Appendix I: Noise Study

Noise Impact Analysis
Grand Park Specific Plan
City of Ontario, California

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LIST OF ACRONYMS AND ABBREVIATIONS

ADT	average daily traffic
ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dB	decibel
dBA	A-weighted decibel
dBA/DD	A-weighted decibel per each doubling of distance
DOT	Department of Transportation
FAA	Federal Aviation Administration
FHWA	Federal Highway Administration
FICON	Federal Interagency Committee on Noise
FTA	Federal Transit Administration
Hz	Hertz
L_{dn}	Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
L_V	Vibration Level
MBA	Michael Brandman Associates
ONAC	Federal Office of Noise Abatement Control
ONC	California Department of Health Services Office of Noise Control
OSHA	Occupational Safety and Health Administration
PPV	peak particle velocity
RMS	root mean square
SEL	Single Event Level
sq ft	square feet
UMTA	Urban Mass Transit Administration
VdB	L_V at 1 microinch per second

SECTION 1: INTRODUCTION

1.1 - Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared by Michael Brandman Associates (MBA) to determine the offsite and onsite noise impacts associated with the proposed Grand Park Specific Plan project. The following is provided in this report:

- A description of the study area, project site, and proposed project.
- Information regarding the fundamentals of noise.
- Information regarding the fundamentals of vibration.
- A description of the local noise guidelines and standards.
- An evaluation of the existing noise environment.
- An analysis of the potential short-term construction-related noise and vibration impacts from the proposed project.
- An analysis of long-term operations-related noise and vibration impacts from the proposed project.

1.2 - Project Location and Study Area

The approximately 320-acre project site is located south of Edison Avenue, west of Haven Avenue, north of Eucalyptus Avenue (future Merrill Avenue), and east of Archibald Avenue in the City of Ontario, San Bernardino County, California. Regional access to the project site is provided via the Ontario Freeway (Interstate 15) located approximately 1.5 miles east of the site, Euclid Avenue (State Route 83) located approximately 3.3 miles west of the site, and the Pomona Freeway (State Route 60), approximately 2.3 miles to the north (Exhibit 1). Other primary roadways in the vicinity of the site include Riverside Drive to the north, South Milliken Avenue and Hamner Avenue to the east, and Remington Avenue to the south. In addition, the Cucamonga Creek Channel, which flows south into the Prado Flood Control Basin, is located west of the site. As shown in Exhibit 2), the site is located within the Grand Park Specific Plan area and within the New Model Colony of the City of Ontario, approximately ten miles south of the San Gabriel Mountains and four miles north of the Santa Ana River.

The project site consists of the following 11 parcels (APN 0218-241-06, 0218-241-10, 0218-241-11, 0218-241-13, 0218-241-14, 0218-241-15, 0218-241-16, 0218-241-19, 0218-241-20, 0218-241-22, 0218-241-23) on approximately 320 acres of land, as illustrated Exhibit 2. Exhibit 3 designates the project site as Residential-Low Density (2.1-5 DU/ac), Residential-Medium Density (11.1-25 DU/ac), Public School and Open Space-Parkland.

The site currently is characterized by agricultural land with residential homes, two dairy barns, garage, shed, swimming pool, and several agriculture-related structures. Specifically, one parcel on the west end of the project site (APN 0218-241-06), bordered by Edison Avenue to the north, Archibald Avenue to the west, Eucalyptus Avenue to the south, and other operating dairy farms to the east, is currently an active dairy farm with a large stock of cattle grazing pastures, feed lots, agricultural areas, manure spreading basins, and many smaller auxiliary features. A small farmhouse and several associated farm buildings are also present on portions of the project site. The parcels (APN 0218-241-19, 0218-241-20) on the east side of the site, bordered by Edison Avenue to the north, Eucalyptus Avenue and another dairy farm to the south, Haven Avenue to the east, and other operating farms to the west include agricultural ranching and dairy farms. Surrounding land uses include agricultural and/or livestock ranching in all directions.

1.3 - Project Description

Distinguished Homes (the "Applicant") proposes the Grand Park Specific Plan (the "proposed project") within the New Model Colony on an approximately 320-acre site in the City of Ontario. The Specific Plan is intended to carry out the goals and polices of The Ontario Plan (TOP). The proposed project would develop a residential community within a larger master planned community by providing a broad array of spaces, including residential neighborhoods, parks and recreational facilities, and schools. Specifically, existing agricultural uses would be removed and the site would be with a variety of housing types including single- and multi-family dwelling units, an elementary school, a high school, and the City of Ontario "Grand Park." Upon build-out of the Specific Plan, the project site would be developed with up to 1,327 residential units in a variety of housing types and densities on approximately 107 acres, an approximately 10.2-acre (net) elementary school, an approximately 50.1-acre (net) high school site, and approximately 130.5 acres (net) for the "Grand Park." The specific land uses proposed within the Specific Plan area are summarized in Table 1. The proposed land use plan is shown in Exhibit 3

Table 1: Summary of Proposed Specific Plan Land Uses

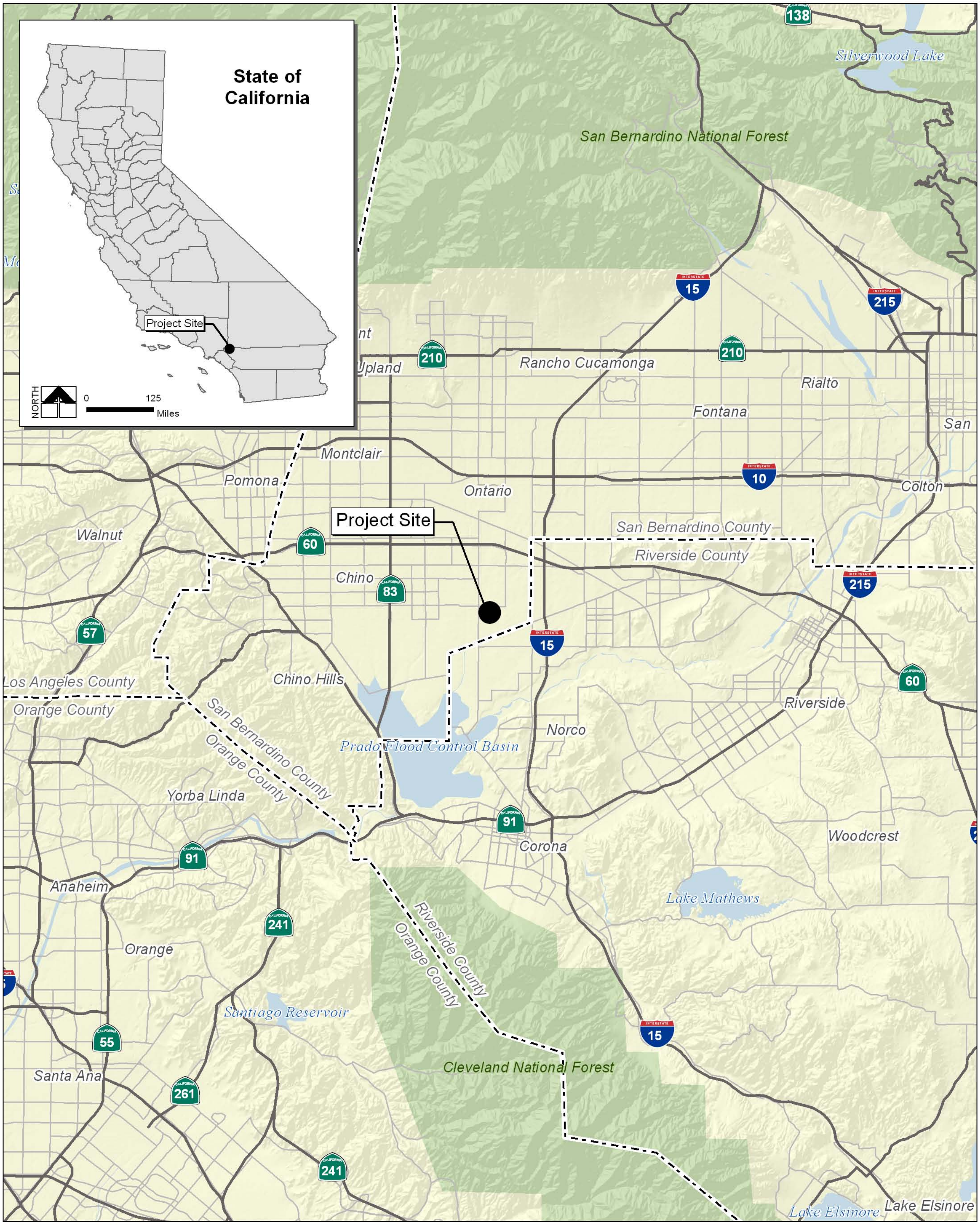
Land Use	Dwelling Units (DU)	Gross Acres	Gross Density - Dwelling Units Per Acre
Residential Uses			
PA 1 (MDR)[2]	99	7.0	14.1
PA 2 (LDR)[3]	122	12.6	9.8
PA 3 (MDR)[3]	157	10.9	14.4
PA 4 (LDR)[3]	145	13.9	10.4

Table 1 (cont.): Summary of Proposed Specific Plan Land Uses

Land Use	Dwelling Units (DU)	Gross Acres	Gross Density - Dwelling Units Per Acre
PA 5 (LDR)[3]	105	13.2	8.0
PA 6 (LDR)[3]	111	17.6	6.3
PA 7 (HDR)[4]	268	14.9	18.0
PA 8 (HDR) [4]	319	16.5	19.3
Residential Uses Total	**1,327**	**106.6[1]**	**12.4**
Other Uses			
PA 9 (Elementary School)	—	10.2[5]	—
PA 10 (High School)	—	50.1[5]	—
Grand Park	—	130.5[5]	—
Roadways	—	22.8[5]	—
Other Uses Total	—	213.6[5]	—
Project Total	**1,327**	**320.2**	**12.4**

Notes:
1. Gross Acres: Calculated to street centerline and includes Pocket Parks and Paseos
2. Medium Density Residential
3. Low Density Residential
4. High Density Residential
5. Net Acres

Source: Grand Park Specific Plan, 2012.



