12 Noise

12.1 INTRODUCTION

This chapter evaluates the potential changes in traffic noise exposure that would result from the implementation of the CBD Tolling Alternative as a result of projected changes in traffic volumes. The Project would not change the horizontal or vertical alignment of roadways, nor would it add travel-lane capacity beyond current conditions; therefore, the Project does not meet the definition of a FHWA Type I noise project. However, it does meet the definition of a Type III noise project as defined under 23 Code of Federal Regulations 772.5, "Procedures for Abatement of Highway Traffic Noise and Construction Noise: Definitions." In this case, FHWA does not require a noise analysis or consideration of abatement measures. Nevertheless, due to the nature of the Project and its potential effects to result in changes in traffic patterns, the screening methodology outlined in Chapter 19 of the City of New York's *CEQR Technical Manual* was used to quantify and assess potential changes in noise exposure from the Project.

12.1.1 Context

Sound is energy generated by the vibration of air molecules, and almost any activity will generate varying degrees of sound energy. Noise is considered unwanted sound, and with Manhattan having the highest population density in the nation, noise generating activities occur in close proximity to where people live and work. The combination of various activities amplifies total noise exposure, resulting in a nearly constant elevated background noise level that city dwellers are exposed to. A 1974 U.S. Environmental Protection Agency research effort[1] showed a strong correlation between population density and ambient noise exposure. Typical frequent and dominant noise sources—ranging between 70 A-weighted decibels (dB(A)) and 90 dB(A)—include those generated by traffic and transit movements, aircraft flyovers, emergency vehicle sirens, construction activities, and building heat and air conditioning systems.

In general, the traffic noise exposure generated by the Project is not anticipated to raise future noise exposure levels appreciably above ambient noise levels experienced today and if implemented, the Project would result in a net decrease in traffic noise exposure along most local roadways evaluated.

12.1.2 Methodology

Noise can be quantified in different ways, depending on its duration (time), tonal (frequency), or magnitude (loudness). Sound is typically measured in units of decibels (dB). The human hearing range is more sensitive to midrange frequencies compared to either low or very high frequencies. This characteristic of the human ear is accounted for by adjusting or weighting the spectrum of the measured sound level for the sensitivity

1 U.S. Environmental Protection Agency. June 1974. *Population Distribution of the United States as a Function of Outdoor Noise Level*, Report No. 550/9-74-009.

of the human hearing range, referred to as the A-weighted scale, and is denoted by the dB(A) notation. The definitions for the standardized environmental noise criteria metrics follow:

- L_{eq} is called the equivalent noise level, a single-value metric derived from the sum of actual time of varying and fluctuating sound over a fixed period of time (typically a one-hour period) that is denoted as L_{eq} (1-hr). The L_{eq} is the noise descriptor most commonly used in noise impact assessment criteria because it provides a measure of the average sound energy over a fixed period of time and correlates with human perception and annoyance.
- L_{max} and L_{min} are metrics for the highest and lowest measured sound levels, respectively, that occur during a measurement period. The L_{max} is commonly used in establishing construction noise exposure limits.
- L_n is a statistical representation of changing noise levels indicating that the fluctuating noise level is equal to, or greater than, the stated level for "n" percent of the time. For example, L_{10}, L_{50}, and L_{90} represent noise levels exceeding 10, 50, and 90 percent of the time, respectively. The L_{10} metric is widely used under the CEQR criteria to define and categorize the exterior noise environment and to establish noise attenuation requirements for maintaining an acceptable interior noise environment.

Table 12-1 provides a summary of an average human's ability to perceive changes in noise levels. Generally, the average human is unable to perceive noise-level changes until the changes measure in the 2-3 dB(A) range, but these increases are barely perceptible to most listeners, and it is not until the noise level change reaches 5 dB(A) or more that most humans can readily perceive changes in noise levels. **Table 12-2** provides a summary of noise levels generated and experienced in everyday life, ranging from 130 dB(A) (disruptive noise generated by a military jet) to 30 dB(A) (a soft whisper that would be unnoticeable to most listeners). Highway and urban traffic noise is typically in the 70 dB(A) to 80 dB(A) range. **Section 12.1.2** provides a discussion of noise exposure guidelines.

