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Noise

The goal of this chapter is to determine whether the Proposed Actions would have a significant adverse impact on the environment at existing noise-sensitive receptors and whether noise levels at any new receptors at the Development Site would exceed applicable New York City noise limits.

Introduction

The Proposed Actions would facilitate the development of up to approximately 3.7 million square feet (sf) of new construction, with destination entertainment that includes a music hall, hotel, a gaming facility,[1] convention and meeting space, restaurant and retail space, and office and community facility space. The Proposed Project would also include public park space—at least 20 acres of the Development Site would be improved with landscaping and other amenities for public recreation—and other public realm improvements as well as structured parking facilities to accommodate up to 13,750 spaces.

The Proposed Actions would introduce new noise-sensitive receptors—a hotel, community facility and office spaces. Other commercial uses, including a music hall, gaming facility, restaurant, and retail space, are not considered to be sensitive to noise according to the *2021 CEQR Technical Manual*. The Proposed Actions would generate noise from mobile sources and stationary equipment such as rooftop mechanical equipment, which has the potential to increase noise at noise sensitive receptors. Other stationary sources include a 3.80-acre open space area dedicated to active recreation with a variety of activities and attractions. Although the Proposed Project would introduce at least 20 acres of public park space, only this 3.80-acre open space area is anticipated to include active recreational spaces for sports such as basketball, racket sports, soccer, playgrounds, and a

[1] The inclusion of a gaming facility is contingent upon receiving a gaming license from the New York State Gaming Commission. See Required Approvals section below.

fitness area. These active spaces are considered to be stationary sources according to the *CEQR Technical Manual*.

Per the *CEQR Technical Manual*, a noise analysis is appropriate if an action would generate mobile or stationary sources of noise or would be located in an area with high ambient noise levels. The purpose of the noise assessment under CEQR is to determine if:

- The Proposed Actions would have a significant adverse environmental impact by significantly increasing sound levels from mobile and stationary sources at existing noise-sensitive receptors adjacent to the Development Site, including residential and commercial land uses; and
- New noise receptors introduced at the Development Site would be in an acceptable ambient sound level environment.

The noise assessment includes the following:

- Background on metrics used to describe noise;
- The methodology and criteria used to assess potential impacts;
- Results from ambient sound level monitoring in the Project Area;
- An evaluation of the ambient sound levels at new receptor locations; and
- An assessment of the potential for the Proposed Actions to significantly affect existing receptors due to the introduction of new mobile or stationary sources.

This noise analysis considers two receptor types when evaluating noise: existing and new receptor(s). Since the Proposed Project would introduce new buildings with hotel, community facility and office spaces, these are considered "new receptors." The analysis also considers "existing receptors" which are the current noise-sensitive uses such as residential and commercial properties surrounding (but not within) the Development Site. The following section summarizes the results of the noise assessment for these two types of receptors.

Principal Conclusions

A noise assessment was conducted to determine whether: (i.) the Proposed Actions would significantly increase sound levels from mobile and stationary sources at existing noise receptors; and (ii.) the new noise receptors that would be introduced by the Proposed Project would be in an acceptable ambient sound level environment. The principal conclusions of this noise assessment are based on the commitment that Citi Field stadium and the proposed New York City Football Club will not conduct concurrent events.

Existing Noise Receptors

The study area includes existing residential and community facility receptors. The Proposed Actions would introduce new stationary and mobile sources of noise.

The increase in noise due to mobile sources from the No-Action and With-Action conditions have been determined from proportional noise modeling at one intersection and one monitoring location within the study area. Mobile source noise levels would increase by up to 1.9 dBA in the With-Action condition as compared to the No-Action condition due to traffic generated by the Proposed Actions. Mobile source noise levels would increase up to 2.0 dBA for the With-Action condition compared to

existing conditions due to forecast traffic growth in the No-Action condition and traffic generated by the Proposed Actions.

The closest existing noise-sensitive building is the proposed residential use that will be introduced by the Willets Point Development Plan in the No-Action condition, located east of the Project Area. No-Action noise levels at this receptor would range from 69.9 to 72.9 dBA (L_{eq}). The Proposed Actions would result in an increase up to 1.9 dBA (L_{eq}) in noise, such that With-Action noise levels at this receptor due to stationary and mobile sources would range from 71.8 to 74.8 dBA (L_{eq}). Since noise levels would not increase by 3 dBA or more at this receptor, the Proposed Project would not result in a significant adverse noise impact due to mobile and stationary sources.

New Noise Receptors

The noise analysis for new receptors evaluates whether receptors would be introduced into an environment with acceptable ambient noise conditions. With-Action noise levels have been evaluated at new receptors based on ambient noise measurements, mobile source proportional noise modeling, and detailed modeling of noise from the Proposed Project.

Area of Development A

The With-Action noise level at the southern facades of Area of Development A due to mobile and stationary sources would be up to 81.5 dBA (L_{dn}). Therefore, the southern façade exposed to Roosevelt Avenue would require a minimum Outdoor Indoor Transmission Class (OITC) rating of 31 to 42 for the composite window/wall construction, based on the distance setback from the center line of the elevated train tracks.

The With-Action noise level at the northern facades of Area of Development A due to mobile and stationary sources would be up to 66.9 dBA (L_{10}). Therefore, enhanced window/wall attenuation would not be required at the northern façade along Shea Road.

Both the western and eastern facades of Development A would require a minimum composite window/wall of 39 OITC at 50 feet to 100 feet from the center line of the elevated train tracks, 36 OITC at 100 feet to 200 feet from the center line of the elevated train tracks, 33 OITC at 200 feet to 400 feet from the center line of the elevated train tracks.

For attenuation details for each façade of each tower, refer to **Table 17-15** and **Figure 17-3**.

Area of Development B

The With-Action noise level at the southern facades of Area of Development B due to mobile and stationary sources would be up to 81.5 dBA (L_{dn}). Therefore, the southern façade along Roosevelt Avenue, and the western façade and the eastern façade within 50 feet of Roosevelt Avenue would require a minimum composite window/wall of 42 OITC.

The With-Action noise level at the northern facades of Development B due to stationary sources would be up to 69.1 dBA (L_{10}). Therefore, enhanced window/wall attenuation would not be required at the northern façade facing Citi Field.

Both the western and eastern facades of Development B would require a minimum composite window/wall of 39 OITC at 50 feet to 100 feet from the center line of the elevated train tracks,

36 OITC at 100 feet to 200 feet from the center line of the elevated train tracks, 33 OITC at 200 feet to 400 feet from the center line of the elevated train tracks.

These attenuation requirements for Area of Development A and B are based on proposed hotel use and community facility use, which have higher attenuation requirements (for comparison, commercial office has a 5 dBA reduction in attenuation requirements).

Public Park Space

The Proposed Project would introduce at least 20 acres public park spaces consisting of various landscaped area and other recreational outdoor spaces, including both active and passive open space. Certain newly created active open spaces would not be considered a sensitive receptor, but rather as sources of sound, particularly those active open spaces that include sports facilities and playgrounds. With the addition of the proposed open space and no reduction in existing open space, the total passive open space acreage in the study area would increase to 45.17 acres. Future noise levels (L10) within the newly created passive open spaces would be above 55 dBA. This exceeds the 55 dBA (L10) guideline for outdoor areas requiring serenity and quiet contained in the CEQR Technical Manual. However, this relatively low noise level is often not achieved in outdoor areas due to the level of nearby noise sources (e.g., nearby roadway, train and aircraft activity, as well as activities within the outdoor space itself) at most New York City outdoor public open space areas and parks. Furthermore, under existing and No-Action conditions, noise levels at the location of the new public park space to be created by the Proposed Project currently exceed, and in the future, would exceed 55 dBA (L10). These levels of existing noise are comparable to noise levels in a number of passive open space areas that are within range of substantial noise sources, including Prospect Park, Brooklyn Bridge Park, and Fort Greene Park. Examining the proposed uses of the open spaces, they are not consistent with activities requiring serenity and quiet. Therefore, the proposed open spaces are not considered sensitive.