Source: Census 2000 Data, The CaSIL, MBA GIS 2013.

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NORTH

5 2.5 0 5 Miles

Exhibit 1
Regional Location Map

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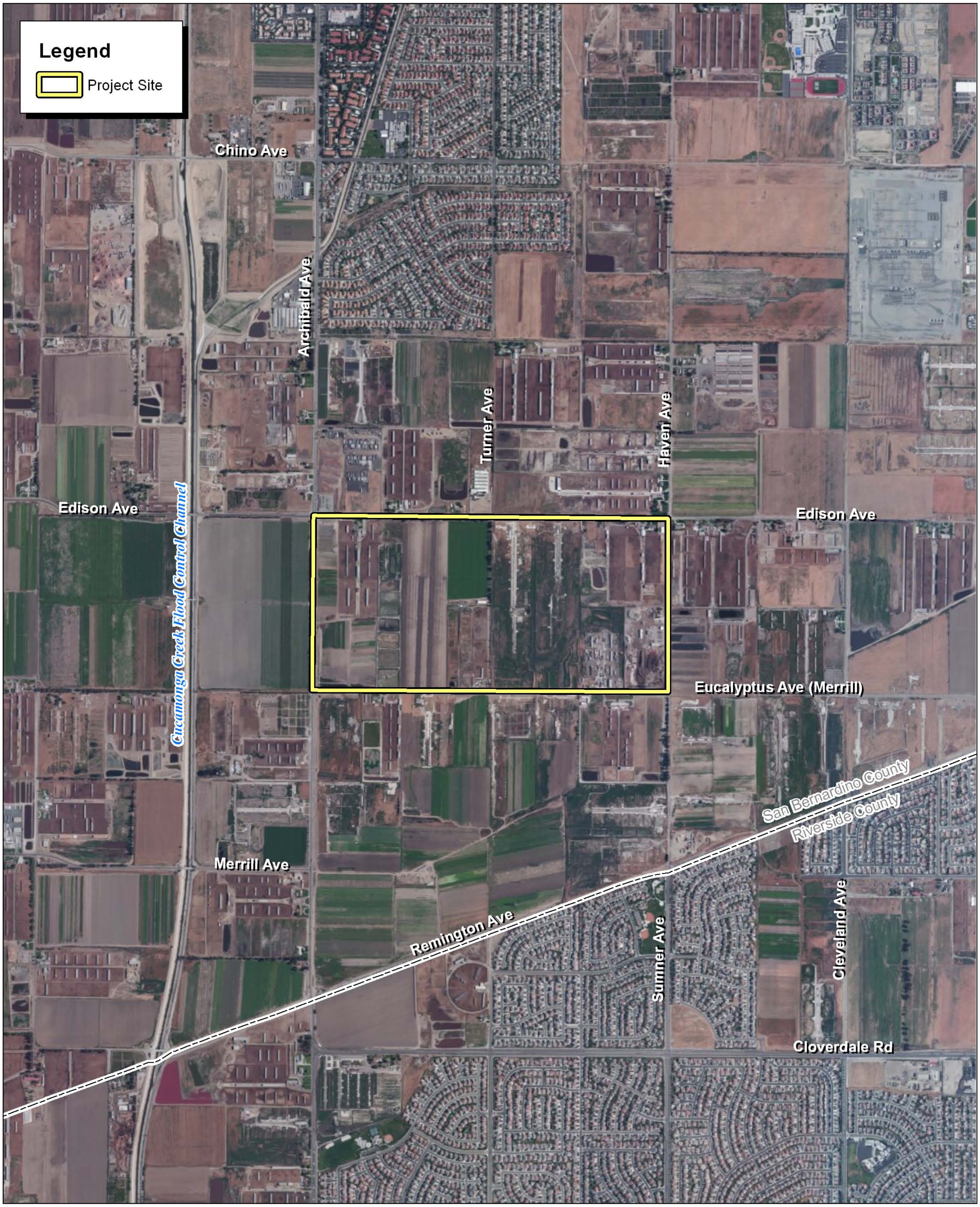
CITY OF ONTARIO • GRAND PARK SPECIFIC PLAN
NOISE IMPACT ANALYSIS



Source: ESRI World Imagery.

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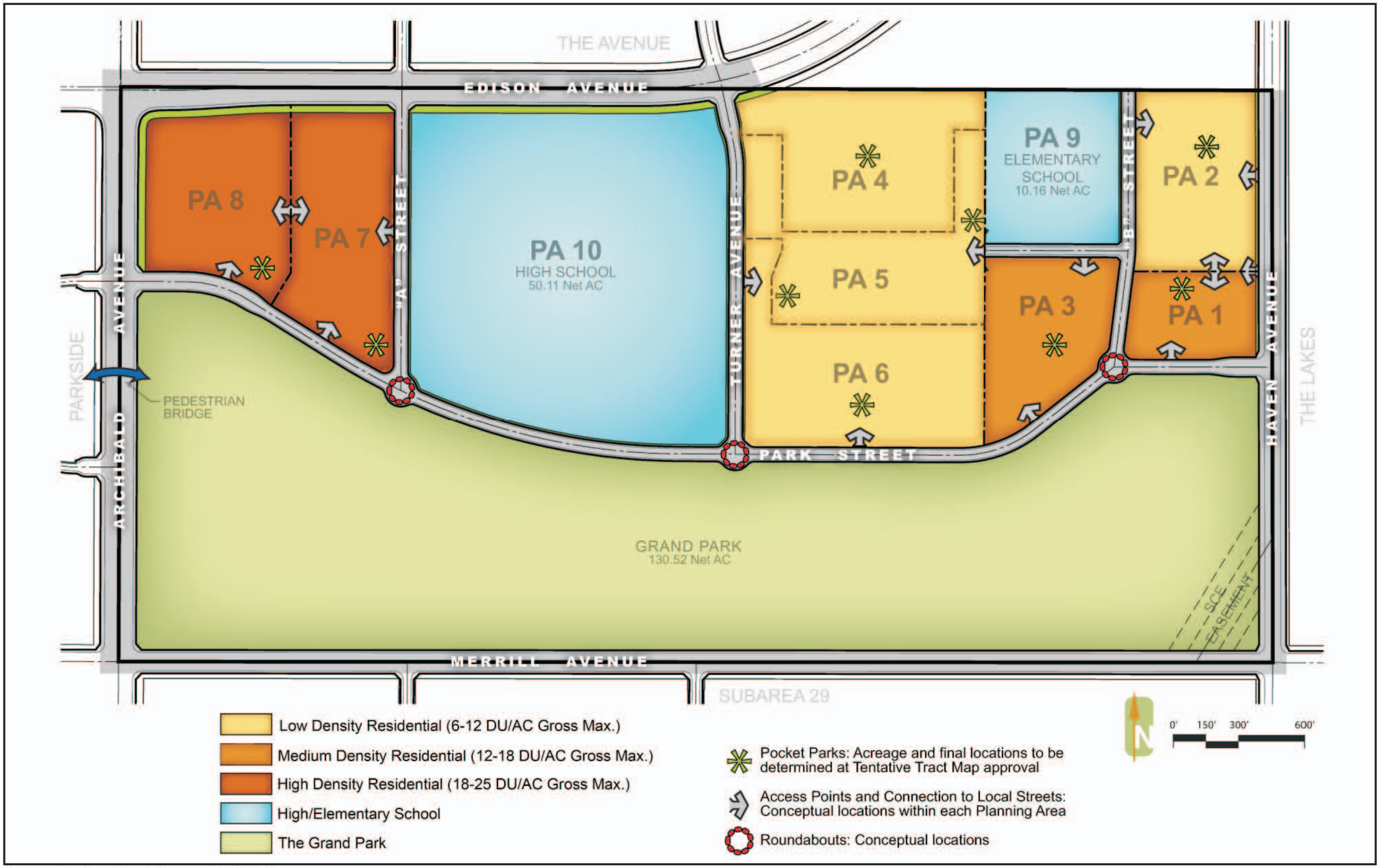
NORTH

2,000 1,000 0 2,000 Feet

Exhibit 2
Local Vicinity Map
Aerial Base



Source: Distinguished Homes, April 2012.

Michael Brandman Associates

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Exhibit 3
Proposed Land Use Plan

SECTION 2: NOISE FUNDAMENTALS

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit, which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies that are audible to the human ear.