Table 12-1. Average Human Ability to Perceive Changes in Noise Levels

NOISE-LEVEL CHANGE (dB(A))	HUMAN PERCEPTION
0 to 2	Not perceptible to most listeners
2 to 3	Barely perceptible
5	Readily perceptible
10	Clearly perceptible

Source: Bolt Beranek and Newman, Inc. June 1973. *Fundamentals and Abatement of Highway Traffic Noise,* Report No. PB-222-703. Prepared for FHWA.

Table 12-2. Range of Recognizable Noise Levels

SOUND SOURCE	TYPICAL NOISE LEVEL dB(A)
Military jet, air raid siren	130
Amplified rock music	110
Jet takeoff at 500 meters	100
Train horn at 30 meters	90
Busy city street, loud shout	80
Highway traffic at 15 meters, train	70
Predominantly industrial area	60
Background noise in an office	50
Public library	40
Soft whisper at 5 meters	30

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

12.1.2.1 Summary Effects of All Tolling Scenarios and Determination of Worst-Case Tolling Scenario

This evaluation considered the effects of noise that would result from changes in traffic patterns as a result of implementation of the CBD Tolling Alternative. Potential increases in noise levels would be the result of changes in traffic characteristics that would produce higher noise levels than the No Action Alternative. These characteristics include changes in vehicle types, volumes, and travel speeds. Because the CEQR screening methodology is a high-level screening analysis technique, it considers only traffic volumes and vehicle classification, and does not account for the potential noise effects from changes in traffic speeds. CEQR exceedances occur, when the screening analysis shows a 3 dB(A) or greater increase in noise exposure with the Project versus the No Action Alternative. When this occurs, more detailed traffic noise modeling using the FHWA Traffic Noise Model (TNM version 2.5) would be performed; these detailed analyses, if required, would consider changes in traffic speeds. An adverse effect is defined to occur if the TNM analysis shows 3 dB(A) or greater increase in noise levels with the Project at the affected receptor site.

Because potential increases in noise levels are partly tied to instances where there would be increases in vehicular traffic, the potential worst-case noise exposure across the tolling scenarios should be consistent with the worst-case, highest incremental increase in traffic volumes. Those findings described in **Subchapter 4B, "Transportation: Highways and Local Intersections"** found Tolling Scenario D to be the representative worst-case tolling scenario based on the modeled level of traffic diversions; Tolling Scenario D is similar to Tolling Scenarios E and F, with comparable levels of traffic diversion. Tolling scenarios without extensive crossing credits (Tolling Scenarios A, B, C, and G) would have little or no incremental increases in traffic; therefore, there would be little or no increases in traffic noise exposure. The Tolling Scenario D traffic volumes were used for the 24-hour bridge and tunnel Passenger Car Equivalent (PCE) noise analysis in **Section 12.3.2.1** and for the local street peak-hour PCE analysis in **Section 12.3.2.2**. However, an exception would occur for the Downtown Brooklyn local street intersections, where Tolling Scenario C was used as the more representative worst-case tolling scenario.

