APPENDIX I: NOISE IMPACT ANALYSIS

NOISE IMPACT ANALYSIS

Car Pros Kia Dealership Project

City of Moreno Valley

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ACRONYMS AND ABBREVIATIONS

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 decibels
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
EPA	Environmental Protection Agency
Hz	Hertz
Ldn	Day-night average noise level
Leq	Equivalent sound level
Lmax	Maximum noise level
ONAC	Federal Office of Noise Abatement and Control
OSB	Oriented Strand Board
OSHA	Occupational Safety and Health Administration
PPV	Peak particle velocity
RMS	Root mean square
SEL	Single Event Level or Sound Exposure Level
STC	Sound Transmission Class
UMTA	Federal Urban Mass Transit Administration
VdB	Vibration velocity level in decibels

1.0 INTRODUCTION

1.1 Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared to determine the noise impacts associated with the proposed Car Pros Kia Dealership project (proposed project). The following is provided in this report:

- A description of the study area and the 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 current noise environment;
- An analysis of the potential short-term construction-related noise impacts from the proposed project; and,
- An analysis of long-term operations-related noise impacts from the proposed project.

1.2 Site Location and Study Area

The project site is located in the eastern portion of the City of Moreno Valley (City) on the eastern corner of the intersection of Auto Mall Drive and Moreno Beach Drive. The approximately 6.19-acre net project site which encompasses 2 parcels is currently vacant and is bounded by Pettit Street and a car storage lot to the north, vacant residential land and industrial uses to the east, Moreno beach Drive and multi-family residential uses to the south, and Auto Mall Drive and vacant land to the west. The project study area is shown in Figure 1.

Sensitive Receptors in Project Vicinity

The nearest sensitive receptors to the project site are the multi-family homes located as near as 180 feet to the southwest of the project site. The nearest school to the project site is Calvary Chapel Christian School, which is located as near as 0.8 mile north of the project site.

1.3 Proposed Project Description

The proposed project would consist of the development of a Kia Dealership with a 41,511 square foot, two-story building and car wash that would be utilized as a sales and service facility, with a 2,562 square foot service reception loading area on the northeast side of the structure. The proposed hours of operation for sales will be seven days a week from 9:00 a.m. to 9:00 p.m. and car service will be Monday through Saturday from 8:00 a.m. to 6:00 p.m.. The proposed site plan is shown in Figure 2.

1.4 Executive Summary

Standard Noise Regulatory Conditions

The proposed project will be required to comply with the following regulatory conditions from the City and State of California (State).

City of Moreno Valley Noise Regulations

The following lists the noise and vibration regulations from the Municipal Code that are applicable, but not limited to the proposed project.

- Section 9.10.170 Vibration;
- Section 11.80.030(B)(2) Sound Level Limits;
- Section 11.80.030(D)(7) Construction Prohibitions

State of California Noise Regulations

The following lists the State of California noise regulations that are applicable, but not limited to the proposed project.

- California Vehicle Code Section 2700-27207 – On Road Vehicle Noise Limits
- California Vehicle Code Section 38365-38350 – Off-Road Vehicle Noise Limits

Summary of Analysis Results

The following is a summary of the proposed project's impacts with regard to the State CEQA Guidelines noise checklist questions.

Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?

Potentially significant impact. Implementation of Mitigation Measure 1 would reduce the impact to less than significant levels.

Generation of excessive groundborne vibration or groundborne noise levels?

Less than significant impact.

For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

No impact.

1.5 Mitigation Measures for the Proposed Project

This analysis found that through adherence to the noise and vibration regulations detailed in Section 1.4 above were adequate to limit all noise and vibration impacts to less than significant levels. No mitigation measures are required for the proposed project with respect to noise and vibration impacts.

Figure 1 – Project Location Map

Figure 2 – Proposed Site Plan

2.0 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 which 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 A-weighted decibels (dBA). The equivalent sound level (Leq) 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 Leq is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Level (Ldn) 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 Ldn, except that it has another addition of 4.77 decibels 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 time periods 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 appears louder in the evening and nighttime hours and is weighted accordingly. The City of Moreno Valley relies on the CNEL dB(A) noise standard to assess transportation-related impacts on noise sensitive land uses.