2.1 - Noise Descriptors

Noise equivalent sound levels are not measured directly, but are calculated from sound pressure levels typically measured in dBA. The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour L_{eq} is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Sound Level (L_{dn}) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time-of-day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. While the Community Noise Equivalent Level (CNEL) is similar to the L_{dn}, except that it has another addition of 4.77 dB to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these times because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason the sound is perceived to be louder in the evening and nighttime hours and is weighted accordingly. Many cities rely on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

Another noise descriptor that is used primarily for the assessment of aircraft noise impacts is the Sound Exposure Level, which is also called the Single Event Level (SEL). The SEL descriptor represents the acoustic energy of a single event (i.e., an aircraft overflight) normalized to one-second event duration. This is useful for comparing the acoustical energy of different events involving different durations of the noise sources. The SEL is based on an integration of the noise during the period when the noise first rises within 10 dBA of its maximum value and last falls below 10 dBA of its maximum value. The SEL is often 10 dBA greater, or more, than the L_{MAX} since the SEL logarithmetically adds the L_{eq} for each second of the duration of the noise.

2.2 - Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown the humans are more perceptible to changes in noise levels of a pure tone (Caltrans 1998). For a noise source to contain a "pure tone," there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to "stand out" against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contagious one-third octave bands by: 5 dB for center frequencies of 500 Hertz (Hz) and above; by 8 dB for center frequencies between 160 and 400 Hz; and by 15 dB for center frequencies of 125 Hz or less (Department of Health Services 1977).

2.3 - Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

2.4 - Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models: soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. To be conservative, hard-site conditions were used in this analysis.

2.5 - Traffic Noise Prediction

The level of traffic noise depends on the three primary factors: (1) the volume of the traffic, (2) the speed of the traffic, and (3) the number of trucks in the flow of traffic. Generally, the loudness of traffic noise is increased by heavier traffic volumes, higher speeds, and greater number of trucks. Vehicle noise is a combination of the noise produced by the engine, exhaust, and tires. Because of the logarithmic nature of traffic noise levels, a doubling of the traffic volume (assuming that the speed and truck mix do not change) results in a noise level increase of 3 dBA. Based on the FHWA community noise assessment criteria, this change is "barely perceptible," for reference a doubling of perceived noise levels would require an increase of approximately 10 dBA. However, the 1992 findings of Federal Interagency Committee on Noise (FICON), which assessed changes in ambient noise levels resulting from aircraft operations, found that noise increases as low as 1.5 dB can cause annoyance, when the existing noise levels are already greater than 65 dB. The truck mix on a given roadway also has an effect on community noise levels. As the number of heavy trucks increases and becomes a larger percentage of the vehicle mix, adjacent noise levels increase.

2.6 - Noise Barrier Attenuation

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. For a noise barrier to work, it must be high enough and long enough to block the view of a road. A noise barrier is most effective when placed close to the noise source or receiver. A noise barrier can achieve a 5-dBA noise level reduction when it is tall enough to break the line-of-sight. When the noise barrier is a berm instead of a wall, the noise attenuation can be increased by another 3 dBA.

SECTION 3: GROUNDBORNE VIBRATION FUNDAMENTALS

Groundborne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of groundborne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although groundborne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Groundborne noise is an effect of groundborne vibration and only exists indoors, since it is produced from noise radiated from the motion of the walls and floors of a room and may consist of the rattling of windows or dishes on shelves.

3.1 - Vibration Descriptors

Several different methods are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (RMS) amplitude of the vibration velocity. Because of the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as L_V and is based on the RMS velocity amplitude. A commonly used abbreviation is VdB, which in this text, is when vibration level (L_V) is based on the reference quantity of 1 microinch per second.

3.2 - Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Offsite sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible groundborne noise or vibration.

3.3 - Vibration Propagation

The propagation of groundborne vibration is not as simple to model as airborne noise. This is because noise in the air travels through a relatively uniform median, while groundborne vibrations travel through the earth, which may contain significant geological differences. There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

3.4 - Construction-Related Vibration Level Prediction

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the construction site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage at the highest levels. Table 2 gives approximate vibration levels for particular construction activities. The data in Table 2 provides a reasonable estimate for a wide range of soil conditions.

Table 2: Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level (L_V) at 25 feet
Pile driver (impact)	1.518 (upper range) 0.644 (typical)	112 104
Pile driver (sonic)	0.734 upper range 0.170 typical	105 93
Clam shovel drop (slurry wall)	0.202	94
Hydromill (slurry wall)	0.008 in soil 0.017 in rock	66 75
Vibratory Roller	0.210	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58
Source: Transit Noise and Vibration Impact Assessment, Federal Transit Administration, May 2006.		

The Federal Transit Administration Report[1] outlines guidelines for assessing the impact of vibration from construction activities on nearby buildings. The guidelines determine impact threshold levels that should be considered based on the age and/or condition of the structures and the level of vibration that could potentially cause damage to the structural integrity of those structures:

- Project construction activities would cause a ground-borne vibration level to exceed 0.2 inches/second peak particle velocity at non-engineered timber and masonry structures;
- Project construction activities would cause a ground-borne vibration level to exceed 0.3 inches/second peak particle velocity at engineered concrete and masonry (no plaster) buildings;
- Project construction activities would cause a ground-borne vibration level to exceed 0.12 inches/second peak particle velocity at buildings extremely susceptible to vibration damage, such as historic buildings; or
- Project construction activities would cause a ground-borne vibration level to exceed 0.5 inch/second peak particle velocity at reinforced-concrete, steel, or timber (no plaster) structures.

[1] U.S. Department of Transportation, Federal Transit Administration, "Transit Noise and Vibration Impact Assessment," May 2006.

SECTION 4: REGULATORY SETTING

The proposed project will be located in the City of Ontario. Noise regulations are addressed through the efforts of various federal, State, and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 - Federal Regulations

The adverse impact of noise was officially recognized by the federal government in the Noise Control Act of 1972, which serves three purposes:

- Promulgating noise emission standards for interstate commerce.
- Assisting state and local abatement efforts.
- Promoting noise education and research.

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency limits noise exposure of workers to 90 dB L_{eq} or less for 8 continuous hours or 105 dB L_{eq} or less for 1 continuous hour. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that “noise sensitive” uses are either prohibited from being sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation sources, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

4.2 - State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. The City of Ontario version is shown in Exhibit 4, which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302 mandates that the legislative body of each county and city in California adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable.

Land Use Categories		Community Noise Equivalent Level (CNEL)						
Category	**Land Use**	**55**	**60**	**65**	**70**	**75**	**80**	
Residential/ Lodging	Single Family / Duplex	Green	Green	Yellow	Orange	Red	Red	Red
	Multi-Family	Green	Green	Yellow	Orange	Orange	Red	Red
	Mobile Homes	Green	Green	Yellow	Red	Red	Red	Red
	Hotel/Motels	Green	Green	Green	Yellow	Orange	Orange	Red
Public/Institutional	Schools/Hospitals	Green	Green	Yellow	Orange	Red	Red	Red
	Churches/ Libraries	Green	Green	Yellow	Orange	Red	Red	Red
	Auditoriums/Concert Halls	Green	Yellow	Orange	Orange	Red	Red	Red
Commercial	Offices	Green	Green	Green	Yellow	Yellow	Orange	Red
	Retail	Green	Green	Green	Green	Yellow	Orange	Red
Industrial	Manufacturing	Green	Green	Green	Green	Yellow	Orange	Orange
	Warehousing	Green	Green	Green	Green	Yellow	Yellow	Orange
Recreational/ Open Space	Parks/Playgrounds	Green	Green	Green	Yellow	Orange	Red	Red
	Golf Courses/ Riding Stables	Green	Green	Green	Yellow	Orange	Red	Red
	Outdoor Spectator Sports	Green	Green	Yellow	Orange	Orange	Red	Red
	Outdoor Music Shells/ Amphitheaters	Yellow	Yellow	Orange	Red	Red	Red	Red
	Livestock/Wildlife Preserves	Green	Green	Green	Green	Orange	Red	Red
	Crop Agriculture	Green	Green	Green	Green	Green	Green	Green

LEGEND

Green	**Clearly Acceptable:**	No special noise insulation required, assuming buildings of normal conventional construction.
Yellow	**Normally Acceptable:**	Acoustical reports will be required for major new residential construction. Conventional construction with closed windows and fresh air supply systems of air conditioning will normally suffice.
Orange	**Normally Unacceptable:**	New construction should be discouraged. Noise/aviation easements required for all new construction. If new construction does proceed, a detailed analysis of noise reduction requirements must be made and necessary noise insulation features included.
Red	**Clearly Unacceptable:**	No new construction should be permitted.

Note: For noise compatibility criteria and contours for Ontario International Airport refer to the adopted ALUCP for ONT.

Source: City of Ontario

Michael Brandman Associates

Exhibit 4
Community Noise and Land Use Compatibility

4.2.1 - City of Ontario Municipal Code

The City of Ontario Municipal Code (CCMC), Chapter 29, Noise, provides exterior/interior noise standards and specific noise restrictions, exemptions, variances for exterior point and stationary noise sources, and ground borne vibration limits. Several of these requirements are applicable to the proposed project and are discussed below.