Noise Background

Noise is defined as unwanted or excessive sound. Sound becomes unwanted when it interferes with normal activities such as sleep, work, or recreation. How people perceive sound depends on several measurable physical characteristics. These factors include:

- **Level:** Sound level is based on the amplitude of sound pressure fluctuations and is often equated to perceived loudness.
- **Frequency:** Sounds are comprised of acoustic energy distributed over a variety of frequencies. Acoustic frequencies, commonly referred to as tone or pitch, are typically measured in Hertz (Hz). Pure tones have energy concentrated in a narrow frequency range and can be more audible to humans than broadband sounds.

Sound levels are most often measured on a logarithmic scale of decibels (dB). The decibel scale compresses the audible acoustic pressure levels which can vary from the threshold of hearing (0 dB) to the threshold of pain (120 dB). Because sound levels are measured in dB, the addition of two sound levels is not linear. Adding two equal sound levels results in a 3 dB increase in the overall level. Research indicates the following general relationships between sound level and human perception:

- A 3-dB increase is a doubling of acoustic energy and is the threshold of perceptibility to the average person.

› A 10-dB increase is a tenfold increase in acoustic energy and is perceived as a doubling in loudness to the average person.

Audible sound is comprised of acoustic energy over a range of frequencies typically from 20 to 20,000 Hz. The human ear does not perceive sound levels at each frequency as equally loud. To compensate for this phenomenon in perception, a frequency filter known as A-weighting (dBA) is used to evaluate environmental noise levels. **Table 17-1** presents a list of common outdoor and indoor sound levels.

Table 17-1 Common Indoor and Outdoor Sound Levels

Outdoor Sound Levels	Sound Pressure μPa		Sound Level dBA	Indoor Sound Levels
	6,324,555	-	110	Rock Band at 5 m
Jet Over-Flight at 300 m		-	105	
	2,000,000	-	100	Inside New York Subway Train
Gas Lawn Mower at 1 m		-	95	
	632,456	-	90	Food Blender at 1 m
Diesel Truck at 15 m		-	85	
Noisy Urban Area—Daytime	200,000	-	80	Garbage Disposal at 1 m
		-	75	Shouting at 1 m
Gas Lawn Mower at 30 m	63,246	-	70	Vacuum Cleaner at 3 m
Suburban Commercial Area		-	65	Normal Speech at 1 m
	20,000	-	60	
Quiet Urban Area—Daytime		-	55	Quiet Conversation at 1 m
	6,325	-	50	Dishwasher Next Room
Quiet Urban Area—Nighttime		-	45	
	2,000	-	40	Empty Theater or Library
Quiet Suburb—Nighttime		-	35	
	632	-	30	Quiet Bedroom at Night
Quiet Rural Area—Nighttime		-	25	Empty Concert Hall
Rustling Leaves	200	-	20	
		-	15	Broadcast and Recording Studios
	63	-	10	
		-	5	
Reference Pressure Level	20	-	0	Threshold of Hearing

μPA MicroPascals describe pressure. The pressure level is what sound level monitors measure
dBA A-weighted decibels describe pressure logarithmically with respect to 20 μPa (the reference pressure level)
Source: Highway Noise Fundamentals, Federal Highway Administration, September 1980

Because sound levels change over time, a variety of sound level metrics can be used to describe environmental noise. The following is a list of sound level descriptors that are used in the noise analysis:

- L_{10} is the sound level which is exceeded for 10 percent of the time during a given time period. Therefore, it represents the higher end of the range of sound levels. The unit is commonly used in the *CEQR Technical Manual* to evaluate acceptable thresholds for noise exposure for new receptors that would be introduced by a proposed development.
- L_{eq} is the continuous equivalent A-weighted sound level. The L_{eq} is a single value of the sound pressure level that is equivalent in sound energy to the fluctuating levels over a period of time. Therefore, the L_{eq} considers how loud noise events are during the period, how long they last, and how many times they occur. L_{eq} is commonly used to describe environmental noise and relates well to human annoyance. In accordance with the *CEQR Technical Manual*, the L_{eq} sound level is used to assess the potential for significant increases in noise due to a proposed development at existing receptors in the study area.
- 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 10:00 PM to 7:00 AM. This 10 dB addition accounts for the extra sensitivity people have to noise during typical sleeping hours.
- DNL is the annual average day-night average sound level used to evaluate exposure to aircraft noise in the vicinity of an airport.

Noise Standards and Impact Criteria

Noise Exposure Guidelines

The *CEQR Technical Manual* provides noise exposure guidelines for assessing ambient noise conditions at hotel, community facility and office receptors, as shown in **Table 17-2**.

Impact Criteria

The determination of significant adverse noise impacts in this analysis is based on both absolute noise level limits and relative impact criteria. According to the *CEQR Technical Manual*, for the purposes of determining a significant impact during daytime hours, it is reasonable to consider a L_{eq} noise level of 65 dBA as an absolute noise level that should not be significantly exceeded.

If mobile or stationary sources associated with the proposed project would increase L_{eq} sound levels by 3 dB or more and absolute levels would exceed 65 dBA L_{eq}, the proposed project would cause a significant adverse impact. Additionally, if No-Action condition noise levels are 60 dBA L_{eq} or less, a 5-dB increase would be considered a significant adverse noise impact.

Table 17-2 Noise Exposure Guidelines for Use in City Environmental Impact Review

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	Airport[3] Exposure
1. Outdoor area requiring serenity and quiet[2]		L10 ≤ 55 dBA	DNL ≤ 60 dBA		60 dBA < DNL ≤ 65 dBA		65 dBA <DNL ≤ 75 dBA		75 dBA ≤ DNL
2. Hospital, Nursing Home		L10 ≤ 55 dBA		55 <L10≤ 65 dBA		65<L10≤80 dBA		L10>80dBA	
3. Residence, residential hotel or motel	7 am to 10 pm	L10 ≤ 65dBA		65 <L10≤ 70 dBA		70<L10≤80 dBA		L10>80dBA	
	10 pm to 7 am	L10 ≤ 55dBA		55 <L10≤ 70 dBA		70<L10≤80 dBA		L10>80dBA	
4. School, museum, library, courthouse 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	

Source: Table 19-2, *2021 CEQR Technical Manual*.

(i) In addition, any new activity shall comply with Impact Thresholds detailed in Section 410.

[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 as 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 DNL contours supplied by the Port Authority of New York and New Jersey (PANYNJ), or the noise contours may be computed from the federally approved Aviation Environmental Design Tool (AEDT) Computer Model using flight data supplied by the PANYNJ.

[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 listed by octave bands). Sources: New York City Department of Environmental Protection (adopted policy 1983).

Assessment Methodology

General Methodology

This noise analysis considers two receptor types when evaluating noise for a proposed development: existing and new receptor(s). Since the Proposed Project would introduce new hotel, community facility and office uses, these are considered "new receptors."

If the Proposed Project would introduce a new receptor, With-Action noise levels of the new receptor in dB(A) would be compared to the values contained in the Noise Exposure Guidelines. The descriptor used to assess the mobile noise sources is dependent upon the source of noise. For example, if a new receptor is exposed to aircraft noise, DNL is used, while L_{eq} or L_{10} is used to evaluate noise from other sources. Since the Proposed Project would not introduce new receptors within an existing 65 dB(A) DNL contour of an airport (i.e., LaGuardia Airport), noise impact analysis from aircraft noise is not warranted. As the Proposed Project would introduce new receptors within 1,500 feet of an existing rail transit facility and have a direct line of sight to that rail transit facility, a detailed train noise analysis is warranted. Therefore, the L_{dn} descriptor is used to evaluate required attenuation from this existing rail source, while the L_{10} descriptor is used to evaluate attenuation from other sources.

