Noise Study

for the

Everest Value School Project

233–241 N. Westmoreland Avenue

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January 2020

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A. EXECUTIVE SUMMARY

This Noise Study assesses and discusses the potential noise and vibration impacts that may occur with the Everest Value School Project (Project), located in the City of Los Angeles (City), California. The analysis describes the existing environment in the Project area; estimates future noise and vibration levels at surrounding land uses resulting from construction and operation of the Project; and identifies the potential for significant impacts. An evaluation of the Project's contribution to potential cumulative noise impacts is also provided. The study summarizes the potential for the Project to conflict with applicable noise and vibration regulations, standards, and thresholds. The findings of the analyses are as follows:

- Construction activities would potentially result in short-term, temporary noise impacts to nearby noise-sensitive receptors due to on-site construction equipment and activities. Implementation of noise-attenuation techniques, and placement of the construction-staging area away from noise-sensitive sites would lower construction noise levels.
- Construction of the Project would generate sporadic, temporary vibration effects adjacent to the Project area, but would not be expected to exceed the significance thresholds.
- Noise associated with cumulative construction activities would be reduced to the degree reasonably and technically feasible through proposed recommended measures for each individual project and compliance with locally adopted and enforced noise ordinances. Given that construction activities would be required to comply with the City's allowable hours and would be temporary, construction-related noise would not be significant.
- Noise associated with cumulative operational sources would not be significant.
- Due to the rapid attenuation characteristics of ground-borne vibration and the distance of the cumulative projects to the Project site, no potential exists for cumulative construction- or operational-related impacts with respect to ground-borne vibration.

B. INTRODUCTION

This Noise Study was prepared to assess and discuss the impact of potential noise impacts that may occur with the Project located in the City of Los Angeles, California. The noise report analyzes short-term noise and ground-borne vibration impacts associated with the Project. The report also discusses the applicable federal, State, and local noise and vibration regulations; the applicable noise and vibration thresholds; the methodology used to analyze potential noise and vibration impacts; and the modeled roadway noise.

The Project site is located at 233–245 N. Westmoreland Avenue, 3611–3627 W. Cosmopolitan Street, and 232–240 N. Madison Avenue in the City of Los Angeles (refer to **Figure 1: Regional and Local Vicinity Map**). As shown in **Table 1: Assessor Parcels**, the Project site is comprised of 10 parcels (five associated Assessor's Parcel Numbers) totaling 53,353 square feet. The Project Site is bounded by Cosmopolitan Street on the south, Westmoreland Avenue on the east, and Madison Avenue on the west. To the north, the Project Site abuts parcels which are developed with commercial and retail uses; to the south developed with the Central City Value High School; to the east with a commercial car wash and public storage; and to the south and southwest with Virgil Middle School, and CWC Silver Lake Middle School. The Project Site is located within the Wilshire Community Plan and Subarea D (Light Industrial/Commercial) of the Vermont/Western SNAP.

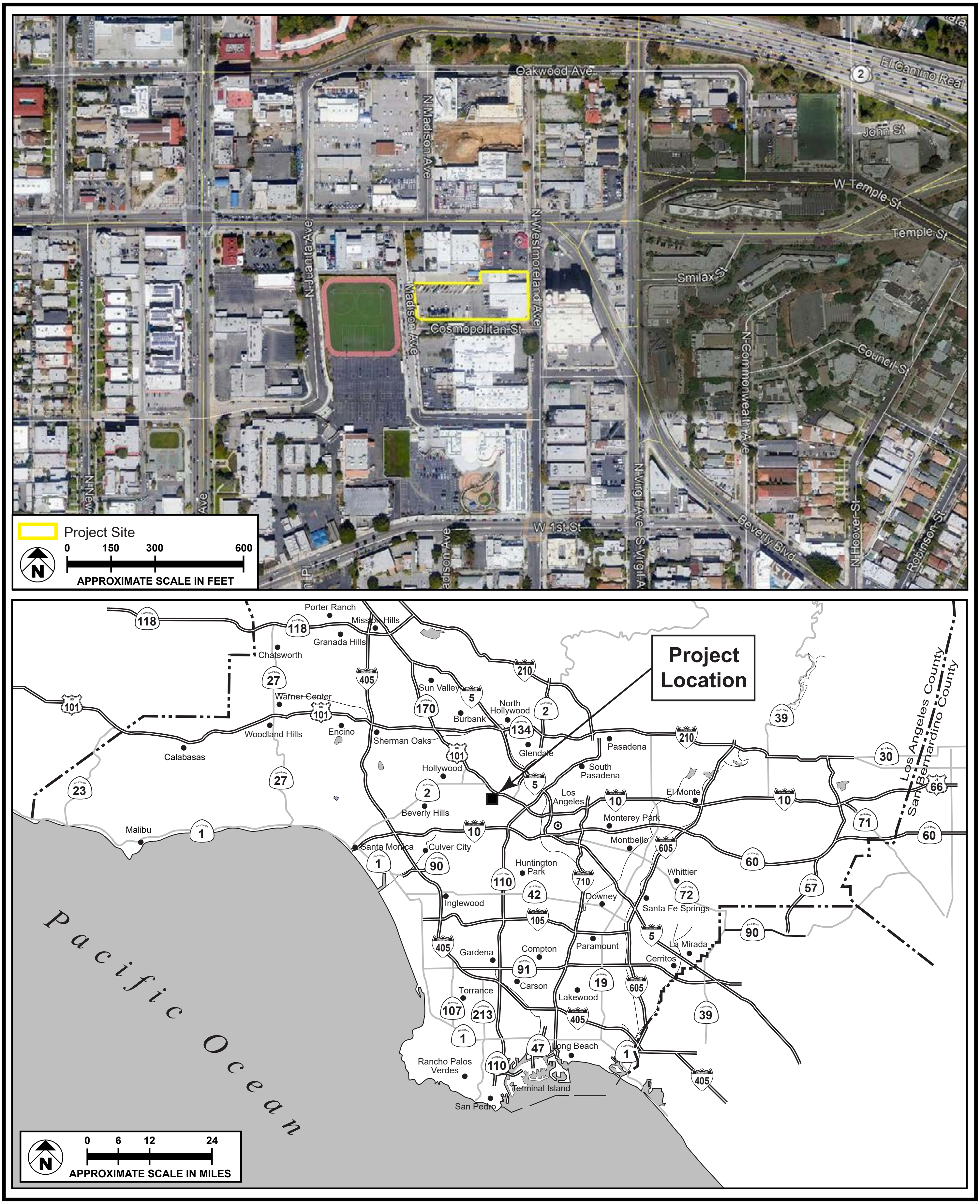
Table 1
Assessor Parcels

APN	Address
5501-009-021	3619 – 23 W. Cosmopolitan Street
	240 N. Madison Avenue
	236 N. Madison Avenue
	232 N. Madison Avenue
5501-009-012	3615 W. Cosmopolitan Street
5501-009-022	237 N Westmoreland Avenue
	233 N. Westmoreland Avenue
5501-009-008	245 N. Westmoreland Avenue
5501-009-009	241 N. Westmoreland Avenue

The Applicant proposes removal of the existing single-story industrial/warehouse building located at the southeastern portion of the Project site for construction of a two-story (32-foot in height), approximately 24,360 square foot building for use as a public transitional kindergarten (TK) to 8TH grade charter school (Proposed School), consisting of 20 classrooms, administrative offices, and outdoor recreational areas which includes playgrounds, lunch areas, planting gardens and basketball courts, and a soccer field (refer to **Figure 2: Proposed Site Plan**). The proposed maximum number of students enrolled would be 480 students.

The proposed Project includes an on-site pickup/drop-off area which will be accessed by a driveway providing inbound and outbound access for vehicles from Cosmopolitan Street. A secondary driveway is proposed to provide outbound traffic on Madison Avenue. The Project would provide 28 surface parking spaces within a surface parking located on-site the southern portion of the site.

The Proposed School would regularly be operational Monday through Friday from 8:00 AM to 2:45 PM. Special events would include, but not limited to, before school program, musical performances and athletic practice/games may occur between the hours of 6:00 AM to 9:00 PM Monday through Friday. Additionally, occasional on-site activities on the weekend including on Saturdays would take place from 8:00 Am to 5:00 PM and Sundays from 12:00 PM to 5:00 PM.



SOURCE: Google Earth - 2019; Meridian Consultants, LLC - 2019

FIGURE 1

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Regional and Local Vicinity Map

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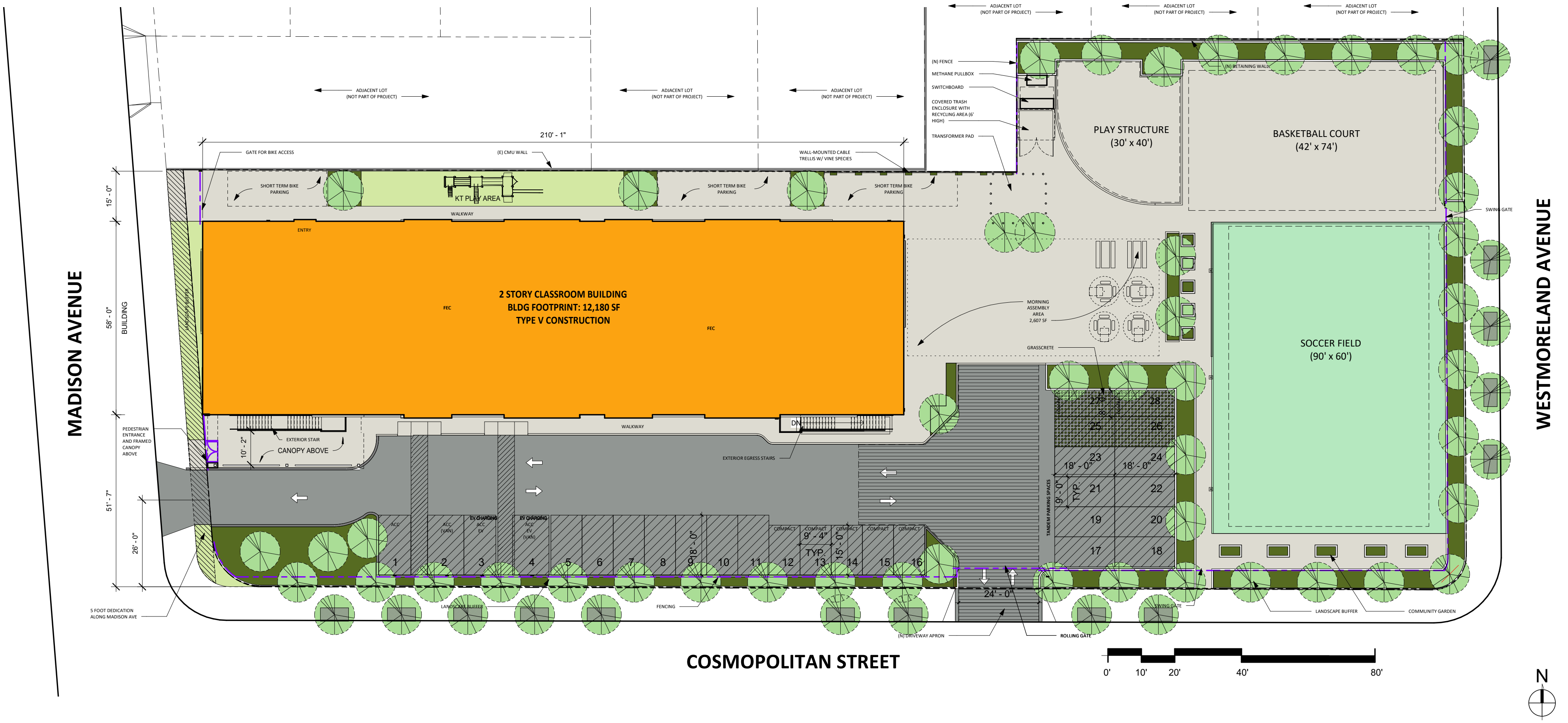


SOURCE: CSDA Design Group - January 2020

FIGURE 2

Meridian Consultants

Proposed Site Plan

235-001-18

C. NOISE DESCRIPTORS

Fundamentals of Sound

Because the human ear does not respond uniformly to sounds at all frequencies, sound pressure level alone is not a reliable indicator of loudness. For example, the human ear is less sensitive to low and high frequencies than to the medium frequencies that more closely correspond to human speech. In response to the sensitivity of the human ear to certain sound frequencies, the A-weighted noise level—referenced in units of dBA—was developed to better correspond with people's subjective judgment of sound levels. To support assessing a community reaction to noise, scales have been developed that average sound pressure levels over time and quantify the result in terms of a single numerical descriptor. Several scales have been developed that address community noise levels. The equivalent sound level (Leq) is the average A-weighted sound level measured over a given time interval. Leq can be measured over any period but is typically measured for 1-minute, 15-minute, 1-hour, or 24-hour periods.

Table 2: Noise Descriptors identifies various noise descriptors developed to measure sound levels over different periods of time.

Table 2
Noise Descriptors

Term	Definition
Decibel (dB)	The unit for measuring the volume of sound equal to 10 times the logarithm (base 10) of the ratio of the pressure of a measure sound to a reference pressure.
A-weighted decibel (dBA)	A sound measurement scale that adjusts the pressure of individual frequencies according to human sensitivities. The scale accounts for the fact that the region of highest sensitivity for the human ear is between 2,000 and 4,000 cycles per second (hertz).
Hertz (Hz)	The frequency of the pressure vibration, which is measured in cycles per second.
Kilo hertz (kHz)	One thousand cycles per second.
Equivalent sound level (Leq)	The sound level containing the same total energy as a time varying signal over a given time period. The Leq is the value that expresses the time averaged total energy of a fluctuating sound level. Leq can be measured over any time period, but is typically measured for 1-minute, 15-minute, 1-hour, or 24-hour periods.
Community noise equivalent level (CNEL)	A rating of community noise exposure to all sources of sound that differentiates between daytime, evening, and nighttime noise exposure. These adjustments add 5 dBA for the evening, 7:00 PM to 10:00 PM, and add 10 dBA for the night, 10:00 PM to 7:00 AM. The 5 and 10 dB penalties are applied to account for increased noise sensitivity during the evening and nighttime hours. The logarithmic effect of adding these penalties to the 1-

Term	Definition
	hour Leq measurements typically results in a CNEL measurement that is within approximately 3 dBA of the peak-hour Leq.[a]
Nighttime (Lnight)	Lnight is the average noise exposure during the hourly periods from 10:00 PM to 7:00 AM.
Sound pressure level	The sound pressure is the force of sound on a surface area perpendicular to the direction of the sound. The sound pressure level is expressed in dB.
Ambient noise	The level of noise that is all encompassing within a given environment, being usually a composite of sounds from many and varied sources near to and far from the observer. No specific source is identified in the ambient environment.