Sec. 5-29.04. Exterior noise standards.

(a) The following exterior noise standards, unless otherwise specifically indicated, shall apply to all properties within a designated noise zone (see Table 3).

Table 3: Maximum Exterior Noise Levels

Type of Land Use/Noise Zone	Maximum Allowable Noise Levels, L_{eq} (dBA) Exterior 7:00 a.m. to 10:00 p.m.	Maximum Allowable Noise Levels, L_{eq} (dBA) Exterior 10:00 p.m. to 7:00 a.m.
Single Family Residential / Noise Zone I	65	45
Multi-family residential and mobile home parks/ Noise Zone II	65	50
Commercial Property/Noise Zone III	65	60
Residential Portion of Mixed Use/Noise Zone IV	70	70
Manufacturing and Industrial, Other Uses/Noise Zone V	70	70

Source: City of Ontario Municipal Code, Section 5-29.04.

(1) If the ambient noise level exceeds the resulting standard, the ambient noise level shall be the standard.

(2) Measurements for compliance are made on the affected property pursuant to § 5-29.15.

(b) It is unlawful for any person at any location within the incorporated area of the City to create noise, or to allow the creation of any noise on property owned, leased, occupied or otherwise controlled by such person, which noise causes the noise level, when measured at any location on any other property, to exceed either of the following:

(1) The noise standard for the applicable zone for any fifteen-minute (15) period; and

(2) A maximum instantaneous (single instance) noise level equal to the value of the noise standard plus twenty (20) dBA for any period of time (measured using A-weighted slow response).

(c) In the event the ambient noise level exceeds the noise standard, the maximum allowable noise level under such category shall be increased to reflect the maximum ambient noise level.

(d) The Noise Zone IV standard shall apply to that portion of residential property falling within one hundred (100) feet of a commercial property or use, if the noise originates from that commercial property or use.

(e) If the measurement location is on a boundary between two (2) different noise zones, the lower noise level standard applicable to the noise zone shall apply.

Sec. 5-29.06. Exemptions.

The following activities shall be exempted from the provisions of this chapter:

(d) Noise sources associated with construction, repair, remodeling, demolition or grading of any real property. Such activities shall instead be subject to the provisions of § 5-29.09

Sec. 5-29.09. Construction activity noise regulations.

a) No person, while engaged in construction, remodeling, digging, grading, demolition or any other related building activity, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, on any weekday except between the hours of 7:00 a.m. and 6:00 p.m. or on Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m.

Ground-Borne Vibration

In accordance with the City of Ontario Municipal Code, vibration shall not be detectable beyond the property line of the site from which the vibration is emanating, but this applies to ground-borne vibrations from long-term operations activities (on-site, stationary sources), not construction. Therefore, Federal Transit Administration (FTA) criteria (as described previously in Section 3.4) are use to access the Project construction related vibration impacts.

SECTION 5: EXISTING NOISE CONDITIONS

To determine the existing noise level environment, short-term noise measurements were taken in the study area at four locations in the project vicinity. The following describes the measurement procedures, measurement locations, and the noise measurement results.

5.1 - Measurement Procedure and Criteria

To ascertain the existing noise at and adjacent to the project site, field monitoring was conducted on Wednesday, July 11, 2012. The field survey noted that noise within the project area is generally characterized by highway and roadway traffic noise.

5.1.1 - Noise Measurement Equipment

Noise monitoring was performed using an Extech Model 407780 Type 2 integrating sound level meter. The Extech meter was programmed in “slow” mode to record the sound pressure level at 1-second intervals for in A-weighted form. The sound level meter and microphone was mounted approximately five feet above the ground and equipped with a windscreen during all measurements. The sound level meter was calibrated before monitoring using an Extech calibrator, Model 407766. The noise level measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

5.1.2 - Noise Measurement Locations

The noise monitoring locations were selected in order to obtain noise measurements of the current noise sources impacting the vicinity of the project site and to provide a baseline for any potential noise impacts that may be created by development of the proposed project. The sites are shown in Exhibit 5 on the following page. Appendix A includes a photographic index of the study area and noise level measurement locations.

5.1.3 - Traffic Noise Modeling

Noise impacts related to vehicular traffic were modeled using a version of the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108), as modified for CNEL and the “Calveno” energy curves. Site-specific information is entered, such as roadway traffic volumes, roadway active width, source-to-receiver distances, travel speed, noise source and receiver heights, and the percentages of automobiles, medium trucks, and heavy trucks that the traffic is made up of throughout the day, amongst other variables.

Table 4 presents the traffic flow distributions (vehicle mix) used in this noise impact analysis. These distributions were obtained from Caltrans and from field observations of similar roads. The vehicle mix provides the hourly distribution percentages of automobiles, medium trucks, and heavy trucks for input into the FHWA Models.

Table 4: Roadway Vehicle Mix

Vehicle Type	Percent of Hourly Distribution			
	Day (7 a.m. to 7 p.m.)	Evening (7 p.m. to 10 p.m.)	Night (10 p.m. to 7 a.m.)	Overall
Automobiles	69.5	12.9	9.6	92.0
Medium Trucks	1.6	0.8	0.6	3.0
Heavy Trucks	3.5	1.0	0.5	5.0

In order to determine the height above the road grade from where the noise is being emitted, each type of vehicle has been analyzed independently with autos at road grade, medium trucks at 2.3 feet above road grade, and heavy trucks at 8 feet above road grade. These elevations were determined through a noise-weighted average of the elevation of the exhaust pipe, tires, and mechanical parts in the engine, which are the primary noise emitters from a vehicle.

The printouts are provided in Appendix C and the results are shown in Exhibit 5 below.

5.1.4 - Noise Measurement Timing and Climate

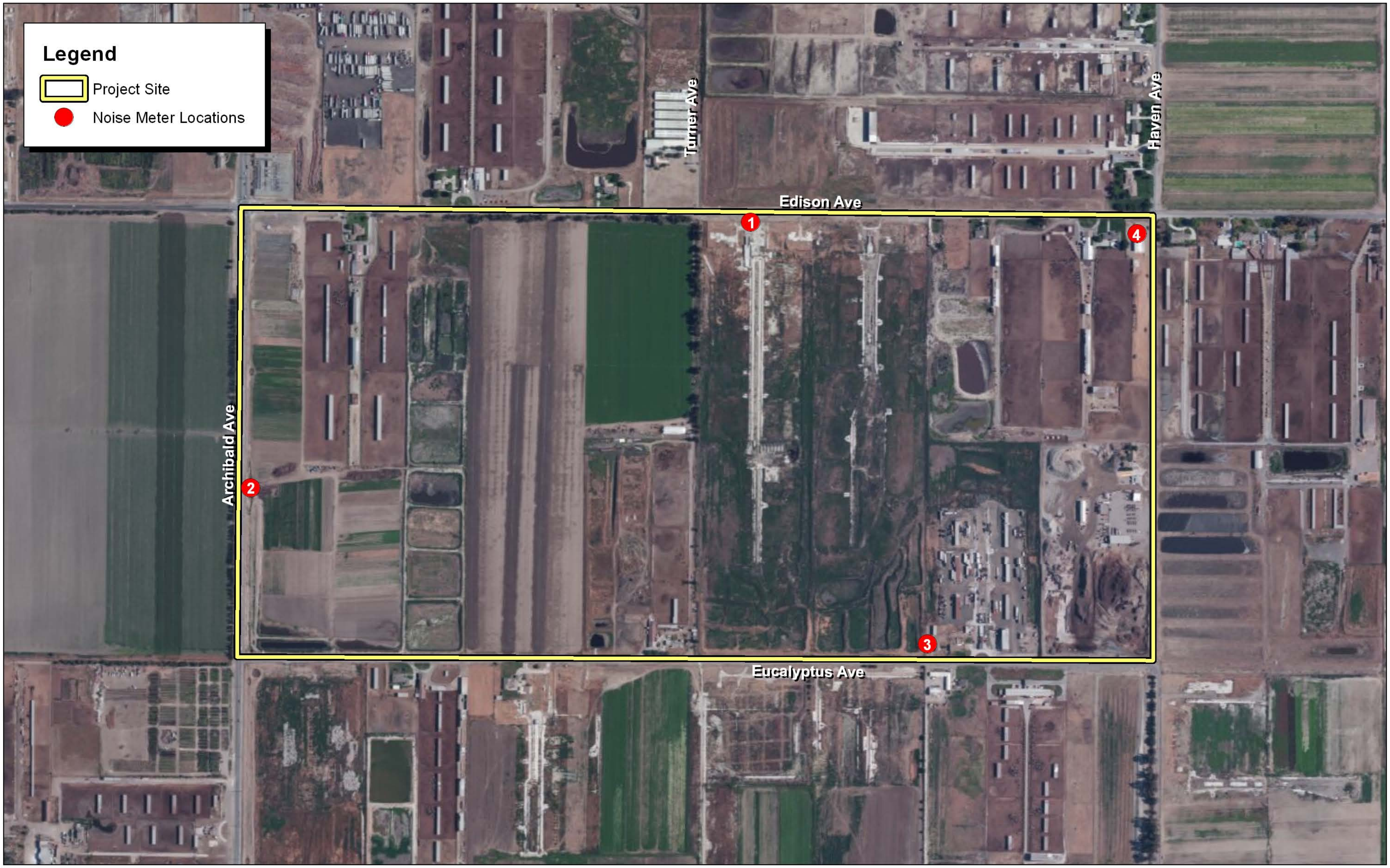
The noise measurements were recorded between 8:35 hours and 10:28 hours on Wednesday, July 11, 2012. At the start of the noise monitoring, there were fair skies and no wind. The temperature was 78°F.

