8445 Los Coches Road Development

Noise Impact Study

Lakeside, CA

Prepared for:

NLA Acquisitions, LLC
105 Tallapoosa Street, Suite 307
Montgomery, AL 36104

Prepared by:

MD Acoustics, LLC
Mike Dickerson, INCE
Robert Pearson
4960 S. Gilbert Road, Ste 1-461
Chandler, AZ 85249

Date: 6/15/2023

MD ACOUSTICS
Sound Solutions for Planning and Design

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

1.0 Executive Summary

This report has been prepared to provide the calculated noise projections from the proposed Los Coches Road Development/Express Car Wash ("Project") located at 8445 Los Coches Road in Lakeside, CA. All calculations are compared to the County of San Diego noise ordinance as well as the existing ambient condition.

1.1 Findings and Conclusions

Three (3) one-hour baseline ambient measurements were performed at the project site and represent the ambient noise condition within the project vicinity. Ambient noise data indicate the hourly average noise level ranged between 62.0 to 74.0 dBA Leq. The predominant source of noise impacting the existing residences and retail/commercial uses is traffic noise propagating from Los Coches Road and the Kumeyaay Highway.

This study compares the Project's operational noise levels to two (2) different noise assessment scenarios: 1) Project only operational noise level projections, 2) Project plus ambient noise level projections.

Project only operational noise levels are anticipated to range between 47 to 50 dBA Leq at adjacent residential uses. The "project only" noise projections to the adjacent uses are below the County's 50 dBA residential limit as outlined within the County's Municipal Code (see Section 36.404 (2)).

Project plus ambient noise level projections are anticipated to range between 62 to 74 dBA Leq, depending on the location of the receptor. This assessment evaluates the baseline noise condition and compares the project's worst-case operational noise level to the measured noise level (during the project's proposed hours of operation).

The following outlines the project design features:

1. A total 15 Sonny Blowers were modeled at 10 to 12 feet high as point sources. The Sonny Blowers will be located approximately 5 feet inside the exit of the tunnel and will have a Sonny silencer package (see: https://www.sonnysdirect.com/sonnysdirect/en/OEM-Replacements/SONNY-S-Replacements/Blower-Inlet-Silencer-Non-Gator-Black/p/000000000020018005). The reference equipment sound level data is provided in Appendix B.

2. The car wash was modeled with acoustic liner (quiet fiber, acoustic perforated metal panels or equivalent) lining the interior walls around the blower system. Manufacturer acoustic liner materials are provided in Appendix C.

3. The project proposes 10 foot by 8 foot CMU wing walls be built on the north side of the entrance and exit of the tunnel.

4. The project proposes to house the vacuum turbine motors inside the attached fully enclosed equipment room.

2.0 Introduction

2.1 Purpose of Analysis and Study Objectives

This purpose of this noise impact study is to evaluate the potential noise impacts for the project study area and to recommend noise mitigation measures, if necessary, to minimize the potential noise impacts. The assessment was conducted and compared to potentially applicable noise standards set-forth by the State and/or Local agencies. Consistent with the County's Noise Guidelines, the project must demonstrate compliance to the applicable noise zoning ordinance and sound attenuation requirements.

The following is provided in this report:

- A description of the study area and the proposed project
- Information regarding the fundamentals of noise
- A description of the local noise guidelines and standards
- An evaluation of the existing ambient noise environment
- An analysis of stationary noise impact (e.g. blowers and vacuums) from the project site to adjacent land uses

2.2 Site Location and Study Area

The project site is located on the northeast corner of Los Coches Rd and the Kumeyaay Highway in Lakeside, CA as shown in Exhibit A. The land uses directly surrounding the project site includes existing residential to the north, east, and west, with multifamily residential to the southwest.

2.3 Proposed Project Description

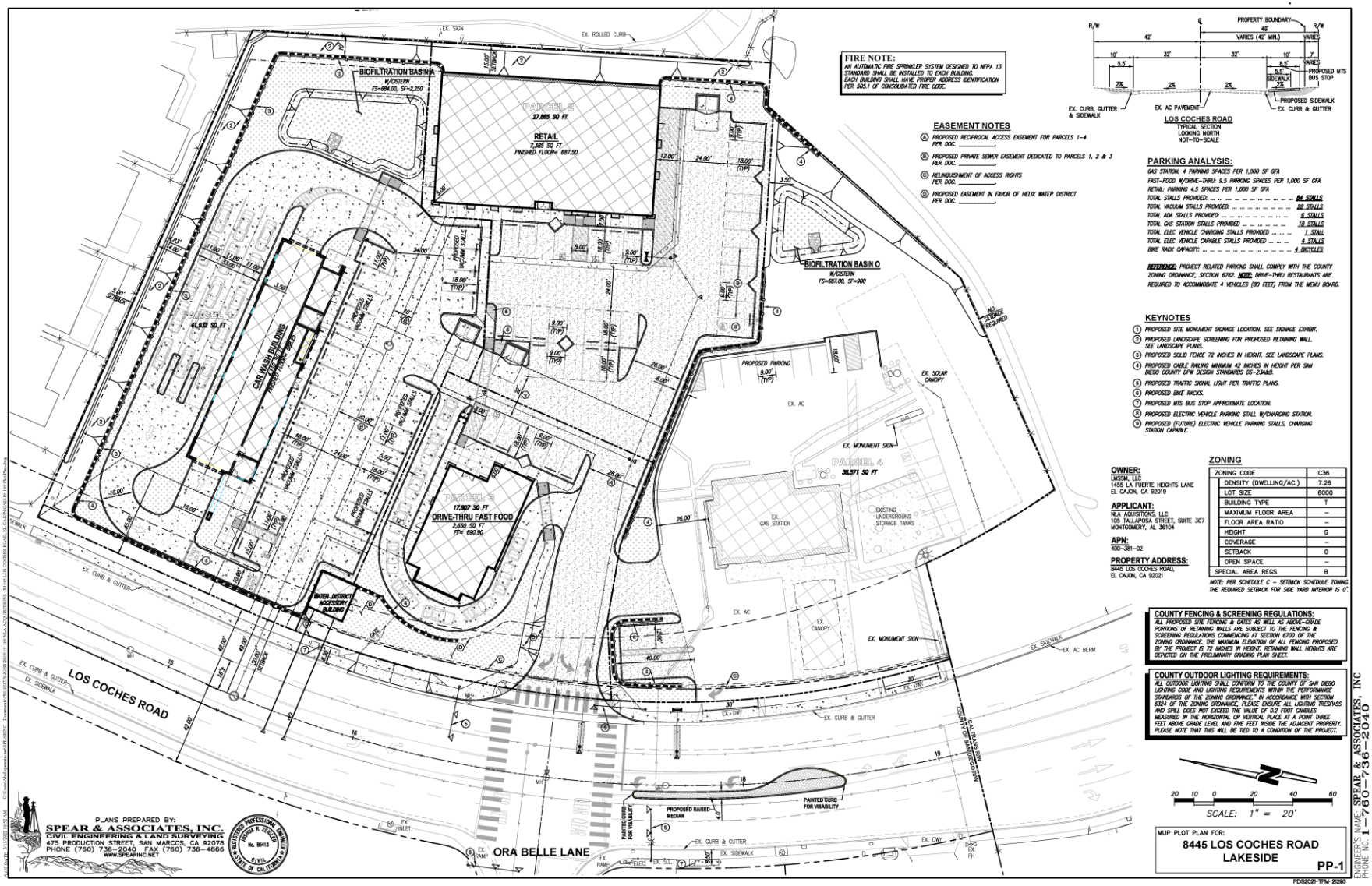
The project proposes to develop 7,385 square feet of retail, 2,660 square feet of fast food drive -thru restaurant, including approximately 4,110 square feet of car was tunnel with approximately 25 vacuum bays. Vacuum turbine motors will be housed inside the attached fully enclosed vacuum room. Car wash tunnel entrance opening is a 9-foot tall by 10-foot wide opening and the exit opening is approximately 10-feet tall by 9-feet wide. Acoustic treatment design features are provided in Section 5.2.

Project operations will occur from 7 a.m. to 8 p.m. Per the County's noise ordinance, a noise study has been prepared which identifies the Project's potential impact to the adjacent uses and compares the noise level projections to the County's applicable noise ordinance. The site plan used for this is illustrated in Exhibit B.

Exhibit A
Location Map

Exhibit B

Site Plan



3.0 Fundamentals of Noise

This section of the report provides basic information about noise and presents some of the terms used within the report.

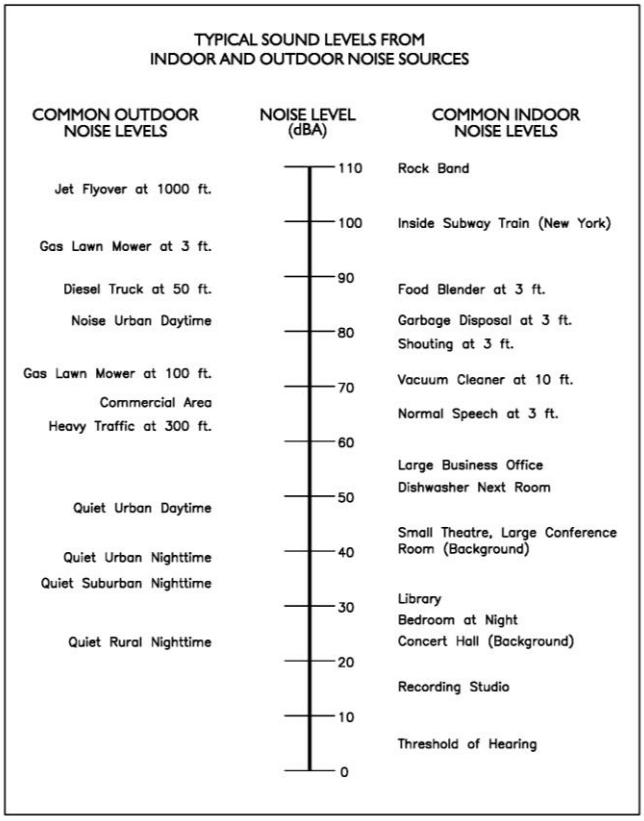
3.1 Sound, Noise and Acoustics

Sound is a disturbance created by a moving or vibrating source and is capable of being detected by the hearing organs. Sound may be thought of as mechanical energy of a moving object transmitted by pressure waves through a medium to a human ear. For traffic, or stationary noise, the medium of concern is air. *Noise* is defined as sound that is loud, unpleasant, unexpected, or unwanted.

