Noise Impact Analysis Skyline Heights Project City of Corona, California

Prepared for:



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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

du/ac dwelling units per acre

FAA Federal Aviation Administration

FEIR Final Environmental Impact Report

FHWA Federal Highway Administration

FICON Federal Interagency Committee on Noise

FTA Federal Transit Administration

Hz Hertz

 $L_{\mbox{\tiny dn}}$ Day-Night Average Sound Level

L_{ea} 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

TTM Tentative Tract Map

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 Skyline Heights (Tentative Tract Map [TTM] 36544) 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 Skyline Heights (TTM 36544) project is comprised of 270.9 acres vacant land situated in the hills to the southwest of the City of Corona in Western Riverside County, California (see Exhibit 1, Regional Location Map). Specifically, the site is located adjacent to Foothill Parkway approximately three miles south of both State Route (SR) 71 and SR-91 freeways and four miles west of Interstate 15. (see Exhibit 2, Local Vicinity Map - Aerial Base). The project site currently consists of sparsely vegetated undeveloped land, with the exception of dirt roads. Within the boundaries of the site lies an undeveloped 10.0-acre parcel owned by the U.S. Forest Service, which is considered "Not a Part" of the overall project site. The project is bounded by single-family residences to the north and east and by the Cleveland National Forest and large privately owned parcels to the south and west (Exhibit 3, Exhibit 4a, and Exhibit 4b). Adjacent to the southeast area of the site is a single-family residential community that is currently graded and under construction (TTM 31955).

The existing General Plan Land Use designation for this site is Agriculture and the existing Zoning is Rural Residential I (0.2 to 0.5 dwelling units per acre [du/ac]). The project will be processing a GPA and Zone Change for the property through the City of Corona. The proposed General Plan designation will be Low Density Residential (3 to 6 du/ac). The proposed Zoning for this project will be designated as R-1-7.2 Single-Family Residential with 7,200 square feet (sq ft) minimum lots.

The project is included as part of the City of Corona's annexation area (see Appendix B for map). Parts of the annexation area (APNs: 102-320-009, -014 (partial); 275-040-016, -004, -005; 275-050-009 -014, -004, -005, -007, -010, -011, -017, -013, -012; 275-080-041, -040, -038, -017, -039, -013, -021, -011, -020, -009; 275-090-007, and 275-090-011) that are not part of the project, have no specific development details available, and are addressed programmatically in a qualitative manner in this report (see Appendix D for Annexation Map).

1.3 - Project Description

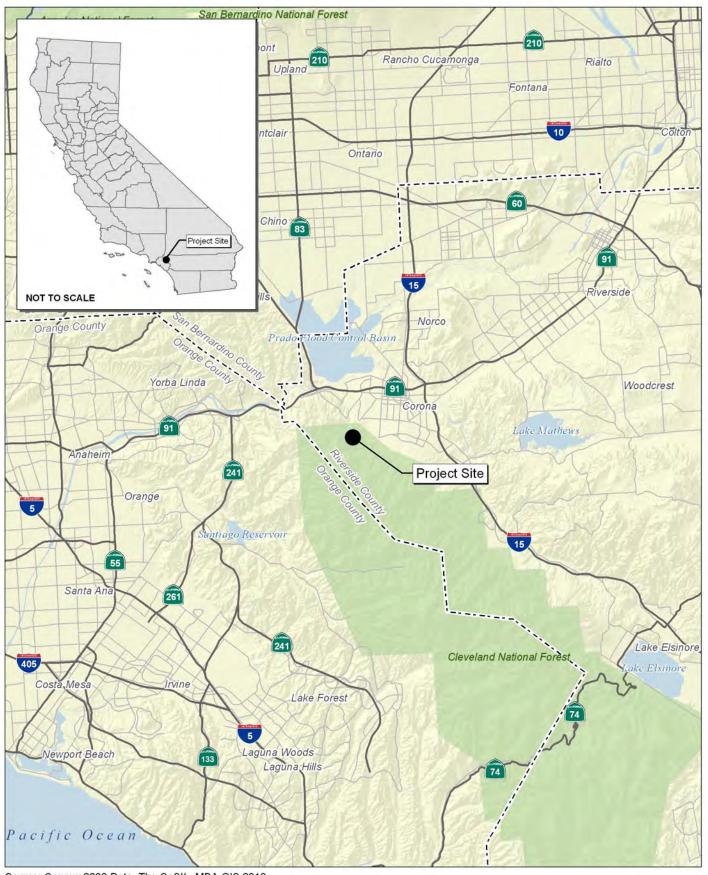
The project and will consist of two (2) graded areas. The area north of Mabey Canyon is proposing 45 single-family lots and the area to the south will be 247 single-family lots. This totals to 292 Single Family Low Density Residential lots for a project density of 1.08 du/ac.

The primary access to the site is from the future westerly extension of Foothill Parkway proposed by the City of Corona. Foothill Parkway is designated as a Secondary Highway with 72 feet of pavement within a 103-foot right-of-way. This regional thoroughfare is anticipated to be constructed in the next few years and is targeted to be completed by 2015. Area 1 proposes a single point public roadway access off Foothill Parkway just north of Mabey Canyon Debris Basin. This public roadway is 88 foot wide with a 16 foot wide raised median. A 28-foot wide emergency fire and existing residents' access road will also be proposed for emergency purposes to connect to the existing dirt access along Mabey Canyon south of the proposed roadway. The new access road is proposed to become the primary access route for the existing residents west of the project site. Area 2 proposes a 68-foot private local collector roadway section that extends into the project site from the intersection of Border Avenue and future Foothill Parkway. A 60-foot private roadway section will connect and continue this spine local roadway southerly to connect with existing 68 foot wide Trudy Way (TTM 31955).

In addition to these proposed roadways, other local private roadways are proposed throughout the project site. These proposed roadways are designed with 36-foot wide pavement within a 56-foot right-of-way or 36 foot wide pavement within a 60-foot right-of-way. The parkways are 10 foot wide or 12 foot wide with 4 foot sidewalks (not curb adjacent). Although an exact construction schedule is not known at this time, grading for the Project is anticipated to begin about First Quarter 2015.

The project will be processing a GPA and Zone Change for the property through the City of Corona. The proposed General Plan designation will be Low Density Residential (3-6 du/ac). The proposed Zoning for this project will be designated as R-1-7.2 Single Family Residential with 7,200 sq ft minimum lots.

