ACOUSTICAL AND GROUND VIBRATION SITE ASSESSMENT
LAKE JENNINGS MARKET PLACE
SAN DIEGO, CA

RECORD ID: PDS2014-GPA-14-005; PDS2014-REZ-14-004; PDS2014-TM-5590; PDS2014-STP-14-019; PDS2014-MUP-15-004
Environmental Log No.: PDS2014-ER-14-14013

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ISE Project #14-003

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May 12, 2015 (Revised)

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INTRODUCTION AND DEFINITIONS

Existing Site Characterization

The project site consists of approximately 13.1 gross acres located within the eastern portion of San Diego County, as shown in Figure 1, on Page 3. The site parallels an approximately 1,000 foot stretch of Olde Highway 80 adjacent to the north, and is bordered on the west by Ridge Hill Road, and on the east by Rios Canyon Road. The Los Coches Creek flood line marks the southern boundary of the project area. The site delineation can be seen in Figure 2.

The site and surrounding community consists of semi-rural land with the immediate project vicinity consisting of vacant undisturbed land, two vacant residential structures, and several local businesses north of the site, which can be seen in Figure 3. Land uses to the east and south of the project site include the Pecan Park Mobile Home Park, and the Rio Vista housing development, respectively.

Elevations onsite range from approximately 650 feet above mean sea level (MSL) at the southwestern corner of the project site to 700 feet above MSL at the northeastern edge.

Project Description

The proposed Lake Jennings Market Place project would consist of a mix of commercial uses. Applicant improvements to the site would include infrastructure such as sewer, road improvements and utilities, the vacation of an existing paved road, and dedication of a biological open space easement, on the aforementioned 13.1 acre site. The proposed site development plan, as well as the internal lot configuration, is shown in Figures 4a and -b. Specifics of the plan are detailed below.

Project Access

The project requires four access points for proper traffic flow. These ingress/egress points are from Ridge Hill Road located on the west side of the project, a right-in (only) approximately 200 feet east of the intersection of Olde Highway 80 and Lake Jennings Park Road, a full signalized project entry half-way along the project frontage of Olde Highway 80, and a second non-signalized project entry (right in – right out only) near the northeast corner of the property.

Commercial Shopping Center

The project proposes to construct a commercial shopping center with 76,100 square feet (s.f.) of building area. The project would include six structures, all of which will be located on individually parceled lots according to the breakdown shown in Table 1 on the following page.

TABLE 1: Lake Jennings Market Place Project Components

Structure	Indicated on Site Plan As	Size	Location
Market Building	Building A	43,000 s.f.	Along the east side of the project site adjacent to Rios Canyon Road
Financial Building	Building B	4,500 s.f.	On the northeast intersection of Olde Highway 80 at the proposed signalized project entrance.
Restaurant	Building C	3,500 s.f.	Same as Building B above.
Restaurant-Retail Building	Building D	9,600 s.f.	Along the southern boundary of the project's developed area
Gas Station with convenience store and car wash	Building E	3,000 s.f. (43,800 s.f. pad)	At the intersection of Olde Highway 80 and Lake Jennings Park Road.
Restaurant-Retail Building	Building F	12,500 s.f.	Along the southern boundary of the developed area.

Trail Component / Walls and Signage

The project will construct a multi-use trail suitable for pedestrians and equestrian users. The trail will be 10 feet wide and constructed of decomposed granitic material. The trail segments are proposed as standard pathways per the Park Lands Dedication Ordinance (PLDO). The trail segment within the open space lot will run along the southern edge of the development area footprint within a 20-foot-wide trail easement.

There will be a comprehensive sign program for the project. It would include a Freeway Pylon Display, Monument Center ID Displays, Monument Signage at the signalized entrance on Olde Highway 80, and a State of California Gas Pricing Sign.

Parking and Landscaping

The project proposes 389 parking spaces in accordance with the County of San Diego Zoning Ordinance located almost entirely within the central portion of the site, and out of the casual view of surface street traffic. Therefore, the project meets the parking requirements of the County of San Diego Zoning Ordinance.

Finally, a landscape plan has been prepared for the project that incorporates a variety of species intended to provide a visual buffer from Interstate 8 (I-8), and be compatible with the Los Coches Creek riparian zone. The plant palette reflects a selection of Southern California native plant material.

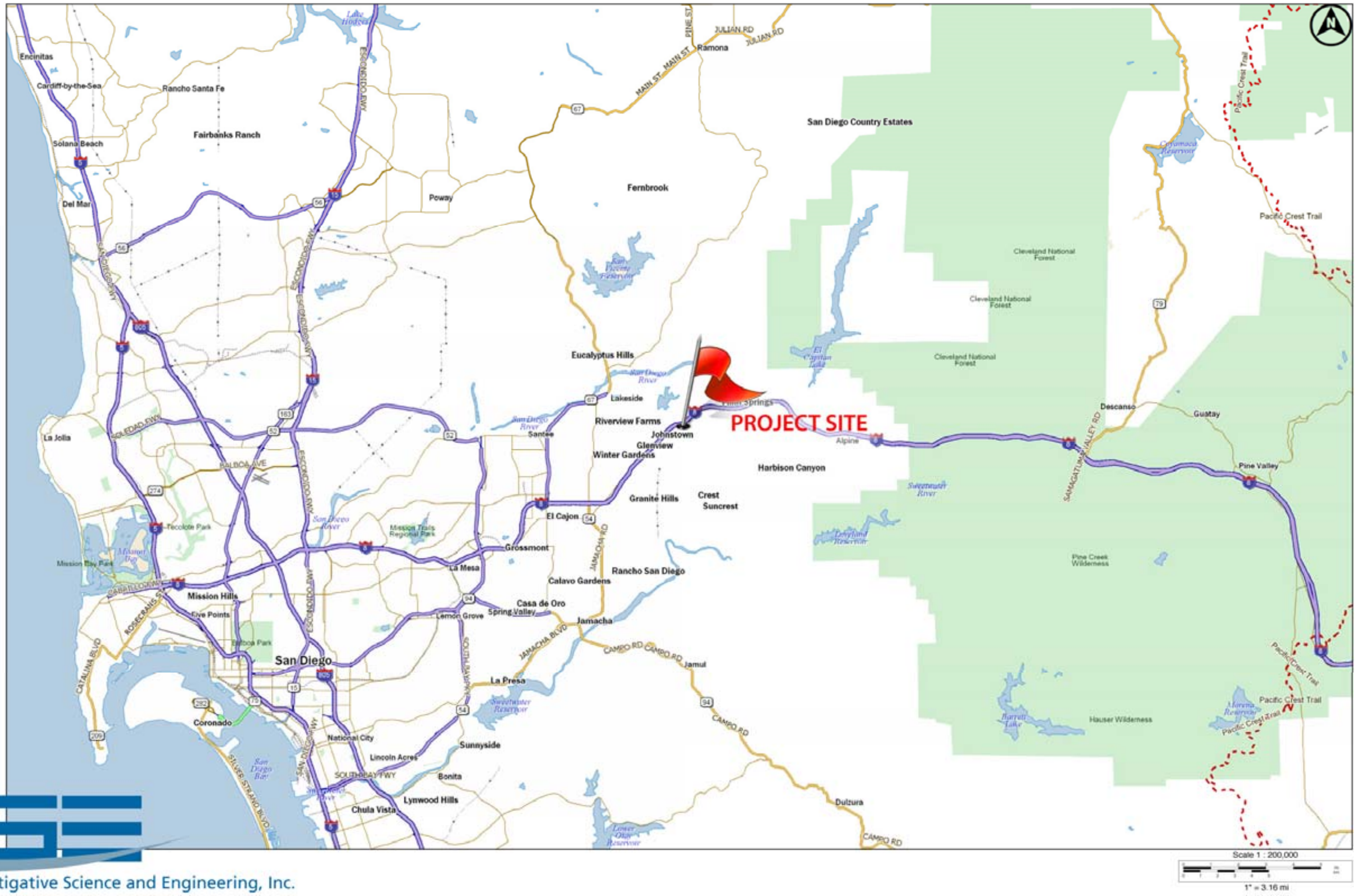

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FIGURE 1: Project Study Area Vicinity Map (ISE 7/14)

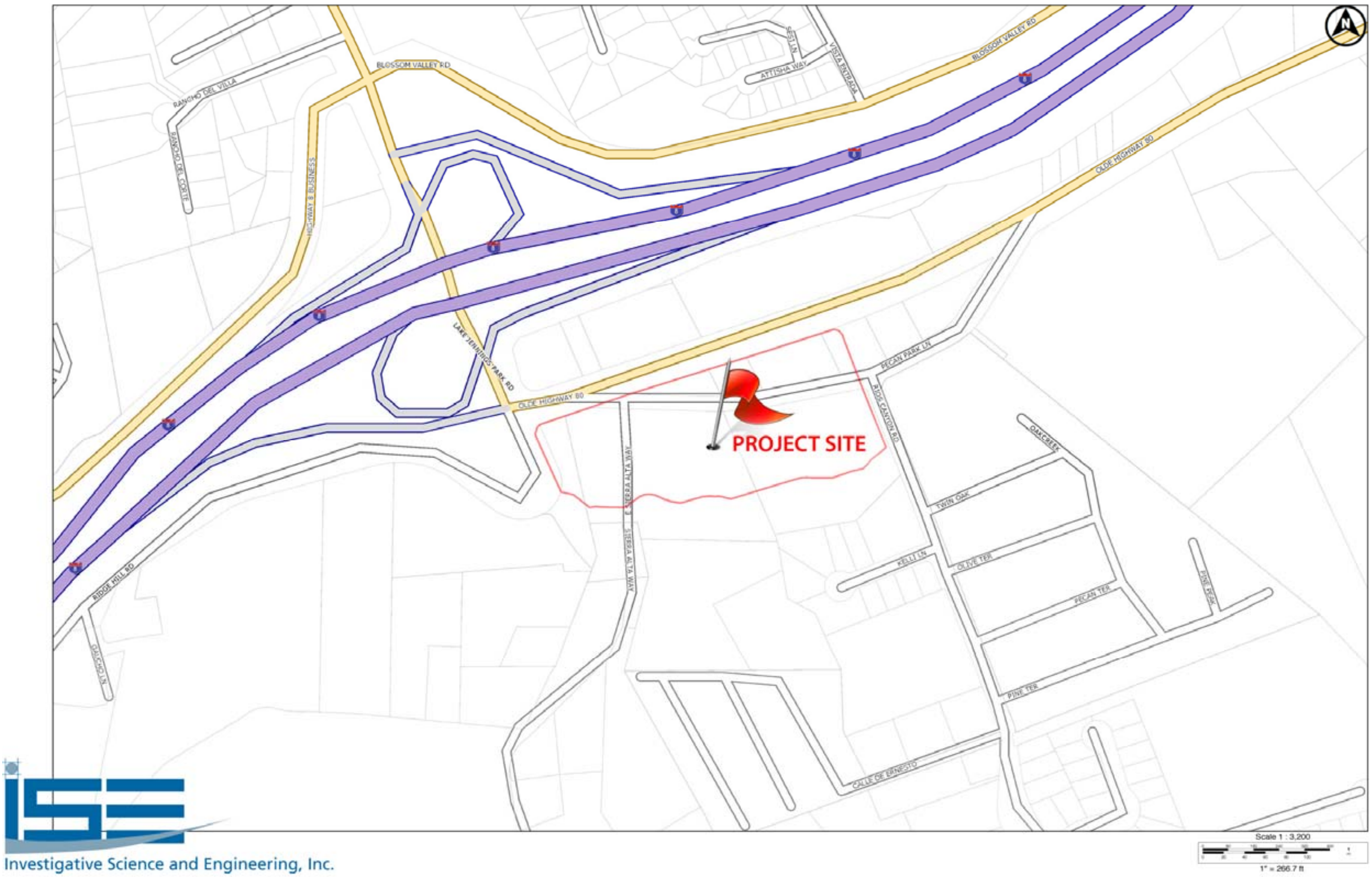

FIGURE 2: Project Study Area Parcel Map (ISE 7/14)

FIGURE 3: Aerial Image Showing Lake Jennings Market Place and Surrounding Uses (ISE 7/14)

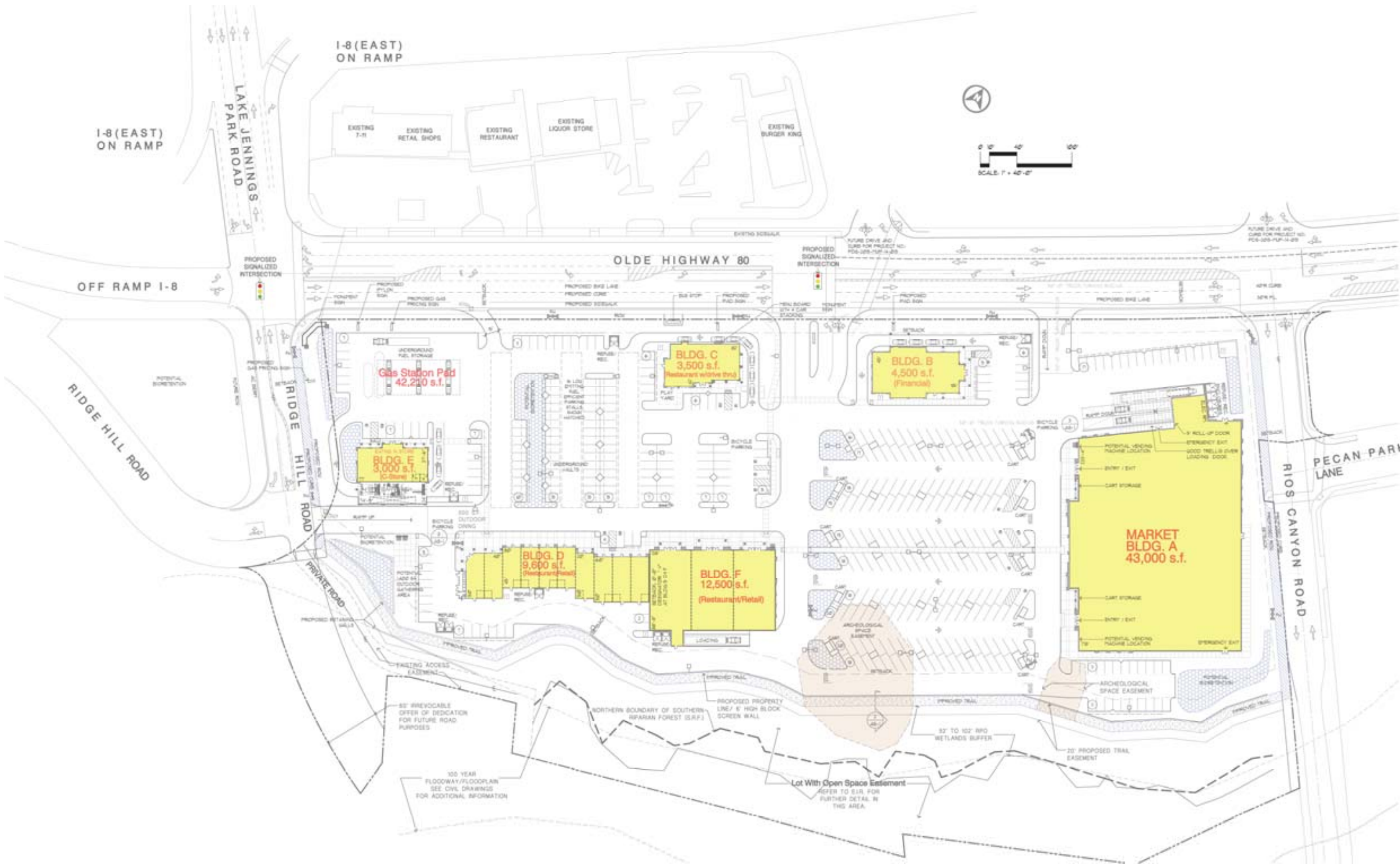

FIGURE 4a: Proposed Lake Jennings Market Place Development Map (Smith Consulting Architects 1/15)

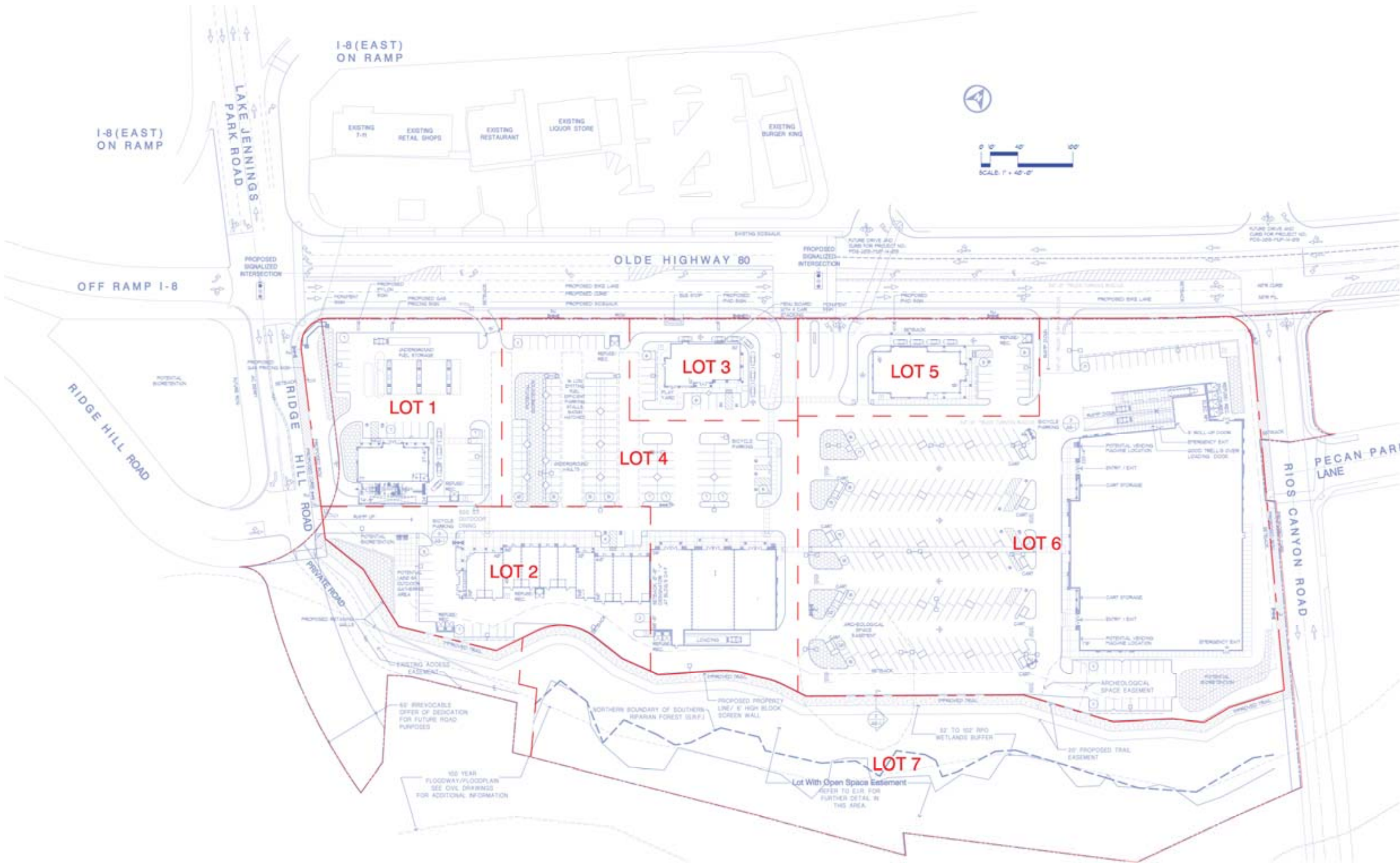

FIGURE 4b: Proposed Lake Jennings Market Place Internal Lot Plan (Smith Consulting Architects 1/15)

Acoustical Definitions and Theory

Sound waves are linear mechanical waves. They can be propagated in solids, liquids, and gases. The material transmitting such a wave oscillates in the direction of propagation of the wave itself. Sound waves originate from some sort of vibrating surface, which alternatively compress the surrounding air on a forward movement, and expand it on a backward movement.