3.2 Frequency and Hertz

A continuous sound is described by its *frequency* (pitch) and its *amplitude* (loudness). Frequency relates to the number of pressure oscillations per second. Low-frequency sounds are low in pitch (bass sounding) and high-frequency sounds are high in pitch (squeak). These oscillations per second (cycles) are commonly referred to as Hertz (Hz). The human ear can hear from the bass pitch starting out at 20 Hz all the way to the high pitch of 20,000 Hz.

Exhibit C: Typical A-Weighted Noise Levels



3.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines it loudness. The loudness of sound increases or decreases as the amplitude increases or decreases. Sound pressure amplitude is measure in units of micro-Newton per square inch meter (N/m2), also called micro-Pascal (µPa). One µPa is approximately one hundred billionths (0.00000000001) of normal atmospheric pressure. Sound pressure level (SPL or L_p) is used to describe in logarithmic units the ratio of actual sound pressures to a reference pressure squared. These units are called decibels abbreviated dB. Exhibit C illustrates references sound levels for different noise sources.

3.4 Addition of Decibels

Because decibels are on a logarithmic scale, sound pressure levels cannot be added or subtracted by simple plus or minus addition. When two sounds or equal SPL are combined, they will produce an SPL 3 dB greater than the original single SPL. In other words, sound energy must be doubled to produce a 3 dB increase. If two sounds differ by approximately 10 dB, the higher sound level is the predominant sound.

3.5 Human Response to Changes in Noise Levels

In general, the healthy human ear is most sensitive to sounds between 1,000 Hz and 5,000 Hz, (A-weighted scale) and it perceives a sound within that range as being more intense than a sound with a higher or lower frequency with the same magnitude. For purposes of this report as well as with most environmental documents, the A-scale weighting is typically reported in terms of A-weighted decibel (dBA). Typically, the human ear can barely perceive the change in noise level of 3 dB. A change in 5 dB is readily perceptible, and a change in 10 dB is perceived as being twice or half as loud. As previously discussed, a doubling of sound energy results in a 3 dB increase in sound, which means that a doubling of sound energy (e.g. doubling the volume of traffic on a highway) would result in a barely perceptible change in sound level.

3.6 Noise Descriptors

Noise in our daily environment fluctuates over time. Some noise levels occur in regular patterns, others are random. Some noise levels are constant while others are sporadic. Noise descriptors were created to describe the different time-varying noise levels.

A-Weighted Sound Level: The sound pressure level in decibels as measured on a sound level meter using the A-weighted filter network. The A-weighting filter de-emphasizes the very low and very high frequency components of the sound in a manner similar to the response of the human ear. A numerical method of rating human judgment of loudness.

Ambient Noise Level: The composite of noise from all sources, near and far. In this context, the ambient noise level constitutes the normal or existing level of environmental noise at a given location.

Community Noise Equivalent Level (CNEL): The average equivalent A-weighted sound level during a 24-hour day, obtained after addition of five (5) decibels to sound levels in the evening from 7:00 to 10:00 PM and after addition of ten (10) decibels to sound levels in the night before 7:00 AM and after 10:00 PM.

Decibel (dB): A unit for measuring the amplitude of a sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micro-pascals.

dB(A): A-weighted sound level (see definition above).

Equivalent Sound Level (LEQ): The sound level corresponding to a steady noise level over a given sample period with the same amount of acoustic energy as the actual time varying noise level. The energy average noise level during the sample period.

Habitable Room: Any room meeting the requirements of the Uniform Building Code or other applicable regulations which is intended to be used for sleeping, living, cooking or dining purposes, excluding such enclosed spaces as closets, pantries, bath or toilet rooms, service rooms, connecting corridors, laundries, unfinished attics, foyers, storage spaces, cellars, utility rooms and similar spaces.

L(n): The A-weighted sound level exceeded during a certain percentage of the sample time. For example, L10 in the sound level exceeded 10 percent of the sample time. Similarly L50, L90 and L99, etc.

Noise: *A*ny unwanted sound or sound which is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying. The State Noise Control Act defines noise as "...excessive undesirable sound...".

Outdoor Living Area: Outdoor spaces that are associated with residential land uses typically used for passive recreational activities or other noise-sensitive uses. Such spaces include patio areas, barbecue areas, jacuzzi areas, etc. associated with residential uses; outdoor patient recovery or resting areas associated with hospitals, convalescent hospitals, or rest homes; outdoor areas associated with places of worship which have a significant role in services or other noise-sensitive activities; and outdoor school facilities routinely used for educational purposes which may be adversely impacted by noise. Outdoor areas usually not included in this definition are: front yard areas, driveways, greenbelts, maintenance areas and storage areas associated with residential land uses; exterior areas at hospitals that are not used for patient activities; outdoor areas associated with places of worship and principally used for short-term social gatherings; and, outdoor areas associated with school facilities that are not typically associated with educational uses prone to adverse noise impacts (for example, school play yard areas).

Percent Noise Levels: See L(n).

Sound Level (Noise Level): The weighted sound pressure level obtained by use of a sound level meter having a standard frequency-filter for attenuating part of the sound spectrum.

Sound Level Meter: An instrument, including a microphone, an amplifier, an output meter, and frequency weighting networks for the measurement and determination of noise and sound levels.

Single Event Noise Exposure Level (SENEL): The dB(A) level which, if it lasted for one second, would produce the same A-weighted sound energy as the actual event.

3.7 Traffic Noise Prediction

Noise levels associated with traffic depends on a variety of factors: (1) volume of traffic, (2) speed of traffic, (3) auto, medium truck (2–3 axle) and heavy truck percentage (4 axle and greater), and sound propagation. The greater the volume of traffic, higher speeds and truck percentages equate to a louder volume in noise. A doubling of the Average Daily Traffic (ADT) along a roadway will increase noise levels by approximately 3 dB; reasons for this are discussed in the sections above.

3.8 Sound Propagation

As sound propagates from a source it spreads geometrically. Sound from a small, localized source (i.e., a point source) radiates uniformly outward as it travels away from the source in a spherical pattern. The sound level attenuates at a rate of 6 dB per doubling of distance. The movement of vehicles down a roadway makes the source of the sound appear to propagate from a line (i.e., line source) rather than a point source. This line source results in the noise propagating from a roadway in a cylindrical spreading

versus a spherical spreading that results from a point source. The sound level attenuates for a line source at a rate of 3 dB per doubling of distance.

As noise propagates from the source, it is affected by the ground and atmosphere. Noise models use hard site (reflective surfaces) and soft site (absorptive surfaces) to help calculate predicted noise levels. Hard site conditions assume no excessive ground absorption between the noise source and the receiver. Soft site conditions such as grass, soft dirt or landscaping attenuate noise at a rate of 1.5 dB per doubling of distance. When added to the geometric spreading, the excess ground attenuation results in an overall noise attenuation of 4.5 dB per doubling of distance for a line source and 7.5 dB per doubling of distance for a point source.

Research has demonstrated that atmospheric conditions can have a significant effect on noise levels when noise receivers are located 200 feet from a noise source. Wind, temperature, air humidity and turbulence can further impact have far sound can travel.

4.0 Regulatory Setting

The proposed project is located in the City of Lakeside, California and noise regulations are addressed through the efforts of various federal, state and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

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

- Publicize noise emission standards for interstate commerce
- Assist state and local abatement efforts
- Promote noise education and research

The Federal Office of Noise Abatement and Control (ONAC) originally was tasked with implementing the Noise Control Act. However, it was eventually eliminated leaving other federal agencies and committees to develop noise policies and programs. Some examples of these agencies are as follows: The Department of Transportation (DOT) assumed a significant role in noise control through its various agencies. The Federal Aviation Agency (FAA) is responsible for regulating noise from aircraft and airports. The Federal Highway Administration (FHWA) is responsible for regulating noise from the interstate highway system. The Occupational Safety and Health Administration (OSHA) is responsible for the prohibition of excessive noise exposure to workers. The Housing and Urban Development (HUD) is responsible for establishing noise regulations as it relates to exterior/interior noise levels for new HUD-assisted housing developments near high noise areas.

The federal government advocates that local jurisdictions use their land use regulatory authority to arrange new development in such a way that “noise sensitive” uses are either prohibited from being constructed adjacent to a highway or, or alternatively that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

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

4.2 State Regulations

Established in 1973, the California Department of Health Services Office of Noise Control (ONC) was instrumental in developing regularity tools to control and abate noise for use by local agencies. One significant model is the “Land Use Compatibility for Community Noise Environments Matrix.” The matrix allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

The State of California has established noise insulation standards as outlined in Title 24 and the Uniform Building Code (UBC) which in some cases requires acoustical analyses to outline exterior noise levels and

to ensure interior noise levels do not exceed the interior threshold. The State mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines published by the State Department of Health Services. The County of San Diego's guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable as illustrated in Exhibit D.