The proposed onsite water facilities will include an intermediate water pressure Zone 6A Water Reservoir site, a Zone 6A Booster Pump Station site, and a network of Zone 5 (1,380 feet HWL) and Zone 6A (1,560 feet HWL) water distribution pipelines. The proposed Booster Pump Station has a firm pumping capacity to provide the required flows and pressures using one (1) duty pump and one (1) standby pump at 500 gallons per minute (gpm) each and one 1,500 gpm fire flow pump. Three detention basins are proposed within the project site to detain the increased runoff flows from the project development and are identified on TTM 36544. The proposed detention basins are designated to be publicly maintained by the City of Corona.



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

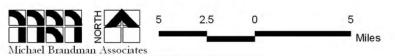
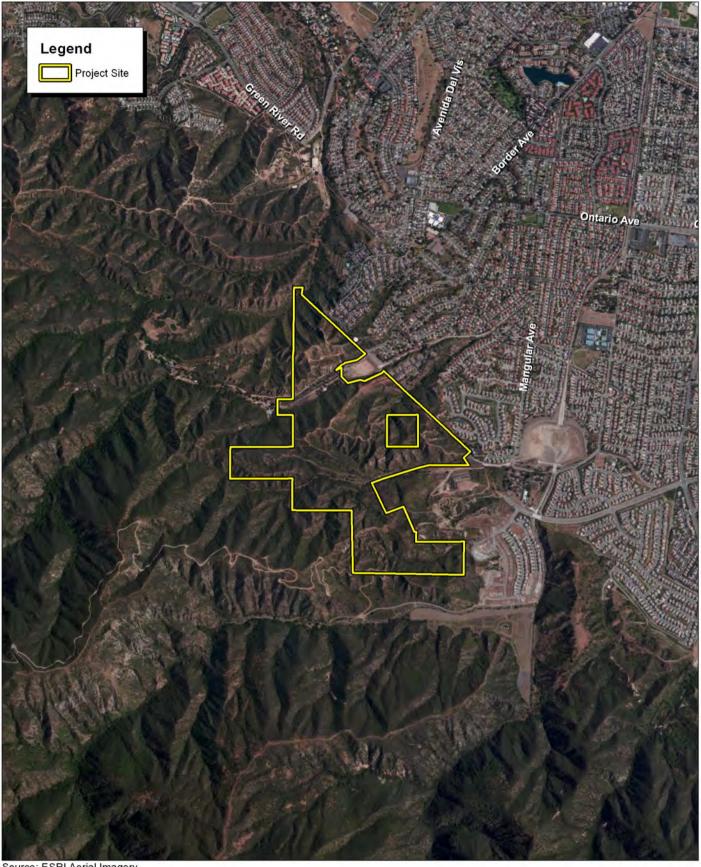


Exhibit 1 Regional Location Map



Source: ESRI Aerial Imagery.