2.2 Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown that humans are more perceptible to changes in noise levels of a pure tone. 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 contiguous one-third octave bands by:

- 5 dB for center frequencies of 500 hertz (Hz) and above
- 8 dB for center frequencies between 160 and 400 Hz
- 15 dB for center frequencies of 125 Hz or less

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. Caltrans research has shown that the use of soft-site conditions is more appropriate for the application of the Federal Highway Administration (FHWA) traffic noise prediction model used in this analysis.

3.0 GROUND-BORNE VIBRATION FUNDAMENTALS

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels damage to buildings may occur. Although ground-borne 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. Ground-borne noise is an effect of ground-borne 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 also consist of the rattling of windows or dishes on shelves.

3.1 Vibration Descriptors

There are several different methods that 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. Due to the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as (L_v) and is based on the rms velocity amplitude. A commonly used abbreviation is “VdB”, which in this text, is when L_v is based on the reference quantity of 1 micro inch per second.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Off-site 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 ground-borne noise or vibration.

3.3 Vibration Propagation

The propagation of ground-borne vibration is not as simple to model as airborne noise. This is due to the fact that noise in the air travels through a relatively uniform median, while ground-borne 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.

4.0 REGULATORY SETTING

The project site is located in the City of Moreno Valley. 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 prohibits exposure of workers to excessive sound levels. 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.

Although the proposed project is not under the jurisdiction of the FTA, the FTA is the only agency that has defined what constitutes a significant noise impact from implementing a project. The FTA standards are based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise and a summary of the FTA findings are provided below in Table A.

Table A – FTA Project Effects on Cumulative Noise Exposure

Existing Noise Exposure (dBA Leq or Ldn)	Allowable Noise Impact Exposure dBA Leq or Ldn		
	Project Only	Combined	Noise Exposure Increase
45	51	52	+7
50	53	55	+5
55	55	58	+3
60	57	62	+2
65	60	66	+1
70	64	71	+1
75	65	75	0

Source: Federal Transit Administration, 2006.

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

Noise Standards

California Department of Health Services Office of Noise Control

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 is the "Land Use Compatibility for Community Noise Environments Matrix," which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

California Noise Insulation Standards

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

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.

California Vehicle Code Section 27200-27207 – On-Road Vehicle Noise

California Vehicle Code Section 27200-27207 provides noise limits for vehicles operated in California. For vehicles over 10,000 pounds noise is limited to 88 dB for vehicles manufactured before 1973, 86 dB for vehicles manufactured before 1975, 83 dB for vehicles manufactured before 1988, and 80 dB for vehicles manufactured after 1987. All measurements are based at 50 feet from the vehicle.

California Vehicle Section 38365-38380 – Off-Road Vehicle Noise

California Vehicle Code Section 38365-38380 provides noise limits for off-highway motor vehicles operated in California. 92 dBA for vehicles manufactured before 1973, 88 dBA for vehicles manufactured before 1975, 86 dBA for vehicles manufactured before 1986, and 82 dBA for vehicles manufactured after December 31, 1985. All measurements are based at 50 feet from the vehicle.

Vibration Standards

Title 14 of the California Administrative Code Section 15000 requires that all state and local agencies implement the California Environmental Quality Act (CEQA) Guidelines, which requires the analysis of exposure of persons to excessive groundborne vibration. However, no statute has been adopted by the state that quantifies the level at which excessive groundborne vibration occurs.

Caltrans issued the *Transportation- and Construction-Induced Vibration Guidance Manual* in 2004. The manual provides practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. However, this manual is also used as a reference point by many lead agencies and CEQA practitioners throughout California, as it provides numeric thresholds for vibration impacts. Thresholds are established for continuous (construction-related) and transient (transportation-related) sources of vibration, which found that the human response becomes distinctly perceptible at 0.25 inch per second PPV for transient sources and 0.04 inch per second PPV for continuous sources.

4.3 Local Regulations

The City of Moreno Valley General Plan and Municipal Code establishes the following applicable policies related to noise and vibration.

City of Moreno Valley General Plan

The following applicable goals and policies to the proposed project are from the Noise Element of the General Plan.

Objective 6.3

Provide noise compatible land use relationships by establishing noise standards utilized for design and siting purposes.

Policies

6.3.6 Building shall be limited in areas of sensitive receptors.

Objective 6.4

Review noise issues during the planning process and require noise attenuation measures to minimize acoustic impacts to existing and future surrounding land uses.