[a] *California Department of Transportation,* Technical Noise Supplement; A Technical Supplement to the Traffic Noise Analysis Protocol, *(Sacramento, California: November 2009), pp. N51–N54.*

A doubling of sound energy results in a 3 dBA increase in sound, which means that a doubling of sound wave energy (e.g., doubling the volume of traffic on a roadway) would result in a barely perceptible change in sound level. In general, the human ear does not notice changes in a noise level less than 3 dBA;[1] however, some individuals who are extremely sensitive to changes in noise may notice changes from 3 to 5 dBA. An increase of greater than 5 dBA is readily noticeable, as the human ear perceives a 10 dBA increase in sound level to be a doubling of sound volume.

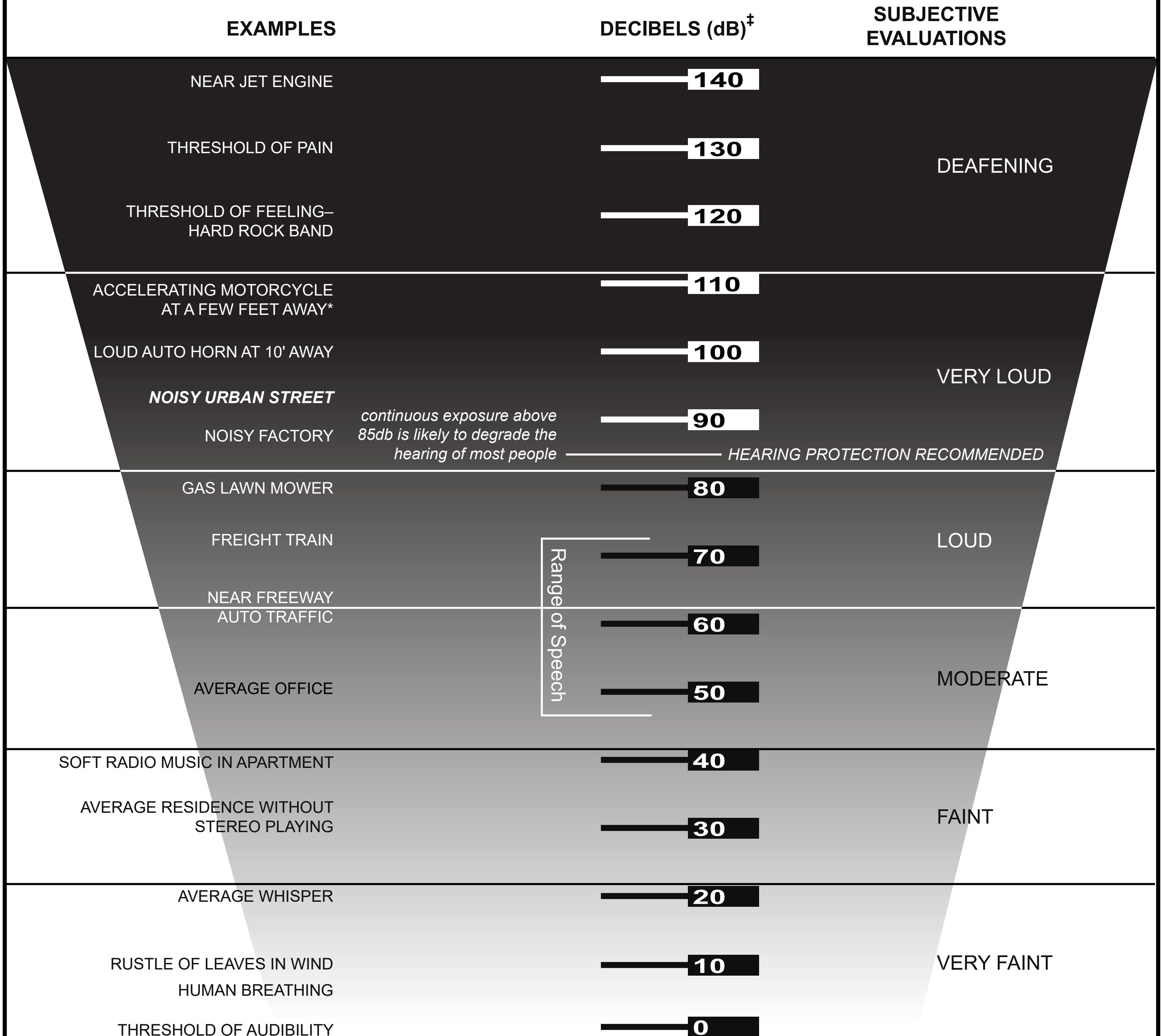
Noise sources can generally be categorized in two types: (1) point sources, such as stationary equipment and (2) line sources, such as a roadway. Sound generated by a point source typically diminishes (attenuates) at a rate of 6 dBA for each doubling of distance from the source to the receptor at acoustically hard sites, and at a rate of 7.5 dBA at acoustically soft sites.[2] A hard or reflective site consists of asphalt, concrete, or very hard-packed soil, which does not provide any excess ground-effect attenuation. An acoustically soft or absorptive site is characteristic of normal earth and most ground with vegetation. As an example, a 60-dBA noise level measured at 50 feet from a point source at an acoustically hard site would be 54 dBA at 100 feet from the source and 48 dBA at 200 feet from the source. Contrastingly, noise from the same point source at an acoustically soft site would be 52.5 dBA at 100 feet and 45 dBA at 200 feet from the source. Sound generated by a line source typically attenuates at a rate of 3 dBA and 4.5 dBA per doubling of distance from the source to the receptor for hard and soft sites, respectively.[3] Noise levels generated by a variety of activities are shown in **Figure 3: Common Noise Levels**. Man-made or natural barriers can also attenuate sound levels, as illustrated in **Figure 4: Noise Attenuation by Barriers**.

1 US Department of Transportation, Federal Highway Administration (USDOT FHWA), *Fundamentals and Abatement of Highway Traffic Noise* (Springfield, VA: Author, September 1980), 81.
2 USDOT FHWA, *Fundamentals and Abatement,* 97.
3 USDOT FHWA, *Fundamentals and Abatement,* 97.

Fundamentals of Vibration

Vibration is commonly defined as an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The peak particle velocity (PPV) or root-mean-square (RMS) velocity is typically used to describe vibration amplitudes. PPV is defined as the maximum instantaneous peak of the vibration signal, while RMS is defined as the square root of the average of the squared amplitude of the signal. PPV is typically used for evaluating potential building damage, whereas RMS is typically more suitable for evaluating human response to ground-borne vibration. The RMS-vibration velocity level can be presented in inches per second (ips) or in VdB (a decibel unit referenced to 1 microinch per second). Commonly, ground-borne vibration generated by man-made activities (i.e., road traffic, construction) attenuates rapidly with distance from the source of the vibration.

The vibration velocity level threshold of perception for humans is approximately 65 VdB. A vibration velocity of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels for many people. Most perceptible indoor vibration is caused by sources within buildings such as the operation of mechanical equipment, the movement of people, or the slamming of doors. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration from traffic is barely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration velocity, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings.



** NOTE: 50' from motorcycle equals noise at about 2000' from a four-engine jet aircraft.*

‡ NOTE: dB are "average" values as measured on the A–scale of a sound–level meter.

FIGURE 3

Common Noise Levels

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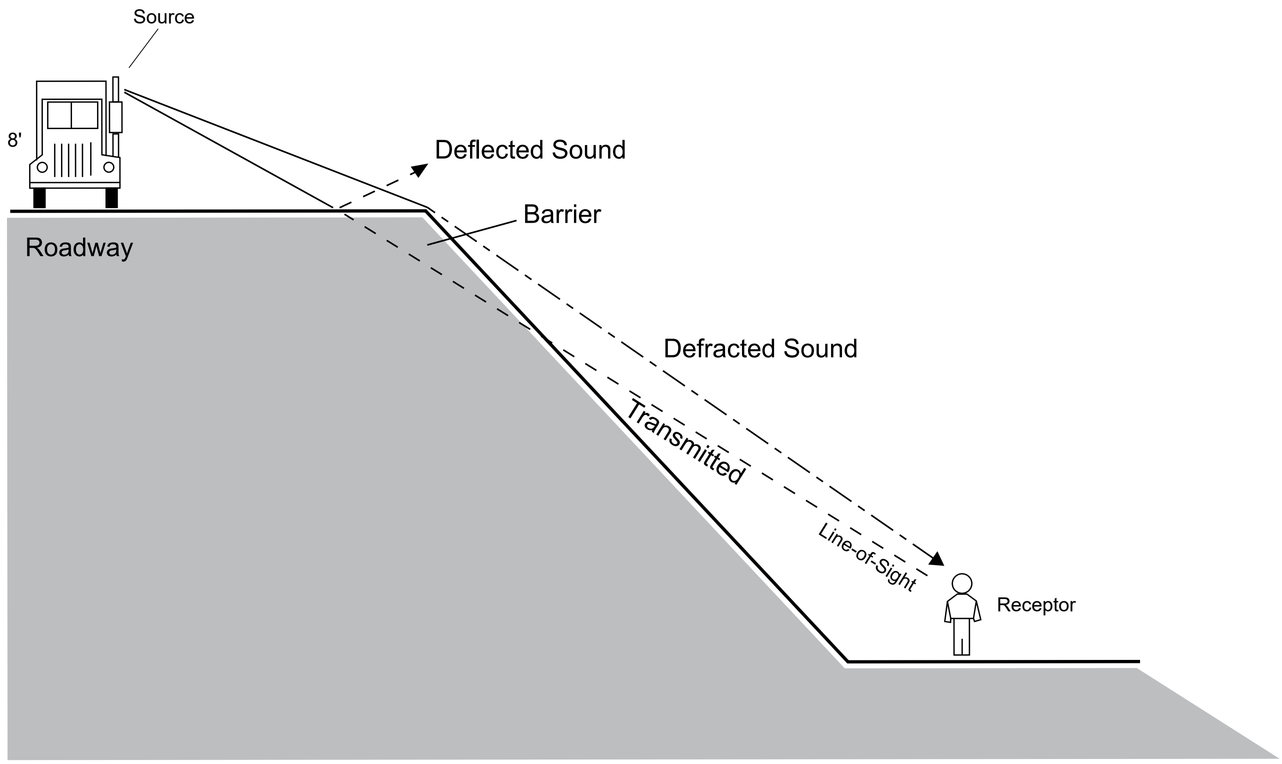
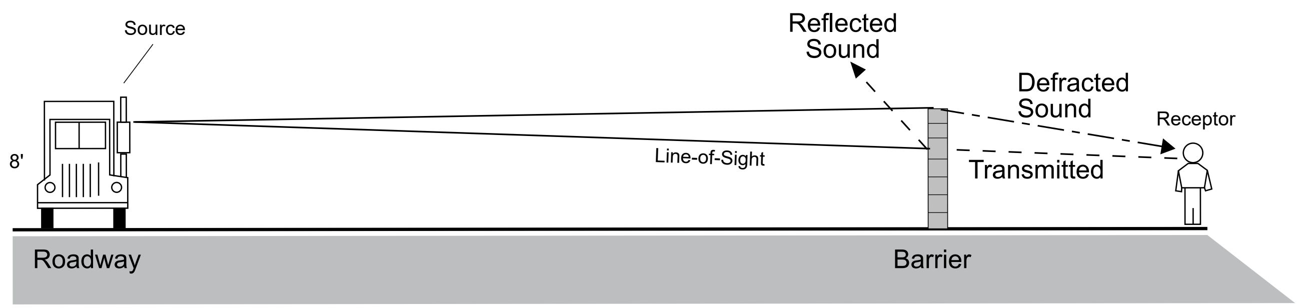


"Barrier Effect" Resulting from Differences in Elevation.



"Barrier Effect" Resulting from Typical Soundwall.

FIGURE 4

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Noise Attenuation by Barriers

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D. SIGNIFICANCE THRESHOLDS

Construction Noise

The *L.A. CEQA Thresholds Guide*[4] defines the following significance thresholds for construction activities lasting more than 10 days in a 3-month period or occurring during the hours of 9:00 PM and 7:00 AM Monday through Friday, before 8:00 AM or after 6:00 PM on Saturday, or anytime on Sunday:

- On-site Project construction activities cause the exterior ambient noise level to increase by 5 dBA or more at a noise-sensitive use, as measured at the property line of any sensitive use.
- Off-site Project construction traffic causes the exterior ambient noise level to increase by 5 dBA CNEL or more at a noise-sensitive use, as measured at the property line of any sensitive use.

Operation Noise

Operational noise impacts are evaluated for Project-related off-site roadway traffic noise impacts and on-site stationary source noise from on-site activities and equipment. The Project would have a significant to noise if it would exceed the following thresholds:

- The Project would cause any ambient noise levels to increase by 5 dBA CNEL or more and the resulting noise falls on a noise-sensitive land use within an area categorized as either "normally acceptable" or "conditionally acceptable" (see **Table 3: City of Los Angeles Land Use Compatibility for Community Noise** for description of these categories); or cause ambient noise levels to increase by 3 dBA CNEL or more and the resulting noise falls on a noise-sensitive land use within an area categorized as either "normally acceptable" or "clearly unacceptable."
- Project-related operational (i.e., nonroadway) noise sources such as outdoor activities, building mechanical/electrical equipment, etc., increase ambient noise level by 5 dBA, causing a violation of the City Noise Ordinance.

Ground-Borne Vibration

The City has not adopted a significance threshold to assess vibration impacts during construction. Thus, the Caltrans *Transportation and Construction Vibration Guidance Manual*[5] is used as a screening tool to assess the potential for adverse vibration effects related to structural damage. The Project would have a significant impact to vibration if it would exceed the following thresholds:

- **Potential Building Damage**. Project construction activities cause ground-borne vibration levels to exceed 0.5 ips PPV at the nearest off-site residential buildings.

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4 City of Los Angeles, *L.A. CEQA Threshold Guide* (2006), accessed August 2019, http://www.environmentla.org/programs/Thresholds/Complete%20Threshold%20Guide%202006.pdf.

5 Caltrans, *Transportation and Construction Vibration Guidance Manual* (September 2013), accessed August 2019, http://www.dot.ca.gov/hq/env/noise/pub/TCVGM_Sep13_FINAL.pdf.

METHODOLOGY

Ambient Noise Measurements

Noise-level monitoring was conducted by Meridian Consultants on November 11, 2019, at three (3) locations within the Project area vicinity, as shown in **Figure 5: Noise Monitoring Locations**. Noise-level monitoring was conducted for 15-minute intervals at each location using a Larson Davis Model 831 sound-level meter. This meter satisfies the American National Standards Institute (ANSI) standard for general environmental noise measurement instrumentation. The ANSI specifies several types of sound-level meters according to their precision. Types 1, 2, and 3 are referred to as "precision," "general-purpose," and "survey" meters, respectively. Most measurements carefully taken with a Type 1 sound-level meter will have a margin of error not exceeding 1 dB.

The Larson Davis Model 831 is a Type 1 precision sound-level meter. This meter meets all requirements of ANSI S1.4-1983 and ANSI1.43-1997 Type 1 standards, as well as International Electrotechnical Commission (IEC) IEC61672-1 Ed. 1.0, IEC60651 Ed 1.2, and IEC60804 Type 1, Group X standards.

The sound-level meter was located approximately 5 feet above ground and was covered with a Larson Davis windscreen. The sound-level meter was field calibrated with an external calibrator prior to operation.