12.1.2.2 CEQR Noise Criteria

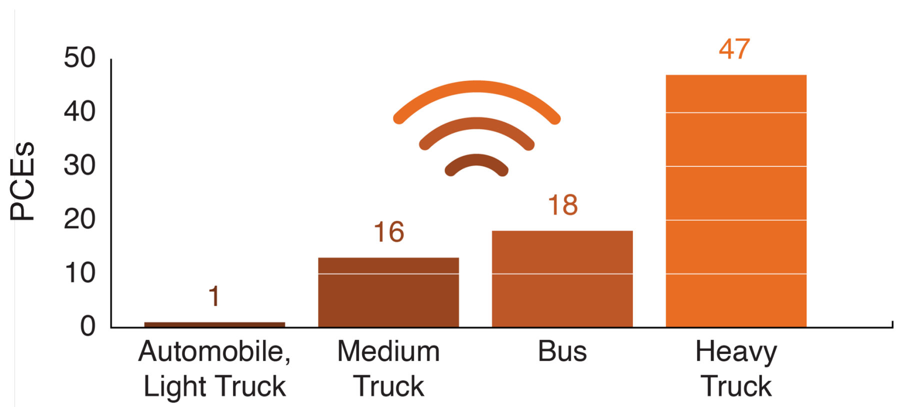
The *CEQR Technical Manual* contains exterior noise exposure guidelines as well as required attenuation values to maintain an acceptable interior noise environment inside buildings. **Table 12-3** shows these values. Noise exposure is classified into four principal categories: "Clearly Acceptable," "Marginally Acceptable," "Marginally Unacceptable," and "Clearly Unacceptable." The CEQR guidelines are based on maintaining an acceptable interior noise level, defined as an L_{10} value of 45 dB(A) or less for residential properties and hotels.

In addition to providing guidelines for acceptable interior noise environment, CEQR defines an adverse effect[2] as occurring when a project "build condition" exterior $L_{eq(1hr)}$ noise level—estimated at a sensitive receptor, such as a residence, play area, park, school, library or house of worship—exceeds a future "no action scenario" by more than 3 dB(A). The 3 dB(A) threshold is used because it represents a doubling of the Project traffic PCE volume over the No Action Alternative

12.1.2.3 CEQR Guidance for Estimating Projected Noise-Level Changes

The *CEQR Technical Manual* sets forth guidelines and procedures for determining potential changes to traffic noise generated as a result of a project and the effects those changes would have on the affected communities. Pursuant to these guidelines, the assessment requires converting the traffic volume into the various vehicle types (i.e., cars, trucks, and buses) traveling on each evaluated roadway to PCE values. For example, the PCE value for an automobile is 1 unit, 16 units for one medium truck, 18 units for one bus and 47 units for one heavy truck (**Figure 12-1**). In coordination with the traffic studies, hourly volumes were converted to PCEs based on the different vehicle types on each evaluated roadway. For each traffic movement, a logarithmic ratio of the hourly CBD Tolling Alternative PCEs divided by the hourly No Action Alternative PCEs was computed. A ratio increasing by 100 percent (doubling) or more would represent an increase of 3 dB(A) or higher in future L_{eq} values under the CBD Tolling Alternative, which would trigger a more detailed noise analysis using the FHWA TNM to verify the increase is accurate. On the other hand, a change of less than 3 dB(A) would indicate no adverse effect and would warrant no further action.

Figure 12-1. Traffic Noise Comparison in Passenger Car Equivalents (PCEs)



Source: City of New York's *City Environmental Quality Review Technical Manual*

[2] CEQR terminology refers to an adverse effect as a "significant adverse impact."

Table 12-3. New York City Environmental Quality Review External Noise Exposure Guidelines

RECEPTOR TYPE[1]	TIME PERIOD	ACCEPTABLE GENERAL EXTERNAL EXPOSURE	AIRPORT EXPOSURE[3]	MARGINALLY ACCEPTABLE GENERAL EXTERNAL EXPOSURE	AIRPORT EXPOSURE[3]	MARGINALLY UNACCEPTABLE GENERAL EXTERNAL EXPOSURE	AIRPORT EXPOSURE[3]	CLEARLY UNACCEPTABLE GENERAL EXTERNAL EXPOSURE	AIRPORT EXPOSURE[3]
1. Outdoor area requiring serenity and quiet[2]		$L_{10} \leq 55$ dB(A)							
2. Hospital, Nursing Home		$L_{10} \leq 55$ dB(A)	---------------$L_{dn} \leq 60$ dB(A)---------------	$55 < L_{10} \leq 65$ dB(A)	---------------$L_{dn} \leq 65$ dB(A)---------------	$65 < L_{10} \leq 80$ dB(A)	---------------$65 < L_{dn} \leq 70$ dB(A)[(i)]---------------	$L_{10} > 80$ dB(A)	---------------$L_{dn} > 75$ dB(A)---------------
3. Residence, residential hotel or motel	7 AM–10 PM	$L_{10} \leq 65$ dB(A)		$65 < L_{10} \leq 70$ dB(A)		$70 < L_{10} \leq 80$ dB(A)		$L_{10} > 80$ dB(A)	
	10 PM–7 AM	$L_{10} \leq 55$ dB(A)		$55 < L_{10} \leq 70$ dB(A)		$70 < L_{10} \leq 80$ dB(A)		$L_{10} > 80$ dB(A)	
4. School, museum, library, court, house of worship or 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: New York Department of Environmental Protection (adopted policy 1983).