Policies

6.4.1 Site, landscape and architectural design features shall be encouraged to mitigate noise impacts for new developments, with a preference for noise barriers that avoid freeway sound barrier walls.

Objective 6.5

Minimize noise impacts from significant noise generators such as, but not limited to, motor vehicles, trains, aircraft, commercial, industrial, construction, and other activities.

Policies

6.5.1 New commercial and industrial activities (including the placement of mechanical equipment) shall be evaluated and designed to mitigate noise impacts on adjacent uses.

6.5.1 Construction activities shall be operated in a manner that limits noise impacts on surrounding uses.

City of Moreno Valley Municipal Code

The City of Moreno Valley Municipal Code establishes the following applicable standards related to noise.

Section 9.10.170 Vibration

No vibration shall be permitted which can be felt at or beyond the property line.

Section 11.80.030 Prohibited Acts

A. General Prohibition. It is unlawful and a violation of this chapter to maintain, make, cause, or allow the making of any sound that causes a noise disturbance, as defined in Section 11.80.020.

B. Sound causing permanent hearing loss.

1. Sound level limits. Based on statistics from the Center for Disease Control and Prevention and the National Institute for Occupational Safety and Health, Table 1 and Table 1-A specify sound level limits which, if exceeded, will have a high probability of producing permanent hearing loss in anyone in the area where the sound levels are being exceeded. No sound shall be permitted within the city which exceeds the parameters set for in Tables 11.80.030-1 [see Table B] and 11.80.030-1-A [see Table C] of this chapter:

Table B – City of Moreno Valley Maximum Continuous Sound Levels

Duration per Day (Continuous Hours)	Sound Level [dB(A)]
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
.5	110
.25	115

Source: City of Moreno Valley Municipal Code Section 11.80.030.

Table C – City of Moreno Valley Maximum Impulsive Sound Levels

Number of Repetitions per 24-Hour Period	Sound Level [dB(A)]
1	145
10	135
100	125

Source: City of Moreno Valley Municipal Code Section 11.80.030.

C. Nonimpulsive Sound Decibel Limits. No person shall maintain, create, operate or cause to be operated on private property any source of sound in such a manner as to create any nonimpulsive sound which exceeds the limits set forth for the source land use category (as defined in Section 11.80.020) in Table 11.80.030-2 [see Table D] when measured at a distance of two hundred (200) feet or more from the real property line of the source of the sound, if the sound occurs on privately owned property, or from the source of the sound, if the sound occurs on public right-of-way, public space or other publicly owned property. Any source of sound in violation of this subsection shall be deemed prima facie to be a noise disturbance.

Table D – City of Moreno Valley Maximum Sound Levels for Source Land Uses

Residential		Commercial	
Daytime[1]	Nightime[2]	Daytime[1]	Nightime[2]
60	55	65	60

Notes:
[1] Daytime defined as 8:00 a.m. to 10:00 p.m.
[2] Nighttime define as 10:01 p.m. to 7:59 a.m. the following day.
Source: City of Moreno Valley Municipal Code Section 11.80.030.

D. Specific Prohibitions. In addition to the general prohibitions set out in subsection A of this section, and unless otherwise exempted by this chapter, the following specific acts, or the causing or permitting thereof, are regulated as follows:

7. Construction and Demolition. No person shall operate or cause the operation of any tools or equipment used in construction, drilling, repair, alteration or demolition work between the hours of eight p.m. and seven a.m. the following day Monday through Friday, and between the hours of four p.m. and eight a.m. Saturday such that the sound there from creates a noise disturbance, except for emergency work by public service utilities or for other work approved by the city manager or designee. No work shall occur on Sunday. This section shall not apply to the use of power tools as provided in subsection (D)(9) of this section.

E. Exemptions. The following uses and activities shall be exempt from the sound level regulations except the maximum sound levels provided in Tables 11.80.030-1 [see Table B] and 11.80.030-1A [see Table C]:

5. Sounds from the operation of motor vehicles, to the extent they are regulated by the California Vehicle Code.

5.0 EXISTING NOISE CONDITIONS

To determine the existing noise levels, noise measurements have been taken in the vicinity of the project site. The field survey noted that noise within the proposed project area is generally characterized by vehicle traffic on Moreno Beach Drive, which is located adjacent southwest side of the project site. The following describes the measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment.