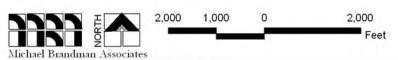


Exhibit 2 Local Vicinity Map **Aerial Base**

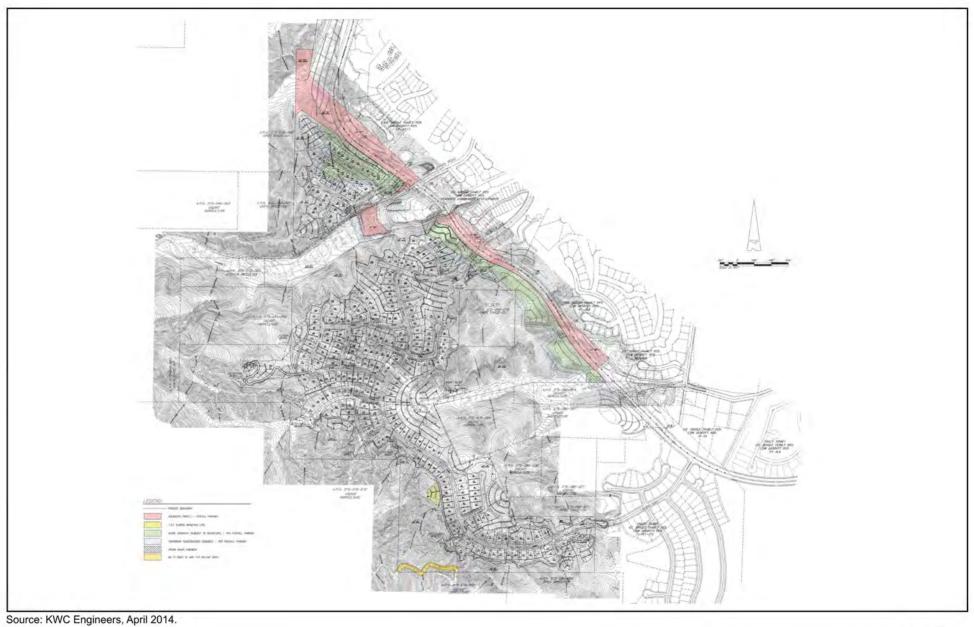




Exhibit 3 Site Plan

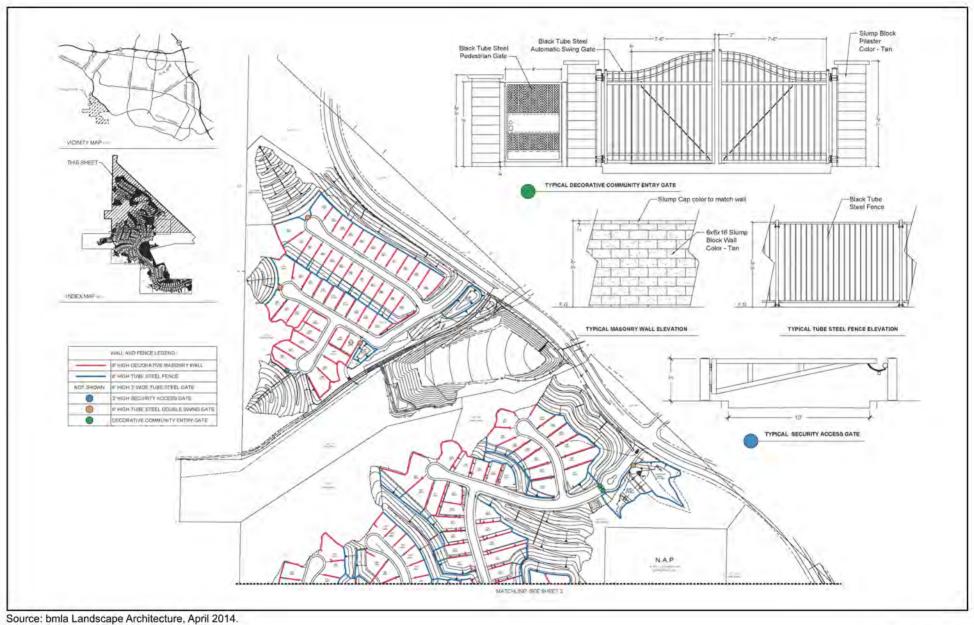




Exhibit 4a Wall and Fence Plan

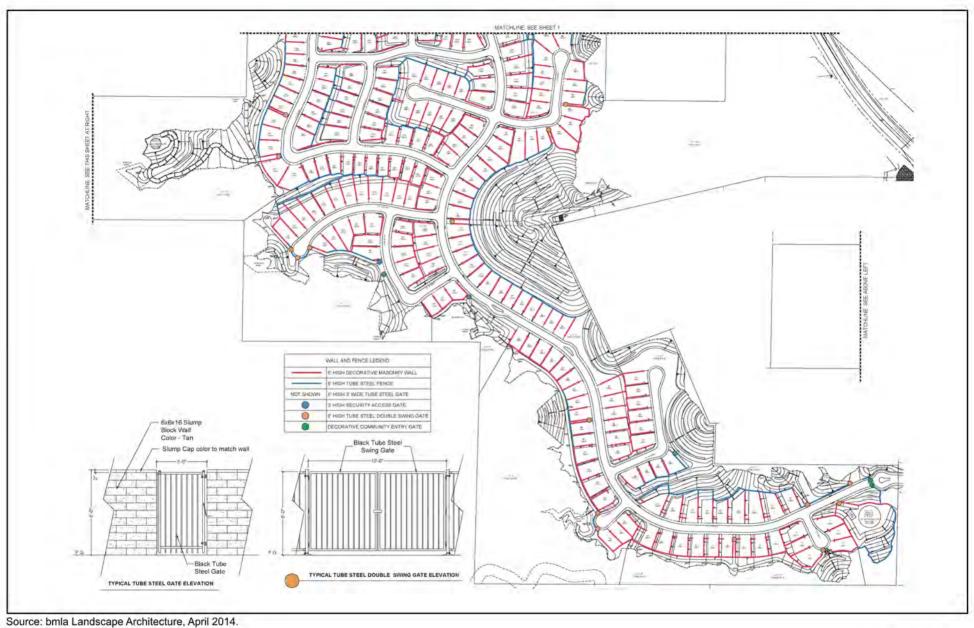




Exhibit 4b Wall and Fence Plan

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 denoted as L_V and is based on the RMS velocity amplitude. A commonly used abbreviation is VdB, which in this text, is when the particle velocity level (L_V) or sound velocity level (SVL) is based on the reference quantity of 1 microinch per second. The L_V should not be confused with the speed of sound.

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 1 gives approximate vibration levels for particular construction activities. The data in Table 1 provides a reasonable estimate for a wide range of soil conditions.

Table 1: 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

SECTION 4: REGULATORY SETTING

The proposed project will be located in the City of Corona, California. 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. One significant model, which is shown in Exhibit 5, is the "Land Use Compatibility Matrix," which

allows the local jurisdiction, such as the City of Corona, to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

Exhibit 5: Land Use Compatibility Matrix

Table	4 Land Use Noise Compa	tibili	ty M	atrix				
La	nd Use Categories	Community Noise Equivalent Level CNEL			NEL			
Categories	Uses	<55		60 65 7		70 75		80>
RESIDENTIAL	Single Family, Duplex	Α	Α	В	В	D	D	D
	Multiple Family	Α	Α	В	В	С	D	D
RESIDENTIAL	Mobile Home	Α	Α	В	С	С	D	D
COMMERCIAL Regional, District	Hotel, Motel Transient Lodging	Α	Α	В	В	С	С	D
COMMERCIAL Regional, Village District, Special	Commercial Retail, Bank, Restaurant, Movie Theatre	Α	Α	Α	Α	В	В	С
COMMERCIAL OFFICE INSTITUTIONAL	Office Building, Research and Development, Professional Offices, City Office Building	Α	Α	А	В	В	С	D
COMMERCIAL Recreation INSTITUTIONAL Civic Center	Amphitheatre, Concert Hall Auditorium, Meeting Hall	В	В	С	С	D	D	D
COMMERCIAL Recreation	Children's Amusement Park, Miniature Golf Course, Go-cart Track, Equestrian Center, Sports Club	А	Α	А	В	В	D	D
COMMERCIAL General, Special INDUSTIRAL, INSTITUTIONAL	Automobile Service Station, Auto Dealership, Manufacturing, Warehousing, Wholesale, Utilities	Α	Α	А	Α	В	В	В
INSTITUTIONAL General	Hospital, Church, Library, Schools' Classroom	Α	Α	В	С	С	D	D
OPEN SPACE	Parks	Α	Α	Α	В	С	D	D
OPEN SPACE	Golf Course, Cemeteries, Nature Centers Wildlife Reserves, Wildlife Reserves, Wildlife Habitat	Α	Α	Α	А	В	С	С
AGRICULTURE	Agriculture	Α	Α	Α	Α	Α	Α	Α
Interpretation	•							
Clearly Compatible without Zone B New co Normally Compatible made an	land use is satisfactory, based upon the assumption that any any special noise insulation requirements. astruction or development should be undertaken only after d needed noise insulation features in the design are determi supply systems or air conditioning, will normally suffice. No han 65	detailed ned. Con	analysis vention	of the r	noise re	duction with clo	require	ments are dows and
Zone C New co	ruction or development should generally be discouraged. If new construction or development does proceed, a alysis of noise reduction requirements must be made and needed noise insulation features included in the design.							
Zone D New cor Clearly Incompatible	struction of development should generally not be undertaken	1.						

Source: City of Corona General Plan Final Environmental Impact Report (FEIR) (2004).

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.

4.3 - Local Regulations

The City of Corona General Plan establishes the following applicable conclusions, recommendations, standards, policies, and regulations regarding noise and vibration.

4.3.1 - City of Corona General Plan

The Noise Element of the City of Corona General Plan provides the conclusions, recommendations, and strategies necessary to ensure an appropriately quiet and pleasurable environment for the residents, employees, and visitors in the County's unincorporated areas. Since the regulation of transportation noise sources such as roadway and aircraft primarily fall under either State or federal jurisdiction, local jurisdictions will generally use land use and planning decisions to limit locations or volumes of such transportation noise sources, to avoid development within noise impact zones, or to shield impacted receivers or sensitive receptors.

Noise Element

Applicable Conclusions and Recommendations

- 1) In the planning of land use, 65 CNEL (Community Noise Equivalent Level) should be regarded as the maximum exterior aircraft noise exposure compatible with noise sensitive uses. Where roadway noise exceeds 65 CNEL mitigation is required.
- 2) The California Noise Insulation Standards sets a 45 dBA CNEL interior noise standard for new multi-family residential units.
- 3) Noise-sensitive land uses should be considered to include:
 - a) Residential, including single and multifamily dwellings, and similar uses.
 - b) Libraries, school classroom areas, churches, and other similar areas.
 - c) Hospitals, nursing homes, convalescent hospitals, and other facilities for long-term medical care.