(i) In addition, any new activity shall not increase the ambient noise level by 3 dB(A) 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 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, 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 old-age homes.

3 One may use the Federal Aviation Administration-approved L_{dn} contours supplied by the Port Authority of New York and New Jersey, or the noise contours may be computed from the Federally approved Integrated Noise Model using 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.)

The PCE methodology does not account for traffic travel speed, but the traffic studies showed that the Project would result in a reduction in traffic volumes on many of the streets, particularly near and within the Manhattan CBD. Given the low posted speed limits for city streets (25 miles per hour) and limited-access highways (50 miles per hour or less), as well as the general lack of free-flow conditions, any potential increases in travel speed resulting from lower traffic volumes are not anticipated to result in perceptible noise increases.

12.2 AFFECTED ENVIRONMENT

As described in **Subchapter 4B, "Transportation: Highways and Local Intersections,"** the traffic study areas chosen to assess potential changes in traffic volumes as a result of the Project include 102 intersections primarily grouped around key approaches to the Manhattan CBD (i.e., tunnels and bridges) and the local streets that enter the Manhattan CBD from north of 60th Street. The traffic assessment also includes highway segments leading to these approaches, as well as highways that may see an increase from circumferential diversions around the Manhattan CBD (to avoid the Manhattan CBD toll). The traffic noise assessment took the traffic data information and utilizing a conservative screening assessment determined the resultant noise level changes of the No Action Alternative versus the CBD Tolling Alternative at each of the tunnel and bridge crossings and all 102 intersections.

12.3 ENVIRONMENTAL CONSEQUENCES

12.3.1 No Action Alternative

As set forth in **Subchapter 4A, "Transportation: Regional Transportation Effects and Modeling"** as well as **Subchapter 4B, "Transportation: Highways and Local Intersections,"** the baseline travel demand model and traffic conditions were developed with pre-COVID-19 pandemic peak volumes and are used to approximate 2023 No Action Alternative conditions, along with known changes to the road network.

12.3.2 CBD Tolling Alternative

Based on the methodology presented in **Section 12.1.2**, the noise assessment was undertaken by first using the traffic assignment data from **Subchapter 4B** to calculate a PCE volume change for the 13 local street study area locations. The PCE volume changes were evaluated compared to the No Action Alternative condition to calculate an estimate of Project-generated incremental changes in noise levels. **Table 12-4** presents the projected noise-level changes derived from PCE calculations under the representative worst-case tolling scenarios (Tolling Scenario D overall and Tolling Scenario C for Downtown Brooklyn intersections) versus the No Action Alternative estimated PCE volumes.

12.3.2.1 Bridge and Tunnel Crossing Noise Assessment

The PCE analysis was completed at the crossings into and out of the Manhattan CBD and at highway crossings north of the Manhattan CBD (e.g., George Washington Bridge, Robert F. Kennedy Bridge). This noise assessment was completed to measure the bulk sound energy that is projected to be generated by vehicles moving into and out of Manhattan across these major entry points, without focusing on a specific sensitive receptor. Once the traffic leaves these crossings, the volume flow would be absorbed into the local street network, where the local street PCE analysis was performed to determine maximum noise-level changes within each community.