There is a large range of frequencies within which linear waves can be generated, sound waves being confined to the frequency range that can stimulate the auditory organs to the sensation of hearing. For humans, this range is from about 20 Hertz (Hz or cycles per second) to about 20,000 Hz. The air transmits these frequency disturbances outward from the source of the wave.

Noise can be represented as a superposition of periodic waves with a large number of random components, and is generally defined as unwanted or annoying sound which interferes with, or disrupts human activities. Although exposure to high noise levels has been demonstrated to cause hearing loss, the principal human physiological response to environmental noise is annoyance.

The loudest sounds that the human ear can hear comfortably are approximately one trillion (or 1×10^{12}) times the acoustic energy that the ear can barely detect. Because of this vast range, any attempt to represent the acoustic intensity of a particular sound on a linear scale becomes unwieldy. As a result, a logarithmic ratio, originally conceived for radio work, known as the decibel (dB), is commonly employed.[1]

A sound level of zero "0" dB is scaled such that it is defined as the threshold of human hearing, and would be barely audible to a human of normal hearing under extremely quiet listening conditions. Sound levels above 120 dB roughly correspond to the threshold of pain. The minimum change in sound level that the human ear can detect is approximately 3.0 dBA.[2] A change in sound level of 10 dB is usually perceived by the average person as a doubling (or halving) of the sound's loudness.[3] A change in sound level of 10 dB actually represents an approximate 90 percent change in the sound intensity, but only about a 50 percent change in the perceived loudness. This is due to the nonlinear response of the human ear to sound.

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[1] A unit used to express the relative magnitude of a sound wave. This level is defined as being equal to 20 times the common logarithm of the ratio of the pressure produced by a sound wave of interest, to a 'reference' pressure wave equal to 20 micro Pascal's (μPa) measured at a distance of 1 meter. 20 μPa is the smallest amount of pressure capable of producing the sensation of hearing in a human.

[2] Every 3 dB equates to a 50% drop (or increase) in wave strength; therefore a 6 dB drop/increase = a loss/increase of 75% of total signal strength and so on.

[3] This is a subjective reference based upon the nonlinear nature of the human ear.

As mentioned above, most of the sounds we hear in the environment do not consist of a single frequency, but rather a broad band of frequencies differing in sound level. The intensities of each frequency add to generate the sound we hear. The method commonly used to quantify environmental sounds, consists of determining all of the frequencies of a sound according to a weighting system that reflects the nonlinear response characteristics of the human ear. This is called "A" weighting, and the decibel level measured is called the A-weighted sound level (or dBA). In practice, the level of a noise source is conveniently measured using a sound level meter that includes a filter corresponding to the dBA curve.

Although the A-weighted sound level may adequately indicate the level of environmental noise at any instant in time, community noise levels vary continuously. Most environmental noise includes a conglomeration of sounds from distant sources that create a relatively steady background noise in which no particular source is identifiable. For this type of noise, a single descriptor called the Leq (or equivalent sound level) is used. Leq is the energy-mean A-weighted sound level during a measured time interval, and would be defined mathematically by the following continuous integral,

$$L_{eq} = 10Log_{10}\left[\frac{1}{T}\int_{0}^{T} SPL(t)^2\,dt\right]$$

In the previous expression, L_{eq} is the energy equivalent sound level, t is the independent variable of time, T is the total time interval of the event, and, SPL is the sound pressure level *re. 20* μ*Pa*. Thus, L_{eq} is the ‘equivalent’ constant sound level that would have to be produced by a given source to equal the average of the fluctuating level measured. For most acoustical studies, the study interval is generally taken as one-hour and the abbreviation used is $L_{eq\text{-}h}$ or $L_{eq(h)}$; however, other time intervals are utilized depending on the jurisdictional preference.

To describe the time-varying character of environmental noise, the statistical noise descriptors L_{10} and L_{90} are commonly used. They are the noise levels equaled or exceeded during 10 percent and 90 percent of a stated time. Sound levels associated with the L_{10} typically describe transient or short-term events, while levels associated with the L_{90} describe the steady state (or most prevalent) noise conditions. In addition, it is often desirable to know the acoustic range of the noise source being measured. This is accomplished through the maximum and minimum measured sound level (L_{max} and L_{min}) indicators. The L_{min} value obtained for a particular monitoring location is often called the *acoustic floor* for that location.

The aggregate of all community noise events are typically averaged into a single value known as the *Community Noise Equivalent Level* (CNEL). This descriptor is calculated by averaging all events over a specified time interval, and applying a 5-dBA penalty to any sounds occurring between 7:00 p.m. and 10:00 p.m., and a 10-dBA penalty to sounds that occur during nighttime hours (i.e., 10 p.m. to 7 a.m.). This penalty is applied to compensate for the increased sensitivity to noise during the quieter nighttime hours.

Mathematically, CNEL can be derived based upon the hourly L_{eq} values, via the following expression where, $L_{eq}(x)_i$ is the equivalent sound level during period x at time interval i, and n is the number of time intervals:

$$CNEL = 10Log_{10}\frac{1}{n}\sum_{i=1}^{n}\left(10^{\frac{Leq(day)_i}{10}} + 10^{\frac{Leq(evening+5)_i}{10}} + 10^{\frac{Leq(night+10)_i}{10}}\right)$$

Ground Vibration and Dynamics Definitions

Vibration is generally defined as any oscillatory motion induced in a structure or mechanical device as a direct result of some type of input excitation. The object (either structure or machine) of interest typically has sufficient inertia (defined as the quantity ‘m’) so that by Newton’s first law of motion, its rest state is one of zero vibration with the velocity (v) = 0. Input excitation, generally in the form of an applied external force (F_{Ext}) or displacement, is the mechanism required to start some type of vibratory response.

Thus,

$$\frac{d}{dt}(mv) = \sum\nolimits_{Ext} F = 0$$

Once an object begins to respond to an applied excitation (F ≠ 0), its natural tendency is to vibrate as a linear combination of its natural frequencies. A natural frequency is defined as the frequency at which an object will vibrate if set into motion and allowed to move freely. Any continuous system of particles (such as a building or motor assembly) will have an infinite number of natural frequencies, with each one adding to the overall response, in a sea of ever-decreasing contributions.

As the frequency (f) of the excitation approaches one of the object’s natural frequencies the magnitude of the object’s vibratory response (e.g., displacement) increases until, when the two frequencies are exact, a condition known as *resonance* arises. At resonance, the amplitude of the response of the object theoretically approaches infinity. The only natural mechanism available to temper the catastrophic effects of resonance is the object’s own inherent level of damping.

Little is still currently known about the actual physical mechanisms that produce damping in an object, although, a great deal is known about what effects it produces. Damping can be thought of as a type of ‘drag force or resistance’ that is always present to some degree in an object and serves to remove energy from the vibrating system as it moves. Artificial damping is used routinely in mechanical devices and takes the form of shock absorbers, viscous isolation materials, and simple friction.

In structures or soils/rock, damping is generally present within the material itself and hence is called ‘*material damping*’. The cause of this damping is due to the interactions between the molecular lattice structures comprising the material itself. Damping of surface (or *Rayleigh*) waves in soils typically occurs as a combination of distance attenuation (*radiation damping*) and material damping. The latter is commonly approximated using a linear damping model that assumes the overall material damping to increase as a function of distance between the source and receiver (i.e., the more soil between the source and receiver, the greater the material damping level).

The final inherent property of a vibrating system is its stiffness (k). The stiffness of a system is what allows an object to store the energy imparted to it through an excitation, and redistribute it in the form of a vibration. Without some form of stiffness, an object simply will not vibrate. Mechanical forms of stiffness take the form of springs, while in a structural and soil system the stiffness is inherent in the material.

Table 2 provides a tabular representation of typical vibration sources and their effects on buildings, equipment, and humans. The peak ground velocity produced by various disturbances is given throughout a wide spectrum ranging from the infinitesimal to the severe. This chart is a compilation from various sources (textbooks, research papers, international standards, and past demonstrated engineering tolerance levels).

For most practical applications, induced mechanical and/or structural vibrations are a thing to be avoided, since they are generally unwanted and according to their magnitude can produce physical discomfort, misalignment of equipment, loosening of mechanical fasteners, product defects, and skewed research results. In the case where the excitation frequency is close to resonance or of sufficient magnitude (such as in an earthquake), severe structural damage can occur.

Finally, in a manner similar to the measurement of environmental noise, ground borne vibration varies as a function of time (t) and/or frequency. Thus, it is convenient to describe this ground motion in terms of single number descriptors, such as the maximum and/or peak particle velocities ($Lmax_{VRMS}$ or $Lmax_{VPEAK}$).

TABLE 2: Typical Vibration Sources and Sensitivities

	Environmental Ground Vibration Sources (Typically Measured at 50 Feet from Source)			Observed Effects and Tolerances		
Peak Ground Velocity (in/Sec)	**Transportation Sources**	**Construction Sources**	**Natural Sources**	**Structural Effects**	**Human Response**	**Typical Engineering Tolerances**
100			San Francisco, CA Earthquake 4/18/06 Sana Cruz, CA Earthquake 10/17/89		Intolerable	
10		Quarry Blasting Construction Blasting	Coalinga, CA Earthquake 5/2/83	Structural Damage Minor Damage Low Probability of Damage	Extremely Unpleasant Very Unpleasant Unpleasant	Human Exposure (ISO Limits) 1 Minute 1 Hours 8 Hours 24 Hours
1.0		Pile-Driving	Typical Moonquake	Very Safe to Buildings		
0.1	Subway Train (Above Tunnel)	Truck or Dozer Typical Construction Grading Equipment			Strongly Noticeable Easily Noticeable	Computers Office
0.01	Motor Vehicle Traffic on Rough Roadway Motor Vehicle Traffic on Smooth Roadway	Handheld Jackhammer Blasting at 500 ft.	Micro-Meteorite Impacts		Barely Perceptible Imperceptible	Residences Optical Microscopes
0.001						
0.0001	Truck on Rough Roadway	Pile Driving at 500 ft.				Electronic Microscopes

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ENVIRONMENTAL SIGNIFICANCE THRESHOLDS

California Environmental Quality Act (CEQA) Noise Thresholds

Section 15382 of the California Environmental Quality Act (CEQA) guidelines defines a significant impact as,

> *"… a substantial, or potentially substantial, adverse change in any of the physical conditions within the area affected by the project including land, air, water, minerals, flora, fauna, ambient noise, and objects of historic or aesthetic significance."*

The minimum change in sound level that the human ear can detect is approximately 3-dBA. This increment, 3-dBA, is commonly accepted under CEQA as representing the point where a noise level increase would represent a significant impact. Therefore, a traffic noise increase of 3-dBA CNEL is accepted by the County of San Diego as the significance threshold to determine the proposed project action's impact on the affected environment.

San Diego County Noise Ordinance Regulations

Construction Noise Requirements

The County of San Diego Noise Ordinance Sections 36.409 through 36.410 govern construction noise emissions and allowable daily thresholds. The relevant parts are cited below.

Section 36.409: Sound Level Limitations on Construction Equipment Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received.

Section 36.410: Sound Level Limitations on Impulsive Noise

a) Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level… {of 82 dBA within a residential, village zoning or civic use area, or 85 dBA within an agricultural, commercial or industrial use zone}, …when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period. The maximum sound level depends on the use being made of the occupied property.

b) Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level… {of 85 dBA within a residential, village zoning or civic use area, or 90 dBA within an agricultural, commercial or industrial use zone}, …when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period. The maximum sound level depends on the use being made of the occupied property.

c) The minimum measurement period for any measurements conducted under this section shall be one hour. During the measurement period a measurement shall be conducted every minute from a fixed location on an occupied property. The measurements shall measure the maximum sound level during each minute of the measurement period. If the sound level caused by construction equipment or the producer of the impulsive noise exceeds the maximum sound level for any portion of any minute, it will be deemed that the maximum sound level was exceeded during that minute.

Noise Ordinance Section 36.404

San Diego County Noise Ordinance Section 36.404 governs operational noise as a function of the time of day and the applicable land use zone as shown in Table 3.[4]

TABLE 3: County of San Diego Noise Ordinance Limits

Land Use Zone	Time of Day	1-Hour Average Sound Level (dBA L_{eq})
RS, RD, RR, RMH, A70, A72, S80, S81, S87, S90, S92, RV, and RU w/ density less than 11 DU/AC	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45
RRO, RC, RM, S86, V5, RV and RU w/ density of 11 or more DU/AC	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50
S94, V4, and all commercial zones	**7 a.m. to 10 p.m.** **10 p.m. to 7 a.m.**	**60** **55**
V1, V2	7 p.m. to 10 p.m.	55
V1, V2	10 p.m. to 7 a.m.	V1 = 55, V2 = 50
V3	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	70 65
M-50, M-52, and M-54	Anytime	70
S82, M56, and M58	Anytime	75
S88	S88 zones are Specific Planning Areas. Refer to the Specific Plan for the site for applicable standards.	

Source: County of San Diego Noise Ordinance Section 36.404, 1981.[5]

[4] For the purposes of compliance with nearby sensitive receptors, sound levels are measured at the boundary of the property, or properties, containing the noise source. In the case where two adjacent property lines differ in zoning, the applicable threshold would be the arithmetic average of the two standards.

[5] Amended by Ord. No. 7094 (N.S.), effective 3-25-86; amended by Ord. No. 9478 (N.S.), effective 7-19-02; amended by Ord. No. 9621 (N.S.), effective 1-9-04; amended by Ord. No. 9962 (N.S.), effective 1-9-09.

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The proposed Lake Jennings Market Place would be located within a proposed commercial zone, with the adjacent uses to the north, east, and west having a similar zoning, or consisting of a local connecting roadway. For these uses, the applicable property line standards would be 60 dBA $L_{eq\text{-}h}$ between the hours of 7:00 a.m. and 10:00 p.m., and 55 dBA $L_{eq\text{-}h}$ between the hours of 10:00 p.m. and 7:00 a.m.

Properties to the immediate south of the project site (across the creek area) are zoned RV and RS. The applicable property line standard in this case would be the arithmetic average of this zone and the proposed Lake Jennings Market Place commercial zone. In this case, the standard would be 55 dBA $L_{eq\text{-}h}$ between the hours of 7:00 a.m. and 10:00 p.m., and 50 dBA $L_{eq\text{-}h}$ between the hours of 10:00 p.m. and 7:00 a.m.

County of San Diego Ground Motion Standards

The County of San Diego currently does not have a set of ground motion thresholds for structures and humans as it pertains to construction sources such as extractive blasting. General constraints associated with blasting criteria within the County are governed by County's Consolidated Fire Code.[6] The general assumption is that vibration damage produced by any source (not just those of seismic origin) would need to be minimized to the maximum extent possible using conventional engineering criteria. This is typically deferred to various ground vibration standards currently in effect (such as Bureau of Mines, International Organization for Standardization or ISO, Uniform Building Code or UBC, etc.).

<u>U.S. Bureau of Mines RI 8507 Vibration Criteria</u>

The United States Bureau of Mines provides a well-defined impact guide to vibration on structures. This assessment was originally developed to catalog the observable effects of blasting on structures, due to ground vibration. The criteria are well accepted for all types of ground vibration excitation, since the fundamental parameter in all cases is the peak particle velocity ($Lmax_{VPEAK}$) of the receiving structure. This criterion is identified in Table 4 on the following page.

The standards are based upon the Bureau of Mines report RI 8507 entitled "*Structure Response and Damage Produced by Ground Vibrations from Surface Blasting*". This criterion presented, which is similar to the earlier Bureau of Mines *Bulletin 656*, sets the maximum peak particle velocity as a function of frequency. It has been shown by the Bureau that these vibratory excitation levels would produce negligible effects (displacement, fatigue, and damage) in conventionally constructed structures (i.e., structures built within the past 100 years).

[6] Source: County of San Diego Consolidated Fire Code Sec 3301 et. seq., Revised 10/28/11 (http://www.sdcounty.ca.gov/pds/docs/cosd-fire-code.pdf).

TABLE 4: US Bureau of Mines RI 8507 Ground Vibration Standards

Vibration Frequency Component (*f*) (Hz.)	Maximum Allowable Peak Particle Velocity (inches per second)
2.5 to 10.0	0.05
11.0 to 40.0	0.05 x ***f***
> 40.0	2.0

It is noted for clarification that the maximum allowable peak particle velocity for the range of frequencies between 11.0 and 40.0 Hz. is limited to the value of 0.05 times the dominant frequency (*f*). Thus, if the frequency were 30.0 Hz. the maximum allowable particle velocity at the monitoring point would be 1.5 inches per second.

For conventionally constructed structures, such as the surrounding residential structures, a common upper *rule-of-thumb* for vibration exposure is a maximum of 2.0 inches per second (with the applicable adjustments for frequency as shown in Table 4). Levels for historic or antiquated structures are typically half this value, or 1.0 inch per second (again, adjusted for frequency content).

ISO Human Vibration Standards

The International Organization for Standardization (ISO) has developed design goals based on human response to vibration. Typical tolerance requirements pertaining to vibration effects on machines and structures are generally a function of the object's construction, projected service life, materials used, design strategy, operational environment, and resilience to unexpected types of loading. For the types of equipment proposed, these factors (and many more) contribute to the overall service life of the structure.