- 4) The City of Corona General Plan requires development in areas that exceed or may in the future exceed the 65 DB (A) L_{dn} to conduct an acoustical analysis and incorporate design measures in their construction to reduce the interior levels to 45 DB (A) L_{dn} .
- 5) It is required for all areas with existing or future ambient noise levels that exceed an exterior noise level of 65 dB(A) L_{dn} to provide satisfactory buffering or construction mitigation measures for all development of new housing, health care facilities, schools, libraries, religious facilities, and other "noise sensitive" land uses.

4.3.2 - City of Corona, California Municipal Code

The City of Corona, California Municipal Code establishes the following noise regulations that are relevant to the proposed project.

Title 17- Zoning

17.84 Performance Standards:

17.84.040- Noise: Stationary Noise Standards

(C) 2) Residential land uses including single, double, and multi uses shall have an exterior maximum allowable noise level of 55 dBA CNEL between 7 a.m. and 10 p.m. and 50 dBA CNEL between 10 p.m. and 7 a.m. Interior noise standards from 7 a.m. to 10 p.m. are 45 dBA CNEL and 35 dBA CNEL from 10 p.m. to 7 a.m.

(d) Exterior noise:

- It shall be unlawful for any person, entity, or operation at any location within the incorporated
 area of the city to create any noise or to allow the creation of any noise on property owned,
 leased, occupied, or otherwise controlled by such person, which causes the noise level when
 measured on any other property to exceed:
 - a) The noise standard for a cumulative period of more than 30 minutes in any hour;
 - b) The noise standard plus 5 dB for a cumulative period of more than 15 minutes in any hour;
 - c) The noise standard plus 10 dB for a cumulative period of more than 5 minutes in any hour:
 - d) The noise standard plus 15 dB for a cumulative period of more than one minute in any hour;
 - e) The noise standard plus 20 dB for any period of time.
- (e) Interior Noise: It shall be unlawful for any person at any location within the incorporated area of the city to create any noise or to allow the creation of any noise on property owned, leased, occupied, or otherwise controlled by such person which causes the noise level when measured within any other residential dwelling unit or sensitive land use to exceed:
 - 1) The noise standard for a cumulative period of more than five minutes in any hour;
 - 2) The noise standard plus 5 dB for a cumulative period of more than one minute in any hour; or
 - 3) The noise standard plus 10 dB, or the maximum measured ambient, for any period of time.

17.84.040- Noise: (3)Transportation Noise Sources

The maximum exterior noise level for transportation, both roadway and airport, within residential land uses is 65 dBA CNEL while the interior maximum is 45 dBA CNEL.

17.84.040- Noise: (D) Special Provisions

(2) Construction noise is prohibited between the hours of 8:00 p.m. and 7:00 a.m. Monday through Saturday and 6:00 p.m. to 10:00 a.m. Sundays and federal holidays.

SECTION 5: EXISTING NOISE CONDITIONS AND METHODOLOGY

To determine the existing noise level environment, short-term noise measurements were taken in the study area at six 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, May 1, 2013. The field survey noted that noise within the project area is generally characterized by sounds of nature (birds and such), construction activity, 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 6. Appendix A includes a photographic index of the study area and noise level measurement locations.

5.1.3 - Noise Measurement Timing and Climate

The noise measurements were recorded between 0853 hours and 1100 hours on Wednesday, May 1, 2013. At the start of the noise monitoring, the skies were partly cloudy, winds ranging between 0 to 3 miles per hour, the temperature was 65 degrees Fahrenheit.

5.2 - Noise Measurement Results

The noise measurements were taken at five (5) locations at and adjacent to the project site. The results of the noise level measurements are provided below in Table 2.

Table 2: Existing Noise Level Measurements

Site Location	Description		L _{MAX}	L _{MIN}
Site 1	Western side of Adobe Avenue, north of proposed planning area 1		64.6	43.3
Site 2	Eastern end of Chisholm Trail Circle, east of proposed planning area 1	43.0	54.1	38.8
Site 3	Western terminus of the public right-of-way portion of Mabey Canyon Road, adjacent to Mabey Canyon Debris Basin and within proposed Planning Area 1.		55.2	39.0
Site 4	Southern terminus of Elker Road, adjacent to Skyline Drive/Trail and south of proposed Planning Area 3.		60.4	40.9
Site 5	Intersection of Green River Road and Paseo Grande, north of proposed Planning Area 1.		71.1	43.4

5.3 - Traffic Noise Modeling Methodology

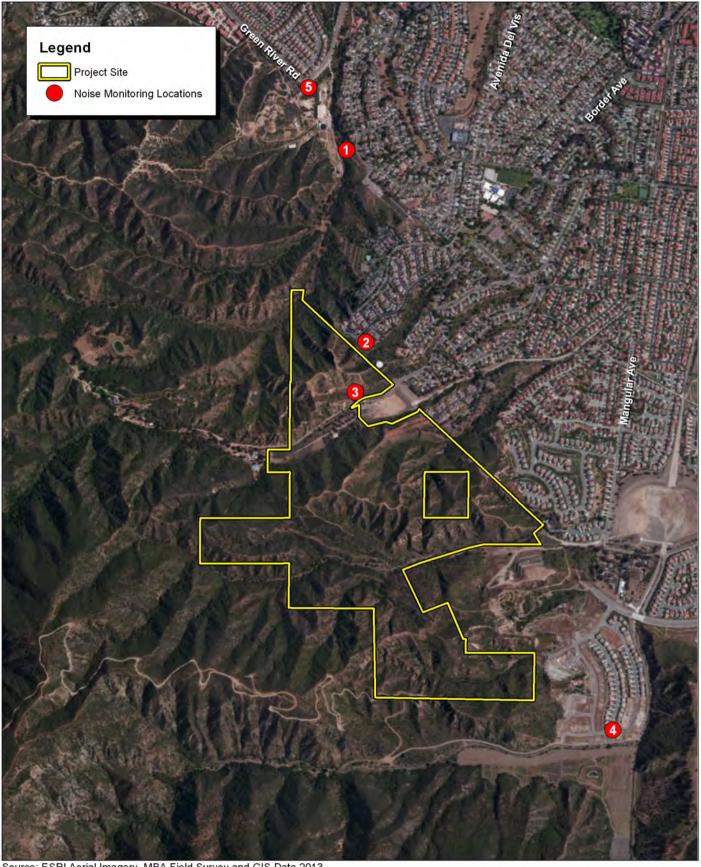
Noise impacts related to vehicular traffic were modeled using a version of the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108), as modified for CNEL and the "Calveno" energy curves. Site-specific information is entered, such as roadway traffic volumes, roadway active width, source-to-receiver distances, 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. The daily traffic volumes were obtained from the project-specific traffic study (Linscott, Law & Greenspan 2013). The printouts are provided in Appendix C and the results are shown in Table 6 below.