5.2 - Noise Measurement Results

The noise measurements were taken at four (4) locations at and adjacent to the project site. The results of the noise level measurements are provided below in Table 5.

Table 5: Existing Noise Level Measurements

Site Location	Description	L_{eq}	L_{MAX}	L_{MIN}
R1	North Boundary East Edison Avenue	65.1	85.2	41.0
R2	West Boundary South Archibald Avenue	73.6	87.8	41.2
R3	South Boundary Eucalyptus Avenue	60.9	80.8	36.8
R4	Northeast Boundary East Edison Avenue at Haven Avenue	66.2	86.7	44.1



Source: ESRI World Imagery. MBA Field Survey and GIS Data, 2012.

Michael Brandman Associates

NORTH

800 400 0 800
Feet

Exhibit 5
Noise Metering Locations

SECTION 6: NOISE AND VIBRATION THRESHOLDS

Consistent with the California Environmental Quality Act (CEQA) and the CEQA Guidelines, a significant impact related to noise would occur if a proposed project is determined to result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable standards of other agencies.
- Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels.
- A substantial permanent increase in ambient noise levels in the project vicinity above existing levels without the proposed project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above noise levels existing without the proposed project.
- Exposure of persons residing or working in the project area to excessive noise levels from aircraft.

According to the CEQA checklist, to determine whether impacts to noise resources are significant environmental effects, the following thresholds are analyzed and evaluated:

- Exceedance of noise standards for construction and operational noise
- Groundborne vibration.
- Operational noise.
- Short-term construction noise.
- Airport noise.

Each of these thresholds is analyzed below.

6.1 - Exceedance of Noise Standards

This impact discussion analyzes the potential for project construction noise and operational noise to cause an exposure of persons to or generation of noise levels in excess of established City of Ontario noise standards or applicable standards of other agencies. Noise levels in the project area would be influenced by construction activities and from the on-going operation of the proposed project.

6.1.1 - Construction Noise

Per Sec. 5-29.09, Construction activity noise regulations, of the Municipal Code:

"No person, while engaged in construction, remodeling, digging, grading, demolition or any other related building activity, shall operate any tool, equipment or machine in a manner that produces loud noise that disturbs a person of normal sensitivity who works or resides in the vicinity, or a Police or Code Enforcement Officer, on any weekday except between the hours of 7:00 a.m. and 6:00 p.m. or on Saturday or Sunday between the hours of 9:00 a.m. and 6:00 p.m."

Short-term noise impacts could potentially occur during project construction activities from either the noise impacts created from the transport of workers and movement of construction materials to and from the project site, or from the noise generated onsite during demolition and ground clearing activities; excavation, grading, and similar ground-disturbing activities; and construction activities.

Construction noise levels vary significantly based upon the size and topographical features of the active construction zone, duration of the workday, and types of equipment employed, as indicated in Table 6. A typical eight-hour construction day will generate an average of 84 dBA CNEL at a distance of 50 feet from the noise source, on average. Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Although there would be potential for a relatively high single-event noise exposure, resulting in potential short-term intermittent annoyances, the effect on long-term ambient noise levels would be nominal when averaged over a longer period. As shown by the ambient noise level measurements in Table 5, maximum noise levels in project vicinity are already up to 87.8 dBA $L_{max.}$

In order to construct the proposed project, portions of the existing site would be graded. Site preparation activities typically involve the use of heavy equipment, such as scrapers, dozers, tractors, loaders etc. Trucks would also be used to deliver equipment and building materials, and to haul away landscape and construction debris. Smaller equipment, such as jackhammers, pneumatic tools, saws, and impact hammers would also be used throughout the project site during the construction phases. This equipment would generate both steady-state and episodic noise that could be heard both on and off the project site.

Individual pieces of construction equipment that would be used for project construction produce maximum noise levels of 76 dBA to 90 dBA at a reference distance of 50 feet from the noise source, as shown in Table 6. These maximum noise levels would occur when equipment is operating under full power conditions or during "impact" activities such as percussive pile driving. However, equipment used on construction sites often operates under less than full power condition, or part power. To more accurately characterize construction-period noise levels, the average (Leq) noise level associated with each construction stage is provided in Table 6. These average noise levels are based on the quantity, type, and usage factors for each type of equipment that would be used during each construction stage, and is typically attributable to multiple pieces of equipment operating simultaneously. As shown in Table 6, the maximum construction-period noise level can range from 76 dBA to 90 dBA at a reference distance of 50 feet.

In general, the first and noisiest construction phase is site preparation (i.e., grading and excavation), which would involve movement of construction equipment to and from the project site, earth moving, and compaction of soils. High noise levels created during site preparation would be associated with the operation of heavy-duty trucks, scrapers, dozers, graders, backhoes, and front-end loaders. When construction equipment is operating, noise levels average approximately 86 dBA at a distance of 50 feet from the construction area. During grading activities, heavy-duty equipment would only intermittently pass near the project boundaries as the majority of grading would take place more central to the project site.

During the second stage of construction, foundation forms are constructed and concrete foundations are poured. Primary noise sources include heavy concrete trucks and mixers, cranes, and pneumatic drills. At 50 feet from the source, noise levels are approximately 77 dBA.

The third and fourth stages consist of interior and exterior building construction, and site cleanup, respectively. Primary noise sources associated with the third phase include use of diesel generators, compressors, and light truck traffic and hammering. Noise levels are typically in the 83 dBA-range at a distance of 50 feet. The fourth and final stage typically involves the use of trucks, landscape rollers and compactors, with noise levels generally in the 86 dBA-range.

Table 6: Maximum Noise Levels Generated by Typical Construction Equipment

	Maximum Sound Levels at Indicated Distance (dBA)a			
Type of Equipment	**25 feet**	**50 feet**	**100 feet**	**200 feet**
Air Compressor	84	78	72	66
Backhoe	84	78	72	66
Concrete Mixer	85	79	73	67
Crane, Mobile	87	81	75	69
Dozer	88	82	76	70
Grader	91	85	79	73
Jack Hammer	95	89	83	77
Loader	85	79	73	67
Paver	83	77	71	65
Pneumatic Tool	91	85	79	73
Pump	87	81	75	69
Roller	86	80	74	68
Saw (concrete)	96	90	84	78

Table 6 (cont.): Summary of Proposed Specific Plan Land Uses

	Maximum Sound Levels at Indicated Distance (dBA)a			
Type of Equipment	**25 feet**	**50 feet**	**100 feet**	**200 feet**
Scraper	90	84	78	72
Truck	82	76	70	64
Minimum Sound Level	82	76	70	64
Maximum Sound Level	96	90	84	78

Notes:
a Sound levels at 25 feet, 100 feet and 200 feet are calculated based on reference noise levels at 50 feet. Calculation assumes a drop-off rate of 6-dB per doubling of distance, which is appropriate for use in characterizing point-source (such as construction equipment) sound attenuation over a hard surface propagation path.
Source: FHWA Roadway Construction Noise Model User's Guide, Table 1, 2006.

Construction activities would temporary increase the existing ambient noise in close proximity of the construction site. Currently, there are no noise sensitive uses are located around the site; however, there are planned residential and institutional developments adjacent to the project site, which could be built and occupied prior to project construction. However, construction activities would be required to comply with the City's allowable hours as described above and would be temporary. However, mitigation measures are proposed to ensure noise generated by construction activities is less than significant.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

MM NOI-1 All project construction vehicles or equipment, fixed or mobile, be equipped with standard and properly operating and maintained mufflers.

MM NOI-2 Stockpiling and/or vehicle staging areas to be located as far as practical from existing residential units on and off the project site.

MM NOI-3 Whenever feasible, schedule the noisiest construction operations to occur together to avoid continuing periods of the greatest annoyance.

Level of Significance After Mitigation

Less than significant impact. With incorporation of the above mitigation measures, construction noise levels would still increase the existing ambient noise levels at noise sensitive receptors within 300 feet from the boundaries of construction site. However, noise levels will be experienced for short-durations as only portions of the project site will be under construction at any one time. The majority of the time construction noise levels at sensitive locations will be much lower due to reduced construction activity and the phasing of construction (i.e., construction noise levels at a given location will be reduced as construction activities conclude or move to another more distant location of the site). Regardless, short-term construction noise would be less than significant because all construction activity would proceed in compliance with existing City requirements and proposed conditions of approval. In addition, Mitigation Measures NOI 1 through NOI 3 would pro-actively reduce construction generated noise levels to the extent feasible.

6.1.2 - Operational Noise

Potential noise impacts associated with the operations of the proposed project are a result of project-generated vehicular traffic on roadways within the project vicinity and from stationary noise sources associated with the proposed project. The following section provides an analysis of potential long-term offsite and onsite noise impacts associated with the ongoing operations of the proposed project.