Exhibit D: Land Use Compatibility Guidelines

Table N-1 Noise Compatibility Guidelines

Land Use Category		Exterior Noise Level (CNEL)						
			55	60	65	70	75	80
A	Residential—single family residences, mobile homes, senior housing, convalescent homes							
B	Residential—multi-family residences, mixed-use (commercial/residential)							
C	Transient lodging—motels, hotels, resorts							
D*	Schools, churches, hospitals, nursing homes, child care facilities							
E*	Passive recreational parks, nature preserves, contemplative spaces, cemeteries							
F*	Active parks, golf courses, athletic fields, outdoor spectator sports, water recreation							
G*	Office\professional, government, medical\dental, commercial, retail, laboratories							
H*	Industrial, manufacturing, utilities, agriculture, mining, stables, ranching, warehouse, maintenance/repair							

	ACCEPTABLE—Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal construction, without any special noise insulation requirements.
	CONDITIONALLY ACCEPTABLE—New construction or development should be undertaken only after a detailed noise analysis is conducted to determine if noise reduction measures are necessary to achieve acceptable levels for land use. Criteria for determining exterior and interior noise levels are listed in Table N-2, Noise Standards. If a project cannot mitigate noise to a level deemed Acceptable, the appropriate county decision-maker must determine that mitigation has been provided to the greatest extent practicable or that extraordinary circumstances exist.
	UNACCEPTABLE—New construction or development shall not be undertaken.

* Denotes facilities used for part of the day; therefore, an hourly standard would be used rather than CNEL (refer to Table N-2).

Note: For projects located within an Airport Influence Area of an adopted Airport Land Use Compatibility Plan (ALUCP), additional Noise Compatibility Criteria restrictions may apply as specified in the ALUCP.

4.3 County of San Diego Noise Regulations

Municipal Code

Lakeside follows the County of San Diego's Noise Ordinance. The Municipal Code Section 36.404 (2) – Sound Level Limits outlines the sound requirements.

SEC. 36.404 Sound Level Limits.

San Diego County Municipal Code Section 36.404 (2) defines exterior noise standards for various receiving land uses. The noise standards are not to be exceeded at the portion of a property used for a particular land use. For environmental noise, the Leq in any hour cannot exceed the noise standards. These standards are shown in Table 1.

Table 1: San Diego County Exterior Noise Limits

ZONE	TIME	ONE-HOUR AVERAGE SOUND LEVEL LIMITS (dBA)
(1) RS, RD, RR, RMH, A70, A72, S80, S81, S87, S90, S92 and RV and RU with a density of less than 11 dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45
(2) RRO, RC, RM, S86, V5 and RV and RU with a density of 11 or more dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50
(3) S94, V4 and all commercial zones.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55
(4) V1, V2 V1, V2 V1 V2 V3	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m. 10 p.m. to 7 a.m. 7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55 55 50 70 65
(5) M50, M52 and M54	Anytime	70
(6) S82, M56 and M58.	Anytime	75
(7) S88 (see subsection (c) below)		

SEC. 36.404 Sound Level Limits:

Unless a variance has been applied for and granted, it shall be unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the property on which the sound is produced, exceeds the applicable limits set forth below, except that:

(1) Construction noise level limits shall be governed by Section 36.410 of this chapter; and

(2) Where a noise study has been conducted and the noise mitigation measures recommended by that study have been made conditions of approval of a Major Use Permit which authorizes the noise-generating use or activity, and the decision making body approving the Major Use Permit determined

that those mitigation measures reduce potential noise impacts to a level below significance, then implementation and compliance with such noise mitigation measures shall be deemed to constitute compliance with this section.

If the measured ambient level exceeds the applicable limit noted above, the allowable one hour average sound level shall be the ambient noise level. The ambient noise level shall be measured when the alleged noise violation source is not operating.

The sound level limit at a location on a boundary between two (2) zoning districts is the arithmetic mean of the respective limits for the two districts; provided however, that the one-hour average sound level limit applicable to extractive industries, including but not limited to borrow pits and mines, shall be 75 decibels at the property line regardless of the zone where the extractive industry is actually located.

Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line shall be subject to the noise level limits of this section, measured at or beyond six (6) feet from the boundary of the easement upon which the equipment is located.

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

SEC 36.408 Hours of Operation of Construction Equipment:

Except for emergency work, it shall be unlawful for any person to operate or cause to be operated, construction equipment:

- *(a) Between 7 p.m. and 7 a.m.*
- *(b) On a Sunday or a holiday. For purposes of this section, a holiday means January 1st, the last Monday in May, July 4th, the first Monday in September, December 25th and any day appointed by the President as a special national holiday or the Governor of the State as a special State holiday. A person may, however, operate construction equipment on a Sunday or holiday between the hours of 10 a.m. and 5 p.m. at the person's residence or for the purpose of constructing a residence for himself or herself, provided that the operation of construction equipment is not carried out for financial consideration or other consideration of any kind and does not violate the limitations in sections 36.409 and 36.410.*

SEC 36.409 sound Level Limitations on Construction Equipment:

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

SEC 36.410 Sound level limitations on Impulsive Noise:

In addition to the general limitations on sound levels in section 36.404 and the limitations on construction equipment in section 36.409, the following additional sound level limitations shall apply:

a) *Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410A, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410A are as described in the County Zoning Ordinance.*

TABLE 36.410A.
MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA)

OCCUPIED PROPERTY USE	DECIBELS (dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

b) *Except for emergency work, no person working on a public road project shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 36.410B, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period, as described in subsection (c) below. The maximum sound level depends on the use being made of the occupied property. The uses in Table 36.410B are as described in the County Zoning Ordinance.*

TABLE 36.410B.
MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA) FOR PUBLIC ROAD PROJECTS

OCCUPIED PROPERTY USE	dB(A)
Residential, village zoning or civic use	85
Agricultural, commercial or industrial use	90

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

SEC. 36.417 Exemptions.

(a) Emergency Work. The provisions of this chapter shall not apply to any emergency work as defined herein, provided that (1) the Noise Control Officer has been notified in advance, if possible, or as soon as practical after said emergency, and (2) any vehicle device, apparatus, or equipment used, related to or connected with emergency work is designed, modified, or equipped to reduce sounds produced to the lowest possible level consistent with effective operation of such vehicle, device, apparatus, or equipment.

(b) Sporting, Entertainment, Public Events. The provisions of this chapter shall not apply to:

(1) Those reasonable sounds emanating from authorized school bands, school athletic and school entertainments events.

(2) Sporting, entertainment and public events which are conducted pursuant to a license or permit issued by the County of San Diego for noise exceeding criteria, standards or levels as set forth in this chapter.

(3) Those reasonable sounds emanating from a sporting, entertainment, or public event; provided, however, it shall be unlawful to exceed those levels set forth in Section 36.404 when measured at or within the property lines of any property which is developed and used either in part or in whole for residential purposes unless a variance has been granted allowing sounds in excess of said levels.

(c) Federal or State Preempted Activities. The provisions of this chapter shall not apply to any activity to the extent regulation thereof has been preempted by State or Federal law.

(d) Minor Maintenance to Residential Property. The provisions of Section 36.404 shall not apply to noise sources associated with minor maintenance to property used either in part or in whole for residential purposes provided said activities take place between the hours 7 a.m. and 8 p.m. on any day except Sunday, or between the hours of 10 a.m. and 8 p.m. on Sunday.

(e) Agricultural Operations. The provisions of Section 36.404 shall not apply to equipment associated with agricultural operations, provided that, all equipment and machinery powered by internal-combustion engines is equipped with a proper muffler and air intake silencer in good working order, and provided further that:

(1) Operations do not take place between 7 p.m. and the following 7 a.m.; or

(2) Such operations and equipment are utilized for the preparation, planting, harvesting, protection or salvage of agricultural crops during periods of potential or actual frost damage or other adverse weather conditions; or

(3) Such operations and equipment are associated with agricultural pest control, provided the application is made in accordance with regulations or procedures administered by the County Department of Agriculture; or

(4) Such operations and equipment are associated with the application of agricultural chemicals provided the application is made in accordance with acceptable agricultural practices or upon the recommendation of an agricultural specialist.

(Amended by Ord. No. 7428 (N.S.), effective 2-4-88)

5.0 Study Method and Procedure

The following section describes the noise modeling procedures and assumptions used for this assessment.

5.1 Noise Measurement Procedure and Criteria

MD conducted three (3) one-hour noise measurements at or near the project site and represents the noise level from the existing traffic conditions along Los Coches and the I-8 Freeway. Measurements were performed using Larson Davis 831 type 1 sound level meters at the perimeter of the project. (see Appendix A for the field sheet data).

5.2 Stationary Noise Modeling

SoundPLAN (SP) acoustical modeling software was utilized to model future worst-case stationary noise impacts to the adjacent land uses. SP is capable of evaluating multiple stationary noise source impacts at various receiver locations. SP's software utilizes algorithms (based on the inverse square law and reference equipment noise level data) to calculate noise level projections. The software allows the user to input specific noise sources, spectral content, sound barriers, building placement, topography, and sensitive receptor locations.

The future worst-case noise level projections were modeled using referenced sound level data for the various stationary on-site sources (parking spaces, restaurant drive through lanes, drive through speakers, vacuums, vacuum turbine motors and car wash blowers at the exit). The SP model assumes a total of 25 vacuums and the dryer system are operating simultaneously (worst-case scenario), when the noise will in reality be intermittent and lower in noise level. The reference vacuum equipment sound level data is provided in Appendix B.