New sensitive receptors that would be introduced by the Proposed Project are evaluated under With-Action noise conditions to determine if receptors would be in an acceptable ambient sound level environment. The noise exposure guidelines for acceptable ambient conditions depend on the type of land use; for hotel and community facility spaces, the goal is to maintain interior noise levels of 45 dBA (L_{10}) and 40 dBA (L_{dn}) or lower. It is generally assumed that without specific information on a building's window and wall construction, the outdoor-to-indoor noise reduction of the building is 25 decibels. As shown in **Table 17-2**, exterior ambient sound levels exceeding 70 dBA (L_{10}) or 65 dBA (L_{dn}) are considered Marginally Unacceptable. Exterior sound levels exceeding 80 dBA (L_{10}) or 75 dBA (L_{dn}) are considered Clearly Unacceptable. If there would be Marginally Unacceptable or Clearly Unacceptable ambient noise conditions, there is a need to provide window/wall sound attenuation that is sufficient to reduce interior sound levels to acceptable levels.

Since the Proposed Project would introduce new hotel and community facility spaces, the highest L_{10} or L_{dn} sound level among all of the peak transportation periods (i.e., weekday morning, midday, and afternoon, Saturday afternoon, and Sunday morning) is used to evaluate whether the Proposed Project would introduce new receptors into an acceptable noise environment.

As mentioned above, the Proposed Project would introduce at least 20 acres public park spaces consisting of various landscaped area and other recreational outdoor spaces. As indicated in the *CEQR Technical Manual* noise exposure guidelines (as shown in **Table 17-2**), publicly accessible outdoor areas where serenity and quiet are extraordinarily important and serve as important public need, and where the preservation of these qualities is essential for the area to serve its intended purpose, are considered noise sensitive receptors. According to the *CEQR Technical Manual*, 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. According to the *CEQR Technical Manual*, examples are grounds for ambulatory hospital patients and patients and residents of sanitariums and nursing homes. As described in **Chapter 1, Project Description**, the public park spaces introduced by the Proposed Actions would include both passive and active recreational spaces.

Figure 17-1 shows the new public park space introduced by the Proposed Actions , while **Table 17-3** details the acreages and proposed amenities within the proposed park space, which are discussed in more detail below. The newly created open spaces would provide areas for gathering, play, respite, public restrooms, and critical pedestrian and cycling connections to transit and other surrounding open spaces—including the Malcolm X Promenade and the Flushing Meadows Corona Park—and provide connectivity within the Development Site. With the addition of the proposed open space and no reduction in existing open space, the total passive open space acreage in the study area would increase to 45.17 acres. However, the intended use of these open spaces is not consistent with activities requiring serenity and quiet, so they are not considered sensitive. In addition, the newly created active open spaces would not be considered sensitive receptors, but would be considered stationary sources—specifically those active open spaces with sports courts and playgrounds (e.g. OS-4 and OS-6).

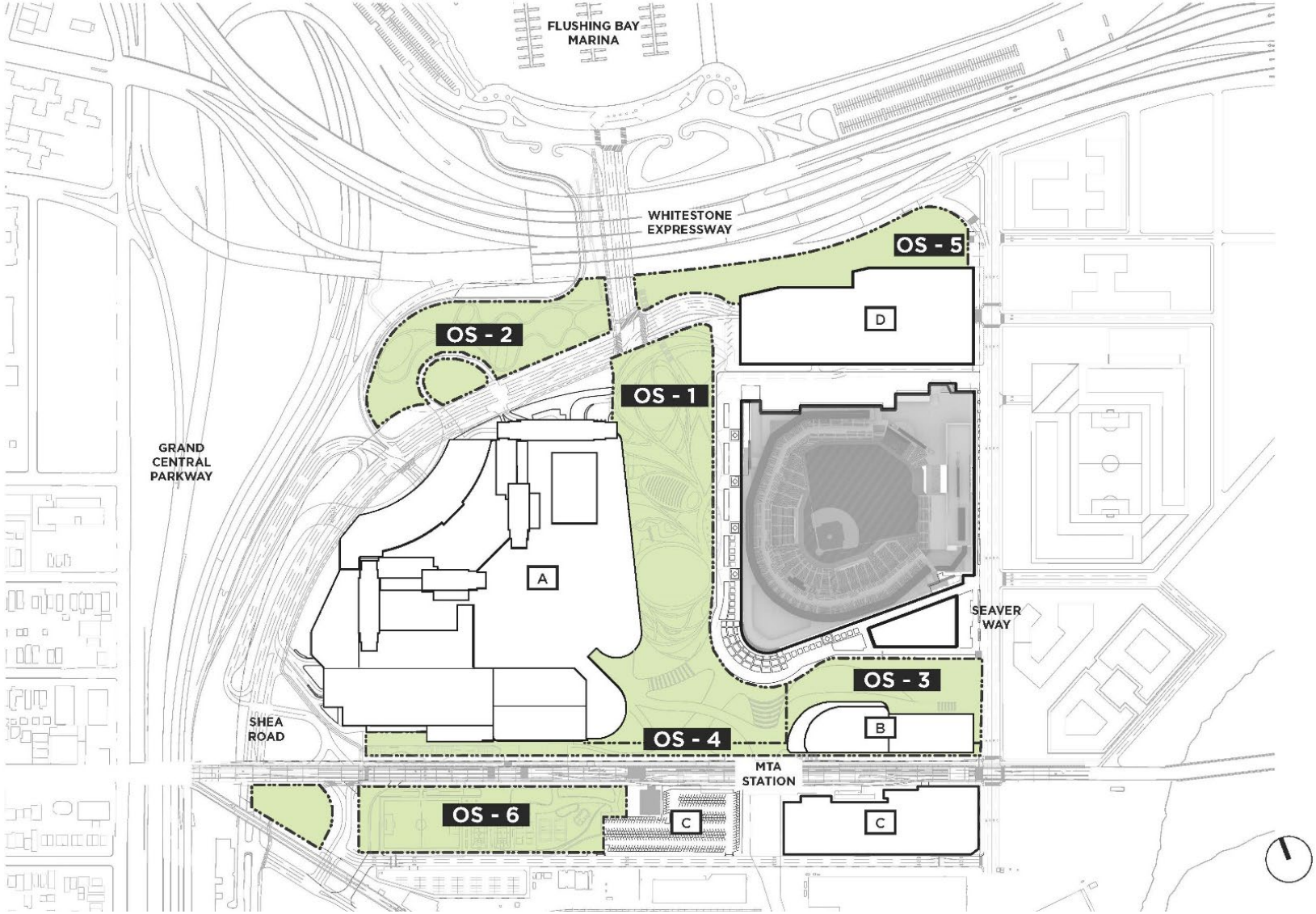
Table 17-3 With-Action Condition – Proposed Open Spaces

Name	Active Acreage	Passive Acreage	Total Acreage	Proposed Amenities
OS-1	0.69	9.81	10.50	Outdoor event space, gardens, moveable seating, picnic areas, open lawns, promenades, and landscaped pathways
OS-2	0.76	0.94	1.70	Dog run, passive recreation spaces, picnic areas and seating, and bike and pedestrian connections
OS-3	0.00	1.60	1.60	Landscaping, walkways, eating areas, event space, and seating
OS-4	0.30	0.90	1.20	Sports courts, walkways, seating, planting, bike lanes, and bike parking
OS-5	0.26	0.94	1.20	Passive recreation spaces, seating, and bike and pedestrian connections
OS-6	2.00	1.80	3.80	Active recreational spaces for sports such as basketball, racket sports, soccer, playgrounds, and fitness areas.
Total	**4.01**	**15.99**	**20.00**	

Notes: Only OS-4 and OS-6 will include active use for sports such as basketball, racket sports, soccer, playgrounds, and fitness areas. Other OS will only include active use such as bike lane and pedestrian pathway which are not expected to generate noticeable noise levels.