Potential Onsite Noise Impacts

Future residents of the proposed project would generate and would be exposed to on-site noise sources typical of residential neighborhood related activities including; air conditioning units, lawn care equipment, radio/stereos systems, domestic animals, etc. These noise sources contribute to the ambient noise levels experienced in all similarly-developed areas and typically do not exceed the noise standards for the types of land uses proposed on the project site. In addition, these noise sources are consistent with the planned developments adjacent to the project site. Therefore, residential-related on-site noise impacts would be less than significant.

In addition, future on- and off-site residential developments would surround the proposed public schools and park. Noise from the public schools and park would be generated by a variety of sources including voices, public address systems, parking lot noise, and most notably sports activities. These noise levels may be in excess of the exterior noise standards presented in the City Municipal Code for residential uses. These sources would generate short-term and intermittent noise levels. It should be noted that public schools and parks are commonly located near residential areas with little or no compatibility problems. In general, the public schools and park would be designed with features that would be consistent with the General Plan. These design features may include, but would not be limited to locate student pick-up and drop-off areas as far away from residences as feasible, locate loading and shipping facilities away from adjacent noise sensitive uses, configure buildings such that they serve as a buffer between play field and residences, minimize the use of outside speakers and amplifiers, and erecting noise attenuation barriers between play fields and residences. Nonetheless, public school and park uses could generate noise levels in excess of the standards set forth in the City Municipal Code for residential uses if proper design consideration and features were not put in place. Therefore, it is anticipated that noise impacts on residential uses from the public school and park activities could be significant without incorporation of mitigation measures.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

MM NOI-4 Active recreational uses that are likely to draw cheering crowds, elicit loud play, or have amplified game announcements (i.e., stadiums, soccer fields, tennis courts, basketball courts, etc.) shall be located within the park's interior and away from surrounding residential and "noise sensitive" uses.

MM NOI-5 Educational and recreational land uses (including educational campus, parks, and stadiums) shall be designed in such a manner that:

- locate and orient vehicle access points away from residential and/or noise sensitive parcels.
- locate loading and shipping facilities away from adjacent noise sensitive uses;
- incorporate structural building materials that mitigate sound transmission;
- minimize the use of outside speakers and amplifiers;
- configure interior spaces to minimize sound amplification and transmission;
- incorporate fences, walls landscaping and other noise buffers and barriers between incompatible uses, as appropriate.

MM NOI-6 Sound barrier walls or earth berms of sufficient height and length shall be provided to reduce exterior noise levels to 65 CNEL or lower at outdoor noise sensitive uses, including residential backyards/courtyards and school playgrounds. Prior to the issuance of grading permits, an acoustical analysis report shall be prepared by a qualified acoustical consultant and submitted to the City Engineer by the developer. The report shall specify the noise barriers' height, location, and types capable of achieving the desired mitigation affect.

MM NOI-7 Parks if placed in the development areas where noise from traffic exceeds or is forecasted to exceed 70 dBA CNEL shall incorporate the following:

- Sound barrier walls or earth berms of sufficient height and length shall be designed by a qualified acoustical consultant to reduce exterior noise levels to 70 CNEL or lower; or
- Passive recreation areas, such as picnic tables, shall be located away from the roadway as far as possible.

MM NOI-8 Prior to the issuance of building permit, an acoustical analysis shall be prepared by a qualified acoustical consultant for all new residential developments that are within 65 dBA CNEL or higher, for the purpose of documenting that an acceptable interior noise level of 45 dBA (CNEL) or below will be achieved with the windows and doors closed. The report shall be submitted at plan check to the City for approval.

Level of Significance After Mitigation

With implementation of Mitigation Measures NOI 4 and NOI 5, the noise impacts from school and park uses would be reduced to a less than significant level. Mitigation Measures NOI-6 and NOI-7 would reduce the exterior noise environments at proposed residential and school uses to meet the City's exterior noise standards and will reduce the noise impact to less than significant. In addition, Mitigation Measure NOI-8 will ensure that interior noise environments of residential structures meet the State and City noise insulation requirements. Thus, would reduce the noise impact to less than significant.

6.2 - Groundborne Vibration

This impact discussion analyzes the potential for the proposed project to cause an exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels. Vibration levels in the project area would be influenced by construction activities and from the ongoing operations of the proposed project.

The City does not have a significance threshold to assess vibration impacts during construction. Thus, the FTA and Caltrans standards described earlier are used to evaluate potential impacts related to project construction.

- Construction - Project construction activities cause ground-borne vibration levels to exceed 1.0 inches per second (PPV) at any off-site structures.
- Operation - Vibration shall not be detectable beyond the property line of the site from which the vibration is emanating. In accordance with the City of Ontario Municipal Code, vibration shall not exceed the standards set forth in Table 7.

Table 7: Maximum Vibration in M Districts

Frequency (Cycles Per Second)	Vibration Displacement (inches)	
	Steady State	Impact
Under 10	0.0055	0.0010
10-19	0.0044	0.0008
20-29	0.0033	0.0006
30-39	0.0002	0.0004
40+	0.0001	0.0002

Source: Source: City of Ontario Municipal Code, Section 9-1.3310. Table 33-3.

6.2.1 - Construction Vibration

Construction activities can generate varying degrees of ground vibration, depending on the construction procedures and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of a construction site often varies depending on soil type, ground strata, and construction characteristics of the receptor building(s). The results from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration and the construction equipment used. The operation of construction equipment generates vibrations that spread through the ground at moderate levels, to slight damage at the highest levels. Ground-borne vibrations from construction activities rarely reach the levels that damage structures. The FTA has published standard vibration velocities for construction equipment operations. The peak particle velocities for construction equipment pieces expected to be used during project construction are listed in Table 8.

Table 8: Typical Vibration Velocities for Potential Project Construction Equipment

Frequency (Cycles Per Second)	Vibration Displacement (inches)	
	Steady State	Impact
Under 10	0.0055	0.0010
10-19	0.0044	0.0008
20-29	0.0033	0.0006
30-39	0.0002	0.0004
40+	0.0001	0.0002
Source: Source: City of Ontario Municipal Code, Section 9-1.3310. Table 33-3.		

The proposed project would generate ground-borne vibration during site clearing and grading activities or large bulldozer operation. Based on the vibration data provided in Table 8, vibration velocities from the operation of construction equipment would range from approximately 0.003 to 0.089 inch per second PPV at 25 feet from the source of activity. As this estimated level of Project related construction vibration is considerably below the 1.0 inches per second PPV significance threshold (potential building damage), vibration impacts associated with construction would be less than significant.

6.2.2 - Operational Vibration

As the proposed project consists of the development of up to 1,327 residential units in a variety of housing types and densities on approximately 107 acres, an approximately 10.2-acre (net) elementary school, an approximately 50.1-acre (net) high school site, and approximately 130.5 acres (net) for the "Grand Park." The proposed project will include typical residential and commercial-grade stationary mechanical and electrical equipment such as air handling units, condenser units, exhaust fans, and electrical emergency power generators, which would produce vibration. Ground-borne vibration generated by each of the above-mentioned activities would be limited to close proximity of the equipment, and would not expect to exceed the City's detectable vibration limits (Table 7). Therefore, impacts associated with operational vibration would be considered less than significant.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

6.3 - Area-wide Traffic Noise

This impact discussion analyzes the potential for a substantial permanent increase in ambient noise levels in the project vicinity associated with operation of the proposed project from impacts related to offsite vehicular noise. Potential noise impacts associated with operation of the proposed project are a result of project-generated vehicular traffic on the project vicinity roadways and from stationary noise sources associated with the proposed project. A threshold of 5 dBA is used where existing ambient noise conditions fall within the City's acceptable noise environment. Generally, the dividing line for acceptable noise is between "normally compatible" and "normally incompatible" as described Figure IV.J-1. Where the existing ambient noise level is already above the City's acceptable noise zone, a more conservative 3 dBA threshold is used. Therefore, the Proposed Project would have a significant impact on noise levels from off-site transportation sources if one of the two following criteria is exceeded:

1. The Proposed Project would cause ambient noise levels to increase by 5 dBA CNEL or more and the resulting noise falls on a land use within an area categorized as either "clearly compatible" or "normally compatible" (Exhibit 4); or
2. The Proposed Project would cause ambient noise levels to increase by 3 dBA CNEL or more and the resulting noise falls on a land use within an area categorized as either "normally incompatible" or "clearly incompatible."

Existing and future roadway noise levels were calculated along various arterial segments adjacent to and within the proposed developments that would be utilized by project traffic. Roadway-noise attributable to project development was calculated using the traffic noise model previously described (in Section 5.1.3) and compared to baseline noise levels that would occur under the "No Project" condition.

