Victorville CarMax

NOISE IMPACT ANALYSIS

CITY OF VICTORVILLE

PREPARED BY:

Bill Lawson, PE, INCE
blawson@urbanxroads.com
(949) 336-5979

Alex Wolfe, INCE
awolfe@urbanxroads.com
(949) 336-5977

OCTOBER 24, 2018

TABLE OF CONTENTS

APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

LIST OF ABBREVIATED TERMS

(1)	Reference
ADT	Average Daily Traffic
ANSI	American National Standards Institute
Calveno	California Vehicle Noise
CEQA	California Environmental Quality Act
CNEL	Community Noise Equivalent Level
dBA	A-weighted decibels
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
INCE	Institute of Noise Control Engineering
L_{eq}	Equivalent continuous (average) sound level
L_{max}	Maximum level measured over the time interval
L_{min}	Minimum level measured over the time interval
mph	Miles per hour
PPV	Peak Particle Velocity
Project	Victorville CarMax
REMEL	Reference Energy Mean Emission Level
RMS	Root-mean-square
VdB	Vibration Decibels

EXECUTIVE SUMMARY

Urban Crossroads, Inc. has prepared this noise study to determine the noise exposure and the necessary noise mitigation measures, if any, for the proposed Victorville CarMax development ("Project"). The Project site is generally located south of Roy Rogers Drive and east of Civic Drive, in the City of Victorville. The proposed Project consists of up to 7,480 square-feet of automobile sales use. This study has been prepared consistent with applicable City of Victorville noise standards, and identifies significance criteria based on guidance provided in Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1)

OFF-SITE TRAFFIC NOISE ANALYSIS

Traffic generated by the operation of the proposed Project will influence the traffic noise levels in surrounding off-site areas. To quantify the traffic noise increases on the surrounding off-site areas, the changes in traffic noise levels on two roadway segments adjacent to the Project site entrance were calculated based on the change in the average daily traffic (ADT) volumes. The traffic noise levels provided in this analysis are based on the traffic forecasts provided in the *CarMax Traffic Impact Analysis*, prepared by Michael Baker International. (2) To assess the off-site noise level impacts associated with the proposed Project, noise contour boundaries were developed for Existing, Opening Year, and Horizon Year conditions. The analysis shows that the unmitigated Project-related traffic noise level increases under all traffic scenarios will be *less than significant*.

OPERATIONAL NOISE ANALYSIS

Using reference noise levels to represent the potential noise sources within Victorville CarMax site, this analysis estimates the Project-related daytime operational (stationary-source) noise levels at the nearby receiver locations. The Project-related operational noise sources are expected to include roof-top air conditioning units, parking lot vehicle movements, vehicle deliveries, and vehicle maintenance activity. Additional noise sources include sirens used by police cars for emergency purposes.

OPERATIONAL NOISE LEVEL COMPLIANCE

The analysis shows that the unmitigated Project-related operational noise levels will satisfy the City of Victorville daytime exterior noise level standards at the off-site receiver locations in the Project study area. Therefore, operational noise impacts will be *less than significant* at nearby sensitive receiver locations.

OPERATIONAL NOISE LEVEL CONTRIBUTIONS

Further, this analysis demonstrates that the unmitigated Project-related noise level increases to the existing noise environment at all noise-sensitive receiver locations would be less than the Federal Interagency Committee on Noise (FICON) guidance for noise level increases, and thus would be *less than significant* during daytime hours. Therefore, the operational noise level impacts associated with the proposed Project activities, such as the roof-top air conditioning units, parking lot vehicle movements, vehicle deliveries, and vehicle maintenance activity will be *less than significant*.

CONSTRUCTION NOISE ANALYSIS

Construction activities are expected to create temporary and intermittent high-level noise conditions at receivers surrounding the Project site. Using sample reference noise levels to represent the planned construction activities of Victorville CarMax site, this analysis estimates the Project-related construction noise levels at nearby sensitive receiver locations.

CONSTRUCTION NOISE LEVEL COMPLIANCE

Since the City of Victorville General Plan and Municipal Code do not identify specific construction noise level thresholds, a threshold is identified based on the National Institute for Occupational Safety and Health (NIOSH) limits for construction noise. The Project-related short-term construction noise levels are expected to range from 35.6 to 73.5 dBA L_{eq} and will satisfy the 85 dBA L_{eq} threshold identified by NIOSH at all receiver locations, and as such, all nearby receiver locations will experience *less than significant* impacts due to temporary Project construction noise levels. The construction noise analysis presents a conservative approach with the highest noise-level-producing equipment for each stage of Project construction operating at the closest point from primary construction activity to the nearby sensitive receiver locations. This scenario is unlikely to occur during typical construction activities and likely overstates the construction noise levels which will be experienced at each receiver location.

TEMPORARY CONSTRUCTION NOISE LEVEL CONTRIBUTIONS

Further, to describe the temporary Project construction noise level contributions to the existing ambient noise environment, the Project construction noise levels were combined with the existing daytime noise levels measurements at the off-site sensitive receiver locations. A temporary noise level increase of 12 dBA L_{eq} is considered a potentially significant impact based on the Caltrans substantial noise level increase criteria which is used in this report to assess the Project-construction noise level increases. (3) The analysis shows that the Project will contribute unmitigated, worst-case construction noise level increases ranging from 0.3 to 1.0 dBA L_{eq} during the daytime hours when located at the closest point from the edge of Project construction activities to the nearby sensitive receiver locations. Since the worst-case temporary noise level increase during Project construction will satisfy the 12 dBA L_{eq} significance threshold, the unmitigated construction noise level increases are considered *less than significant* temporary noise impacts.

CONSTRUCTION VIBRATION ANALYSIS

At distances ranging from 50 to 1,346 feet from Project construction activity, construction vibration velocity levels are expected to range from 6.1 to 78.0 VdB. Based on the Federal Transit Administration (FTA) threshold of 80 VdB for residential uses, Project construction vibration levels of up to 78.0 VdB are considered a *less than significant* vibration impact. Further, vibration levels at the site of the closest receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the Project site perimeter.

CONSTRUCTION NOISE AND VIBRATION BEST PRACTICES

The following best practices are not required but would help reduce noise levels produced by the construction equipment to the nearby sensitive residential land uses.

- During all Project site construction, the construction contractors shall equip all construction equipment, fixed or mobile, with properly operating and maintained mufflers, consistent with manufacturers' standards. The construction contractor shall place all stationary construction equipment so that emitted noise is directed away from the noise sensitive receptors nearest the Project site.
- The construction contractor shall locate equipment staging in areas that will create the greatest distance between construction-related noise sources and noise-sensitive receivers nearest the Project site during all Project construction (i.e., to the center).
- The contractor shall design delivery routes to minimize the exposure of sensitive land uses or residential dwellings to delivery truck-related noise.

SUMMARY OF CEQA SIGNIFICANCE FINDINGS

The results of this Victorville CarMax Noise Impact Analysis are summarized below based on the significance criteria in Section 4 of this report consistent with Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1). Table ES-1 shows the findings of significance for each potential noise and/or vibration impact under CEQA before and after any required mitigation measures described below.

TABLE ES-1: SUMMARY OF CEQA SIGNIFICANCE FINDINGS

Analysis	Report Section	Significance Findings	
		Unmitigated	Mitigated
Off-Site Traffic Noise	7	*Less Than Significant*	-
Operational Noise	9	*Less Than Significant*	-
Construction Noise	10	*Less Than Significant*	-
Construction Vibration		*Less Than Significant*	-

This page intentionally left blank

1 INTRODUCTION

This noise analysis has been completed to determine the noise impacts associated with the development of the proposed Victorville CarMax ("Project"). This noise study briefly describes the proposed Project, provides information regarding noise fundamentals, describes the local regulatory setting, provides the study methods and procedures for traffic noise analysis, and evaluates the future exterior noise environment. In addition, this study includes an analysis of the potential Project-related long-term operational and short-term construction noise impacts.

1.1 SITE LOCATION

The proposed Victorville CarMax Project is generally located south of Roy Rogers Drive and east of Civic Drive, in the City of Victorville, as shown on Exhibit 1-A. The Project site is bounded by commercial uses to the north, south, east and west of the Project site. Existing noise-sensitive residential uses are located northeast across Roy Rogers Drive in the Project study area.

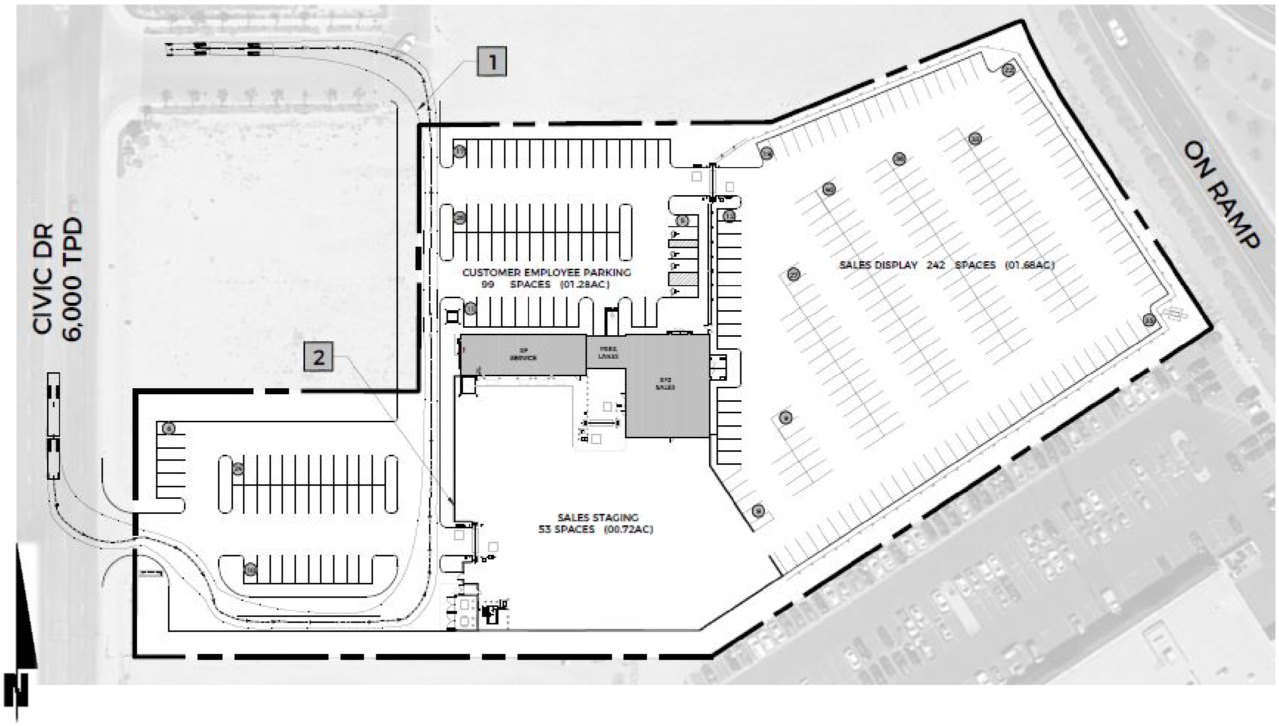
1.2 PROJECT DESCRIPTION

The proposed Project consists of up to 7,480 square-feet of automobile sales use, as shown on Exhibit 1-B.

CarMax management would establish the actual Project store operating hours. For this noise study, Project operations are anticipated to be limited to between the hours of 7:00 a.m. and 10:00 p. m. The on-site Project-related noise sources are expected to include: roof-top air conditioning units, parking lot vehicle movements, vehicle deliveries, and vehicle maintenance activity. This noise analysis is intended to describe noise level impacts associated with the expected typical 24-hour operational activities at the Project site.

EXHIBIT 1-A: LOCATION MAP

EXHIBIT 1-B: SITE PLAN



This page intentionally left blank

2 FUNDAMENTALS

Noise has been simply 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. Noise is measured on a logarithmic scale of sound pressure level known as a decibel (dB). A-weighted decibels (dBA) approximate the subjective response of the human ear to 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. Exhibit 2-A presents a summary of the typical noise levels and their subjective loudness and effects that are described in more detail below.

EXHIBIT 2-A: TYPICAL NOISE LEVELS

COMMON OUTDOOR ACTIVITIES	COMMON INDOOR ACTIVITIES	A - WEIGHTED SOUND LEVEL dBA	SUBJECTIVE LOUDNESS	EFFECTS OF NOISE
THRESHOLD OF PAIN		140	INTOLERABLE OR DEAFENING	HEARING LOSS
NEAR JET ENGINE		130		
		120		
JET FLY-OVER AT 300m (1000 ft)	ROCK BAND	110		
LOUD AUTO HORN		100	VERY NOISY	
GAS LAWN MOWER AT 1m (3 ft)		90		
DIESEL TRUCK AT 15m (50 ft), at 80 km/hr (50 mph)	FOOD BLENDER AT 1m (3 ft)	80		SPEECH INTERFERENCE
NOISY URBAN AREA, DAYTIME	VACUUM CLEANER AT 3m (10 ft)	70	LOUD	
HEAVY TRAFFIC AT 90m (300 ft)	NORMAL SPEECH AT 1m (3 ft)	60		
QUIET URBAN DAYTIME	LARGE BUSINESS OFFICE	50	MODERATE	
QUIET URBAN NIGHTTIME	THEATER, LARGE CONFERENCE ROOM (BACKGROUND)	40		SLEEP DISTURBANCE
QUIET SUBURBAN NIGHTTIME	LIBRARY	30	FAINT	NO EFFECT
QUIET RURAL NIGHTTIME	BEDROOM AT NIGHT, CONCERT HALL (BACKGROUND)	20		
	BROADCAST/RECORDING STUDIO	10	VERY FAINT	
LOWEST THRESHOLD OF HUMAN HEARING	LOWEST THRESHOLD OF HUMAN HEARING	0		

Source: Environmental Protection Agency Office of Noise Abatement and Control, Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety (EPA/ONAC 550/9-74-004) March 1974.

2.1 RANGE OF NOISE

Since the range of intensities that the human ear can detect is so large, the scale frequently used to measure intensity is a scale based on multiples of 10, the logarithmic scale. The scale for measuring intensity is the decibel scale. Each interval of 10 decibels indicates a sound energy ten times greater than before, which is perceived by the human ear as being roughly twice as loud. (4) The most common sounds vary between 40 dBA (very quiet) to 100 dBA (very loud). Normal conversation at three feet is roughly at 60 dBA, while loud jet engine noises equate to 110 dBA at approximately 100 feet, which can cause serious discomfort. (5) Another important aspect of noise is the duration of the sound and the way it is described and distributed in time.

2.2 Noise Descriptors

Environmental noise descriptors are generally based on averages, rather than instantaneous, noise levels. The most commonly used figure is the equivalent level (L_{eq}). 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 (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period and is commonly used to describe the “average” noise levels within the environment.

Peak hour or average noise levels, while useful, do not completely describe a given noise environment. Noise levels lower than peak hour may be disturbing if they occur during times when quiet is most desirable, namely evening and nighttime (sleeping) hours. To account for this, the Community Noise Equivalent Level (CNEL), representing a composite 24-hour noise level is utilized. The CNEL 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 5 decibels to dBA L_{eq} sound levels in the evening from 7:00 p.m. to 10:00 p.m., and the addition of 10 decibels to dBA L_{eq} sound levels at night between 10:00 p.m. and 7:00 a.m. These additions are made to account for the noise sensitive time periods during the evening and night hours when sound appears louder. CNEL does not represent the actual sound level heard at any time, but rather represents the total sound exposure. The City of Victorville relies on the 24-hour CNEL level to assess land use compatibility with transportation related noise sources.

2.3 Sound Propagation

When sound propagates over a distance, it changes in level and frequency content. The way noise reduces with distance depends on the following factors.

2.3.1 Geometric Spreading

Sound from a localized source (i.e., a stationary point source) propagates uniformly outward in a spherical pattern. The sound level attenuates (or decreases) at a rate of 6 dB for each doubling of distance from a point source. Highways consist of several localized noise sources on a defined path and hence can be treated as a line source, which approximates the effect of several point sources. Noise from a line source propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of 3 dB for each doubling of distance from a line source. (4)

2.3.2 Ground Absorption

The propagation path of noise from a highway to a receptor is usually very close to the ground. Noise attenuation from ground absorption and reflective wave canceling adds to the attenuation associated with geometric spreading. Traditionally, the excess attenuation has also been expressed in terms of attenuation per doubling of distance. This approximation is usually sufficiently accurate for distances of less than 200 ft. For acoustically hard sites (i.e., sites with a reflective surface between the source and the receptor, such as a parking lot or body of water), no excess ground attenuation is assumed. For acoustically absorptive or soft sites (i.e., those sites with an absorptive ground surface between the source and the receptor such as soft dirt, grass, or scattered bushes and trees), an excess ground attenuation value of 1.5 dB per doubling of distance is normally assumed. When added to the cylindrical spreading, the excess ground attenuation results in an overall drop-off rate of 4.5 dB per doubling of distance from a line source. (6)

2.3.3 Atmospheric Effects

Receptors located downwind from a source can be exposed to increased noise levels relative to calm conditions, whereas locations upwind can have lowered noise levels. Sound levels can be increased at large distances (e.g., more than 500 feet) due to atmospheric temperature inversion (i.e., increasing temperature with elevation). Other factors such as air temperature, humidity, and turbulence can also have significant effects. (4)

2.3.4 Shielding

A large object or barrier in the path between a noise source and a receptor can substantially attenuate noise levels at the receptor. The amount of attenuation provided by shielding depends on the size of the object and the frequency content of the noise source. Shielding by trees and other such vegetation typically only has an "out of sight, out of mind" effect. That is, the perception of noise impact tends to decrease when vegetation blocks the line-of-sight to nearby resident. However, for vegetation to provide a substantial, or even noticeable, noise reduction, the vegetation area must be at least 15 feet in height, 100 feet wide and dense enough to completely obstruct the line-of sight between the source and the receiver. This size of vegetation may provide up to 5 dBA of noise reduction. The FHWA does not consider the planting of vegetation to be a noise abatement measure. (6)

2.4 Noise Control

Noise control is the process of obtaining an acceptable noise environment for an observation point or receptor by controlling the noise source, transmission path, receptor, or all three. This concept is known as the source-path-receptor concept. In general, noise control measures can be applied to these three elements.

2.5 Noise Barrier Attenuation

Effective noise barriers can reduce noise levels by 10 to 15 dBA, cutting the loudness of traffic noise in half. A noise barrier is most effective when placed close to the noise source or receptor. Noise barriers, however, do have limitations. For a noise barrier to work, it must be high enough and long enough to block the path of the noise source. (6)

2.6 LAND USE COMPATIBILITY WITH NOISE

Some land uses are more tolerant of noise than others. For example, schools, hospitals, churches, and residences are more sensitive to noise intrusion than are commercial or industrial developments and related activities. As ambient noise levels affect the perceived amenity or livability of a development, so too can the mismanagement of noise impacts impair the economic health and growth potential of a community by reducing the area's desirability as a place to live, shop and work. For this reason, land use compatibility with the noise environment is an important consideration in the planning and design process. The FHWA encourages State and Local government to regulate land development in such a way that noise-sensitive land uses are either prohibited from being located adjacent to a highway, or that the developments are planned, designed, and constructed in such a way that noise impacts are minimized. (7)

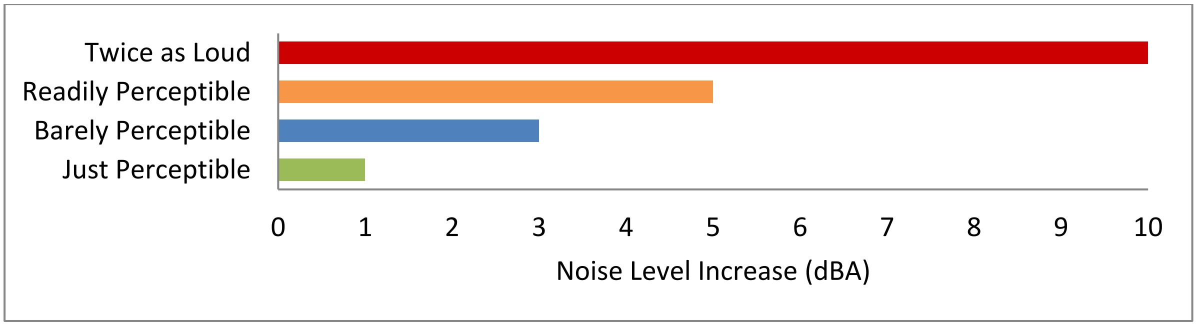
2.7 COMMUNITY RESPONSE TO NOISE

Community responses to noise may range from registering a complaint by telephone or letter, to initiating court action, depending upon everyone's susceptibility to noise and personal attitudes about noise. Several factors are related to the level of community annoyance including:

- Fear associated with noise producing activities;
- Socio-economic status and educational level;
- Perception that those affected are being unfairly treated;
- Attitudes regarding the usefulness of the noise-producing activity;
- Belief that the noise source can be controlled.