As indicated on **Table 12-4**, for the majority of the bridge and tunnel crossings, the 24-hour PCE-based traffic noise screening analysis projected little, or no noise-level increases between the No Action Alternative and CBD Tolling Alternative. Moreover, those locations with a negative value are projected to see a slight decrease in overall noise exposure. The maximum noise-level increases would remain below the CEQR 3 dB(A) PCE doubling threshold level and is considered barely perceptible to most listeners.

According to the modeling, the highest increases in noise exposure would occur adjacent to the Queens-Midtown and Hugh L. Carey Tunnels. In the former, a 2.7 dB(A) to 2.9 dB(A) increase in noise levels would occur from 11:00 p.m. to 6:00 a.m.; in the latter, a 1.8 dB(A) to 1.9 dB(A) increase would occur from 9:00 p.m. to 6:00 a.m. When using the PCE methodology, small increases in a projected future build condition PCE volume can result in larger projected magnitude increases in noise level changes than may actually occur. (Because the model uses a logarithmic formula, small increases in traffic can seem magnified.) Importantly, the increases predicted at the tunnel portals remain below the threshold (3.0 dB(A)) that would require further analysis to determine whether these increases are adverse. Further, the projected increases also remain below the level of increase that would be perceived by the human ear. Finally, as vehicles disperse from the portals into the local street network, these imperceptible noise increases would be diminished at properties farther away from the immediate portals. The local street analysis, discussed in the next section, supports this conclusion

12.3.2.2 Local Street Noise Assessment

To assess the potential noise exposure of the traffic moving across the major bridge and tunnel crossings into and out of Manhattan on local streets, a localized PCE-based noise screening assessment was completed. The assessment was performed for those communities identified by the Project traffic studies as areas where changes in traffic would likely contribute to changes in noise exposure.

The local street PCE-based assessment was completed for the Project's peak traffic travel-time periods for Tolling Scenario D, except in Downtown Brooklyn where Tolling Scenario C was used because it would result in greater trip generation at that location. These evaluated peak periods consisted of AM, midday, PM, and, in some cases, a late-night assessment period. The traffic analysis determined the addition of the late-night assessment hour.

Table 12-4. Projected Noise-Level Changes (in dB(A)) for CBD Tolling Alternative (Worst-Case Tolling Scenarios D and C)