Construction Scenario

Construction would begin on November 2020 with operations beginning in mid-2021. A conceptual construction schedule was developed based on the CalEEMod default construction scheduling assumptions for a school-type project adjusted to reflect the applicant's buildout schedule and equipment used to construct the Project. Construction would occur over the following phases: (1) demolition; (2) grading; (3) building construction; (4) paving; and (5) architectural coating.

Ground-Borne Vibration

Ground-borne vibration impacts were evaluated by identifying potential vibration sources estimating the distance between vibration sources, vibration sensitive receptors, and surrounding structure locations; and making a significance determination based on the significance thresholds.

Roadway Noise

Traffic noise levels were modeled using the FHWA Noise Prediction Model (FHWA-RD-77-108). This model calculates the average noise level in dB(A) CNEL along a given roadway segment based on traffic volumes, vehicle mix, posted speed limits, roadway geometry, and site conditions. The model calculates noise associated with a specific line source and the results characterize noise generated by motor vehicle traffic along the specific roadway segment. According to data collected by Caltrans, California automobile noise is 0.8 to 1.0 dB(A) louder than national levels, while medium and heavy truck noise is 0.3 to 3.0 dB(A) quieter than national levels.[6] Roadway traffic data was obtained from the traffic impact study[7] for the Project. Noise levels were evaluated with respect to the following modeled traffic scenarios:

- Existing Conditions
- Existing with Project
- Future (2021) without Project
- Future (2021) with Project

City of Los Angeles General Plan Noise Element

The City's General Plan Noise Element identifies sources of noise and provides objectives and policies to ensure that noise from various sources does not create an unacceptable noise environment. The following Noise Element policies and objectives are applicable to the Project:[8]

Objective 2 (Nonairport): Reduce or eliminate nonairport related intrusive noise, especially relative to noise sensitive uses.

Policy 2.2: Enforce and/or implement applicable city, State and federal regulations intended to mitigate proposed noise-producing activities, reduce intrusive noise, and alleviate noise that is deemed a public nuisance.

Objective 3 (Land Use Development): Reduce or eliminate noise impacts associated with proposed development of land and changes in land use.

Policy 3.1: Develop land use policies and programs that will reduce or eliminate potential and existing noise impacts.

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6 Rudolf W. Hendriks, *California Vehicle Noise Emission Levels,* NTIS, FHWA/CA/TL-87/03 (1987).
7 KOA, *Valley International Preparatory High School Transportation Assessment*, October 2019.
8 City of Los Angeles, *General Plan,* "Noise Element" (adopted February 3, 1999).

North

West

South

East

SOURCE: Google Earth - 2019

FIGURE **5a**

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Noise Monitoring Location (Site 1)

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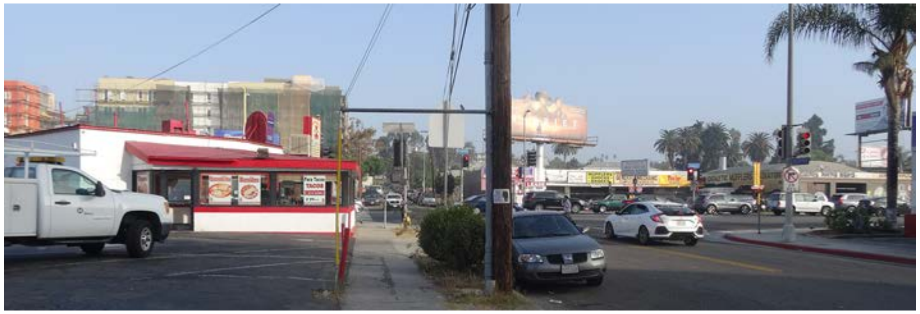

North

West

South

East

SOURCE: Google Earth - 2019

FIGURE **5b**

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Noise Monitoring Location (Site 2)

264-001-19

North

West

South

East

SOURCE: Google Earth - 2019

FIGURE **5c**

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Noise Monitoring Location (Site 3)

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City of Los Angeles General Noise Ordinance

The Los Angeles Municipal Code (LAMC) indicates that in cases where the actual ambient conditions are not known, the City's presumed daytime (7:00 AM to 10:00 PM) and nighttime (10:00 PM to 7:00 AM) minimum ambient noise levels (as defined in Section 111.02 of the LAMC) should be used. The presumed ambient noise levels for these areas set forth in the LAMC Sections 111.02 and 112.05 are provided in **Table 3: City of Los Angeles Presumed Ambient Noise Levels**.

Table 3
City of Los Angeles Presumed Ambient Noise Levels

Zone	Daytime Hours (7:00 AM to 10:00 PM) dBA (Leq)	Nighttime Hours (10:00 PM to 7:00 AM) dBA (Leq)
Residential	50	40
Commercial	60	55
Manufacturing (M1, MR1, and MR2)	60	55
Heavy Manufacturing (M2 and M3)	65	65

Source: Los Angeles Municipal Code, sec. 111.03.

Section 41.40 of the LAMC regulates noise from demolition and construction activities. More specifically, Section 41.40 prohibits construction activity and repair work where the use of any power tool, device, or equipment would disturb persons occupying sleeping quarters in any dwelling, hotel, apartment, or other place of residence between the hours of 9:00 PM to 7:00 AM Monday through Friday, and between 6:00 PM and 8:00 AM on Saturday. All such activities are prohibited on Sundays and all federal holidays.

Section 112.05 of the LAMC also specifies the maximum noise level of construction machinery that can be generated in any residential zone of the City or within 500 feet thereof. Specifically, any construction machinery may not generate a maximum noise level exceeding 75 dBA at 50 feet from the equipment. However, the above noise limitation does not apply where compliance is technically infeasible. LAMC Section 112.05 defines technical infeasibility to mean that "said noise limitations cannot be complied with despite the use of mufflers, shields, sound barriers and/or other noise reduction device or techniques during the operation of the equipment."

Guidelines for Noise-Compatible Land Uses

The City has adopted local guidelines based in part on the community noise compatibility guidelines established by the State Department of Health Services for use in assessing the compatibility of various land use types with a range of noise levels. These guidelines are set forth in the *L.A. CEQA Thresholds*

Guide in terms of the CNEL.[9] CNEL guidelines for specific land uses are classified into four categories: (1) normally acceptable; (2) conditionally acceptable; (3) normally unacceptable; and (4) clearly unacceptable. As shown in **Table 4: City of Los Angeles Land Use Compatibility for Community Noise**, a CNEL value of 70 dBA is the upper limit of what is considered a conditionally acceptable noise environment for multifamily homes, although the upper limit of what is considered "normally acceptable" for these uses are 65 dBA CNEL. New development should generally be discouraged within the "normally unacceptable" or "clearly unacceptable" categories. However, if new development does proceed, a detailed analysis of the noise reduction requirements must be made, and noise insulation features included in the design.

Table 4
City of Los Angeles Land Use Compatibility for Community Noise

Land Use	Normally Acceptable	Conditionally Acceptable	Normally Unacceptable	Clearly Unacceptable
	Community Noise Exposure CNEL (dBA)			
Single-Family, Duplex, Mobile Homes	50–60	55–70	70–75	Above 70
Multifamily Homes	50–65	60–70	70–75	Above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50–70	60–70	70–80	Above 80
Transient Lodging—Motels, Hotels	50–65	60–70	70–80	Above 80
Auditoriums, Concert Halls, Amphitheaters	—	50–70	—	Above 65
Sports Arena, Outdoor Spectator Sports	—	50–75	—	Above 70
Playgrounds, Neighborhood Parks	50–70	—	67–75	Above 72
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50–75	—	70–80	Above 80
Office Buildings, Business and Professional Commercial	50–70	67–77	Above 75	—
Industrial, Manufacturing, Utilities, Agriculture	50–75	70–80	Above 75	—

Source: City of Los Angeles, L.A. CEQA Thresholds Guide *(2006).*
Notes:
Normally Acceptable: Specified land use is satisfactory, based on the assumption that any buildings involved are of normal conventional construction without any special noise-insulation requirements.
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise-insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning, will normally suffice.
Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise-reduction requirements must be made and needed noise-insulation features included in the design.
Clearly Unacceptable: New construction or development should generally not be undertaken.

9 City of Los Angeles, *L.A. CEQA Thresholds Guide.*

E. EXISTING CONDITIONS

Ambient Noise Levels

Short-term sound monitoring was conducted at three (3) locations to measure the ambient sound environment in the Project vicinity. Measurements were taken over 15-minute intervals at each location during the morning peak hour period, as indicated in **Table 5: Ambient Noise Measurements**. **Figure 4** depicts locations where ambient noise measurements were conducted. As shown in **Table 5**, ambient noise levels ranged from a low of 59.9 dBA south of the Project site across Cosmopolitan Street (Site 1) to a high of 64.8 dBA west of the Project site across Madison Avenue (Site 3).

Table 5
Ambient Noise Measurements

Location Number/Description		Nearest Use	Time Period	dBA (Leq)
1	South of the Project site, across Cosmopolitan Street	School	7:46 AM–8:01 AM	59.9
2	Northeast portion of the Project site along N. Westmoreland Avenue	Commercial	8:04 AM–8:19 AM	62.8
3	West of the Project site across Madison Avenue	School	8:24 AM–8:39 AM	64.8

*Source: Refer to **Attachment 1** for noise monitoring data sheets.*
Notes: dBA = A-weighted decibels; Leq = average equivalent sound level.

Roadway Noise Levels

To characterize the ambient roadway noise environment near the Project Site, noise prediction modeling was conducted based on vehicular traffic volumes along nearby roadway segments. Existing roadway noise levels were modeled using the Federal Highway Administration Highway Prediction Noise Model (FHWA-RD-77-108). This model calculates the average noise level in dB(A) CNEL at a given roadway segment based on traffic volumes, vehicle mix, average speeds, roadway geometry, and site conditions. The noise model assumes a "hard" site condition (i.e., providing for the minimum amount of sound attenuation allowed by the traffic noise model, a 3 dB(A) noise reduction per doubling of distance) and assumes no barriers between the roadway and receivers. Traffic noise levels were calculated for sensitive receptors at distances of 75 feet from the center of the roadway. The noise prediction model used daily traffic volumes to determine average daily trips (ADTs) along the analyzed roadway segments. The estimated existing roadway noise levels are provided in **Table 6: Existing Roadway Noise Levels**.

Table 6
Existing Roadway Noise Levels

Intersection	Roadway Segment	Time Period	Existing (dBA CNEL)
Beverly Boulevard			
1	East of Madison Avenue	AM	63.1
		PM	62.9
	West of Madison Avenue	AM	63.1
		PM	62.9
2	East of N. Westmoreland Avenue	AM	60.7
		PM	61.2
	West of N. Westmoreland Avenue	AM	62.4
		PM	62.0
W. 1st Street			
3	East of Vermont Avenue	AM	57.0
		PM	60.8
	West of Vermont Avenue	AM	56.3
		PM	61.2
4	East of N. Westmoreland Avenue	AM	56.1
		PM	56.3
	West of N. Westmoreland Avenue	AM	56.9
		PM	57.1
Madison Avenue			
1	North of Beverly Boulevard	AM	41.4
		PM	39.0
	South of Beverly Boulevard	AM	43.9
		PM	42.3
N. Westmoreland Avenue			
2	North of Beverly Boulevard	AM	42.8
		PM	42.5
	South of Beverly Boulevard	AM	52.2
		PM	50.9
4	North of W. 1st Street	AM	50.2
		PM	47.9
	South of W. 1st Street	AM	41.3
		PM	41.7
N. Vermont Avenue			
3	North of W. 1st Street	AM	63.6
		PM	63.4
	South of W. 1st Street	AM	63.1
		PM	63.0

Source: Refer to ***Attachment 2*** *for roadway noise worksheets.*

Note that these calculated noise levels only consider the traffic volumes along the identified street segment and do not include other noise sources that may contribute to the ambient noise level at that location. The purpose of these calculations is to compare existing to future based specifically on the traffic volume for each roadway segment.

As shown in **Table 6**, the existing weekday vehicle-generated noise levels along roadway segments near the Project site range from a low of 41.4 dBA CNEL along Madison Avenue north of Beverly Boulevard (Intersection 1) to a high of 63.6 dBA CNEL along N. Vermont Avenue north of W. 1st Street (Intersection 3) at a distance of 75 feet from the center of the roadway.

Vibration Conditions

Based on field observations, the primary source of existing ground-borne vibration in the vicinity of the Project site is vehicle traffic on local roadways. According to the Federal Transit Administration,[10] typical road traffic–induced vibration levels are unlikely to be perceptible by people. Trucks and buses typically generate ground-borne vibration velocity levels of approximately 63 VdB (at a 50-foot distance), and these levels could reach 72 VdB when trucks and buses pass over bumps in the road. A vibration level of 72 VdB is above the 60 VdB level of perceptibility.

F. NOISE ANALYSIS

Construction

On-Site Construction Noise

Construction activities that would occur during the construction phases would generate both steady-state and episodic noise that would be heard both on and off the Project site. Each phase involves the use of different types of construction equipment and therefore, has its own distinct noise characteristics. The Project would be constructed using typical construction techniques: no blasting, impact pile driving, or jackhammers would be required.

Typical maximum noise levels and duty cycles of representative types of equipment that would potentially be used during construction for this Project are presented in **Table 7: Typical Maximum Noise Levels for Project Construction Equipment**. Construction equipment noise would not be constant because of the variations of power, cycles, and equipment locations. For maximum noise events, this analysis considers all equipment operating simultaneously at the edge of the property line of the Project site.

10 Federal Transit Administration, *Transit Noise and Vibration Impact Assessment,* FTA report no. 0123 (September 2018), accessed August 2019, https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf.

Table 7
Typical Maximum Noise Levels for Project Construction Equipment

Equipment Description	Typical Duty Cycle (%)	Spec Lmax (dBA)	Actual Lmax (dBA)
Air Compressor	40	80.0	77.7
Backhoe	40	80.0	77.6
Concrete mixer	40	85.0	78.8
Concrete/Industrial saw	20	90.0	89.6
Crane	16	85.0	80.6
Dozer	40	85.0	81.7
Forklift	40	85.0	N/A
Grader	40	85.0	N/A
Paver	50	85.0	77.2
Roller	20	85.0	80.0

Source: FHWA Roadway Construction Noise Model (RCNM) version 1.1
Note: N/A = not available.

As mentioned previously, sound generated by the construction noise source typically diminishes at a rate of 6 dBA over hard surfaces, such as asphalt, and 7.5 dBA over soft surfaces, such as vegetation, for each doubling of distance. Barriers—such as walls, berms, or buildings, and elevation differences—can also reduce sound levels by up to 20 dBA.[11]

The potential noise impact generated during construction depends on the phase of construction and the percentage of time the equipment operates over the workday. However, construction noise estimates used for the analysis are representative of worst-case conditions because it is unlikely that all the equipment contained on-site would operate simultaneously. This activity would take place approximately 50 feet from the Central City Value High School located approximately 33 feet to the south. The maximum noise level at the Central City Value High School and Virgil Middle School from construction activity at the Project site are shown in **Table 8: Construction Maximum Noise Estimates**.