All other noise producing equipment (e.g., compressors, pumps) will be housed within mechanical equipment rooms.

The following outlines the project design features:

1. A total 15 Sonny Blowers were modeled at 10 to 12 feet high as point sources. The Sonny Blowers will be located approximately 5 feet inside the exit of the tunnel and will have a Sonny silencer package (see: https://www.sonnysdirect.com/sonnysdirect/en/OEM-Replacements/SONNY-S-Replacements/Blower-Inlet-Silencer-Non-Gator-Black/p/000000000020018005). The reference equipment sound level data is provided in Appendix B.

2. The car wash was modeled with acoustic liner (quiet fiber, acoustic perforated metal panels or equivalent) lining the interior walls around the blower system. Manufacturer acoustic liner materials are provided in Appendix C.

3. The project proposes 10 foot by 8 foot CMU wing walls be built on the north side of the entrance and exit of the tunnel.

4. The project proposes to house the vacuum turbine motors inside the attached fully enclosed equipment room.

5.3 FHWA Traffic Noise Prediction Model/SoundPlan

Traffic noise from vehicular traffic was projected using a computer program that replicates the FHWA Traffic Noise Prediction Model (FHWA-RD-77-108). The FHWA model arrives at the predicted noise level through a series of adjustments to the Reference Energy Mean Emission Level (REMEL). Roadway volumes and percentages correspond to the project's ADT forecast as prepared by Linscott Law and Greenspan (5/10/21) and roadway classification. The referenced traffic data was applied to the model and is in Appendix D. The following outlines the key adjustments made to the REMEL for the roadway inputs:

- Roadway classification – (e.g. freeway, major arterial, arterial, secondary, collector, etc),
- Roadway Active Width – (distance between the center of the outer most travel lanes on each side of the roadway)
- Average Daily Traffic Volumes (ADT), Travel Speeds, Percentages of automobiles, medium trucks and heavy trucks
- Roadway grade and angle of view
- Site Conditions (e.g. soft vs. hard)
- Percentage of total ADT which flows each hour through-out a 24-hour period

Table 2 indicates the roadway parameters and vehicle distribution utilized for this study.

Table 2: Roadway Parameters and Vehicle Distribution

Roadway	Segment	Existing	Existing + Project ADT[1]	Speed (MPH)	Site Conditions
Los Coches Rd	Aurora Dr to Project Dwy	16,000	18,300	40	Soft
Los Coches Rd	I-18 to Ora Belle Lane	17,700	18,300	40	Soft
Compton Blvd Vehicle Distribution and Mix[2]					
Motor-Vehicle Type		**Daytime % (7AM to 7 PM)**	**Evening % (7 PM to 10 PM)**	**Night % (10 PM to 7 AM)**	**Total % of Traffic Flow**
Automobiles		77.5	12.9	9.6	97.42
Medium Trucks		84.8	4.9	10.3	1.54
Heavy Trucks		86.5	2.7	10.8	0.74

Notes:
[1] Existing ADT and Existing + Project volumes for Los Coches Rd are from the Linscott Law & Greenspan (Sept 2022)
[2] Vehicle distribution data is based on typical Southern California roadway vehicle percentages for Secondary Arterials.

To determine the project's noise impact to the surrounding land uses, MD generated noise contours for scenarios outlined in the table above. Noise contours are used to provide a characterization of sound levels experienced at a set distance from the centerline of a subject roadway. They are intended to represent a

worst-case scenario and do not take into account structures, sound walls, topography, and/or other sound attenuating features which may further reduce the actual noise level. Noise contours are developed for comparative purposes and are used to demonstrate potential increases/decreases along subject roadways as a result of a project.

In addition, this assessment calculates future traffic noise levels at the project site. For the purpose of this evaluation The traffic noise calculation worksheet outputs are located in Appendix D.

5.4 FHWA Roadway Construction Noise Model

The construction noise analysis utilizes the Federal Highway Administration (FHWA) Roadway Construction Noise Model (RNCM), together with several key construction parameters. Key inputs include distance to the sensitive receiver, equipment usage, % usage factor, and baseline parameters for the project site.

The project was analyzed based on the different construction phases. Construction noise is expected to be loudest during the grading, concrete and building phases of construction. The construction noise calculation output worksheet is located in Appendix E. The following assumptions relevant to short-term construction noise impacts were used:

- It is estimated that construction will occur over a year to year and a half -time period. Construction noise is expected to be the loudest during the grading, concrete, and building phases.

6.0 Existing Noise Environment

Three (3) one-hour short-term ambient noise measurements were conducted at the property boundary to the southwest, northwest, and east (See Appendix A). The measurement measured the Leq, Lmin, Lmax and other statistical data (e.g. L2, L8…). The noise measurement was taken to determine the existing ambient noise levels. Noise data indicates that traffic along Los Coches Road and the Kumeyaay Highway (I-8 Freeway) is the primary source of noise impacting the site and the adjacent uses. This assessment utilizes the ambient noise data as a basis and compares project operational levels to said data.

6.1 Short-Term Noise Measurement Results

The results of the noise data is presented in Table 3.

Table 3: Short-Term Noise Measurement Data (dBA)

Location	Time	dB(A)								
		L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}	CNEL
1	2PM-3PM	72	87	58	78	75	74	71	65	71
2	2PM-3PM	74	84	57	79	78	76	73	65	71
3	2PM-3PM	62	74	54	66	64	63	61	90	64

Notes:
1. Short-term noise monitoring location is illustrated in Exhibit E. CNEL Extrapolated from short term measurements
2. Per SEC 36.404 County of San Diego Municipal code If the measured ambient level exceeds the applicable limit noted above, the allowable one hour average sound level shall be the ambient noise level

Noise data indicates the ambient noise level ranged between 62 dBA Leq to 74 dBA Leq near project site and surrounding area. Maximum levels reach 87 dBA as a result of traffic along Los Coches Rd. During times when traffic is present the quietest noise level measured 54 dBA. Additional field notes and photographs are provided in Appendix A.

For this evaluation, MD has utilized the ambient noise level and has compared the project's projected noise levels to the said ambient level.

7.0 Future Noise Environment Impacts

This assessment analyzes future noise impacts as a result of the project. The analysis details the estimated exterior noise levels. Stationary noise impacts are analyzed from the noise sources on-site such as dryers/blowers and vacuums/compressed air systems.

7.1 Future Exterior Noise

The following outlines the exterior noise levels associated with the proposed project.

7.1.1 Off-site Traffic Noise Impact

The potential off-site noise impacts caused by the increase in vehicular traffic as a result of the project were calculated at a distance of 50 feet. The distance to the 55, 60, 65, and 70 dBA CNEL noise contours are also provided for reference. The noise level at 50 feet is representative of approximate distances to existing homes along the subject roadway. The noise contours were calculated for the following scenarios and conditions:

- Existing Condition: This scenario refers to the existing year traffic noise condition and is demonstrated in Table 4.

- Existing + Project Condition: This scenario refers to the existing year plus project traffic noise condition and is demonstrated in Table 4.

Existing/Existing + Project Scenario Comparison

Table 4 provides the Existing and Existing + Project noise conditions and shows the change in noise level as a result of the proposed project. As shown in Table 5, the increase in traffic noise for the Existing and Existing + Project scenario would have a nominal increase of 0.4 dBA at 50 feet from the centerline of the subject roadway.

Table 4: Noise Levels Along Roadways (dBA CNEL)

Existing Without Project Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Los Coches Road	Aurora Dr to Project Dwy	69.6	47	101	218	470
Los Coches Road	I-8 to Ora Belle Lane	70.0	50	108	234	503

Existing + Project Exterior Noise Levels

Roadway	Segment	CNEL at 50 Ft (dBA)	Distance to Contour (Ft)			
			70 dBA CNEL	65 dBA CNEL	60 dBA CNEL	55 dBA CNEL
Los Coches Road	Aurora Dr to Project Dwy	70.2	51	111	239	514
Los Coches Road	I-8 to Ora Belle Lane	70.2	51	111	239	514

Noise Levels as a Result of Projects

Roadway[1]	Segment	CNEL at 50 Feet dBA[2]			
		Existing Without Project	Existing With Project	Change in Noise Level	Potential Significant Impact
Los Coches Road	Auroira Dr to Project Dwy	69.6	70.2	0.6	No
Los Coches Road	I-8 to Ora Belle Lane	70.0	70.2	0.2	No

Notes:
[1] Exterior noise levels calculated at 5 feet above ground level.
[2] Noise levels calculated from centerline of subject roadway.

Traffic noise from the local roadway network was evaluated and compared to the County's Exterior Noise Standard. Per the County's Exterior Noise Standard (Exhibit D), residential noise limit is acceptable up to 60 dBA CNEL and conditionally acceptable up to 75 dBA. Existing residences are approximately 90-feet from the centerline of Los Coches Road. The traffic noise at the existing residences (multi-family units west of the project site, across the street from the project) is approximately 68 to 69 dBA. Existing residences fall within the County's conditionally acceptable noise limit according to the County's General Plan Noise Element (Table N-1, Exhibit D of this report).

As shown in Table 4, the increase in the traffic noise level from the project is anticipated to be 0.4 dBA, which is a nominal increase and not perceptible as it takes a change in 3 dBA or more for the ear to hear a discernable difference. The additional increase in traffic is still below the City's conditionally acceptable limit of 75 dBA for residential uses and therefore the increase is less than significant.

7.1.2 On-Site Traffic Noise Impact

The traffic noise impact to the project site is approximately 71 dBA CNEL. According to the County's noise compatibility matrix the noise level would fall within the County's conditionally acceptable range.