5.1 Noise Measurement Equipment

The noise measurements were taken using two Extech Model 407780 Type 2 integrating sound level meters programmed in "slow" mode to record the sound pressure level at 3-second intervals for approximately 24 hours in "A" weighted form. In addition, the L_{eq} averaged over the entire measuring time and L_{max} were recorded. The sound level meters and microphones were mounted approximately five feet above the ground and were equipped with a windscreen. The sound level meters were calibrated before and after the monitoring using an Extech calibrator, Model 407766. The noise level measurement equipment meets American National Standards Institute specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

Noise Measurement Location

The noise monitoring locations were selected in order to obtain noise levels in the vicinity of the nearest residential uses to the project site. Descriptions of the noise monitoring sites are provided below in Table E. Appendix A includes a photo index of the study area and noise level measurement locations.

Noise Measurement Timing and Climate

The noise measurements were recorded between 1:13 p.m. on Monday, February 25, 2019 and 1:17 p.m. on Tuesday, February 26, 2019. When the noise measurements were started the sky was clear, the temperature was 67 degrees Fahrenheit, the humidity was 31 percent, barometric pressure was 28.14 inches of mercury, and the wind was blowing around 3 miles per hour. Overnight, the sky was partly cloudy and the temperature dropped to 40 degrees Fahrenheit. At the conclusion of the noise measurements, the sky was partly cloudy, the temperature was 68 degrees Fahrenheit, the humidity was 41 percent, barometric pressure was 28.17 inches of mercury, and the wind was blowing around 4 miles per hour.

5.2 Noise Measurement Results

The results of the noise level measurements are presented in Table E. The measured sound pressure levels in dBA have been used to calculate the minimum and maximum L_{eq} averaged over 1-hour intervals. Table E also shows the L_{eq}, L_{max}, and CNEL, based on the entire measurement time. The noise monitoring data printouts are included in Appendix B. Figure 3 shows a graph of the 24-hour noise measurements.

Table E – Existing (Ambient) Noise Level Measurements

Site No.	Site Description	Average (dBA L_{eq})		1-hr Average (dBA L_{eq}/Time)		Average (dBA CNEL)
		Daytime[1]	Nighttime[2]	Minimum	Maximum	
A	Located southwest of the project site on a palm tree approximately 80 feet east of the Auto Mall Drive centerline and 100 feet south of the Moreno Beach Drive centerline.	70.7	66.0	60.4 2:22 a.m.	74.1 6:36 p.m.	73.4
B	Located south of the project site on a palm tree approximately 450 feet east of the Auto Mall Drive centerline and 95 feet south of the Moreno Beach Drive centerline.	69.6	64.7	58.6 2:21 a.m.	71.3 3:40 p.m.	71.9

Notes:
[1] Daytime defined as 8:00 a.m. to 10:00 p.m. (Section 11.80.030 of the Municipal Code)
[2] Nighttime define as 10:01 p.m. to 7:59 a.m. the following day. (Section 11.80.030 of the Municipal Code)
Source: Noise measurements taken with two Extech Model 407780 Type 2 integrating sound level meters between Monday, February 25 and Tuesday, February 26, 2019.

Table E shows that the both the daytime and nighttime average noise levels at the nearby multi-family residential uses, south of the project site currently exceed the City's residential noise standards of 60 dBA Leq during the daytime and 55 dBA Leq during the nighttime.

Figure 3 – Field Noise Measurements Graph

6.0 MODELING PARAMETERS AND ASSUMPTIONS

6.1 Construction Noise

The noise impacts from construction of the proposed project have been analyzed through use of the FHWA's Roadway Construction Noise Model (RCNM). The FHWA compiled noise measurement data regarding the noise generating characteristics of several different types of construction equipment used during the Central Artery/Tunnel project in Boston. Table F below provides a list of the construction equipment anticipated to be used for each phase of construction that was calculated through use of the default equipment mixes provided by the CalEEMod model published by Breeze Software under a contract from the South Coast Air Quality Management District for estimating air emissions from land use projects.