11 Caltrans, *Technical Noise Supplement* (1998), 33–40, 123–131.

Table 8
Construction Maximum Noise Estimates

Use	Distance from Project Site (feet)	Max Leq	Ambient Noise Leq (dBA)	Significance Threshold	Maximum Noise Increase over Significance Threshold
Central City Value High School	33	90.3	59.9	64.9	+25.4
Virgil Middle School	475	67.2	59.9	64.9	+3.0

Source: FHWA, RCNM, version. 1.1.
Refer to ***Attachment 3*** *for Construction Noise Worksheets*

Construction equipment operates at its nosiest levels for certain percentages of time during operation. Equipment such as excavators, graders, and loaders would operate at different percentages over the course of an hour.[12] During a construction day, the highest noise levels would be generated when multiple pieces of construction equipment are operated concurrently. The Project's estimated construction noise levels were calculated for a scenario in which a reasonable number of construction equipment was assumed to be operating simultaneously, given the physical size of the site and logistical limitations, and with the noise equipment located at the construction area nearest to the affected receptors, to present a conservative impact analysis. This is considered a worst-case evaluation because the Project would typically use fewer overall equipment simultaneously at any given time and, as such, would likely generate lower noise levels than reported herein.

Pursuant to Section 41.40 of the LAMC, construction would be limited to the hours between 7:00 AM and 9:00 PM, Monday through Friday, and between 8:00 AM and 6:00 PM on Saturday. No construction activities would occur on Sundays or federal holidays. All construction related noise would be required to comply with the provisions of Section 112.05 of the LAMC. Pursuant to Section 112.05, the operation of any powered equipment or powered hand tool that produces a maximum noise level exceeding 75 dBA at a distance of 50 feet from the source of the noise between the hours of 7:00 AM to 10:00 PM when the source is located within 500 feet of a residential zone is prohibited. Compliance with Section 112.05 of the LAMC includes the use of mufflers, shields, sound barriers, and/or other noise reduction devices or techniques. Other noise-reduction techniques include a construction management plan which specifies that all construction equipment, fixed or mobile, will be equipped with properly operating and maintained mufflers and other State-required noise attenuation devices; identify the maximum distance between construction equipment staging areas and occupied residential areas; and require the use of electric air

12 Federal Highway Administration, *Traffic Noise Model* (2006).

compressors and similar power tools. Optimal muffler systems for all equipment and the break in line of sight to a sensitive receptor would reduce construction noise levels by approximately 10 dB or more.[13] In addition, modifications such as dampening of metal surfaces or the redesign of a particular piece of equipment can achieve noise reduction of up to 5 dBA.[14] Limiting the number of noise-generating heavy-duty off-road construction equipment simultaneously used on the Project site within 50 feet of off-site noise sensitive receptors surrounding the site to no more than one or two pieces of heavy-duty off-road equipment would further reduce construction noise levels by approximately 10 dBA. Temporary abatement techniques include the use of temporary and/or movable shielding for both specific and nonspecific operations. An example of such a barrier utilizes noise curtains in conjunction with trailers to create an easily movable, temporary noise barrier system. A noise barrier can achieve a 5-dB noise level reduction when it is tall enough to break the line-of-sight to the receiver. After it breaks the line-of-sight, it can achieve approximately 1.5 dB of additional noise level reduction for each one (1) meter (3.3 feet) of barrier height.[15]

A sign will be posted at the Project construction site, legible at a distance of 50 feet, with a contact name, telephone number, and dates and duration of construction activities, so that residents can inquire about the construction process and register complaints. In conjunction with this required posting, a noise disturbance coordinator will be identified to address construction noise concerns received. The contact name and the telephone number for the noise disturbance coordinator will be posted on the sign. The coordinator will be responsible for responding to any local complaints about construction noise and will notify the City to determine the cause and implement reasonable measures to the complaint, as deemed acceptable by the City. The Project would comply with the City's Noise Ordinance as it relates to construction equipment by limiting activities to occur between 7:00 AM to 9:00 PM Monday through Friday, and between 8:00 AM and 6:00 PM on Saturday. Compliance with the City's Noise Ordinance, construction noise levels would be reduced by a minimum of 30 dBA and noise levels would be within the normally and conditionally acceptable levels, thus would not be considered significant.

Off-Site Construction Noise

Construction of the Project would require workers travelling to and from the Project site. At the maximum, approximately 18 worker trips per day, 7 vendor trips per day, and 900 total hauling trips during construction. Noise associated with construction truck trips were estimated using the Caltrans FHWA

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13 FHWA, *Special Report – Measurement, Prediction, and Mitigation*, updated June 2017, accessed August 2019, https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm.
14 FHWA, *Special Report—Measurement, Prediction, and Mitigation*, updated June 2017, accessed July 2019, https://www.fhwa.dot.gov/Environment/noise/construction_noise/special_report/hcn04.cfm.
15 FHWA, *Noise Barrier Design – Visual Quality*, accessed April 2019, https://www.fhwa.dot.gov/Environment/noise/noise_barriers/design_construction/keepdown.cfm.

Traffic Noise Model based on the maximum number of truck trips in a day. Construction haul trips would generate noise levels of approximately 60 dBA, measured at a distance of 25 feet from N. Westmoreland Avenue. As shown in **Table 5**, existing noise levels along N. Westmoreland Avenue ranged were 62.8 dBA. The noise level increases from truck trips would be below the significance threshold of 5 dBA.

On-Site Construction Vibration

Table 9: Construction Vibration Levels Estimates—Building Damage present construction vibration impacts associated with on-site construction in terms of building damage. As shown in **Table 9**, the forecasted vibration levels due to on-site construction activities would not exceed the building damage significance threshold at the Everest Value High School to the south. Therefore, construction vibration impacts would not be significant.

Table 9
Construction Vibration Levels Estimates—Building Damage

Nearest Off-Site Building Structures	Estimated Vibration Velocity Levels at the Nearest Off-Site Structures from the Project Construction Equipment							Significance Threshold (PPV ips)
	Pile Driver (impact)[1]	Vibratory Roller	Large Bulldozer	Caisson Drilling	Loaded Trucks	Jack-hammer	Small bulldozer	
FTA Reference Vibration Levels at 25 feet								
	0.644	*0.210*	*0.089*	*0.089*	*0.076*	*0.035*	*0.003*	—
Central City Value High School (33 feet)	0.425	0.138	0.059	0.059	0.050	0.023	0.002	0.5

Source: US Department of Transportation, Federal Transportation Authority, Transit Noise and Vibration Impact Assessment.
Source: Refer to ***Attachment 4*** *for construction vibration worksheets.*
Note:
[1] Pile driving would not be required during construction.

Operation

Roadway Noise

Table 10: Existing plus Project shows the change in CNEL from existing traffic volumes and from traffic generated by the Project. As shown in **Table 10**, the maximum roadway noise level increase along existing roadways would be 1.5 dBA CNEL along N. Westmoreland Avenue north of W. 1st Street (Intersection 4) during the morning (AM) and afternoon (PM) peak hour. Roadway noise levels would not increase by 3 dBA CNEL or more and therefore, impacts related to roadway noise would not be considered significant.

Table 10
Existing plus Project

Intersection	Roadway Segment	Time Period	Existing	Existing plus Project	Difference
			dBA CNEL		
Beverly Boulevard					
1	East of Madison Avenue	AM	63.1	63.1	0.0
		PM	62.9	62.9	0.0
	West of Madison Avenue	AM	63.1	63.2	+0.1
		PM	62.9	62.9	0.0
2	East of N. Westmoreland Avenue	AM	60.7	61.0	+0.3
		PM	61.2	61.2	0.0
	West of N. Westmoreland Avenue	AM	62.4	62.4	0.0
		PM	62.0	62.2	+0.2
W. 1st Street					
3	East of Vermont Avenue	AM	57.0	57.5	+0.5
		PM	60.8	61.1	+0.3
	West of Vermont Avenue	AM	56.3	56.3	0.0
		PM	61.2	61.2	0.0
4	East of N. Westmoreland Avenue	AM	56.1	56.6	+0.5
		PM	56.3	56.5	+0.2
	West of N. Westmoreland Avenue	AM	56.9	57.4	+0.5
		PM	57.1	57.4	+0.3
Madison Avenue					
1	North of Beverly Boulevard	AM	41.4	41.4	0.0
		PM	39.0	39.0	0.0
	South of Beverly Boulevard	AM	43.9	44.7	+0.8
		PM	42.3	43.1	+0.8
N. Westmoreland Avenue					
2	North of Beverly Boulevard	AM	42.8	40.3	-2.5
		PM	42.5	42.5	0.0
	South of Beverly Boulevard	AM	52.2	50.4	-1.8
		PM	50.9	51.4	+0.5
4	North of W. 1st Street	AM	50.2	51.7	+1.5
		PM	47.9	49.4	+1.5
	South of W. 1st Street	AM	41.3	41.3	0.0
		PM	41.7	42.6	+0.9
N. Vermont Avenue					
3	North of W. 1st Street	AM	63.6	63.6	0.0
		PM	63.4	63.4	0.0
	South of W. 1st Street	AM	63.1	63.4	+0.3
		PM	63.0	63.1	+0.1

*Source: Refer to **Attachment 2** for roadway noise worksheets.*

Student Activity

Sources of noise emanate from the Project site within the open gathering and walkway areas during breaks between classes and during lunchtime, and from the surface parking areas. The school campus includes a soccer field, basketball, planting gardens, and turf play area at the eastern portion of the site. The play structure is north of the planting garden.

Noise from students would be similar in the general activities that occur at the Central City Value High School. Noise levels within the parking areas would fluctuate with the amount of automobile and human activity, similar to the current conditions at the surface parking lot. Therefore, operational noise impacts related to student noise and activity would not be significant.

Fixed Mechanical Equipment Noise

The Project would introduce various stationary noise sources, including heating, ventilation, and air conditioning systems, which would be located either on the roof, the side of a structure, or on the ground. All Project mechanical equipment would be required to be designed with appropriate noise-control devices, such as sound attenuators, acoustics louvers, or sound screens/parapet walls, to comply with noise-limitation requirements provided in LAMC Section 112.02, which prohibits the noise from such equipment from causing an increase in the ambient noise level of more than 5 dBA. Therefore, operation of mechanical equipment on the Project building would not exceed the City's threshold of significance.

G. CUMULATIVE NOISE

Construction

For purposes of this analysis, development of the related projects will be considered to contribute to cumulative noise impacts. Noise, by definition, is a localized phenomenon and drastically reduces as distance from the source increases. As a result, only related projects and growth in the general area of the Project site would contribute to cumulative noise impacts. Cumulative construction-noise impacts have the potential to occur when multiple construction projects in the local area generate noise within the same time frame and contribute to the local ambient noise environment. It is expected that, as with the Project, the related projects would implement best management practices, which would minimize any noise-related nuisances during construction. Therefore, the combined construction-noise impacts of the related projects and the Project's contribution would not cause a significant cumulative impact.

Operation

Roadway Noise

Table 11: Future plus Project shows the change in CNEL from future traffic volumes and from traffic generated by the Project. As shown in **Table 11**, the maximum roadway noise level increase along existing roadways would be 1.5 dBA CNEL along N. Westmoreland Avenue north of W. 1st Street (Intersection 4) during the morning (AM) and afternoon (PM) peak hour. Roadway noise levels would not increase by 3 dBA CNEL or more and therefore, impacts related to roadway noise would not be considered significant.

Table 11
Future plus Project

Intersection	Roadway Segment	Time Period	Future	Future plus Project	Difference
			dBA CNEL		
Beverly Boulevard					
1	East of Madison Avenue	AM	63.2	63.3	+0.1
		PM	63.0	63.1	+0.1
	West of Madison Avenue	AM	63.3	63.3	0.0
		PM	63.0	63.0	0.0
2	East of N. Westmoreland Avenue	AM	60.9	60.9	0.0
		PM	61.3	61.3	0.0
	West of N. Westmoreland Avenue	AM	62.6	62.7	+0.1
		PM	62.3	62.4	+0.1
W. 1st Street					
3	East of Vermont Avenue	AM	57.2	57.7	+0.5
		PM	61.1	61.3	+0.2
	West of Vermont Avenue	AM	56.5	56.5	0.0
		PM	61.4	61.4	0.0
4	East of Westmoreland Avenue	AM	56.4	56.8	+0.4
		PM	56.6	56.8	+0.2
	West of Westmoreland Avenue	AM	57.2	57.6	+0.4
		PM	57.4	57.6	+0.2
Madison Avenue					
1	North of Beverly Boulevard	AM	41.5	41.5	0.0
		PM	39.0	39.0	0.0
	South of Beverly Boulevard	AM	44.0	44.8	+0.8
		PM	42.4	43.2	+0.8

Intersection	Roadway Segment	Time Period	Future	Future plus Project	Difference
			dBA CNEL		
N. Westmoreland Avenue					
2	North of Beverly Boulevard	AM	42.9	42.9	0.0
		PM	42.6	42.6	0.0
	South of Beverly Boulevard	AM	52.3	52.4	+0.1
		PM	51.4	51.4	0.0
4	North of W. 1st Street	AM	50.3	51.8	+1.5
		PM	48.0	49.3	+1.3
	South of W. 1st Street	AM	41.3	41.3	0.0
		PM	41.7	41.7	0.0
N. Vermont Avenue					
3	North of W. 1st Street	AM	63.8	63.8	0.0
		PM	63.5	63.5	0.0
	South of W. 1st Street	AM	63.3	63.5	+0.2
		PM	63.1	63.2	+0.1

*Source: Refer to **Attachment 2** for roadway noise worksheets.*

Stationary

Regarding stationary sources, cumulative significant noise impacts may result from cumulative development. Stationary sources of noise that could be introduced in the area by cumulative projects could include mechanical equipment, loading docks, and parking lots. Given that these projects would be required to adhere to the City's noise standards, all stationary sources would be required to have shielding or other noise-abatement measures so as not to cause a substantial increase in ambient noise levels. Moreover, due to distance, it is unlikely that noise from multiple cumulative projects would interact to create a significant combined noise impact. As such, it is not anticipated that a significant cumulative increase in permanent ambient noise levels would occur.