Approximately ten percent of the population has a very low tolerance for noise and will object to any noise not of their making. Consequently, even in the quietest environment, some complaints will occur. Another twenty-five percent of the population will not complain even in very severe noise environments. Thus, a variety of reactions can be expected from people exposed to any given noise environment. (8) Surveys have shown that about ten percent of the people exposed to traffic noise of 60 dBA will report being highly annoyed with the noise, and each increase of one dBA is associated with approximately two percent more people being highly annoyed. When traffic noise exceeds 60 dBA or aircraft noise exceeds 55 dBA, people may begin to complain. (8) Despite this variability in behavior on an individual level, the population can be expected to exhibit the following responses to changes in noise levels as shown on Exhibit 2-B. An increase or decrease of 1 dBA cannot be perceived except in carefully controlled laboratory experiments, a change of 3 dBA are considered *barely perceptible*, and changes of 5 dBA are considered *readily perceptible*. (6)

EXHIBIT 2-B: NOISE LEVEL INCREASE PERCEPTION



2.8 EXPOSURE TO HIGH NOISE LEVELS

The Occupational Safety and Health Administration (OSHA) sets legal limits on noise exposure in the workplace. The permissible exposure limit (PEL) for a worker over an eight-hour day is 90 dBA. The OSHA standard uses a 5 dBA exchange rate. This means that when the noise level is increased by 5 dBA, the amount of time a person can be exposed to a certain noise level to receive the same dose is cut in half. The National Institute for Occupational Safety and Health (NIOSH) has recommended that all worker exposures to noise should be controlled below a level equivalent to 85 dBA for eight hours to minimize occupational noise induced hearing loss. NIOSH also recommends a 3 dBA exchange rate so that every increase by 3 dBA doubles the amount of the noise and halves the recommended amount of exposure time. (9)

OSHA has implemented requirements to protect all workers in general industry (e.g. the manufacturing and the service sectors) for employers to implement a Hearing Conservation Program where workers are exposed to a time weighted average noise level of 85 dBA or higher over an eight-hour work shift. Hearing Conservation Programs require employers to measure noise levels, provide free annual hearing exams and free hearing protection, provide training, and conduct evaluations of the adequacy of the hearing protectors in use unless changes to tools, equipment and schedules are made so that they are less noisy and worker exposure to noise is less than the 85 dBA. This noise study does not evaluate the noise exposure of workers within a project or construction site based on CEQA requirements, and instead, evaluates Project-related operational and construction noise levels at the nearby sensitive receiver locations in the Project study area. Further, periodic exposure to high noise levels in short duration, such as Project construction, is typically considered an annoyance and not impactful to human health. It would take several years of exposure to high noise levels to result in hearing impairment. (10)

2.9 VIBRATION

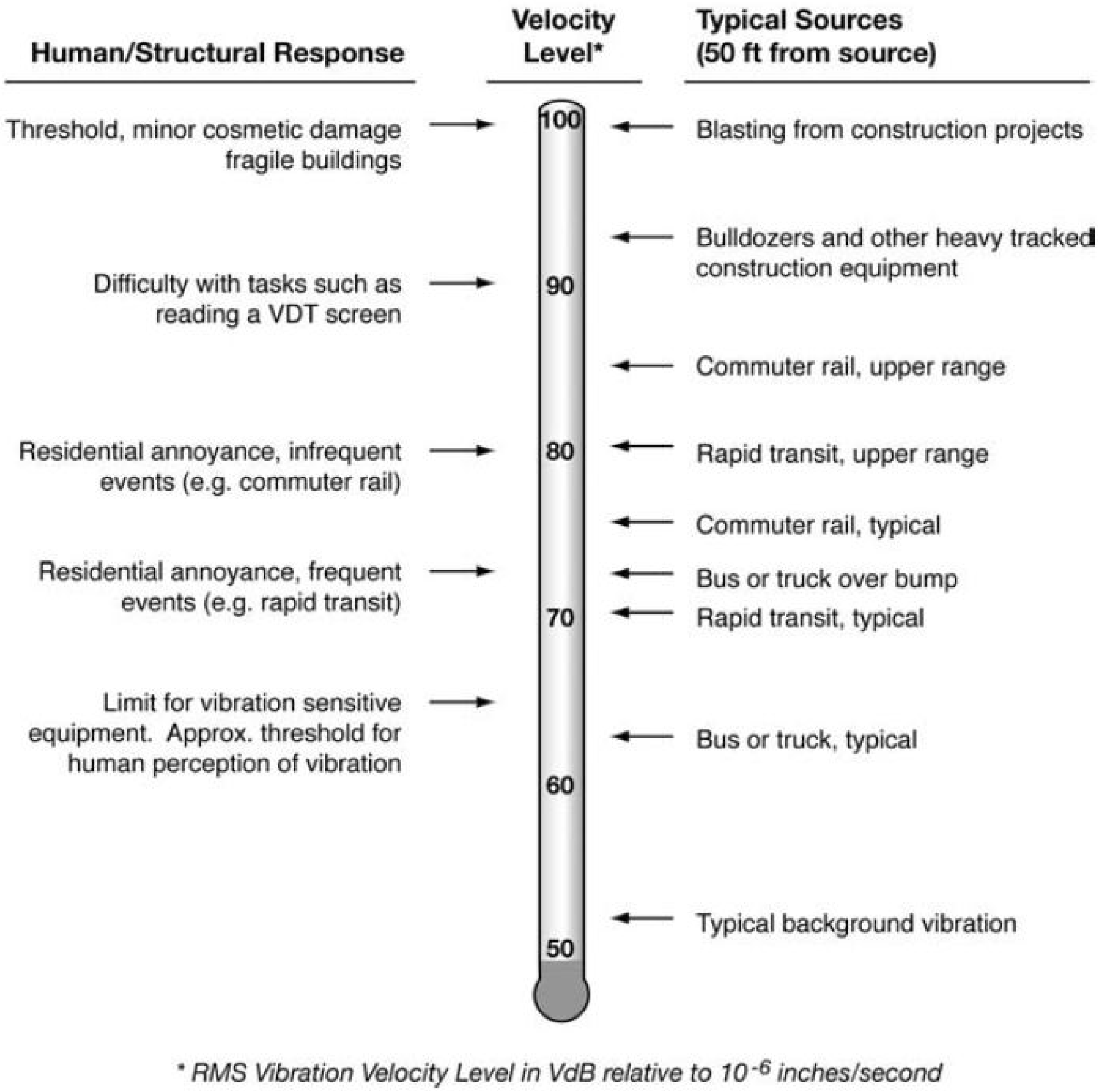
Per the Federal Transit Administration (FTA) *Transit Noise Impact and Vibration Assessment* (11), vibration is the periodic oscillation of a medium or object. The rumbling sound caused by the vibration of room surfaces is called structure-borne noise. Sources of ground-borne vibrations include natural phenomena (e.g., earthquakes, volcanic eruptions, sea waves, landslides) or human-made causes (e.g., explosions, machinery, traffic, trains, construction equipment). Vibration sources may be continuous, such as factory machinery, or transient, such as explosions.

As is the case with airborne sound, ground-borne vibrations may be described by amplitude and frequency.

There are several different methods that are used to quantify vibration. The peak particle velocity (PPV) is defined as the maximum instantaneous peak of the vibration signal. The PPV is most frequently used to describe vibration impacts to buildings but is not always suitable for evaluating human response (annoyance) because it takes some time for the human body to respond to vibration signals. Instead, the human body responds to average vibration amplitude often described as the root mean square (RMS). The RMS amplitude is defined as the average of the squared amplitude of the signal and is most frequently used to describe the effect of vibration on the human body. Decibel notation (VdB) is commonly used to measure RMS. Decibel notation (VdB) serves to reduce the range of numbers used to describe human response to vibration. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Sensitive receivers for vibration include structures (especially older masonry structures), people (especially residents, the elderly, and sick), and vibration-sensitive equipment.

The background vibration-velocity level in residential areas is generally 50 VdB. Ground-borne vibration is normally perceptible to humans at approximately 65 VdB. For most people, a vibration-velocity level of 75 VdB is the approximate dividing line between barely perceptible and distinctly perceptible levels. Typical outdoor sources of perceptible ground-borne vibration are construction equipment, steel-wheeled trains, and traffic on rough roads. If a roadway is smooth, the ground-borne vibration is rarely perceptible. The range of interest is from approximately 50 VdB, which is the typical background vibration-velocity level, to 100 VdB, which is the general threshold where minor damage can occur in fragile buildings. Exhibit 2-C illustrates common vibration sources and the human and structural response to ground-borne vibration.

EXHIBIT 2-C: TYPICAL LEVELS OF GROUND-BORNE VIBRATION



Source: Federal Transit Administration (FTA) Transit Noise Impact and Vibration Assessment.

This page intentionally left blank

3 REGULATORY SETTING

To limit population exposure to physically and/or psychologically damaging as well as intrusive noise levels, the federal government, the State of California, various county governments, and most municipalities in the state have established standards and ordinances to control noise. In most areas, automobile and truck traffic is the major source of environmental noise. Traffic activity generally produces an average sound level that remains constant with time. Air and rail traffic, and commercial and industrial activities are also major sources of noise in some areas. Federal, state, and local agencies regulate different aspects of environmental noise. Federal and state agencies generally set noise standards for mobile sources such as aircraft and motor vehicles, while regulation of stationary sources is left to local agencies.

3.1 STATE OF CALIFORNIA NOISE REQUIREMENTS

The State of California regulates freeway noise, sets standards for sound transmission, provides occupational noise control criteria, identifies noise standards, and provides guidance for local land use compatibility. State law requires that each county and city adopt a General Plan that includes a Noise Element which is to be prepared per guidelines adopted by the Governor's Office of Planning and Research. (12) The purpose of the Noise Element is to *limit the exposure of the community to excessive noise levels*. In addition, the California Environmental Quality Act (CEQA) requires that all known environmental effects of a project be analyzed, including environmental noise impacts.

3.2 STATE OF CALIFORNIA BUILDING STANDARDS

The 2016 State of California's Green Building Standards Code contains mandatory measures for non-residential building construction in Section 5.507 on Environmental Comfort. (13) These noise standards are applied to new construction in California for controlling interior noise levels resulting from exterior noise sources. The regulations specify that acoustical studies must be prepared when non-residential structures are developed in areas where the exterior noise levels exceed 65 dBA CNEL, such as within a noise contour of an airport, freeway, railroad, and other areas where noise contours are not readily available. If the development falls within an airport or freeway 65 dBA CNEL noise contour, the combined sound transmission class (STC) rating of the wall and roof-ceiling assemblies must be at least 50. For those developments in areas where noise contours are not readily available, and the noise level exceeds 65 dBA L_{eq} for any hour of operation, a wall and roof-ceiling combined STC rating of 45, and exterior windows with a minimum STC rating of 40 are required (Section 5.507.4.1).

3.3 CITY OF VICTORVILLE GENERAL PLAN NOISE ELEMENT

The City of Victorville *General Plan Noise Element* is *intended to limit exposure of the community to excessive noise levels*. (14) The City of Victorville *General Plan Noise Element* land use compatibility standards specify the noise levels allowable for new developments impacted by transportation noise sources. The City's compatibility criteria, found in Table N-3of the *General Plan,* identify the criteria for commercial land uses such as the Project, as shown on Exhibit 3-A. When the unmitigated exterior noise levels approach 65 dBA CNEL commercial land use is considered *normally acceptable*. With exterior noise levels ranging from 70 to 75 dBA CNEL, institutional land uses are considered *conditionally acceptable*, and with exterior noise levels greater than 75 dBA CNEL, they are considered *normally unacceptable*.

EXHIBIT 3-A: LAND USE NOISE COMPATIBILITY CRITERIA

Table N-3
Victorville Land Use Compatibility Standards

	Community Noise Exposure Ldn or CNEL, dB						
Land Use Categories	55	60	65	70	75	80 +	
Residential - Low Density, Single Family, Duplex, Multi-family, Mobile Home	1	1	2	2	3	4	4
Transient Lodging - Motels, Hotels	1	1	2	2	3	3	4
Schools, Libraries, Churches, Hospitals, Nursing Homes	1	1	2	3	3	4	4
Auditoriums, Concert Halls, Amphitheaters	2	2	3	3	4	4	4
Sports Arena, Outdoor Spectator Sports	2	2	2	2	3	3	3
Playgrounds, Neighborhood Parks	1	1	1	2	3	3	3
Golf Courses, Riding Stables, Water Recreation, Cemeteries	1	1	1	2	2	4	4
Office Buildings, Business Commercial, Retail Commercial and Professional	1	1	1	2	2	3	3
Industrial, Manufacturing, Utilities	1	1	1	1	2	2	2
Agriculture	1	1	1	1	1	1	1

Legend:
1. NORMALLY ACCEPTABLE: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.
2. CONDITIONALLY ACCEPTABLE: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and Schools, Libraries, Churches, Hospitals, Nursing Homes 1 needed noise insulation features included in the design. Conventional construction, with closed windows and fresh air supply systems or air conditioning will normally suffice.
3. NORMALLY UNACCEPTABLE: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
4. CLEARLY UNACCEPTABLE: New construction or development should generally not be undertaken.

Source: City of Victorville General Plan Noise Element, Table N-3.

3.4 OPERATIONAL NOISE STANDARDS

To analyze noise impacts originating from a designated fixed location or private property such as the Victorville CarMax Project, stationary-source (operational) noise such as the expected roof-top air conditioning units, parking lot vehicle movements, vehicle deliveries, and vehicle maintenance activity are typically evaluated against standards established under a jurisdiction's Municipal Code.

Section 13.01.030 of the City of Victorville Municipal Code, establishes the noise level standards for stationary noise sources. Since the Project land use will potentially impact non-noise-sensitive commercial uses in addition to noise-sensitive uses in the Project study area, this noise study relies on the exterior noise level standards for all land uses identified by the City of Victorville Municipal Code. For industrial uses, exterior noise levels shall not exceed 75 dBA L_{eq} at any time; exterior noise levels at commercial uses shall not exceed 70 dBA L_{eq} at any time. For residential properties, the exterior noise level shall not exceed 65 dBA L_{eq} during the daytime hours (7:00 a.m. to 10:00 p.m.) and 55 dBA L_{eq} during the nighttime hours (10:00 p.m. to 7:00 a.m.). (15) The operational noise level standards are shown on Table 3-1.

TABLE 3-1: OPERATIONAL NOISE STANDARDS

Jurisdiction	Land Use	Time Period	Exterior Noise Level Standard (dBA L_{eq})[2]
City of Victorville[1]	Residential	Daytime (7:00 a.m. - 10:00 p.m.)	65
		Nighttime (10:00 p.m. - 7:00 a.m.)	55
	Commercial	Anytime	70
	Industrial	Anytime	75

[1] Source: City of Victorville Municipal Code, Section 13.01.030 (Appendix 3.1).
L_{eq} represents a steady state sound level containing the same total energy as a time varying signal over a given sample period.

3.5 CONSTRUCTION NOISE STANDARDS

Neither the City of Victorville General Plan or Municipal Code establish numeric maximum acceptable construction source noise levels at potentially affected receivers, which would allow for a quantified determination of what CEQA constitutes a *substantial temporary or periodic noise increase*.

To evaluate whether the Project will generate potentially significant construction noise levels at off-site sensitive receiver locations, a construction-related noise level threshold is adopted from the *Criteria for Recommended Standard: Occupational Noise Exposure* prepared by the National Institute for Occupational Safety and Health (NIOSH). (16) A division of the U.S. Department of Health and Human Services, NIOSH identifies a noise level threshold based on the duration of exposure to the source. The construction related noise level threshold starts at 85 dBA for more than eight hours per day, and for every 3 dBA increase, the exposure time is cut in half. This results in noise level thresholds of 88 dBA for more than four hours per day, 92 dBA for more than one hour per day, 96 dBA for more than 30 minutes per day, and up to 100 dBA for more than 15 minutes per day. (16) For the purposes of this analysis, the lowest, more conservative construction noise level threshold of 85 dBA L_{eq} is used as an acceptable threshold for construction noise at the nearby receiver locations. Since this construction-related noise level threshold represents the energy average of the noise source over a given time, they are expressed as L_{eq} noise levels. Therefore, the noise level threshold of 85 dBA L_{eq} over a period of eight hours or more is used to evaluate the potential Project-related construction noise level impacts at the nearby receiver locations.

3.6 CONSTRUCTION VIBRATION STANDARDS

The City of Victorville has not identified or adopted specific vibration level standards. However, the United States Department of Transportation Federal Transit Administration (FTA) provides guidelines for maximum-acceptable vibration criteria for different types of land uses. These guidelines allow 80 VdB for residential uses and buildings where people normally sleep. (11) Operational and construction activities can result in varying degrees of ground-borne vibration, depending on the equipment and methods used, distance to the affected structures and soil type. The FTA guidelines of 80 VdB for sensitive land uses provide a substantiated basis for determining the relative significance of potential Expansion Project-related vibration impacts due to on-site operational and construction activities.

4 SIGNIFICANCE CRITERIA

The following significance criteria are based on currently adopted guidance provided by Appendix G of the California Environmental Quality Act (CEQA) Guidelines. (1) For the purposes of this report, impacts would be potentially significant if the Project results in or causes:

A. Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;

B. Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.

C. A substantial permanent increase in ambient noise levels in the Project vicinity above existing levels without the proposed Project; or

D. A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above noise levels existing without the proposed Project.

E. For a project located within 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, expose people residing or working in the Project area to excessive noise levels.

F. For a project within the vicinity of a private airstrip, expose people residing or working in the Project area to excessive noise levels.

While the CEQA Guidelines and the City of Victorville General Plan Guidelines provide direction on noise compatibility and establish noise standards by land use type that are sufficient to assess the significance of noise impacts under CEQA Guideline A, they do not define the levels at which increases are considered substantial for use under Guidelines B, C, and D. CEQA Guidelines E and F apply to nearby public and private airports, if any, and the Project's land use compatibility.

The Project site is not located within two miles of a public airport or within an airport land use plan; nor is the Project within the vicinity of a private airstrip. As such, the Project site would not be exposed to excessive noise levels from airport operations, and therefore, impacts are considered *less than significant,* and no further noise analysis is conducted in relation to Guidelines E and F.

4.1 NOISE-SENSITIVE RECEIVERS

Noise level increases resulting from the Project are evaluated based on the Appendix G CEQA Guidelines described above at the closest sensitive receiver locations. Under CEQA, consideration must be given to the magnitude of the increase, the existing ambient noise levels, and the location of noise-sensitive receivers to determine if a noise increase represents a significant adverse environmental impact. This approach recognizes *that there is no single noise increase that renders the noise impact significant.* (17)

4.1.1 SUBSTANTIAL PERMANENT NOISE LEVEL INCREASES

Unfortunately, there is no completely satisfactory way to measure the subjective effects of noise or of the corresponding human reactions of annoyance and dissatisfaction. This is primarily because of the wide variation in individual thresholds of annoyance and differing individual experiences with noise. Thus, an important way of determining a person's subjective reaction to a new noise is the comparison of it to the existing environment to which one has adapted—the so-called *ambient* environment.

In general, the more a new noise exceeds the previously existing ambient noise level, the less acceptable the new noise will typically be judged. The Federal Interagency Committee on Noise (FICON) (18) developed guidance to be used for the assessment of project-generated increases in noise levels that consider the ambient noise level. The FICON recommendations are based on studies that relate aircraft noise levels to the percentage of persons highly annoyed by aircraft noise. Although the FICON recommendations were specifically developed to assess aircraft noise impacts, these recommendations are often used in environmental noise impact assessments involving the use of cumulative noise exposure metrics, such as the average-daily noise level (CNEL) and equivalent continuous noise level (L_{eq}).

As previously stated, the approach used in this noise study recognizes *that there is no single noise increase that renders the noise impact significant*, based on a 2008 California Court of Appeal ruling on Gray v. County of Madera. (17) For example, if the ambient noise environment is quiet (<60 dBA) and the new noise source greatly increases the noise levels, an impact may occur if the noise criteria may be exceeded. Therefore, for this analysis, FICON identifies a *readily perceptible* 5 dBA or greater project-related noise level increase is considered a significant impact when the noise criteria for a given land use is exceeded. Per the FICON, in areas where the without project noise levels range from 60 to 65 dBA, a 3 dBA *barely perceptible* noise level increase appears to be appropriate for most people. When the without project noise levels already exceed 65 dBA, any increase in community noise louder than 1.5 dBA or greater is considered a significant impact if the noise criteria for a given land use is exceeded, since it likely contributes to an existing noise exposure exceedance. Table 4-1 below provides a summary of the potential noise impact significance criteria, based on guidance from FICON.

TABLE 4-1: SIGNIFICANCE OF NOISE IMPACTS AT NOISE-SENSITIVE RECEIVERS

Without Project Noise Level	Potential Significant Impact
< 60 dBA	5 dBA or more
60 - 65 dBA	3 dBA or more
> 65 dBA	1.5 dBA or more

Federal Interagency Committee on Noise (FICON), 1992.

4.1.2 SUBSTANTIAL TEMPORARY OF PERIODIC NOISE LEVEL INCREASES

Due to the temporary, short-term nature of noise-generating construction activities, the temporary or periodic noise level increases over the existing ambient conditions must be considered under CEQA Guideline D. Therefore, the Caltrans *Traffic Noise Analysis Protocol* 12 dBA L_{eq} *substantial* noise level increase threshold is used in this analysis to assess temporary noise level increases. (3) If the Project-related construction noise levels generate a temporary noise level increase above the existing ambient noise levels of up to 12 dBA L_{eq}, then the Project construction noise level increases will be considered a potentially significant impact. Although the Caltrans recommendations were specifically developed to assess traffic noise impacts, the 12 dBA L_{eq} substantial noise level increase threshold is used in California to address noise level increases with the potential to exceed existing conditions. (3)

4.2 SIGNIFICANCE CRITERIA SUMMARY

Noise impacts shall be considered significant if any of the following occur as a direct result of the proposed development. Table 4-2 shows the significance criteria summary matrix.

OFF-SITE TRAFFIC NOISE

- When the noise levels at existing and future noise-sensitive land uses (e.g. residential, etc.):
  - are less than 60 dBA CNEL and the Project creates a *readily perceptible* 5 dBA CNEL or greater Project-related noise level increase; or
  - range from 60 to 65 dBA CNEL and the Project creates a *barely perceptible* 3 dBA CNEL or greater Project-related noise level increase; or
  - already exceed 65 dBA CNEL, and the Project creates a community noise level impact of greater than 1.5 dBA CNEL (FICON, 1992).

OPERATIONAL NOISE

- If Project-related operational (stationary-source) noise levels exceed the exterior noise level standards for each land use category as outlined in Table 3-1.
- If the existing ambient noise levels at the nearby noise-sensitive receivers near the Project site:
  - are less than 60 dBA L_{eq} and the Project creates a *readily perceptible* 5 dBA L_{eq} or greater Project-related noise level increase; or
  - range from 60 to 65 dBA L_{eq} and the Project creates a *barely perceptible* 3 dBA L_{eq} or greater Project-related noise level increase; or
  - already exceed 65 dBA L_{eq}, and the Project creates a community noise level impact of greater than 1.5 dBA L_{eq} (FICON, 1992).

CONSTRUCTION NOISE AND VIBRATION

- If Project-related construction activities:
  - create noise levels which exceed the 85 dBA L_{eq} acceptable noise level threshold at the nearby receiver locations (NIOSH, Criteria for Recommended Standard: Occupational Noise Exposure, June 1998);

- o generate temporary Project construction-related noise level increases which exceed the 12 dBA L_{eq} substantial noise level increase threshold at noise-sensitive receiver locations (Caltrans, Traffic Noise Analysis Protocol).

- If short-term Expansion Project generated construction source vibration levels could exceed the FTA maximum acceptable vibration standard of 80 vibration decibels (VdB) at nearby receiver locations.