7.1.3 Noise Impacts to Off-Site Receptors Due to Stationary Sources

Sensitive receptors that may be affected by project operational noise include existing residences to the north, east, and west The worst-case stationary noise was modeled using SoundPLAN acoustical modeling software. Noise modeling was calibrated by modeling a receptor placed five (5) feet from the blower units, noise level was reduced by 5 dBA to represent the implementation of the Sonny Silencer package. Worst-case assumes the restaurant drive through operations, car wash blowers, vacuums and equipment are always operational when in reality the noise will be intermittent and cycle on/off depending on the customer usage. In addition, the modeling takes into account the proposed enclosure for the vacuum turbines. Project operations will occur from 7 a.m. to 8 p.m. which is within the County's allowable daytime (7 a.m. to 10 p.m.) hours.

A total of four (5) receptors (R1 – R5) were modeled to evaluate the proposed project's operational impact. R1-R5 represent the noise level at the existing nearest residences to the project site. All yellow dots represent either a property line or a sensitive receptor such as an outdoor sensitive area (e.g. courtyard, patio, backyard, etc).

This study compares the Project's operational noise levels to two (2) different noise assessment scenarios: 1) Project Only operational noise level projections, 2) Project plus ambient noise level projections.

Project Operational Noise Levels

Exhibit E shows the "project only" operational noise levels at the property lines and/or sensitive receptor area. Operational noise levels are anticipated to range between 47 dBA to 50 dBA Leq at adjacent uses (depending on the location). Exhibit C provides a scale which illustrates loudness associated with common noise levels.

The "project only" noise projections to the adjacent uses are below the City's 50 dBA residential limit as outlined within the County's noise ordinance.

Project Plus Ambient Operational Noise Levels

Table 5 demonstrates the project plus the ambient noise levels. Project plus ambient noise level projections are anticipated to range between 62 to 74 dBA Leq at residential receptors (R1 – R5).

Table 5: Worst-Case Predicted Operational Noise Levels (dBA)

Receptor[2]	Level	Existing Ambient Noise Level (dBA, Leq)[3]	Project Noise Level (dBA, Leq)[4]	Total Combined Noise Level (dBA, Leq)	County's Daytime Limit (dBA, Leq)	Exceeds Standard (?)	Change in Noise Level as Result of Project
1	Floor 1	72	48	72	50	No	0
2	Floor 1	74	48	74		No	0
3	Floor 1		47	74		No	0
4	Floor 1	62	50	62		No	0
5	Floor 1		46	62		No	0

Notes:
[1.] Receptor locations are indicated in Exhibit E.
[2.] Receptors 1 - 5 represent existing residences.
[3.] One hour noise measurements were conducted during the proposed operable hours to compare the baseline condition to the project plus ambient projections.
[4.] See Exhibit E for the operational noise level projections at said receptors.

In addition, Table 5 provides the anticipated change in noise level as a result of the propose project. As shown in Table 5, the existing noise levels are anticipated to change at adjacent land uses.

Table 6 provides the characteristics associated with changes in noise levels.

Table 6: Change in Noise Level Characteristics[1]

Changes in Intensity Level, dBA	Changes in Apparent Loudness
1	Not perceptible
3	Just perceptible
5	Clearly noticeable
10	Twice (or half) as loud

https://www.fhwa.dot.gov/environMent/noise/regulations_and_guidance/polguide/polguide02.cfm

The change in noise level will be "Not Perceptible" at adjacent residential uses. Therefore, no further mitigation measures are required.

It should be noted, that as traffic volumes continue to increase along Los Coches Road, traffic noise levels will increase along said roadway segment. As previously mentioned in Section 3.7, as a rule of thumb, traffic noise increases approximately 3 dBA every doubling of ADTs (e.g. 14,000 to 28,000). Therefore, ambient noise levels will further increase (regardless of the proposed project) as the roadways expand. Project generated noise levels will further be masked by traffic noise along the subject roadways.

7.2 Project Design Features

The following summarizes the project design features (PDFs) for the project:

1. A total 15 Sonny Blowers were modeled at 10 to 12 feet high as point sources. The Sonny Blowers will be located approximately 5 feet inside the exit of the tunnel and will have a Sonny silencer package (see: https://www.sonnysdirect.com/sonnysdirect/en/OEM-Replacements/SONNY-S-Replacements/Blower-Inlet-Silencer-Non-Gator-Black/p/000000000020018005). The reference equipment sound level data is provided in Appendix B.

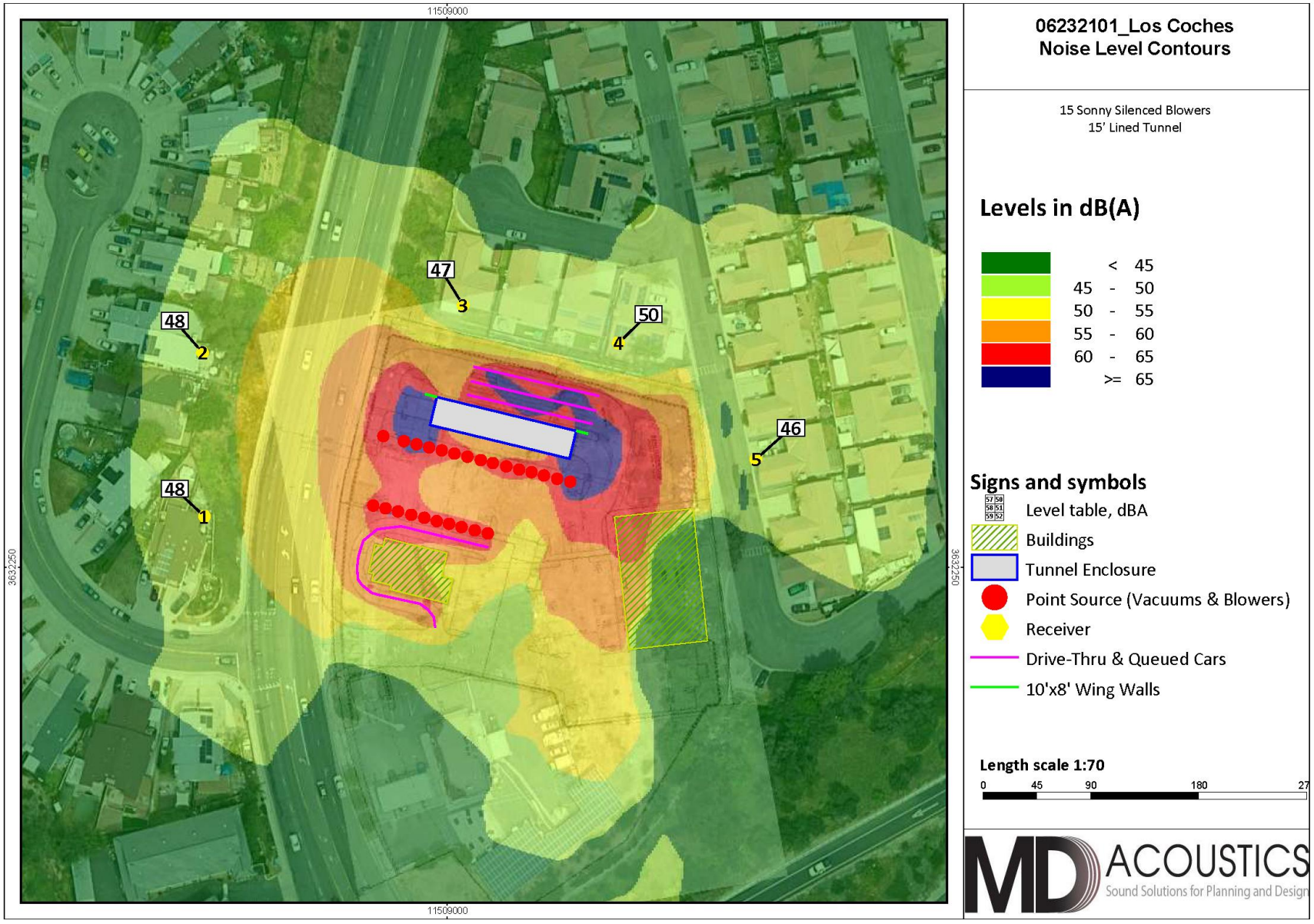
2. Project will incorporate a tunnel within a tunnel design such that a metal, framed-out, acoustically lined tunnel will be built around the blower system (See Appendix D).

3. The project proposes 10 foot by 8 foot CMU wing walls be built on the north side of the entrance and exit of the tunnel.

4. The project proposes to house the vacuum turbine motors inside the attached fully enclosed equipment room.

Exhibit E

Operational Noise Levels Leq(h)



8.0 Construction Noise Impact

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. Noise levels associated with the construction will vary with the different phases of construction.

8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise generated characteristics of typical construction activities, which can be found in the FTA Noise and Vibration Manual. The data is presented in Table 7.

Table 7: Typical Construction Equipment Noise Levels[1]

Type	Lmax (dBA) at 50 Feet
Backhoe	80
Dozers	85
Truck	88
Excavator	86
Concrete Mixer	85
Grader	86
Pneumatic Tool	85
Pump	76
Saw, Electric	76
Air Compressor	81
Generator	81
Paver	89
Roller	74

Notes:
[1] Referenced Noise Levels from FTA noise and vibration manual.

Construction noise is considered a short-term impact and would be considered significant if construction activities are taken outside the allowable times as described in the County's Municipal Code Sec 36.408, 36.409, and 36.410. Construction is anticipated to occur during the permissible hours according to the County's Municipal Code. Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity. Furthermore, noise reduction measures are provided to further reduce construction noise. The impact is considered less than significant however construction noise level projections are provided.