Attachment 1

Noise Monitoring Data Sheets

Monitoring Location: Site 1
Monitoring Date: 11/7/2019

Monitoring Period

Time	LAeq	LApeak	LASmax
7:46:27	58.5	84.4	69.7
7:47:27	62.1	87.1	72.4
7:48:27	55.3	79.3	65.2
7:49:27	58.6	86.1	70.7
7:50:27	61.3	86.2	71.7
7:51:27	60.0	85.4	72.0
7:52:27	62.0	86.4	71.2
7:53:27	60.5	86.6	71.2
7:54:27	53.9	78.8	63.1
7:55:27	57.5	85.2	70.1
7:56:27	58.3	87.3	71.2
7:57:27	61.7	85.0	70.3
7:58:27	60.3	90.5	72.5
7:59:27	58.7	82.5	67.2
8:00:27	63.6	90.6	76.4
8:01:27	52.8	67.4	62.9

15-minute LAeq **59.9**

Monitoring Location: Site 2
Monitoring Date: 11/7/2019

Monitoring Period

Time	LAeq	LApeak	LASmax
8:04:57	67.7	85.1	72.8
8:05:57	61.9	87.5	68.1
8:06:57	62.1	80.6	65.3
8:07:57	63.5	87.3	72.9
8:08:57	66.4	88.0	74.8
8:09:57	63.5	80.4	67.0
8:10:57	62.0	81.6	68.2
8:11:57	58.5	76.8	61.6
8:12:57	61.0	82.4	66.6
8:13:57	63.7	88.3	71.3
8:14:57	59.7	81.9	64.0
8:15:57	60.7	83.8	65.0
8:16:57	59.2	85.8	63.8
8:17:57	60.8	83.8	67.7
8:18:57	61.0	85.0	64.0
8:19:57	60.9	77.8	64.1

15-minute LAeq	**62.8**

Monitoring Location: Site 3
Monitoring Date: 11/7/2019

Monitoring Period

Time	LAeq	LApeak	LASmax
08:24:05	59.7	90.4	70.3
08:25:05	58.5	80.2	65.5
08:26:05	56.6	83.7	61.8
08:27:05	58.0	82.4	68.3
08:28:05	70.8	96.7	83.2
08:29:05	64.4	89.0	74.9
08:30:05	60.1	95.8	72.1
08:31:05	63.2	86.3	71.1
08:32:05	59.0	91.6	70.4
08:33:05	57.7	78.8	60.4
08:34:05	59.4	82.3	67.2
08:35:05	60.7	89.3	69.3
08:36:05	65.3	90.3	76.9
08:37:05	73.0	98.4	85.0
08:38:05	59.7	83.8	76.4
08:39:05	53.3	66.2	53.9

15-minute LAeq **64.8**

Attachment 2

Roadway Noise Worksheets

Project Name | rev. (Date)

Weekday AM Peak Hour Volumes

Intersection: 1

Madison Avenue & Beverly Boulevard

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	Madison Avenue		Beverly Boulevard	
Leg	North of	South of	East of	West of
Cross Street	Beverly Boulevard		Madison Avenue	
Existing	429.0	759.0	14,179.0	14,311.0
Existing with Proj	429.0	924.0	14,355.0	14,487.0
Future	440.0	775.5	14,674.0	14,811.5
Future with Proje	440.0	940.5	14,850.0	14,987.5
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

Madison Avenue

Southbound

	right	through	left
Existing	25	2	1
Existing with Pro	25	2	1
Future	26	2	1
Future with Proje	26	2	1

Beverly Boulevard

Eastbound

	left	through	right
Existing	15	1,359	77
Existing with Pro	15	1,376	77
Future	15	1,416	79
Future with Proje	15	1,433	79

N
W E
S

Westbound

	right	through	left
Existing	35	1,125	46
Existing with Pro	35	1,125	46
Future	36	1,156	47
Future with Proje	36	1,156	47

Northbound

	left	through	right
Existing	1	0	12
Existing with Pro	16	0	27
Future	1	0	12
Future with Proje	16	0	27

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME					Design	Dist. from		Barrier	Vehicle Mix			Traffic Volumes									Ref. Energy Levels			Dist	Ld				Le				Ln			
Segment	Land Use	Lanes	Median Width	ADT Volume	Speed (mph)	Center tc Receptor	Alpha Factor (1	Attn. dB(A)	Medium Trucks	Heavy Trucks	dB(A) CNEL	Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	A	MT	HT	Adj	A	MT	HT	Total	A	MT	HT	Total	A	MT	HT	Total
Madison Avenue n/o Beverly																																				
Existing		2	0	429	15	75	0	0	1.8%	0.7%	41.4	333	54	41	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.3	34.0	39.1	41.7	33.3	26.4	28.9	35.2	20.1	24.6	29.8	31.3
Existing plus Project		2	0	429	15	75	0	0	1.8%	0.7%	41.4	333	54	41	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.3	34.0	39.1	41.7	33.3	26.4	28.9	35.2	20.1	24.6	29.8	31.3
Future		2	0	440	15	75	0	0	1.8%	0.7%	41.5	342	56	42	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.4	34.1	39.2	41.8	33.4	26.5	29.0	35.4	20.2	24.7	29.9	31.4
Future with Project		2	0	440	15	75	0	0	1.8%	0.7%	41.5	342	56	42	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.4	34.1	39.2	41.8	33.4	26.5	29.0	35.4	20.2	24.7	29.9	31.4
Madison Avenue s/o Beverly																																				
Existing		2	0	759	15	75	0	0	1.8%	0.7%	43.9	590	96	73	12	5	1	0	1	0	50.8	65.4	74.5	-1.8	38.7	36.5	41.6	44.2	35.8	28.9	31.4	37.7	22.6	27.0	32.3	33.8
Existing plus Project		2	0	924	15	75	0	0	1.8%	0.7%	44.7	718	117	89	15	6	1	0	1	1	50.8	65.4	74.5	-1.8	39.6	37.4	42.4	45.0	36.6	29.8	32.2	38.6	23.4	27.9	33.2	34.6
Future		2	0	776	15	75	0	0	1.8%	0.7%	44.0	603	98	74	12	5	1	0	1	0	50.8	65.4	74.5	-1.8	38.8	36.6	41.6	44.3	35.8	29.0	31.5	37.8	22.7	27.1	32.4	33.9
Future with Project		2	0	941	15	75	0	0	1.8%	0.7%	44.8	731	119	90	15	6	1	0	1	1	50.8	65.4	74.5	-1.8	39.7	37.4	42.5	45.1	36.7	29.8	32.3	38.7	23.5	28.0	33.2	34.7
Beverly Boulevard e/o																																				
Existing		4	0	14,179	35	75	0	0	1.8%	0.7%	63.1	####	1,801	1,361	223	88	13	3	19	8	65.1	74.8	80.0	-1.7	62.2	55.1	56.3	63.8	59.2	47.5	46.1	59.7	46.0	45.6	47.0	51.0
Existing plus Project		4	0	14,355	35	75	0	0	1.8%	0.7%	63.1	####	1,823	1,378	226	90	13	3	19	8	65.1	74.8	80.0	-1.7	62.2	55.1	56.3	63.8	59.2	47.5	46.2	59.7	46.0	45.7	47.1	51.1
Future		4	0	14,674	35	75	0	0	1.8%	0.7%	63.2	####	1,864	1,409	231	92	13	3	20	8	65.1	74.8	80.0	-1.7	62.3	55.2	56.4	63.9	59.3	47.6	46.2	59.8	46.1	45.8	47.2	51.2
Future with Project		4	0	14,850	35	75	0	0	1.8%	0.7%	63.3	####	1,886	1,426	234	93	13	3	20	8	65.1	74.8	80.0	-1.7	62.4	55.3	56.5	64.0	59.4	47.7	46.3	59.9	46.2	45.8	47.2	51.2
Beverly Boulevard w/o																																				
Existing		4	0	14,311	35	75	0	0	1.8%	0.7%	63.1	####	1,817	1,374	225	89	13	3	19	8	65.1	74.8	80.0	-1.7	62.2	55.1	56.3	63.8	59.2	47.5	46.1	59.7	46.0	45.7	47.1	51.1
Existing plus Project		4	0	14,487	35	75	0	0	1.8%	0.7%	63.2	####	1,840	1,391	228	90	13	3	20	8	65.1	74.8	80.0	-1.7	62.3	55.2	56.4	63.9	59.3	47.6	46.2	59.8	46.1	45.7	47.1	51.1
Future		4	0	14,812	35	75	0	0	1.8%	0.7%	63.3	####	1,881	1,422	233	92	13	3	20	8	65.1	74.8	80.0	-1.7	62.3	55.3	56.5	64.0	59.4	47.7	46.3	59.8	46.2	45.8	47.2	51.2
Future with Project		4	0	14,988	35	75	0	0	1.8%	0.7%	63.3	####	1,903	1,439	236	93	14	3	20	8	65.1	74.8	80.0	-1.7	62.4	55.3	56.5	64.0	59.4	47.7	46.3	59.9	46.2	45.9	47.3	51.3

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)
Weekday PM Peak Hour Volumes

Intersection: 1
Madison Avenue & Beverly Boulevard

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	Madison Avenue		Beverly Boulevard	
Leg	North of	South of	East of	West of
Cross Street	Beverly Boulevard		Madison Avenue	
Existing	247.5	533.5	13,601.5	13,513.5
Existing with Proj	247.5	632.5	13,689.5	13,601.5
Future	247.5	544.5	14,025.0	13,937.0
Future with Proje	247.5	643.5	14,113.0	14,025.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

Madison Avenue

Southbound

	right	through	left
Existing	19	1	1
Existing with Pro	19	1	1
Future	19	1	1
Future with Proje	19	1	1

Beverly Boulevard

Eastbound

	left	through	right
Existing	7	1,378	34
Existing with Pro	7	1,385	34
Future	7	1,417	35
Future with Proje	7	1,424	35

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Westbound

	right	through	left
Existing	17	1,017	51
Existing with Pro	17	1,017	51
Future	17	1,054	52
Future with Proje	17	1,054	52

Northbound

	left	through	right
Existing	2	0	9
Existing with Pro	11	0	18
Future	2	0	9
Future with Proje	11	0	18

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor	Alpha Factor (1)	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL
Madison Avenue n/o Beverly											
Existing		2	0	248	15	75	0	0	1.8%	0.7%	39.0
Existing plus Project		2	0	248	15	75	0	0	1.8%	0.7%	39.0
Future		2	0	248	15	75	0	0	1.8%	0.7%	39.0
Future with Project		2	0	248	15	75	0	0	1.8%	0.7%	39.0
Madison Avenue s/o Beverly											
Existing		2	0	534	15	75	0	0	1.8%	0.7%	42.3
Existing plus Project		2	0	633	15	75	0	0	1.8%	0.7%	43.1
Future		2	0	545	15	75	0	0	1.8%	0.7%	42.4
Future with Project		2	0	644	15	75	0	0	1.8%	0.7%	43.2
Beverly Boulevard e/o											
Existing		4	0	13,602	35	75	0	0	1.8%	0.7%	62.9
Existing plus Project		4	0	13,690	35	75	0	0	1.8%	0.7%	62.9
Future		4	0	14,025	35	75	0	0	1.8%	0.7%	63.0
Future with Project		4	0	14,113	35	75	0	0	1.8%	0.7%	63.1
Beverly Boulevard w/o											
Existing		4	0	13,514	35	75	0	0	1.8%	0.7%	62.9
Existing plus Project		4	0	13,602	35	75	0	0	1.8%	0.7%	62.9
Future		4	0	13,937	35	75	0	0	1.8%	0.7%	63.0
Future with Project		4	0	14,025	35	75	0	0	1.8%	0.7%	63.0

Segment	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
Madison Avenue n/o Beverly																									
Existing	192	31	24	4	2	0	0	0	0	50.8	65.4	74.5	-1.8	33.9	31.6	36.7	39.3	30.9	24.0	26.5	32.9	17.7	22.2	27.4	28.9
Existing plus Project	192	31	24	4	2	0	0	0	0	50.8	65.4	74.5	-1.8	33.9	31.6	36.7	39.3	30.9	24.0	26.5	32.9	17.7	22.2	27.4	28.9
Future	192	31	24	4	2	0	0	0	0	50.8	65.4	74.5	-1.8	33.9	31.6	36.7	39.3	30.9	24.0	26.5	32.9	17.7	22.2	27.4	28.9
Future with Project	192	31	24	4	2	0	0	0	0	50.8	65.4	74.5	-1.8	33.9	31.6	36.7	39.3	30.9	24.0	26.5	32.9	17.7	22.2	27.4	28.9
Madison Avenue s/o Beverly																									
Existing	415	68	51	8	3	0	0	1	0	50.8	65.4	74.5	-1.8	37.2	35.0	40.0	42.7	34.2	27.4	29.9	36.2	21.0	25.5	30.8	32.3
Existing plus Project	491	80	61	10	4	1	0	1	0	50.8	65.4	74.5	-1.8	37.9	35.7	40.8	43.4	35.0	28.1	30.6	36.9	21.8	26.3	31.5	33.0
Future	423	69	52	9	3	0	0	1	0	50.8	65.4	74.5	-1.8	37.3	35.1	40.1	42.7	34.3	27.5	29.9	36.3	21.1	25.6	30.9	32.3
Future with Project	500	82	62	10	4	1	0	1	0	50.8	65.4	74.5	-1.8	38.0	35.8	40.8	43.5	35.0	28.2	30.7	37.0	21.8	26.3	31.6	33.1
Beverly Boulevard e/o																									
Existing	####	1,727	1,306	214	85	12	3	18	8	65.1	74.8	80.0	-1.7	62.0	54.9	56.1	63.6	59.0	47.3	45.9	59.5	45.8	45.4	46.9	50.8
Existing plus Project	####	1,739	1,314	215	85	12	3	19	8	65.1	74.8	80.0	-1.7	62.0	54.9	56.1	63.6	59.0	47.3	45.9	59.5	45.8	45.5	46.9	50.9
Future	####	1,781	1,346	221	87	13	3	19	8	65.1	74.8	80.0	-1.7	62.1	55.0	56.2	63.7	59.1	47.4	46.1	59.6	45.9	45.6	47.0	51.0
Future with Project	####	1,792	1,355	222	88	13	3	19	8	65.1	74.8	80.0	-1.7	62.1	55.0	56.2	63.8	59.2	47.5	46.1	59.6	46.0	45.6	47.0	51.0
Beverly Boulevard w/o																									
Existing	####	1,716	1,297	213	84	12	3	18	8	65.1	74.8	80.0	-1.7	62.0	54.9	56.1	63.6	59.0	47.3	45.9	59.5	45.8	45.4	46.8	50.8
Existing plus Project	####	1,727	1,306	214	85	12	3	18	8	65.1	74.8	80.0	-1.7	62.0	54.9	56.1	63.6	59.0	47.3	45.9	59.5	45.8	45.4	46.9	50.8
Future	####	1,770	1,338	219	87	13	3	19	8	65.1	74.8	80.0	-1.7	62.1	55.0	56.2	63.7	59.1	47.4	46.0	59.6	45.9	45.5	47.0	50.9
Future with Project	####	1,781	1,346	221	87	13	3	19	8	65.1	74.8	80.0	-1.7	62.1	55.0	56.2	63.7	59.1	47.4	46.1	59.6	45.9	45.6	47.0	51.0

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)

Weekday AM Peak Hour Volumes

Intersection: 2

N Westmoreland Avenue & Beverly Boulevard

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	N Westmoreland Avenue		Beverly Boulevard	
Leg	North of	South of	East of	West of
Cross Street	Beverly Boulevard		N Westmoreland Avenue	
Existing	594.0	5,175.5	8,200.5	12,221.0
Existing with Proj	330.0	3,399.0	8,761.5	12,039.5
Future	599.5	5,258.0	8,569.0	12,666.5
Future with Proje	599.5	5,351.5	8,651.5	12,842.5
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