TABLE 4-2: SIGNIFICANCE CRITERIA SUMMARY

Analysis	Receiving Land Use	Condition(s)	Significance Criteria	
			Daytime	Nighttime
Off-Site Traffic	Noise-Sensitive[1]	If ambient is < 60 dBA CNEL	≥ 5 dBA CNEL Project increase	
		If ambient is 60 - 65 dBA CNEL	≥ 3 dBA CNEL Project increase	
		If ambient is > 65 dBA CNEL	≥ 1.5 dBA CNEL Project increase	
Operational	Multiple	Exterior Noise Level Standards	See Table 3-1.	
	Noise-Sensitive[1]	if ambient is < 60 dBA L_{eq}	≥ 5 dBA L_{eq} Project increase	
		if ambient is 60 - 65 dBA L_{eq}	≥ 3 dBA L_{eq} Project increase	
		if ambient is > 65 dBA L_{eq}	≥ 1.5 dBA L_{eq} Project increase	
Construction	All	Noise Level Threshold[2]	85 dBA L_{eq}	
	Noise-Sensitive[3]	Noise Level Increase	12 dBA L_{eq}	
	All	Vibration Level Threshold[4]	80 VdB	

[1] Source: FICON, 1992.
[2] Source: NIOSH, Criteria for Recommended Standard: Occupational Noise Exposure, June 1998.
[3] Source: Caltrans Traffic Noise Analysis Protocol, May 2011.
[4] Source: Federal Transit Administration, Transit Noise and Vibration Impact Assessment, May 2006.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.; "PPV" = peak particle velocity.

5 EXISTING NOISE LEVEL MEASUREMENTS

To assess the existing noise level environment, four 24-hour noise level measurements were taken at receiver locations in the Project study area. The receiver locations were selected to describe and document the existing noise environment within the Project study area. Exhibit 5-A provides the boundaries of the Project study area and the noise level measurement locations. To fully describe the existing noise conditions, noise level measurements were collected by Urban Crossroads, Inc. on Wednesday, September 13th, 2018. Appendix 5.1 includes study area photos.

5.1 MEASUREMENT PROCEDURE AND CRITERIA

To describe the existing noise environment, the hourly noise levels were measured during typical weekday conditions over a 24-hour period. By collecting individual hourly noise level measurements, it is possible to describe the daytime and nighttime hourly noise levels and calculate the 24-hour CNEL. The long-term noise readings were recorded using Piccolo Type 2 integrating sound level meter and dataloggers. The Piccolo sound level meters were calibrated using a Larson-Davis calibrator, Model CAL 150. All noise meters were programmed in "slow" mode to record noise levels in "A" weighted form. The sound level meters and microphones were equipped with a windscreen during all measurements. All noise level measurement equipment satisfies the American National Standards Institute (ANSI) standard specifications for sound level meters ANSI S1.4-2014/IEC 61672-1:2013. (19)

5.2 NOISE MEASUREMENT LOCATIONS

The long-term noise level measurements were positioned as close to the nearest sensitive receiver locations as possible to assess the existing ambient hourly noise levels surrounding the Project site. Both Caltrans and the FTA recognize that it is not reasonable to collect noise level measurements that can fully represent any part of a private yard, patio, deck, or balcony normally used for human activity when estimating impacts for new development projects. This is demonstrated in the Caltrans general site location guidelines which indicate that, *sites must be free of noise contamination by sources other than sources of interest. Avoid sites located near sources such as barking dogs, lawnmowers, pool pumps, and air conditioners unless it is the express intent of the analyst to measure these sources*. (4) Further, FTA guidance states, t*hat it is not necessary nor recommended that existing noise exposure be determined by measuring at every noise-sensitive location in the project area. Rather, the recommended approach is to characterize the noise environment for clusters of sites based on measurements or estimates at representative locations in the community*. (11)

Based on recommendations of Caltrans and the FTA, it is not necessary to collect measurements at each individual building or residence, because each receiver measurement represents a group of buildings that share acoustical equivalence. (11) In other words, the area represented by the receiver shares similar shielding, terrain, and geometric relationship to the reference noise source. Receivers represent a location of noise sensitive areas and are used to estimate the future noise level impacts. Collecting reference ambient noise level measurements at the nearby sensitive receiver locations allows for a comparison of the before and after Project noise levels and is necessary to assess potential noise impacts due to the Project's contribution to the ambient noise levels.

5.3 NOISE MEASUREMENT RESULTS

The noise measurements presented below focus on the average or equivalent sound levels (L_{eq}). The equivalent sound level (L_{eq}) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. Table 5-1 identifies the hourly daytime (7:00 a.m. to 10:00 p.m.) and nighttime (10:00 p.m. to 7:00 a.m.) noise levels at each noise level measurement location. Appendix 5.2 provides a summary of the existing hourly ambient noise levels described below:

- Location L1 represents the noise levels north of the Project site adjacent to existing residential homes on Midtown Drive. The noise level measurements collected show an overall 24-hour exterior noise level of 58.7 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 55.7 dBA L_{eq} with an average nighttime noise level of 50.7 dBA L_{eq}.
- Location L2 represents the noise levels northeast of the Project site near existing residential homes on Culver Road. The noise level measurements collected show an overall 24-hour exterior noise level of 59.2 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 58.1 dBA L_{eq} with an average nighttime noise level of 49.7 dBA L_{eq}.
- Location L3 represents the noise levels southwest of the Project site adjacent to Home Depot and an existing commercial parking lot. The 24-hour CNEL indicates that the overall exterior noise level is 60.9 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 56.7 dBA L_{eq} with an average nighttime noise level of 53.5 dBA L_{eq}.
- Location L4 represents the noise levels southwest of the Project site on Valley Park Lane adjacent to an existing Home Depot and vacant lot. The noise level measurements collected show an overall 24-hour exterior noise level of 60.4 dBA CNEL. The energy (logarithmic) average daytime noise level was calculated at 59.0 dBA L_{eq} with an average nighttime noise level of 51.7 dBA L_{eq}.

Table 5-1 provides the (energy average) noise levels used to describe the daytime and nighttime ambient conditions. These daytime and nighttime energy average noise levels represent the average of all hourly noise levels observed during these time periods expressed as a single number. Appendix 5.2 provides summary worksheets of the noise levels for each hour as well as the minimum, maximum, L_1, L_2, L_5, L_8, L_{25}, L_{50}, L_{90}, L_{95}, and L_{99} percentile noise levels observed during the daytime and nighttime periods.

The background ambient noise levels in the Project study area are dominated by the transportation-related noise associated with the arterial roadway network. The 24-hour existing noise level measurements shown on Table 5-1 present the existing ambient noise conditions.

TABLE 5-1: 24-HOUR AMBIENT NOISE LEVEL MEASUREMENTS

Location[1]	Distance to Project Boundary (Feet)	Description	Energy Average Noise Level (dBA L_{eq})[2]		CNEL
			Daytime	Nighttime	
L1	1,460'	Located north of the Project site adjacent to existing residential homes on Midtown Drive.	55.7	50.7	58.7
L2	640'	Located northeast of the Project site near existing residential homes on Culver Road.	58.1	49.7	59.2
L3	803'	Located southwest of the Project site adjacent to Home Depot and an existing commercial parking lot.	56.7	53.5	60.9
L4	645'	Located southwest of the Project site on Valley Park Lane adjacent to an existing Home Depot and vacant lot.	59.0	51.7	60.4

[1] See Exhibit 5-A for the noise level measurement locations.
[2] The long-term 24-hour measurement printouts are included in Appendix 5.2.
"Daytime" = 7:00 a.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

EXHIBIT 5-A: NOISE MEASUREMENT LOCATIONS

6 METHODS AND PROCEDURES

The following section outlines the methods and procedures used to model and analyze the future traffic noise environment.

6.1 FHWA TRAFFIC NOISE PREDICTION MODEL

The estimated roadway noise impacts from vehicular traffic were calculated using a computer program that replicates the Federal Highway Administration (FHWA) Traffic Noise Prediction Model- FHWA-RD-77-108. (20) The FHWA Model arrives at a predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). In California the national REMELs are substituted with the California Vehicle Noise (Calveno) Emission Levels. (21) Adjustments are then made to the REMEL to account for: the roadway classification (e.g., collector, secondary, major or arterial), the roadway active width (i.e., the distance between the center of the outermost travel lanes on each side of the roadway), the total average daily traffic (ADT), the travel speed, the percentages of automobiles, medium trucks, and heavy trucks in the traffic volume, the roadway grade, the angle of view (e.g., whether the roadway view is blocked), the site conditions ("hard" or "soft" relates to the absorption of the ground, pavement, or landscaping), and the percentage of total ADT which flows each hour throughout a 24-hour period.

6.2 OFF-SITE TRAFFIC NOISE PREDICTION MODEL INPUTS

Table 6-1 presents the roadway parameters used to assess the Project's off-site transportation noise impacts. Table 6-1 identifies the seven study area roadway segments, the distance from the centerline to adjacent land use based on the functional roadway classifications per the City of Victorville General Plan Circulation Element, and the posted vehicle speeds. Exhibit 6-A shows the off-site roadway segments used in this analysis, which were selected based on the roadway segments conveying Project traffic as identified in the *Traffic Impact Analysis*. As such, no analysis has been included for Midtown Drive because no substantive Project traffic would be distributed to this location.

The ADT volumes used in this study are presented on Table 6-2 for the following traffic scenarios: Existing, Opening Year, and Horizon Year conditions. (2) For this analysis, soft site conditions are used to analyze the traffic noise impacts within the Project study area. Soft site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. Caltrans' research has shown that the use of soft site conditions is appropriate for the application of the FHWA traffic noise prediction model as used in this off-site traffic noise analysis. (22)

Table 6-3 presents the time of day vehicle splits and Table 6-4 presents the traffic flow distributions (vehicle mix) used for this analysis. The vehicle mix provides the hourly distribution percentages of automobile, medium trucks, and heavy trucks for input into the FHWA noise prediction model.

TABLE 6-1: OFF-SITE ROADWAY PARAMETERS

ID	Roadway	Segment	General Plan Land Use Designation (North/South or West/East)[1]	Specific Plan Land Use Designation (North/South or West/East)[1]	Existing Adjacent Land Use (North/South or West/East)[1]	Distance From Centerline To Nearest Adjacent Land Use (Feet)[2]	Vehicle Speed (mph)[3]
1	Civic Dr.	n/o Site Driveway #2	Specific Plan (SP)/SP	Civic Commercial (CC)/CC	Commercial(C)/C	42'	45
2	Civic Dr.	n/o Site Driveway #1	SP/SP	CC/Civic Auto Park (CAP)	C/Vacant	42'	45
3	Civic Dr.	s/o Site Driveway #1	SP/SP	CC/CAP	C/CAP	42'	45
4	Roy Rogers Dr.	e/o Amargosa Rd.	Commercial (C)/SP	CC	C/Vacant	62'	45
5	Roy Rogers Dr.	w/o I-15 SB Ramps	C & Residential/SP	CC	C & Vacant/C	62'	45
6	Roy Rogers Dr.	w/o I-15 NB Ramps	C/SP	CC & CAP	Residential/C	42'	45
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	C/SP	CAP & Civic Mixed	C/CAP	42'	35

[1] Sources: City of Victorville General Plan Land Use & Zoning Districts Map, the Civic Center Community Sustainability Plan Proposal Land Use Map, and Nearmap aerial imagery dated August 15th, 2018.
[2] Distance to adjacent land use is based upon the right-of-way distances for each functional roadway classification provided in the General Plan Circulation Element.
[3] Posted vehicle speeds.

EXHIBIT 6-A: OFF-SITE STUDY AREA ROADWAY SEGMENTS

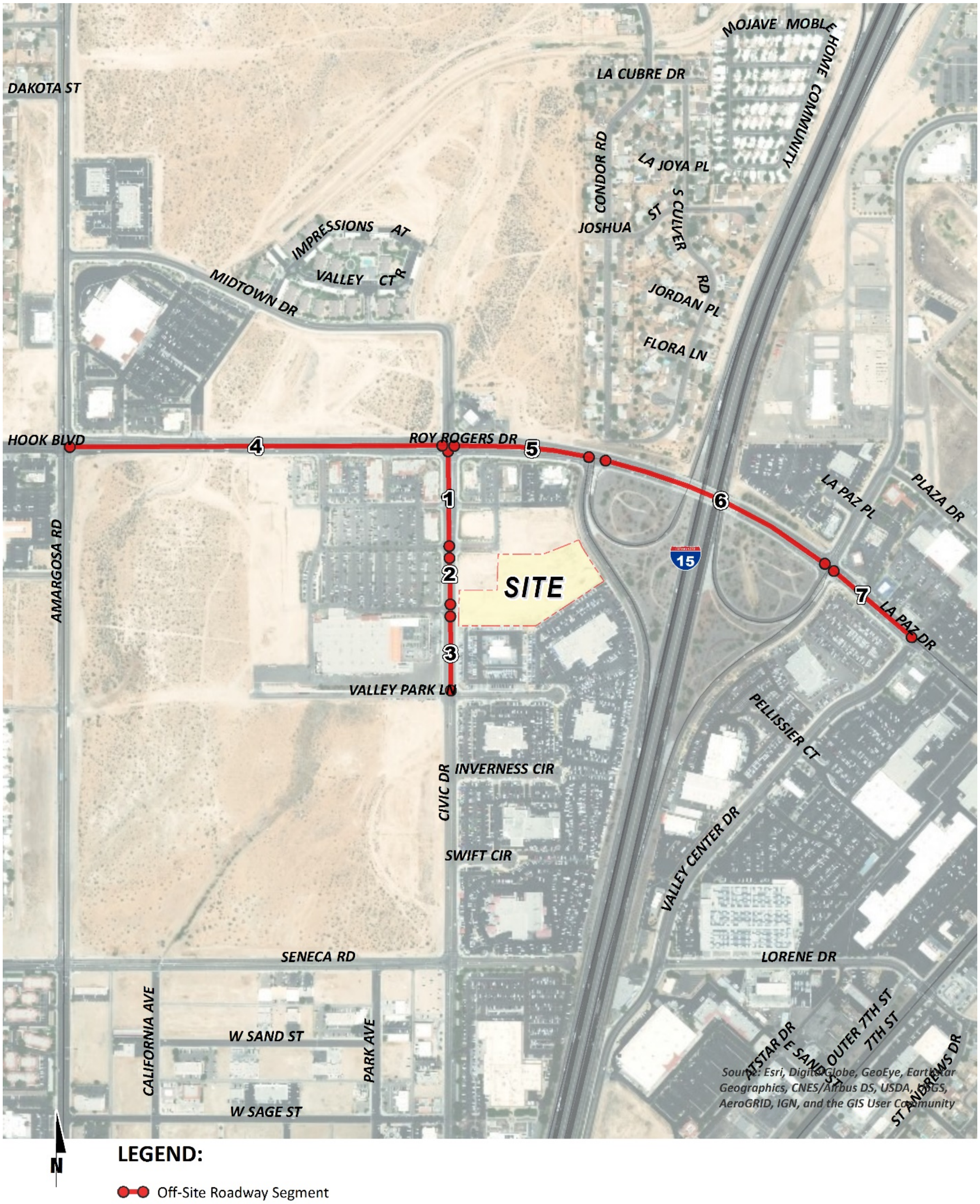


TABLE 6-2: AVERAGE DAILY TRAFFIC VOLUMES

ID	Roadway	Segment	Average Daily Traffic (1,000's)[1]					
			Existing		Opening Year		Horizon Year	
			Without Project	With Project	Without Project	With Project	Without Project	With Project
1	Civic Dr.	n/o Site Driveway #2	11.3	11.5	12.0	12.1	14.4	14.5
2	Civic Dr.	n/o Site Driveway #1	8.2	8.3	8.7	8.8	10.4	10.5
3	Civic Dr.	s/o Site Driveway #1	8.1	8.2	8.6	8.7	10.4	10.4
4	Roy Rogers Dr.	e/o Amargosa Rd.	19.4	19.4	20.9	20.9	24.8	24.8
5	Roy Rogers Dr.	w/o I-15 SB Ramps	28.6	28.8	30.7	30.8	36.8	36.9
6	Roy Rogers Dr.	w/o I-15 NB Ramps	25.9	26.0	27.5	27.6	33.1	33.2
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	23.2	23.2	24.6	24.6	29.5	29.5

[1] Source: CarMax Traffic Impact Analysis, Michael Baker International, September 2018.

TABLE 6-3: TIME OF DAY VEHICLE SPLITS

Vehicle Type	Time of Day Splits[1]			Total of Time of Day Splits
	Daytime	Evening	Nighttime	
Autos	77.50%	12.90%	9.60%	100.00%
Medium Trucks	84.80%	4.90%	10.30%	100.00%
Heavy Trucks	86.50%	2.70%	10.80%	100.00%

[1] Source: Typical Southern California vehicle mix.
"Daytime" = 7:00 a.m. to 7:00 p.m.; "Evening" = 7:00 p.m. to 10:00 p.m.; "Nighttime" = 10:00 p.m. to 7:00 a.m.

TABLE 6-4: WITHOUT PROJECT CONDITIONS VEHICLE MIX

Classification	Total % Traffic Flow			Total
	Autos	Medium Trucks	Heavy Trucks	
All Roadways[1]	97.42%	1.84%	0.74%	100.00%

[1] Source: Typical Southern California vehicle mix.

6.3 CONSTRUCTION VIBRATION ASSESSMENT METHODOLOGY

This analysis focuses on the potential ground-borne vibration associated with vehicular traffic and construction activities. Ground-borne vibration levels from automobile traffic are generally overshadowed by vibration generated by heavy trucks that roll over the same uneven roadway surfaces. However, due to the rapid drop-off rate of ground-borne vibration and the short duration of the associated events, vehicular traffic-induced ground-borne vibration is rarely perceptible beyond the roadway right-of-way, and rarely results in vibration levels that cause damage to buildings in the vicinity.

However, while vehicular traffic is rarely perceptible, construction has the potential to result in varying degrees of temporary ground vibration, depending on the specific construction activities and equipment used. Ground vibration levels associated with various types of construction equipment are summarized on Table 6-5. Based on the representative vibration levels presented for various construction equipment types, it is possible to estimate the human response (annoyance) using the following vibration assessment methods defined by the FTA. To describe the human response (annoyance) associated with vibration impacts the FTA provides the following equation: $L_{VdB}(D) = L_{VdB}(25\text{ ft}) - 30\log(D/25)$

TABLE 6-5: VIBRATION SOURCE LEVELS FOR CONSTRUCTION EQUIPMENT

Equipment	Vibration Decibels (VdB) at 25 feet[1]
Small bulldozer	58
Jackhammer	79
Loaded Trucks	86
Large bulldozer	87

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

7 OFF-SITE TRANSPORTATION NOISE IMPACTS

To assess the off-site transportation CNEL noise level impacts associated with development of the proposed Project, noise contours were developed based on the *Traffic Impact Analysis*. (2) Noise contour boundaries represent the equal levels of noise exposure and are measured in CNEL from the center of the roadway. Noise contours were developed for the following traffic scenarios:

- Existing Conditions Without / With Project: This scenario refers to the existing present-day noise conditions without and with the proposed Project.
- Opening Year 2021 Without / With the Project: This scenario refers to Opening Year noise conditions with ambient growth, without and with the proposed Project. This scenario includes all cumulative traffic volumes identified in the *Traffic Impact Analysis*.
- Horizon Year 2031 Without / With the Project: This scenario refers to Horizon Year noise conditions with ambient growth, without and with the proposed Project. This scenario includes all cumulative traffic volumes identified in the *Traffic Impact Analysis*.

7.1 TRAFFIC NOISE CONTOURS

Noise contours were used to assess the Project's incremental traffic-related noise impacts at land uses adjacent to roadways conveying Project traffic. The noise contours represent the distance to noise levels of a constant value and are measured from the center of the roadway for the 70, 65, and 60 dBA noise levels. The noise contours do not consider the effect of any existing noise barriers or topography that may attenuate ambient noise levels. In addition, because the noise contours reflect modeling of vehicular noise on area roadways, they appropriately do not reflect noise contributions from the surrounding stationary noise sources within the Project study area. Tables 7-1 to 7-6 present a summary of the exterior traffic noise levels, without barrier attenuation, for the study area roadway segments analyzed from the without Project to the with Project conditions under Existing, Opening Year, and Horizon Year traffic conditions. Appendix 7.1 includes a summary of the traffic noise level contours for each of the traffic scenarios.

TABLE 7-1: EXISTING WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Existing Adjacent Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Civic Dr.	n/o Site Driveway #2	Commercial(C)/C	68.7	RW	75	161
2	Civic Dr.	n/o Site Driveway #1	C/Vacant	67.4	RW	60	130
3	Civic Dr.	s/o Site Driveway #1	C/CAP	67.3	RW	60	129
4	Roy Rogers Dr.	e/o Amargosa Rd.	C/Vacant	69.3	55	119	257
5	Roy Rogers Dr.	w/o I-15 SB Ramps	C & Vacant/C	71.0	72	155	333
6	Roy Rogers Dr.	w/o I-15 NB Ramps	Residential/C	72.3	60	130	280
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	C/CAP	69.2	RW	80	172

[1] Sources: City of Victorville General Plan Land Use & Zoning Districts Map, the Civic Center Community Sustainability Plan Proposal Land Use Map, and Nearmap aerial imagery dated August 15th, 2018.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-2: EXISTING WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Existing Adjacent Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Civic Dr.	n/o Site Driveway #2	Commercial(C)/C	68.8	RW	75	162
2	Civic Dr.	n/o Site Driveway #1	C/Vacant	67.4	RW	61	131
3	Civic Dr.	s/o Site Driveway #1	C/CAP	67.3	RW	60	130
4	Roy Rogers Dr.	e/o Amargosa Rd.	C/Vacant	69.3	55	119	257
5	Roy Rogers Dr.	w/o I-15 SB Ramps	C & Vacant/C	71.0	72	155	334
6	Roy Rogers Dr.	w/o I-15 NB Ramps	Residential/C	72.4	60	130	280
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	C/CAP	69.2	RW	80	172

[1] Sources: City of Victorville General Plan Land Use & Zoning Districts Map, the Civic Center Community Sustainability Plan Proposal Land Use Map, and Nearmap aerial imagery dated August 15th, 2018.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-3: OPENING YEAR WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Existing Adjacent Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Civic Dr.	n/o Site Driveway #2	Commercial(C)/C	69.0	RW	78	167
2	Civic Dr.	n/o Site Driveway #1	C/Vacant	67.6	RW	63	135
3	Civic Dr.	s/o Site Driveway #1	C/CAP	67.6	RW	62	135
4	Roy Rogers Dr.	e/o Amargosa Rd.	C/Vacant	69.6	58	125	270
5	Roy Rogers Dr.	w/o I-15 SB Ramps	C & Vacant/C	71.2	75	162	349
6	Roy Rogers Dr.	w/o I-15 NB Ramps	Residential/C	72.6	63	135	292
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	C/CAP	69.4	RW	83	179

[1] Sources: City of Victorville General Plan Land Use & Zoning Districts Map, the Civic Center Community Sustainability Plan Proposal Land Use Map, and Nearmap aerial imagery dated August 15th, 2018.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-4: OPENING YEAR WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Existing Adjacent Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Civic Dr.	n/o Site Driveway #2	Commercial(C)/C	69.1	RW	78	169
2	Civic Dr.	n/o Site Driveway #1	C/Vacant	67.7	RW	63	136
3	Civic Dr.	s/o Site Driveway #1	C/CAP	67.6	RW	63	135
4	Roy Rogers Dr.	e/o Amargosa Rd.	C/Vacant	69.6	58	125	270
5	Roy Rogers Dr.	w/o I-15 SB Ramps	C & Vacant/C	71.3	75	162	350
6	Roy Rogers Dr.	w/o I-15 NB Ramps	Residential/C	72.6	63	136	292
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	C/CAP	69.4	RW	83	179

[1] Sources: City of Victorville General Plan Land Use & Zoning Districts Map, the Civic Center Community Sustainability Plan Proposal Land Use Map, and Nearmap aerial imagery dated August 15th, 2018.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-5: HORIZON YEAR WITHOUT PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Existing Adjacent Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Civic Dr.	n/o Site Driveway #2	Commercial(C)/C	69.8	RW	88	189
2	Civic Dr.	n/o Site Driveway #1	C/Vacant	68.4	RW	71	153
3	Civic Dr.	s/o Site Driveway #1	C/CAP	68.4	RW	71	152
4	Roy Rogers Dr.	e/o Amargosa Rd.	C/Vacant	70.3	65	140	303
5	Roy Rogers Dr.	w/o I-15 SB Ramps	C & Vacant/C	72.0	85	183	394
6	Roy Rogers Dr.	w/o I-15 NB Ramps	Residential/C	73.4	71	153	329
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	C/CAP	70.2	RW	94	202

[1] Sources: City of Victorville General Plan Land Use & Zoning Districts Map, the Civic Center Community Sustainability Plan Proposal Land Use Map, and Nearmap aerial imagery dated August 15th, 2018.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

TABLE 7-6: HORIZON YEAR WITH PROJECT CONDITIONS NOISE CONTOURS

ID	Road	Segment	Existing Adjacent Land Use[1]	CNEL at Nearest Adjacent Land Use (dBA)[2]	Distance to Contour from Centerline (Feet)		
					70 dBA CNEL	65 dBA CNEL	60 dBA CNEL
1	Civic Dr.	n/o Site Driveway #2	Commercial(C)/C	69.8	RW	88	190
2	Civic Dr.	n/o Site Driveway #1	C/Vacant	68.4	RW	71	153
3	Civic Dr.	s/o Site Driveway #1	C/CAP	68.4	RW	71	152
4	Roy Rogers Dr.	e/o Amargosa Rd.	C/Vacant	70.3	65	140	303
5	Roy Rogers Dr.	w/o I-15 SB Ramps	C & Vacant/C	72.1	85	183	395
6	Roy Rogers Dr.	w/o I-15 NB Ramps	Residential/C	73.4	71	153	330
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	C/CAP	70.2	RW	94	202

[1] Sources: City of Victorville General Plan Land Use & Zoning Districts Map, the Civic Center Community Sustainability Plan Proposal Land Use Map, and Nearmap aerial imagery dated August 15th, 2018.
[2] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
"RW" = Location of the respective noise contour falls within the right-of-way of the road.