The analysis also considers "existing receptors," which are the current noise-sensitive land uses, such as residential and commercial properties surrounding the Development Site. Noise impact at the existing sensitive receptors is assessed according to the relative increase between No-Action and With-Action sound levels. Noise impact is assessed according to the increase in the L_{eq} sound level in accordance with the *CEQR Technical Manual*. If mobile or stationary sources associated with the Proposed Project would increase L_{eq} sound levels by 3 dB or more and absolute levels would exceed 65 dBA L_{eq}, the Proposed Project would cause a significant adverse impact. Additionally, if No-Action condition noise levels are 60 dBA L_{eq} or less, a 5-dB increase would be considered a significant adverse noise impact.

Figure 17-1 With-Action Condition - Proposed Open Space Map



Source: SHoP Architects and Field Operation
Note: Development Footprints for Illustrative Purposes Only

Mobile Sources

Screening Analysis

As described in **Chapter 14, Transportation**, a detailed traffic analysis has been conducted at multiple intersections where vehicular traffic is the dominant noise source to evaluate Existing, No-Action, and With-Action traffic volumes near the Development Site for all nine peak periods (the non-game-day weekday AM, midday, PM, and Saturday PM periods, and game-day[2] weekday PM ~~periods~~, Saturday Pre-Game, Saturday Post Game~~PM~~, ~~and~~ Sunday Midday, ~~period~~and Sunday PM periods)~~s~~. First level screening has been conducted for the peak periods at the following intersections which are located immediately adjacent to the existing and new receptors:

- Shea Road and Boat Basin Place
- Shea Road and Grand Central Parkway Ramp
- Seaver Way and 38th Avenue

If the Proposed Project would result in a doubling or more of PCEs, it would result in a 3 dBA or greater increase in noise levels. If PCEs would not double due to the Proposed Project, there would not be a significant adverse vehicular noise impact, and no further mobile source noise analysis is warranted. The *CEQR Technical Manual* describes the process to determine PCEs. Vehicle classes are defined to have the following PCEs based on typical vehicles speeds:

- Each automobile or light truck: 1 noise PCE
- Each medium truck: 13 noise PCEs
- Each bus: 18 noise PCEs
- Each heavy truck: 47 noise PCEs

Future With-Action noise increases are calculated using the following equation:

$$With\ Action\ L_{eq}\ Increase = 10 * \log\left(\frac{With\ Action\ PCE}{No\ Action\ PCE}\right)$$

Detailed Analysis

As instructed in *CEQR Technical Manual*, the latest version of the approved Federal Highway Administration (FHWA) Traffic Noise Model (TNM) should be used when:

- Conditions result in new or significant changes in roadway or street geometry;
- Roadways currently carry no or very low traffic volumes are involved;
- Ambient noise is the result of multiple sources including traffic; or
- A detailed analysis of changes due to the traffic component of the total ambient noise levels is necessary.

The TNM model considers various factors that influence vehicular noise, including traffic volumes, vehicle classifications, source/receptor geometry, shielding (including barriers and terrain), ground attenuation, etc. According to the FHWA, the TNM model requires validation to verify the accuracy.

[2] "Game-day" and "nongame-day" refer to periods with and without events, and NY Mets games in particular, at Citi Field.

The model is validated when differences between the measured versus modeled noise levels are within +/- 3 dB(A).

One particularly useful application of the TNM model is for situations where traffic is one of the components of the total ambient noise. In such situations, the TNM model may be used to compute the traffic component of the noise and may then be subtracted from the measured ambient noise levels to determine the non-traffic components of the total ambient noise levels.

Computerized models, such as CadnaA and SoundPLAN, have developed algorithms that incorporate the TNM model for vehicular noise calculations; they may be utilized for CEQR analyses. Along Shea Road between Roosevelt Avenue and Seaver Way, the Proposed Project would result in new changes in the roadway and street geometry for roadways that currently carry very low traffic volumes. The ambient noise level along Roosevelt Avenue is combination of vehicular traffic noise and train noise (MTA NYCT No. 7 Train). Following the procedures of Section 332.1 in the *CEQR Technical Manual*, the CadnaA noise prediction software was used to estimate the noise levels at the Area of Development A and Area of Development B.

Stationary Sources

The Proposed Project is not anticipated to include any substantial stationary source noise generators, such as unenclosed cooling or ventilation equipment, loudspeaker systems, stationary diesel engines, or other similar types of uses. The Proposed Project would include active open space such as athletic fields and other sports facilities, which are considered stationary sources that generate noise.

The design and specifications for mechanical equipment – such as heating, ventilation, and air conditioning – would incorporate sufficient noise reduction to comply with applicable noise regulations and standards, including the standards contained in the revised New York City Noise Control Code, Subchapter 5, §24-227, the New York City Department of Building Code. This would ensure that mechanical equipment does not result in any significant increase in noise levels, either by itself or cumulatively with other project-related noise sources.

Noise from the proposed recreational areas (i.e., the athletic fields and sports facilities associated with OS-4 and OS-6) have been evaluated based on the 1992 SCA Playground Noise Study that is referenced in the *CEQR Technical Manual*. The evaluation assumes sound from the recreational area equivalent to the sound from an intermediate school playground, which is 71.0 dBA (L_{eq}) at the playground boundary. Sound levels at receptors farther than the playground boundary are reduced by 4.8 dBA at 20 feet, 6.8 dBA at 30 feet, 9.1 dBA at 40 feet, and a 4.5-dB per doubling of distance between 40 and 300 feet.

Potential noise impact has been assessed for existing and new receptors including the noise from the active open space recreational areas in the following sections.

Stadium Noise

Noise levels from the operation of Citi Field include a combination of noise from operation of the stadium's Public Address (PA) system as well as noise from patrons. The stadium and its PA system is designed to comply with NYC Noise Control Code restrictions at adjacent residential properties. However, in addition to noise from the PA system, spectators would produce noise during an event at the stadium. Consequently, an analysis was conducted to determine the potential for total noise from the existing Citi Field (including both PA system noise and crowd noise) to result in noise

impacts at new receptors. **Table 17-4** shows the noise levels measured during a game played at Citi Field on July 15, 2023. Sites 5 and 6 are located at the east side and west side of the main field entrance facing Mets Plaza, respectively. These locations were selected to represent worst case noise emission from a stadium during a Mets game.