Typical operating cycles for these types of construction equipment may involve one or two minutes of full power operation followed by three to four minutes at lower power settings. Noise levels will be loudest during grading phase. A likely worst-case construction noise scenario during grading assumes the use of a grader, a dozer, an excavator, and a backhoe operating at 80 feet from the nearest sensitive receptor.

Assuming a usage factor of 40 percent for each piece of equipment, unmitigated noise levels at 80 feet have the potential to reach 74 dBA L_{eq} at the nearest sensitive receptors. Noise levels for the other construction phases would be lower and range between 72 - 74 dBA. Therefore, not exceeding the County's 75 dB limit.

8.2 Construction Vibration

Construction activities can produce vibration that may be felt by adjacent land uses. The construction of the proposed project would not require the use of equipment such as pile drivers, which are known to generate substantial construction vibration levels. The primary vibration source during construction may be from a bulldozer. A large bulldozer has a vibration impact of 0.089 inches per second peak particle velocity (PPV) at 25 feet which is perceptible but below any risk to architectural damage.

The fundamental equation used to calculate vibration propagation through average soil conditions and distance is as follows:

$$PPV_{equipment} = PPV_{ref} (100/Drec)^n$$

Where: PPV_{ref} = reference PPV at 100ft.

Drec = distance from equipment to receiver in ft.

n = 1.1 (the value related to the attenuation rate through ground)

The thresholds from the Caltrans Transportation and Construction Induced Vibration Guidance Manual in Table 8 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 8: Guideline Vibration Damage Potential Threshold Criteria

Structure and Condition	Maximum PPV (in/sec)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Extremely fragile historic buildings, ruins, ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Table 19, Transportation and Construction Vibration Guidance Manual, Caltrans, Sept. 2013.
Note: Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

Table 9 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 9: Vibration Source Levels for Construction Equipment

Equipment	Peak Particle Velocity (inches/second) at 25 feet	Approximate Vibration Level LV (dVB) at 25 feet
Pile driver (impact)	1.518 (upper range)	112
	0.644 (typical)	104
Pile driver (sonic)	0.734 upper range	105
	0.170 typical	93
Clam shovel drop (slurry wall)	0.202	94
Hydromill	0.008 in soil	66
(slurry wall)	0.017 in rock	75
Vibratory Roller	0.21	94
Hoe Ram	0.089	87
Large bulldozer	0.089	87
Caisson drill	0.089	87
Loaded trucks	0.076	86
Jackhammer	0.035	79
Small bulldozer	0.003	58

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

At a distance of 80 feet (distance residential structure from the property line), a large bulldozer would yield a worst-case 0.025 PPV (in/sec) which may be perceptible for short periods of time during grading along the east property line of the project site, but is below any threshold of damage. The impact is less than significant, and no mitigation is required.

8.3 Construction Noise Reduction Measures

Construction operations must follow the City's General Plan and the Noise Ordinance, which states that construction, repair or excavation work performed must occur within the permissible hours. To further ensure that construction activities do not disrupt the adjacent land uses, the following measures should be taken:

1. Construction should occur during the permissible hours as defined in Sec 36.410.

2. During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise attenuating devices.

3. The contractor should locate equipment staging areas that will create the greatest distance between construction-related noise/vibration sources and sensitive receptors nearest the project site during all project construction.

4. Idling equipment should be turned off when not in use.

5. Equipment shall be maintained so that vehicles and their loads are secured from rattling and banging.

9.0 References

San Diego County: Municipal Code – Chapter 4 Noise Abatement and Control

San Diego County : General Plan – Chapter 8 Noise Element

Local Mobility Analysis Los Coches Plaza – Linscott Law & Greenspan – September 9, 2022

Appendix A:

Field Measurement Data

MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

1-Hour Continuous Noise Measurement Datasheet

Project: Lakeside Car Wash
Site Address/Location: 8445 Los Coches Road, Lakeside Ca
Date: 12/16/2019
Field Tech/Engineer: Jason Schuyler

Site Observations: Clear sky with with mild wind. Traffic noise audible from the Kumeyaay Highway and Los Coches Rd

General Location:
Sound Meter: LD 831 **SN:** 3714 & 3168
Settings: A-weighted, slow, 1-sec, 1-hour duration
Meteorological Con.: 68 degrees F, 0-2 mph wind, from the east south east direction
Site ID: ST-1 thru ST-3

Site Topo: Flat
Ground Type: Hard site conditions, reflective

Noise Source(s) w/ Distance:
NM1 is 43 feet from Center of Los Coches Rd
NM2 is 61 feet from center of Los Coches Rd
NM3 is 299 feet from center of Los Coches Rd

Figure 1: Monitoring Locations

Figure 2: ST-1 Photo

Figure 3: ST-2 Photo

MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249

CA Office
1197 E Los Angeles Ave, C-256
Simi Valley, CA 93065

1-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Lakeside Car Wash
Site Address/Location: 8445 Los Coches Road, Lakeside Ca
Site ID: ST-1 thru ST-3

Table 1: Baseline Noise Measurement Summary

Location	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
1	2:43 PM	3:43 PM	72	87	58	78	75	74	71	65
2	2:49 PM	3:49 PM	74	84	57	79	78	76	73	65
3	2:56 PM	3:56 PM	62	74	54	66	64	63	61	90

Appendix B:

SoundPLAN Input/Outputs

Los Coches
Octave spectra of the sources in dB(A) - 001 - 15 Sonny Silenced - Lined - Wing Wall: Outdoor SP

3

Name	Source type	I or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
	Line	68.79			65.3	83.6	0.0	0.0		0	100%/24h	WhattaBurger	64.5	74.5	73.7	73.7	79.9	76.5	67.9	65.8	63.4
001 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
002 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
003 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
004 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
005 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
006 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
007 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
008 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
009 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
010 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
011 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
012 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
013 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
014 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
015 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
016 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
017 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
018 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
019 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
020 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
021 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
022 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
023 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
024 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
025 Vac	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech - 3'	57.5	53.5	52.2	57.7	61.7	67.6	68.9	61.6	
Queued Cars	Line	32.68			68.5	83.6	0.0	0.0		0	100%/24h	WhattaBurger	64.5	74.5	73.7	73.7	79.9	76.5	67.9	65.8	63.4
Queued Cars	Line	32.68			68.5	83.6	0.0	0.0		0	100%/24h	WhattaBurger	64.5	74.5	73.7	73.7	79.9	76.5	67.9	65.8	63.4
Queued Cars	Line	32.68			68.5	83.6	0.0	0.0		0	100%/24h	WhattaBurger	64.5	74.5	73.7	73.7	79.9	76.5	67.9	65.8	63.4

Los Coches
Octave spectra of the sources in dB(A) - 001 - 15 Sonny Silenced - Lined - Wing Wall: Outdoor SP

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Time histogram	Emission spectrum	63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz	8kHz	16kHz
		m,m²	dB(A)	dB	dB(A)	dB(A)	dB	dB	dB(A)	dB			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Tunnel 15 Sonny Silenced - Lined-Facade 01	Area	143.47	79.9	57.0	31.4	52.9	0.0	0.0		3	100%/24h	106_Facade 01_		48.1	50.2	43.9	34.9	22.4	9.0		
Tunnel 15 Sonny Silenced - Lined-Facade 02	Area	24.47	83.3	57.0	34.0	47.9	0.0	0.0		3	100%/24h	107_Facade 02		41.8	45.5	39.9	31.0	18.5	4.9		
Tunnel 15 Sonny Silenced - Lined-Facade 03	Area	143.47	79.9	57.0	31.4	52.9	0.0	0.0		3	100%/24h	109_Facade 03_		48.0	50.2	43.9	34.9	22.4	9.0		
Tunnel 15 Sonny Silenced - Lined-Facade 04	Area	24.47	85.3	57.0	35.6	49.5	0.0	0.0		3	100%/24h	110_Facade 04		42.8	47.2	42.0	33.3	21.1	8.2		
Tunnel 15 Sonny Silenced - Lined-Roof 01	Area	232.64	79.8	57.0	31.1	54.8	0.0	0.0		0	100%/24h	102_Roof 01_		49.7	52.1	46.0	36.8	24.3	10.9		
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Area	8.36	83.2	0.0	83.2	92.4	0.0	0.0		3	100%/24h	108_Transmissive area 01_		81.2	86.8	87.2	87.2	78.7	68.2		
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Area	8.36	85.4	0.0	85.4	94.6	0.0	0.0		3	100%/24h	111_Transmissive area 01_		81.9	88.6	89.6	89.9	81.7	71.8		
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	Area	33.36	86.4	57.0	36.6	51.8	0.0	0.0		0	100%/24h	113_Transmissive area 03_		44.8	49.5	44.6	36.0	23.9	11.1		
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	Area	20.57	84.3	57.0	34.9	48.0	0.0	0.0		3	100%/24h	114_Transmissive area 04_		41.9	45.6	40.2	31.5	19.4	6.5		
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	Area	20.57	84.4	57.0	35.0	48.1	0.0	0.0		3	100%/24h	115_Transmissive area 05_		42.0	45.7	40.3	31.6	19.5	6.6		