7.2 EXISTING CONDITION PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-1 presents the Existing without Project conditions CNEL noise levels. The without Project exterior noise levels are expected to range from 67.4 to 72.4 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-2 shows the Existing with Project conditions will range from 67.4 to 72.4 dBA CNEL. As shown on Table 7-7 the Project will generate a noise level increase of up to 0.1 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Existing conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-7: EXISTING CONDITION OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?	Threshold Exceeded?[2]
			No Project	With Project	Project Addition		
1	Civic Dr.	n/o Site Driveway #2	68.8	68.9	0.1	No	No
2	Civic Dr.	n/o Site Driveway #1	67.4	67.4	0.0	No	No
3	Civic Dr.	s/o Site Driveway #1	67.4	67.4	0.0	No	No
4	Roy Rogers Dr.	e/o Amargosa Rd.	69.3	69.3	0.0	No	No
5	Roy Rogers Dr.	w/o I-15 SB Ramps	71.0	71.0	0.0	No	No
6	Roy Rogers Dr.	w/o I-15 NB Ramps	72.4	72.4	0.0	Yes	No
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	69.2	69.2	0.0	No	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[2] Significance Criteria (Section 4).

7.3 OPENING YEAR PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-3 presents the Opening Year without Project conditions CNEL noise levels. The without Project exterior noise levels are expected to range from 67.6 to 72.7 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-4 shows the Opening Year with Project conditions will range from 67.6 to 72.7 dBA CNEL. As shown on Table 7-8 the Project will generate a noise level increase of up to 0.1 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Opening Year conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-8: OPENING YEAR OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?	Threshold Exceeded?[2]
			No Project	With Project	Project Addition		
1	Civic Dr.	n/o Site Driveway #2	69.1	69.1	0.0	No	No
2	Civic Dr.	n/o Site Driveway #1	67.7	67.7	0.0	No	No
3	Civic Dr.	s/o Site Driveway #1	67.6	67.6	0.0	No	No
4	Roy Rogers Dr.	e/o Amargosa Rd.	69.6	69.6	0.0	No	No
5	Roy Rogers Dr.	w/o I-15 SB Ramps	71.3	71.3	0.0	No	No
6	Roy Rogers Dr.	w/o I-15 NB Ramps	72.7	72.7	0.0	Yes	No
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	69.5	69.5	0.0	No	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[2] Significance Criteria (Section 4).

7.4 HORIZON YEAR PROJECT TRAFFIC NOISE LEVEL CONTRIBUTIONS

Table 7-5 presents the Horizon Year without Project conditions CNEL noise levels. The without Project exterior noise levels are expected to range from 68.4 to 73.5 dBA CNEL, without accounting for any noise attenuation features such as noise barriers or topography. Table 7-6 shows the Horizon Year with Project conditions will range from 68.4 to 73.5 dBA CNEL. As shown on Table 7-9 the Project will generate a noise level increase of up to 0.1 dBA CNEL on the study area roadway segments. Based on the significance criteria in Section 4, the Project-related noise level increases are considered *less than significant* under Horizon Year conditions at the land uses adjacent to roadways conveying Project traffic.

TABLE 7-9: HORIZON YEAR OFF-SITE PROJECT-RELATED TRAFFIC NOISE IMPACTS

ID	Road	Segment	CNEL at Adjacent Land Use (dBA)[1]			Noise-Sensitive Land Use?	Threshold Exceeded?[2]
			No Project	With Project	Project Addition		
1	Civic Dr.	n/o Site Driveway #2	69.8	69.9	0.1	No	No
2	Civic Dr.	n/o Site Driveway #1	68.5	68.5	0.0	No	No
3	Civic Dr.	s/o Site Driveway #1	68.4	68.4	0.0	No	No
4	Roy Rogers Dr.	e/o Amargosa Rd.	70.4	70.4	0.0	No	No
5	Roy Rogers Dr.	w/o I-15 SB Ramps	72.1	72.1	0.0	No	No
6	Roy Rogers Dr.	w/o I-15 NB Ramps	73.5	73.5	0.0	Yes	No
7	Roy Rogers Dr.	e/o 1-15 NB Ramps	70.3	70.3	0.0	No	No

[1] The CNEL is calculated at the boundary of the right-of-way of each roadway and the property line of the nearest adjacent land use.
[2] Significance Criteria (Section 4).

This page intentionally left blank

8 RECEIVER LOCATIONS

To assess the potential for long-term operational and short-term construction noise impacts, the following five receiver locations as shown on Exhibit 8-A were identified as representative locations for focused analysis. Sensitive receivers are generally defined as locations where people reside or where the presence of unwanted sound could otherwise adversely affect the use of the land. Noise-sensitive land uses are generally considered to include: schools, hospitals, single-family dwellings, mobile home parks, churches, libraries, and recreation areas. Moderately noise-sensitive land uses typically include: multi-family dwellings, hotels, motels, dormitories, out-patient clinics, cemeteries, golf courses, country clubs, athletic/tennis clubs, and equestrian clubs. Land uses that are considered relatively insensitive to noise include business, commercial, and professional developments. Land uses that are typically not affected by noise include: industrial, manufacturing, utilities, agriculture, natural open space, undeveloped land, parking lots, warehousing, liquid and solid waste facilities, salvage yards, and transit terminals.

Noise-sensitive receivers near the Project site include existing residential homes, as described below. Non-noise-sensitive receiver locations include the existing commercial uses in the Project study area. Other sensitive land uses in the Project study area that are located at greater distances than those identified in this noise study will experience lower noise levels than those presented in this report due to the additional attenuation from distance and the shielding of intervening structures.

R1: Location R1 represents the existing residential homes located approximately 1,315 feet northwest of the Project site on Midtown Drive. A 24-hour noise level measurement was taken near this location, L1, to describe the existing ambient noise environment.

R2: Location R2 represents the existing residential homes located approximately 530 feet north of the Project site on Culver Road. A 24-hour noise level measurement was taken near this location, L2, to describe the existing ambient noise environment.

R3: Location R3 represents future, currently vacant, commercial-designated land use located approximately 26 feet north of the Project site.

R4: Location R4 represents existing commercial use south of the Project site at roughly 78 feet.

R5: Location R5 represents an existing commercial use west of the Project site at an approximate distance of 152 feet on Civic Drive.

EXHIBIT 8-A: RECEIVER LOCATIONS

9 OPERATIONAL IMPACTS

This section analyzes the potential operational noise impacts due to the Project's stationary noise sources on the off-site noise-sensitive receiver locations identified in Section 8. Exhibit 9-A identifies the receiver locations and noise source locations used to assess the Project-related operational noise levels.

9.1 REFERENCE NOISE LEVELS

To estimate the Project operational noise impacts, reference noise level measurements were collected from similar types of activities to represent the noise levels expected with the development of the proposed Project. This section provides a detailed description of the reference noise level measurements shown on Table 9-1 used to estimate the Project operational noise impacts. It is important to note that the following projected noise levels assume the worst-case noise environment with the roof-top air conditioning units, parking lot vehicle movements, vehicle deliveries, and vehicle maintenance activity all operating continuously. These noise level impacts will likely vary throughout the day.

TABLE 9-1: REFERENCE NOISE LEVEL MEASUREMENTS

Noise Source	Duration (hh:mm:ss)	Distance From Source (Feet)	Noise Source Height (Feet)	Hourly Activity (Min.)[5]	Reference Noise Level (dBA L_{eq})	
					@ Ref. Dist.	@ 50 Feet
Roof-Top Air Conditioning Unit[1]	96:00:00	5'	5'	39	77.2	57.2
Parking Lot Vehicle Movements[2]	00:02:00	20'	4'	60	62.9	56.9
Vehicle Deliveries[2]	00:01:05	20'	8'	20	84.7	76.7
Vehicle Maintenance Activity (Impact Wrench)[3]	00:01:13	15'	5'	20	78.7	68.2

[1] As measured by Urban Crossroads, Inc. on 7/27/2015 at the Santee Walmart located at 170 Town Center Parkway.
[2] Based on the car wash tunnel exit reference level operating at 50 feet from the entrance.
[3] As measured by Urban Crossroads, Inc. at the Audi Mission Viejo dealership on 6/10/2016.
[4] As measured by Urban Crossroads, Inc. at the Lake Forest Discount Tire Center on 6/19/2015.
[5] Anticipated duration (minutes within the hour) of noise activity during peak hourly conditions expected at the Project site.

9.1.1 ROOF-TOP AIR CONDITIONING UNITS

To assess the noise levels created by the roof-top air conditioning units at the Project site, reference noise levels measurements were taken at the Santee Walmart on July 27th, 2015. Located at 170 Town Center Parkway in the City of Santee, the noise level measurements describe a mechanical roof-top air conditioning unit on the roof of an existing Walmart store, with additional units operating in the background. The reference noise level represents a Lennox SCA120 series 10-ton model packaged air conditioning unit. Using a uniform reference distance of 50 feet, the reference noise level is 57.2 dBA L_{eq}. The operating conditions of the reference noise level measurement reflect peak summer cooling requirements with measured temperatures approaching 96 degrees Fahrenheit (°F) with average daytime temperatures of 82°F. The noise attenuation provided by a parapet wall is not reflected in this reference noise level measurement.

9.1.2 PARKING LOT VEHICLE MOVEMENTS

To determine the noise levels associated with parking lot vehicle movements, Urban Crossroads collected reference noise level measurements at the Audi Mission Viejo dealership on June 10th, 2016. The noise level measurement indicates that the parking lot vehicle movements generate noise levels of 56.9 dBA L_{eq} at a normalized distance of 50 feet. The parking lot noise levels are mainly due to cars pulling in and out of spaces, car doors being shut, locking sounds including car horns, and employees and customers talking. Noise associated with parking lot vehicle movements is expected during the entire hour (60 minutes).

9.1.3 VEHICLE DELIVERIES

A reference noise level measurement was taken of vehicle delivery unloading activities to describe the vehicle deliveries at the Project site. The exact schedule of Project vehicle deliveries was unknown at the time of this analysis, and therefore, the estimated operational minutes of activity for vehicle delivery is based on the observed conditions at the Audi Mission Viejo dealership. With an estimated one-minute unloading time per vehicle for a total of approximately 20 cars per truck, the total operating time is expected to occur over 20 minutes during peak hour conditions. The vehicle delivery reference noise level is 76.7 dBA L_{eq} at the uniform reference distance of 50 feet.

9.1.4 VEHICLE MAINTENANCE ACTIVITY (IMPACT WRENCH)

To describe the peak noise events during vehicle maintenance activities, a reference noise level measurement of an air impact wrench noise level of 68.2 dBA L_{eq} at 50 feet is used in this analysis. This reference noise level measurement was collected by Urban Crossroads, Inc. on June 19th, 2015 at the Lake Forest Discount Tire Center located at 22482 Muirlands Boulevard in the City of Lake Forest. The vehicle maintenance activities are expected to occur during the full hour (20 minutes) of peak operating conditions.

EXHIBIT 9-A: OPERATIONAL NOISE SOURCE AND RECEIVER LOCATIONS

9.2 OPERATIONAL NOISE LEVELS

Based upon the reference noise levels, it is possible to estimate the Project operational stationary-source noise levels at each receiver location. The operational noise level calculations shown on Table 9-2 account for the distance attenuation provided due to geometric spreading, when sound from a localized stationary source (i.e., a point source) propagates uniformly outward in a spherical pattern. Hard site conditions are used in the operational noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source. The basic noise attenuation equation shown below is used to calculate the distance attenuation based on a reference noise level (SPL_1):

$$SPL_2 = SPL_1 - 20\log(D_2/D_1)$$

Where SPL_2 is the resulting noise level after attenuation, SPL_1 is the source noise level, D_2 is the distance to the reference sound pressure level (SPL_1), and D_1 is the distance to the receiver location. Table 9-2 indicates that the unmitigated operational noise levels associated with the roof-top air conditioning units, parking lot vehicle movements, vehicle deliveries, and vehicle maintenance activity are expected to range from 43.8 to 63.6 dBA L_{eq} at nearby receiver locations. The unmitigated operational noise level calculation worksheets are included in Appendix 9.1.

9.3 OPERATIONAL NOISE LEVEL COMPLIANCE

To demonstrate compliance with local noise regulations, the Project-only operational noise levels generated by on-site operational activities are evaluated against daytime exterior noise level thresholds based on the City of Victorville exterior noise level standards at nearby receiver locations. Table 9-2 shows the operational noise levels associated with Victorville CarMax Project will satisfy the City of Victorville exterior noise level standards at all of the receiver locations. Therefore, the Project-related operational noise level impacts are considered *less than significant* impacts.

TABLE 9-2: UNMITIGATED PROJECT OPERATIONAL NOISE LEVELS

Receiver Location[1]	Land Use	Noise Source[2]				Unmitigated Total Project Operational Noise Levels (dBA L_{eq})[3]	Daytime Noise Level Standard (dBA L_{eq})[4]	Threshold Exceeded?
		Roof-Top A/C Unit	Parking Lot Vehicle Movements	Vehicle Deliveries	Vehicle Maint. Activity			
R1	Residential	26.0	35.5	42.4	34.0	43.8	65	No
R2	Residential	31.1	40.9	46.3	38.6	48.0	65	No
R3	Commercial	44.2	57.1	56.9	50.8	60.6	70	No
R4	Commercial	40.7	51.9	63.1	49.6	63.6	70	No
R5	Commercial	37.0	48.6	55.4	45.3	56.6	70	No

[1] See Exhibit 9-A for the receiver and noise source locations.
[2] Reference noise sources as shown on Table 9-1.
[3] Calculations for each noise source are provided in Appendix 9.1.
[4] Exterior noise level standards (Table 3-1).
"Daytime" = 7:00 a.m. to 10:00 p.m.

9.4 PROJECT OPERATIONAL NOISE CONTRIBUTION

To describe the Project operational noise level contributions at nearby noise-sensitive receiver locations, the Project operational noise levels were combined with the existing ambient noise levels measurements for the off-site noise-sensitive receiver locations potentially impacted by Project operational noise sources. Since the units used to measure noise, decibels (dB), are logarithmic units, the Project-operational and existing ambient noise levels cannot be combined using standard arithmetic equations. (4) Instead, they must be logarithmically added using the following base equation:

$$SPL_{Total} = 10\log_{10}[10^{SPL1/10} + 10^{SPL2/10} + \ldots 10^{SPLn/10}]$$

Where "SPL1," "SPL2," etc. are equal to the sound pressure levels being combined, or in this case, the Project-operational and existing ambient noise levels. The difference between the combined Project and ambient noise levels describe the Project noise level contributions. Noise levels that would be experienced at noise-sensitive receiver locations when unmitigated Project-source noise is added to the ambient daytime conditions are presented on Table 9-3.

As indicated on Table 9-3, the Project will contribute an unmitigated operational noise level increase during the daytime hours ranging from 0.3 to 0.4 dBA L_{eq} at the closest noise-sensitive receiver locations used in this analysis. Based on the without Project (ambient) noise levels, the Project operational noise level increases will, therefore, satisfy the daytime significance criteria discussed in Section 4, and as such, the increases at the sensitive receiver locations will be *less than significant*. On this basis, Project operational stationary-source noise would not result in a substantial temporary/periodic, or permanent increase in ambient noise levels in the Project vicinity above levels existing without the Project.

TABLE 9-3: UNMITIGATED DAYTIME OPERATIONAL NOISE LEVEL CONTRIBUTIONS

Receiver Location[1]	Total Project Operational Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Project Increase[6]	Threshold[7]	Threshold Exceeded?[7]
R1	43.8	L1	55.7	56.0	0.3	5.0	No
R2	48.0	L2	58.1	58.5	0.4	5.0	No

[1] See Exhibit 9-A for the sensitive receiver locations.
[2] Total Project operational noise levels as shown on Table 9-2.
[3] Reference noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project activities.
[6] The noise level increase expected with the addition of the proposed Project activities.
[7] Significance Criteria as defined in Section 4.

10 CONSTRUCTION IMPACTS

This section analyzes potential impacts resulting from the short-term construction activities associated with the development of the Project. Exhibit 10-A shows the construction activity boundaries in relation to the nearby sensitive receiver locations.

10.1 CONSTRUCTION NOISE LEVELS

Noise generated by the Project construction equipment will include a combination of trucks, power tools, concrete mixers, and portable generators that when combined can reach high levels. The number and mix of construction equipment is expected to occur in the following stages:

- Site Preparation
- Grading
- Building Construction
- Paving
- Architectural Coating

This construction noise analysis was prepared using reference noise level measurements taken by Urban Crossroads, Inc. to describe the typical construction activity noise levels for each stage of Project construction. The construction reference noise level measurements represent a list of typical construction activity noise levels. Noise levels generated by heavy construction equipment can range from approximately 68 dBA to in excess of 80 dBA when measured at 50 feet. Hard site conditions are used in the construction noise analysis which result in noise levels that attenuate (or decrease) at a rate of 6 dBA for each doubling of distance from a point source (i.e. construction equipment). For example, a noise level of 80 dBA measured at 50 feet from the noise source to the receiver would be reduced to 74 dBA at 100 feet from the source to the receiver and would be further reduced to 68 dBA at 200 feet from the source to the receiver. The construction stages and equipment used in this analysis are consistent with the *Air Quality Impact Analysis* prepared by Urban Crossroads, Inc. (23)

10.2 CONSTRUCTION REFERENCE NOISE LEVELS

To describe the Project construction noise levels, measurements were collected for similar activities at several construction sites. Table 10-1 provides a summary of the construction reference noise level measurements. Since the reference noise levels were collected at varying distances, all construction noise level measurements presented on Table 10-1 have been adjusted to describe a common reference distance of 50 feet.

TABLE 10-1: CONSTRUCTION REFERENCE NOISE LEVELS

ID	Noise Source	Duration (h:mm:ss)	Reference Distance from Source (Feet)	Reference Noise Levels @ Reference Distance (dBA L_{eq})	Reference Noise Levels @ 50 Feet (dBA L_{eq})[5]
1	Truck Pass-Bys & Dozer Activity[1]	0:01:15	30'	63.6	59.2
2	Dozer Activity[1]	0:01:00	30'	68.6	64.2
3	Construction Vehicle Maintenance Activities[2]	0:01:00	30'	71.9	67.5
4	Foundation Trenching[2]	0:01:01	30'	72.6	68.2
5	Rough Grading Activities[2]	0:05:00	30'	77.9	73.5
6	Framing[3]	0:02:00	30'	66.7	62.3
7	Concrete Mixer Truck Movements[4]	0:01:00	50'	71.2	71.2
8	Concrete Paver Activities[4]	0:01:00	30'	70.0	65.6
9	Concrete Mixer Pour & Paving Activities[4]	0:01:00	30'	70.3	65.9
10	Concrete Mixer Backup Alarms & Air Brakes[4]	0:00:20	50'	71.6	71.6
11	Concrete Mixer Pour Activities[4]	1:00:00	50'	67.7	67.7

[1] As measured by Urban Crossroads, Inc. on 10/14/15 at a business park construction site located at the northwest corner of Barranca Parkway and Alton Parkway in the City of Irvine.
[2] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[3] As measured by Urban Crossroads, Inc. on 10/20/15 at a construction site located in Rancho Mission Viejo.
[4] Reference noise level measurements were collected from a nighttime concrete pour at an industrial construction site, located at 27334 San Bernardino Avenue in the City of Redlands, between 1:00 a.m. to 2:00 a.m. on 7/1/15.
[5] Reference noise levels are calculated at 50 feet using a drop off rate of 6 dBA per doubling of distance (point source).

EXHIBIT 10-A: CONSTRUCTION ACTIVITY AND RECEIVER LOCATIONS

10.3 CONSTRUCTION NOISE ANALYSIS

Tables 10-2 to 10-6 show the Project construction stages and the reference construction noise levels used for each stage. Table 10-7 provides a summary of the noise levels from each stage of construction at each of the sensitive receiver locations. Based on the reference construction noise levels, the Project-related construction noise levels when the highest reference noise level is operating at the edge of primary construction activity nearest each sensitive receiver location will range from 35.6 to 73.5 dBA L_{eq} at the sensitive receiver locations, as shown on Table 10-7.