Table 17-4 Noise Level Measured During Game

Site	Monitoring Location	L_{eq}	L_{10}	L_{50}	L_{90}
5	Parking Lot G facing Citi Field	66.5	69.1	63.9	60.5
6	Parking Lot D facing Citi Field	69.8	72.2	67.3	65.0

The measured L_{eq} and L_{10} noise levels at the Location 5 and 6 can be assumed to represent stadium noise at west and south side of the Citi Field with direct line of sight to the Citi Field. For this assessment, the measured noise level at Site 6 due to the crowd and sound system at Citi Field was extrapolated to the east facade of the tower, assuming that any increase in the noise level at the upper floors of the tower, due to an improved line-of-sight into Citi Field, would be offset by the increased distance between the upper floors of the tower, which would be set back from the eastern edge of the gaming base and Citi Field. It is also worthwhile to note that the measured levels at Sites 5 and 6 are consistent with the measured Game Day noise levels collected by others in support of the EIS for the Willets Point Phase 2 Development.[3]

A 500,000-gsf soccer-specific stadium for the New York City Football Group (NYCFC), and 500 accessory parking spaces are proposed in the Willets Point Phase 2 Development located on the east side of the existing Citi Field across Seaver Way in the No-Action condition. Since the NYCFC stadium and the Citi Field stadium events will not occur simultaneously, (reference the agreement in Willets Point Phase 2 Development[2]), the noise from one event was analyzed. The proposed NYCFC stadium is substantially smaller (in both capacity and square footage) than the existing Citi Field and would be expected to have a smaller PA system. Furthermore, the PA system is subject to the NYC Noise Control Code limits. Citi Field is closer to the Development Site and new receptors associated with the Proposed Project than the soccer stadium. Accordingly, an assessment of noise from Citi Field as a stationary source is more conservative than an assessment of noise from the soccer stadium.

Existing Condition

To characterize existing conditions, noise measurements were conducted at seven locations throughout the Development Site as shown in **Figure 17-2**. Measurements were conducted on May 16, 2023 (weekday game-night), July 15, 2023 (Saturday game-night), June 7 and 8, 2023 (weekday nongame-day), June 10 and 11, 2023 (weekend nongame-day), which are dates approved by NYCDOT for traffic counts and were not subject to a measurement pause due to COVID-related traffic effects. Existing noise measurements were adjusted based on the difference between the vehicle counts conducted during noise measurement and the existing vehicle counts collected and summarized in **Chapter 14, Transportation**.

Vehicular traffic was the dominant source of noise at Sites 1, 2, and 7. Consequently, 20-minute spot measurements at these locations were taken during the three weekday periods without a baseball game, one Saturday period without a baseball game, one weekday period with a baseball game, and

[3] Willets Point Phase 2 Development. CEQR No. 23DME005Q. Final Second Supplemental Environmental Impact Statement for the Willets Point Phase 2 Development Project, published February 23, 2024.

one weekend period with a baseball game that reflect peak hours of trip generation: AM weekday (7:00–10:00 AM), midday (MD) weekday (12:00 AM–2:00 PM), PM weekday (5:00–7:00 PM), midday (MD) Saturday (12:00–5:00 PM), PM weekday pre-game (5:30–7:30 PM), and PM weekend pre-game (5:30–7:30 PM).

Train noise from the elevated No. 7 subway line along Roosevelt Avenue was the dominant source of noise at Site 3 and 4. 24-hour measurements were taken at Location 3 from 12 PM on June 7 to 12 pm on June 8, 2023 (nongame weekday) and 3 PM on June 10 to 3 PM on June 11, 2023 (nongame weekend). Additional noise measurements were also conducted pre-game at Site 3 and 4, which are adjacent to the train.

To evaluate the noise from the Citi Field during a baseball game, noise measurements were conducted during the baseball game at Site 5 and 6 on June 7 and 10, 2023, at the approximate locations of the façades of the buildings associated with the Proposed Project.

Measurements were conducted using Type I sound level meters at ground level and followed the procedures outlined in the *CEQR Technical Manual*, which include documenting significant sources of sound and conducting spot counts of traffic by vehicle classification. The noise monitors were placed with a minimum of four feet between the microphone and nearby reflecting surfaces. Data collected included A-weighted overall and one-third octave band sound levels including minimum (L_{min}), maximum (L_{max}), statistics (L_{xx}), and equivalent noise levels (L_{eq}). Atmospheric conditions including air temperature, wind speed, wind direction, relative humidity, and precipitation were obtained from a nearby weather station. The atmospheric conditions were within acceptable ranges and did not influence the measurement results.

Table 17-5 presents the measured L_{eq}, L_{10}, L_{50}, and L_{90} sound level during each time period at the measurement location Sites 1, 2, and 7, where vehicular traffic is the predominant noise source. Existing sound levels ranged from 63.0 to 70.7 dBA (L_{eq}) and from 65.2 to 73.7 dBA (L_{10}). As mentioned above, detailed mobile source analysis is required when the With-Action condition results in new or significant changes in roadway or street geometry or the roadways currently carry no or very low traffic volumes. Based on the field observations and the Conceptual Site Plan associated with the Proposed Project, Shea Road, which is immediately adjacent to measurement location Sites 1 and 2, currently carries very low traffic volumes and the roadway geometry would substantially change under the With-Action condition. Therefore, measurement location Sites 1 and 2 would require a detailed mobile source noise assessment, and the measurement results would be used to calibrate the model.

Table 17-6 presents the measured L_{dn}, and hourly L_{eq}, L_{10}, L_{50}, and L_{90} sound level at measurement location Sites 3 and 4, where the dominant noise source is the train noise; the vehicular noise is negligible in these locations.

Figure 17-2 Noise Monitoring Locations



Source: VHB, 2024.

Table 17-5 Measured Sound Levels Where Vehicular Noise is Predominant

Site	Monitoring Location	Game Day or Not	Time Period	L_{eq}	L_{10}	L_{50}	L_{90}
1	Shea Road & Boat Basin Place	Non-Game Day	Morning	68.4	69.7	67.6	66.2
			Midday	66.9	68.5	65.7	63.9
			Evening	64.1	66.7	63.0	60.1
			Saturday	67.6	68.6	67.2	66.1
		Game Day	Weekday	66.1	67.4	64.3	62.4
			Saturday	67.3	69.1	64.3	61.4
2	Shea Road & Grand Central Pkwy Ramp	Non-Game Day	Morning**	67.3	67.1	64.5	62.9
			Midday	63.4	65.2	62.3	60.9
			Evening	63.5	65.5	62.3	60.1
			Saturday	66.3	68.1	64.8	62.0
		Game Day	Weekday	63.0	65.3	62.1	60.0
			Saturday	64.2	67.4	62.2	59.1
7*	Seaver Way between 38th and Roosevelt Avenues, across from Citi Field stadium	Non-Game Day	Morning	70.2	73.4	67.5	62.3
			Midday	70.7	73.9	67.6	62.4
			Evening	68.0	71.7	66.2	58.8
			Saturday	70.0	72.7	67.0	60.0
		Game Day	Weekday	67.9	71.0	66.3	61.6
			Saturday	69.4	71.5	68.4	65.8

*Site 7 is Measurement Site 1 from Willets Point Phase 2 Development EIS.
** The field notes and 1-second time history indicate two heavy trucks passed the microphone on the near side of the road, which resulted in the 20-minute L_{eq} being slightly higher than the L_{10}.
Nongame Day data was collected on June 7 to June 11, 2023. Game Day data was collected on May 16 and July 15, 2023.

Table 17-6 Measured Sound Levels Where Train Noise Is Predominant

Site	Monitoring Location	Game Day or Not	Time Period	L_{eq}	L_{10}	L_{50}	L_{90}	L_{dn}
3	Roosevelt Avenue (Parking Lot E/F)	Non-Game Day	Morning	77.4	80.3	68.2	62.0	81.5
			Midday	77.5	77.9	67.2	63.9	
			Evening	80.5	85.9	66.3	61.3	
			Saturday	78.2	78.5	65.1	60.4	80.4
		Game Day	Weekday	78.2	79.6	69.4	64.0	--
			Saturday	75.2	80.6	66.7	61.7	--
4	Roosevelt Avenue (Parking Lot G)	Game Day	Weekday	77.9	81.9	67.4	62.5	--

Nongame Day data was collected on June 7 to June 10, 2023. Game Day data was collected on May 16 and July 15, 2023.