ISO Standard 2631 Part 2 entitled "*Evaluation of human exposure to whole body vibration - Continuous and shock induced vibration in buildings*" contains guidelines pertaining to human exposure to vibration. The recommended continuous excitation levels (in Leq_{VRMS}) are based upon various types of activities and building occupancy. The ISO human vibration standards are shown in the last column of Table 2.

Additionally, maximum (or shock induced) vibration levels have a lower recommended level, as shown in Table 5. The criterion is based upon the maximum RMS 1/3 octave band level ($Lmax_{VRMS}$) measured, and would be utilized when siting a proposed vibration sensitive project.

TABLE 5: ISO 2631 Recommended Maximum Single Event Vibration Levels

Land Use Classification	Recommended RMS Maximum 1/3 Octave Band Vibration Level (in/sec)
Residential (Daytime)	0.007
Residential (Nighttime)	0.005
School Areas (Anytime)	0.007
Office Buildings	0.015

Source: ISO Standard 2631 - Part 2

APPROACH AND METHODOLOGY

Field Reconnaissance Survey Protocol

Acoustical Field Reconnaissance

Two independent monitoring locations were selected within the proposed Lake Jennings Market Place site for the purpose of determining the ambient baseline community noise levels during normal free-flow weekday traffic conditions. The instrumentation locations, denoted as Monitoring Locations ML 1 (near the proposed gas station), and ML 2 (near the proposed southern corner of market building 'A'), are shown in Figure 5. Measurements were performed on 7/9/14, between 10:00 a.m. and 1:00 p.m., under normal traffic conditions.

For the field monitoring effort, two Quest SoundPro SP-DL-2 ANSI Type 2 integrating sound level meters were used as the data collection devices. The meters were affixed to tripods five-feet above ground level, in order to simulate the noise exposure of an average-height human being. Photos of the ambient acoustical monitoring are provided as an attachment to this report.

Ambient Ground Vibration Monitoring Procedure

Two vibration-monitoring locations (VL 1 and VL 2) were instrumented using a Kinemetrics *Ranger Model SS-1* moving-coil short period field seismometer. This instrument, which is a terrestrial version of the lunar seismometer developed for NASA, is a direct velocity-reading instrument capable of measuring inertial changes into the micro-inch-per-second range (the equivalent of footfalls one city block away).

Locations VL 1 and VL 2 are shown in Figure 6, and are representative of the ground motion conditions adjacent to the dominant traffic vibration generation area (VL 1), and the closest receptor point radius to the proposed blasting activities (VL 2). The generator constant of the seismometer used was 9070 mV/in/sec with a natural period of one second. Photos of the ambient ground vibration monitoring are provided as an attachment to this report.

The seismometer was positioned in the vertical (z- axis) direction consistent with the ground excitation direction. All signals were fed through shielded cable to a Stanford research Systems Model SR 760 FFT spectrum analyzer for analysis and recording. The measurement spectrum examined, ranged between 0 Hz and 50 Hz, which is the entire usable range of most civil vibration problems. The cable length used was at least 75 feet to ensure adequate isolation of the experimenter and the monitoring location. Prior to testing, all equipment was calibrated at ISE's acoustics and vibration laboratory to verify conformance with ANSI S1-4 1983 Type 2 and IEC 651 Type 2 standards.[7]

Construction Impact Assessment Approach

Construction Noise Impact Modeling

Major construction noise emission generators expected within the Lake Jennings Market Place site would consist predominately of diesel-powered grading and earthwork equipment required for grading activities, underground work, and surface paving. The proposed Lake Jennings Market Place project site would be cleared and graded over the course of approximately eight (8) months (240 days) as shown in Table 6.

Construction noise present at the project site was based upon past measured levels and sources from EPA PB 206717 of each expected equipment type, the duty cycle and load factor of each of the equipment components, and the expected average noise level (over a given eight-hour workday), as well as the expected worst-case noise level at the nearest sensitive receptor.

Cumulative (i.e., worst case aggregate) levels were calculated for a range of expected worst-case noise emissions from proposed equipment at the boundary line of a sensitive receptor, under spherically-soft ground propagation conditions, and compared against the aforementioned County of San Diego Noise Ordinance Sections 36.409 through 36.410.

[7] All testing and calibration is performed by ISE's Acoustics and Vibration Laboratory using a LORAN-C and Rubidium atomic frequency and time standard traceable to National Institute of Standards & Technology (NIST). The time and frequency calibration signal has a long-term stability of 10^{-10}. Specifications for traceability can be obtained at *www.nist.gov*.

TABLE 6: Anticipated Construction Grading Phasing Plan

Phase	Operation	Duration (Months)	Activities Completed
1	Clearing and Grubbing of Site	0.5	Removal of all site debris. Demolition of existing structures and infrastructure. Removal of all vegetation.
2	Alluvial Excavation	3.0	Excavate center section of project site to a depth of 18-feet to remove unconsolidated alluvial materials. Stockpile materials in southern portion of project site. Cover sensitive paleontological area with GeoGrid material, and backfill to approximately three feet.
3	Drill, Blast, and Excavate Existing Rock	1.0	Drill and blast at eastern rock removal locations. Mechanical excavation of rock material at western locations.
4	Backfill Alluvial Excavation Areas with Rock	1.0	Backfill alluvial excavation area with oversized rock spoils.
5	Finish Rough Grading Operations and Underground Work	2.5	Complete rough grading operations by removal of alluvial excavation and placement onsite. Bring final site to rough pad elevation. Complete underground utility placement and terminations.

FIGURE 5: Ambient Noise Monitoring Locations ML 1 and ML 2 (ISE 7/14)

FIGURE 6: Ambient Vibration Monitoring Locations VL 1 and VL 2 (ISE 7/14)

Potential blasting operations were based upon a representative charge weight required to rip the onsite rock mass using a conventional shot pattern.[8] Source noise levels due to blasting were then calculated assuming Ammonium Nitrate / Fuel Oil (or ANFO) prills (pellets) will be used as the blasting compound. Emission levels were predicted using the U.S. Army CERL *Peakest* computer model. The *Peakest* model utilizes semi-empirical blast response data to generate an equivalent airborne noise level.

Construction-Related Ground Motion Modeling

Ground motion due to proposed blasting operations was examined using two different methods, each providing differing levels of insight into the propagation of surface vibration waves, and their effect on the closest structural receptors (which are different from the closest residential receptors), approximately 50 feet distant. These methods are described below.

A ground vibration assessment was performed using ISE's *WaveProp 2.0* program. The *WaveProp* program calculates the maximum theoretical ground response based upon a single degree of freedom (SDOF) dynamic curve fit of the experimental data. The program essentially seeks to mathematically fit the SDOF system, $\ddot{u} + 2\xi\omega_n\dot{u} + \omega_n{}^2 u = H(\Omega)$ to the experimentally measured data as a function of time and distance.

In the previous expression, $\ddot{u}$, $\dot{u}$, and u represent the acceleration, velocity, and displacement motion of the soil, ζ represents the level of soil damping per foot (which was taken at an average level of 0.00045 per foot based upon the field monitoring results), ω_n represents the natural frequency of the system (which is a function of the soil type) and $H(\Omega)$ is the applied initial input excitation (blasting vibration input) as a function of frequency.

The model output is a graphical representation of the vibratory decay response as a function of distance from the source blast detonation point to the closest receptor. At distances beyond the point where the vibration drops below the thresholds indicated above, no impacts to sensitive structures would be indicated.

Additionally, a more refined method of predicting ground motion due to construction activity was performed using ISE's *R-Wave 2.6* Program. The *R-Wave* program calculates the maximum theoretical Rayleigh wave response using a constrained boundary element method, based upon input considerations such as maximum soil particle excitation and dynamic material properties.[9,10] The motion of the advancing Rayleigh waves' particle response, which the model predicts as a function of

[8] Source: International Society of Explosives Engineers / DuPont, 1998.

[9] A complete treatment and discussion of the model and underlying theory can be found in the following document, *"Determination of Blast-Induced Dynamic Soil Response Using Axisymmetric Boundary Elements – © Rick Tavares, UCI Press, 2001".*

[10] Rayleigh waves are the slowest of all the seismic wave types and in some ways the most complicated. They are dispersive waves (with the soil particles moving in retrograde elliptical paths), so the particular speed at which they travel depends on the wave period and the near-surface geologic structure. These waves also decrease in amplitude with depth. Typical speeds for Rayleigh waves are on the order of 1 to 5 km/s.

frequency (for dispersion analysis), and depth below the soil/rock is shown graphically in Figure 7.

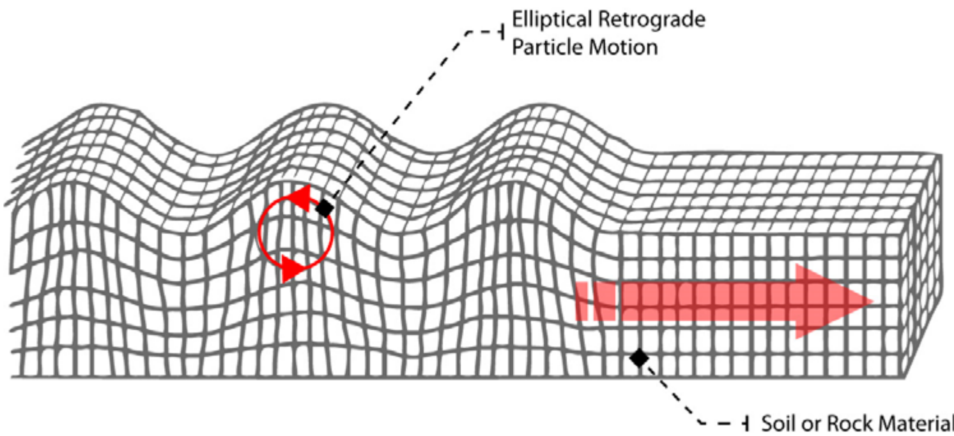

FIGURE 7: Typical Rayleigh Wave Propagation Profile (ISE 1/15)

Traffic Segment Impact Assessment Approach

The ISE *RoadNoise v2.4* traffic noise prediction model, which is based upon the Federal Highway Administration's RD-77-108 Noise Prediction Model with FHWA/CA/TL-87/03 noise emission factors, was used to calculate the increase in vehicular traffic noise levels, due to the proposed Lake Jennings Market Place site, along all identified major servicing roadways.[11] The model assumed a 3.0-dBA loss per doubling of distance (DD) propagation rule, and a 95/3/2 mix of automobiles/midsize vehicles/trucks, thereby yielding a representative worst-case noise contour set.

Stationary Onsite Noise Assessment Approach

Proposed onsite noise sources, consisting of 42 rooftop-mounted HVAC units, one hydraulic trash compactor, and one enclosed car wash tunnel, were modeled in a three-dimensional fashion using the ISE Industrial Source Model (IS^3) v4.0.[12] Significant attenuative features of the model included the proposed onsite architectural structural facades, a minimum three-foot-high rooftop parapet on each building, and ground absorption effects.

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[11] Source: Lake Jennings Market Place Traffic Impact Study, KOA Corporation, 11/11/14.

[12] The ISE *Industrial Source Model* (*IS^3*) *v4.0* provides a visual representation of an acoustic field pattern across any three-dimensional surface, factoring in the effects of topographic and structural interference, apparent receptor elevation, static reflection from objects, multiple material attenuative sources, variable propagation rates and source types, and atmospheric scattering. The IS^3 model calculates the predicted acoustic field pattern using a vector-based summation of all source-receptor pairs. The resulting output consists of an isogram containing the predicted acoustic field.

Rooftop HVAC / Trash Compactor Modeling

Rooftop HVAC units were assumed to consist of hemi-spherical acoustical radiators having a mean emissive spectra of 800-Hz, and a reference sound pressure level of 75 dBA at 15-feet (a conservative assumption given that final HVAC product selection is unknown at this time). The trash compactor unit was modeled at 80 dBA at 15-feet based upon conservative estimates. Both sets of acoustic sources are shown in Figure 8a on the following page, with reference distances to associated property lines shown in Figure 8b. All units were modeled under worst-case (duty cycle of 100%) conditions assuming continuous and simultaneous operation.

Car Wash Equipment Modeling

The proposed car wash equipment, chosen as a Coleman Hanna Micro 40 system shown in Figures 9a and -b, indicate a worst-case instantaneous level of 89 dBA at 15 feet from the source (as provided as an attachment at the end of this report). This source is due entirely to the final stage of the car washing process, notably the air-drying phase, which is roughly 10 dBA greater than any other process cycle, and thus dominates the acoustical environment.

The maximum throughput of any automated car wash system is roughly one car every six minutes. This equates to a worst-case scenario of 10 cars per hour, with a maximum drying cycle time for the Micro 40 system of one-minute per car, or 10 minutes during each hour of continuous operation.

Mathematically, this equates to the following per-hour noise emission from the car wash tunnel as measured at 15 feet:

$$
\begin{aligned}
L_{\text{eq-h}} &= 89\ \text{dBA} + 10\, g Log_{10}\left(\frac{10}{60}\right)\ \text{dBA} \\
&= 89\ \text{dBA} - 7.78\ \text{dBA} \\
&= 81.2\ \text{dBA}
\end{aligned}
$$

Further, the car wash tunnel was modeled as an elevated point source with a similar mean emissive spectra of 800-Hz. A clockwise movement of automobiles into the facility was required by design to minimize internal property line noise exposure to the east, as requested by the County.

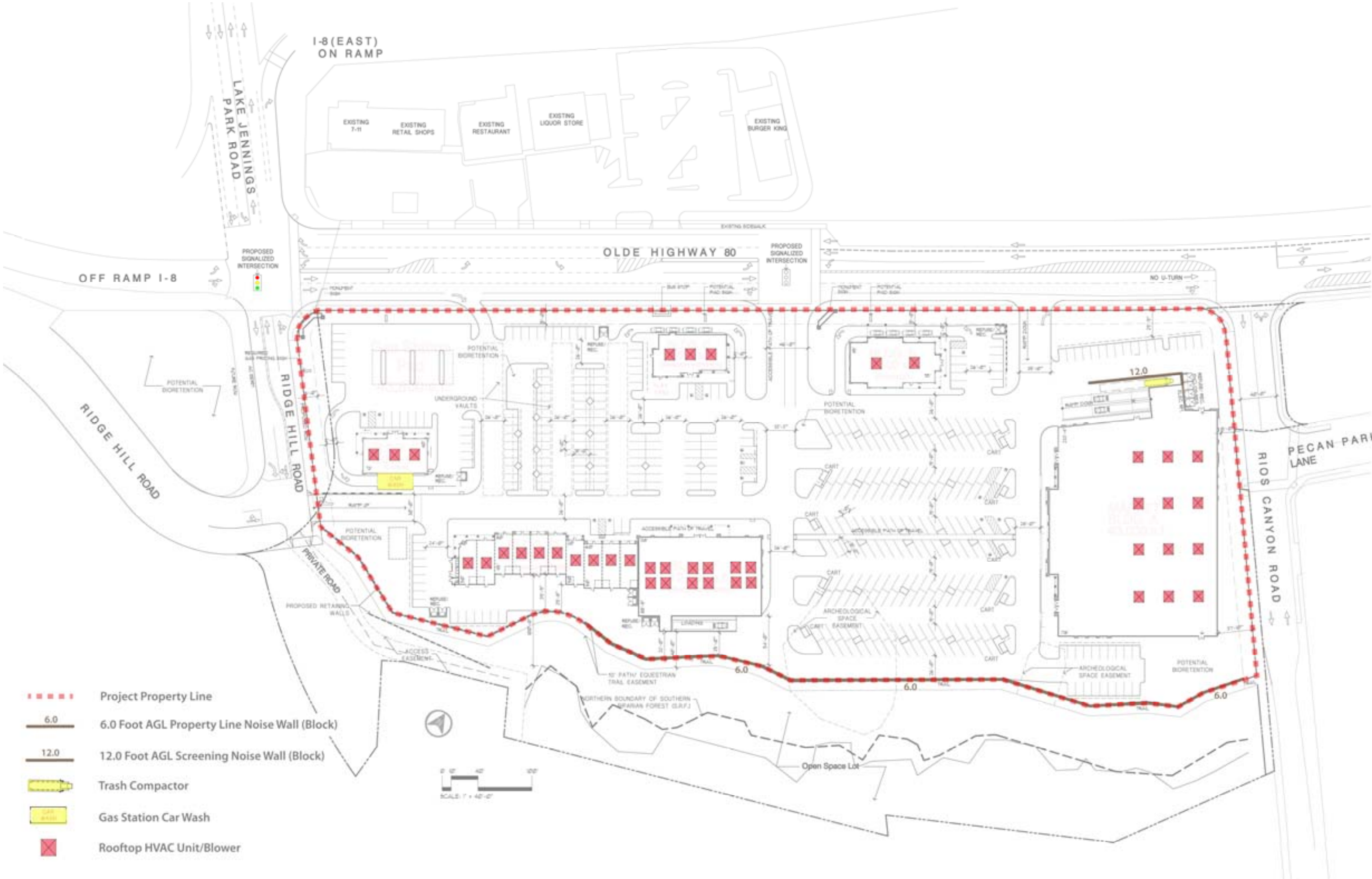


FIGURE 8a: Lake Jennings Market Place Onsite Noise Sources (ISE 11/14)

FIGURE 8b: Representative Distances to Onsite Noise Sources from Closest Property Lines (ISE 11/14)