Source	Source group	Source ty	Tr. lane	LrD dB(A)	A dB	
Receiver 11508938,3632263 Fl G LrD,lim dB(A) LrD 48.3 dB(A) Sigma(LrD) 0.0 dB(A)						
001 Vac	Default industrial noise	Point		28.0	0.0	
002 Vac	Default industrial noise	Point		26.7	0.0	
003 Vac	Default industrial noise	Point		26.3	0.0	
004 Vac	Default industrial noise	Point		25.8	0.0	
005 Vac	Default industrial noise	Point		25.3	0.0	
006 Vac	Default industrial noise	Point		24.9	0.0	
007 Vac	Default industrial noise	Point		26.4	0.0	
008 Vac	Default industrial noise	Point		26.0	0.0	
009 Vac	Default industrial noise	Point		25.7	0.0	
010 Vac	Default industrial noise	Point		25.3	0.0	
011 Vac	Default industrial noise	Point		25.0	0.0	
012 Vac	Default industrial noise	Point		24.6	0.0	
013 Vac	Default industrial noise	Point		24.3	0.0	
014 Vac	Default industrial noise	Point		24.0	0.0	
015 Vac	Default industrial noise	Point		23.7	0.0	
016 Vac	Default industrial noise	Point		29.0	0.0	
017 Vac	Default industrial noise	Point		28.3	0.0	
018 Vac	Default industrial noise	Point		27.7	0.0	
019 Vac	Default industrial noise	Point		27.0	0.0	
020 Vac	Default industrial noise	Point		26.4	0.0	
021 Vac	Default industrial noise	Point		25.9	0.0	
022 Vac	Default industrial noise	Point		25.4	0.0	
023 Vac	Default industrial noise	Point		24.9	0.0	
024 Vac	Default industrial noise	Point		24.4	0.0	
025 Vac	Default industrial noise	Point		23.9	0.0	
26	Default industrial noise	Line		38.7	0.0	
Queued Cars	Default industrial noise	Line		20.4	0.0	
Queued Cars	Default industrial noise	Line		22.4	0.0	
Queued Cars	Default industrial noise	Line		24.7	0.0	
Tunnel 15 Sonny Silenced - Lined-Roof 01	Default industrial noise	Area		1.4	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	Default industrial noise	Area		-3.4	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 01	Default industrial noise	Area		-3.8	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	Default industrial noise	Area		-11.5	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 02	Default industrial noise	Area		1.8	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Default industrial noise	Area		46.8	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 03	Default industrial noise	Area		5.4	0.0	

Source	Source group	Source ty	Tr. lane	LrD dB(A)	A dB	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	Default industrial noise	Area		-1.7	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 04	Default industrial noise	Area		-8.8	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Default industrial noise	Area		31.0	0.0	
Receiver 11508938,3632304 Fl G LrD,lim dB(A) LrD 48.3 dB(A) Sigma(LrD) 0.0 dB(A)						
001 Vac	Default industrial noise	Point		27.4	0.0	
002 Vac	Default industrial noise	Point		26.4	0.0	
003 Vac	Default industrial noise	Point		25.8	0.0	
004 Vac	Default industrial noise	Point		25.3	0.0	
005 Vac	Default industrial noise	Point		24.8	0.0	
006 Vac	Default industrial noise	Point		24.3	0.0	
007 Vac	Default industrial noise	Point		23.9	0.0	
008 Vac	Default industrial noise	Point		23.4	0.0	
009 Vac	Default industrial noise	Point		23.1	0.0	
010 Vac	Default industrial noise	Point		22.7	0.0	
011 Vac	Default industrial noise	Point		22.3	0.0	
012 Vac	Default industrial noise	Point		22.0	0.0	
013 Vac	Default industrial noise	Point		21.7	0.0	
014 Vac	Default industrial noise	Point		21.3	0.0	
015 Vac	Default industrial noise	Point		22.7	0.0	
016 Vac	Default industrial noise	Point		26.0	0.0	
017 Vac	Default industrial noise	Point		25.5	0.0	
018 Vac	Default industrial noise	Point		25.1	0.0	
019 Vac	Default industrial noise	Point		24.6	0.0	
020 Vac	Default industrial noise	Point		24.1	0.0	
021 Vac	Default industrial noise	Point		25.7	0.0	
022 Vac	Default industrial noise	Point		25.4	0.0	
023 Vac	Default industrial noise	Point		25.1	0.0	
024 Vac	Default industrial noise	Point		24.7	0.0	
025 Vac	Default industrial noise	Point		24.4	0.0	
26	Default industrial noise	Line		35.0	0.0	
Queued Cars	Default industrial noise	Line		33.5	0.0	
Queued Cars	Default industrial noise	Line		33.5	0.0	
Queued Cars	Default industrial noise	Line		33.4	0.0	
Tunnel 15 Sonny Silenced - Lined-Roof 01	Default industrial noise	Area		2.1	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	Default industrial noise	Area		-1.9	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 01	Default industrial noise	Area		-2.6	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	Default industrial noise	Area		-10.0	0.0	

Source	Source group	Source ty	Tr. lane	LrD dB(A)	A dB	
Tunnel 15 Sonny Silenced - Lined-Facade 02	Default industrial noise	Area		2.2	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Default industrial noise	Area		47.0	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 03	Default industrial noise	Area		-3.9	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	Default industrial noise	Area		-11.1	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 04	Default industrial noise	Area		-10.4	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Default industrial noise	Area		29.2	0.0	
Receiver 11509004,3632316 Fl G LrD,lim dB(A) LrD 47.1 dB(A) Sigma(LrD) 0.0 dB(A)						
001 Vac	Default industrial noise	Point		17.5	0.0	
002 Vac	Default industrial noise	Point		17.8	0.0	
003 Vac	Default industrial noise	Point		15.3	0.0	
004 Vac	Default industrial noise	Point		11.2	0.0	
005 Vac	Default industrial noise	Point		11.2	0.0	
006 Vac	Default industrial noise	Point		11.1	0.0	
007 Vac	Default industrial noise	Point		11.0	0.0	
008 Vac	Default industrial noise	Point		10.8	0.0	
009 Vac	Default industrial noise	Point		10.5	0.0	
010 Vac	Default industrial noise	Point		10.1	0.0	
011 Vac	Default industrial noise	Point		9.8	0.0	
012 Vac	Default industrial noise	Point		9.5	0.0	
013 Vac	Default industrial noise	Point		9.3	0.0	
014 Vac	Default industrial noise	Point		9.0	0.0	
015 Vac	Default industrial noise	Point		8.7	0.0	
016 Vac	Default industrial noise	Point		12.6	0.0	
017 Vac	Default industrial noise	Point		12.0	0.0	
018 Vac	Default industrial noise	Point		12.5	0.0	
019 Vac	Default industrial noise	Point		9.2	0.0	
020 Vac	Default industrial noise	Point		9.0	0.0	
021 Vac	Default industrial noise	Point		9.1	0.0	
022 Vac	Default industrial noise	Point		9.0	0.0	
023 Vac	Default industrial noise	Point		8.3	0.0	
024 Vac	Default industrial noise	Point		8.4	0.0	
025 Vac	Default industrial noise	Point		8.1	0.0	
26	Default industrial noise	Line		21.1	0.0	
Queued Cars	Default industrial noise	Line		40.1	0.0	
Queued Cars	Default industrial noise	Line		39.8	0.0	
Queued Cars	Default industrial noise	Line		44.0	0.0	
Tunnel 15 Sonny Silenced - Lined-Roof 01	Default industrial noise	Area		6.7	0.0	

Source	Source group	Source ty	Tr. lane	LrD dB(A)	A dB	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	Default industrial noise	Area		1.3	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 01	Default industrial noise	Area		11.8	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	Default industrial noise	Area		3.7	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 02	Default industrial noise	Area		1.7	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Default industrial noise	Area		35.6	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 03	Default industrial noise	Area		-1.5	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	Default industrial noise	Area		-9.3	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 04	Default industrial noise	Area		-5.9	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Default industrial noise	Area		32.9	0.0	
Receiver 11509044,3632307 Fl G LrD,lim dB(A) LrD 49.7 dB(A) Sigma(LrD) 0.0 dB(A)						
001 Vac	Default industrial noise	Point		8.0	0.0	
002 Vac	Default industrial noise	Point		7.9	0.0	
003 Vac	Default industrial noise	Point		8.1	0.0	
004 Vac	Default industrial noise	Point		8.2	0.0	
005 Vac	Default industrial noise	Point		8.5	0.0	
006 Vac	Default industrial noise	Point		8.8	0.0	
007 Vac	Default industrial noise	Point		9.1	0.0	
008 Vac	Default industrial noise	Point		9.4	0.0	
009 Vac	Default industrial noise	Point		9.7	0.0	
010 Vac	Default industrial noise	Point		9.9	0.0	
011 Vac	Default industrial noise	Point		10.2	0.0	
012 Vac	Default industrial noise	Point		10.4	0.0	
013 Vac	Default industrial noise	Point		10.6	0.0	
014 Vac	Default industrial noise	Point		11.0	0.0	
015 Vac	Default industrial noise	Point		15.3	0.0	
016 Vac	Default industrial noise	Point		6.7	0.0	
017 Vac	Default industrial noise	Point		6.8	0.0	
018 Vac	Default industrial noise	Point		7.1	0.0	
019 Vac	Default industrial noise	Point		7.2	0.0	
020 Vac	Default industrial noise	Point		7.4	0.0	
021 Vac	Default industrial noise	Point		7.8	0.0	
022 Vac	Default industrial noise	Point		7.2	0.0	
023 Vac	Default industrial noise	Point		7.4	0.0	
024 Vac	Default industrial noise	Point		7.7	0.0	
025 Vac	Default industrial noise	Point		7.8	0.0	
26	Default industrial noise	Line		17.5	0.0	