Table F – Construction Equipment Noise Emissions and Usage Factors

Equipment Description	Number of Equipment	Acoustical Use Factor[1] (percent)	Spec 721.560 Lmax at 50 feet[2] (dBA, slow[3])	Actual Measured Lmax at 50 feet[4] (dBA, slow[3])
Site Preparation				
Rubber Tired Dozer	3	40	85	82
Tractor, Loader, or Backhoe	4	40	84	N/A
Grading				
Excavator	1	40	85	81
Grader	1	40	85	83
Rubber Tired Dozer	1	40	85	82
Tractor, Loader or Backhoe[5]	3	40	84	N/A
Building Construction				
Crane	1	16	85	81
Forklift (Gradall)	3	40	85	83
Generator	1	50	82	81
Tractor, Loader or Backhoe[5]	3	40	84	N/A
Welder	1	40	73	74
Paving				
Paver	2	50	85	77
Paving Equipment	2	50	85	77
Roller	2	20	85	80
Architectural Coating				
Air Compressor	1	40	80	78

Notes:
[1] Acoustical use factor is the percentage of time each piece of equipment is operational during a typical workday.
[2] Spec 721.560 is the equipment noise level utilized by the RCNM program.
[3] The "slow" response averages sound levels over 1-second increments. A "fast" response averages sound levels over 0.125-second increments.
[4] Actual Measured is the average noise level measured of each piece of equipment during the Central Artery/Tunnel project in Boston, Massachusetts primarily during the 1990s.
[5] For the tractor/loader/backhoe, the tractor noise level was utilized, since it is the loudest of the three types of equipment.
[6] For the cement & mortar mixer, the concrete mixer truck noise level was utilized.
Source: Federal Highway Administration, 2006 and CalEEMod default equipment mix.

Table F also shows the associated measured noise emissions for each piece of equipment from the RCNM model and measured percentage of typical equipment use per day. Construction noise impacts to the nearby sensitive receptors have been calculated according to the equipment noise levels and usage factors listed in Table F and through use of the RCNM. For each phase of construction, the nearest piece of equipment was placed at the shortest distance of the proposed activity to the nearest sensitive receptor and each subsequent piece of equipment was placed an additional 50 feet away.

6.2 Vibration

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

Table G – Vibration Source Levels for Construction Equipment

Equipment		Peak Particle Velocity (inches/second)	Approximate Vibration Level (L_v)at 25 feet
Pile driver (impact)	Upper range	1.518	112
	typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	94
Hoe Ram		0.089	87
Large bulldozer		0.089	87
Caisson drill		0.089	87
Loaded trucks		0.076	86
Jackhammer		0.035	79
Small bulldozer		0.003	58

Source: Federal Transit Administration, May 2006.

The construction-related vibration impacts have been calculated through the vibration levels shown above in Table G and through typical vibration propagation rates. The equipment assumptions were based on the equipment lists provided above in Table F.

7.0 IMPACT ANALYSIS

7.1 CEQA Thresholds of Significance

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

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

7.2 Generation of Noise Levels in Excess of Standards

The proposed project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. The following section calculates the potential noise emissions associated with the temporary construction activities and long-term operations of the proposed project and compares the noise levels to the City standards.

Construction-Related Noise

The construction activities for the proposed project are anticipated to include site preparation and grading of the 6.19-acre project site, building construction of the sales and service building, paving of the onsite driveways and parking areas, and application of architectural coatings. Noise impacts from construction activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities. The nearest sensitive receptors to the project site are the multi-family homes located as near as 180 feet to the southwest of the project site. The nearest offsite worker is located at Caliber Collison, that is as near as 265 feet northwest of the project site.

Section 11.80.030(B) of the City's Municipal Code limits all noise sources in the City to the noise levels where a high probability hearing loss would occur as determined by the Center for Disease Control and Prevention and OSHA. The noise levels thresholds are shown above in Table B and include a threshold of 90 dBA for eight hours, which is the typical daily duration of construction activities. Section 11.80.030(D)(7) of the City's Municipal Code provides additional prohibitions on construction activities by restricting construction activities from occurring between the hours of 8:00 p.m. and 7:00 a.m Monday through Friday, between the hours of four p.m. and eight a.m. on Saturday and no work on Sunday.

Construction noise impacts to the nearby sensitive receptors have been calculated through use of the RCNM and the parameters and assumptions detailed in Section 6.1 of this report including Table F – Construction Equipment Noise Emissions and Usage Factors. The results are shown below in Table H and the RCNM printouts are provided in Appendix C.