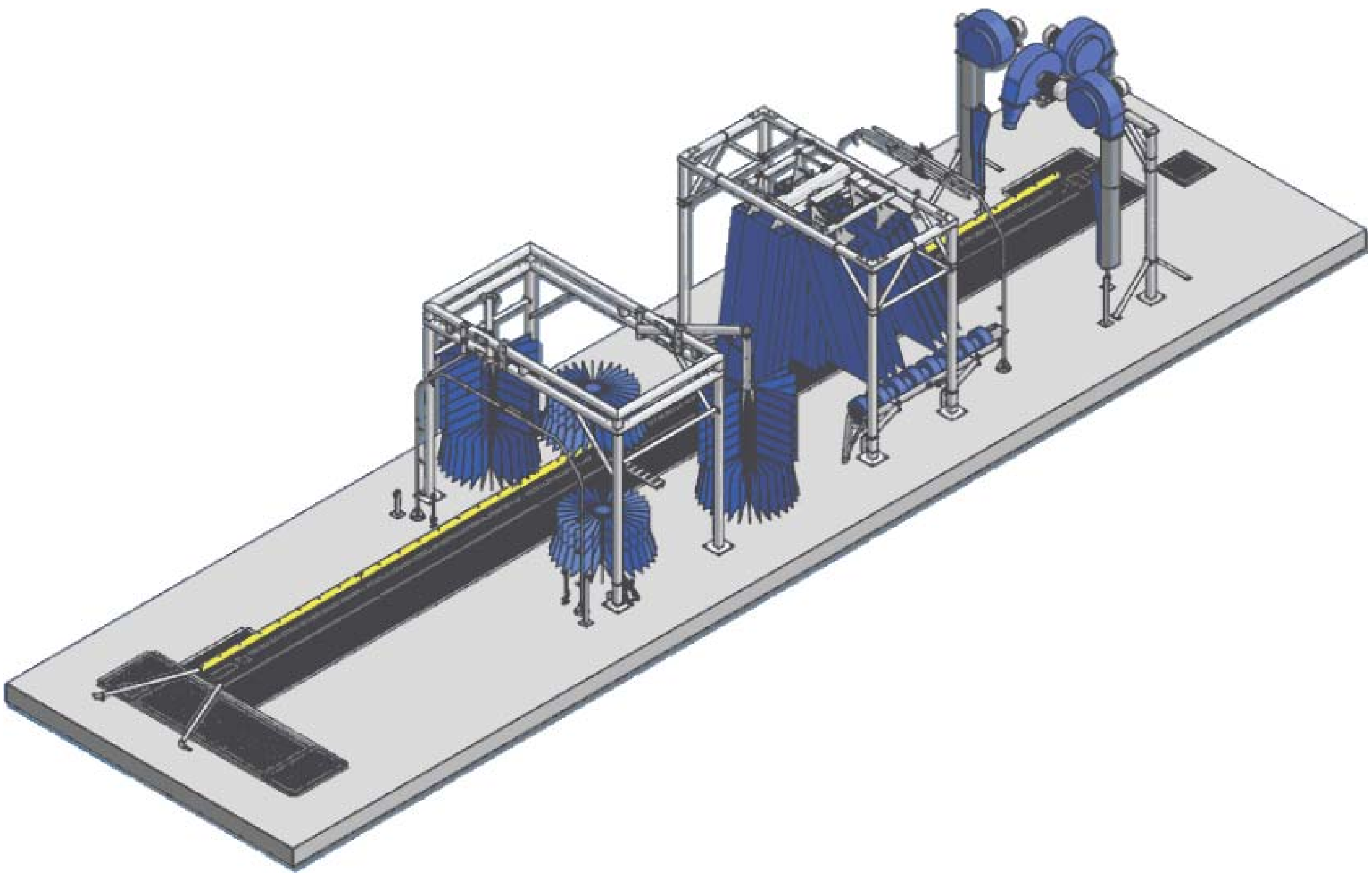


FIGURE 9a: Isometric View of Typical Micro 40 Car Wash System (Coleman Hanna 1/15)

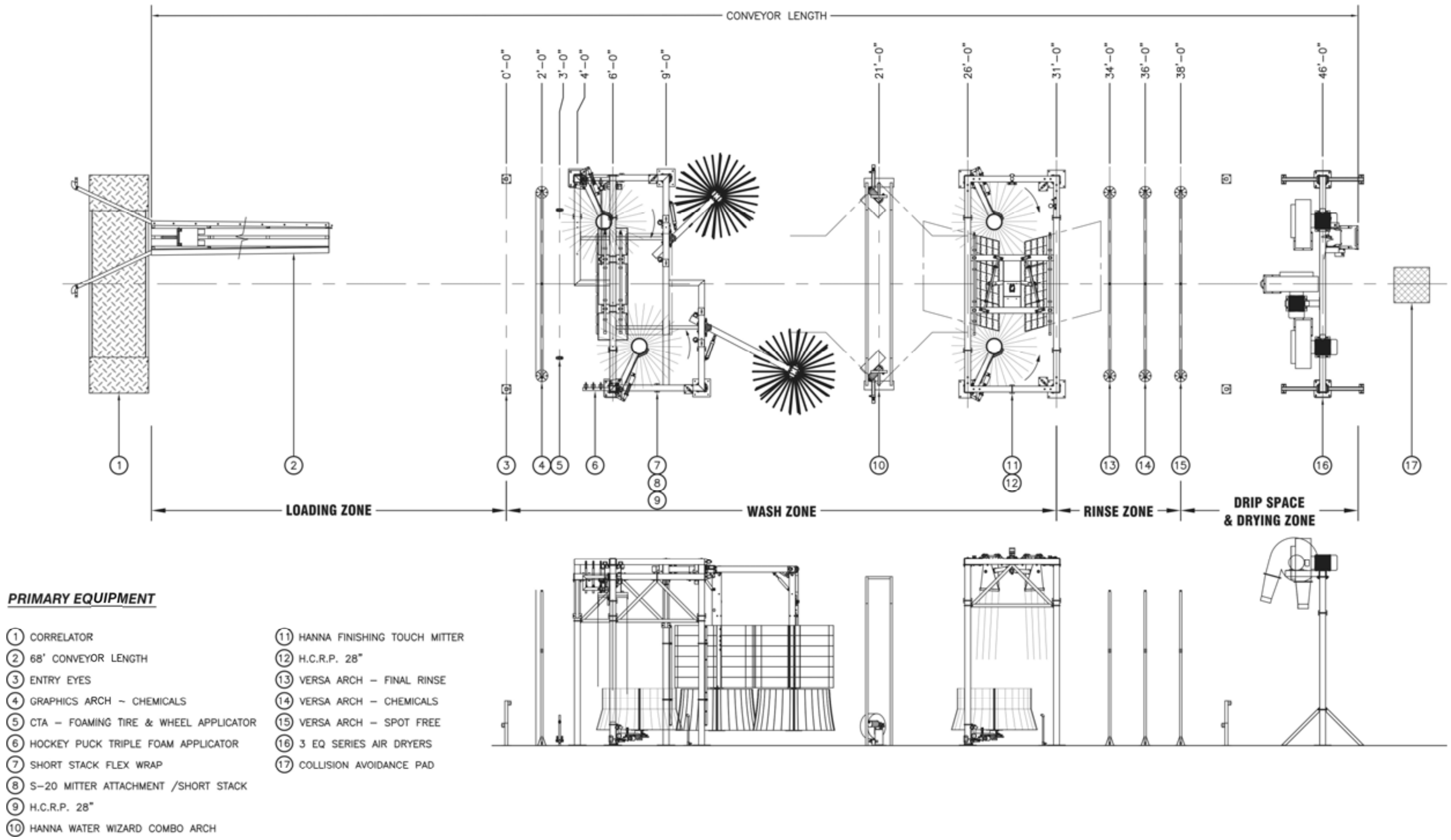


FIGURE 9b: Schematic View of Micro 40 Car Wash System (Coleman Hanna 1/15)

FINDINGS AND RECOMMENDATIONS

Field Reconnaissance Findings

Acoustical Field Monitoring Findings

The results of the field reconnaissance sound level monitoring are shown in Table 7 with the field data record provided as an attachment to this report. The values for the equivalent sound level ($L_{eq\text{-}h}$), the maximum and minimum measured sound levels (L_{max} and L_{min}), and the statistical indicators L_{10} and L_{90}, are given for the monitoring location examined.

TABLE 7: Measured Ambient Sound Levels – Lake Jennings Market Place

		One-Hour Noise Level Descriptors in dBA				
Location	**Start Time**	**L_{eq}**	**L_{max}**	**L_{min}**	**L_{10}**	**L_{90}**
ML 1	10:20 a.m.	63.4	76.3	56.1	66.0	59.2
ML 2	11:53 a.m.	51.4	57.4	46.5	53.5	47.8

Monitoring Location:

Location ML 1: Near Proposed Gas Station. GPS: CACA-VI 6368020.0, 1887199.7
Location ML 2: Near Proposed Southern Corner of Market Building. GPS: CA-VI 6368809.7, 1887090.5

Measurements performed by ISE on 7/9/14. EPE = Estimated GPS Position Error = 8 ft. Temperature = 82.0 °F. Relative Humidity = 64.2 %. Barometric Pressure = 29.96 in-Hg.

Measurements collected reflect the ambient daytime community sound levels in the vicinity of the proposed project site. As can be seen, the hourly average sound level (or $L_{eq\text{-}h}$) recorded over the monitoring periods ranged between 51 to 63 dBA and was observed to be entirely due to an aggregation of community traffic noise from afar. These levels were found to be in compliance with the County's compatibility standards and consistent with the observed community setting.

Existing Ambient Vibration Conditions

No excessive ambient ground motion was indicated with traffic only levels averaging approximately 0.25 inches per second adjacent to the roadway edge. Soil damping levels were found to decay at a rate of 0.00045 per foot (ς/ft = 0.00045). This damping level will be utilized for the analytical vibration assessment within this report.

Construction Noise and Vibration Findings

Construction Noise Emission Levels

The estimated worst-case construction vehicle noise emissions are provided in Table 8 for the combination of site clearing, remedial grading, rock drilling, and infrastructure work inclusive of any powered haulage. Construction within the proposed project area would typically occur between the hours of 7:00 a.m. and 3:00 p.m. Monday through Friday.

The nearest sensitive residential receptor line would be, at a minimum, approximately 150-feet from any construction activity centroid. As can be seen, predicted worst-case aggregate construction noise levels could be as high as 86.7 dBA Leq_{8h} at 50-feet, with a resultant receptor level of 74.8 dBA Leq_{8h} or less. This level is below the County of San Diego construction noise abatement threshold of 75.0 dBA Leq_{8h} and is not expected to result in significant impacts.

Blasting, which would be performed in accordance with the County of San Diego Consolidated Fire Code Sec 3301 et. seq. (refer to required excerpts provided as an attachment to this report), is proposed within the project site at one location, as shown in Figure 10). This blasting is necessitated due to the presence of large granitic rock masses. Blasting of this rock would be accomplished using traditional *'drill and shoot'* methods. There are two dominant sources of noise associated with blasting operations of this type. Namely, the sound of the rock drill (a total of four would be used in this case, two in each blasting area), and the actual blasting itself.

Noise emissions from blasting can be based upon values given in the DuPont Blaster's Handbook.[13] Typical extractive ratios (commonly called *Powder Factors*) average about 0.5 pounds per ton of rock being blasted. For the purposes of construction noise analysis, a conventional (excavative) shot pattern with a minimum eight (8) ms delay, loaded with six (6) pounds of ANFO at an average blasting depth of 10 feet each, will be examined. The resultant levels can, of course, be scaled up or down depending on the actual blasting requirements and measured ground response levels. These requirements are consistent with the San Diego County Consolidated Fire Code Sec 3301 et. seq.

Source noise levels produced by a six pound shot of ANFO were found by the Army CERL *Peakest* computer model to be as high as 113.9 dB at 100 meters (130.2 dB at 50 feet) from the source, based upon a standard atmospheric model (base conditions) and an assumed average overburden depth of 10 feet. Applying a 26 dB correction for sounds below 100 Hz gives a corrected 'A' weighted blast level of 104.2 dBA SEL at 50 feet.

[13] *Source: International Society of Explosives Engineers (ISEE) Blaster's Handbook, 17 Edition, 1998.*

TABLE 8: Aggregate Construction Noise Levels – Lake Jennings Market Place

Equipment Type Model	Selected EPA Tier Level	Quantity Used (#)	Source Level @ 50 Feet @ Full Load (dBA)	Average Load Factor (%)	Duty Cycle (hrs/day)	Cumulative Effect @ 50 Feet (dBA Leq_{8h})
Push Dozer D11T w/ Breaker	3	1	80	60	8	77.8
Push Dozer D10T	3	1	75	40	8	71.0
Dozer D9R	3	1	70	50	8	67.0
Dozer D6T LGP	3	1	75	40	8	71.0
Scraper- 657G Tractor	3	1	80	30	8	74.8
Motor Grader 120K	3	2	70	50	8	70.0
Water Truck	3	1	70	40	8	66.0
Hydraulic Excavator 349EL	3	1	75	60	8	72.8
ECM 590 Rock Drill	3	2	85	50	8	85.0
					Worst-Case Aggregate Sum @ 50 Ft. (Σ):	**86.7**
					Leq_{8h} at Receptor Area 150-Feet Distant:	**74.8**

Source: EPA PB 206717, Environmental Protection Agency, 12/31/71, “Noise from Construction Equipment and Operations”

FIGURE 10: Approximate Construction Drilling and Blasting Area (ISE 4/15)

Assuming that there are a maximum of 500 holes shot per blast (with a minimum 8 ms delay per hole) and a blast SEL given above, yields the following hourly noise level,

$$Leq(h) = 10Log_{10}(\sum_{i=1}^{500} 10^{\frac{104.2}{10}}) - 35.56 = 131.2 - 35.6 = 95.6\ \ dBA$$

Since the closest residence would be approximately 200 feet distant from any blasting activities, the resultant hourly level would be (95.6 dBA – 12.0 dBA) or 83.6 dBA Leq-h for the shot, which is consistent with typical construction levels and would not be classified as impactive, with implementation of proper blasting control measures. Thus, no acoustical impacts to adjacent residences are expected due to the proposed blasting operations.

Blast-Related Ground Motion Findings

The estimated blast excitation is predicted below, for a worst-case assumed reference vibration level of 1.0 inch per second, as measured at 50-feet from the detonation point. Thus, the analysis is independent of individual charge weight (or powder factor for that matter), and can be scaled either up or down from the unitary value using standard blast prediction methods, assuming low to moderate confinement.

Utilizing the ISE *WaveProp* program, the results for a pure 5-, 10-, and 50 Hz wave motion are shown below in the accompanying Figures 11a through -c as measured from the blasting reference point. This response curve is also a function of the previously measured soil damping response (ζ/ft = 0.00045) discussed earlier.

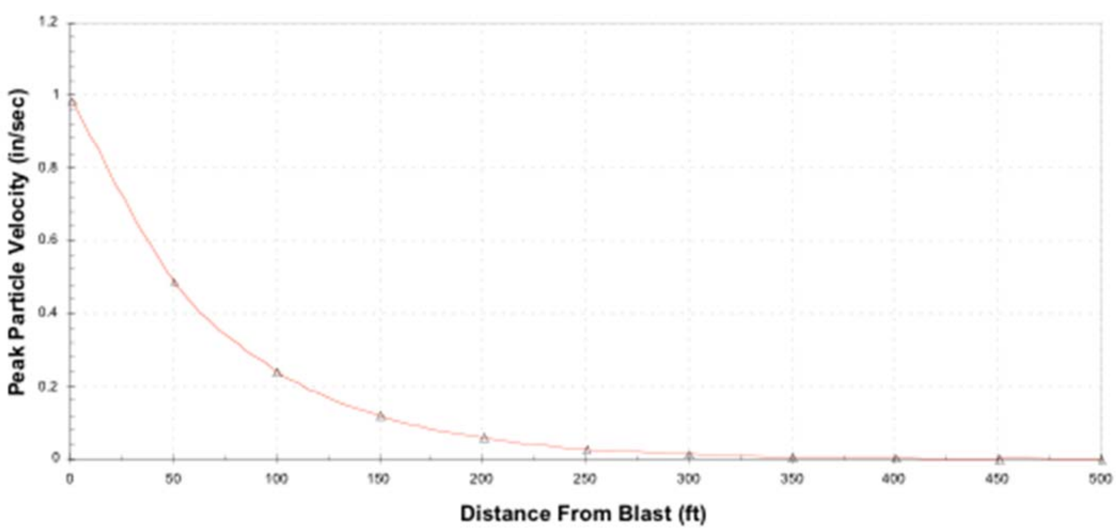


FIGURE 11a: Predicted Ground Velocity (Source: f = 5.0 Hz., ref = 50', ζ/ft = 0.00045)

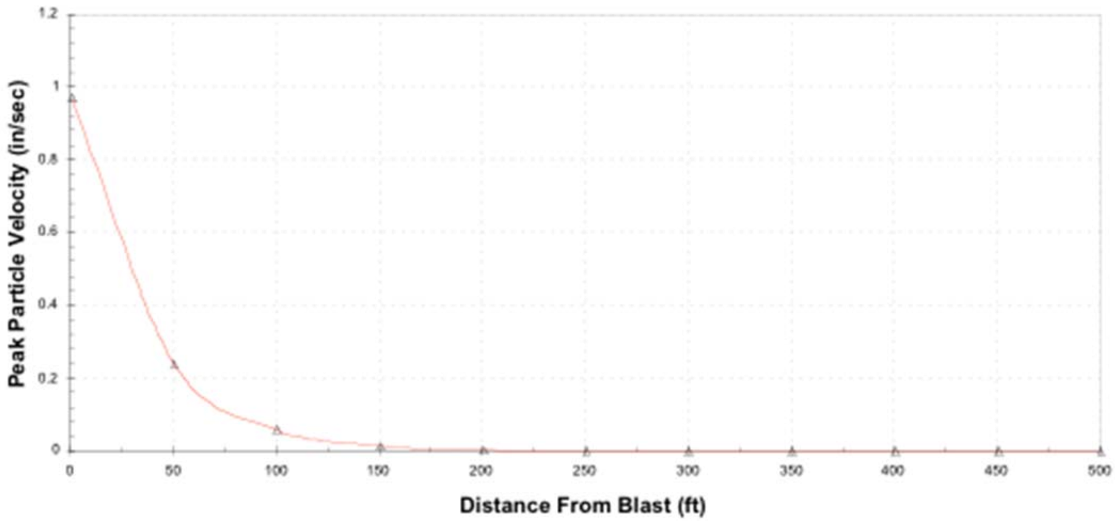


FIGURE 11b: Predicted Ground Velocity (Source: f = 10.0 Hz., ref = 50', ζ /ft = 0.00045)

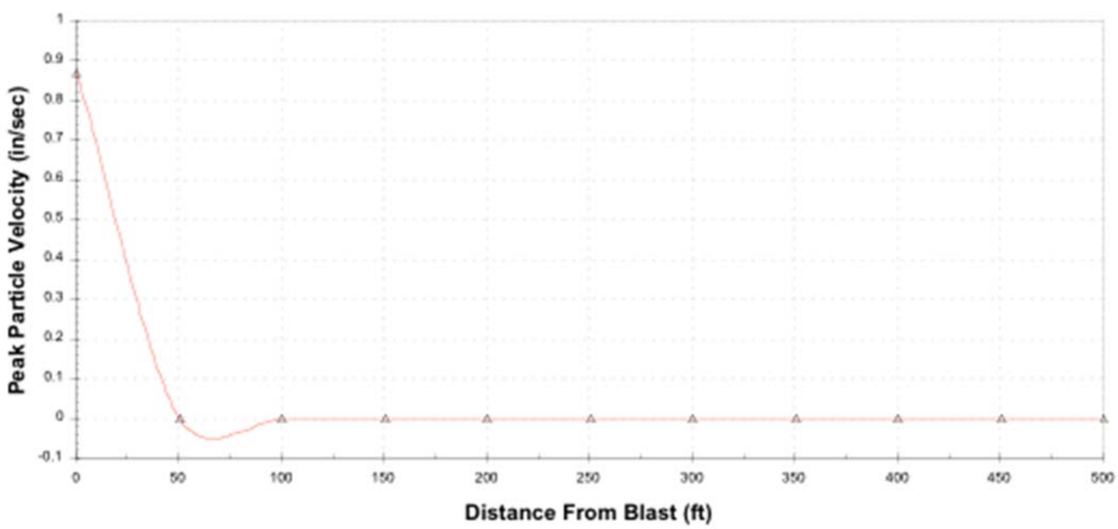


FIGURE 11c: Predicted Ground Velocity (Source: f = 50.0 Hz., ref = 50', ζ /ft = 0.00045)

Based upon the findings, worst-case ground motion levels would decay (due to material damping alone) to a level of insignificance (i.e., ambient levels due to traffic and community activities) at distances of approximately 400 feet, and below the Bureau of Mines standard at distances approaching 200 feet, for a one-second total energy release. Waves of higher frequency content would decay even faster, as necessitated by the underlying physics. Since typical imparted ground frequencies from blasting range from 10 to 30 Hz, no ground vibration impacts are anticipated.