TIME	ED KOCH QUEENSBORO BRIDGE	QUEENS-MIDTOWN TUNNEL (SITE R1)	HUGH L. CAREY TUNNEL (SITE R2)	HOLLAND TUNNEL	LINCOLN TUNNEL	RFK BRIDGE – BRONX	RFK BRIDGE – MANHATTAN	RFK BRIDGE – QUEENS	WILLIAMSBURG BRIDGE	MANHATTAN BRIDGE	BROOKLYN BRIDGE	GEORGE WASHINGTON + HENRY HUDSON BRIDGES	HENRY HUDSON BRIDGE	VERRAZZANO-NARROWS BRIDGE	60TH STREET CROSSINGS	GEORGE WASHINGTON BRIDGE
12 AM	-1.9	2.9	1.8	-0.6	-0.3	0.0	0.5	0.0	-2.4	-1.7	-0.4	0.0	-0.1	0.2	-0.6	0.1
1 AM	-1.9	2.9	1.8	-0.7	-0.4	0.0	0.5	0.0	-2.4	-1.7	-0.3	0.0	-0.1	0.2	-0.6	0.1
2 AM	-1.9	2.9	1.9	-0.7	-0.2	0.0	0.5	0.0	-2.6	-1.7	-0.3	0.0	-0.1	0.3	-0.6	0.1
3 AM	-1.7	2.9	1.8	-0.6	-0.1	0.0	0.4	0.0	-2.9	-1.6	-0.4	0.0	-0.1	0.2	-0.6	0.1
4 AM	-1.6	2.9	1.8	-0.6	0.0	0.0	0.4	0.0	-3.2	-1.7	-0.4	0.0	-0.1	0.2	-0.6	0.1
5 AM	-1.5	2.7	1.8	-0.4	0.2	0.0	0.3	0.0	-3.3	-1.8	-0.5	0.0	-0.1	0.1	-0.6	0.1
6 AM	0.0	0.4	1.1	-0.3	-0.2	0.0	0.2	0.0	-0.3	-0.6	-0.2	0.0	0.0	0.0	-0.2	0.0
7 AM	0.0	0.1	0.6	-0.3	-0.2	0.0	0.2	0.0	-0.1	-0.6	-0.2	0.0	0.0	0.1	-0.2	0.0
8 AM	0.0	0.1	0.7	-0.3	-0.2	0.0	0.3	0.0	-0.1	-0.6	-0.1	0.0	0.0	0.1	-0.2	0.0
9 AM	0.0	0.1	1.0	-0.3	-0.2	0.0	0.3	0.0	-0.2	-0.6	-0.1	0.0	0.0	0.1	-0.2	0.0
10 AM	-0.4	0.4	1.1	-0.5	-0.4	0.0	0.3	0.0	-0.7	-1.8	-0.1	0.0	-0.1	0.2	-0.6	0.1
11 AM	-0.5	0.5	1.5	-0.5	-0.5	0.0	0.3	0.0	-1.0	-1.8	-0.2	0.0	-0.1	0.3	-0.6	0.1
12 PM	-0.8	0.7	1.7	-0.6	-0.5	0.0	0.3	0.0	-1.0	-1.7	-0.2	0.0	-0.1	0.3	-0.6	0.1
1 PM	-0.7	0.4	1.7	-0.6	-0.6	0.0	0.3	0.0	-0.9	-1.7	-0.3	0.0	-0.1	0.2	-0.6	0.1
2 PM	-0.7	0.3	1.1	-0.6	-0.6	0.0	0.4	0.0	-0.7	-1.6	-0.3	0.0	-0.1	0.2	-0.6	0.1
3 PM	-0.7	0.3	0.7	-0.5	-0.7	0.0	0.4	0.0	-0.5	-1.4	-0.3	0.0	-0.1	0.2	-0.6	0.1
4 PM	-0.9	0.7	0.7	-0.3	-0.6	0.0	0.3	0.0	-0.8	-0.4	-0.1	0.0	0.0	0.1	-0.2	0.0
5 PM	-1.0	0.6	0.7	-0.3	-0.6	0.0	0.3	0.0	-0.8	-0.5	-0.1	0.0	0.0	0.1	-0.2	0.0
6 PM	-0.7	0.6	0.8	-0.4	-0.6	0.0	0.3	0.0	-1.0	-0.5	-0.1	0.0	0.0	0.1	-0.2	0.0
7 PM	-0.8	0.8	1.1	-0.4	-0.6	0.0	0.3	0.0	-1.2	-0.5	-0.1	0.0	0.0	0.1	-0.2	0.0
8 PM	-1.5	1.2	1.4	-0.6	-0.3	0.0	0.6	0.0	-1.5	-1.7	-0.4	0.0	-0.1	0.2	-0.6	0.1
9 PM	-1.6	1.7	1.8	-0.6	-0.3	0.0	0.5	0.0	-2.0	-1.7	-0.4	0.0	-0.1	0.2	-0.6	0.1
10 PM	-1.5	2.2	1.8	-0.6	-0.3	0.0	0.5	0.0	-2.2	-1.7	-0.4	0.0	-0.1	0.2	-0.6	0.1
11 PM	-1.8	2.8	1.8	-0.7	-0.2	0.0	0.5	0.0	-2.6	-1.7	-0.4	0.0	-0.1	0.2	-0.6	0.1

Source: WSP, 2022.