Table H – Construction Noise Levels at the Nearest Business Structure and Homes

Construction Phase	Construction Noise Level (dBA Leq) at:	
	Nearest Homes[1]	Nearest Offsite Workers[2]
Site Preparation	72	70
Grading	72	70
Building Construction	70	65
Paving	67	64
Painting	60	53
City's Noise Threshold[3]	**90**	**90**
Exceed Thresholds?	**No**	**No**

[1] The nearest homes are located on the south side of Moreno Beach Drive and are as near as 180 feet southwest of the project site.
[2] The nearest offsite workers are located at Caliber Collision that is as near as 265 feet northwest of the project site.
[3] City Noise Threshold obtained from Section 11.80.030(B) of the Municipal Code.
Source: RCNM, Federal Highway Administration, 2006

Table H shows that the greatest noise impacts would occur during the site preparation and grading phases of construction, with a noise level as high as 72 dBA Leq at the nearest homes and as high as 70 dBA at the nearest offsite workers to the project site, which are both within the City's 8-hour noise threshold of 90 dBA. Through adherence to the limitation of allowable construction times provided in Section 11.80.030(D)(7) of the City's Municipal Code, the construction-related noise levels would not exceed any standards. Therefore, impacts would be less than significant.

Operational-Related Noise

The proposed project would consist of the development of a Kia dealership. Potential noise impacts associated with the operations of the proposed project would be from project-generated vehicular traffic on the nearby roadways and from onsite activities, which have been analyzed separately below.

Roadway Vehicular Noise

Vehicle noise is a combination of the noise produced by the engine, exhaust and tires. The level of traffic noise depends on three primary factors (1) the volume of traffic, (2) the speed of traffic, and (3) the number of trucks in the flow of traffic. The proposed project does not propose any uses that would require a substantial number of truck trips and the proposed project would not alter the speed limit on any existing roadway so the proposed project's potential offsite noise impacts have been focused on the noise impacts associated with the change of volume of traffic that would occur with development of the proposed project.

Objective 6.5 of the City's General Plan Noise Element, requires the City to minimize noise impacts from significant noise generators including roadway noise impacts. However neither the General Plan nor the CEQA Guidelines define what constitutes a "substantial permanent increase to ambient noise levels", as such, this impact analysis has utilized guidance from the Federal Transit Administration for a moderate impact that has been detailed above in Table A that shows that the project contribution to the noise environment can range between 0 and 7 dB, which is dependent on the existing noise levels.

The *Trip Generation Analysis for Proposed Kia Dealership,* prepared by EPD Solutions, Inc., March, 2019, found that the proposed project would generate 1,200 daily vehicle trips. According to the *Moreno Valley*

General Plan Final Program EIR, prepared July 2006, show that Moreno Beach Drive in the vicinity of the project site is anticipated to have 40,760[1] daily trips at General Plan buildout.

In order for project-generated vehicular traffic to increase the noise level by 3 dB the roadway traffic would have to double and for the noise levels to increase by 1.5 dB, the roadway traffic would have to increase by 50 percent. Since the proposed project would only result in a maximum of a 2.9 percent increase on Moreno Beach Drive, the project-related roadway noise increases is anticipated to be negligible. Impacts would be less than significant.

Onsite Noise Sources

The operation of the proposed project may create an increase in onsite noise levels from the proposed auto service bays, rooftop mechanical equipment, car wash, and parking lot activities. Section 11.80.030(C) of the City's Municipal Code limits noise levels at the nearby residential properties to 60 dBA between 8:00 a.m. and 10:00 p.m. and 55 dBA between 10:01 p.m. and 7:59 a.m. the following day. Section 11.80.030(C) also limits noise levels at the nearby commercial properties to 65 dBA between 8:00 a.m. and 10:00 p.m. and 60 dBA between 10:01 p.m. and 7:59 a.m. the following day.

Since the proposed project's hours of operation for sales will be seven days a week from 9:00 a.m. to 9:00 p.m. and car service will be Monday through Saturday from 8:00 a.m. to 6:00 p.m., no onsite activities would occur during the 10:01 p.m to 7:59 a.m. time period. As such, only the 8:00 a.m. to 10:00 p.m. noise standards of 60 dBA at the nearest homes and 65 dBA at the nearest commercial properties have been analyzed.

In order to determine the noise impacts from the proposed auto service bays, rooftop mechanical equipment, car wash, and parking lot activities, reference noise measurements were taken of each noise source and are shown in Table I. Table I also shows the anticipated noise level from each source at the nearest off-site receptors. The operational reference noise measurements are shown in Appendix D.