N Westmoreland Avenue

Southbound

	right	through	left
Existing	19	41	26
Existing with Pro	19	0	26
Future	19	41	27
Future with Proje	19	41	27

Beverly Boulevard

Eastbound

	left	through	right
Existing		601	769
Existing with Project		773	618
Future		643	784
Future with Project		658	801

N

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Westbound

	right	through	left
Existing	15	779	
Existing with Pro	15	779	
Future	15	803	
Future with Proje	15	803	

Northbound

	left	through	right
Existing	54	7	70
Existing with Pro	0	0	0
Future	54	7	70
Future with Proje	54	7	70

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor	Alpha Factor (1)	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL
N Westmoreland Avenue n/o											
Existing		2	0	594	15	75	0	0	1.8%	0.7%	42.8
Existing plus Project		2	0	330	15	75	0	0	1.8%	0.7%	40.3
Future		2	0	600	15	75	0	0	1.8%	0.7%	42.9
Future with Project		2	0	600	15	75	0	0	1.8%	0.7%	42.9
N Westmoreland Avenue s/o											
Existing		2	0	5,176	15	75	0	0	1.8%	0.7%	52.2
Existing plus Project		2	0	3,399	15	75	0	0	1.8%	0.7%	50.4
Future		2	0	5,258	15	75	0	0	1.8%	0.7%	52.3
Future with Project		2	0	5,352	15	75	0	0	1.8%	0.7%	52.4
Beverly Boulevard e/o N											
Existing		4	0	8,201	35	75	0	0	1.8%	0.7%	60.7
Existing plus Project		4	0	8,762	35	75	0	0	1.8%	0.7%	61.0
Future		4	0	8,569	35	75	0	0	1.8%	0.7%	60.9
Future with Project		4	0	8,652	35	75	0	0	1.8%	0.7%	60.9
Beverly Boulevard w/o N											
Existing		4	0	12,221	35	75	0	0	1.8%	0.7%	62.4
Existing plus Project		4	0	12,040	35	75	0	0	1.8%	0.7%	62.4
Future		4	0	12,667	35	75	0	0	1.8%	0.7%	62.6
Future with Project		4	0	12,843	35	75	0	0	1.8%	0.7%	62.7

Segment	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
N Westmoreland Avenue n/o																									
Existing	462	75	57	9	4	1	0	1	0	50.8	65.4	74.5	-1.8	37.7	35.4	40.5	43.1	34.7	27.8	30.3	36.7	21.5	26.0	31.3	32.7
Existing plus Project	256	42	32	5	2	0	0	0	0	50.8	65.4	74.5	-1.8	35.1	32.9	37.9	40.6	32.1	25.3	27.8	34.1	18.9	23.4	28.7	30.2
Future	466	76	58	9	4	1	0	1	0	50.8	65.4	74.5	-1.8	37.7	35.5	40.5	43.2	34.7	27.9	30.4	36.7	21.5	26.0	31.3	32.8
Future with Project	466	76	58	9	4	1	0	1	0	50.8	65.4	74.5	-1.8	37.7	35.5	40.5	43.2	34.7	27.9	30.4	36.7	21.5	26.0	31.3	32.8
N Westmoreland Avenue s/o																									
Existing	4,021	657	497	81	32	5	1	7	3	50.8	65.4	74.5	-1.8	47.1	44.8	49.9	52.5	44.1	37.3	39.7	46.1	30.9	35.4	40.7	42.1
Existing plus Project	2,641	432	326	53	21	3	1	5	2	50.8	65.4	74.5	-1.8	45.2	43.0	48.1	50.7	42.3	35.4	37.9	44.2	29.1	33.6	38.8	40.3
Future	4,085	668	505	83	33	5	1	7	3	50.8	65.4	74.5	-1.8	47.1	44.9	50.0	52.6	44.2	37.3	39.8	46.1	31.0	35.4	40.7	42.2
Future with Project	4,158	680	514	84	33	5	1	7	3	50.8	65.4	74.5	-1.8	47.2	45.0	50.0	52.7	44.2	37.4	39.9	46.2	31.0	35.5	40.8	42.3
Beverly Boulevard e/o N																									
Existing	6,372	1,041	787	129	51	7	2	11	5	65.1	74.8	80.0	-1.7	59.8	52.7	53.9	61.4	56.8	45.1	43.7	57.3	43.6	43.2	44.7	48.6
Existing plus Project	6,808	1,113	841	138	55	8	2	12	5	65.1	74.8	80.0	-1.7	60.1	53.0	54.2	61.7	57.1	45.4	44.0	57.6	43.9	43.5	44.9	48.9
Future	6,658	1,088	823	135	53	8	2	12	5	65.1	74.8	80.0	-1.7	60.0	52.9	54.1	61.6	57.0	45.3	43.9	57.5	43.8	43.4	44.8	48.8
Future with Project	6,722	1,099	831	136	54	8	2	12	5	65.1	74.8	80.0	-1.7	60.0	52.9	54.1	61.6	57.0	45.3	44.0	57.5	43.8	43.5	44.9	48.9
Beverly Boulevard w/o N																									
Existing	9,496	1,552	1,173	192	76	11	2	17	7	65.1	74.8	80.0	-1.7	61.5	54.4	55.6	63.1	58.5	46.8	45.5	59.0	45.3	45.0	46.4	50.4
Existing plus Project	9,355	1,529	1,156	189	75	11	2	16	7	65.1	74.8	80.0	-1.7	61.4	54.4	55.6	63.1	58.5	46.8	45.4	58.9	45.3	44.9	46.3	50.3
Future	9,842	1,609	1,216	199	79	12	3	17	7	65.1	74.8	80.0	-1.7	61.7	54.6	55.8	63.3	58.7	47.0	45.6	59.2	45.5	45.1	46.5	50.5
Future with Project	9,979	1,631	1,233	202	80	12	3	17	7	65.1	74.8	80.0	-1.7	61.7	54.6	55.8	63.4	58.8	47.1	45.7	59.2	45.6	45.2	46.6	50.6

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)
Weekday PM Peak Hour Volumes

Intersection: 2
N Westmoreland Avenue & Beverly Boulevard

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	N Westmoreland Avenue		Beverly Boulevard	
Leg	North of	South of	East of	West of
Cross Street	Beverly Boulevard		N Westmoreland Avenue	
Existing	555.5	3,822.5	9,097.0	11,154.0
Existing with Proj	555.5	4,257.0	9,146.5	11,638.0
Future	561.0	4,279.0	9,421.5	11,929.5
Future with Proje	561.0	4,317.5	9,471.0	12,017.5
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

N Westmoreland Avenue

Southbound

	right	through	left
Existing	12	29	43
Existing with Pro	12	29	43
Future	12	29	44
Future with Proje	12	29	44

Beverly Boulevard

Eastbound

	left	through	right
Existing		798	508
Existing with Project		807	587
Future		825	591
Future with Project		834	598

N
W E
S

Westbound

	right	through	left
Existing	9	682	
Existing with Pro	9	682	
Future	9	713	
Future with Proje	9	713	

Northbound

	left	through	right
Existing	28	8	122
Existing with Pro	28	8	122
Future	28	8	122
Future with Proje	28	8	122

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor	Alpha Factor (1)	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
N Westmoreland Avenue n/o																																				
Existing		2	0	556	15	75	0	0	1.8%	0.7%	42.5	432	71	53	9	3	1	0	1	0	50.8	65.4	74.5	-1.8	37.4	35.1	40.2	42.8	34.4	27.6	30.0	36.4	21.2	25.7	31.0	32.4
Existing plus Project		2	0	556	15	75	0	0	1.8%	0.7%	42.5	432	71	53	9	3	1	0	1	0	50.8	65.4	74.5	-1.8	37.4	35.1	40.2	42.8	34.4	27.6	30.0	36.4	21.2	25.7	31.0	32.4
Future		2	0	561	15	75	0	0	1.8%	0.7%	42.6	436	71	54	9	3	1	0	1	0	50.8	65.4	74.5	-1.8	37.4	35.2	40.2	42.9	34.4	27.6	30.1	36.4	21.2	25.7	31.0	32.5
Future with Project		2	0	561	15	75	0	0	1.8%	0.7%	42.6	436	71	54	9	3	1	0	1	0	50.8	65.4	74.5	-1.8	37.4	35.2	40.2	42.9	34.4	27.6	30.1	36.4	21.2	25.7	31.0	32.5
N Westmoreland Avenue s/o																																				
Existing		2	0	3,823	15	75	0	0	1.8%	0.7%	50.9	2,970	485	367	60	24	3	1	5	2	50.8	65.4	74.5	-1.8	45.8	43.5	48.6	51.2	42.8	35.9	38.4	44.7	29.6	34.1	39.3	40.8
Existing plus Project		2	0	4,257	15	75	0	0	1.8%	0.7%	51.4	3,308	541	409	67	27	4	1	6	2	50.8	65.4	74.5	-1.8	46.2	44.0	49.0	51.7	43.2	36.4	38.9	45.2	30.0	34.5	39.8	41.3
Future		2	0	4,279	15	75	0	0	1.8%	0.7%	51.4	3,325	543	411	67	27	4	1	6	2	50.8	65.4	74.5	-1.8	46.2	44.0	49.1	51.7	43.3	36.4	38.9	45.2	30.1	34.6	39.8	41.3
Future with Project		2	0	4,318	15	75	0	0	1.8%	0.7%	51.4	3,355	548	414	68	27	4	1	6	2	50.8	65.4	74.5	-1.8	46.3	44.0	49.1	51.7	43.3	36.5	38.9	45.3	30.1	34.6	39.9	41.3
Beverly Boulevard e/o N																																				
Existing		4	0	9,097	35	75	0	0	1.8%	0.7%	61.2	7,068	1,155	873	143	57	8	2	12	5	65.1	74.8	80.0	-1.7	60.2	53.1	54.3	61.9	57.3	45.6	44.2	57.7	44.1	43.7	45.1	49.1
Existing plus Project		4	0	9,147	35	75	0	0	1.8%	0.7%	61.2	7,107	1,162	878	144	57	8	2	12	5	65.1	74.8	80.0	-1.7	60.3	53.2	54.4	61.9	57.3	45.6	44.2	57.8	44.1	43.7	45.1	49.1
Future		4	0	9,422	35	75	0	0	1.8%	0.7%	61.3	7,321	1,197	904	148	59	9	2	13	5	65.1	74.8	80.0	-1.7	60.4	53.3	54.5	62.0	57.4	45.7	44.3	57.9	44.2	43.8	45.3	49.2
Future with Project		4	0	9,471	35	75	0	0	1.8%	0.7%	61.3	7,359	1,203	909	149	59	9	2	13	5	65.1	74.8	80.0	-1.7	60.4	53.3	54.5	62.0	57.4	45.7	44.3	57.9	44.2	43.9	45.3	49.3
Beverly Boulevard w/o N																																				
Existing		4	0	11,154	35	75	0	0	1.8%	0.7%	62.0	8,667	1,417	1,071	176	70	10	2	15	6	65.1	74.8	80.0	-1.7	61.1	54.0	55.2	62.7	58.1	46.4	45.1	58.6	44.9	44.6	46.0	50.0
Existing plus Project		4	0	11,638	35	75	0	0	1.8%	0.7%	62.2	9,043	1,478	1,117	183	73	11	2	16	7	65.1	74.8	80.0	-1.7	61.3	54.2	55.4	62.9	58.3	46.6	45.2	58.8	45.1	44.8	46.2	50.2
Future		4	0	11,930	35	75	0	0	1.8%	0.7%	62.3	9,269	1,515	1,145	188	74	11	2	16	7	65.1	74.8	80.0	-1.7	61.4	54.3	55.5	63.0	58.4	46.7	45.4	58.9	45.2	44.9	46.3	50.3
Future with Project		4	0	12,018	35	75	0	0	1.8%	0.7%	62.4	9,338	1,526	1,154	189	75	11	2	16	7	65.1	74.8	80.0	-1.7	61.4	54.3	55.5	63.1	58.5	46.8	45.4	58.9	45.3	44.9	46.3	50.3

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name | rev. (Date)

Weekday AM Peak Hour Volumes

Intersection: 3

N Vermont Avenue & W 1st Street

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	N Vermont Avenue		W 1st Street	
Leg	North of	South of	East of	West of
Cross Street	W 1st Street		N Vermont Avenue	
Existing	15,895.0	14,344.0	6,567.0	5,599.0
Existing with Proj	15,895.0	15,119.5	7,342.5	5,599.0
Future	16,549.5	14,828.0	6,919.0	5,802.5
Future with Proje	16,549.5	15,603.5	7,694.5	5,802.5
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

N Vermont Avenue

Southbound

	right	through	left
Existing	83	1,243	99
Existing with Pro	83	1,243	99
Future	85	1,296	120
Future with Proje	85	1,296	120

W 1st Street

Eastbound

	left	through	right
Existing	144	378	49
Existing with Pro	144	378	49
Future	147	389	50
Future with Proje	147	389	50

N
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Westbound

	right	through	left
Existing	211	332	105
Existing with Pro	211	332	169
Future	221	351	107
Future with Proje	221	351	171

Northbound

	left	through	right
Existing	32	1,110	69
Existing with Pro	32	1,110	146
Future	33	1,140	70
Future with Proje	33	1,140	147

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center tc Receptor	Alpha Factor (1)	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL
N Vermont Avenue n/o W 1st											
Existing		4	0	15,895	35	75	0	0	1.8%	0.7%	63.6
Existing plus Project		4	0	15,895	35	75	0	0	1.8%	0.7%	63.6
Future		4	0	16,550	35	75	0	0	1.8%	0.7%	63.8
Future with Project		4	0	16,550	35	75	0	0	1.8%	0.7%	63.8
N Vermont Avenue s/o W 1st											
Existing		4	0	14,344	35	75	0	0	1.8%	0.7%	63.1
Existing plus Project		4	0	15,120	35	75	0	0	1.8%	0.7%	63.4
Future		4	0	14,828	35	75	0	0	1.8%	0.7%	63.3
Future with Project		4	0	15,604	35	75	0	0	1.8%	0.7%	63.5
W 1st Street e/o N Vermont											
Existing		2	0	6,567	25	75	0	0	1.8%	0.7%	57.0
Existing plus Project		2	0	7,343	25	75	0	0	1.8%	0.7%	57.5
Future		2	0	6,919	25	75	0	0	1.8%	0.7%	57.2
Future with Project		2	0	7,695	25	75	0	0	1.8%	0.7%	57.7
W 1st Street w/o N Vermont											
Existing		2	0	5,599	25	75	0	0	1.8%	0.7%	56.3
Existing plus Project		2	0	5,599	25	75	0	0	1.8%	0.7%	56.3
Future		2	0	5,803	25	75	0	0	1.8%	0.7%	56.5
Future with Project		2	0	5,803	25	75	0	0	1.8%	0.7%	56.5