The local street noise assessment shows that traffic movements disperse fairly quickly from major crossings into the Manhattan CBD, with lower incremental changes in dB(A) than at the major crossings. The peak-hour, local street intersection-based PCE assessment was completed for the 13 local street traffic analysis areas shown below. Appendix 12, "Noise," contains the details of those findings in the appendix tables noted below:

- Long Island City Traffic Analysis Area (Table 12-1)
- Lower Manhattan Traffic Analysis Area (Table 12-2)
- Queens-Midtown Tunnel Traffic Analysis Area (Table 12-3)
- Red Hook Brooklyn Traffic Analysis Area (Table 12-4)
- Upper East Side Traffic Analysis Area (Table 12-5)
- Lincoln Tunnel Traffic Analysis Area (Table 12-6)
- West Side Highway/Route 9A Traffic Analysis Area (Table 12-7)
- Downtown Brooklyn Traffic Analysis Area (Table 12-8)
- Robert F. Kennedy Bridge Traffic Analysis Area (Table 12-9)
- Upper West Side Traffic Analysis Area (Table 12-10)
- Little Dominican Republic (Washington Heights) Traffic Analysis Area (Table 12-11)
- Lower East Side Traffic Analysis Area (Table 12-12)
- Jersey City, New Jersey (Table 12-13)

The local street PCE-based analysis identified the maximum noise exposure level changes that potentially would occur during peak travel periods. The analysis findings indicate that no roadways would experience a 3 dB(A) or more noise-level increase. Noise-level changes at approximately 90 percent of the roadways analyzed would range from -1 dB(A) to +1 dB(A), and less than 1 percent would show an increase between 1 dB(A) and 2 dB(A). There are a few isolated turning movements, as described below, that result in noise level increases in the range of 2 to 2.5 dB(A). However, these maximum noise level increases were determined using the PCE ratio values for a single sub-movement, and the PCE sum of all the sub-movements (for example right turn, through and left turn) on a given roadway segment would result in lower overall noise level increases than the values shown below.

The PCE-based analysis found that noise levels would remain below the 3 dB(A) CEQR threshold for the evaluated travel-time periods within all Long Island Rail Road (LIRR) 13 traffic analysis areas and therefore no TNM analysis was found warranted to verify if a 3 dB(A) or greater increase in noise exposure would occur. The highest projected noise-level increase would occur during the midday time period in the Lower Manhattan Traffic Analysis Area (Appendix 12, "Noise," Table 12-2) adjacent to Trinity Place and Edgar Street (Intersection #1), where a 2.5 dB(A) increase is projected to occur along the eastbound left-turn movement. Other locations yielding a noise-level increase between 2 dB(A) and 2.5 dB(A) would occur in the peak PM time period on the following roadway segments:

- The Long Island City Traffic Analysis Area (Appendix 12, "Noise," Table 12-1) at Intersection #1a (Pulaski Bridge/11th Street and Jackson Avenue), at both the eastbound left-turn and through approaches, where 2.4 dB(A) and 2.1 dB(A) increases are projected, respectively.

- The Long Island City Traffic Analysis Area (**Appendix 12, "Noise," Table 12-1**) at Intersection #7 (11th Street and Borden Avenue), at the southbound right-turn, though, and left-turn approaches, where 2.3 dB(A), 2.2 dB(A), and 2.3 dB(A) increases are projected, respectively.
- The Robert F. Kennedy Bridge Traffic Analysis Area (**Appendix 12, "Noise," Table 12-9**) at Intersection #2 (East 125th Street and Second Avenue), at the southwest-bound left- and right-turn approaches, where 2.1 dB(A) increases are projected at each approach.

The maximum approach noise-level changes in a given direction would be lower than the approach sub-movement values shown above, as these values would include the PCE values for all the movements in a given direction; therefore, these maximum noise-level increase estimates represent an overstatement of overall noise-level changes on a given roadway segment direction.

In conclusion, local street PCE analysis findings indicate that the projected noise-level increases would be below the CEQR 3 dB(A) screening threshold necessary to warrant a more detailed analysis using the FHWA TNM and noise exposure levels with the Project would remain within their current CEQR exterior noise exposure categories. As a result, the CBD Tolling Alternative would result in no noise effects within any of the communities evaluated.