Project-Related Traffic

Impacts attributable to project-specific traffic increases would be considered significant if they create a 5-dBA or greater increase in noise levels along roadways accessed by project-specific traffic (3 dBA if resulting noise level exceeds 65 dBA at sensitive receptor boundaries). Offsite noise levels were calculated along roadway segments in the project vicinity for the following scenarios:

- Existing conditions
- Existing plus project
- Year 2020, without project
- Year 2020, with project
- Year 2035 (cumulative), without project
- Year 2035 (cumulative), with project

Using the traffic noise modeling parameters outlined above, the various scenarios that are described above were modeled to determine project-specific increases in noise levels at a uniform distance of 50 feet from roadway centerline. The uniform distance 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. Therefore, the change in a noise level between scenarios is the focus of this portion of the analysis, rather than the resulting independent noise level for any one segment.



Source: ESRI Aerial Imagery. MBA Field Survey and GIS Data 2013.



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.

The City of Corona General Plan FEIR states the following regarding CEQA Guidelines:

The CEQA Guidelines also do not define the levels at which temporary and permanent increases in ambient noise are considered "substantial." For the purposes of this analysis, noise impacts would be considered to be potentially significant if the proposed General Plan resulted in the following:

- Construction activities lasting more than one day that increase the ambient noise levels by 10 dBA or more at any noise-sensitive location during the evening and nighttime hours, at any time on Sundays, or at any time on public holidays.
- A permanent (i.e., long-term operational) increase of 5 dBA CNEL over ambient noise levels at any existing noise-sensitive land use.

 A permanent (i.e., long term operational) increase of 3 dBA CNEL over ambient noise levels at any existing noise-sensitive land use location where the future resulting noise level would exceed 65 dBA CNEL (i.e., the noise levels would be considered unacceptable for noise-sensitive uses).

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 Corona 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

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 4. A typical eight-hour construction day will generate 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 2, maximum noise levels in project vicinity are already up to 71.1 dBA.

Construction of the proposed project would require the use of heavy equipment for demolition of the existing onsite structures, site grading and excavation, installation of utilities, paving, and building fabrication. Development activities would also involve the use of smaller power tools, generators, and other sources of noise. During each stage of development, there would be a different mix of equipment operating and noise levels would vary based on the amount of equipment in operation and the location of the activity. The closest noise-sensitive use to the Project site are the residences located along Condor Circle, Clearview Circle and Meadow Crest Circle, roughly 75 feet northeast of the project site boundary.

The U.S. EPA has compiled data regarding the noise generating characteristics of specific types of construction equipment and typical construction activities. The data pertaining to the types of

construction equipment and activities that would occur at the project site are presented in Table 3 and Table 4, respectively, at a distance of 50 feet from the noise source (i.e., reference distance). The noise levels shown in Table 4 represent composite noise levels associated with typical construction activities, which take into account both the number of pieces and spacing of heavy construction equipment that are typically used during each phase of construction. As shown in Table 4, construction noise during the heavier initial periods of construction is presented as an average of 86 dBA when measured at a reference distance of 50 feet from the center of construction activity. These noise levels would diminish notably with distance from the construction site at a rate of 6 dBA per doubling of distance. For example, a noise level of 86 dBA measured at 50 feet from the noise source to the receptor would reduce to 80 dBA at 100 feet from the source to the receptor, and reduce by another 6 dBA to 74 dBA at 200 feet from the source to the receptor.

During construction, two basic types of activities would be expected to occur and generate noise at the project site. The first activity would involve the preparation and grading of the project site to accommodate the building foundations for the proposed project. The second activity that would generate noise during construction would involve the physical construction and finishing of the new proposed residential buildings.

The Annexation Area that is not part of the Project will be graded and potentially constructed upon at a later date and will be subject to all the noise standards that the current Project will comply with. It is unknown at this time how the grading of the Annexation Area will be phased or divided up; therefore, impacts from those areas will be addressed as they become specific projects, and will be required to undergo a similar analysis to the one performed for this Project. Furthermore, the existing sensitive receptors in the vicinity of the Annexation Area, that is not part of this Project, are further away from the project boundary than the receptors analyzed for this project; therefore construction noise impacts would be similar to, or less than, those already reported herein.

Table 3: Construction Equipment Noise Levels

						NOISE LEVEL (dBA) AT 50 FEET												
EQUIPMENT			60			70			80			90)		1	00		110
		Compacters (Rollers)																
EQUIPMENT POWERED BY INTERNAL COMBUSTION ENGINES		Front Loaders																
	VING	Backhoes																
	EARTH MOVING	Tractors																
	EART	Scrapers, Graders																
		Pavers																
ERNAL		Trucks																
RED BY INTE	MATERIAL HANDLING	Concrete Mixers																
		Concrete Pumps																
POWE		Cranes (Moveable)																
MENT		Cranes (Derrick)																
EQUIF	ΙRΥ	Pumps																
	STATIONARY	Generators																
	STA	Compressors																
	Ę	Pneumatic Wrenches																
	IMPACT EQUIPMENT	Jack Hammers and Rock Drills																
E Q		Pile Drivers																
	ĖR	Vibrators																
	OTHER	Saws																

Source: United States Environmental Protection Agency, 1971, "Noise from Construction Equipment and Operations, Building Equipment, and Home Appliances," NTID 300-1.

Table 4: Typical Outdoor Construction Noise Levels

Construction Phase	Average Noise Levels at 50 Feet with Mufflers (dBA)	Average Noise Levels at 60 Feet with Mufflers (dBA)	Average Noise Levels at 100 Feet with Mufflers (dBA)	Average Noise Levels at 200 Feet with Mufflers (dBA)
Ground Clearing	82	80	76	70
Excavation, Grading	86	84	80	74
Foundations	77	75	71	65
Structural	83	81	77	71
Finishing	86	84	80	74

Source:

United States Environmental Protection Agency, Noise from Construction Equipment and Operations, Building Equipment and Home Appliances, PB 206717, 1971

As shown in Table 4, outdoor noise levels at noise-sensitive receptors 50 feet from the noise source could range from 77 dBA to 86 dBA with the use of noise-attenuating devices. Table 5 shows the construction noise levels that would occur at the adjacent offsite sensitive uses during construction at the project site.