According to the project traffic study, the project build out, year 2015, is expected to generate 15,200 daily trips. This increase in roadway traffic volumes was analyzed to determine if any traffic-related noise impacts would result from project development along roadways in the vicinity. Table 9 provides the calculated traffic noise levels (CNEL) at roadways in the vicinity of the project site, for the following scenarios: existing conditions; future (2030) conditions without development of the proposed project; and future conditions (2030) with development of the proposed project; to determine the increase attributed to project-generated traffic volumes. The calculated CNEL levels are at 50 feet distance from the edge of the roadway and do not account for presence of any purpose built sound barriers or intervening structures. Furthermore, the uniform distance of 50 feet allows for direct comparisons of potential increases or decreases in noise levels based upon various traffic scenarios; however, at this distance, no specific noise standard necessarily applies

The largest project-related traffic noise impact is anticipated to occur along the segment of Schafer Avenue, west of Archibald Avenue, which project-related traffic could add 6.0 dBA CNEL to this roadway segment. The existing traffic volume at this segment is only 100 vehicles a day. The project will add 300 vehicles per day at this location. However, the noise level generated by this addition of traffic would still be well below the 65 dBA residential standard. This area is characterized by agricultural uses, which are not deemed “sensitive” land uses. Therefore, even with the increase in traffic, the noise levels generated would still be compatible with surrounding land uses and would even be compatible with future residential land uses, if such uses were proposed. The increase in project-related traffic noise at all other roadway segments would be less, which would be below the project’s 5 dBA significance threshold. Therefore, project-related roadway noise impacts would be less than significant.

As shown in Section 6.1.2, operational noise impacts from onsite activities are considered to be less than significant.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

Table 9: Project Traffic Noise Contributions

Road Segment	Existing (2012)		Existing Plus Project			2030				
						2030 without Project		2030 Plus Project ADT	Total	Project-Specific Increase
	ADT	dB CNEL	ADT	Total	Project-Specific Increase	ADT	dB CNEL			
NS Streets										
Archibald Avenue										
n/o SR-60	18,300	70.3	19,000	70.5	0.2	37,878	73.5	37,961	73.5	0.0
at SR-60 EB Ramps	4,450	64.2	5,450	65.1	0.9	—	—	—	—	—
s/o SR-60	27,200	72.0	28,600	72.3	0.3	31,288	72.7	31,650	72.7	0.0
n/o Schafer Avenue	13,550	69.0	15,300	69.5	0.5	17,365	70.1	17,720	70.2	0.1
s/o Schafer Avenue	13,600	69.0	15,600	69.6	0.6	14,660	69.4	15,285	69.5	0.1
n/o Park Street	0	—	2,350	61.4	—	0	—	2,350	61.4	—
s/o Park Street	0	—	1,500	59.5	—	0	—	1,500	59.5	—
n/o Eucalyptus Avenue	15,950	69.7	17,450	70.1	0.4	15,905	69.7	15,432	69.6	-0.1
s/o Eucalyptus Avenue	14,950	69.4	15,800	69.7	0.3	17,487	70.1	17,669	70.2	0.1
A Street										
n/o Edison Avenue	0	—	150	49.5	—	—	—	150	49.5	—
s/o Edison Avenue	0	—	2,000	60.7	—	—	—	2,000	60.7	—
Turner Avenue										
n/o Edison Avenue	0	—	250	51.7	—	3,007	62.5	3,148	62.7	0.2
s/o Edison Avenue	0	—	3,000	62.5	—	—	—	3,000	62.5	—

Table 9 (cont.): Project Traffic Noise Contributions

Road Segment	Existing (2012)		Existing Plus Project			2030				
						2030 without Project				
	ADT	dB CNEL	ADT	Total	Project-Specific Increase	ADT	dB CNEL	2030 Plus Project ADT	Total	Project-Specific Increase
H Avenue										
n/o Schafer Avenue	0	—	1,400	59.2	—	8,692	67.1	9,202	67.3	0.2
s/o Schafer Avenue	0	—	1,400	59.2	—	9,572	67.5	9,854	67.6	0.1
n/o Park Street	0	—	2,050	60.8	—	0	—	2,050	60.8	—
s/o Park Street	0	—	2,150	61.0	—	0	—	2,150	61.0	—
n/o Eucalyptus Avenue	0	—	2,150	61.0	—	6,015	65.5	6,132	65.6	0.1
s/o Eucalyptus Avenue	1,050	57.9	2,600	61.8	3.9	6,348	65.7	6,746	66.0	0.3
B Street										
n/o Park Street	0	—	3,050	62.5	—	0	—	3,050	62.5	—
EW Streets										
SR-60 WB ramps										
w/o Archibald Avenue	8,200	66.8	8,500	67.0	0.2	22,817	71.3	22,942	71.3	0.0
e/o Archibald Avenue	4,450	64.2	4,450	64.2	0.0	19,366	70.6	19,060	70.5	-0.1
SR-60 EB ramps										
w/o Archibald Avenue	7,650	66.5	8,100	66.8	0.3	23,893	71.5	24,211	71.5	0.0
e/o Archibald Avenue	8,450	67.0	8,450	67.0	0.0	17,050	70.0	17,014	70.0	0.0
Schaefer Avenue										
w/o Archibald Avenue	100	47.7	400	53.7	6.0	8,056	66.8	8,214	66.8	0.0
e/o Archibald Avenue	300	52.5	350	53.1	0.6	6,241	65.7	6,182	65.6	-0.1
w/o H Avenue	0	—	50	44.7	—	6,170	65.6	6,038	65.5	-0.1

Table 9 (cont.): Project Traffic Noise Contributions

Road Segment	Existing (2012)		Existing Plus Project			2030				
						2030 without Project				
	ADT	dB CNEL	ADT	Total	Project-Specific Increase	ADT	dB CNEL	2030 Plus Project ADT	Total	Project-Specific Increase
Edison Avenue										
w/o A Street	0	—	2,700	62.0	—	0	—	2,700	62.0	—
e/o A Street	0	—	3,100	62.6	—	0	—	3,100	62.6	—
w/o Turner Avenue	0	—	3,100	62.6	—	20,599	70.8	20,155	70.7	-0.1
e/o Turner Avenue	0	—	3,000	62.5	—	18,849	70.5	18,262	70.3	-0.2
Park Street										
w/o Archibald Avenue	0	—	300	52.5	—	0	—	300	52.5	—
e/o Archibald Avenue	0	—	3,800	63.5	—	0	—	3,800	63.5	—
w/o A Street	0	—	3,800	63.5	—	0	—	3,800	63.5	—
e/o A Street	0	—	2,900	62.3	—	0	—	2,900	62.3	—
w/o Turner Avenue	0	—	2,900	62.3	—	0	—	2,900	62.3	—
e/o Turner Avenue	0	—	3,200	62.8	—	0	—	3,200	62.8	—
w/o B Street	0	—	3,200	62.8	—	0	—	3,200	62.8	—
e/o B Street	0	—	4,000	63.7	—	0	—	4,000	63.7	—
w/o H Avenue	0	—	4,000	63.7	—	0	—	4,000	63.7	—
e/o H Avenue	0	—	300	52.5	—	0	—	300	52.5	—
Eucalyptus Avenue										
w/o Archibald Avenue	0	—	600	55.5	—	12,552	68.7	12,804	68.8	0.1
e/o Archibald Avenue	1,100	58.1	1,500	59.5	1.4	6,741	66.0	7,170	66.3	0.3
w/o H Avenue	1,050	57.9	1,500	59.5	1.6	6,895	66.1	6,937	66.1	0.0
e/o H Avenue	0	—	450	54.2	—	7,639	66.5	7,613	66.5	0.0

Table 9 (cont.): Project Traffic Noise Contributions

Road Segment	Existing (2012)		Existing Plus Project			2030				
						2030 without Project		2030 Plus Project ADT	Total	Project-Specific Increase
	ADT	dB CNEL	ADT	Total	Project-Specific Increase	ADT	dB CNEL			

Notes:
* The uniform distance of 50 feet allows for direct comparisons of potential increases or decreases in noise levels based upon various traffic scenarios; however, at this distance, no specific noise standard necessarily applies.

NS = North-South n/o = north of SR = State Route EB = eastbound s/o = south of WB = westbound
w/o = west of e/o = east of ADT = average daily trips db = decibels CNEL = community noise equivalent level
— = no data available

Source: Michael Brandman Associates, 2013.

6.4 - Short-term Construction Noise

This impact discussion analyzes the potential for project construction noise to cause a substantial temporary increase in ambient noise levels in the project vicinity above noise levels existing without the proposed project.

As previously addressed in Impact 6.1, Exceedance of Noise Standards, short-term construction-related noise impacts will be reduced to less than significant levels with the incorporation of Mitigation Measures NOI-1 through NOI-3. Overall, the proposed project is expected to comply with all applicable noise provisions set fourth by the City of Ontario. As shown by the ambient noise level measurements in Table 5, maximum noise levels in project vicinity are already up to 87.8 dBA, while a typical eight-hour construction day will generate 84 dBA CNEL at a distance of 50 feet from the noise source, on average. This represents no increase in ambient noise levels in the study area with the addition of project construction conditions. Additionally, construction noise is contingent on construction activities, which are intermittent and temporary in nature. As a result, project construction will not cause an increase in noise levels above existing levels within the project area.

With implementation of Mitigation Measures NOI-1 through NOI-3, noise impacts associated with project construction would be considered less than significant.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

Mitigation Measures NOI-1 through NOI-3, as previously provided in Section 6.1.1, Construction Noise.

Level of Significance After Mitigation

Less than significant impact.

6.5 - Airport Noise

This impact discussion analyzes the potential for nearby airports or private airstrips to expose people residing or working in the project area to excessive noise levels.