Finally, the ground motion produced by any surface excitation (such as impactive construction loads) is in-fact a surface wave and would be classified as a Rayleigh-type wave. Wave generation of this type is common during earthquakes (although of a much higher amplitude). These waves have a characteristic ‘rolling’ motion similar to that of an oceanic wave.

Using ISE’s *R-Wave 2.6* Program, a prediction of the ‘through the ground’ response of the construction activity is obtained. The results showing the expected vertical and horizontal source wave motion are shown in Figures 12a and -b for the same 1.0 inch-per-second, at 50 feet from the reference distance. This was repeated at the point of insignificance (previously identified as approaching 400 feet). These results are given in Figures 13a and -b.

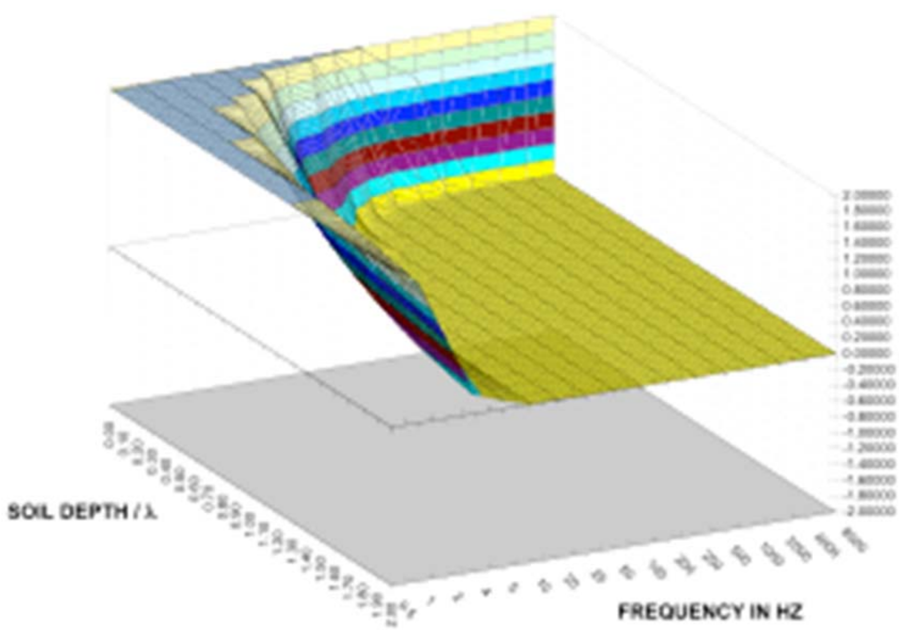


FIGURE 12a: Predicted Vertical Surface Vibration Levels (50-Feet from Reference Point)

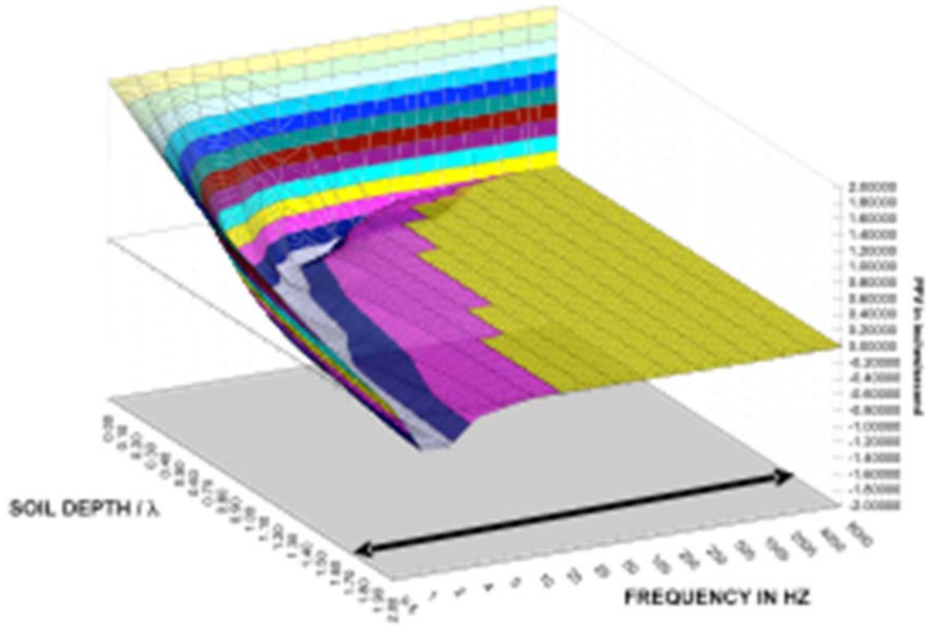


FIGURE 12b: Predicted Horizontal Surface Vibration Levels (50-Feet from Reference Point)

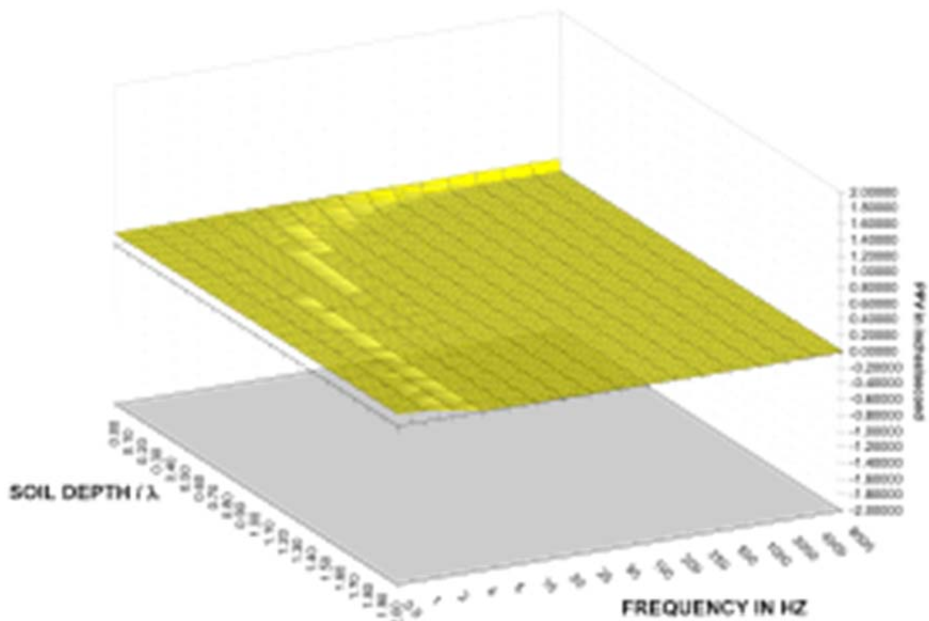


FIGURE 13a: Predicted Vertical Surface Vibration Levels (400-Feet from Reference Point)

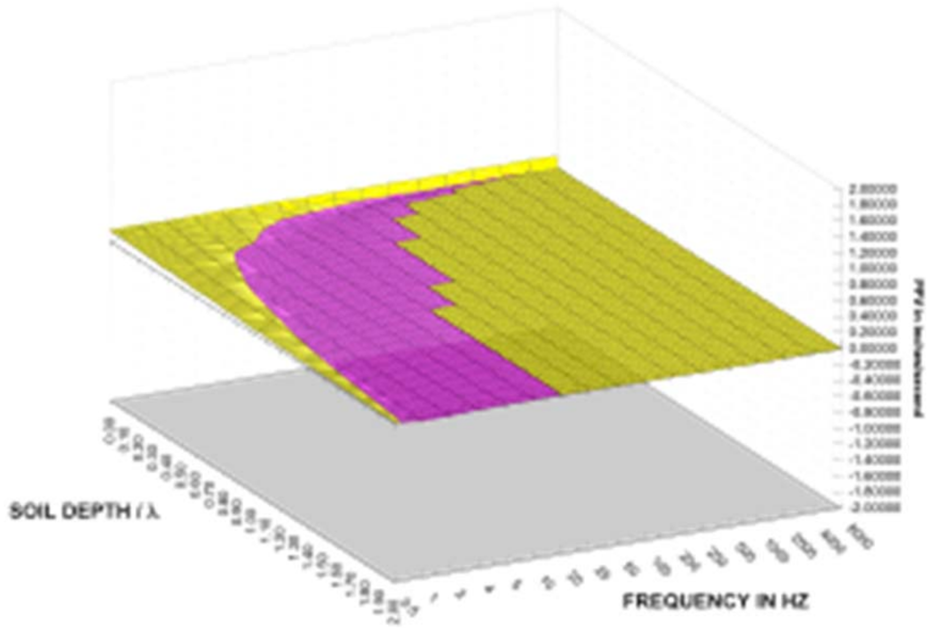


FIGURE 13b: Predicted Horizontal Surface Vibration Levels (400-Feet from Reference Point)

As can be seen most of the energy occurs along the surface at low frequencies (which is what is to be expected during typical construction blasting activities). The energy decays rapidly as a function of depth, and even faster as a function of frequency content. Overall excitation was found to produce ‘surface only’ worst-case RMS vibration levels of slightly over 0.1458 inches per second at the 400-foot point of insignificance. As can be seen from the results, no significant ground motion impacts are expected. No remedial vibration mitigation would be required.

<u>Human (ISO) Vibration Findings</u>

Based upon the findings, the predicted ground motion levels would fall into the category of being noticeable by humans but not a significant source of impact due to the infrequent nature of blasting operations. Thus, no significant impacts are expected.

Future Traffic Noise Impacts

The results showing the effect of traffic noise increases on the various servicing roadway segments associated with the proposed Lake Jennings Market Place site are presented in Tables 9a through -f. The scenarios examined consisted of: Existing Conditions, Existing + Project Conditions, Cumulative Conditions, Cumulative + Project Conditions, General Plan Build out Conditions, and General Plan Build out + Project Conditions. A comparison matrix of these various scenarios is shown in Table 9g.

For each roadway segment examined, the worst case average daily traffic volume (ADT) and observed/predicted speeds are shown, along with the corresponding reference noise level at 50-feet (in dBA). Additionally, the line-of-sight distance from the roadway centerline to the 60-, 65, and 75 dBA CNEL contours are provided as an indication of the worst-case unobstructed theoretical traffic noise contour placement.

As can be seen, the worst-case traffic noise condition is expected to occur on Lake Jennings Park Road between Olde Highway 80 and the Project Driveway by a worst case 2.5 dBA CNEL under the existing condition scenario. This level would be reduced to 2.0 dBA CNEL under the future General Plan scenario. This would not be deemed impactive, since no affected traffic segments are at, or above, the 3.0 dBA CNEL significance threshold.

Stationary Onsite Noise Emission Levels

Finally, the results of the onsite noise generation analysis are shown in Figure 14 for the entire Lake Jennings Market Place site. Additionally, a detailed analysis specific to the Lot 1 car wash facility only, per the request of the County, is shown in Figure 15. The IS^3 model decks for both analyses are provided as attachments to this report.

As can be seen from the contour plot, all sound emissions above 55 dBA Leq-h remain confined to the exterior project boundaries. Southerly residential areas behind the project site are exposed to non-impactive levels of 50 dBA Leq-h or less. Thus, no offsite impacts are expected do to operation of the Lake Jennings Marketplace project.

Since the project itself would be physically subdivided into several building pads, each with their own Assessor Parcel Number, internal property line compliance with the applicable County of San Diego commercial noise standard is also required. Referring back to Table 3 of this report, daytime operation within a commercial zone of the type proposed by the Lake Jennings Marketplace project requires compliance with an hourly noise standard of 60 dBA Leq_h.

All sound emissions from the car wash shown in Figure 15, above 60 dBA Leq_h, remain confined to the Lot 1 project boundaries in which it is contained. Given this, no internal property line impacts to adjacent commercial uses are expected due to operation of the proposed uses within Lot 1.

TABLE 9a: Project Traffic Noise Conditions (Existing Conditions)

Roadway	Segment	LOS	ADT	Speed (MPH)	SPL	75 dBA CNEL Contour Distance in Feet	65 dBA CNEL Contour Distance in Feet	60 dBA CNEL Contour Distance in Feet
Olde Highway 80	Lake Jennings Park Rd. to Dwy 1	E	14,350	45	71.0	20	199	629
	Project Dwy 1 to Dwy 2	E	14,350	45	71.0	20	199	629
	Project Dwy 2 to Dwy 3	E	14,350	45	71.0	20	199	629
	Project Dwy 3 to Rios Canyon Rd.	E	14,350	45	71.0	20	199	629
	Rios Canyon Rd. to Pecan Park Ln.	D	10,150	45	69.5	14	141	446
	Pecan Park Ln. to Chimney Rock Ln.	D	10,050	45	69.4	14	138	435
Mapleview Street	Ashwood St. to Pino Dr.	A	12,000	35	67.9	10	97	308
Lake Jennings Park Road	Pino Dr. to El Monte Rd.	A	10,400	45	69.6	14	144	456
	El Monte Rd. to Jack Oak Rd.	D	11,260	45	69.9	15	155	489
	Jack Oak Rd. to Harritt Rd.	D	11,520	45	70.0	16	158	500
	Harritt Rd. to Blossom Valley Rd.	E	13,550	45	70.7	19	186	587
	Blossom Valley Rd. to I-8 WB Off-Ramp	E	18,510	45	72.1	26	256	811
	I-8 WB Off-Ramp to Olde Highway 80	F	17,130	45	71.7	23	234	740
	Olde Highway 80 to Project Driveway 4	A	1,670	45	61.6	2	23	72
Ridge Hill Road	Lake Jennings Park Rd. to Cordial Rd.	Better than C	1,670	35	59.3	1	13	43
Rios Canyon Road	South of Olde Highway 80	Better than C	3,506	35	62.5	3	28	89

TABLE 9b: Project Traffic Noise Conditions (Existing + Project Conditions)

Roadway	Segment	LOS	ADT	Speed (MPH)	SPL	75 dBA CNEL Contour Distance in Feet	65 dBA CNEL Contour Distance in Feet	60 dBA CNEL Contour Distance in Feet
Olde Highway 80	Lake Jennings Park Rd. to Dwy 1	F	21,934	45	72.8	30	301	953
	Project Dwy 1 to Dwy 2	F	21,363	45	72.7	29	294	931
	Project Dwy 2 to Dwy 3	E	15,911	45	71.4	22	218	690
	Project Dwy 3 to Rios Canyon Rd.	E	15,746	45	71.4	22	218	690
	Rios Canyon Rd. to Pecan Park Ln.	E	11,081	45	69.8	15	151	477
	Pecan Park Ln. to Chimney Rock Ln.	D	10,972	45	69.8	15	151	477
Mapleview Street	Ashwood St. to Pino Dr.	A	12,721	35	68.1	10	102	323
Lake Jennings Park Road	Pino Dr. to El Monte Rd.	A	11,149	45	69.9	15	155	489
	El Monte Rd. to Jack Oak Rd.	D	12,225	45	70.3	17	169	536
	Jack Oak Rd. to Harritt Rd.	D	13,289	45	70.6	18	182	574
	Harritt Rd. to Blossom Valley Rd.	E	15,776	45	71.4	22	218	690
	Blossom Valley Rd. to I-8 WB Off-Ramp	F	21,827	45	72.8	30	301	953
	I-8 WB Off-Ramp to Olde Highway 80	F	22,258	45	72.9	31	308	975
	Olde Highway 80 to Project Driveway 4	B	2,934	45	64.1	4	41	129
Ridge Hill Road	Lake Jennings Park Rd. to Cordial Rd.	Better than C	2,102	35	60.3	2	17	54
Rios Canyon Road	South of Olde Highway 80	Better than C	3,794	35	62.9	3	31	97

TABLE 9c: Project Traffic Noise Conditions (Cumulative Conditions)

Roadway	Segment	LOS	ADT	Speed (MPH)	SPL	75 dBA CNEL Contour Distance in Feet	65 dBA CNEL Contour Distance in Feet	60 dBA CNEL Contour Distance in Feet
Olde Highway 80	Lake Jennings Park Rd. to Dwy 1	E	15,072	45	71.2	21	208	659
	Project Dwy 1 to Dwy 2	E	15,072	45	71.2	21	208	659
	Project Dwy 2 to Dwy 3	E	15,072	45	71.2	21	208	659
	Project Dwy 3 to Rios Canyon Rd.	E	15,072	45	71.2	21	208	659
	Rios Canyon Rd. to Pecan Park Ln.	D	10,661	45	69.7	15	148	467
	Pecan Park Ln. to Chimney Rock Ln.	D	10,556	45	69.6	14	144	456
Mapleview Street	Ashwood St. to Pino Dr.	A	12,604	35	68.1	10	102	323
Lake Jennings Park Road	Pino Dr. to El Monte Rd.	A	10,923	45	69.8	15	151	477
	El Monte Rd. to Jack Oak Rd.	D	11,827	45	70.1	16	162	512
	Jack Oak Rd. to Harritt Rd.	D	12,100	45	70.2	17	166	524
	Harritt Rd. to Blossom Valley Rd.	E	14,232	45	70.9	19	195	615
	Blossom Valley Rd. to I-8 WB Off-Ramp	F	19,442	45	72.3	27	269	849
	I-8 WB Off-Ramp to Olde Highway 80	F	17,992	45	72.0	25	251	792
	Olde Highway 80 to Project Driveway 4	A	1,754	45	61.8	2	24	76
Ridge Hill Road	Lake Jennings Park Rd. to Cordial Rd.	Better than C	1,754	35	59.5	1	14	45
Rios Canyon Road	South of Olde Highway 80	Better than C	3,682	35	62.7	3	29	93

TABLE 9d: Project Traffic Noise Conditions (Cumulative + Project Conditions)