Table 5: Exterior Noise at Nearest Offsite Sensitive Uses from Project Construction

Sensitive Land Use	Approximate Distance to Project Site (ft.)	Estimated Highest Average Construction Noise Level at Property Line (dBA)
Residences located adjacent to the northeast portion of the project site along Condor Circle, Clearview Circle and Meadow Crest Circle.	75	82

Source: First Carbon Solutions-Michael Brandman Associates, 2013; Federal Transit Administration, Transit Noise and Vibration Impact Assessment, Final Report, May 2006.

As shown in Table 5, the peak construction noise levels experienced by the adjacent offsite sensitive receptors would be approximately 82 dBA, with the use of mufflers on the construction equipment. It should be noted, however, that the increase in noise levels at the offsite locations during construction at the project site would be temporary in nature, and would not generate continuously high noise levels, although occasional single-event disturbances from construction are possible. As such, the estimated noise level increases at each receptor that is shown in Table 5 would only occur periodically, not continuously, throughout the construction day. Additionally, in the later phases of construction when work is being conducted within the interior of the proposed buildings, the noise levels at the adjacent sensitive receptors would be reduced even further as the physical structures that are constructed onsite would break the line-of-sight noise transmission from the project to the offsite receptors. Nonetheless, the typical construction noise levels associated with the proposed project

would exceed the residential noise standard of 65 dBA at the closest residential receptor boundary. As such, construction-related noise impacts associated with the proposed project would be potentially significant.

However, with the incorporation of Mitigation Measures NOI-1 though NOI-8, noise impacts associated with project construction would be considered less than significant.

Level of Significance Before Mitigation

Potentially significant impact.

Mitigation Measures

MM NOI-1 Construction and demolition shall be restricted to the hours of 7:00 A.M. to 8:00 P.M. Monday through Saturday, and 10:00 A.M. to 6:00 P.M. on Sundays and federal holidays.

Noise and groundborne vibration construction activities whose specific location on the project site may be flexible (e.g., operation of compressors and generators, cement mixing, general truck idling) shall be conducted as far as possible from the nearest noise- and vibration-sensitive land uses.

MM NOI-3 Construction and demolition activities shall be scheduled so as to avoid operating several pieces of equipment simultaneously, which causes high noise levels.

MM NOI-4 The use of those pieces of construction equipment or construction methods with the greatest peak noise generation potential shall be minimized. Examples include the use of drills, jackhammers, etc.

MM NOI-5 The Project contractor shall use power construction equipment with state-of-the-art noise shielding and muffling devices.

Barriers such as, but not limited to, plywood structures or flexible sound control curtains shall be erected between the proposed project and the adjacent existing residences to the northeast and west, to minimize the amount of noise to the maximum extent feasible during construction.

MM NOI-7 All construction truck traffic shall be restricted to truck routes approved by the City of Corona Planning Department, which shall avoid residential areas and other sensitive receptors to the extent feasible.

MM NOI-8 Adjacent land uses within 300 feet of the construction site shall be notified about the estimated duration and hours of construction activity at least 30 days before the start of construction.

Level of Significance After Mitigation

Less than significant impact.

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

The proposed project is a residential use and is not considered a source on onsite operational noise.

Potential Offsite Noise Impacts

The closest main road to the proposed project would be West Foothill Parkway. Lots 251 to 247 will be located the closest to the road; however, those lots will be at least 50 feet from the road right-of-way (ROW) and pad elevation will be at least 30 feet above the roadway. At this distance and elevation, the roadway noise would be approximately 43.8 dBA CNEL (see Appendix C, FHWA Model Analysis Calculations and Airport Noise Contours, for details), which meets the residential noise standard. The embankment in-between the road ROW and the backyard of the proposed homes will be landscaped, and a perimeter wall will be placed on top of the embankment, which would reduce roadway noise even further.

The roads proposed within the project are collectors and are not a source of significant traffic noise.

Project Traffic Noise Contributions

The Project Traffic Noise roadway noise impacts were calculated by comparing the existing traffic noise levels with existing plus project, the comparison of Year 2020 traffic noise levels both with and without the project, and Year 2035 traffic noise levels both with and without the project. The results are shown in Table 6.

Table 6 shows that none of the roads analyzed have 3 to dBA or greater increase. The highest increase is 1.3 dBA CNEL along the segment of Foothill Parkway between Elysia Street and Lincoln Avenue for between the existing and existing plus project scenarios. Therefore, the change in noise level from existing conditions for this scenario is not considered significant.

Cumulative Impact Analysis

Operational Roadway Noise

In order for the proposed project to create a cumulative considerable impact, the proposed project's portion of the cumulative increase in noise would need to increase the noise levels by 3 to 5 dBA at sensitive receptor boundaries. The cumulative roadway noise impacts have been calculated for the year 2035 scenarios. The highest increase is 0.4 dBA CNEL along the segment of Foothill Parkway

between Elysia Street and Lincoln Avenue for Year 2035 scenarios (with and without project). Therefore, no cumulative noise impact is anticipated.

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 6: Project Traffic Noise Contributions

	Existing		Existing Plus Project				Year 2020				Year 2035				
Roadways/Road Segment	ADT	dB CNEL	Existing plus Project ADT	dB CNEL	Project- Specific Increase	without project ADT	dB CNEL	with Project ADT	dB CNEL	Project- Specific Increase	without project ADT	dB CNEL	with Project ADT	dB CNEL	Project- Specific Increase
Green River Road															
between Serfas Club Drive and Paseo Grande	12,398	68.6	13,228	68.9	0.3	16,303	69.8	17,273	70.1	0.3	26,492	71.9	27,462	72.1	0.2
Paseo Grande															
between Ontario Avenue and Green River Road	12,357	68.6	13,187	68.9	0.3	7,893	66.7	8,031	66.7	0.0	9,546	67.5	9,684	67.6	0.1
Ontario Avenue															
between Paseo Grande and Border Avenue	10,413	67.9	11,383	68.3	0.4	1,959	60.6	1,959	60.6	0.0	2,304	61.3	2,304	61.3	0.0
between Border Avenue and Via Pacifica	11,873	68.4	11,873	68.4	0.0	5,400	65.0	5,400	65.0	0.0	6,353	65.7	6,353	65.7	0.0
between Via Pacifica and Lincoln Avenue	25,677	71.8	25,677	71.8	0.0	17,157	70.0	17,157	70.0	0.0	20,184	70.8	20,184	70.8	0.0
Border Avenue					<u>'</u>										
between Via Pacifica and Ontario Avenue	3,362	63.0	3,500	63.1	0.1	3,539	63.2	3,677	63.4	0.2	4,177	63.9	4,315	64.0	0.1
between Ontario Avenue and Foothill Parkway	3,097	62.6	4,205	63.9	1.3	3,205	62.8	3,343	62.9	0.1	3,695	63.4	3,833	63.5	0.1
Lincoln Avenue				1						-					
between Citron Street and Ontario Avenue	20,521	70.8	21,213	71.0	0.2	18,997	70.5	19,551	70.6	0.1	21,883	711	22,437	71.2	0.1
between Ontario Avenue and Foothill Parkway	16,785	69.9	17,616	70.2	0.3	6,721	66.0	7,413	66.4	0.4	9,209	67.3	9,901	67.7	0.4
Foothill Parkway															·
between Elysia Street and Lincoln Avenue	4,941	64.6	6,603	65.9	1.3	9,336	67.4	10,860	68.1	0.7	21,619	71.0	23,143	71.32	0.3
between n Lincoln Avenue and Highgrove Street	6e352	65.7	7,182	66.3	0.6	8,990	67.2	9,820	67.6	0.4	16,203	69.8	17,035	70.0	0.2