Table I – Operational Noise Levels at the Nearest Homes and Commercial Uses

	Nearest Homes		Nearest Commercial	
Noise Source	**Homes to Noise Source Distance (feet)**	**Noise Level[1] (dBA Leq)**	**Off-Site Worker to Noise Source (feet)**	**Noise Level[1] (dBA Leq)**
Auto Service Bays[2]	235	37	530	30
Parking Lot[3]	195	31	290	28
Rooftop Equipment[4]	240	39	530	32
Car Wash[5]	250	58	680	49
	Combined Noise Levels	58		49
	City Noise Standards[6]	**60**		65
	Exceed City Noise Standards?	No		No

Notes:
[1] The noise levels were calculated through use of geometric spreading of noise from a point source with a drop-off rate of 6 dB for each doubling of the distance between the source and receiver.
[2] The auto service bays was based on a noise measurement 35 feet from a dealership service bay that produced a noise level of 53.3 dBA Leq
[3] The parking lot was based on a noise measurement 5 feet from a commercial parking lot that produced a noise level of 63.1 dBA Leq

[1] From Alternative 1 – Proposed Circulation Plan for Moreno Beach Drive between Alessandro Boulevard and Cactus Avenue (closest available roadway segment to the project site) of the Moreno Valley General Plan Final Program EIR, July 2006

[4] The rooftop equipment was based on a noise measurement 10 feet from an operational rooftop HVAC unit that measured 66.6 dBA Leq.
[5] The car wash was based on a noise measurement 30 feet from a car wash that produced a noise level of 76.2 dBA Leq.
[6] The City noise standards are from Table 11.80.030-2 of the Municipal Code and are based on the 8:00 am to 10:00 pm noise standards.

Table I shows that the combined sources noise level would be 58 dBA at the homes located southwest of the project site on the south side of Moreno Beach Drive, which would be within the City's daytime noise standard of 60 dBA Leq. Table I also shows that the combined sources noise level would be 49 dBA Leq at the nearest commercial uses that are located northwest of the project site, which would be within the City's commercial daytime noise standard of 65 dBA Leq. Through adherence to the proposed project's hours of operation for sales will be seven days a week from 9:00 a.m. to 9:00 p.m. and car service will be Monday through Saturday from 8:00 a.m. to 6:00 p.m., the operational onsite noise sources would not exceed the City's noise standards. Therefore, impacts would be less than significant.

Level of Significance after Mitigation

Less than significant impact.

7.3 Generation of Excessive Groundborne Vibration

The proposed project would not expose persons to or generation of excessive groundborne vibration or groundborne noise levels. The following section analyzes the potential vibration impacts associated with the construction and operations of the proposed project.

Construction-Related Vibration Impacts

The construction activities for the proposed project are anticipated to include site preparation and grading of the 6.19-acre project site, building construction of the sales and service building, paving of the onsite driveways and parking areas, and application of architectural coatings. Vibration impacts from construction activities associated with the proposed project would typically be created from the operation of heavy off-road equipment. The nearest sensitive receptors to the project site are the multi-family homes located as near as 180 feet to the southwest of the project site. The nearest offsite worker is located at Caliber Collison, that is as near as 265 feet northwest of the project site.

Section 9.10.170 of the City's Municipal Code prohibits any vibration which can be felt at or beyond the property line. Since the City's Municipal does not provide a quantifiable vibration level, Caltrans guidance that is detailed above in Section 4.2 has been utilized, which defines the threshold of perception from transient sources at 0.25 inch per second PPV.

The primary source of vibration during construction would be from the operation of a bulldozer. From Table G above a large bulldozer would create a vibration level of 0.089 inch per second PPV at 25 feet.

Based on typical propagation rates, the vibration level at the nearest offsite receptor (180 feet away) would be 0.006 inch per second PPV. The vibration level at the nearest offsite receptor would be within the 0.25 inch per second PPV threshold detailed above. Impacts would be less than significant.

Operations-Related Vibration Impacts

The proposed project would consist of the development of a Kia dealership. The on-going operation of the proposed project would not include the operation of any known vibration sources. Therefore, a less than significant vibration impact is anticipated from the operation of the proposed project.

Level of Significance

Less than significant impact.