Roadway	Segment	LOS	ADT	Speed (MPH)	SPL	75 dBA CNEL Contour Distance in Feet	65 dBA CNEL Contour Distance in Feet	60 dBA CNEL Contour Distance in Feet
Olde Highway 80	Lake Jennings Park Rd. to Dwy 1	F	23,428	45	73.1	32	323	1,021
	Project Dwy 1 to Dwy 2	F	22,856	45	73.0	32	315	998
	Project Dwy 2 to Dwy 3	F	16,720	45	71.6	23	229	723
	Project Dwy 3 to Rios Canyon Rd.	F	16,555	45	71.6	23	229	723
	Rios Canyon Rd. to Pecan Park Ln.	E	11,679	45	70.1	16	162	512
	Pecan Park Ln. to Chimney Rock Ln.	D	11,565	45	70.0	16	158	500
Mapleview Street	Ashwood St. to Pino Dr.	A	13,325	35	68.3	11	107	338
Lake Jennings Park Road	Pino Dr. to El Monte Rd.	A	11,673	45	70.1	16	162	512
	El Monte Rd. to Jack Oak Rd.	D	12,791	45	70.5	18	177	561
	Jack Oak Rd. to Harritt Rd.	E	13,954	45	70.8	19	190	601
	Harritt Rd. to Blossom Valley Rd.	E	16,657	45	71.6	23	229	723
	Blossom Valley Rd. to I-8 WB Off-Ramp	F	22,931	45	73.0	32	315	998
	I-8 WB Off-Ramp to Olde Highway 80	F	23,703	45	73.2	33	330	1,045
	Olde Highway 80 to Project Driveway 4	B	3,018	45	64.2	4	42	132
Ridge Hill Road	Lake Jennings Park Rd. to Cordial Rd.	Better than C	2,186	35	60.5	2	18	56
Rios Canyon Road	South of Olde Highway 80	Better than C	3,970	35	63.1	3	32	102

TABLE 9e: Project Traffic Noise Conditions (General Plan Build Out Conditions)

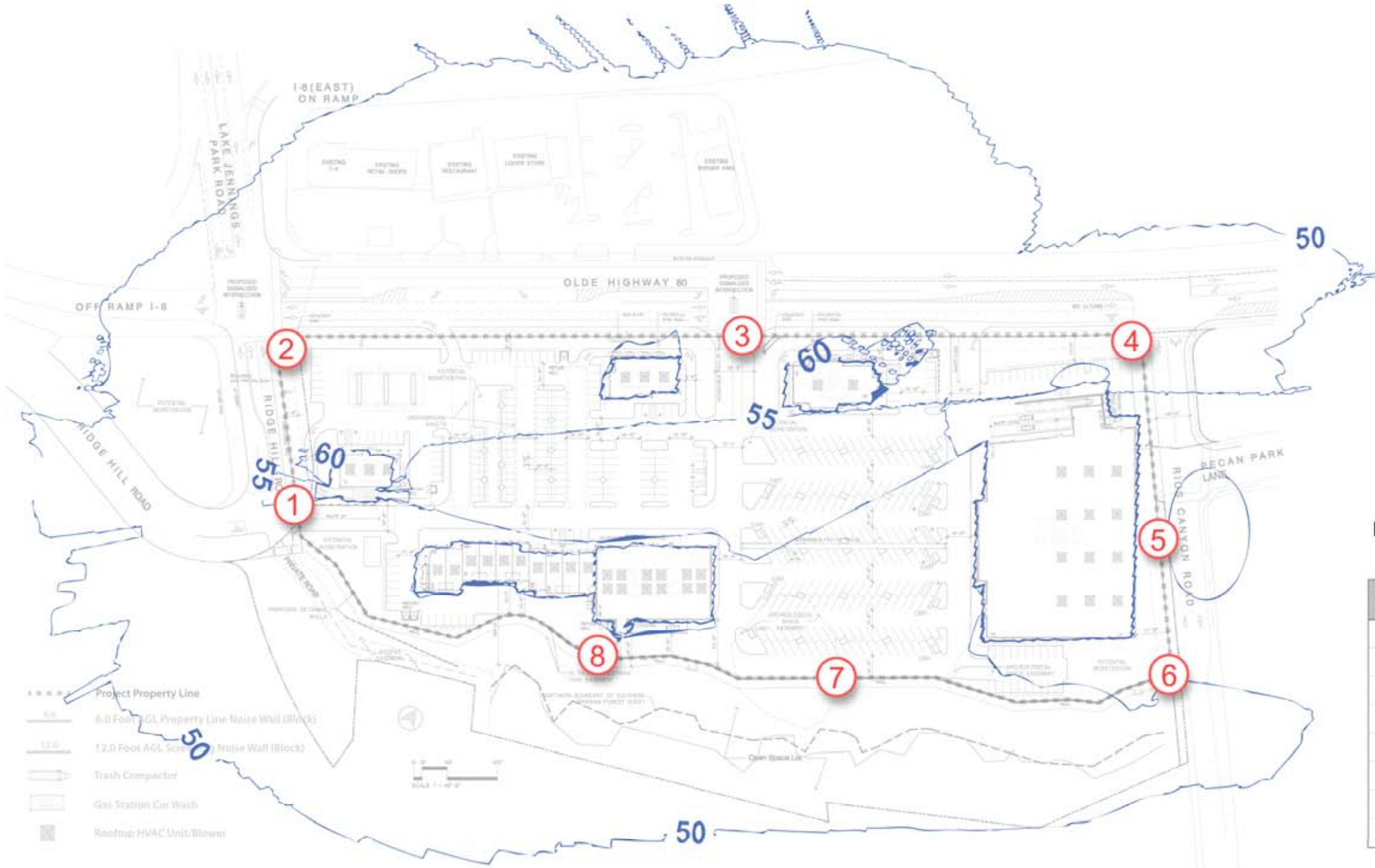
Roadway	Segment	LOS	ADT	Speed (MPH)	SPL	75 dBA CNEL Contour Distance in Feet	65 dBA CNEL Contour Distance in Feet	60 dBA CNEL Contour Distance in Feet
Olde Highway 80	Lake Jennings Park Rd. to Dwy 1	F	19,406	45	72.3	27	269	849
	Project Dwy 1 to Dwy 2	F	19,406	45	72.3	27	269	849
	Project Dwy 2 to Dwy 3	F	19,406	45	72.3	27	269	849
	Project Dwy 3 to Rios Canyon Rd.	F	19,406	45	72.3	27	269	849
	Rios Canyon Rd. to Pecan Park Ln.	E	13,726	45	70.8	19	190	601
	Pecan Park Ln. to Chimney Rock Ln.	E	13,591	45	70.7	19	186	587
Mapleview Street	Ashwood St. to Pino Dr.	B	16,228	35	69.2	13	132	416
Lake Jennings Park Road	Pino Dr. to El Monte Rd.	B	14,064	45	70.9	19	195	615
	El Monte Rd. to Jack Oak Rd.	E	15,227	45	71.2	21	208	659
	Jack Oak Rd. to Harritt Rd.	E	15,579	45	71.3	21	213	674
	Harritt Rd. to Blossom Valley Rd.	E	18,324	45	72.0	25	251	792
	Blossom Valley Rd. to I-8 WB Off-Ramp	F	25,032	45	73.4	35	346	1,094
	I-8 WB Off-Ramp to Olde Highway 80	F	23,165	45	73.1	32	323	1,021
	Olde Highway 80 to Project Driveway 4	B	2,258	45	62.9	3	31	97
Ridge Hill Road	Lake Jennings Park Rd. to Cordial Rd.	Better than C	2,258	35	60.6	2	18	57
Rios Canyon Road	South of Olde Highway 80	Worse than C	4,741	35	63.8	4	38	120

TABLE 9f: Project Traffic Noise Conditions (General Plan Build Out + Project Conditions)

Roadway	Segment	LOS	ADT	Speed (MPH)	SPL	75 dBA CNEL Contour Distance in Feet	65 dBA CNEL Contour Distance in Feet	60 dBA CNEL Contour Distance in Feet
Olde Highway 80	Lake Jennings Park Rd. to Dwy 1	F	26,990	45	73.7	37	371	1,172
	Project Dwy 1 to Dwy 2	F	26,419	45	73.6	36	362	1,145
	Project Dwy 2 to Dwy 3	F	20,967	45	72.6	29	288	910
	Project Dwy 3 to Rios Canyon Rd.	F	20,802	45	72.6	29	288	910
	Rios Canyon Rd. to Pecan Park Ln.	E	14,657	45	71.1	20	204	644
	Pecan Park Ln. to Chimney Rock Ln.	E	14,513	45	71.0	20	199	629
Mapleview Street	Ashwood St. to Pino Dr.	B	16,949	35	69.4	14	138	435
Lake Jennings Park Road	Pino Dr. to El Monte Rd.	B	14,814	45	71.1	20	204	644
	El Monte Rd. to Jack Oak Rd.	E	16,192	45	71.5	22	223	706
	Jack Oak Rd. to Harritt Rd.	E	17,347	45	71.8	24	239	757
	Harritt Rd. to Blossom Valley Rd.	F	20,550	45	72.5	28	281	889
	Blossom Valley Rd. to I-8 WB Off-Ramp	F	28,349	45	73.9	39	388	1,227
	I-8 WB Off-Ramp to Olde Highway 80	F	28,293	45	73.9	39	388	1,227
	Olde Highway 80 to Project Driveway 4	B	3,522	45	64.9	5	49	155
Ridge Hill Road	Lake Jennings Park Rd. to Cordial Rd.	Better than C	2,690	35	61.4	2	22	69
Rios Canyon Road	South of Olde Highway 80	Worse than C	5,029	35	64.1	4	41	129

TABLE 9g: Project Traffic Noise Comparison (All Scenarios)

Roadway	Segment	Existing + Project *minus* Existing Conditions	Cumulative + Project *minus* Cumulative Conditions	General Plan + Project *minus* General Plan Conditions
Olde Highway 80	Lake Jennings Park Rd. to Dwy 1	1.8	1.9	1.4
	Project Dwy 1 to Dwy 2	1.7	1.8	1.3
	Project Dwy 2 to Dwy 3	0.4	0.4	0.3
	Project Dwy 3 to Rios Canyon Rd.	0.4	0.4	0.3
	Rios Canyon Rd. to Pecan Park Ln.	0.3	0.4	0.3
	Pecan Park Ln. to Chimney Rock Ln.	0.4	0.4	0.3
Mapleview Street	Ashwood St. to Pino Dr.	0.2	0.2	0.2
Lake Jennings Park Road	Pino Dr. to El Monte Rd.	0.3	0.3	0.2
	El Monte Rd. to Jack Oak Rd.	0.4	0.4	0.3
	Jack Oak Rd. to Harritt Rd.	0.6	0.6	0.5
	Harritt Rd. to Blossom Valley Rd.	0.7	0.7	0.5
	Blossom Valley Rd. to I-8 WB Off-Ramp	0.7	0.7	0.5
	I-8 WB Off-Ramp to Olde Highway 80	1.2	1.2	0.8
	Olde Highway 80 to Project Driveway 4	2.5	2.4	2.0
Ridge Hill Road	Lake Jennings Park Rd. to Cordial Rd.	1.0	1.0	0.8
Rios Canyon Road	South of Olde Highway 80	0.4	0.4	0.3



Representative Property Line Sound Levels

Property Line Point	Sound Level (in dBA)
1	56.0
2	51.5
3	52.1
4	52.2
5	49.6
6	48.5
7	51.7
8	52.6

FIGURE 14: Lake Jennings Market Place 50, 55 and 60 dBA Leq-h Contour Placement (ISE 11/14)

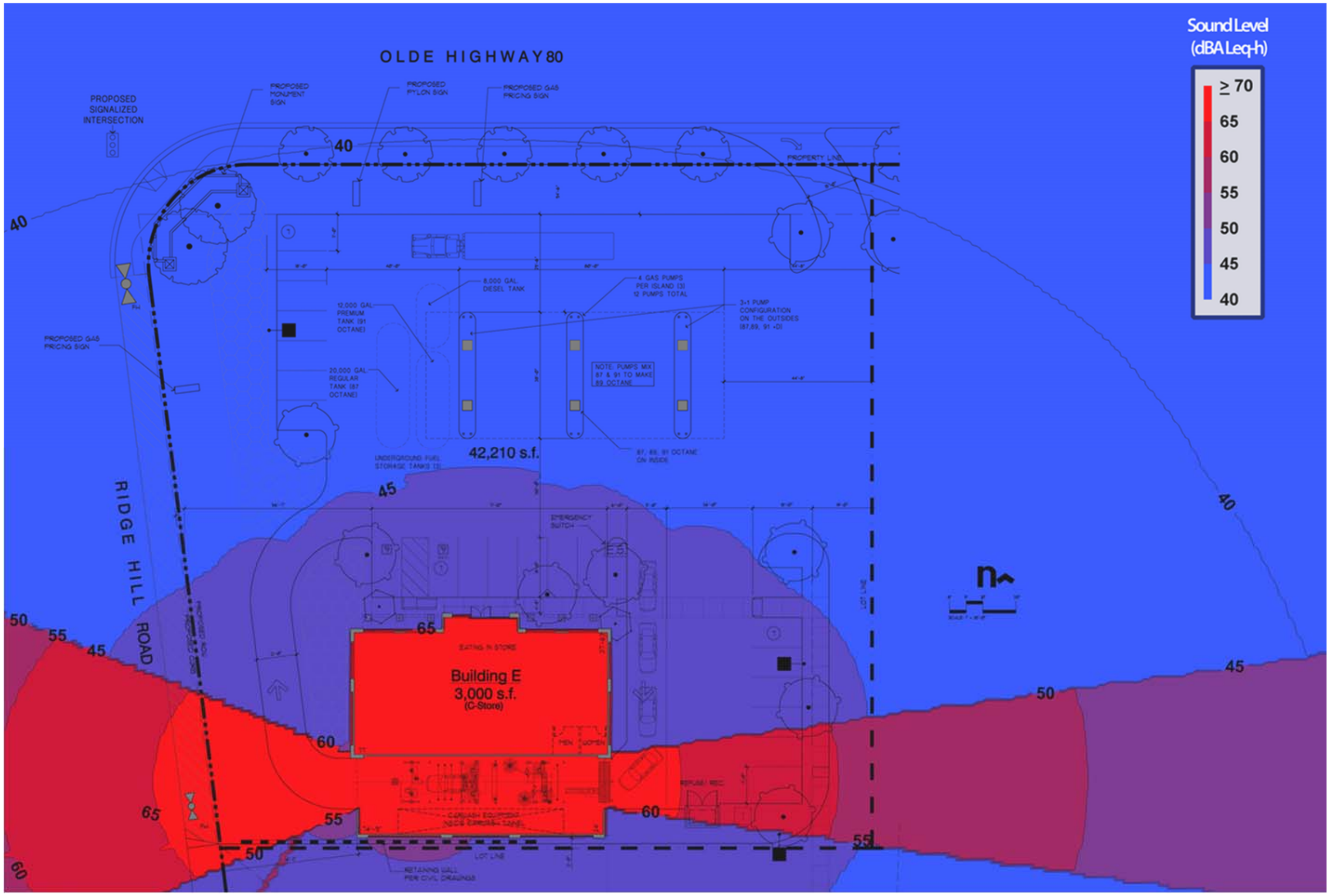


FIGURE 15: Lake Jennings Market Place Lot 1 Contour Placement (ISE 2/15)

Applicable Noise Control Measures

Given the above findings, the following noise control measures would be applicable for the Lake Jennings Marketplace development project to demonstrate compliance under CEQA.

- Rooftop areas would be protected from noise impacts using a minimum three-foot-high parapet screen wall as shown in Figure 16 below.
- Rock drilling would require a minimum set back distance of 125 feet from any sensitive receptor property line.
- Aggregate construction grading operations should occur no closer than 150 feet from any sensitive receptor area.
- Finally, noise associated with the proposed car wash tunnel would require the following for compliance:
    1. An extended car wash tunnel, as shown in the architectural site plans prepared by Smith Consulting Architects dated 1/15.
    2. A clockwise movement of automobiles into the facility to minimize internal property line noise exposure.
    3. The final design of the mitigation plan would be conditioned as part of a separate Major Use Permit (MUP) action for this construction pad.

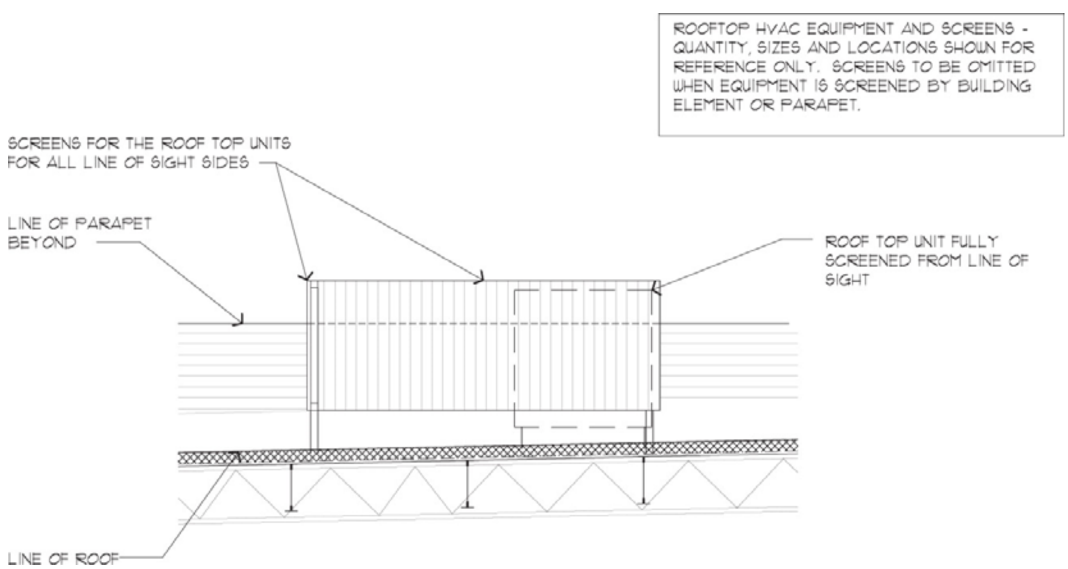


FIGURE 16: Typical Rooftop Parapet Acoustical Design (Smith Consulting Architects 1/15)

CERTIFICATION OF ACCURACY AND QUALIFICATIONS

This report was prepared by Investigative Science and Engineering, Inc. (ISE), located at 1134 D Street, Ramona, CA 92065. The members of its professional staff contributing to the report are listed below:

Rick Tavares *(rtavares@ise.us)*	Ph.D. Civil Engineering M.S. Structural Engineering M.S. Mechanical Engineering B.S. Aerospace Engineering / Engineering Mechanics
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ISE affirms to the best of its knowledge and belief that the statements and information contained herein are in all respects true and correct as of the date of this report. Content and information contained within this report is intended only for the subject project and is protected under 17 U.S.C. §§ 101 through 810.