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.

6.2.1 - Construction Vibration

Construction activities can produce vibration that may be felt by adjacent uses. The construction of the proposed project would not require the use of equipment such as pile drivers, which are known to generate substantial construction vibration levels. The primary source of vibration during project construction would likely be from a large bulldozer (tractor), which would generate 0.089 inch per second PPV at 25 feet.

The closest receptors to the project site are the residential uses located approximately 75 feet from the northeastern project boundary. The vibration levels caused by a large bulldozer operating 75 feet from the nearest sensitive receptor will be less than 0.02 inch per second RMS. This vibration level would not exceed the 0.05 inch per second significance threshold and the impact is considered to be less than significant.

The City of Corona does not have any specific provisions regarding vibration that would be applicable to the project site as currently zoned; nonetheless, the increase in offsite vibration generated by onsite construction activities would represent only a nominal increase whose impact would not be considered significant. Therefore, impacts associated with construction vibration would be considered less than significant.

6.2.2 - Operational Vibration

As the proposed project consists of a residential development, the project does not include any sources of operational vibration. 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 - 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.

The City of Corona GP FEIR Noise Element's section states that, "noise impacts would be considered to be potentially significant if: Construction activities lasting more than one day that increase the ambient noise levels by 10 dBA or more at any noise-sensitive location during the evening and nighttime hours, at any time on Sundays, or at any time on public holidays."

As previously addressed in Impact 6.1, Exceedance of Noise Standards, construction of the project would exceed the maximum ambient noise level of 71 dBA by 10 dBA (at a distance of 75 feet from the noise source). However, short-term construction-related noise impacts will be reduced to less than significant levels with the incorporation of Mitigation Measures NOI-1 through NOI-8. Overall, the proposed project is expected to comply with all applicable noise provisions set forth by the City of Corona. Additionally, construction noise is contingent on construction activities, which are intermittent and temporary in nature.

With implementation of Mitigation Measures NOI-1 through NOI-8, 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 8, as provided in Section 6.1.1, Construction Noise

Level of Significance After Mitigation

Less than significant impact.

6.4 - 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 nearest airport is the Corona Municipal Airport, which is located approximately 3 miles northeast of the project site. The project site falls outside the 65 dBA noise contour for the airport (see Appendix C for details), which is not considered as a source that contributes to the ambient noise levels on the project site.

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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Richland Developers,	Inc.	- Skyline	Heights	Project
Noise Impact Analysis	5	-	_	•

Appendix A: Study Area Photographic Index



Photograph 1: Western side of Adobe Avenue, north of proposed Planning Area 1.



Photograph 2: Eastern end of Chisholm Trail Circle, east of proposed Planning Area 1.

Source: FirstCarbon Solutions | Michael Brandman Associates, 2013



Appendix A Photographs 1 and 2



Photograph 3: Western terminus of the public right-of-way portion of Mabey Canyon Road, adjacent to Mabey Canyon Debris Basin and within proposed Planning Area 1.



Photograph 4: Southern terminus of Elker Road, adjacent to Skyline Drive/Trail and south of proposed Planning Area 3.

Source: FirstCarbon Solutions | Michael Brandman Associates, 2013



Appendix A Photographs 3 and 4



Photograph 5: Intersection of Green River Road and Paseo Grande, north of proposed Planning Area 1.

Source: FirstCarbon Solutions | Michael Brandman Associates, 2013



Appendix A Photograph 5

Richland Developers, Inc.	- Skyline	Heights	Project
Noise Impact Analysis	-	_	

Appendix B: Field Noise Measurement Print-outs

Skyline Heights						
5/1/2013						
Location	Start Time	Coordinates	Conditions	Noise Sources	Variances	Final Leq
#1: Western side of Adobe Avenue, north of proposed Planning Area 1.	853	33°51'37.32"N 117°36'42.16"W	65°F, Partly Cloudy, 0-3 mph	Natural ambient sounds	None	48.6 Leq
#2: Eastern end of Chisholm Trail Circle, east of proposed Planning Area 1.	918	33°51'8.81"N 117°36'39.67"W	65°F, Partly Cloudy, 0-3 mph	Natural ambient sounds	None	43.0 Leq
#3: Western terminus of the public right-of-way portion of Mabey Canyon Road, adjacent to Mabey Canyon Debris Basin and within proposed Planning Area 1.	941	33°51'1.68"N 117°36'41.47"W	65°F, Partly Cloudy, 0-3 mph	Natural ambient sounds	None	44.9 Leq
#4: Southern terminus of Elker Road, adjacnt to Skyline Drive/Trail and south of proposed Planning Area 3.	1014	33°50'13.76"N 117°35'56.83"W	65°F, Partly Cloudy, 0-3 mph	Natural ambient sounds, construction activity	None	47.4 Leq
#5: Intersection of Green River Road and Paseo Grande, north of proposed Planning Area 1.	1042	33°51'47.14"N 117°36'50.41"W	65°F, Partly Cloudy, 0-3 mph	Vehicle traffic	None	57.7 Leq

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58.8,10:56:22,
58.3,10:56:23,
59.2,10:56:24,
59.8,10:56:25,
59.0,10:56:26,
58.5,10:56:27,
58.7,10:56:28,
58.9,10:56:29,
60.3,10:56:30,
60.2,10:56:31,
60.2,10.56.31,
60.0,10:56:32,
60.1,10:56:33,
60.1,10:56:34,
60.4,10:56:35,
60.4,10:56:35,
60.4,10:56:36,
59.0,10:56:37,
58.1,10:56:38,
58.5,10:56:39,
57.6,10:56:40,
56.1,10:56:41,
54.8,10:56:42,
53.3,10:56:43,
52.0,10:56:44,
53.9,10:56:45,
55.8,10:56:46,
56.3,10:56:47,
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Appendix C: FHWA Model Analysis Calculations and Airport Noise Contours