12.4 CONCLUSION

A traffic noise assessment was completed in those communities identified by the Project traffic studies **(Subchapter 4B, "Transportation: Highways and Local Intersections")** as areas where changes in traffic would likely contribute to changes in noise exposure. Potential noise-level changes resulting from the variations in traffic patterns due to the Project were determined using the passenger car equivalent (PCE) screening methodology outlined in Chapter 19 of the *CEQR Technical Manual*. CEQR defines a noise level increase of more than 3 dB(A) over comparable future no build (i.e., no action) conditions to result in an adverse impact.

The PCE-based assessment was completed for Project peak AM, midday, PM, and late-night time periods at the following 13 traffic analysis areas:

- Long Island City
- Lower Manhattan
- Queens-Midtown Tunnel
- Red Hook Brooklyn
- Upper East Side
- Lincoln Tunnel
- West Side Highway/Route 9A
- Downtown Brooklyn
- Robert F. Kennedy Bridge
- Upper West Side
- Little Dominican Republic

- Lower East Side
- Jersey City, New Jersey

The PCE analysis found that projected noise-level changes on all roadways in the Project area would be below the 3 dB(A) CEQR impact threshold. Furthermore, because changes in noise levels of less than 3 dB(A) are barely perceptible to the human ear, ambient noise levels with the Project would not be perceptibly different from those without the Project.

Noise-level changes at approximately 90 percent of the evaluated roadways would range from -1 dB(A) to +1 dB(A), and less than 1 percent of the roadways evaluated would show an increase between 1 dB(A) and 2 dB(A). Based on the conservative PCE analysis, the highest reported increase is projected to occur adjacent to the Queens Midtown Tunnel portal area with a 2.9 dB(A) increase during the late night hours with the nearest sensitive property located more than 100 feet away. The overall Project study area would result in a net decrease in traffic noise exposure along most local roadways evaluated.

As a result, the CBD Tolling Alternative would result in no noise impacts within the evaluated traffic analysis areas (**Table 12-5**).

Table 12-5. Summary of Effects of the CBD Tolling Alternative on Noise

<table>
<tr><th>SUMMARY OF EFFECTS</th><th>LOCATION</th><th>EFFECT FOR ALL TOLLING SCENARIOS</th><th>POTENTIAL ADVERSE EFFECT</th><th>MITIGATION AND ENHANCEMENTS</th></tr>
<tr><td rowspan="2">Imperceptible increases or decreases in noise levels resulting from changes in traffic volumes</td><td>Bridge and tunnel crossings</td><td>The maximum noise level increases (2.9 dB(A)), which were predicted adjacent to the Queens-Midtown Tunnel in Tolling Scenario D, would not be perceptible.</td><td>No</td><td rowspan="2">▪ No mitigation needed. No adverse effects
▪ See overall Project enhancement below.</td></tr>
<tr><td>Local streets</td><td>Tolling Scenario C was used to assess noise level changes in Downtown Brooklyn, Tolling Scenario D was used at all other locations assessed. The maximum predicted noise level increases (2.5 dB(A)), which were at Trinity Place and Edgar Street, would not be perceptible. There was no predicted increase in noise levels in the Downtown Brooklyn locations.</td><td>No</td></tr>
<tr><td colspan="5">Overall Project Enhancement. The Project Sponsors commit to ongoing monitoring and reporting of potential effects on the Project, including, for example, traffic entering the Manhattan CBD; taxi/FHV VMT in the Manhattan CBD; transit ridership from providers across the region; bus speeds within the Manhattan CBD; air quality and emissions trends; parking; and Project revenue. Data will be collected in advance and after implementation of the Project. A formal report on the effects of the Project will be issued one year after implementation and then every two years. In addition, a reporting website will make data, analysis, and visualizations available in open data format to the greatest extent possible. Updates will be provided on at least a bi-annual basis as data becomes available and analysis is completed.</td></tr>
</table>