TABLE 10-2: SITE PREPARATION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	64.2

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,346'	-28.6	0.0	35.6
R2	577'	-21.2	0.0	42.9
R3	50'	0.0	0.0	64.2
R4	167'	-10.5	0.0	53.7
R5	108'	-6.7	0.0	57.5

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms in the Project study area.

TABLE 10-3: GRADING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Truck Pass-Bys & Dozer Activity	59.2
Dozer Activity	64.2
Rough Grading Activities	73.5
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	73.5

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,346'	-28.6	0.0	44.9
R2	577'	-21.2	0.0	52.2
R3	50'	0.0	0.0	73.5
R4	167'	-10.5	0.0	63.0
R5	108'	-6.7	0.0	66.8

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms in the Project study area.

TABLE 10-4: BUILDING CONSTRUCTION EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Foundation Trenching	68.2
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	68.2

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,346'	-28.6	0.0	39.6
R2	577'	-21.2	0.0	46.9
R3	50'	0.0	0.0	68.2
R4	167'	-10.5	0.0	57.7
R5	108'	-6.7	0.0	61.5

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms in the Project study area.

TABLE 10-5: PAVING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Concrete Mixer Truck Movements	71.2
Concrete Paver Activities	65.6
Concrete Mixer Pour & Paving Activities	65.9
Concrete Mixer Backup Alarms & Air Brakes	71.6
Concrete Mixer Pour Activities	67.7
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	71.6

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,346'	-28.6	0.0	43.0
R2	577'	-21.2	0.0	50.4
R3	50'	0.0	0.0	71.6
R4	167'	-10.5	0.0	61.1
R5	108'	-6.7	0.0	64.9

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms in the Project study area.

TABLE 10-6: ARCHITECTURAL COATING EQUIPMENT NOISE LEVELS

Reference Construction Activity[1]	Reference Noise Level @ 50 Feet (dBA L_{eq})
Construction Vehicle Maintenance Activities	67.5
Highest Reference Noise Level at 50 Feet (dBA L_{eq}):	67.5

Receiver Location	Distance To Construction Activity (Feet)[2]	Distance Attenuation (dBA L_{eq})[3]	Estimated Noise Barrier Attenuation (dBA L_{eq})[4]	Construction Noise Level (dBA L_{eq})
R1	1,346'	-28.6	0.0	38.9
R2	577'	-21.2	0.0	46.2
R3	50'	0.0	0.0	67.5
R4	167'	-10.5	0.0	57.0
R5	108'	-6.7	0.0	60.8

[1] Reference construction noise level measurements taken by Urban Crossroads, Inc.
[2] Distance from the nearest point of construction activity to the nearest receiver.
[3] Point (stationary) source drop off rate of 6.0 dBA per doubling of distance.
[4] Estimated barrier/berm attenuation from existing barriers/berms in the Project study area.

10.4 CONSTRUCTION NOISE THRESHOLDS OF SIGNIFICANCE

The construction noise analysis shows that the highest construction noise levels will occur when construction activities take place at the closest point from the edge of primary construction activity to each of the nearby receiver locations. As shown on Table 10-7, the unmitigated construction noise levels are expected to range from 35.6 to 73.5 dBA L_{eq} at the nearby receiver locations.

TABLE 10-7: UNMITIGATED CONSTRUCTION EQUIPMENT NOISE LEVEL SUMMARY

Receiver Location[1]	Construction Hourly Noise Level (dBA L_{eq})					
	Site Preparation	Grading	Building Construction	Paving	Architectural Coating	Highest Construction Noise Levels[2]
R1	35.6	44.9	39.6	43.0	38.9	44.9
R2	42.9	52.2	46.9	50.4	46.2	52.2
R3	64.2	73.5	68.2	71.6	67.5	73.5
R4	53.7	63.0	57.7	61.1	57.0	63.0
R5	57.5	66.8	61.5	64.9	60.8	66.8

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Estimated construction noise levels during peak operating conditions.

Table 10-8 shows the highest construction noise levels at the potentially impacted receiver locations are expected to approach 73.5 dBA L_{eq} and, therefore, will satisfy the construction noise level threshold of 85 dBA L_{eq} at all receiver locations. The noise impact due to unmitigated Project construction noise levels is, therefore, considered a *less than significant* impact at all receiver locations.

TABLE 10-8: CONSTRUCTION EQUIPMENT NOISE LEVEL COMPLIANCE

Receiver Location[1]	Construction Noise Levels (dBA L_{eq})		
	Highest Activity Noise Levels[2]	Threshold[3]	Threshold Exceeded?[4]
R1	44.9	85	No
R2	52.2	85	No
R3	73.5	85	No
R4	63.0	85	No
R5	66.8	85	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Highest construction noise levels during peak operating conditions, as shown on Table 10-7.
[3] Construction noise level threshold as shown on Table 4-2.
[4] Do the estimated Project construction noise levels meet the construction noise level threshold?

10.5 TEMPORARY CONSTRUCTION NOISE LEVEL CONTRIBUTIONS

To describe the temporary Project construction noise level contributions to the existing ambient noise environment at noise-sensitive receiver locations, the Project construction noise levels were combined with the existing ambient noise levels measurements at the off-site sensitive receiver locations. The difference between the combined Project-construction and ambient noise levels are used to describe the construction noise level contributions. Temporary noise level increases that would be experienced at sensitive receiver locations when Project construction-source noise is added to the ambient daytime conditions are presented on Table 10-9. A temporary noise level increase of 12 dBA L_{eq} is considered a potentially significant impact based on the Caltrans substantial noise level increase criteria which is used in this report to assess the Project-construction noise level increases. (3)

As indicated in Table 10-9, the Project will contribute unmitigated, worst-case construction noise level increases approaching 1.0 dBA L_{eq} during the daytime hours at the closest sensitive receiver location, R2. Since the worst-case temporary noise level increases during Project construction will not exceed the 12 dBA L_{eq} significance threshold, the unmitigated construction noise level increases are considered *less than significant* temporary noise impacts at the noise-sensitive receiver locations.

TABLE 10-9: TEMPORARY CONSTRUCTION NOISE LEVEL INCREASES

Receiver Location[1]	Highest Project Construction Noise Level[2]	Measurement Location[3]	Reference Ambient Noise Levels[4]	Combined Project and Ambient[5]	Temporary Worst-Case Project Contribution[6]	Threshold Exceeded?[7]
R1	44.9	L1	55.7	56.0	0.3	No
R2	52.2	L2	58.1	59.1	1.0	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Unmitigated Project construction noise levels as shown on Table 10-8.
[3] Ambient noise level measurement locations as shown on Exhibit 5-A.
[4] Observed daytime ambient noise levels as shown on Table 5-1.
[5] Represents the combined ambient conditions plus the Project construction activities.
[6] The temporary noise level increase expected with the addition of the proposed Project activities.
[7] Based on the 12 dBA L_{eq} temporary increase significance criteria as defined in Section 4.

10.6 CONSTRUCTION VIBRATION IMPACTS

Construction activity can result in varying degrees of ground vibration, depending on the equipment and methods used, distance to the affected structures and soil type. It is expected that ground-borne vibration from Project construction activities would cause only intermittent, localized intrusion. The proposed Project's construction activities most likely to cause vibration impacts are:

- Heavy Construction Equipment: Although all heavy mobile construction equipment has the potential of causing at least some perceptible vibration while operating close to buildings, the vibration is usually short-term and is not of sufficient magnitude to cause building damage.
- Trucks: Trucks hauling building materials to construction sites can be sources of vibration intrusion if the haul routes pass through residential neighborhoods on streets with bumps or potholes. Repairing the bumps and potholes generally eliminates the problem.

Ground-borne vibration levels resulting from construction activities occurring within the Project site were estimated by data published by the Federal Transit Administration (FTA). Construction activities that would have the potential to generate low levels of ground-borne vibration within the Project site include grading. Using the vibration source level of construction equipment provided on Table 6-5 and the construction vibration assessment methodology published by the FTA, it is possible to estimate the Project vibration impacts. Table 10-10 presents the expected Project related vibration levels at each of the sensitive receiver locations.

At distances ranging from 50 to 1,346 feet from Project construction activity, construction vibration velocity levels are expected to range from 6.1 to 78.0 VdB. Based on the Federal Transit Administration (FTA) threshold of 80 VdB for residential uses, Project construction vibration levels of up to 78.0 VdB are considered a *less than significant* vibration impact. Further, vibration levels at the site of the closest receiver are unlikely to be sustained during the entire construction period but will occur rather only during the times that heavy construction equipment is operating simultaneously adjacent to the Project site perimeter.

TABLE 10-10: UNMITIGATED CONSTRUCTION EQUIPMENT VIBRATION LEVELS

Receiver Location[1]	Distance to Construction Activity (Feet)	Receiver Vibration Levels (VdB)[2]					Threshold Exceeded?[3]
		Small Bulldozer	Jackhammer	Loaded Trucks	Large Bulldozer	Highest Vibration Levels	
R1	1,346'	6.1	27.1	34.1	35.1	35.1	No
R2	577'	17.1	38.1	45.1	46.1	46.1	No
R3	50'	49.0	70.0	77.0	78.0	78.0	No
R4	167'	33.3	54.3	61.3	62.3	62.3	No
R5	108'	38.9	59.9	66.9	67.9	67.9	No

[1] Noise receiver locations are shown on Exhibit 10-A.
[2] Based on the Vibration Source Levels of Construction Equipment included on Table 6-5.
[3] Does the peak vibration exceed the FTA maximum acceptable vibration standard of 80 VdB?

This page intentionally left blank

11 REFERENCES

1. **State of California.** *California Environmental Quality Act, Appendix G.* 2018.

2. **Michael Baker International.** *CarMax Traffic Impact Analysis.* September 2018.

3. **California Department of Transportation.** *Traffic Noise Analysis Protocol for New Highway Construction, Reconstruction, and Retrofit Barrier Projects.* May 2011.

4. **California Department of Transportation Environmental Program.** *Technical Noise Supplement - A Technical Supplement to the Traffic Noise Analysis Protocol.* Sacramento, CA : s.n., September 2013.

5. **Environmental Protection Agency Office of Noise Abatement and Control.** *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety.* March 1974. EPA/ONAC 550/9/74-004.

6. **U.S. Department of Transportation, Federal Highway Administration, Office of Environment and Planning, Noise and Air Quality Branch.** *Highway Traffic Noise Analysis and Abatement Policy and Guidance.* June, 1995.

7. **U.S. Department of Transportation, Federal Highway Administration.** *Highway Traffic Noise in the United States, Problem and Response.* April 2000. p. 3.

8. **U.S. Environmental Protection Agency Office of Noise Abatement and Control.** *Noise Effects Handbook-A Desk Reference to Health and Welfare Effects of Noise.* October 1979 (revised July 1981). EPA 550/9/82/106.

9. **Occupational Safety and Health Administration.** *Standard 29 CRF, Part 1910.*

10. **Center for Disease Control and Prevention.** About Hearing Loss. [Online] [Cited: 04 15, 2016.] http://www.cdc.gov/healthyschools/noise/signs.htm.

11. **U.S. Department of Transportation, Federal Transit Administration.** *Transit Noise and Vibration Impact Assessment.* May 2006. FTA-VA-90-1003-06.

12. **Office of Planning and Research.** *State of California General Plan Guidlines.* 2017.

13. **State of California.** *California Green Building Standards Code.* 2016.

14. **City of Victorville.** *General Plan Noise Element.* 2008.

15. —. *Municipal Code, Section 13.01.030.*

16. **National Institute for Occupational Safety and Health.** *Criteria for Recommended Standard: Occupational Noise Exposure.* June 1998.

17. **California Court of Appeal.** *Gray v. County of Madera, F053661.* 167 Cal.App.4th 1099; - Cal.Rptr.3d, October 2008.

18. **Federal Interagency Committee on Noise.** *Federal Agency Review of Selected Airport Noise Analysis Issues.* August 1992.

19. **American National Standards Institute (ANSI).** *Specification for Sound Level Meters ANSI S1.4-2014/IEC 61672-1:2013.*

20. **U.S. Department of Transportation, Federal Highway Administration.** *FHWA Highway Traffic Noise Prediction Model.* December 1978. FHWA-RD-77-108.

21. **California Department of Transportation Environmental Program, Office of Environmental Engineering.** *Use of California Vehicle Noise Reference Energy Mean Emission Levels (Calveno REMELs) in FHWA Highway Traffic Noise Prediction.* September 1995. TAN 95-03.

22. **California Department of Transportation.** *Traffic Noise Attenuation as a Function of Ground and Vegetation Final Report.* June 1995. FHWA/CA/TL-95/23.

23. **Urban Crossroads, Inc.** *Victorville CarMax Air Quality Impact Analysis.* October 2018.

12 CERTIFICATION

The contents of this noise study report represent an accurate depiction of the noise environment and impacts associated with the proposed Victorville CarMax Project. The information contained in this noise study report is based on the best available data at the time of preparation. If you have any questions, please contact me directly at (949) 336-5979.

Bill Lawson, P.E., INCE
Principal
URBAN CROSSROADS, INC.
260 E. Baker Street, Suite 200
Costa Mesa, CA 92626
(949) 336-5979
blawson@urbanxroads.com

EDUCATION

Master of Science in Civil and Environmental Engineering
California Polytechnic State University, San Luis Obispo • December, 1993

Bachelor of Science in City and Regional Planning
California Polytechnic State University, San Luis Obispo • June, 1992

PROFESSIONAL REGISTRATIONS

PE – Registered Professional Traffic Engineer – TR 2537 • January, 2009
AICP – American Institute of Certified Planners – 013011 • June, 1997–January 1, 2012
PTP – Professional Transportation Planner • May, 2007 – May, 2013
INCE – Institute of Noise Control Engineering • March, 2004

PROFESSIONAL AFFILIATIONS

ASA – Acoustical Society of America
ITE – Institute of Transportation Engineers

PROFESSIONAL CERTIFICATIONS

Certified Acoustical Consultant – County of Orange • February, 2011
FHWA-NHI-142051 Highway Traffic Noise Certificate of Training • February, 2013

This page intentionally left blank

APPENDIX 3.1:

CITY OF VICTORVILLE MUNICIPAL CODE

This page intentionally left blank

Chapter 13.01 - NOISE CONTROL

Sections:

13.01.010 - Purpose and intent.

(a) The purpose of this chapter is to establish criteria and standards for the regulation of noise levels within the city of Victorville.

(b) The city council declares and finds that excessive noise levels are detrimental to the public health, welfare and safety and contrary to the public interest. It is the intent of this chapter to protect persons from excessive levels of noise from sources including, but not limited to; persons, animals, or fowl; automobiles, motorcycles, engines, machines, or other mechanical devices; loudspeakers, musical instruments, radios, televisions, phonographs, or other amplifying devices.

(c) This chapter includes standards for the measurement of noise levels to ensure that noise levels do not disturb and interfere with the peace, comfort or repose of the residents of the neighborhood from which the noise is emitted.

(Ord. 1962 § 2 (part), 2002)

13.01.020 - Definitions.

The following words, phrases, and terms as used in this chapter shall have the following meanings:

(1) "A-weighted sound level" means the sound pressure level in decibels as measured on a sound level meter using A-weighting network. The level to read is designated db(A) or dB(A).

(2) "Ambient noise level" means the all-encompassing noise level associated with a given environment, being a composite of sounds from all sources, excluding any intrusive noise.

(3) "Cumulative period" means an additive period of time composed of individual time segments which may be continuous or interrupted.

(4) "Decibel" means a unit of measure of sound level noise.

(5) "Noise level" means the same as "sound level" and the terms may be used interchangeably herein.

(6) "Sound level" (noise level) in decibels is the quantity measured using the frequency weighting of A of a sound level meter as defined herein.

(7) "Sound level meter" means an instrument meeting American National Standard Institute's Standard S1.4-1971 for type 1 or type 2 sound level meters or an instrument

and the associated recording and analyzing equipment which will provide equivalent data.

(Ord. 1962 § 2 (part), 2002)

13.01.030 - Noise measurement criteria.

Any noise level measurements made pursuant to the provisions of this chapter shall be performed using a sound level meter as defined in this chapter. The location selected for measuring exterior noise levels shall be at any point on the property line of the offender or anywhere on the affected property.

(Ord. 1962 § 2 (part), 2002)

13.01.040 - Base ambient noise levels.

All ambient noise measurements shall commence in decibels within the respective zones and times as follows:

Zone	Time	Sound Level Decibels
All residential zones	10:00pm to 7:00am	55 dB(A)
	7:00am to 10:00pm	65 dB(A)
All commercial zones	Anytime	70 dB(A)
All industrial zones	Anytime	75 dB(A)

If the ambient noise level exceeds the applicable limit as noted in the above table, the ambient noise level shall be the standard.

(Ord. 1962 § 2 (part), 2002)

13.01.050 - Noise levels prohibited.

Noise levels shall not exceed the ambient noise levels in Section 13.01.040 by the following dB(A) levels for the cumulative period of time specified:

(1) Less than 5dB(A) for a cumulative period of more than thirty minutes in any hour;

(2) Less than 10 dB(A) for a cumulative period of more than fifteen minutes in any hour;

(3) Less than 15 dB(A) for a cumulative period of more than five minutes in any hour;

(4) Less than 20 dB(A) for a cumulative period of more than one minute in any hour;

(5) 20 dB(A) or more for any period of time.

(Ord. 1962 § 2 (part), 2002)

13.01.060 - Noise source exemptions.

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

(1) All mechanical devices, apparatus or equipment used, related to or connected with emergency machinery, vehicle or work.

(2) The provisions of this regulation shall not preclude the construction, operation, maintenance and repairs of equipment, apparatus or facilities of park and recreation projects, public works projects or essential public works services and facilities, including those utilities subject to the regulatory jurisdiction of the California Public Utilities Commission.

(3) Activities conducted on the grounds of any elementary, intermediate or secondary school or college.

(4) Outdoor gatherings, public dances and shows, provided said events are conducted pursuant to a permit as required by this code.

(5) Activities conducted in public parks and public playgrounds, provided said events are conducted pursuant to a permit as required by this code.

(6) Any activity to the extent regulation thereof has been preempted by state or federal law.

(7) Traffic on any roadway or railroad right-of-way.

(8) The operation of the Southern California Logistics Airport.

(9) Construction activity on private properties that are determined by the director of building and safety to be essential to the completion of a project.

(Ord. 1962 § 2 (part), 2002)

13.01.070 - Notice and penalties.

Any person violating any of the provisions, or failing to comply with the requirements of this chapter, is guilty of a civil penalty, punishable in accordance with Chapter 1.05. In addition, in the discretion of the city attorney and based upon the specific facts and circumstances presented to him or her, any such violation may be charged as an infraction subject to the penalties contained in Section 1.04.010.

(Ord. 1962 § 2 (part), 2002)

13.01.080 - Severability.

If any provision of the ordinance codified in this chapter or the application thereof to any person or circumstance is held invalid, the remainder of the ordinance, and the application of such provision to other persons or circumstances, shall not be affected thereby.

(Ord. 1962 § 2 (part), 2002)

APPENDIX 5.1:

STUDY AREA PHOTOS

This page intentionally left blank


L1 East
34, 31' 23.960000", 117, 19' 32.540000"

L1 North
34, 31' 24.050000", 117, 19' 32.540000"


L1 Northwest
34, 31' 23.830000", 117, 19' 32.570000"


L1 South
34, 31' 23.890000", 117, 19' 32.540000"


L1 West
34, 31' 23.830000", 117, 19' 32.570000"


L2 East
34, 31' 17.170000", 117, 19' 12.960000"

L2 North
34, 31' 17.890000", 117, 19' 12.930000"

L2 South
34, 31' 17.960000", 117, 19' 12.990000"

L2 West
34, 31' 17.890000", 117, 19' 12.930000"

L3 East
34, 31' 9.580000", 117, 19' 34.520000"

L3 North
34, 31' 9.560000", 117, 19' 34.520000"

L3 South
34, 31' 9.560000", 117, 19' 34.520000"

L3 West
34, 31' 9.500000", 117, 19' 34.520000"

L4 East
34, 31' 4.540000", 117, 19' 30.920000"

L4 North
34, 31' 4.540000", 117, 19' 30.920000"

L4 South
34, 31' 4.590000", 117, 19' 30.920000"

L4 West
34, 31' 4.540000", 117, 19' 30.920000"

This page intentionally left blank

APPENDIX 5.2:

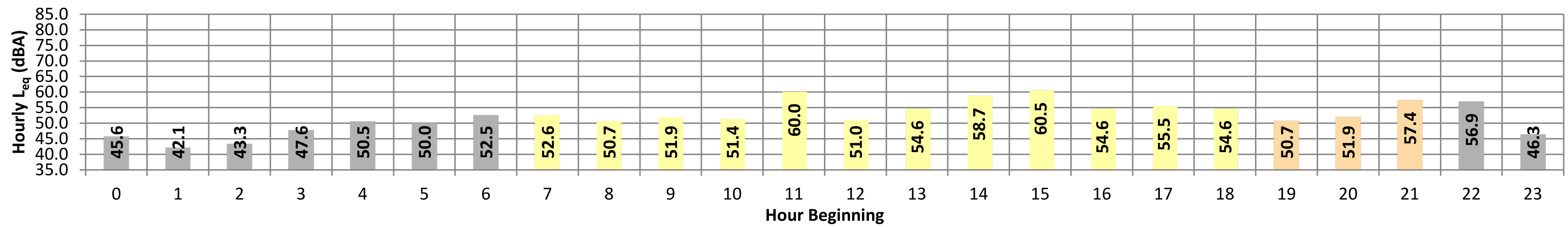
NOISE LEVEL MEASUREMENT WORKSHEETS

This page intentionally left blank

24-Hour Noise Level Measurement Summary

Date: Thursday, September 13, 2018
Project: Victorville Carmax
Location: L1 - Located north of the Project site adjacent to existing residential homes on Midtown Drive.
Meter: Piccolo I
JN: 11803
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	45.6	69.8	38.6	53.0	49.0	46.0	45.0	43.0	42.0	40.0	40.0	40.0	45.6	10.0	55.6
	1	42.1	52.0	38.5	46.0	45.0	44.0	43.0	42.0	41.0	40.0	40.0	38.0	42.1	10.0	52.1
	2	43.3	64.3	38.5	48.0	47.0	46.0	45.0	43.0	41.0	40.0	39.0	38.0	43.3	10.0	53.3
	3	47.6	74.2	38.6	53.0	51.0	49.0	47.0	44.0	43.0	41.0	40.0	40.0	47.6	10.0	57.6
	4	50.5	77.3	41.4	59.0	56.0	51.0	50.0	48.0	45.0	43.0	42.0	42.0	50.5	10.0	60.5
	5	50.0	70.0	42.3	55.0	54.0	53.0	52.0	50.0	48.0	46.0	45.0	44.0	50.0	10.0	60.0
	6	52.5	69.4	46.9	61.0	58.0	55.0	54.0	52.0	50.0	48.0	48.0	47.0	52.5	10.0	62.5
Day	7	52.6	74.8	44.6	63.0	59.0	55.0	53.0	50.0	49.0	47.0	46.0	45.0	52.6	0.0	52.6
	8	50.7	70.4	40.3	62.0	58.0	52.0	51.0	49.0	47.0	45.0	44.0	43.0	50.7	0.0	50.7
	9	51.9	73.7	38.5	63.0	61.0	54.0	51.0	46.0	45.0	41.0	40.0	40.0	51.9	0.0	51.9
	10	51.4	77.9	40.4	61.0	58.0	54.0	52.0	49.0	47.0	44.0	43.0	42.0	51.4	0.0	51.4
	11	60.0	89.3	42.9	72.0	70.0	57.0	53.0	49.0	47.0	44.0	44.0	44.0	60.0	0.0	60.0
	12	51.0	74.8	40.3	63.0	59.0	54.0	52.0	48.0	45.0	43.0	42.0	41.0	51.0	0.0	51.0
	13	54.6	78.3	41.2	67.0	63.0	58.0	55.0	49.0	46.0	44.0	43.0	42.0	54.6	0.0	54.6
	14	58.7	88.0	44.4	66.0	62.0	60.0	60.0	54.0	50.0	47.0	47.0	46.0	58.7	0.0	58.7
	15	60.5	82.0	45.3	73.0	71.0	69.0	61.0	52.0	50.0	48.0	47.0	46.0	60.5	0.0	60.5
	16	54.6	77.3	47.2	64.0	62.0	58.0	56.0	53.0	52.0	49.0	49.0	48.0	54.6	0.0	54.6
	17	55.5	76.6	47.5	65.0	63.0	59.0	57.0	53.0	52.0	50.0	49.0	48.0	55.5	0.0	55.5
	18	54.6	73.2	47.2	64.0	62.0	59.0	57.0	53.0	51.0	49.0	48.0	48.0	54.6	0.0	54.6
Evening	19	50.7	71.5	43.7	59.0	57.0	53.0	52.0	49.0	48.0	46.0	45.0	45.0	50.7	5.0	55.7
	20	51.9	69.9	43.6	62.0	59.0	55.0	54.0	51.0	49.0	46.0	45.0	44.0	51.9	5.0	56.9
	21	57.4	74.0	42.5	69.0	68.0	63.0	62.0	50.0	47.0	44.0	44.0	43.0	57.4	5.0	62.4
Night	22	56.9	82.1	42.0	69.0	67.0	61.0	58.0	48.0	46.0	43.0	43.0	42.0	56.9	10.0	66.9
	23	46.3	67.9	40.3	54.0	52.0	48.0	47.0	45.0	44.0	42.0	41.0	41.0	46.3	10.0	56.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	50.7	70.4	38.5	61.0	58.0	52.0	51.0	46.0	45.0	41.0	40.0	40.0
	Max	60.5	89.3	47.5	73.0	71.0	69.0	61.0	54.0	52.0	50.0	49.0	48.0
Energy Average		56.0	Average:		65.3	62.3	57.4	54.8	50.4	48.4	45.9	45.2	44.4
Evening	Min	50.7	69.9	42.5	59.0	57.0	53.0	52.0	49.0	47.0	44.0	44.0	43.0
	Max	57.4	74.0	43.7	69.0	68.0	63.0	62.0	51.0	49.0	46.0	45.0	45.0
Energy Average		54.4	Average:		63.3	61.3	57.0	56.0	50.0	48.0	45.3	44.7	44.0
Night	Min	42.1	52.0	38.5	46.0	45.0	44.0	43.0	42.0	41.0	40.0	39.0	38.0
	Max	56.9	82.1	46.9	69.0	67.0	61.0	58.0	52.0	50.0	48.0	48.0	47.0
Energy Average		50.7	Average:		55.3	53.2	50.3	49.0	46.1	44.4	42.6	42.0	41.3

24-Hour L_{eq} (dBA)

54.4

24-Hour CNEL (dBA)

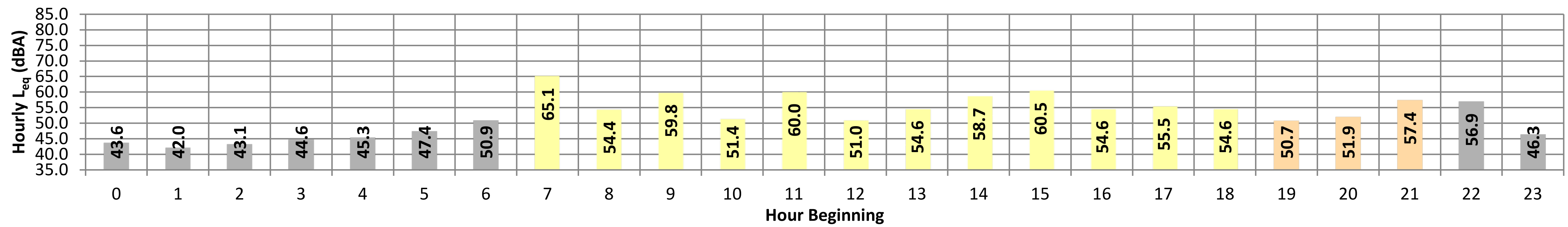
58.7

URBAN CROSSROADS

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 12, 2018
Project: Victorville Carmax
Location: L2 - Located northeast of the Project site near existing residential homes on Culver Road.
Meter: Piccolo I
JN: 11803
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	43.6	60.7	38.6	48.0	47.0	45.0	45.0	43.0	42.0	41.0	40.0	40.0	43.6	10.0	53.6
	1	42.0	50.0	38.5	46.0	45.0	44.0	43.0	42.0	41.0	40.0	39.0	38.0	42.0	10.0	52.0
	2	43.1	60.1	38.5	50.0	48.0	46.0	45.0	42.0	41.0	40.0	39.0	38.0	43.1	10.0	53.1
	3	44.6	70.4	38.5	51.0	48.0	46.0	45.0	43.0	42.0	40.0	40.0	38.0	44.6	10.0	54.6
	4	45.3	65.6	38.5	52.0	50.0	47.0	47.0	45.0	43.0	41.0	40.0	39.0	45.3	10.0	55.3
	5	47.4	58.0	41.3	54.0	53.0	50.0	49.0	47.0	46.0	43.0	43.0	42.0	47.4	10.0	57.4
	6	50.9	70.5	43.1	60.0	56.0	52.0	51.0	50.0	48.0	46.0	46.0	44.0	50.9	10.0	60.9
Day	7	65.1	84.9	44.1	82.0	64.0	57.0	54.0	50.0	48.0	46.0	46.0	45.0	65.1	0.0	65.1
	8	54.4	76.8	40.2	67.0	63.0	56.0	53.0	49.0	47.0	44.0	43.0	41.0	54.4	0.0	54.4
	9	59.8	85.0	38.5	71.0	69.0	65.0	60.0	50.0	46.0	43.0	41.0	40.0	59.8	0.0	59.8
	10	51.4	77.9	40.4	61.0	58.0	54.0	52.0	49.0	47.0	44.0	43.0	42.0	51.4	0.0	51.4
	11	60.0	89.3	42.9	72.0	70.0	57.0	53.0	49.0	47.0	44.0	44.0	44.0	60.0	0.0	60.0
	12	51.0	74.8	40.3	63.0	59.0	54.0	52.0	48.0	45.0	43.0	42.0	41.0	51.0	0.0	51.0
	13	54.6	78.3	41.2	67.0	63.0	58.0	55.0	49.0	46.0	44.0	43.0	42.0	54.6	0.0	54.6
	14	58.7	88.0	44.4	66.0	62.0	60.0	60.0	54.0	50.0	47.0	47.0	46.0	58.7	0.0	58.7
	15	60.5	82.0	45.3	73.0	71.0	69.0	61.0	52.0	50.0	48.0	47.0	46.0	60.5	0.0	60.5
	16	54.6	77.3	47.2	64.0	62.0	58.0	56.0	53.0	52.0	49.0	49.0	48.0	54.6	0.0	54.6
	17	55.5	76.6	47.5	65.0	63.0	59.0	57.0	53.0	52.0	50.0	49.0	48.0	55.5	0.0	55.5
	18	54.6	73.2	47.2	64.0	62.0	59.0	57.0	53.0	51.0	49.0	48.0	48.0	54.6	0.0	54.6
Evening	19	50.7	71.5	43.7	59.0	57.0	53.0	52.0	49.0	48.0	46.0	45.0	45.0	50.7	5.0	55.7
	20	51.9	69.9	43.6	62.0	59.0	55.0	54.0	51.0	49.0	46.0	45.0	44.0	51.9	5.0	56.9
	21	57.4	74.0	42.5	69.0	68.0	63.0	62.0	50.0	47.0	44.0	44.0	43.0	57.4	5.0	62.4
Night	22	56.9	82.1	42.0	69.0	67.0	61.0	58.0	48.0	46.0	43.0	43.0	42.0	56.9	10.0	66.9
	23	46.3	67.9	40.3	54.0	52.0	48.0	47.0	45.0	44.0	42.0	41.0	41.0	46.3	10.0	56.3

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	51.0	73.2	38.5	61.0	58.0	54.0	52.0	48.0	45.0	43.0	41.0	40.0
	Max	65.1	89.3	47.5	82.0	71.0	69.0	61.0	54.0	52.0	50.0	49.0	48.0
Energy Average		58.7	Average:		67.9	63.8	58.8	55.8	50.8	48.4	45.9	45.2	44.3
Evening	Min	50.7	69.9	42.5	59.0	57.0	53.0	52.0	49.0	47.0	44.0	44.0	43.0
	Max	57.4	74.0	43.7	69.0	68.0	63.0	62.0	51.0	49.0	46.0	45.0	45.0
Energy Average		54.4	Average:		63.3	61.3	57.0	56.0	50.0	48.0	45.3	44.7	44.0
Night	Min	42.0	50.0	38.5	46.0	45.0	44.0	43.0	42.0	41.0	40.0	39.0	38.0
	Max	56.9	82.1	43.1	69.0	67.0	61.0	58.0	50.0	48.0	46.0	46.0	44.0
Energy Average		49.7	Average:		53.8	51.8	48.8	47.8	45.0	43.7	41.8	41.2	40.2

24-Hour L_{eq} (dBA)

56.4

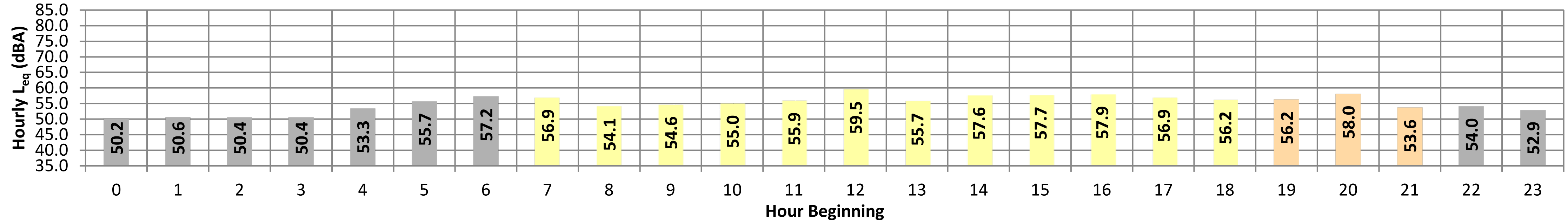
24-Hour CNEL (dBA)

59.2

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 12, 2018
Project: Victorville Carmax
Location: L3 - Located southwest of the Project site adjacent to Home Depot and an existing commercial parking lot.
Meter: Piccolo I
JN: 11803
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	50.2	59.9	45.7	54.0	53.0	52.0	52.0	50.0	49.0	48.0	47.0	46.0	50.2	10.0	60.2
	1	50.6	60.4	45.3	54.0	54.0	53.0	52.0	51.0	50.0	48.0	47.0	46.0	50.6	10.0	60.6
	2	50.4	67.1	45.5	54.0	53.0	52.0	52.0	50.0	49.0	47.0	47.0	46.0	50.4	10.0	60.4
	3	50.4	58.8	45.8	53.0	53.0	52.0	52.0	51.0	50.0	48.0	48.0	47.0	50.4	10.0	60.4
	4	53.3	70.1	49.7	58.0	57.0	55.0	55.0	53.0	52.0	51.0	50.0	50.0	53.3	10.0	63.3
	5	55.7	66.7	51.4	60.0	59.0	58.0	57.0	56.0	55.0	53.0	53.0	52.0	55.7	10.0	65.7
	6	57.2	76.4	52.7	63.0	61.0	59.0	58.0	57.0	55.0	54.0	53.0	53.0	57.2	10.0	67.2
Day	7	56.9	80.5	49.7	64.0	60.0	58.0	57.0	56.0	55.0	52.0	51.0	50.0	56.9	0.0	56.9
	8	54.1	78.8	48.0	61.0	57.0	55.0	54.0	52.0	51.0	49.0	49.0	48.0	54.1	0.0	54.1
	9	54.6	79.2	46.7	63.0	59.0	55.0	54.0	52.0	51.0	49.0	48.0	47.0	54.6	0.0	54.6
	10	55.0	78.8	46.6	63.0	58.0	55.0	54.0	52.0	50.0	48.0	48.0	47.0	55.0	0.0	55.0
	11	55.9	82.3	48.5	62.0	59.0	55.0	54.0	53.0	52.0	50.0	49.0	49.0	55.9	0.0	55.9
	12	59.5	83.6	46.6	72.0	67.0	59.0	55.0	52.0	51.0	49.0	49.0	48.0	59.5	0.0	59.5
	13	55.7	76.1	46.4	61.0	59.0	58.0	57.0	56.0	54.0	50.0	49.0	47.0	55.7	0.0	55.7
	14	57.6	82.6	51.2	66.0	61.0	58.0	57.0	55.0	54.0	53.0	52.0	52.0	57.6	0.0	57.6
	15	57.7	80.5	53.0	62.0	61.0	58.0	58.0	57.0	56.0	54.0	54.0	54.0	57.7	0.0	57.7
	16	57.9	80.8	53.4	62.0	60.0	59.0	58.0	57.0	56.0	55.0	55.0	54.0	57.9	0.0	57.9
	17	56.9	71.2	52.6	61.0	60.0	58.0	58.0	57.0	56.0	54.0	54.0	53.0	56.9	0.0	56.9
	18	56.2	75.2	50.2	62.0	59.0	58.0	57.0	56.0	55.0	53.0	52.0	51.0	56.2	0.0	56.2
Evening	19	56.2	79.1	49.9	62.0	60.0	58.0	57.0	55.0	54.0	52.0	52.0	51.0	56.2	5.0	61.2
	20	58.0	83.7	51.4	66.0	61.0	57.0	56.0	55.0	54.0	53.0	52.0	52.0	58.0	5.0	63.0
	21	53.6	60.0	49.5	56.0	56.0	55.0	55.0	54.0	53.0	51.0	51.0	50.0	53.6	5.0	58.6
Night	22	54.0	63.2	49.2	58.0	57.0	56.0	55.0	54.0	53.0	52.0	51.0	50.0	54.0	10.0	64.0
	23	52.9	61.1	47.5	57.0	56.0	55.0	55.0	53.0	52.0	50.0	49.0	48.0	52.9	10.0	62.9

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	54.1	71.2	46.4	61.0	57.0	55.0	54.0	52.0	50.0	48.0	48.0	47.0
	Max	59.5	83.6	53.4	72.0	67.0	59.0	58.0	57.0	56.0	55.0	55.0	54.0
Energy Average		56.8	Average:		63.3	60.0	57.2	56.1	54.6	53.4	51.3	50.8	50.0
Evening	Min	53.6	60.0	49.5	56.0	56.0	55.0	55.0	54.0	53.0	51.0	51.0	50.0
	Max	58.0	83.7	51.4	66.0	61.0	58.0	57.0	55.0	54.0	53.0	52.0	52.0
Energy Average		56.3	Average:		61.3	59.0	56.7	56.0	54.7	53.7	52.0	51.7	51.0
Night	Min	50.2	58.8	45.3	53.0	53.0	52.0	52.0	50.0	49.0	47.0	47.0	46.0
	Max	57.2	76.4	52.7	63.0	61.0	59.0	58.0	57.0	55.0	54.0	53.0	53.0
Energy Average		53.5	Average:		56.8	55.9	54.7	54.2	52.8	51.7	50.1	49.4	48.7

24-Hour L_{eq} (dBA)

55.7

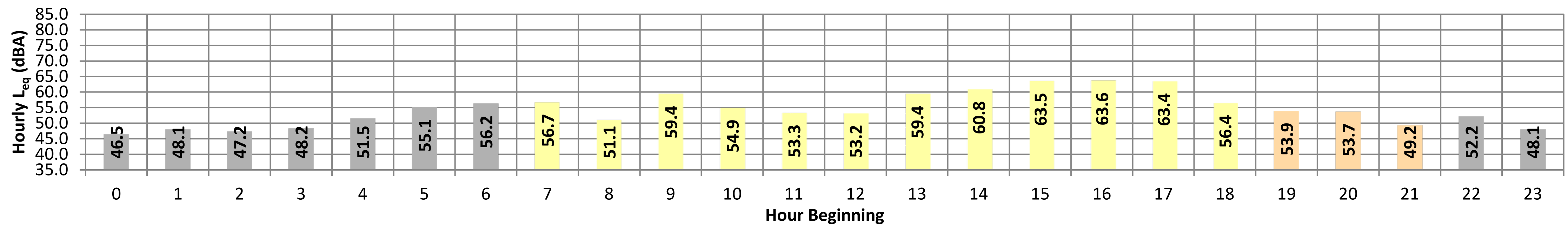
24-Hour CNEL (dBA)

60.9

24-Hour Noise Level Measurement Summary

Date: Wednesday, September 12, 2018
Project: Victorville Carmax
Location: L4 - Located southwest of the Project site on Valley Park Lane adjacent to an existing Home Depot and vacant lot.
Meter: Piccolo I
JN: 11803
Analyst: R. Saber

Hourly L_{eq} dBA Readings (unadjusted)



Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%	L_{eq}	Adj.	Adj. L_{eq}
Night	0	46.5	62.3	42.3	53.0	50.0	49.0	48.0	46.0	45.0	44.0	43.0	43.0	46.5	10.0	56.5
	1	48.1	56.6	43.6	53.0	52.0	51.0	50.0	48.0	47.0	45.0	44.0	44.0	48.1	10.0	58.1
	2	47.2	67.9	42.3	53.0	52.0	49.0	48.0	46.0	45.0	44.0	44.0	43.0	47.2	10.0	57.2
	3	48.2	60.1	42.9	54.0	53.0	51.0	50.0	48.0	47.0	45.0	45.0	44.0	48.2	10.0	58.2
	4	51.5	67.8	45.1	59.0	57.0	54.0	53.0	51.0	49.0	48.0	47.0	46.0	51.5	10.0	61.5
	5	55.1	76.4	47.7	62.0	60.0	57.0	56.0	53.0	52.0	50.0	49.0	49.0	55.1	10.0	65.1
	6	56.2	69.1	50.2	63.0	62.0	60.0	59.0	56.0	54.0	52.0	51.0	51.0	56.2	10.0	66.2
Day	7	56.7	73.9	46.4	68.0	65.0	60.0	59.0	55.0	53.0	50.0	48.0	47.0	56.7	0.0	56.7
	8	51.1	66.0	44.0	58.0	57.0	56.0	54.0	51.0	49.0	47.0	46.0	45.0	51.1	0.0	51.1
	9	59.4	84.1	43.8	70.0	64.0	59.0	57.0	52.0	49.0	46.0	46.0	45.0	59.4	0.0	59.4
	10	54.9	73.2	45.4	64.0	61.0	58.0	57.0	54.0	52.0	49.0	48.0	47.0	54.9	0.0	54.9
	11	53.3	72.8	44.7	61.0	59.0	57.0	56.0	53.0	51.0	47.0	47.0	46.0	53.3	0.0	53.3
	12	53.2	76.9	44.2	62.0	59.0	57.0	55.0	51.0	49.0	47.0	46.0	45.0	53.2	0.0	53.2
	13	59.4	71.0	44.6	66.0	65.0	64.0	63.0	60.0	57.0	50.0	49.0	47.0	59.4	0.0	59.4
	14	60.8	71.2	48.9	67.0	67.0	65.0	64.0	61.0	59.0	54.0	52.0	51.0	60.8	0.0	60.8
	15	63.5	81.0	49.7	70.0	69.0	67.0	67.0	64.0	61.0	56.0	55.0	52.0	63.5	0.0	63.5
	16	63.6	81.2	51.5	70.0	69.0	67.0	66.0	64.0	61.0	57.0	55.0	54.0	63.6	0.0	63.6
	17	63.4	73.0	52.1	69.0	69.0	67.0	66.0	64.0	62.0	57.0	55.0	54.0	63.4	0.0	63.4
	18	56.4	71.7	46.5	64.0	63.0	61.0	60.0	57.0	54.0	50.0	49.0	47.0	56.4	0.0	56.4
Evening	19	53.9	66.1	47.4	60.0	59.0	57.0	57.0	54.0	52.0	49.0	49.0	48.0	53.9	5.0	58.9
	20	53.7	70.7	46.3	63.0	59.0	56.0	55.0	53.0	51.0	49.0	48.0	47.0	53.7	5.0	58.7
	21	49.2	58.2	45.6	54.0	53.0	51.0	51.0	49.0	48.0	47.0	46.0	46.0	49.2	5.0	54.2
Night	22	52.2	78.7	44.8	58.0	57.0	54.0	52.0	49.0	48.0	46.0	46.0	45.0	52.2	10.0	62.2
	23	48.1	61.3	43.1	54.0	53.0	51.0	50.0	48.0	46.0	45.0	44.0	44.0	48.1	10.0	58.1