No-Action Condition

Existing Noise Receptors

The closest existing noise-sensitive receptor (Site 7) is the proposed residential use that will be introduced by the Willets Point Development Plan in the No-Action condition, located east of the Development Site. A mobile source screening analysis (see **Table 17-7**) has been conducted for this existing receptor at corresponding roadway segments based on proportional noise modeling to determine the Existing and No-Action noise levels as well as noise increases at the monitored location. Included are traffic volumes and vehicle classifications that contribute to the noise measurements along the roadway segments. Existing noise levels have been computed based on the existing vehicle counts collected and summarized in **Chapter 14, Transportation**. No-Action noise levels have been computed based on the sound increment between the No-Action PCEs and the Existing PCEs.

PCE calculations were performed for three intersections in proximity to the project site. Since the proposed project would significantly change the geometry on roadways with very low traffic volumes in the Existing condition, a detailed analysis was necessary for intersections #32 and #31, which potentially affect Sites 1 and 2. The detailed analysis utilized a CadnaA model of traffic noise as described later in this chapter. Furthermore, the land use with Existing Conditions at Sites 1 and 2 is not considered noise-sensitive (Sites 1 and 2 are an existing parking lot), so the incremental change in traffic noise levels based on a PCE analysis is meaningless for Sites 1 and 2, and a detailed analysis was performed in lieu of a PCE analysis.

Table 17-7 Predicted No-Action Mobile Source Noise Screening at Existing Receptor Site 7

Site	Intersection Number and Description	Game Day or Not	Time Period	Existing PCEs	No-Action PCEs	No-Action Minus Existing Sound Levels (dBA)
7	#112 Seaver Way between 38th and Roosevelt Avenues, across from Citi Field stadium	Non-Game Day	Morning	784	957	0.9
			Midday	1,195	1,372	0.6
			Evening	850	1,022	0.8
			Saturday	361	498	1.4
		Game Day	Weekday Evening	895	1,072	0.8
			Saturday Pre-Game	1,252	1,384	0.4
			Saturday Post-Game	1,018	1,144	0.5

As shown in **Table 17-8,** the predicted No-Action noise levels including the increase in mobile sources would range from 68.7 to 71.4 dBA L_{eq} levels and L_{10} levels would range from 71.8 to 74.5 dBA.

Table 17-8 Predicted No-Action Sound Levels Compared to Existing Sound Levels

Site	Intersection Number and Description	Game Day or Not	Time Period	Existing L_{eq}	Change	No-Action L_{eq}	No-Action L_{10}
7	#112, Seaver Way between 38th and Roosevelt Avenues, across from Citi Field stadium	Non-Game Day	Morning	70.2	0.9	71.1	74.3
			Midday	70.7	0.6	71.3	74.5
			Evening	68.0	0.8	68.8	72.5
			Saturday	70.0	1.4	71.4	74.1
		Game Day	Weekday Evening	67.9	0.8	68.7	71.8
			Saturday Pre-Game	69.4	0.4	69.8	71.9
			Saturday Post-Game	69.4	0.5	69.9	72.0

New Noise Receptors

Absent the Proposed Actions, it is assumed that the Development Site would continue operating under existing conditions; it would remain as a paved parking area for Citi Field under the current lease agreement with the City. Therefore, the No-Action condition does not introduce new receptors.

With-Action Condition

Existing Noise Receptors

Similar to the No-Action condition, the With-Action noise levels at the existing receptor has been computed based on the With-Action PCEs. **Table 17-9** shows that at Site 7, With-Action noise levels would generally be up to 2.6 dBA higher than the No-Action noise levels during non-game day peak periods. With-Action noise levels would be up to 0.5 dBA higher than No-Action noise levels on game days. According to the *CEQR Technical Manual* guidelines, increases of less than 3 dBA would be barely perceptible. As the Proposed Actions would not increase noise levels by 3 dBA or more compared to No-Action conditions, there would not be significant noise impact at existing sensitive receptors due to mobile sources.

Table 17-9 Mobile Source Noise Screening at Existing Receptors

Site	Roadway Intersection/ Segment	Game Day or Not	Time Period	Existing PCEs	No-Action PCEs	With-Action PCEs	No-Action Minus Existing Sound Levels (dBA)	With-Action Minus No-Action Sound Levels (dBA)
7	Seaver Way between 38th and Roosevelt Avenues, across from Citi Field stadium	Non-Game Day	Morning	784	957	1,071	0.9	0.5
			Midday	1,195	1,372	1,625	0.6	0.7
			Evening	850	1,022	1,452	0.8	1.5
			Saturday	361	498	905	1.4	2.6
		Game Day	Weekday Evening	895	1,072	1,213	0.8	0.5
			Saturday Pre-Game	1,252	1,384	1,222	0.4	-0.5
			Saturday Post-Game	1,018	1,144	1,134	0.5	0.0

As shown in **Table 17-10,** the predicted With-Action L_{eq} levels would range from 69.2 to 74.0 dBA and the L_{10} levels would range from 71.4 to 76.7 dBA. With-Action sound levels would exceed 70 dBA (L_{eq} or L_{10}) at measurement location Site 7, which corresponds to the mobile source sound level at façades of the proposed buildings nearest to Seaver Way.

Table 17-10 Predicted With-Action Sound Levels Compared to No Action Sound Levels at Existing Receptors

Site	Monitoring Location	Game Day or not	Time Period	NA L_{eq}	change	WA L_{eq}	WA L_{10}
7	Seaver Way between 38th and Roosevelt Avenues, across from Citi Field stadium	Non-Game Day	Morning	71.1	0.5	71.6	74.8
			Midday	71.3	0.7	72.0	75.2
			Evening	68.8	1.5	70.3	74.0
			Saturday	71.4	2.6	74.0	76.7
		Game Day	Weekday Evening	68.7	0.5	69.2	72.3
			Saturday Pre-Game	69.8	-0.5	69.3	71.4
			Saturday Post-Game	69.9	0.0	69.9	72.0

Source: VHB, 2024

New Noise Receptors

Along Shea Road between Roosevelt Avenue and Seaver Way, the Proposed Project would result in new changes in the roadway and street geometry for roadways that currently carry very low traffic volumes. Following the procedures of Section 332.1 in the *CEQR Technical Manual*, the CadnaA noise prediction software was used to estimate the noise levels at Area of Development A and Area of Development B. Since the Proposed Actions would introduce new hotel and community facility spaces, which are sensitive receptors, the highest L_{10} or L_{eq} sound level among all of the peak transportation periods (i.e., weekday morning, midday, and afternoon, Saturday evening) is used to evaluate whether the Proposed Project would introduce these new receptors into an acceptable noise environment. It is found that the Non-Game Day midday period would have the highest PCEs at Measurement Sites 1 and 2 due to the high percentage of buses and trucks along the roadways in close proximity to the new receptors, compared to other peak periods analyzed. Therefore, nongame-day midday period is selected to be modeled as the worst-case scenario.

Table 17-11 summarizes the predicted mobile sources noise levels at the new receptors during nongame-day midday period.

Table 17-11 Predicted With-Action Sound Levels at New Receptors During Nongame-Day Midday

Location	Facade	Measurement Site	Existing L_{eq}	Existing L_{10}	With-Action L_{eq}	With-Action L_{10}
Area of Development A	North	1	66.9	68.5	65.8	67.4
	West	2	63.4	65.2	68.6	70.4
	South	3	77.5	77.9	82.0	82.5
Area of Development B	West	6	65.5	67.6	73.6	75.7
	East	7	70.7	73.9	71.9	75.1
	South	3	77.5	77.9	82.3	82.7

Source: VHB, 2024

With-Action noise levels at new receptors that would be introduced by the Proposed Actions would also be impacted by the stationary source noise from the proposed active open space recreational uses. The proposed active open space area would be comprised of approximately 2.00 acres (OS-6) located south of Roosevelt Avenue to the west of the surface parking area of Area of Development C, and 0.3 acres (OS-4) located along Roosevelt Avenue. These active open space areas will be dedicated to active recreation with a variety of activities and attractions, anticipated to include active recreational spaces for sports such as basketball, racket sports, soccer, playgrounds, and fitness area. Although the Proposed Project would introduce at least 20 acres of public park space, only OS-4 and OS-6 are anticipated to include active recreational spaces and these active spaces are considered to be stationary sources according to the *CEQR Technical Manual*. Area of Development A would be the closest new receptor to the proposed active open spaces, but Area of Development B would also include noise from the active open space.