ROADWAY NAME Segment	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
N Vermont Avenue n/o W 1st																									
Existing	####	2,019	1,526	250	99	14	3	22	9	65.1	74.8	80.0	-1.7	62.7	55.6	56.8	64.3	59.7	48.0	46.6	60.2	46.5	46.1	47.5	51.5
Existing plus Project	####	2,019	1,526	250	99	14	3	22	9	65.1	74.8	80.0	-1.7	62.7	55.6	56.8	64.3	59.7	48.0	46.6	60.2	46.5	46.1	47.5	51.5
Future	####	2,102	1,589	260	103	15	3	22	9	65.1	74.8	80.0	-1.7	62.8	55.7	56.9	64.5	59.9	48.2	46.8	60.3	46.7	46.3	47.7	51.7
Future with Project	####	2,102	1,589	260	103	15	3	22	9	65.1	74.8	80.0	-1.7	62.8	55.7	56.9	64.5	59.9	48.2	46.8	60.3	46.7	46.3	47.7	51.7
N Vermont Avenue s/o W 1st																									
Existing	####	1,822	1,377	226	89	13	3	19	8	65.1	74.8	80.0	-1.7	62.2	55.1	56.3	63.8	59.2	47.5	46.2	59.7	46.0	45.7	47.1	51.1
Existing plus Project	####	1,920	1,451	238	94	14	3	20	9	65.1	74.8	80.0	-1.7	62.4	55.3	56.5	64.1	59.5	47.8	46.4	59.9	46.3	45.9	47.3	51.3
Future	####	1,883	1,423	233	92	13	3	20	8	65.1	74.8	80.0	-1.7	62.4	55.3	56.5	64.0	59.4	47.7	46.3	59.9	46.2	45.8	47.2	51.2
Future with Project	####	1,982	1,498	246	97	14	3	21	9	65.1	74.8	80.0	-1.7	62.6	55.5	56.7	64.2	59.6	47.9	46.5	60.1	46.4	46.0	47.4	51.4
W 1st Street e/o N Vermont																									
Existing	5,103	834	630	103	41	6	1	9	4	59.4	71.1	78.7	-1.8	54.5	49.3	53.0	57.5	51.5	41.7	42.8	52.4	38.3	39.9	43.7	46.0
Existing plus Project	5,705	932	705	116	46	7	1	10	4	59.4	71.1	78.7	-1.8	55.0	49.8	53.4	58.0	52.0	42.2	43.3	52.9	38.8	40.4	44.2	46.5
Future	5,376	879	664	109	43	6	1	9	4	59.4	71.1	78.7	-1.8	54.7	49.6	53.2	57.7	51.7	42.0	43.0	52.7	38.5	40.1	44.0	46.3
Future with Project	5,979	977	739	121	48	7	2	10	4	59.4	71.1	78.7	-1.8	55.2	50.0	53.7	58.2	52.2	42.4	43.5	53.1	39.0	40.6	44.4	46.7
W 1st Street w/o N Vermont																									
Existing	4,350	711	538	88	35	5	1	8	3	59.4	71.1	78.7	-1.8	53.8	48.6	52.3	56.8	50.8	41.1	42.1	51.8	37.6	39.2	43.0	45.3
Existing plus Project	4,350	711	538	88	35	5	1	8	3	59.4	71.1	78.7	-1.8	53.8	48.6	52.3	56.8	50.8	41.1	42.1	51.8	37.6	39.2	43.0	45.3
Future	4,509	737	557	91	36	5	1	8	3	59.4	71.1	78.7	-1.8	54.0	48.8	52.4	57.0	51.0	41.2	42.3	51.9	37.8	39.3	43.2	45.5
Future with Project	4,509	737	557	91	36	5	1	8	3	59.4	71.1	78.7	-1.8	54.0	48.8	52.4	57.0	51.0	41.2	42.3	51.9	37.8	39.3	43.2	45.5

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)
Weekday PM Peak Hour Volumes

Intersection: 3
N Vermont Avenue & W 1st Street

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	N Vermont Avenue		W 1st Street	
Leg	North of	South of	East of	West of
Cross Street	W 1st Street		N Vermont Avenue	
Existing	15,163.5	13,904.0	6,374.5	6,974.0
Existing with Proj	15,163.5	14,294.5	6,765.0	6,974.0
Future	15,724.5	14,322.0	6,765.0	7,254.5
Future with Proje	15,724.5	14,712.5	7,155.5	7,254.5
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

N Vermont Avenue

Southbound

	right	through	left
Existing	167	1,257	117
Existing with Pro	167	1,257	117
Future	170	1,291	125
Future with Proje	170	1,291	125

W 1st Street

Eastbound

	left	through	right
Existing	150	470	64
Existing with Pro	150	470	64
Future	153	495	65
Future with Proje	153	495	65

N
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Westbound

	right	through	left
Existing	79	345	67
Existing with Pro	79	345	105
Future	96	363	68
Future with Proje	96	363	106

Northbound

	left	through	right
Existing	72	987	81
Existing with Pro	72	987	114
Future	73	1,024	83
Future with Proje	73	1,024	116

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center tc Receptor	Alpha Factor (1	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL
N Vermont Avenue n/o W 1st											
Existing		4	0	15,164	35	75	0	0	1.8%	0.7%	63.4
Existing plus Project		4	0	15,164	35	75	0	0	1.8%	0.7%	63.4
Future		4	0	15,725	35	75	0	0	1.8%	0.7%	63.5
Future with Project		4	0	15,725	35	75	0	0	1.8%	0.7%	63.5
N Vermont Avenue s/o W 1st											
Existing		4	0	13,904	35	75	0	0	1.8%	0.7%	63.0
Existing plus Project		4	0	14,295	35	75	0	0	1.8%	0.7%	63.1
Future		4	0	14,322	35	75	0	0	1.8%	0.7%	63.1
Future with Project		4	0	14,713	35	75	0	0	1.8%	0.7%	63.2
W 1st Street e/o N Vermont											
Existing		2	0	6,375	40	75	0	0	1.8%	0.7%	60.8
Existing plus Project		2	0	6,765	40	75	0	0	1.8%	0.7%	61.1
Future		2	0	6,765	40	75	0	0	1.8%	0.7%	61.1
Future with Project		2	0	7,156	40	75	0	0	1.8%	0.7%	61.3
W 1st Street w/o N Vermont											
Existing		2	0	6,974	40	75	0	0	1.8%	0.7%	61.2
Existing plus Project		2	0	6,974	40	75	0	0	1.8%	0.7%	61.2
Future		2	0	7,255	40	75	0	0	1.8%	0.7%	61.4
Future with Project		2	0	7,255	40	75	0	0	1.8%	0.7%	61.4

Segment	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
N Vermont Avenue n/o W 1st																									
Existing	####	1,926	1,456	239	95	14	3	21	9	65.1	74.8	80.0	-1.7	62.5	55.4	56.6	64.1	59.5	47.8	46.4	60.0	46.3	45.9	47.3	51.3
Existing plus Project	####	1,926	1,456	239	95	14	3	21	9	65.1	74.8	80.0	-1.7	62.5	55.4	56.6	64.1	59.5	47.8	46.4	60.0	46.3	45.9	47.3	51.3
Future	####	1,997	1,510	247	98	14	3	21	9	65.1	74.8	80.0	-1.7	62.6	55.5	56.7	64.2	59.6	47.9	46.5	60.1	46.4	46.1	47.5	51.5
Future with Project	####	1,997	1,510	247	98	14	3	21	9	65.1	74.8	80.0	-1.7	62.6	55.5	56.7	64.2	59.6	47.9	46.5	60.1	46.4	46.1	47.5	51.5
N Vermont Avenue s/o W 1st																									
Existing	####	1,766	1,335	219	87	13	3	19	8	65.1	74.8	80.0	-1.7	62.1	55.0	56.2	63.7	59.1	47.4	46.0	59.6	45.9	45.5	46.9	50.9
Existing plus Project	####	1,815	1,372	225	89	13	3	19	8	65.1	74.8	80.0	-1.7	62.2	55.1	56.3	63.8	59.2	47.5	46.1	59.7	46.0	45.6	47.1	51.1
Future	####	1,819	1,375	225	89	13	3	19	8	65.1	74.8	80.0	-1.7	62.2	55.1	56.3	63.8	59.2	47.5	46.1	59.7	46.0	45.7	47.1	51.1
Future with Project	####	1,868	1,412	232	92	13	3	20	8	65.1	74.8	80.0	-1.7	62.3	55.2	56.4	63.9	59.3	47.6	46.3	59.8	46.1	45.8	47.2	51.2
W 1st Street e/o N Vermont																									
Existing	4,953	810	612	100	40	6	1	9	4	67.4	76.3	81.2	-1.8	60.2	52.4	53.2	61.6	57.3	44.8	43.0	57.7	44.1	42.9	44.0	48.5
Existing plus Project	5,256	859	649	106	42	6	1	9	4	67.4	76.3	81.2	-1.8	60.5	52.6	53.5	61.8	57.5	45.1	43.3	57.9	44.3	43.2	44.2	48.7
Future	5,256	859	649	106	42	6	1	9	4	67.4	76.3	81.2	-1.8	60.5	52.6	53.5	61.8	57.5	45.1	43.3	57.9	44.3	43.2	44.2	48.7
Future with Project	5,560	909	687	113	45	7	1	10	4	67.4	76.3	81.2	-1.8	60.7	52.9	53.7	62.1	57.8	45.3	43.5	58.2	44.6	43.4	44.5	49.0
W 1st Street w/o N Vermont																									
Existing	5,419	886	670	110	43	6	1	9	4	67.4	76.3	81.2	-1.8	60.6	52.8	53.6	62.0	57.7	45.2	43.4	58.0	44.5	43.3	44.4	48.9
Existing plus Project	5,419	886	670	110	43	6	1	9	4	67.4	76.3	81.2	-1.8	60.6	52.8	53.6	62.0	57.7	45.2	43.4	58.0	44.5	43.3	44.4	48.9
Future	5,637	921	696	114	45	7	1	10	4	67.4	76.3	81.2	-1.8	60.8	52.9	53.8	62.1	57.8	45.4	43.6	58.2	44.6	43.5	44.5	49.0
Future with Project	5,637	921	696	114	45	7	1	10	4	67.4	76.3	81.2	-1.8	60.8	52.9	53.8	62.1	57.8	45.4	43.6	58.2	44.6	43.5	44.5	49.0

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name | rev. (Date)

Weekday AM Peak Hour Volumes

Intersection: 4

N Westmoreland Avenue & W 1st Street

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	N Westmoreland Avenue		W 1st Street	
Leg	North of	South of	East of	West of
Cross Street	W 1st Street		N Westmoreland Avenue	
Existing	3,267.0	418.0	5,329.5	6,451.5
Existing with Proj	4,620.0	418.0	5,907.0	7,227.0
Future	3,333.0	418.0	5,654.0	6,798.0
Future with Proje	4,686.0	418.0	6,231.5	7,573.5
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

N Westmoreland Avenue

Southbound

	right	through	left
Existing	261	6	100
Existing with Pro	325	6	148
Future	266	6	102
Future with Proje	330	6	150

W 1st Street

Eastbound

	left	through	right
Existing	132	380	15
Existing with Pro	209	380	15
Future	135	410	15
Future with Proje	212	410	15

N

W E

S

Westbound

	right	through	left
Existing	93	364	8
Existing with Pro	150	364	8
Future	95	389	8
Future with Proje	152	389	8

Northbound

	left	through	right
Existing	21	2	24
Existing with Pro	21	2	24
Future	21	2	24
Future with Proje	21	2	24

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor	Alpha Factor (1)	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
N Westmoreland Avenue n/o																																				
Existing		2	0	3,267	15	75	0	0	1.8%	0.7%	50.2	2,538	415	314	51	20	3	1	4	2	50.8	65.4	74.5	-1.8	45.1	42.8	47.9	50.5	42.1	35.3	37.7	44.1	28.9	33.4	38.7	40.1
Existing plus Project		2	0	4,620	15	75	0	0	1.8%	0.7%	51.7	3,590	587	444	73	29	4	1	6	3	50.8	65.4	74.5	-1.8	46.6	44.3	49.4	52.0	43.6	36.8	39.2	45.6	30.4	34.9	40.2	41.6
Future		2	0	3,333	15	75	0	0	1.8%	0.7%	50.3	2,590	423	320	52	21	3	1	5	2	50.8	65.4	74.5	-1.8	45.2	42.9	48.0	50.6	42.2	35.3	37.8	44.1	29.0	33.5	38.7	40.2
Future with Project		2	0	4,686	15	75	0	0	1.8%	0.7%	51.8	3,641	595	450	74	29	4	1	6	3	50.8	65.4	74.5	-1.8	46.6	44.4	49.5	52.1	43.7	36.8	39.3	45.6	30.5	34.9	40.2	41.7
N Westmoreland Avenue s/o																																				
Existing		2	0	418	15	75	0	0	1.8%	0.7%	41.3	325	53	40	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.1	33.9	39.0	41.6	33.2	26.3	28.8	35.1	20.0	24.5	29.7	31.2
Existing plus Project		2	0	418	15	75	0	0	1.8%	0.7%	41.3	325	53	40	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.1	33.9	39.0	41.6	33.2	26.3	28.8	35.1	20.0	24.5	29.7	31.2
Future		2	0	418	15	75	0	0	1.8%	0.7%	41.3	325	53	40	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.1	33.9	39.0	41.6	33.2	26.3	28.8	35.1	20.0	24.5	29.7	31.2
Future with Project		2	0	418	15	75	0	0	1.8%	0.7%	41.3	325	53	40	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.1	33.9	39.0	41.6	33.2	26.3	28.8	35.1	20.0	24.5	29.7	31.2
W 1st Street e/o N																																				
Existing		2	0	5,330	25	75	0	0	1.8%	0.7%	56.1	4,141	677	512	84	33	5	1	7	3	59.4	71.1	78.7	-1.8	53.6	48.4	52.1	56.6	50.6	40.8	41.9	51.5	37.4	39.0	42.8	45.1
Existing plus Project		2	0	5,907	25	75	0	0	1.8%	0.7%	56.6	4,590	750	567	93	37	5	1	8	3	59.4	71.1	78.7	-1.8	54.0	48.9	52.5	57.1	51.1	41.3	42.3	52.0	37.9	39.4	43.3	45.6
Future		2	0	5,654	25	75	0	0	1.8%	0.7%	56.4	4,393	718	543	89	35	5	1	8	3	59.4	71.1	78.7	-1.8	53.8	48.7	52.3	56.9	50.9	41.1	42.1	51.8	37.7	39.2	43.1	45.4
Future with Project		2	0	6,232	25	75	0	0	1.8%	0.7%	56.8	4,842	791	598	98	39	6	1	8	4	59.4	71.1	78.7	-1.8	54.3	49.1	52.7	57.3	51.3	41.5	42.6	52.2	38.1	39.6	43.5	45.8
W 1st Street w/o N																																				
Existing		2	0	6,452	25	75	0	0	1.8%	0.7%	56.9	5,013	819	619	102	40	6	1	9	4	59.4	71.1	78.7	-1.8	54.4	49.3	52.9	57.4	51.4	41.7	42.7	52.4	38.2	39.8	43.7	46.0
Existing plus Project		2	0	7,227	25	75	0	0	1.8%	0.7%	57.4	5,615	918	694	114	45	7	1	10	4	59.4	71.1	78.7	-1.8	54.9	49.7	53.4	57.9	51.9	42.2	43.2	52.9	38.7	40.3	44.1	46.4
Future		2	0	6,798	25	75	0	0	1.8%	0.7%	57.2	5,282	863	653	107	42	6	1	9	4	59.4	71.1	78.7	-1.8	54.6	49.5	53.1	57.7	51.7	41.9	42.9	52.6	38.5	40.0	43.9	46.2
Future with Project		2	0	7,574	25	75	0	0	1.8%	0.7%	57.6	5,885	962	727	119	47	7	2	10	4	59.4	71.1	78.7	-1.8	55.1	49.9	53.6	58.1	52.1	42.4	43.4	53.1	38.9	40.5	44.3	46.7