Timeframe	Hour	L_{eq}	L_{max}	L_{min}	L1%	L2%	L5%	L8%	L25%	L50%	L90%	L95%	L99%
Day	Min	51.1	66.0	43.8	58.0	57.0	56.0	54.0	51.0	49.0	46.0	46.0	45.0
	Max	63.6	84.1	52.1	70.0	69.0	67.0	67.0	64.0	62.0	57.0	55.0	54.0
Energy Average		59.8	Average:		65.8	63.9	61.5	60.3	57.2	54.8	50.8	49.7	48.3
Evening	Min	49.2	58.2	45.6	54.0	53.0	51.0	51.0	49.0	48.0	47.0	46.0	46.0
	Max	53.9	70.7	47.4	63.0	59.0	57.0	57.0	54.0	52.0	49.0	49.0	48.0
Energy Average		52.7	Average:		59.0	57.0	54.7	54.3	52.0	50.3	48.3	47.7	47.0
Night	Min	46.5	56.6	42.3	53.0	50.0	49.0	48.0	46.0	45.0	44.0	43.0	43.0
	Max	56.2	78.7	50.2	63.0	62.0	60.0	59.0	56.0	54.0	52.0	51.0	51.0
Energy Average		51.7	Average:		56.6	55.1	52.9	51.8	49.4	48.1	46.6	45.9	45.4

24-Hour L_{eq} (dBA)	24-Hour CNEL (dBA)
57.4	60.4

APPENDIX 7.1:

OFF-SITE TRAFFIC NOISE LEVEL CONTOURS

This page intentionally left blank

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Civic Dr.
Road Segment: n/o Site Driveway #2
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,280 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,128 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.43	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-18.67	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.62	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.5	65.6	63.8	57.8	66.4	67.0
Medium Trucks:	61.3	59.8	53.4	51.8	60.3	60.5
Heavy Trucks:	62.1	60.7	51.6	52.9	61.3	61.4
Vehicle Noise:	69.3	67.6	64.4	59.7	68.3	68.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	32	70	150	323
CNEL:	35	75	161	346

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Civic Dr.
Road Segment: n/o Site Driveway #1
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,190 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	819 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.82	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-20.06	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-24.01	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.1	64.2	62.4	56.4	65.0	65.6
Medium Trucks:	59.9	58.4	52.0	50.5	58.9	59.1
Heavy Trucks:	60.7	59.3	50.3	51.5	59.9	60.0
Vehicle Noise:	67.9	66.2	63.0	58.4	66.9	67.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	26	56	121	261
CNEL:	28	60	130	280

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Civic Dr.
Road Segment: s/o Site Driveway #1
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,130 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	813 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.85	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-20.09	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-24.04	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.0	64.1	62.4	56.3	65.0	65.6
Medium Trucks:	59.8	58.3	52.0	50.4	58.9	59.1
Heavy Trucks:	60.7	59.3	50.2	51.5	59.8	60.0
Vehicle Noise:	67.9	66.2	63.0	58.3	66.9	67.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	26	56	121	260
CNEL:	28	60	129	279

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project
Road Name: Roy Rogers Dr.
Road Segment: e/o Amargosa Rd.
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,420 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,942 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	62.0 feet
Centerline Dist. to Observer:	62.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	0.93	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-16.31	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-20.26	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.0	66.1	64.3	58.3	66.9	67.5
Medium Trucks:	61.8	60.3	53.9	52.4	60.8	61.0
Heavy Trucks:	62.6	61.2	52.2	53.4	61.8	61.9
Vehicle Noise:	69.8	68.1	64.9	60.3	68.8	69.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	52	111	240	516
CNEL:	55	119	257	554

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* CarMax
Road Name: Roy Rogers Dr. — *Job Number:* 11803
Road Segment: w/o I-15 SB Ramps

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	28,630 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	2,863 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	72 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	62.0 feet
Centerline Dist. to Observer:	62.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.62	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-14.62	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.58	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	69.7	67.8	66.0	60.0	68.6	69.2
Medium Trucks:	63.5	61.9	55.6	54.0	62.5	62.7
Heavy Trucks:	64.3	62.9	53.8	55.1	63.4	63.6
Vehicle Noise:	71.5	69.8	66.6	62.0	70.5	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	67	144	310	669
CNEL:	72	155	333	717

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* CarMax
Road Name: Roy Rogers Dr. — *Job Number:* 11803
Road Segment: w/o I-15 NB Ramps

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	25,850 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	2,585 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	36 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.17	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-15.06	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-19.02	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	69.2	67.4	61.4	70.0	70.6
Medium Trucks:	64.9	63.4	57.0	55.4	63.9	64.1
Heavy Trucks:	65.7	64.3	55.2	56.5	64.9	65.0
Vehicle Noise:	72.9	71.2	68.0	63.3	71.9	72.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	56	121	261	561
CNEL:	60	130	280	602

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing Without Project — *Project Name:* CarMax
Road Name: Roy Rogers Dr. — *Job Number:* 11803
Road Segment: e/o 1-15 NB Ramps

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	23,190 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	2,319 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	35 mph		
Near/Far Lane Distance:	36 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	2.79	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	75.75	-14.44	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	81.57	-18.40	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.5	65.6	63.9	57.8	66.4	67.0
Medium Trucks:	61.8	60.3	53.9	52.4	60.8	61.1
Heavy Trucks:	63.6	62.2	53.2	54.4	62.8	62.9
Vehicle Noise:	69.8	68.1	64.6	60.2	68.8	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	35	75	161	347
CNEL:	37	80	172	371

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* CarMax
Road Name: Civic Dr. — *Job Number:* 11803
Road Segment: n/o Site Driveway #2

SITE SPECIFIC INPUT DATA		NOISE MODEL INPUTS	
Highway Data		**Site Conditions (Hard = 10, Soft = 15)**	
Average Daily Traffic (Adt):	11,452 vehicles	Autos:	15
Peak Hour Percentage:	10%	Medium Trucks (2 Axles):	15
Peak Hour Volume:	1,145 vehicles	Heavy Trucks (3+ Axles):	15
Vehicle Speed:	45 mph		
Near/Far Lane Distance:	36 feet		

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.36	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-18.60	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.56	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.5	65.6	63.9	57.8	66.4	67.0
Medium Trucks:	61.3	59.8	53.5	51.9	60.4	60.6
Heavy Trucks:	62.2	60.7	51.7	53.0	61.3	61.4
Vehicle Noise:	69.4	67.6	64.5	59.8	68.4	68.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	33	70	151	326
CNEL:	35	75	162	350

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Civic Dr.
Road Segment: n/o Site Driveway #1
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,271 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	827 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-2.78	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-20.01	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.97	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.1	64.2	62.5	56.4	65.0	65.6
Medium Trucks:	59.9	58.4	52.0	50.5	59.0	59.2
Heavy Trucks:	60.8	59.3	50.3	51.5	59.9	60.0
Vehicle Noise:	68.0	66.2	63.1	58.4	66.9	67.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	26	57	122	263
CNEL:	28	61	131	282

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Civic Dr.
Road Segment: s/o Site Driveway #1
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,160 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	816 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-2.83	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-20.07	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-24.03	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.1	64.2	62.4	56.3	65.0	65.6
Medium Trucks:	59.9	58.3	52.0	50.4	58.9	59.1
Heavy Trucks:	60.7	59.3	50.2	51.5	59.8	60.0
Vehicle Noise:	67.9	66.2	63.0	58.3	66.9	67.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	26	56	121	260
CNEL:	28	60	130	279

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Roy Rogers Dr.
Road Segment: e/o Amargosa Rd.
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	19,440 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,944 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	62.0 feet
Centerline Dist. to Observer:	62.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	0.94	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-16.30	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-20.26	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.0	66.1	64.3	58.3	66.9	67.5
Medium Trucks:	61.8	60.3	53.9	52.4	60.8	61.1
Heavy Trucks:	62.6	61.2	52.2	53.4	61.8	61.9
Vehicle Noise:	69.8	68.1	64.9	60.3	68.8	69.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	52	111	240	517
CNEL:	55	119	257	554

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project
Road Name: Roy Rogers Dr.
Road Segment: w/o I-15 SB Ramps
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	28,782 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,878 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	62.0 feet
Centerline Dist. to Observer:	62.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.64	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-14.60	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.55	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.7	67.8	66.0	60.0	68.6	69.2
Medium Trucks:	63.5	62.0	55.6	54.1	62.5	62.8
Heavy Trucks:	64.3	62.9	53.9	55.1	63.5	63.6
Vehicle Noise:	71.5	69.8	66.6	62.0	70.5	71.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	67	145	312	671
CNEL:	72	155	334	720

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* CarMax
Road Name: Roy Rogers Dr. — *Job Number:* 11803
Road Segment: w/o I-15 NB Ramps

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	25,951 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,595 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.19	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-15.05	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-19.00	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.1	69.2	67.4	61.4	70.0	70.6
Medium Trucks:	64.9	63.4	57.0	55.5	63.9	64.2
Heavy Trucks:	65.7	64.3	55.3	56.5	64.9	65.0
Vehicle Noise:	72.9	71.2	68.0	63.4	71.9	72.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	56	121	261	563
CNEL:	60	130	280	604

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Existing With Project — *Project Name:* CarMax
Road Name: Roy Rogers Dr. — *Job Number:* 11803
Road Segment: e/o 1-15 NB Ramps

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	23,210 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,321 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	2.80	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	75.75	-14.44	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	81.57	-18.40	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.5	65.6	63.9	57.8	66.4	67.0
Medium Trucks:	61.8	60.3	53.9	52.4	60.8	61.1
Heavy Trucks:	63.6	62.2	53.2	54.4	62.8	62.9
Vehicle Noise:	69.8	68.1	64.6	60.2	68.8	69.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	35	75	161	347
CNEL:	37	80	172	371

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year — *Project Name:* CarMax
Road Name: Civic Dr. — *Job Number:* 11803
Road Segment: n/o Site Driveway #2

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	11,960 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,196 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-1.17	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-18.41	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.37	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.7	65.8	64.1	58.0	66.6	67.2
Medium Trucks:	61.5	60.0	53.6	52.1	60.6	60.8
Heavy Trucks:	62.4	60.9	51.9	53.1	61.5	61.6
Vehicle Noise:	69.6	67.8	64.7	60.0	68.5	69.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	34	72	156	336
CNEL:	36	78	167	360

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year — *Project Name:* CarMax
Road Name: Civic Dr. — *Job Number:* 11803
Road Segment: n/o Site Driveway #1

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,690 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	869 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.56	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-19.80	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.75	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.3	64.4	62.7	56.6	65.2	65.8
Medium Trucks:	60.1	58.6	52.3	50.7	59.2	59.4
Heavy Trucks:	61.0	59.5	50.5	51.8	60.1	60.2
Vehicle Noise:	68.2	66.4	63.3	58.6	67.2	67.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	27	58	126	271
CNEL:	29	63	135	291

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year
Road Name: Civic Dr.
Road Segment: s/o Site Driveway #1
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,630 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	863 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-2.59	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-19.83	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.79	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	66.3	64.4	62.6	56.6	65.2	65.8
Medium Trucks:	60.1	58.6	52.2	50.7	59.1	59.4
Heavy Trucks:	60.9	59.5	50.5	51.7	60.1	60.2
Vehicle Noise:	68.2	66.4	63.3	58.6	67.1	67.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	27	58	125	270
CNEL:	29	62	135	290

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year
Road Name: Roy Rogers Dr.
Road Segment: e/o Amargosa Rd.
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	20,900 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,090 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	62.0 feet
Centerline Dist. to Observer:	62.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.25	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-15.99	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.94	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.3	66.4	64.6	58.6	67.2	67.8
Medium Trucks:	62.1	60.6	54.2	52.7	61.1	61.4
Heavy Trucks:	62.9	61.5	52.5	53.7	62.1	62.2
Vehicle Noise:	70.2	68.4	65.3	60.6	69.1	69.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	54	117	252	542
CNEL:	58	125	270	582

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year
Road Name: Roy Rogers Dr.
Road Segment: w/o I-15 SB Ramps
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	30,660 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,066 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	62.0 feet
Centerline Dist. to Observer:	62.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.91	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-14.32	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.28	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.0	68.1	66.3	60.3	68.9	69.5
Medium Trucks:	63.8	62.2	55.9	54.3	62.8	63.0
Heavy Trucks:	64.6	63.2	54.1	55.4	63.7	63.9
Vehicle Noise:	71.8	70.1	66.9	62.2	70.8	71.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	70	151	325	700
CNEL:	75	162	349	751

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year
Road Name: Roy Rogers Dr.
Road Segment: w/o I-15 NB Ramps
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	27,540 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,754 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.45	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-14.79	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-18.75	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.3	69.4	67.7	61.6	70.2	70.9
Medium Trucks:	65.1	63.6	57.3	55.7	64.2	64.4
Heavy Trucks:	66.0	64.6	55.5	56.8	65.1	65.3
Vehicle Noise:	73.2	71.5	68.3	63.6	72.2	72.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	59	126	272	586
CNEL:	63	135	292	628

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year
Road Name: Roy Rogers Dr.
Road Segment: e/o 1-15 NB Ramps
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,590 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,459 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	64.30	3.05	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	75.75	-14.19	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	81.57	-18.15	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.8	65.9	64.1	58.1	66.7	67.3
Medium Trucks:	62.0	60.5	54.2	52.6	61.1	61.3
Heavy Trucks:	63.9	62.5	53.4	54.7	63.0	63.2
Vehicle Noise:	70.0	68.3	64.9	60.5	69.0	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	36	78	167	361
CNEL:	39	83	179	385

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year With Project
Road Name: Civic Dr.
Road Segment: n/o Site Driveway #2
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	12,132 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,213 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.11	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-18.35	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.31	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.8	65.9	64.1	58.1	66.7	67.3
Medium Trucks:	61.6	60.1	53.7	52.2	60.6	60.9
Heavy Trucks:	62.4	61.0	52.0	53.2	61.6	61.7
Vehicle Noise:	69.6	67.9	64.7	60.1	68.6	69.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	34	73	157	339
CNEL:	36	78	169	364

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year With Project
Road Name: Civic Dr.
Road Segment: n/o Site Driveway #1
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,771 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	877 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-2.52	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-19.76	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.71	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.4	64.5	62.7	56.7	65.3	65.9
Medium Trucks:	60.2	58.7	52.3	50.8	59.2	59.4
Heavy Trucks:	61.0	59.6	50.6	51.8	60.2	60.3
Vehicle Noise:	68.2	66.5	63.3	58.7	67.2	67.7

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	27	59	127	273
CNEL:	29	63	136	293

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year With Project
Road Name: Civic Dr.
Road Segment: s/o Site Driveway #1
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	8,660 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	866 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-2.58	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-19.81	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-23.77	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	66.3	64.4	62.7	56.6	65.2	65.8
Medium Trucks:	60.1	58.6	52.2	50.7	59.2	59.4
Heavy Trucks:	61.0	59.5	50.5	51.7	60.1	60.2
Vehicle Noise:	68.2	66.4	63.3	58.6	67.1	67.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	27	58	126	271
CNEL:	29	63	135	290

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year With Project
Road Name: Roy Rogers Dr.
Road Segment: e/o Amargosa Rd.
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 20,920 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,092 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 72 feet

Site Data

Barrier Height: **0.0 feet**
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 62.0 feet
Centerline Dist. to Observer: 62.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.006 *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 50.725
Medium Trucks: 50.550
Heavy Trucks: 50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	1.25	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-15.98	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.94	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.3	66.4	64.7	58.6	67.2	67.8
Medium Trucks:	62.1	60.6	54.2	52.7	61.1	61.4
Heavy Trucks:	62.9	61.5	52.5	53.7	62.1	62.2
Vehicle Noise:	70.2	68.4	65.3	60.6	69.1	69.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	54	117	252	543
CNEL:	58	125	270	582

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year With Project
Road Name: Roy Rogers Dr.
Road Segment: w/o I-15 SB Ramps
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 30,812 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 3,081 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 72 feet

Site Data

Barrier Height: **0.0 feet**
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 62.0 feet
Centerline Dist. to Observer: 62.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.006 *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 50.725
Medium Trucks: 50.550
Heavy Trucks: 50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.94	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-14.30	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-18.26	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.0	68.1	66.3	60.3	68.9	69.5
Medium Trucks:	63.8	62.3	55.9	54.4	62.8	63.1
Heavy Trucks:	64.6	63.2	54.2	55.4	63.8	63.9
Vehicle Noise:	71.8	70.1	66.9	62.3	70.8	71.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	70	151	326	702
CNEL:	75	162	350	753

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year With Project
Road Name: Roy Rogers Dr.
Road Segment: w/o I-15 NB Ramps
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 27,641 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,764 vehicles
Vehicle Speed: 45 mph
Near/Far Lane Distance: 36 feet

Site Data

Barrier Height: **0.0 feet**
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 42.0 feet
Centerline Dist. to Observer: 42.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.006 *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 38.275
Medium Trucks: 38.043
Heavy Trucks: 38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	2.46	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-14.77	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-18.73	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	71.4	69.5	67.7	61.6	70.3	70.9
Medium Trucks:	65.2	63.6	57.3	55.7	64.2	64.4
Heavy Trucks:	66.0	64.6	55.5	56.8	65.1	65.3
Vehicle Noise:	73.2	71.5	68.3	63.6	72.2	72.6

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	59	126	273	587
CNEL:	63	136	292	630

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Opening Year With Project
Road Name: Roy Rogers Dr.
Road Segment: e/o 1-15 NB Ramps
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt): 24,610 vehicles
Peak Hour Percentage: 10%
Peak Hour Volume: 2,461 vehicles
Vehicle Speed: 35 mph
Near/Far Lane Distance: 36 feet

Site Data

Barrier Height: **0.0 feet**
Barrier Type (0-Wall, 1-Berm): 0.0
Centerline Dist. to Barrier: 42.0 feet
Centerline Dist. to Observer: 42.0 feet
Barrier Distance to Observer: 0.0 feet
Observer Height (Above Pad): 5.0 feet
Pad Elevation: 0.0 feet
Road Elevation: 0.0 feet
Road Grade: 0.0%
Left View: -90.0 degrees
Right View: 90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos: 15
Medium Trucks (2 Axles): 15
Heavy Trucks (3+ Axles): 15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos: 0.000
Medium Trucks: 2.297
Heavy Trucks: 8.006 *Grade Adjustment:* 0.0

Lane Equivalent Distance (in feet)

Autos: 38.275
Medium Trucks: 38.043
Heavy Trucks: 38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	3.05	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	75.75	-14.19	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	81.57	-18.14	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	67.8	65.9	64.1	58.1	66.7	67.3
Medium Trucks:	62.0	60.5	54.2	52.6	61.1	61.3
Heavy Trucks:	63.9	62.5	53.4	54.7	63.0	63.2
Vehicle Noise:	70.0	68.3	64.9	60.5	69.0	69.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	36	78	168	361
CNEL:	39	83	179	386

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year
Road Name: Civic Dr.
Road Segment: n/o Site Driveway #2

Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,360 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,436 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-0.38	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-17.62	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-21.57	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	68.5	66.6	64.9	58.8	67.4	68.0
Medium Trucks:	62.3	60.8	54.4	52.9	61.4	61.6
Heavy Trucks:	63.2	61.7	52.7	53.9	62.3	62.4
Vehicle Noise:	70.4	68.6	65.5	60.8	69.3	69.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	38	82	176	379
CNEL:	41	88	189	407

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year
Road Name: Civic Dr.
Road Segment: n/o Site Driveway #1

Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,420 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,042 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.77	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-19.01	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.97	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.1	65.2	63.5	57.4	66.0	66.6
Medium Trucks:	60.9	59.4	53.0	51.5	60.0	60.2
Heavy Trucks:	61.8	60.3	51.3	52.6	60.9	61.0
Vehicle Noise:	69.0	67.2	64.1	59.4	67.9	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	31	66	142	306
CNEL:	33	71	153	329

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year
Road Name: Civic Dr.
Road Segment: s/o Site Driveway #1

Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,360 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,036 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.80	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-19.04	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-22.99	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.1	65.2	63.4	57.4	66.0	66.6
Medium Trucks:	60.9	59.4	53.0	51.5	59.9	60.2
Heavy Trucks:	61.7	60.3	51.3	52.5	60.9	61.0
Vehicle Noise:	68.9	67.2	64.0	59.4	67.9	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	31	66	142	305
CNEL:	33	71	152	327

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year
Road Name: Roy Rogers Dr.
Road Segment: e/o Amargosa Rd.

Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,790 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,479 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	62.0 feet
Centerline Dist. to Observer:	62.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	1.99	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-15.25	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-19.20	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.1	67.2	65.4	59.3	68.0	68.6
Medium Trucks:	62.8	61.3	55.0	53.4	61.9	62.1
Heavy Trucks:	63.7	62.3	53.2	54.5	62.8	62.9
Vehicle Noise:	70.9	69.2	66.0	61.3	69.9	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	61	131	282	608
CNEL:	65	140	303	652

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year — *Project Name:* CarMax
Road Name: Roy Rogers Dr. — *Job Number:* 11803
Road Segment: w/o I-15 SB Ramps

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,790 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,679 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	62.0 feet
Centerline Dist. to Observer:	62.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.71	-0.20	-1.20	-4.70	0.000	0.000
Medium Trucks:	79.45	-13.53	-0.17	-1.20	-4.88	0.000	0.000
Heavy Trucks:	84.25	-17.49	-0.18	-1.20	-5.32	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	70.8	68.9	67.1	61.1	69.7	70.3
Medium Trucks:	64.5	63.0	56.7	55.1	63.6	63.8
Heavy Trucks:	65.4	64.0	54.9	56.2	64.5	64.7
Vehicle Noise:	72.6	70.9	67.7	63.0	71.6	72.0

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	79	170	367	791
CNEL:	85	183	394	848

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year — *Project Name:* CarMax
Road Name: Roy Rogers Dr. — *Job Number:* 11803
Road Segment: w/o I-15 NB Ramps

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,070 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,307 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.24	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-13.99	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-17.95	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.1	70.2	68.5	62.4	71.0	71.6
Medium Trucks:	65.9	64.4	58.1	56.5	65.0	65.2
Heavy Trucks:	66.8	65.4	56.3	57.6	65.9	66.0
Vehicle Noise:	74.0	72.2	69.1	64.4	73.0	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	66	143	307	662
CNEL:	71	153	329	710

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year — *Project Name:* CarMax
Road Name: Roy Rogers Dr. — *Job Number:* 11803
Road Segment: e/o 1-15 NB Ramps

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,520 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,952 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	3.84	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	75.75	-13.40	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	81.57	-17.35	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.6	66.7	64.9	58.9	67.5	68.1
Medium Trucks:	62.8	61.3	55.0	53.4	61.9	62.1
Heavy Trucks:	64.7	63.3	54.2	55.5	63.8	64.0
Vehicle Noise:	70.8	69.1	65.7	61.3	69.8	70.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	41	88	189	408
CNEL:	44	94	202	435

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year Without Project — *Project Name:* CarMax
Road Name: Civic Dr. — *Job Number:* 11803
Road Segment: n/o Site Driveway #2

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	14,532 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,453 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	-0.33	1.64	-1.20	-4.60	0.000	0.000
Medium Trucks:	79.45	-17.57	1.68	-1.20	-4.87	0.000	0.000
Heavy Trucks:	84.25	-21.52	1.67	-1.20	-5.53	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.6	66.7	64.9	58.9	67.5	68.1
Medium Trucks:	62.4	60.9	54.5	52.9	61.4	61.6
Heavy Trucks:	63.2	61.8	52.7	54.0	62.4	62.5
Vehicle Noise:	70.4	68.7	65.5	60.8	69.4	69.8

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	38	82	178	382
CNEL:	41	88	190	410

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year Without Project — *Project Name:* CarMax
Road Name: Civic Dr. — *Job Number:* 11803
Road Segment: n/o Site Driveway #1

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,501 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,050 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.74	1.64	-1.20	*-4.60*	0.000	0.000
Medium Trucks:	79.45	-18.98	1.68	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.93	1.67	-1.20	*-5.53*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.2	65.3	63.5	57.4	66.1	66.7
Medium Trucks:	60.9	59.4	53.1	51.5	60.0	60.2
Heavy Trucks:	61.8	60.4	51.3	52.6	60.9	61.1
Vehicle Noise:	69.0	67.3	64.1	59.4	68.0	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	31	66	143	308
CNEL:	33	71	153	330

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year Without Project — *Project Name:* CarMax
Road Name: Civic Dr. — *Job Number:* 11803
Road Segment: s/o Site Driveway #1

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	10,390 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	1,039 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	-1.78	1.64	-1.20	*-4.60*	0.000	0.000
Medium Trucks:	79.45	-19.02	1.68	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-22.98	1.67	-1.20	*-5.53*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	67.1	65.2	63.4	57.4	66.0	66.6
Medium Trucks:	60.9	59.4	53.0	51.5	59.9	60.2
Heavy Trucks:	61.7	60.3	51.3	52.5	60.9	61.0
Vehicle Noise:	69.0	67.2	64.1	59.4	67.9	68.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	31	66	142	306
CNEL:	33	71	152	328

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year Without Project — *Project Name:* CarMax
Road Name: Roy Rogers Dr. — *Job Number:* 11803
Road Segment: e/o Amargosa Rd.