The following **Table 17-12** summarizes the stationary sources noise assessment at new receptors.

Table 17-12 With-Action Sound Levels from Active Open Space Recreational Area

Recreational Area	New Receptor Location	Baseline Sound Level at boundary (L_{eq})	Time Period	Total With-Action Sound Level	
				L_{eq}	L_{10}
Active Open Space Recreational Area (OS-4 and OS-6)	Area of Development A and B	71.0	NGD Morning	77.4	77.9
			NGD Midday	77.5	80.3
			NGD Afternoon	80.5	85.9
			NGD Saturday	78.3	78.5
			GD Weekday	78.2	79.6
			GD Saturday	75.2	80.6

Source: VHB, 2024

With-Action noise conditions at new sensitive receptors that would be introduced by the Proposed Project are evaluated to determine if receptors would be in an acceptable ambient sound level environment. The noise exposure guidelines for acceptable ambient conditions depend on the type of land use; for hotel and community facility spaces, the goal is to maintain interior noise levels of 45 dBA or lower. It is generally assumed that without specific information on a building's window and wall construction, the outdoor-to-indoor noise reduction of the building is 25 decibels. As shown in **Table 17-2**, exterior ambient sound levels exceeding 70 dBA (L_{10}) during the daytime (7 AM to 10 PM) are considered Marginally Unacceptable. Exterior sound levels exceeding 80 dBA (L_{10}) are

considered Clearly Unacceptable. If there would be Marginally Unacceptable or Clearly Unacceptable ambient noise conditions, there is a need to provide window/wall sound attenuation that is sufficient to reduce interior sound levels to acceptable levels.

Noise Attenuation Measures

Acceptability Assessment

The *CEQR Technical Manual* provides noise exposure guidelines for assessing ambient sound levels, as shown in **Table 17-2**. Based on these noise exposure guidelines, noise has been assessed to determine the level of acceptability for new sensitive receptors introduced by the Proposed Project. **Table 17-13** summarizes the maximum With-Action L_{10} or L_{dn} level at each proposed building for each façade based on results of the noise monitoring and cumulative noise analysis—including mobile and stationary sources and whether the With-Action sound levels are considered to be acceptable according to the *CEQR Technical Manual*.

Table 17-13 Sound Level Acceptability, dBA

Building	Façade	Noise Site	Time Period[C]	With-Action Sound Level (dBA)	Acceptability
Area of Development A	North	1	NGD Midday	66.9 (L_{10})[A]	Acceptable
	East	6	NGD Evening	**73.3(L_{10})**	**Marginally Unacceptable**
	West	2	NGD Midday	**70.4 (L_{10})[A]**	**Marginally Unacceptable**
	South	3	24-hour/ NGD Evening	**81.5 (L_{dn})/85.9 (L_{10})[B]**	**Clearly Unacceptable**
Area of Development B	North	5	GD Saturday	69.1 (L_{10})	Acceptable
	East	7	NGD Saturday	**75.1 (L_{10})[A]**	**Marginally Unacceptable**
	West	6	NGD Evening	**75.7 (L_{10})[A]**	**Marginally Unacceptable**
	South	3	24-hour/ NGD Evening	**81.5 (L_{dn}) / 85.9 (L_{10})[B]**	**Clearly Unacceptable**

Note: Although not included in this table, additional facades within 50 feet of dominant noise source were considered with attenuation requirement based on Monitoring Location directly exposed to the elevated subway track as depicted in Figure 17-2
A: Based on CadnaA modeling analysis described above.
B: Includes sound level from recreational area
C: "NGD" = nongame-day; "GD" = game-day
Source: VHB, 2024

According to the noise exposure guidelines in the *CEQR Technical Manual*, With-Action sound levels would be Clearly Unacceptable on the southern façade of Area of Development A and Area of Development B, Marginally Unacceptable on the eastern and western facades of Area of Development A and Area of Development B, and Acceptable on the northern facades of Area of Development A and Area of Development B.

Based on the finding of Marginally Unacceptable and Clearly Unacceptable sound levels, sufficient outdoor-to-indoor sound attenuation of the window/wall must be specified to provide acceptable sound attenuation from the window/wall materials.

For the façade with direct line of sight to the Roosevelt Avenue, the major source of the noise is from the elevated train services. For "line" sources, the sound level drops off at a rate of 3 dB(A) with each

doubling of the distance from the source. The South Façade of the Area of Development A was determined by the noise measurement result taken at Measurement Site 3, which is located 50 feet north from the centerline of the elevated train tracks. Therefore, the same method is used to determine the required attenuation for the receptors located further away from Roosevelt Avenue.

Required Noise Attenuation

The most common measure for reducing interior noise from ambient sources is to specify sufficient outdoor-to-indoor sound attenuation for the proposed building. As shown in **Table 17-14**, the required level of attenuation varies based on the exterior sound levels and type of receptor.

Table 17-14 Required Attenuation Values

	Marginally Unacceptable				Clearly Unacceptable
Vehicular Traffic	$70<L_{10}\leq73$	$73<L_{10}\leq76$	$76<L_{10}\leq78$	$78<L_{10}\leq80$	$80<L_{10}$
Aircraft[A]	$65<DNL\leq68$	$68<DNL\leq71$	$71<DNL\leq73$	$73<DNL\leq75$	$75<DNL$
Train	$65<L_{dn}\leq68$	$68<L_{dn}\leq71$	$71<L_{dn}\leq73$	$73<L_{dn}\leq75$	$75<L_{dn}$
Attenuation[B]	(I) 28 dBA	(II) 31 dBA	(III) 33 dBA	(IV) 35 dBA	See Note [C]

Note:
[A] DNL descriptor based on average values of L_{dn} over a year period
[B] The above composite window-wall attenuation values are for hotel and community facility development. Commercial office spaces and meeting rooms would be 5 dBA less in each category. All of the above categories require a closed window situation and hence an alternate means of ventilation.
[C] The required attenuation value is the difference between L_{build} and $L_{interior}$, using the appropriate noise descriptor
Where: L_{build} is the projected noise level under the build condition rounded up to the whole number
$L_{interior}$ is the designed interior noise level (45 dB(A) for vehicular noise, 40 dB(A) for aircraft and train noise)
Source: New York City Department of Environmental Protection (*2021 CEQR Technical Manual*, Table 19-3)

The results show the proposed hotel and community facility spaces would require a minimum composite window/wall sound attenuation to maintain an interior noise level not greater than 45 dBA (L_{10}) or 40 dBA (L_{dn}). In order to maintain acceptable interior noise conditions an alternative means of ventilation must be included such as, but not limited to, central air conditioning, to provide ventilation during the closed window condition.

The composite OITC value of the window-wall structure is used to determine the necessary sound attenuation. The OITC classification is defined by ASTM International (ASTM E1331-10a) and provides a single number rating that is used for designing a building façade, including walls, doors, glazing, and combinations thereof. Sound attenuation measures would be achieved through construction materials and techniques with sufficient OITC-rated windows and walls.