Should the reader have any questions regarding the findings and conclusions presented in this report, please do not hesitate to contact ISE at (760) 787-0016.

Approved as to Form and Content:

Rick Tavares, Ph.D.

Project Principal
Investigative Science and Engineering, Inc. (ISE)

APPENDICIES AND SUPPLEMENTAL INFORMATION

Ambient Acoustical Monitoring Test Photos – ML 1

Ambient Acoustical Monitoring Test Photos – ML 2

Ambient Ground Vibration Monitoring Test Photos – VL 1


California
4URY796

Ambient Ground Vibration Monitoring Test Photos – VL 2

Candidate Rock Crushing Plant Test Photograph

Field Reconnaissance Measurement Results

LJMP ML 1

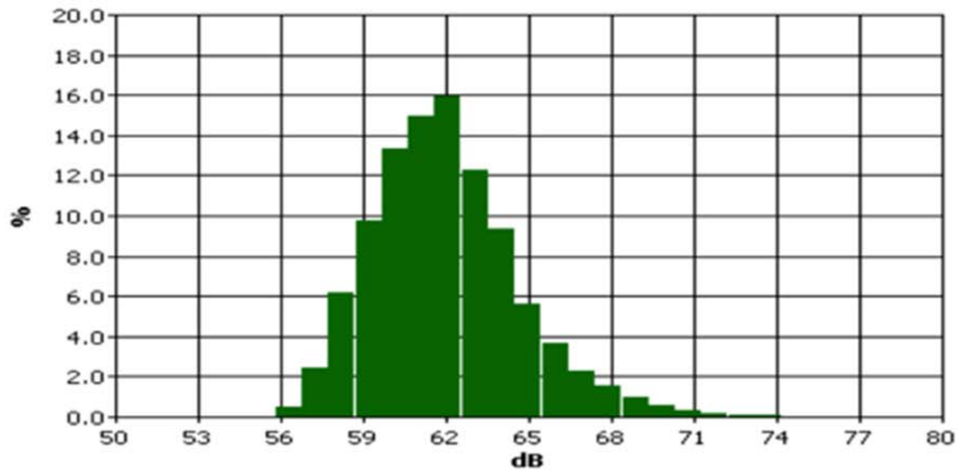
Information Panel

Name	ML 1
Start Time	Wednesday, July 09, 2014 10:20:52
Stop Time	Wednesday, July 09, 2014 11:20:45
Device Model Type	SoundPro DL
Comments	

General Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	63.3 dB	Exchange Rate	1	3 dB
Weighting	1	A	Response	1	SLOW
Bandwidth	1	OFF	Exchange Rate	2	3 dB
Weighting	2	C	Response	2	FAST

Statistics Chart



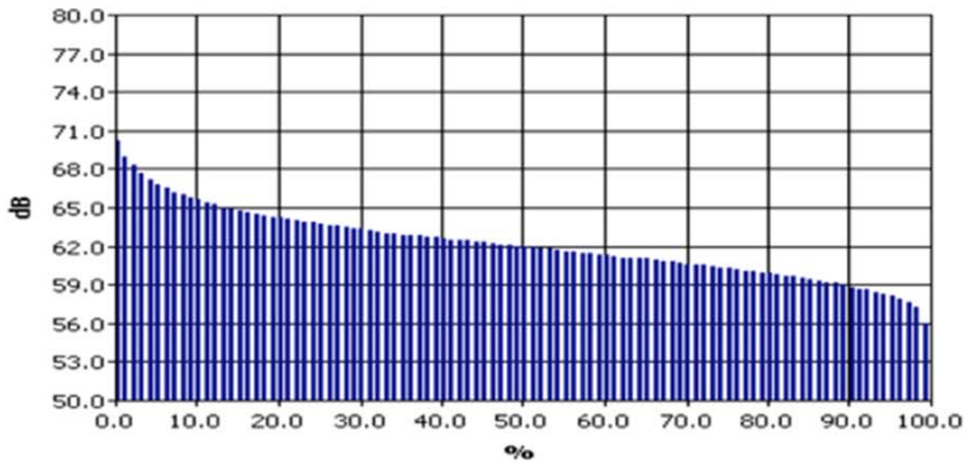
Statistics Table

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
51.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
52.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
53.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
54.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
55.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
56.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1	0.1	0.5
57.0	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.4	0.5	0.3	2.4
58.0	0.3	0.5	0.5	0.6	0.6	0.7	0.7	0.8	0.7	0.9	6.2
59.0	0.8	0.9	0.9	0.9	1.0	0.9	1.0	1.1	1.1	1.1	9.8
60.0	1.4	1.4	0.9	1.3	1.3	1.5	1.5	1.3	1.5	1.4	13.4
61.0	1.7	1.6	1.6	1.6	1.5	1.3	1.4	1.4	1.4	1.5	14.9
62.0	1.4	1.7	1.7	1.7	1.7	1.5	1.4	1.5	1.7	1.7	15.9
63.0	1.5	1.5	1.0	1.3	1.2	1.1	1.2	1.3	1.2	1.0	12.3
64.0	1.1	1.1	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.7	9.3
65.0	0.7	0.7	0.7	0.5	0.5	0.5	0.5	0.5	0.6	0.6	5.6
66.0	0.5	0.5	0.3	0.4	0.4	0.4	0.3	0.3	0.3	0.3	3.7
67.0	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	2.3
68.0	0.2	0.2	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.1	1.5
69.0	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	1.0
70.0	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.6
71.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3
72.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2
73.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
74.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
75.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
76.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
77.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
78.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Statistics Table (cont'd)

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
79.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
80.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Exceedance Chart



Exceedance Table

	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%
0%		70.2	69.0	68.3	67.7	67.2	66.8	66.5	66.2	66.0
10%	65.8	65.6	65.4	65.2	65.0	64.9	64.8	64.6	64.5	64.4
20%	64.3	64.2	64.1	64.0	63.9	63.8	63.7	63.6	63.6	63.5
30%	63.4	63.3	63.2	63.1	63.0	63.0	62.9	62.8	62.8	62.7
40%	62.7	62.6	62.5	62.5	62.4	62.3	62.3	62.2	62.1	62.1
50%	62.0	62.0	61.9	61.8	61.8	61.7	61.6	61.6	61.5	61.4
60%	61.3	61.3	61.2	61.1	61.1	61.0	61.0	60.9	60.8	60.8
70%	60.7	60.6	60.5	60.5	60.4	60.3	60.3	60.2	60.1	60.0
80%	59.9	59.9	59.8	59.7	59.6	59.5	59.4	59.3	59.2	59.1
90%	59.0	58.8	58.7	58.6	58.4	58.3	58.1	57.9	57.6	57.2
100%	56.0									

LJMP ML 2

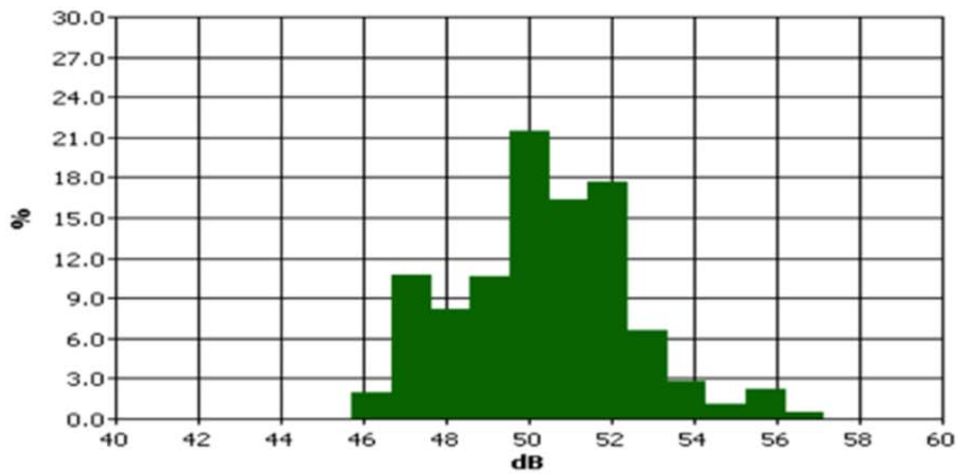
Information Panel

Name	ML 2
Start Time	Wednesday, July 09, 2014 11:53:15
Stop Time	Wednesday, July 09, 2014 12:53:18
Device Model Type	SoundPro DL
Comments	

General Data Panel

Description	Meter	Value	Description	Meter	Value
Leq	1	51.3 dB	Exchange Rate	1	3 dB
Weighting	1	A	Response	1	SLOW
Bandwidth	1	OFF	Exchange Rate	2	3 dB
Weighting	2	C	Response	2	FAST

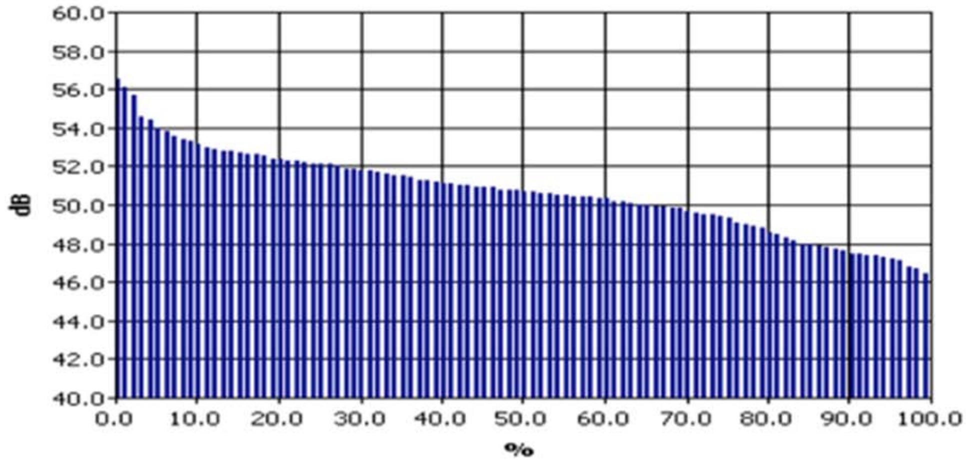
Statistics Chart



Statistics Table

dB	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	%
40.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
41.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
42.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
43.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
44.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
45.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
46.0	0.0	0.0	0.0	0.0	0.0	0.1	0.3	0.1	0.6	0.9	2.0
47.0	0.4	0.5	0.6	1.3	1.2	1.3	2.4	1.2	0.9	1.1	10.7
48.0	1.1	1.7	0.6	0.5	0.6	0.6	0.6	0.7	0.8	0.9	8.1
49.0	0.9	0.9	0.6	0.6	0.8	1.2	1.3	1.2	1.6	1.7	10.7
50.0	2.0	2.1	1.1	1.6	2.5	2.6	2.1	1.9	2.6	3.0	21.5
51.0	2.4	2.5	1.4	1.6	1.7	1.3	1.3	1.4	1.4	1.3	16.3
52.0	1.9	1.8	2.1	1.6	1.7	2.1	1.5	1.5	1.6	1.9	17.6
53.0	1.1	0.8	0.5	0.5	0.6	0.6	0.7	0.8	0.4	0.6	6.6
54.0	0.3	0.5	0.2	0.2	0.2	0.3	0.3	0.5	0.2	0.1	2.8
55.0	0.1	0.1	0.2	0.2	0.1	0.0	0.0	0.0	0.1	0.3	1.1
56.0	0.3	0.3	0.2	0.1	0.2	0.3	0.2	0.2	0.3	0.1	2.2
57.0	0.2	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.4
58.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
59.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
60.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Exceedance Chart



Exceedance Table

	0%	1%	2%	3%	4%	5%	6%	7%	8%	9%
0%		56.5	56.1	55.7	54.6	54.4	54.0	53.8	53.6	53.4
10%	53.3	53.1	53.0	52.9	52.8	52.8	52.7	52.6	52.6	52.5
20%	52.4	52.4	52.3	52.3	52.2	52.1	52.1	52.1	52.0	51.9
30%	51.9	51.8	51.8	51.7	51.6	51.5	51.5	51.4	51.3	51.3
40%	51.2	51.1	51.1	51.0	51.0	50.9	50.9	50.9	50.8	50.8
50%	50.8	50.7	50.7	50.6	50.6	50.5	50.5	50.4	50.4	50.4
60%	50.3	50.3	50.2	50.2	50.1	50.0	50.0	49.9	49.9	49.8
70%	49.8	49.7	49.6	49.5	49.5	49.4	49.3	49.1	49.0	48.9
80%	48.8	48.6	48.5	48.3	48.1	48.0	48.0	47.9	47.8	47.7
90%	47.6	47.5	47.5	47.4	47.4	47.3	47.2	47.1	46.8	46.7
100%	46.4									

IS³ Acoustical Model Input Deck / Output Results (Entire Shopping Center)

```
IS3 PROGRAM INPUT DECK - (C) 2014 INVESTIGATIVE SCIENCE & ENGINEERING INC.
GLOBAL VARIABLE DECLARATION
   PROBLEM STATEMENT: LAKE JENNINGS MARKET PLACE ONSITE NOISE GENERATION (FLAT TERRAIN)
   STARTING POINT (XY IN FEET): 6367373.1,1886476.1
   ENDING POINT (XY IN FEET): 6369676.9,1888005.9
   ANALYSIS FREQUENCY (HZ): 800
   REFERENCE DISTANCE FOR SOUND (D IN FEET): 15
   SOUND PROPAGATION COEFF XLOG10: 20
   EXCESS ATTENUATION (DB): 0
   COMPUTATIONAL STEP DISTANCE (IN FEET): 3
   RECEPTOR ELEVATION (IN FEET): 5
ACOUSTIC SOURCE DECLARATION (XYZ - SOUND LEVEL - LABEL)
   NUMBER OF SOURCE POINTS: 44
   6368035,1887084.5,21,75,ROOFTOP HVAC 1
   6368057,1887090,21,75,ROOFTOP HVAC 2
   6368077,1887095.8,21,75,ROOFTOP HVAC 3
   6368319,1887272.2,25,75,ROOFTOP HVAC 4
   6368341,1887279.6,25,75,ROOFTOP HVAC 5
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DISCRETE RECEPTOR POINT DECLARATION (XYZ - LABEL)
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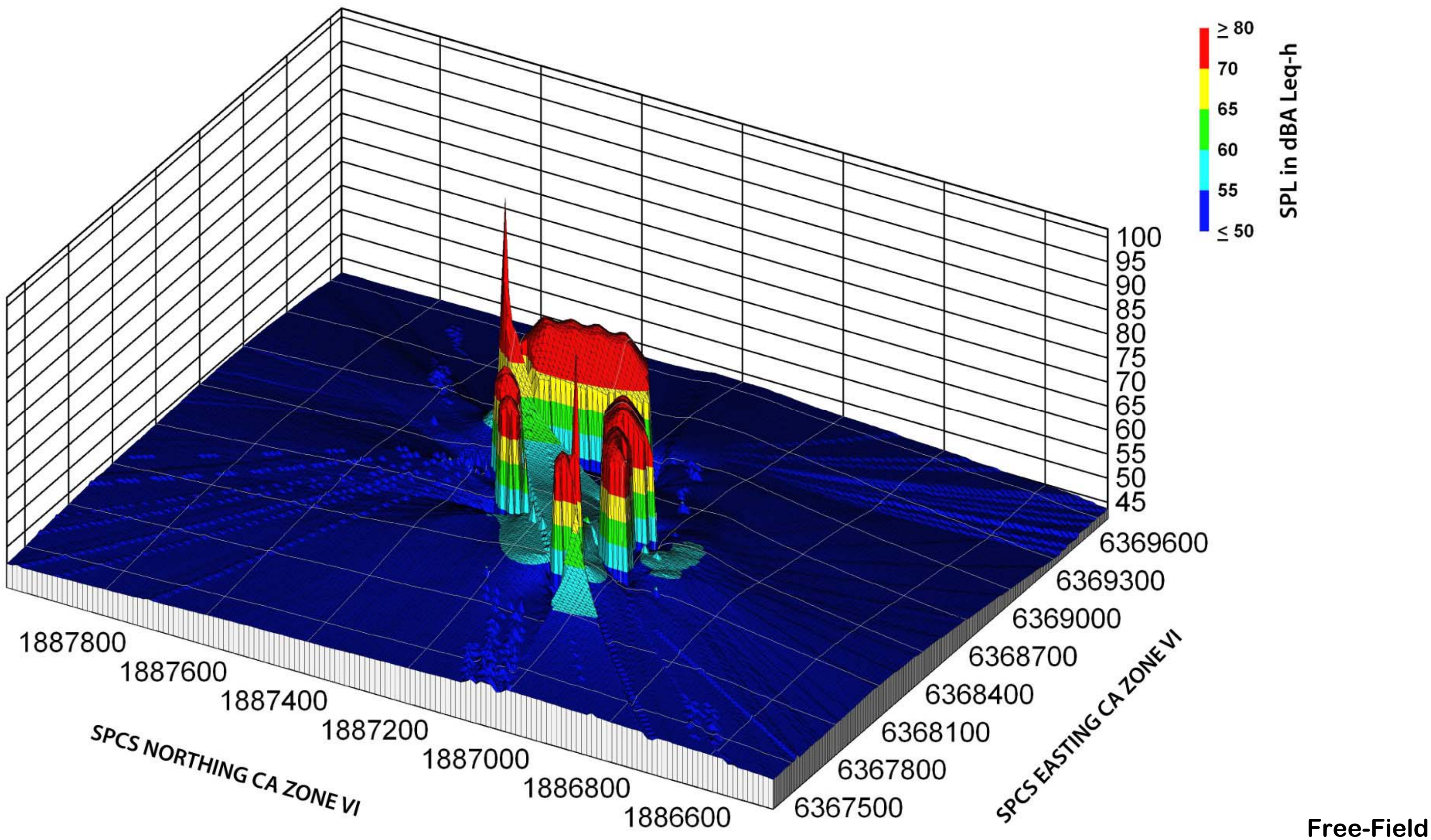
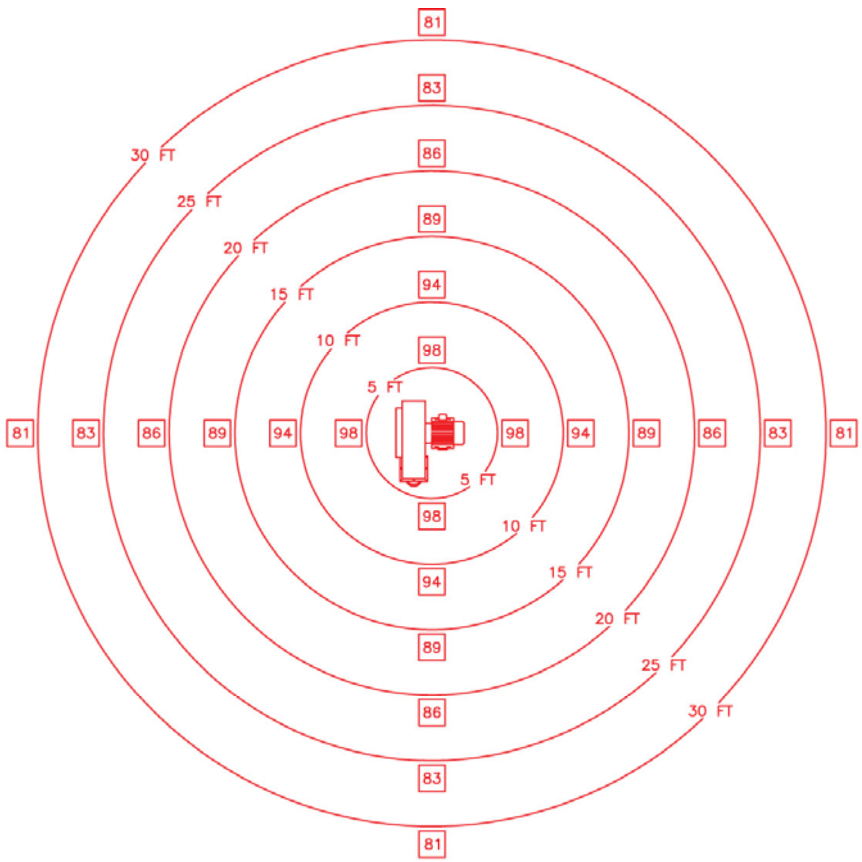


Acoustical Radiation of Micro 40 Car Wash Equipment



TEST CONDITIONS:

- TEST DATE: 02/13/2013
- LOCATION: CAR WASH FACILITY
- CEILING HEIGHT: 18 FT
- AMBIENT NOISE LEVEL: 60 dBA
- AIR DRYER(S) USED: ONE CW 15 HP 60 HZ
- MEASURMENT DEVICE:
  ANALOG SOUND METER
  RADIOSHACK CAT. NO 33–2055,
  READINGS TAKEN AT HEIGHT OF 4 FT OFF FLOOR
- COMMENTS: SOME TALL OBSTRUCTIONS WERE AROUND TEST AREA

- READING ON 10 HP UNIT WERE RECORDED AT 2 dB LESS AT EACH READING

EQ BLOWER - SOUND TEST
SCALE: AS SHOWN

OWNER: COLEMAN HANNA CAR WASH SYSTEMS, LLC 5842 WEST 34TH STREET HOUSTON, TX 77092			
SHEET NAME: EQ BLOWER / SOUND TEST			
SCALE: AS SHOWN	DATE: 02/14/2013	DRAWN BY: JTREVINO	APPROVED BY:
DRAWING AKO: -	EQUIPMENT AKO: -	FILE NAME: T:\EQ BLOWER TEST.DWG	

COLEMAN HANNA CARWASH SYSTEMS LLC
AN O'HANRAHAN COLEMAN COMPANY

IS3 Acoustical Model Input Deck / Output Results (Car Wash Area Only)