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Project Name rev. (Date)
Weekday PM Peak Hour Volumes

Intersection: 4
N Westmoreland Avenue & W 1st Street

If Peak Hour = 6% of ADT, Scaling Factor = 16.667
If Peak Hour = 7% of ADT, Scaling Factor = 14.286
If Peak Hour = 8% of ADT, Scaling Factor = 12.5
If Peak Hour = 9% of ADT, Scaling Factor = 11.111
If Peak Hour = 10% of ADT, Scaling Factor = 10

ADT

Road	N Westmoreland Avenue		W 1st Street	
Leg	North of	South of	East of	West of
Cross Street	W 1st Street		N Westmoreland Avenue	
Existing	1,908.5	456.5	5,604.5	6,781.5
Existing with Proj	2,695.0	561.0	5,896.0	7,172.0
Future	1,952.5	456.5	5,978.5	7,177.5
Future with Proje	2,634.5	456.5	6,270.0	7,568.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0
	0.0	0.0	0.0	0.0

N Westmoreland Avenue

Southbound

	right	through	left
Existing	131	2	32
Existing with Pro	169	21	61
Future	134	2	33
Future with Proje	172	2	62

W 1st Street

Eastbound

	left	through	right
Existing	144	607	24
Existing with Pro	177	607	24
Future	147	641	24
Future with Proje	180	641	24

N
W E
S

Westbound

	right	through	left
Existing	30	314	19
Existing with Pro	54	314	19
Future	31	346	19
Future with Proje	55	346	19

Northbound

	left	through	right
Existing	13	8	17
Existing with Pro	13	8	17
Future	13	8	17
Future with Proje	13	8	17

2

NOISE LEVEL CONTOURS - Existing Plus Project Weekday Off-Site ADT Volumes

ROADWAY NAME Segment	Land Use	Lanes	Median Width	ADT Volume	Design Speed (mph)	Dist. from Center to Receptor	Alpha Factor (1)	Barrier Attn. dB(A)	Vehicle Mix Medium Trucks	Vehicle Mix Heavy Trucks	dB(A) CNEL	Traffic Volumes Day	Eve	Night	MTd	HTd	MTe	HTe	MTn	HTn	Ref. Energy Levels A	MT	HT	Dist Adj	Ld A	MT	HT	Total	Le A	MT	HT	Total	Ln A	MT	HT	Total
N Westmoreland Avenue n/o																																				
Existing		2	0	1,909	15	75	0	0	1.8%	0.7%	47.9	1,483	242	183	30	12	2	0	3	1	50.8	65.4	74.5	-1.8	42.7	40.5	45.6	48.2	39.8	32.9	35.4	41.7	26.6	31.0	36.3	37.8
Existing plus Project		2	0	2,695	15	75	0	0	1.8%	0.7%	49.4	2,094	342	259	42	17	2	1	4	2	50.8	65.4	74.5	-1.8	44.2	42.0	47.1	49.7	41.3	34.4	36.9	43.2	28.1	32.5	37.8	39.3
Future		2	0	1,953	15	75	0	0	1.8%	0.7%	48.0	1,517	248	187	31	12	2	0	3	1	50.8	65.4	74.5	-1.8	42.8	40.6	45.7	48.3	39.9	33.0	35.5	41.8	26.7	31.1	36.4	37.9
Future with Project		2	0	2,635	15	75	0	0	1.8%	0.7%	49.3	2,047	335	253	41	16	2	1	4	1	50.8	65.4	74.5	-1.8	44.1	41.9	47.0	49.6	41.2	34.3	36.8	43.1	28.0	32.4	37.7	39.2
N Westmoreland Avenue s/o																																				
Existing		2	0	457	15	75	0	0	1.8%	0.7%	41.7	355	58	44	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.5	34.3	39.3	42.0	33.5	26.7	29.2	35.5	20.4	24.8	30.1	31.6
Existing plus Project		2	0	561	15	75	0	0	1.8%	0.7%	42.6	436	71	54	9	3	1	0	1	0	50.8	65.4	74.5	-1.8	37.4	35.2	40.2	42.9	34.4	27.6	30.1	36.4	21.2	25.7	31.0	32.5
Future		2	0	457	15	75	0	0	1.8%	0.7%	41.7	355	58	44	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.5	34.3	39.3	42.0	33.5	26.7	29.2	35.5	20.4	24.8	30.1	31.6
Future with Project		2	0	457	15	75	0	0	1.8%	0.7%	41.7	355	58	44	7	3	0	0	1	0	50.8	65.4	74.5	-1.8	36.5	34.3	39.3	42.0	33.5	26.7	29.2	35.5	20.4	24.8	30.1	31.6
W 1st Street e/o N																																				
Existing		2	0	5,605	25	75	0	0	1.8%	0.7%	56.3	4,355	712	538	88	35	5	1	8	3	59.4	71.1	78.7	-1.8	53.8	48.6	52.3	56.8	50.8	41.1	42.1	51.8	37.6	39.2	43.0	45.3
Existing plus Project		2	0	5,896	25	75	0	0	1.8%	0.7%	56.5	4,581	749	566	93	37	5	1	8	3	59.4	71.1	78.7	-1.8	54.0	48.9	52.5	57.1	51.0	41.3	42.3	52.0	37.9	39.4	43.3	45.6
Future		2	0	5,979	25	75	0	0	1.8%	0.7%	56.6	4,645	759	574	94	37	5	1	8	3	59.4	71.1	78.7	-1.8	54.1	48.9	52.6	57.1	51.1	41.3	42.4	52.0	37.9	39.5	43.3	45.6
Future with Project		2	0	6,270	25	75	0	0	1.8%	0.7%	56.8	4,872	796	602	99	39	6	1	8	4	59.4	71.1	78.7	-1.8	54.3	49.1	52.8	57.3	51.3	41.5	42.6	52.2	38.1	39.7	43.5	45.8
W 1st Street w/o N																																				
Existing		2	0	6,782	25	75	0	0	1.8%	0.7%	57.1	5,269	861	651	107	42	6	1	9	4	59.4	71.1	78.7	-1.8	54.6	49.5	53.1	57.7	51.7	41.9	42.9	52.6	38.5	40.0	43.9	46.2
Existing plus Project		2	0	7,172	25	75	0	0	1.8%	0.7%	57.4	5,573	911	689	113	45	7	1	10	4	59.4	71.1	78.7	-1.8	54.9	49.7	53.3	57.9	51.9	42.1	43.2	52.8	38.7	40.3	44.1	46.4
Future		2	0	7,178	25	75	0	0	1.8%	0.7%	57.4	5,577	912	689	113	45	7	1	10	4	59.4	71.1	78.7	-1.8	54.9	49.7	53.4	57.9	51.9	42.1	43.2	52.8	38.7	40.3	44.1	46.4
Future with Project		2	0	7,568	25	75	0	0	1.8%	0.7%	57.6	5,880	961	727	119	47	7	2	10	4	59.4	71.1	78.7	-1.8	55.1	49.9	53.6	58.1	52.1	42.4	43.4	53.1	38.9	40.5	44.3	46.6

(1) Alpha Factor: Coefficient of absorption relating to the effects of the ground surface. An alpha factor of 0 indicates that the site is an acoustically "hard" site such as aspalt. An alpha factor of 0.5 indicates that the site is an acoustically "soft" site such as vegetative ground cover.

Assumed 24-Hour Traffic Distribution:	Day	Evening	Night
Total ADT Volumes	77.70%	12.70%	9.60%
Medium-Duty Trucks	87.43%	5.05%	7.52%
Heavy-Duty Trucks	89.10%	2.84%	8.06%

Attachment 3

Construction Noise Worksheets

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat(########
Case Descr Everest Value Schools_Demolition

---- Receptor #1 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Central City	Residential	59.9	59.9	59.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	33	0
Dozer	No	40		81.7	33	0
Tractor	No	40	84		33	0
Tractor	No	40	84		33	0

	Calculated (dBA)	
Equipment	*Lmax	Leq
Concrete Saw	93.2	86.2
Dozer	85.3	81.3
Tractor	87.6	83.6
Tractor	87.6	83.6
Total	93.2	90.1

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Virgil Midd	Residential	59.9	59.9	59.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	475	0
Dozer	No	40		81.7	475	0
Tractor	No	40	84		475	0
Tractor	No	40	84		475	0

	Calculated (dBA)	
Equipment	*Lmax	Leq
Concrete Saw	70	63
Dozer	62.1	58.1
Tractor	64.4	60.5
Tractor	64.4	60.5
Total	70	66.9

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat(########
Case Descr Everest Value Schools_Grading

---- Receptor #1 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Central City	Residential	59.9	59.9	59.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	33	0
Dozer	No	40		81.7	33	0
Tractor	No	40	84		33	0
Tractor	No	40	84		33	0

	Calculated (dBA)	
Equipment	*Lmax	Leq
Concrete Saw	93.2	86.2
Dozer	85.3	81.3
Tractor	87.6	83.6
Tractor	87.6	83.6
Total	93.2	90.1

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Virgil Midd	Residential	59.9	59.9	59.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Saw	No	20		89.6	475	0
Dozer	No	40		81.7	475	0
Tractor	No	40	84		475	0
Tractor	No	40	84		475	0

Calculated (dBA)

Equipment	*Lmax	Leq
Concrete Saw	70	63
Dozer	62.1	58.1
Tractor	64.4	60.5
Tractor	64.4	60.5
Total	70	66.9

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat ########
Case Descr Everest Value Schools_BuildingConstruction

---- Receptor #1 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Central City	Residential	59.9	59.9	59.9

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Crane	No	16		80.6	33	0
Forklift	No	40	85		33	0
Forklift	No	40	85		33	0
Tractor	No	40	84		33	0
Tractor	No	40	84		33	0

		Calculated (dBA)	
Equipment		*Lmax	Leq
Crane		84.2	76.2
Forklift		88.6	84.6
Forklift		88.6	84.6
Tractor		87.6	83.6
Tractor		87.6	83.6
	Total	88.6	90.3

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

Baselines (dBA)

Descriptior	Land Use	Daytime	Evening	Night
Virgil Midd	Residential	59.9	59.9	59.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Crane	No	16		80.6	475	0
Forklift	No	40	85		475	0
Forklift	No	40	85		475	0
Tractor	No	40	84		475	0
Tractor	No	40	84		475	0

Calculated (dBA)

Equipment	*Lmax	Leq
Crane	61	53
Forklift	65.4	61.5
Forklift	65.4	61.5
Tractor	64.4	60.5
Tractor	64.4	60.5
Total	65.4	67.2

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat ########
Case Descr Everest Value Schools_Paving

---- Receptor #1 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Central City	Residential	59.9	59.9	59.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	33	0
Concrete Mixer Truck	No	40		78.8	33	0
Concrete Mixer Truck	No	40		78.8	33	0
Concrete Mixer Truck	No	40		78.8	33	0
Paver	No	50		77.2	33	0
Roller	No	20		80	33	0
Tractor	No	40	84		33	0

Calculated (dBA)

Equipment	*Lmax	Leq
Concrete Mixer Truck	82.4	78.4
Concrete Mixer Truck	82.4	78.4
Concrete Mixer Truck	82.4	78.4
Concrete Mixer Truck	82.4	78.4
Paver	80.8	77.8
Roller	83.6	76.6
Tractor	87.6	83.6
Total	87.6	87.9

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

	Baselines (dBA)		
Descriptior Land Use	Daytime	Evening	Night
Virgil Midd Residential	59.9	59.9	59.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Concrete Mixer Truck	No	40		78.8	475	0
Concrete Mixer Truck	No	40		78.8	475	0
Concrete Mixer Truck	No	40		78.8	475	0
Concrete Mixer Truck	No	40		78.8	475	0
Paver	No	50		77.2	475	0
Roller	No	20		80	475	0
Tractor	No	40	84		475	0

Calculated (dBA)

Equipment	*Lmax	Leq
Concrete Mixer Truck	59.2	55.3
Concrete Mixer Truck	59.2	55.3
Concrete Mixer Truck	59.2	55.3
Concrete Mixer Truck	59.2	55.3
Paver	57.7	54.7
Roller	60.4	53.5
Tractor	64.4	60.5
Total	64.4	64.7

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report dat(	########
Case Descr	Everest Value Schools_ArchitecturalCoating

---- Receptor #1 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Central Cit)	Residential	59.9	59.9	59.9

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	33	0

	Calculated (dBA)	
Equipment	*Lmax	Leq
Compressor (air)	81.3	77.3
Total	81.3	77.3

*Calculated Lmax is the Loudest value.

---- Receptor #2 ----

		Baselines (dBA)		
Descriptior	Land Use	Daytime	Evening	Night
Virgil Midd	Residential	59.9	59.9	59.9

			Equipment			
			Spec	Actual	Receptor	Estimated
	Impact		Lmax	Lmax	Distance	Shielding
Description	Device	Usage(%)	(dBA)	(dBA)	(feet)	(dBA)
Compressor (air)	No	40		77.7	475	0

	Calculated (dBA)	
Equipment	*Lmax	Leq
Compressor (air)	58.1	54.1
Total	58.1	54.1

*Calculated Lmax is the Loudest value.

Attachment 4

Construction Vibration Worksheets

Everest Value High School
Construction Vibration Model
(33 feet)

Equipment		Pieces of Equipment	PPV at 25 feet (in/sec)	Distance from Equipment	PPV at adjusted distance	RMS velocity amplitude in in/sec at adjusted distance[a]	RMS Vibration level in VdB at adjusted distance
Caisson drilling		1	0.089	33	0.059	0.015	83
Jackhammer		1	0.035	33	0.023	0.006	75
Large bulldozer		1	0.089	33	0.059	0.015	83
Loaded trucks		1	0.076	33	0.050	0.013	82
Pile Drive (impact)		1	0.644	33	0.425	0.106	101
Vibratory Roller		1	0.210	33	0.138	0.035	91
Small bulldozer		1	0.003	33	0.002	0.000	54

*** Suggested Vibration Thresholds per the Federal Transit Administration, United States Department of Transportation, Transit Noise and Vibration Impact Assessment (FTA-VA-90-1003-06), May 2006, pg. 12-12.**

-Fragile Buildings- 0.20 in/sec