The With-Action sound levels presented in **Table 17-13** were compared to the required attenuation values in **Table 17-14** to determine the sound attenuation needed. As shown in **Table 17-13** and **Figure 17-3**, a minimum composite window/wall sound attenuation would be required on the facades of Development A and B which are closest to Roosevelt Avenue, Shea Road and the proposed open space recreational areas.

Area of Development A

The With-Action noise level at the southern facades of Area of Development A including mobile and stationary sources would be up to 81.5 dBA (L_{dn}). Therefore, the southern façade exposed to Roosevelt Avenue would require a minimum composite window/wall of 42 OITC.

The With-Action noise level at the northern facades of Area of Development A including mobile and stationary sources would be up to 66.9 dBA (L_{10}). Therefore, enhanced window/wall attenuation would not be required at the northern façade along Shea Road.

The With-Action noise level at the western facades of Area of Development A including mobile and stationary sources would be up to 70.4 dBA (L_{10}). Therefore, the western façade facing Shea Road would require a minimum composite window/wall of 28 OITC.

The With-Action noise level at the eastern facades of Area of Development A including mobile and stationary sources would be up to 73.3 dBA (L_{10}) at 450 feet north from the center line of the elevated train tracks. The required attenuation for the south portion of the façade was calculated at the reduction rate of 3 dB per doubling of the distance from the center line of the elevated train tracks starting at 50 feet. Therefore, the eastern façade would require a minimum composite window/wall of 39 OITC at 50 feet to 100 feet away from the center line of the elevated train tracks, 36 OITC at 100 feet to 200 feet away from the center line of the elevated train tracks, 33 OITC at 200 feet to 400 feet away from the center line of the elevated train tracks, and 31 OITC at the facade more than 400 feet away from the center line of the elevated train tracks.

This required attenuation would also apply to the hotel towers to be constructed within Area of Development A. For attenuation details for each façade of each tower, refer to **Table 17-15** and **Figure 17-3**.

Table 17-15 Required Attenuation for Each Façade of the Hotel Towers

Location	Facade	Required Attenuation (dBA)
Hotel Tower A	East	31
	South	33
	West	28
	North	28
Hotel Tower B	East	31
	South	31
	West	28
	North	28
Hotel Tower C	East	31
	South	31
	West	28
	North	NA
Hotel Tower D	East	31
	South	31
	West	28
	North	NA

Source: VHB, 2024

Area of Development B

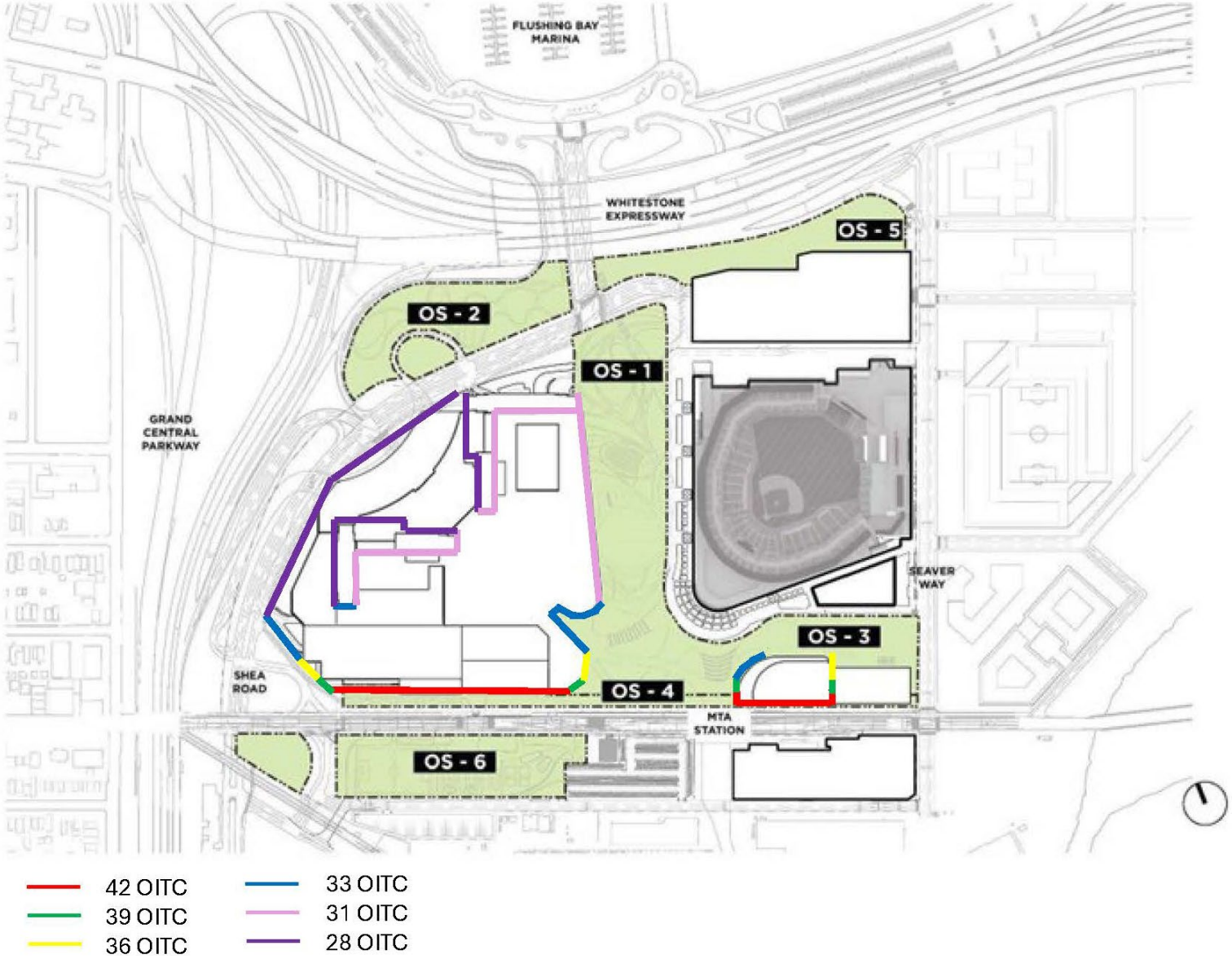
The With-Action noise level at the southern facades of Development B including mobile and stationary sources would be up to 81.5 dBA (L_{dn}). Therefore, the southern façade facing Roosevelt Avenue, the western façade and the eastern façade facing Seaver Way within 50 feet of Roosevelt Avenue, would require a minimum composite window/wall of 42 OITC.

The With-Action noise level at the northern facades of Development B including stationary sources would be up to 69.1 dBA (L_{10}). Therefore, enhanced window/wall attenuation would not be required at the northern façade facing Citi Field.

Both the western and eastern facades of Development B would have direct line of sight to the elevated train tracks, the required attenuation was calculated at the reduction rate of 3 dB per doubling of the distance from the center line of the elevated train tracks starting at 50 feet. Therefore, the eastern and western façades would require a minimum composite window/wall of 39 OITC at 50 feet to 100 feet away from the center line of the elevated train tracks, 36 OITC at 100 feet to 200 feet away from the center line of the elevated train tracks, 33 OITC at 200 feet to 400 feet away from the center line of the elevated train tracks.

These attenuation requirements are based on the currently assumed proposed use of the interior spaces, which are characterized as hotel use and community facility use. As the design of Development B progresses, should the proposed use of any interior spaces be characterized as commercial office use, the attenuation requirements identified above would be reduced by 5 dBA. Note that the attenuation requirements will be incorporated into the development agreement and/or amended lease.

Figure 17-3 Required Noise Attenuation



Source: VHB, 2024
Note: Development Footprints for Illustrative Purposes Only