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	24,810 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,481 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	62.0 feet
Centerline Dist. to Observer:	62.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	2.00	-0.20	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	79.45	-15.24	-0.17	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-19.20	-0.18	-1.20	*-5.32*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	69.1	67.2	65.4	59.3	68.0	68.6
Medium Trucks:	62.8	61.3	55.0	53.4	61.9	62.1
Heavy Trucks:	63.7	62.3	53.2	54.5	62.8	63.0
Vehicle Noise:	70.9	69.2	66.0	61.3	69.9	70.3

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	61	131	282	608
CNEL:	65	140	303	652

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year Without Project — *Project Name:* CarMax
Road Name: Roy Rogers Dr. — *Job Number:* 11803
Road Segment: w/o I-15 SB Ramps

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	36,942 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,694 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	72 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	62.0 feet
Centerline Dist. to Observer:	62.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	*Day*	*Evening*	*Night*	*Daily*
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	50.725
Medium Trucks:	50.550
Heavy Trucks:	50.567

FHWA Noise Model Calculations

VehicleType	*REMEL*	*Traffic Flow*	*Distance*	*Finite Road*	*Fresnel*	*Barrier Atten*	*Berm Atten*
Autos:	68.46	3.72	-0.20	-1.20	*-4.70*	0.000	0.000
Medium Trucks:	79.45	-13.51	-0.17	-1.20	*-4.88*	0.000	0.000
Heavy Trucks:	84.25	-17.47	-0.18	-1.20	*-5.32*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	*Leq Peak Hour*	*Leq Day*	*Leq Evening*	*Leq Night*	*Ldn*	*CNEL*
Autos:	70.8	68.9	67.1	61.1	69.7	70.3
Medium Trucks:	64.6	63.1	56.7	55.1	63.6	63.8
Heavy Trucks:	65.4	64.0	54.9	56.2	64.6	64.7
Vehicle Noise:	72.6	70.9	67.7	63.1	71.6	72.1

Centerline Distance to Noise Contour (in feet)

	70 dBA	*65 dBA*	*60 dBA*	*55 dBA*
Ldn:	79	171	368	793
CNEL:	85	183	395	850

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year Without Project
Road Name: Roy Rogers Dr.
Road Segment: w/o I-15 NB Ramps
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	33,171 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	3,317 vehicles
Vehicle Speed:	45 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	68.46	3.26	1.64	-1.20	*-4.60*	0.000	0.000
Medium Trucks:	79.45	-13.98	1.68	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	84.25	-17.94	1.67	-1.20	*-5.53*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	72.2	70.3	68.5	62.4	71.1	71.7
Medium Trucks:	65.9	64.4	58.1	56.5	65.0	65.2
Heavy Trucks:	66.8	65.4	56.3	57.6	65.9	66.1
Vehicle Noise:	74.0	72.3	69.1	64.4	73.0	73.4

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	66	143	308	663
CNEL:	71	153	330	711

Tuesday, October 16, 2018

FHWA-RD-77-108 HIGHWAY NOISE PREDICTION MODEL

Scenario: Horizon Year Without Project
Road Name: Roy Rogers Dr.
Road Segment: e/o 1-15 NB Ramps
Project Name: CarMax
Job Number: 11803

SITE SPECIFIC INPUT DATA

Highway Data

Average Daily Traffic (Adt):	29,540 vehicles
Peak Hour Percentage:	10%
Peak Hour Volume:	2,954 vehicles
Vehicle Speed:	35 mph
Near/Far Lane Distance:	36 feet

Site Data

Barrier Height:	**0.0 feet**
Barrier Type (0-Wall, 1-Berm):	0.0
Centerline Dist. to Barrier:	42.0 feet
Centerline Dist. to Observer:	42.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Height (Above Pad):	5.0 feet
Pad Elevation:	0.0 feet
Road Elevation:	0.0 feet
Road Grade:	0.0%
Left View:	-90.0 degrees
Right View:	90.0 degrees

NOISE MODEL INPUTS

Site Conditions (Hard = 10, Soft = 15)

Autos:	15
Medium Trucks (2 Axles):	15
Heavy Trucks (3+ Axles):	15

Vehicle Mix

VehicleType	Day	Evening	Night	Daily
Autos:	77.5%	12.9%	9.6%	97.42%
Medium Trucks:	84.8%	4.9%	10.3%	1.84%
Heavy Trucks:	86.5%	2.7%	10.8%	0.74%

Noise Source Elevations (in feet)

Autos:	0.000
Medium Trucks:	2.297
Heavy Trucks:	8.006

Grade Adjustment: 0.0

Lane Equivalent Distance (in feet)

Autos:	38.275
Medium Trucks:	38.043
Heavy Trucks:	38.066

FHWA Noise Model Calculations

VehicleType	REMEL	Traffic Flow	Distance	Finite Road	Fresnel	Barrier Atten	Berm Atten
Autos:	64.30	3.84	1.64	-1.20	*-4.60*	0.000	0.000
Medium Trucks:	75.75	-13.39	1.68	-1.20	*-4.87*	0.000	0.000
Heavy Trucks:	81.57	-17.35	1.67	-1.20	*-5.53*	0.000	0.000

Unmitigated Noise Levels (without Topo and barrier attenuation)

VehicleType	Leq Peak Hour	Leq Day	Leq Evening	Leq Night	Ldn	CNEL
Autos:	68.6	66.7	64.9	58.9	67.5	68.1
Medium Trucks:	62.8	61.3	55.0	53.4	61.9	62.1
Heavy Trucks:	64.7	63.3	54.2	55.5	63.8	64.0
Vehicle Noise:	70.8	69.1	65.7	61.3	69.8	70.2

Centerline Distance to Noise Contour (in feet)

	70 dBA	65 dBA	60 dBA	55 dBA
Ldn:	41	88	189	408
CNEL:	44	94	202	436

Tuesday, October 16, 2018

This page intentionally left blank

APPENDIX 9.1:

OPERATIONAL NOISE LEVEL CALCULATIONS

This page intentionally left blank

STATIONARY SOURCE NOISE PREDICTION MODEL

10/15/2018

Observer Location: **R1**
Source: Roof-Top Air Conditioning Units
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,461.0 feet
Noise Distance to Barrier:	1,461.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Elevation:	0.0 feet
Noise Source Elevation:	10.0 feet
Barrier Elevation:	0.0 feet
Barrier Height:	**0.0 feet**
Noise Source Height:	5.0 feet
Observer Height:	5.0 feet
Barrier Type (0-Wall, 1-Berm):	0
Drop Off Coefficient:	20.0

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,461.0	-49.3	-49.3	-49.3	-49.3	-49.3	-49.3
Shielding (Barrier Attenuation)	1,461.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		27.9	-49.3	-49.3	-49.3	-49.3	-49.3
39 Minute Hourly Adjustment		**26.0**	**-51.2**	**-51.2**	**-51.2**	**-51.2**	**-51.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/15/2018

Observer Location: **R1**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,344.0 feet
Noise Distance to Barrier:	1,344.0 feet
Barrier Distance to Observer:	0.0 feet
Observer Elevation:	0.0 feet
Noise Source Elevation:	0.0 feet
Barrier Elevation:	0.0 feet
Barrier Height:	**0.0 feet**
Noise Source Height:	4.0 feet
Observer Height:	5.0 feet
Barrier Type (0-Wall, 1-Berm):	0
Drop Off Coefficient:	15.0

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	62.9	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,344.0	-27.4	-27.4	-27.4	-27.4	-27.4	-27.4
Shielding (Barrier Attenuation)	1,344.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		35.5	-27.4	-27.4	-27.4	-27.4	-27.4
60 Minute Hourly Adjustment		**35.5**	**-27.4**	**-27.4**	**-27.4**	**-27.4**	**-27.4**

STATIONARY SOURCE NOISE PREDICTION MODEL	10/15/2018

***Observer Location:* R1** | *Source:* Vehicle Deliveries | *Condition:* Operational

Project Name: CarMax | *Job Number:* 11803 | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,508.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,508.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	84.7	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,508.0	-37.5	-37.5	-37.5	-37.5	-37.5	-37.5
Shielding (Barrier Attenuation)	1,508.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		47.2	-37.5	-37.5	-37.5	-37.5	-37.5
20 Minute Hourly Adjustment		**42.4**	**-42.3**	**-42.3**	**-42.3**	**-42.3**	**-42.3**

STATIONARY SOURCE NOISE PREDICTION MODEL	10/15/2018

***Observer Location:* R1** | *Source:* Vehicle Maintenance Activity | *Condition:* Operational

Project Name: CarMax | *Job Number:* 11803 | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	1,496.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	1,496.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	78.8	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	1,496.0	-40.0	-40.0	-40.0	-40.0	-40.0	-40.0
Shielding (Barrier Attenuation)	1,496.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		38.8	-40.0	-40.0	-40.0	-40.0	-40.0
20 Minute Hourly Adjustment		**34.0**	**-44.8**	**-44.8**	**-44.8**	**-44.8**	**-44.8**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/15/2018

Observer Location: **R2**
Source: Roof-Top Air Conditioning Units
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer 810.0 feet
Noise Distance to Barrier: 810.0 feet
Barrier Distance to Observer: 0.0 feet

Observer Elevation: 0.0 feet
Noise Source Elevation: 10.0 feet
Barrier Elevation: 0.0 feet

Barrier Height: **0.0 feet**
Noise Source Height: 5.0 feet
Observer Height: 5.0 feet

Barrier Type (0-Wall, 1-Berm): 0
Drop Off Coefficient: 20.0

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	810.0	-44.2	-44.2	-44.2	-44.2	-44.2	-44.2
Shielding (Barrier Attenuation)	810.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		33.0	-44.2	-44.2	-44.2	-44.2	-44.2
39 Minute Hourly Adjustment		**31.1**	**-46.1**	**-46.1**	**-46.1**	**-46.1**	**-46.1**

STATIONARY SOURCE NOISE PREDICTION MODEL 10/15/2018

Observer Location: **R2**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer 585.0 feet
Noise Distance to Barrier: 585.0 feet
Barrier Distance to Observer: 0.0 feet

Observer Elevation: 0.0 feet
Noise Source Elevation: 0.0 feet
Barrier Elevation: 0.0 feet

Barrier Height: **0.0 feet**
Noise Source Height: 4.0 feet
Observer Height: 5.0 feet

Barrier Type (0-Wall, 1-Berm): 0
Drop Off Coefficient: 15.0

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	62.9	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	585.0	-22.0	-22.0	-22.0	-22.0	-22.0	-22.0
Shielding (Barrier Attenuation)	585.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		40.9	-22.0	-22.0	-22.0	-22.0	-22.0
60 Minute Hourly Adjustment		**40.9**	**-22.0**	**-22.0**	**-22.0**	**-22.0**	**-22.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/15/2018

***Observer Location:* R2** | *Project Name:* CarMax
Source: Vehicle Deliveries | *Job Number:* 11803
Condition: Operational | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	952.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	952.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	84.7	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	952.0	-33.6	-33.6	-33.6	-33.6	-33.6	-33.6
Shielding (Barrier Attenuation)	952.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		51.1	-33.6	-33.6	-33.6	-33.6	-33.6
20 Minute Hourly Adjustment		**46.3**	**-38.4**	**-38.4**	**-38.4**	**-38.4**	**-38.4**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/15/2018

***Observer Location:* R2** | *Project Name:* CarMax
Source: Vehicle Maintenance Activity | *Job Number:* 11803
Condition: Operational | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	880.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	880.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	78.8	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	880.0	-35.4	-35.4	-35.4	-35.4	-35.4	-35.4
Shielding (Barrier Attenuation)	880.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		43.4	-35.4	-35.4	-35.4	-35.4	-35.4
20 Minute Hourly Adjustment		**38.6**	**-40.2**	**-40.2**	**-40.2**	**-40.2**	**-40.2**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/15/2018

***Observer Location:* R3**
Source: Roof-Top Air Conditioning Units
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer 179.0 feet
Noise Distance to Barrier: 179.0 feet
Barrier Distance to Observer: 0.0 feet

Observer Elevation: 0.0 feet
Noise Source Elevation: 10.0 feet
Barrier Elevation: 0.0 feet

Barrier Height: **0.0 feet**
Noise Source Height: 5.0 feet
Observer Height: 5.0 feet

Barrier Type (0-Wall, 1-Berm): 0
Drop Off Coefficient: 20.0

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	179.0	-31.1	-31.1	-31.1	-31.1	-31.1	-31.1
Shielding (Barrier Attenuation)	179.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		46.1	-31.1	-31.1	-31.1	-31.1	-31.1
39 Minute Hourly Adjustment		**44.2**	**-33.0**	**-33.0**	**-33.0**	**-33.0**	**-33.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/15/2018

***Observer Location:* R3**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer 49.0 feet
Noise Distance to Barrier: 49.0 feet
Barrier Distance to Observer: 0.0 feet

Observer Elevation: 0.0 feet
Noise Source Elevation: 0.0 feet
Barrier Elevation: 0.0 feet

Barrier Height: **0.0 feet**
Noise Source Height: 4.0 feet
Observer Height: 5.0 feet

Barrier Type (0-Wall, 1-Berm): 0
Drop Off Coefficient: 15.0

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	62.9	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	49.0	-5.8	-5.8	-5.8	-5.8	-5.8	-5.8
Shielding (Barrier Attenuation)	49.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		57.1	-5.8	-5.8	-5.8	-5.8	-5.8
60 Minute Hourly Adjustment		**57.1**	**-5.8**	**-5.8**	**-5.8**	**-5.8**	**-5.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/15/2018

***Observer Location:* R3**
Source: Vehicle Deliveries
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	284.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	284.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	84.7	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	284.0	-23.0	-23.0	-23.0	-23.0	-23.0	-23.0
Shielding (Barrier Attenuation)	284.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		61.7	-23.0	-23.0	-23.0	-23.0	-23.0
20 Minute Hourly Adjustment		**56.9**	**-27.8**	**-27.8**	**-27.8**	**-27.8**	**-27.8**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/15/2018

***Observer Location:* R3**
Source: Vehicle Maintenance Activity
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	216.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	216.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	78.8	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	216.0	-23.2	-23.2	-23.2	-23.2	-23.2	-23.2
Shielding (Barrier Attenuation)	216.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		55.6	-23.2	-23.2	-23.2	-23.2	-23.2
20 Minute Hourly Adjustment		**50.8**	**-28.0**	**-28.0**	**-28.0**	**-28.0**	**-28.0**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/15/2018

Observer Location: **R4**
Source: Roof-Top Air Conditioning Units
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	270.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	270.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	10.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	270.0	-34.6	-34.6	-34.6	-34.6	-34.6	-34.6
Shielding (Barrier Attenuation)	270.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		42.6	-34.6	-34.6	-34.6	-34.6	-34.6
39 Minute Hourly Adjustment		**40.7**	**-36.5**	**-36.5**	**-36.5**	**-36.5**	**-36.5**

STATIONARY SOURCE NOISE PREDICTION MODEL

10/15/2018

Observer Location: **R4**
Source: Parking Lot Vehicle Movements
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	108.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	108.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	62.9	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	108.0	-11.0	-11.0	-11.0	-11.0	-11.0	-11.0
Shielding (Barrier Attenuation)	108.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		51.9	-11.0	-11.0	-11.0	-11.0	-11.0
60 Minute Hourly Adjustment		**51.9**	**-11.0**	**-11.0**	**-11.0**	**-11.0**	**-11.0**

STATIONARY SOURCE NOISE PREDICTION MODEL	10/15/2018

***Observer Location:* R4** | *Project Name:* CarMax
Source: Vehicle Deliveries | *Job Number:* 11803
Condition: Operational | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	139.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	139.0 feet	*Noise Source Height:*	8.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	84.7	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	139.0	-16.8	-16.8	-16.8	-16.8	-16.8	-16.8
Shielding (Barrier Attenuation)	139.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		67.9	-16.8	-16.8	-16.8	-16.8	-16.8
20 Minute Hourly Adjustment		**63.1**	**-21.6**	**-21.6**	**-21.6**	**-21.6**	**-21.6**

STATIONARY SOURCE NOISE PREDICTION MODEL	10/15/2018

***Observer Location:* R4** | *Project Name:* CarMax
Source: Vehicle Maintenance Activity | *Job Number:* 11803
Condition: Operational | *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	249.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	249.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	78.8	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	249.0	-24.4	-24.4	-24.4	-24.4	-24.4	-24.4
Shielding (Barrier Attenuation)	249.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		54.4	-24.4	-24.4	-24.4	-24.4	-24.4
20 Minute Hourly Adjustment		**49.6**	**-29.2**	**-29.2**	**-29.2**	**-29.2**	**-29.2**

STATIONARY SOURCE NOISE PREDICTION MODEL	10/15/2018

Observer Location: **R5** — *Project Name:* CarMax
Source: Roof-Top Air Conditioning Units — *Job Number:* 11803
Condition: Operational — *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	412.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	412.0 feet	*Noise Source Height:*	5.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	10.0 feet	*Drop Off Coefficient:*	20.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	5.0	77.2	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	412.0	-38.3	-38.3	-38.3	-38.3	-38.3	-38.3
Shielding (Barrier Attenuation)	412.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		38.9	-38.3	-38.3	-38.3	-38.3	-38.3
39 Minute Hourly Adjustment		**37.0**	**-40.2**	**-40.2**	**-40.2**	**-40.2**	**-40.2**

STATIONARY SOURCE NOISE PREDICTION MODEL	10/15/2018

Observer Location: **R5** — *Project Name:* CarMax
Source: Parking Lot Vehicle Movements — *Job Number:* 11803
Condition: Operational — *Analyst:* A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	180.0 feet	***Barrier Height:***	**0.0 feet**
Noise Distance to Barrier:	180.0 feet	*Noise Source Height:*	4.0 feet
Barrier Distance to Observer:	0.0 feet	*Observer Height:*	5.0 feet
Observer Elevation:	0.0 feet	*Barrier Type (0-Wall, 1-Berm):*	0
Noise Source Elevation:	0.0 feet	*Drop Off Coefficient:*	15.0
Barrier Elevation:	0.0 feet		

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	62.9	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	180.0	-14.3	-14.3	-14.3	-14.3	-14.3	-14.3
Shielding (Barrier Attenuation)	180.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		48.6	-14.3	-14.3	-14.3	-14.3	-14.3
60 Minute Hourly Adjustment		**48.6**	**-14.3**	**-14.3**	**-14.3**	**-14.3**	**-14.3**

STATIONARY SOURCE NOISE PREDICTION MODEL — 10/15/2018

Observer Location: **R5**
Source: Vehicle Deliveries
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	337.0	feet
Noise Distance to Barrier:	337.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Elevation:	0.0	feet
Noise Source Elevation:	0.0	feet
Barrier Elevation:	0.0	feet
Barrier Height:	**0.0**	**feet**
Noise Source Height:	8.0	feet
Observer Height:	5.0	feet
Barrier Type (0-Wall, 1-Berm):	0	
Drop Off Coefficient:	20.0	

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	20.0	84.7	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	337.0	-24.5	-24.5	-24.5	-24.5	-24.5	-24.5
Shielding (Barrier Attenuation)	337.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		60.2	-24.5	-24.5	-24.5	-24.5	-24.5
20 Minute Hourly Adjustment		**55.4**	**-29.3**	**-29.3**	**-29.3**	**-29.3**	**-29.3**

STATIONARY SOURCE NOISE PREDICTION MODEL — 10/15/2018

Observer Location: **R5**
Source: Vehicle Maintenance Activity
Condition: Operational

Project Name: CarMax
Job Number: 11803
Analyst: A. Wolfe

NOISE MODEL INPUTS

Noise Distance to Observer	409.0	feet
Noise Distance to Barrier:	409.0	feet
Barrier Distance to Observer:	0.0	feet
Observer Elevation:	0.0	feet
Noise Source Elevation:	0.0	feet
Barrier Elevation:	0.0	feet
Barrier Height:	**0.0**	**feet**
Noise Source Height:	5.0	feet
Observer Height:	5.0	feet
Barrier Type (0-Wall, 1-Berm):	0	
Drop Off Coefficient:	20.0	

20 = 6 dBA per doubling of distance
15 = 4.5 dBA per doubling of distance

NOISE MODEL PROJECTIONS

Noise Level	*Distance (feet)*	*Leq*	*L50*	*L25*	*L8*	*L2*	*Lmax*
Reference (Sample)	15.0	78.8	0.0	0.0	0.0	0.0	0.0
Distance Attenuation	409.0	-28.7	-28.7	-28.7	-28.7	-28.7	-28.7
Shielding (Barrier Attenuation)	409.0	0.0	0.0	0.0	0.0	0.0	0.0
Raw (Distance + Barrier)		50.1	-28.7	-28.7	-28.7	-28.7	-28.7
20 Minute Hourly Adjustment		**45.3**	**-33.5**	**-33.5**	**-33.5**	**-33.5**	**-33.5**