The project site is located approximately 2 miles northeast of the Chino Airport and 3.9 miles south of the Ontario International Airport. Per each of the airport's Airport Land Use Plan the Compatibility Maps contained within the Chino Airport's and Ontario International Airport's Airport Land Use Compatibility Plans, the project site is located outside of 65 CNEL noise contours. Therefore, noise due to aircraft at the project site would be compatible for proposed residential, school, and park developments. It is likely that aircraft noise would be audible at the project site. However, the project building sound isolation requirements for traffic noise would also provide adequate attenuation of the aircraft sound levels. Thus, the proposed project would not expose people to excessive noise levels from airport activities, and no impacts would occur due to project development.

Level of Significance Before Mitigation

Less than significant impact.

Mitigation Measures

No mitigation measures are required.

Level of Significance After Mitigation

Less than significant impact.

SECTION 7: REFERENCES

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Appendix A: Study Area Photographic Index

Photograph 1: South side of Edison Avenue, approximately 200 feet east of the future Edison Avenue-Turner Avenue intersection.

Photograph 2: East side of South Archibald Avenue, between Edison Avenue to the north and Eucalyptus Avenue to the south.

Source: Michael Brandman Associates, 2013.

Michael Brandman Associates

Appendix A
Site Photographs 1 and 2

Photograph 3: North side of Eucalyptus Avenue, approximately 1,300 feet west of the Eucalyptus Avenue-Haven Avenue intersection.

Photograph 4: Southwest corner of Edison Avenue-Haven Avenue intersection.

Source: Michael Brandman Associates, 2013.

Michael Brandman Associates

Appendix A
Site Photographs 3 and 4

Appendix B: Field Noise Measurement Print-outs

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MIN Value=44.1
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Appendix C: FHWA Model Analysis Calculations

Michael Brandman Associates

NOISE CONTOUR WORKSHEET

(calculations based on the FHWA-RD-77-108 Highway Noise Prediction Model)

PROJECT INFORMATION

Project:	- -	**W.O. #:**	- -
City/County:	- -	**Date Entered:**	
Comments:	- -	**Entered By:**	- -

SITE INFORMATION

Planning Area(s):	- -	**Land Use(s):**	- -
Obs. Location:	(see below)	**Scenario:**	LOS 'C' Volumes

ROADWAY SEGMENT, VEHICULAR AND OBSERVER CHARACTERISTICS

Roadway:	"standard roadway"	**Roadway Class:**	- -
Segment:	- -	**Right of Way:**	- -
ADT:	10,000	**Travel Speed:**	40 MPH
Pad Elev. (opt.):	0.0 feet	**Obs. Height:**	5.0 feet
Roadway Elev.:	0.0 feet	**Roadway Grade:**	0.1%

	Required	Type	Height
Ext. Mitigation:	- -	- -	- -

	Autos	Med Trucks	Heavy Trucks
Noise Height: (above roadway)	0.00 feet	2.30 feet	8.01 feet

	Left	Right	Total
Exposure:	90º	90º	180º

	Autos	Med Trucks	Heavy Trucks
Hard/Soft Site:	Hard	Hard	Hard

Veh. Distribution	Daytime	Evening	Nighttime	Daily
Automobiles	77.50%	12.90%	9.59%	97.42%
Medium Trucks	84.78%	4.89%	10.33%	1.84%
Heavy Trucks	86.49%	2.70%	10.81%	0.74%

Notes: Standard Road at 50 feet from the centerline

CALCULATED CNEL NOISE IMPACTS

Noise impact under various scenarios:

67.7
Exterior Umitigated

Noise is a function of both speed and ADTs.
Since speed is assumed constant at 40 mph for this analysis, noise is a function of ADT onl
and can be calculated by the following equation:

CNEL (dB) = 67.7 + 10 x log (ADT/10,000)

Noise Levels 50 feet from Roadway Centerline

Road Segment	Existing (2012)		Existing Plus Project			2030				
			E + P			2030 w/o Project		2030 + Project		
	ADT	dB CNEL	ADT	Total	Project-Specific Increase	ADT	dB CNEL	ADT	Total	Project-Specific Increase
NS Streets										
Archibald Avenue										
n/o SR-60	18,300	70.3	19,000	70.5	0.2	37,878	73.5	37,961	73.5	0.0
at 60 EB Ramps	4,450	64.2	5,450	65.1	0.9	--	--	--	--	--
s/o SR-60	27,200	72.0	28,600	72.3	0.3	31,288	72.7	31,650	72.7	0.0
n/o Schafer Ave	13,550	69.0	15,300	69.5	0.5	17,365	70.1	17,720	70.2	0.1
s/o Schafer Ave	13,600	69.0	15,600	69.6	0.6	14,660	69.4	15,285	69.5	0.1
n/o Park St	0	--	2,350	61.4	--	0	--	2,350	61.4	--
s/o Park St	0	--	1,500	59.5	--	0	--	1,500	59.5	--
n/o Eucalyptus Ave	15,950	69.7	17,450	70.1	0.4	15,905	69.7	15,432	69.6	-0.1
s/o Eucalyptus Ave	14,950	69.4	15,800	69.7	0.3	17,487	70.1	17,669	70.2	0.1
A St										
n/o Edison Ave	0	--	150	49.5	--	--	--	150	49.5	--
s/o Edison Ave	0	--	2,000	60.7	--	--	--	2,000	60.7	--
Turner Ave										
n/o Edison Ave	0	--	250	51.7	--	3,007	62.5	3,148	62.7	0.2
s/o Edison Ave	0	--	3,000	62.5	--	--	--	3,000	62.5	--
Haven Ave										
n/o Schafer Ave	0	--	1,400	59.2	--	8,692	67.1	9,202	67.3	0.2
s/o Schafer Ave	0	--	1,400	59.2	--	9,572	67.5	9,854	67.6	0.1
n/o Park St	0	--	2,050	60.8	--	0	--	2,050	60.8	--
s/o Park St	0	--	2,150	61.0	--	0	--	2,150	61.0	--
n/o Eucalyptus Ave	0	--	2,150	61.0	--	6,015	65.5	6,132	65.6	0.1
s/o Eucalyptus Ave	1,050	57.9	2,600	61.8	3.9	6,348	65.7	6,746	66.0	0.3
B St										
n/o Park St	0	--	3,050	62.5	--	0	--	3,050	62.5	--
EW Streets										
SR-60 Fwy WB ramps										
w/o Archibald Ave	8,200	66.8	8,500	67.0	0.2	22,817	71.3	22,942	71.3	0.0
e/o Archibald Ave	4,450	64.2	4,450	64.2	0.0	19,366	70.6	19,060	70.5	-0.1
SR-60 Fwy EB ramps										
w/o Archibald Ave	7,650	66.5	8,100	66.8	0.3	23,893	71.5	24,211	71.5	0.0
e/o Archibald Ave	8,450	67.0	8,450	67.0	0.0	17,050	70.0	17,014	70.0	0.0
Schaefer Ave										
w/o Archibald Ave	100	47.7	400	53.7	**6.0**	8,056	66.8	8,214	66.8	0.0
e/o Archibald Ave	300	52.5	350	53.1	0.6	6,241	65.7	6,182	65.6	-0.1
w/o Haven Ave	0	--	50	44.7	--	6,170	65.6	6,038	65.5	-0.1
Edison Ave										
w/o A St	0	--	2,700	62.0	--	0	--	2,700	62.0	--
e/o A St	0	--	3,100	62.6	--	0	--	3,100	62.6	--
w/o Turner Ave	0	--	3,100	62.6	--	20,599	70.8	20,155	70.7	-0.1
e/o Turner Ave	0	--	3,000	62.5	--	18,849	70.5	18,262	70.3	-0.2
Park St										
w/o Archibald Ave	0	--	300	52.5	--	0	--	300	52.5	--
e/o Archibald Ave	0	--	3,800	63.5	--	0	--	3,800	63.5	--
w/o A St	0	--	3,800	63.5	--	0	--	3,800	63.5	--
e/o A St	0	--	2,900	62.3	--	0	--	2,900	62.3	--
w/o Turner Ave	0	--	2,900	62.3	--	0	--	2,900	62.3	--
e/o Turner Ave	0	--	3,200	62.8	--	0	--	3,200	62.8	--
w/o B St	0	--	3,200	62.8	--	0	--	3,200	62.8	--
e/o B St	0	--	4,000	63.7	--	0	--	4,000	63.7	--
w/o Haven Ave	0	--	4,000	63.7	--	0	--	4,000	63.7	--
e/o Haven Ave	0	--	300	52.5	--	0	--	300	52.5	--
Eucalyptus Ave										
w/o Archibald Ave	0	--	600	55.5	--	12,552	68.7	12,804	68.8	0.1
e/o Archibald Ave	1,100	58.1	1,500	59.5	1.4	6,741	66.0	7,170	66.3	0.3
w/o Haven Ave	1,050	57.9	1,500	59.5	1.6	6,895	66.1	6,937	66.1	0.0
e/o Haven Ave	0	--	450	54.2	--	7,639	66.5	7,613	66.5	0.0

*The uniform distance of 50 feet allows for direct comparisons of potential increases or decreases in noise levels based upon various traffic scenarios; however, at this distance, no specific noise standard necessarily applies