	76.0
ATT3	Southernmost of 3 units along western side	55	64.2
ATT4	Middle unit of 3 units along western side	83	60.6
ATT5	Northernmost of 3 units along western side	120	57.4
Subtotal			**76.6**
Total Noise			**79.8**

Source: Sandstone Environmental Associates, Inc.

The potential total cumulative worst-case noise level would be 79.8 dBA for the 55 windows near the southern end of the eastern façade, due primarily to the BAC coolers. Based on the foregoing, a total of 55 windows would experience noise levels of 79.8 dBA. This would require a minimum of 35 dBA of exterior to interior noise level attenuation to ensure an interior noise level of 45 dBA or less.

At the northern end of the eastern facade, the nearest AT&T cooling tower, approximately 55 feet from the nearest apartment window, would contribute 65 dBA to the total noise levels. Noise contributed from the other four AT&T towers would be lower. Adding the AT&T tower noise levels to the maximum BAC noise level of 74.0 dBA at that end of the building would yield a cumulative noise level of 74.8 dBA. Windows on the higher stories would be expected to have lower cumulative noise levels depending on their vertical and horizontal distances from the cooling towers. This would require a minimum of 30 dBA of exterior to interior noise level attenuation to ensure an interior noise level of 45 dBA or less.

H. CONCLUSIONS AND RECOMMENDATIONS

Noise from increased traffic due to the proposed action would not cause noise level impacts on sensitive receptors along affected roadways because the relative increases in noise level would fall below the impact criterion of 3.0 dBA. The maximum L_{10} level of 75.8 dBA at ground level and 79.8 dBA for some residences on the eastern wall places the project site in the Marginally Unacceptable II category. As shown in Table 16-3, the *NYC CEQR Technical Manual* provides noise attenuation goals for buildings, based on exterior noise levels. Recommended noise attenuation values for buildings are designed to maintain interior noise levels of 45 dBA or lower for residential uses and 50 dBA or lower for commercial uses and are determined from exterior L_{10} levels.

As the proposed project would introduce residential and commercial uses into an area where projected exterior noise levels would range between 75 and 80 dBA, the site would be suitable only by providing window-wall attenuation of at least 35 dBA for the exterior façades in order to achieve a 45 dBA interior noise level for residential uses and a 50 dBA interior noise level for commercial uses.

This attenuation can be achieved through installing double-glazed windows on a heavy frame in masonry structures or windows consisting of laminated glass. The *NYC CEQR Technical Manual* states that when maximum L_{10} levels are greater than 70 dBA, alternate means of ventilation should be incorporated into building, and building attenuation is required.

Therefore, as noted on the project's site plan contained in the ULURP application (ULURP No. 080010/11 ZMS) (drawing Z-02 Site Plan), 35 dB(A) of window/wall attenuation would be provided on all facades of the building at 770 Eleventh Avenue. These measures would ensure that no significant adverse noise impacts would result from the proposed action.

To ensure that the proposed cooling towers on the third level on eastern side of the building would not create noise levels that exceed 75 dBA at the residential windows, the applicant will use the Baltimore Air Coil Company's Model FXV-Q661 closed circuit cooling tower with Series FXV Whisper Q Fan and intake sound attenuation. The specifications for this model show a maximum noise level of 74 dBA at a distance of 5 feet from the top of the tower and 60 dBA at a distance of 50 feet from the top of the tower. The specifications for the unit are shown in the Noise Appendix.

Based on the projected noise levels, these design measures would provide sufficient attenuation to satisfy CEQR requirements. With the specified attenuation measures, the proposed project would not have any significant adverse noise impacts and would comply with all CEQR requirements.