Noise Levels 50 feet from Roadway Centerline

	Exis	ting						Year 2020					Year 2035		
Road Segment	ADT	dB CNEL	Existing plus Project ADT	dB CNEL	Project- Specific Increase	without project ADT	dB CNEL	with Project ADT	dB CNEL	Project- Specific Increase	without project ADT	dB CNEL	with Project ADT	dB CNEL	Project- Specific Increase
ROADWAYS															
Green River Road															
b/n Serfas Club Drive and Paseo Grande	12398	68.6	13228	68.9	0.3	16303	69.8	17273	70.1	0.3	24670	71.6	25640	71.8	0.2
Paseo Grande															
bn Ontario Avenue and Green River Road	12357	68.6	13187	68.9	0.3	7893	66.7	8031	66.7	0.0	9286	67.4	9424	67.4	0.0
Ontario Avenue															
bn Paseo Grande and Border Avenue	10413	67.9	11383	68.3	0.4	1959	60.6	1959	60.6	0.0	2304	61.3	2304	61.3	0.0
bn Border Avenue and Via Pacifica	11873	68.4	11873	68.4	0.0	5400	65.0	5400	65.0	0.0	6353	65.7	6353	65.7	0.0
bn Via Pacifica and Lincoln Avenue	25677	71.8	25677	71.8	0.0	17157	70.0	17157	70.0	0.0	20184	70.8	20184	70.8	0.0
Border Avenue															
bn Via Pacifica and Ontario Avenue	3362	63.0	3500	63.1	0.1	3539	63.2	3677	63.4	0.2	3917	63.6	4055	63.8	0.2
bn Ontario Avenue and Foothill Parkway	3097	62.6	4205	63.9	1.3	3205	62.8	3343	62.9	0.1	3435	63.1	3573	63.2	0.1
Lincoln Avenue															
bn Citron Street and Ontario Avenue	20521	70.8	21213	71.0	0.2	18997	70.5	19551	70.6	0.1	20841	70.9	21395	71.0	0.1
bn Ontario Avenue and Foothill Parkway	16785	69.9	17616	70.2	0.3	6721	66.0	7413	66.4	0.4	7907	66.7	8599	67.0	0.3
Foothill Parkway															
bn Elysia Street and Lincoln Avenue	4941	64.6	6603	65.9	1.3	9336	67.4	10860	68.1	0.7	18755	70.4	20279	70.8	0.4
bn Lincoln Avenue and Highgrove Street	6352	65.7	7182	66.3	0.6	8990	67.2	9820	67.6	0.4	14641	69.4	15471	69.6	0.2

Michael Brandman Associates

CNEL NOISE IMPACT WORKSHEET

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

PROJECT INFORMATION

Project:Skyline HeightsProject #:4025.0006City/County:CoronaDate Entered:051413Comments:--Entered By:Katie

SITE INFORMATION

Building: Land Use(s): residential

Obs. Loc. Ext.: 10 foot behind boundary Scenario: Year 2035 Volumes

ROADWAY SEGMENT, VEHICULAR AND OBSERVER CHARACTERISTICS

2.70%

Roadway: West Foothill Parkway Roadway Class: Major Arterial Right of Way: 106 feet Segment: n-o Trudy Way CL Dist. to Obs.: 130 feet Near/Far Lane: 77 feet CL Dist. to Wall: 120 feet ADT: 20,279 Travel Speed: 50 MPH Pad Elev.: 35.0 feet Obs. Height: 5.0 feet Roadway Elev.: 0.0 feet Roadway Grade: 0.1% Med Heavy Required Type **Height** Autos Trucks Trucks Ext. Mitigation: Noise Height: 0.00 feet 2.30 feet 8.01 feet (above roadway) Med Trucks Heavy Trucks <u>Left</u> Right **Total** <u>Autos</u> 180° Exposure: 90° 90° Hard/Soft Site: soft soft soft Veh. Distribution: Daytime Notes: Evening Nighttime Daily Automobiles 77.50% 12.90% 9.59% 97.42% Medium Trucks 84.78% 4.89% 10.33% 1.84%

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CALCULATED CNEL NOISE IMPACTS

Noise impact under various scenarios:

Heavy Trucks 86.49%

43.2	43.2
Exterior without Topo or Barrier Attenuation	Exterior Mitigated

10.81% 0.74%

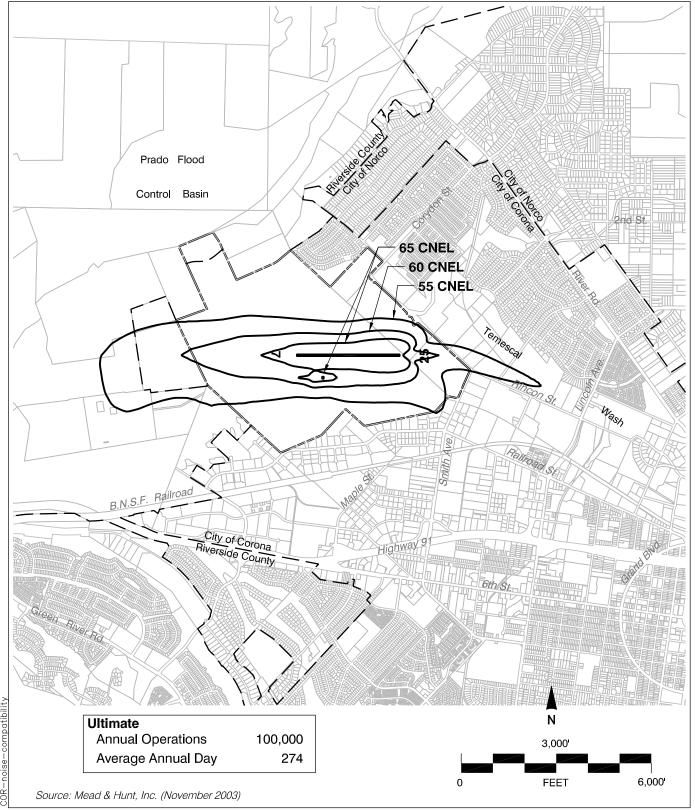


Exhibit CO-5

Future Noise Impacts

Corona Municipal Airport

Richland Developers, Inc.	- Skyline	Heights	Project
Noise Impact Analysis	-	_	-

Appendix D: Skyline Heights Annexation Area Exhibit