```
IS3 PROGRAM INPUT DECK - (C) 2015 INVESTIGATIVE SCIENCE & ENGINEERING INC.
GLOBAL VARIABLE DECLARATION
   PROBLEM STATEMENT: LAKE JENNINGS MARKET PLACE LOT 1 MUP CONFORMITY (FLAT
TERRAIN)
   STARTING POINT (XY IN FEET): 6367923.5,1887000.0
   ENDING POINT (XY IN FEET): 6368226.5,1887315.1
   ANALYSIS FREQUENCY (HZ): 800
   REFERENCE DISTANCE FOR SOUND (D IN FEET): 15
   SOUND PROPAGATION COEFF XLOG10: 25
   EXCESS ATTENUATION (DB): 0
   COMPUTATIONAL STEP DISTANCE (IN FEET): 0.5
   RECEPTOR ELEVATION (IN FEET): 5
ACOUSTIC SOURCE DECLARATION (XYZ - SOUND LEVEL - LABEL)
   NUMBER OF SOURCE POINTS: 4
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   6368034,1887069.6,21,75,ROOFTOP HVAC 3
BARRIER SEGMENT DECLARATION (START XY - END XY - HEIGHT - STC - LABEL)
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DISCRETE RECEPTOR POINT DECLARATION (XYZ - LABEL)
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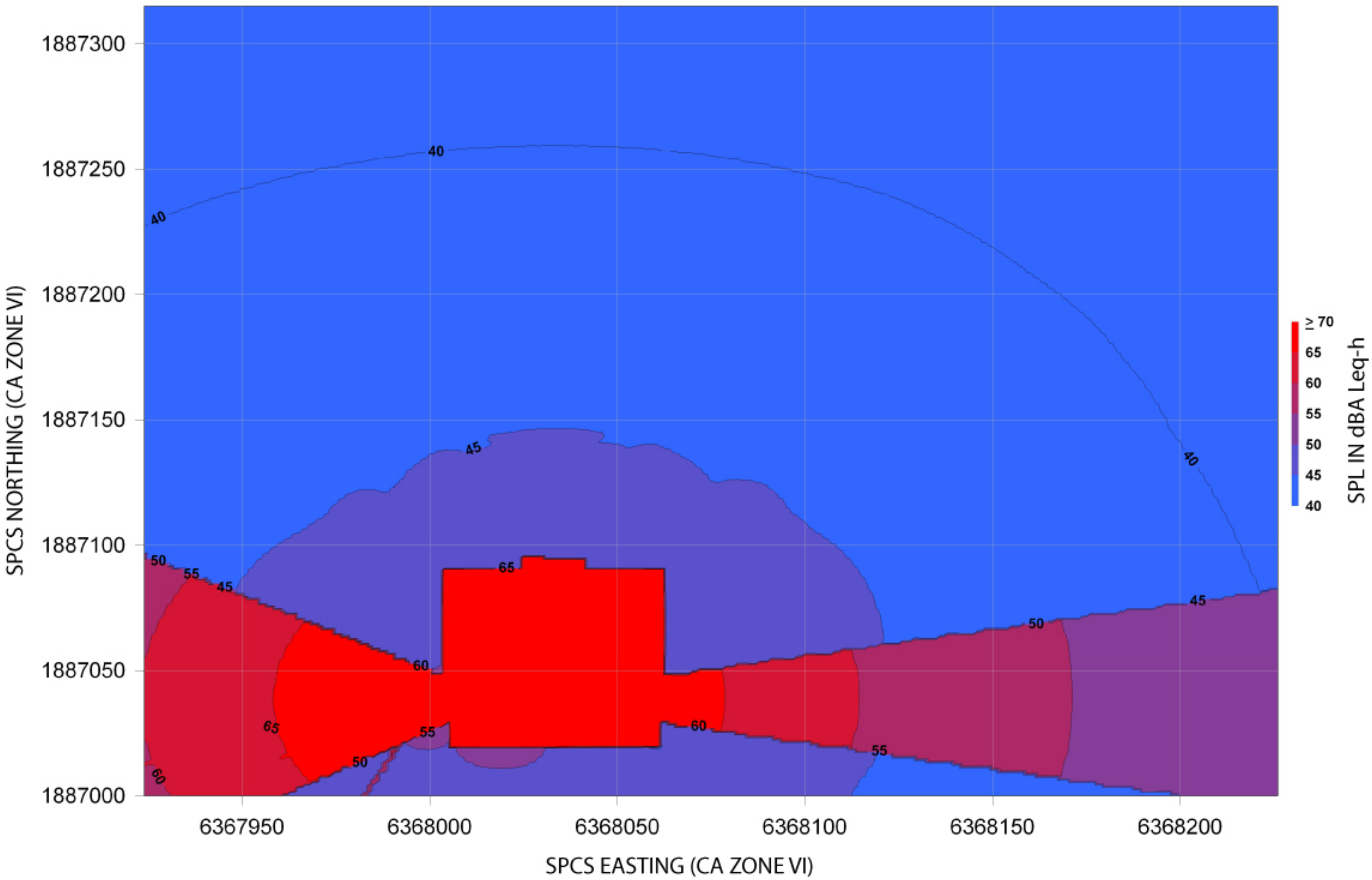
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1887250
1887200
1887150
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1887050
1887000
SPCS NORTHING (CA ZONE VI)
6367950
6368000
6368050
6368100
6368150
6368200
SPCS EASTING (CA ZONE VI)
≥ 70
65
60
55
50
45
40
SPL IN dBA Leq-h

County of San Diego Consolidated Fire Code Section 3301 (Blasting)

SEC. 96.1.2306.2. GENERAL FIRE PROTECTION AND LIFE SAFETY FEATURES.

Section 2306.2 Exception J of Table 2306.2 of the California Fire Code is deleted.

SEC. 96.1.3301.2. EXPLOSIVES AND FIREWORKS-APPLICABILITY.

Section 3301.2 is added to the California Fire Code to read:

Sec. 3301.2 Applicability. This section shall apply to the manufacture, possession, storage, sale, transportation and use of explosives and blasting agents and to any blasting operation in the unincorporated area of the County. The Sheriff shall be the Issuing Officer for any permit under this section, but may delegate the responsibility to any fire chief in the unincorporated area to issue a permit in the geographical area of the chief's jurisdiction. The issuing officer shall determine whether a blast is a major blast or a minor blast under this section. A minor blast is subject to all conditions of this section except the inspection requirements.

Sec. 3301.2.1 Definitions. The following definitions shall apply to this section:

BLASTER. A person who has been approved by the Sheriff to conduct blasting operations and who has been placed on the list of approved blasters. The listing shall be valid for one year unless revoked by the Sheriff.

BLASTING AGENT. A material or mixture consisting of a fuel and oxidizer intended for blasting. The finished product as mixed and packaged for use or shipment shall not be detonated by means of a No. 8 test blasting cap when unconfined.

BLASTING OPERATION. The uses of an explosive device or explosive material to destroy, modify, obliterate or remove any obstruction of any kind.

BLASTING PERMIT. A permit issued by the Issuing Officer pursuant to section 105.6.14. The permit shall apply to a specific site and shall be valid for a period not to exceed one year.

BLAST SITE. The geographically defined area, as shown on a project map or plot plan, where a blaster is authorized by a blasting permit issued under this section to conduct a blasting operation.

EXPLOSIVES PERMIT. A permit to possess or use explosives, issued by the Issuing Officer, pursuant to California Health and Safety Code sections 12000 et seq. and Chapter 33 of this code. An explosives permit shall be valid for a period not to exceed one year, as provided in the permit conditions.

INSPECTOR. A person on the Sheriff's approved of inspectors authorized to conduct inspections, before and after a blast. To be on the Sheriff's approved list, an inspector shall have a blasting license issued by Cal/OSHA.

MAJOR BLASTING. A blasting operation that does not meet the criteria for minor blasting.

MINOR BLASTING. A blasting operation that meets all of the following criteria: quantity of rock to be blasted does not exceed 100 cubic yards per shot, bore hole diameter does not exceed 2 inches, hole depth does not exceed 12 feet, maximum charge weight does not exceed 8 pounds of explosives per delay and the initiation of each charge will be separated by at least 8 milliseconds. The maximum charge weight shall not exceed the Scaled Distance as shown below:

Distance from Blast Site (In Feet)	Scale-Distance Factor
0 - 300	Mandatory Seismic Monitoring
301 - 5,000	55
5,000+	65

Sec. 3301.2.2. Application. Application for a permit required by this section shall be in the form required by the Issuing Officer.

Sec. 3301.2.3 Permit requirements. No person shall conduct blasting in the unincorporated area of the County without an explosives permit issued under this chapter. A person applying for an explosives permit shall, in addition to demonstrating compliance with fire safety requirements, shall also comply with all County requirements for any building permits, grading permits, use permits, encroachment permits and all other entitlements to use property, including zoning requirements and any determination under the Zoning Ordinance of nonconforming status. The applicant shall be responsible for providing proof of all necessary approvals when requested by the Issuing Officer.

AMENDMENT TO SECTION 3301.2.3.1.

The Deer Springs, North County, Rincon Del Diablo, San Marcos, San Miguel, Valley Center and Vista Fire Protection Districts adopt the following code amendment:

Sec. 3301.2.3.1 Blasting permit required. In addition to obtaining an explosives permit, no person shall conduct blasting without first obtaining a blasting permit. The applicant shall be responsible for providing proof of all necessary approvals when requested by the Issuing Officer.

Sec. 3301.2.4 Permit conditions. The Issuing Officer may impose conditions and procedures as are deemed reasonably necessary to protect the public health and safety based upon the facts and circumstances of a particular blasting operation. The permit conditions shall be in writing. Failure to comply with any permit condition is grounds for revocation of the permit. A blaster may request the Issuing Officer release the blaster from any permit condition if circumstances have changed that make the condition no longer applicable. In addition to complying with the County blasting regulations, a blaster shall also comply with blasting regulations of neighboring jurisdictions, for any blasting operations outside of the unincorporated area of the County conducted in conjunction with a project within the unincorporated areas of the County.

Sec. 3301.2.5 Insurance and indemnification required. As an additional condition for obtain an explosives permit the applicant shall submit: (1) a certificate of insurance evidencing that the blaster has obtained a general liability insurance policy which includes coverage for explosion, collapse and underground property damage from an insurer satisfactory to the Issuing Officer, that is in effect for the period covered by the permit, written on an "occurrence" basis, in an amount of not less than $500,000 per each occurrence, naming the County as an additional insured and providing that the policy will not be canceled or terminated without 30 days prior written notice to the County and (2) an agreement signed by the blaster agreeing to defend, indemnify and hold the County and its agents, officers and employees harmless from any claims or actions arising from the issuance of the permit or any blasting activity conducted under the permit.

Sec. 3301.2.6 Blasting hours. Blasting shall only be allowed Monday through Saturday, between the hours of 7:00 a.m. and 6:00 p.m. or ½ hour before sunset, whichever occurs first, unless special circumstances warrant another time or day and the Issuing Officer grants approval of the change in time or day.

Sec. 3301.2.7 Additional operational requirements. The owner of any property in the unincorporated area of the County on which any blasting is intended to occur, shall give, or cause to be given, a one-time notice in writing, for any proposed blasting to the local fire agency and dispatch center and to all residences, including mobilehomes, and businesses within 600 feet of any potential major blast location or 300 feet from any potential minor blast location. The notice shall be given not less than 24 hours, but not more than one week, before a blasting operation and shall be in a form approved by the Issuing Officer. The minimum 24-hour notice requirement may be reduced to a lesser period but not less than one hour if the Issuing Officer determines that special circumstances warrant the reduction in time. Adequate precautions shall be taken to reasonably safeguard persons and property before, during and after blasting operations. These precautions shall include:

1. The blaster shall retain an inspector to inspect all structures, including mobilehomes, within 300 feet of the blast site before blasting operations, unless inspection is waived by the owner and/or occupant. The inspector shall obtain permission of the owner and/or occupant before conducting the inspection. The inspection shall be only for the purpose of determining the existence of any visible or reasonably recognizable preexisting defects or damages in any structure. Waiver of inspection shall be in writing signed by the owner and/or occupant. Refusal to allow inspection shall also constitute a waiver. The inspector shall notify the owner and/or occupant of the consequences of refusing an inspection shall include a refusal in the summary report filed with the Issuing Officer. The blaster shall request an inspector conduct post-blast inspections upon receipt of a written complaint of property damage if the complaint is made within 60 days of completion of blasting operations. If the blaster has knowledge of alleged property damage independent of the written complaint, the blaster shall also retain an inspector to conduct a post-blast inspection.

2. An inspector shall complete and sign pre-blast inspection reports identifying all findings and inspection waivers. The blaster shall retain the inspection reports for three years from the date of the blasting and upon a complaint of alleged damage the blaster shall immediately file a copy of the report with the Issuing Officer and provide a copy to the complainant. If there is a change in the blasting contractor after blasting has commenced on a project, a re-inspection shall be conducted in accordance with the preceding paragraph before the new blasting contractor undertakes any additional blasting.

3. The blaster shall retain an inspector to conduct a post-blast inspection of any structure for which a written complaint alleging blast damage has been received. A written report of the inspection shall be immediately filed with the Issuing Officer and provided to any person who made a complaint for damages.

4. The blaster shall allow any representative of the Issuing Officer to inspect the blast site and blast materials or explosives at any reasonable time.

5. If the blaster wants a representative of the Issuing Officer to witness a blasting operation the blaster shall make a request with the Issuing Officer at least 12 hours before the blast. The blaster shall confirm the request for a witness with the Issuing Officer at least one hour before the blast. The blaster shall be responsible for any cost incurred by the Issuing Officer in having a representative witness the blast.

6. The blaster shall notify the Issuing Officer on the day of a scheduled blasting operation not less than one hour before blasting.

7. All major blasting operations shall be monitored by an approved seismograph located at the nearest structure within 600 feet of the blasting operation. All daily seismograph reports shall be maintained by the blaster for three years from the blasting.

Sec. 3301.2.8 Seizure of illegal items. The Sheriff may seize at the owner's expense, all explosives, ammunition or blasting agents, which are illegally manufactured, sold, offered or exposed for sale, delivered, stored, possessed or transported in violation of this chapter.

Sec. 3301.2.9 Violations for false or misleading information. It shall be unlawful and a violation of this chapter for any person to provide false or misleading information or documentation to the County or any of its officers or employees or to any fire department, fire protection district, fire company or legally formed volunteer fire department, or its officers or employees in the unincorporated area of the County, having jurisdiction over any aspect of the explosives or blasting permit process or blasting operations.

Sec. 3301.2.10 Fees. A person applying to the Sheriff to be approved as a blaster or inspector, as defined in this section, shall pay an application fee to the Sheriff. A person applying for an explosives permit under this section shall pay the fee established by the Sheriff with the application. The amount of any fee required by this chapter shall be determined by the Sheriff on the basis of the full costs involved in processing an application.

SEC. 96.1.3308.1. FIREWORKS DISPLAY.

Section 3308.1 of the California Fire Code is revised to read:

Sec. 3308.1 General. Outdoor fireworks displays, use of pyrotechnics before a proximate audience and pyrotechnic special effects in motion picture, television, theatrical and group entertainment productions shall comply with California Code of Regulations, Title 19, Chapter 6 and County Code sections 32.101 et seq. The Sheriff shall be the Issuing Officer for a permit for a fireworks display.

Sec. 3308.1.1 Scope. The possession, manufacture, sale, storage, use and display of fireworks are prohibited in the unincorporated area of the County except as provided in County Code sections 32.101 et seq.

SEC. 96.1.3405.2.4. TRANSFERRING CLASS I, II OR III LIQUIDS.

Section 3405.2.4 of the California Fire Code is revised to read:

INDEX OF IMPORTANT TERMS