7.4 Aircraft Noise

The proposed project would not expose people residing or working in the project area to excessive noise levels from aircraft. The nearest airport is March Air Reserve Base that is located approximately 5.3 miles southwest of the project site. The project site is located outside of the 60 dBA CNEL noise contours of the March Air Reserve Base. No impact would occur from aircraft noise.

Level of Significance

No impact.

8.0 REFERENCES

Breeze Software, *California Emissions Estimator Model* (CalEEMod) version 2016.3.2.

California Department of Transportation, *2016 Annual Average Daily Truck Traffic on the California State Highway System*, 2018.

California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analytics Protocol*, September 2013.

California Department of Transportation, *Transportation- and Construction-Induced Vibration Guidance Manual*, September 2013.

City of Moreno Valley, *City of Moreno Valley General Plan*, July 11, 2006.

City of Moreno Valley, *Moreno Valley General Plan Final Program EIR,* July 2006.

City of Moreno Valley, *City of Moreno Valley Municipal Code*, May 2014.

EPD Solutions, Inc., *Trip Generation Analysis for Proposed Kia Dealership,* March, 2019.

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment,* May 2006.

U.S. Department of Transportation, *FHWA Roadway Construction Noise Model User's Guide,* January, 2006.

APPENDIX A

Field Noise Measurements Photo Index

APPENDIX B

Field Noise Measurements Printouts

APPENDIX C

RCNM Model Construction Noise Calculations

APPENDIX D

Reference Noise Measurements Printouts

APPENDIX J: TRIP GENERATION ANALYSIS

Environment | Planning | Development Solutions, Inc.

To:	Eric Lewis, PE, TE, City Traffic Engineer, City of Moreno Valley
From:	Meghan Macias, TE
CC:	
Date:	4/5/2019
Re:	Trip Generation Analysis for Proposed Kia Dealership

This technical memorandum presents an analysis of the trip generation for the proposed Kia Dealership located at the eastern corner of Moreno Beach Drive/Auto Mall Drive, in the North East part of the City of Moreno Valley. The project proposes the construction of a 23,858 square foot, two-story building for the proposed Kia Dealership on a 6.35-acre lot, with a 17,653 square foot future expansion planned (inclusive of a proposed 856 square foot car wash). The project site plan is shown in Figure 1. The project site is currently vacant.

The project trip generation was prepared using trip rates from the Institute of Transportation Engineers (ITE) *Trip Generation*, 10th Edition (2017). Table 1 presents the trip generation estimate for the proposed project. The project was analyzed utilizing both square feet and service bays to find the worst-case scenario.

As shown in Table 1, the project is forecast to generate 1156 daily trips including 78 trips during the AM peak hour and 96 trips during the PM peak hour. According to Exhibit A of the City of Moreno Valley *Traffic Impact Analysis Preparation Guide*, projects that generate fewer than 100 vehicle trips during the peak hours are generally exempt from the requirement to prepare a traffic impact analysis. The worst-case peak hour trip generation of the project is 96 PM peak hour trips, fewer than 100 peak hour, trips and would therefore be exempt from the requirement to prepare a TIA.

If you have any questions about this analysis, please contact me at (949) 794-1186 or at meghan@epdsolutions.com.

Table 1. Project Trip Generation

Land Use		Units	Daily	AM Peak Hour In	AM Peak Hour Out	AM Peak Hour Total	PM Peak Hour In	PM Peak Hour Out	PM Peak Hour Total
Trip Rates									
Automobile Sales[1]		TSF	27.840	1.365	0.505	1.870	0.928	1.392	2.320
Automobile Sales[1]		Bays	-[2]	1.320	0.711	2.030	1.017	1.243	2.260
Project Trip Generation									
Square Feet[3]	41.511	TSF	1156	57	21	78	39	58	96
Service Bays	25	Bays	-[2]	33	18	51	25	31	57

TSF = Thousand Square Feet

[1] Trip rates from the Institute of Transportation Engineers, *Trip Generation, 10th Edition,* 2017. Land Use Code 840 - Automobile Sales. PM peak hour trip rate determined using fitted curve equation.

[2] No Daily Trip Rate is provided based on service bays.

[3] Square footage was calculated based on City of Moreno Valley Municipal Code Chapter 9.15, Definitions, for Floor Area (Gross).

Note' Highlight indicates worst case trip generation.

Figure 1: Project Site Plan