Source	Source group	Source ty	Tr. lane	LrD dB(A)	A dB	
Queued Cars	Default industrial noise	Line		39.7	0.0	
Queued Cars	Default industrial noise	Line		40.5	0.0	
Queued Cars	Default industrial noise	Line		44.5	0.0	
Tunnel 15 Sonny Silenced - Lined-Roof 01	Default industrial noise	Area		5.3	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	Default industrial noise	Area		4.2	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 01	Default industrial noise	Area		9.6	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	Default industrial noise	Area		7.2	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 02	Default industrial noise	Area		-8.3	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Default industrial noise	Area		30.1	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 03	Default industrial noise	Area		-3.1	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	Default industrial noise	Area		-6.0	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 04	Default industrial noise	Area		5.9	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Default industrial noise	Area		46.3	0.0	
Receiver 11509078,3632277 Fl G LrD,lim dB(A) LrD 46.1 dB(A) Sigma(LrD) 0.0 dB(A)						
001 Vac	Default industrial noise	Point		6.4	0.0	
002 Vac	Default industrial noise	Point		7.1	0.0	
003 Vac	Default industrial noise	Point		7.4	0.0	
004 Vac	Default industrial noise	Point		7.8	0.0	
005 Vac	Default industrial noise	Point		7.2	0.0	
006 Vac	Default industrial noise	Point		7.6	0.0	
007 Vac	Default industrial noise	Point		8.0	0.0	
008 Vac	Default industrial noise	Point		11.5	0.0	
009 Vac	Default industrial noise	Point		12.0	0.0	
010 Vac	Default industrial noise	Point		12.8	0.0	
011 Vac	Default industrial noise	Point		13.3	0.0	
012 Vac	Default industrial noise	Point		14.0	0.0	
013 Vac	Default industrial noise	Point		14.6	0.0	
014 Vac	Default industrial noise	Point		15.3	0.0	
015 Vac	Default industrial noise	Point		16.4	0.0	
016 Vac	Default industrial noise	Point		7.6	0.0	
017 Vac	Default industrial noise	Point		7.9	0.0	
018 Vac	Default industrial noise	Point		8.1	0.0	
019 Vac	Default industrial noise	Point		8.4	0.0	
020 Vac	Default industrial noise	Point		8.6	0.0	
021 Vac	Default industrial noise	Point		8.9	0.0	

Source	Source group	Source ty	Tr. lane	LrD dB(A)	A dB	
022 Vac	Default industrial noise	Point		9.2	0.0	
023 Vac	Default industrial noise	Point		9.5	0.0	
024 Vac	Default industrial noise	Point		10.1	0.0	
025 Vac	Default industrial noise	Point		10.5	0.0	
26	Default industrial noise	Line		20.2	0.0	
Queued Cars	Default industrial noise	Line		27.4	0.0	
Queued Cars	Default industrial noise	Line		27.6	0.0	
Queued Cars	Default industrial noise	Line		27.3	0.0	
Tunnel 15 Sonny Silenced - Lined-Roof 01	Default industrial noise	Area		-0.9	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	Default industrial noise	Area		1.1	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 01	Default industrial noise	Area		2.3	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	Default industrial noise	Area		1.0	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 02	Default industrial noise	Area		-15.0	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Default industrial noise	Area		24.9	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 03	Default industrial noise	Area		-2.1	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	Default industrial noise	Area		-2.7	0.0	
Tunnel 15 Sonny Silenced - Lined-Facade 04	Default industrial noise	Area		3.3	0.0	
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	Default industrial noise	Area		45.8	0.0	

Los Coches
Contribution spectra - 001 - 15 Sonny Silenced - Lined - Wing Wall: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Receiver 11508938,3632263 Fl G LrD,lim dB(A) LrD 48.3 dB(A) Sigma(LrD) 0.0 dB(A)																													
26	LrD	38.7	-0.3	1.1	5.1	10.2	18.1	20.6	23.7	27.0	25.8	20.6	19.7	18.8	17.6	18.6	22.3	29.9	30.7	30.8	30.2	27.8	23.9	19.9	17.9	16.3	14.2	12.0	8.7
001 Vac	LrD	28.0	-2.9	4.4	7.9	11.0	12.2	8.1	5.3	4.9	2.8	-3.9	-1.5	-1.2	0.4	4.0	5.2	10.3	8.8	14.3	17.3	18.1	20.6	21.4	18.9	17.4	13.4	5.4	
002 Vac	LrD	26.7	-3.6	3.7	7.2	10.3	11.5	7.4	4.6	4.1	2.0	-4.9	-2.5	-2.2	-0.6	3.0	4.2	9.5	8.1	13.5	16.6	17.3	19.0	19.8	17.3	15.8	11.9	3.8	
003 Vac	LrD	26.3	-4.0	3.2	6.7	9.8	11.1	7.0	4.1	3.7	1.6	-5.5	-3.1	-2.8	-1.2	2.4	3.6	9.1	7.6	13.0	16.1	16.8	18.5	19.3	16.7	15.3	11.2	3.0	
004 Vac	LrD	25.8	-4.4	2.8	6.3	9.4	10.7	6.6	3.7	3.2	1.2	-6.1	-3.7	-3.3	-1.8	1.8	3.1	8.6	7.1	12.6	15.7	16.4	18.1	18.8	16.2	14.7	10.6	2.3	
005 Vac	LrD	25.3	-4.8	2.4	5.9	9.0	10.3	6.2	3.3	2.8	0.7	-6.6	-4.3	-3.9	-2.3	1.3	2.5	8.2	6.7	12.1	15.3	16.0	17.6	18.3	15.7	14.2	10.0	1.5	
006 Vac	LrD	24.9	-5.2	2.0	5.5	8.6	9.9	5.8	2.9	2.4	0.3	-7.1	-4.8	-4.4	-2.9	0.7	2.0	7.7	6.3	11.7	14.9	15.6	17.2	17.9	15.3	13.6	9.4	0.8	
007 Vac	LrD	26.4	-5.6	1.6	5.1	8.2	9.5	5.4	2.4	2.0	-0.1	-7.7	-5.3	-2.8	-1.2	2.4	3.6	9.5	8.1	13.5	16.7	17.4	19.0	19.6	17.0	15.2	10.8	2.1	
008 Vac	LrD	26.0	-6.0	1.3	4.7	7.8	9.1	5.0	2.0	1.6	-0.5	-8.2	-5.9	-3.3	-1.7	1.9	3.1	9.2	7.7	13.1	16.3	17.0	18.6	19.2	16.5	14.7	10.2	1.3	
009 Vac	LrD	25.7	-6.3	1.0	4.4	7.5	8.8	4.7	1.7	1.2	-0.8	-8.6	-6.3	-5.9	-2.1	1.5	2.7	8.8	7.3	12.8	16.0	16.7	18.2	18.9	16.1	14.3	9.7	0.7	
010 Vac	LrD	25.3	-6.5	0.7	4.2	7.3	8.6	4.5	1.4	0.9	-1.2	-9.1	-6.7	-6.4	-2.5	1.1	2.3	8.5	7.0	12.4	15.7	16.3	17.9	18.5	15.7	13.8	9.2	0.1	
011 Vac	LrD	25.0	-6.8	0.5	4.0	7.1	8.3	4.2	1.1	0.6	-1.5	-9.5	-7.2	-6.8	-2.9	0.7	1.9	8.2	6.7	12.1	15.4	16.0	17.6	18.1	15.3	13.4	8.7	-0.6	
012 Vac	LrD	24.6	-7.0	0.3	3.8	6.8	8.1	4.0	0.8	0.3	-1.8	-9.9	-7.5	-7.2	-3.3	0.3	1.6	7.9	6.4	11.8	15.1	15.7	17.3	17.8	15.0	13.0	8.2	-1.2	
013 Vac	LrD	24.3	-7.2	0.1	3.5	6.6	7.9	3.8	0.5	0.0	-2.0	-10.3	-7.9	-7.6	-3.6	0.0	1.2	7.6	6.1	11.5	14.8	15.4	17.0	17.5	14.6	12.6	7.7	-1.8	
014 Vac	LrD	24.0	-7.4	-0.1	3.3	6.4	7.7	3.6	0.2	-0.3	-2.3	-10.6	-8.3	-7.9	-4.1	-0.5	0.8	7.3	5.8	11.2	14.5	15.1	16.6	17.2	14.2	12.2	7.2	-2.4	
015 Vac	LrD	23.7	-7.6	-0.4	3.1	6.2	7.5	3.4	-0.1	-0.6	-2.6	-11.0	-8.7	-8.3	-4.4	-0.8	0.4	7.0	5.5	10.9	14.2	14.9	16.3	16.8	13.9	11.7	6.7	-3.1	
016 Vac	LrD	29.0	-1.6	5.6	9.1	12.2	13.5	9.4	6.6	6.2	4.1	-2.1	0.2	0.6	2.1	5.7	7.0	11.7	10.2	15.7	18.6	19.4	21.1	22.0	19.6	18.4	14.7	7.0	
017 Vac	LrD	28.3	-2.2	5.0	8.5	11.6	12.9	8.8	6.0	5.5	3.5	-3.0	-0.6	-0.3	1.3	4.9	6.1	11.0	9.6	15.0	18.0	18.8	20.5	21.3	18.9	17.6	13.9	6.1	
018 Vac	LrD	27.7	-2.7	4.5	8.0	11.1	12.3	8.2	5.4	5.0	2.9	-3.7	-1.4	-1.0	0.5	4.1	5.4	10.4	9.0	14.4	17.4	18.2	19.9	20.7	18.3	16.9	13.1	5.2	
019 Vac	LrD	27.0	-3.3	3.9	7.4	10.5	11.8	7.7	4.8	4.4	2.3	-4.5	-2.2	-1.8	-0.3	3.3	4.6	9.8	8.3	13.8	16.8	17.6	19.3	20.0	17.6	16.2	12.2	4.2	
020 Vac	LrD	26.4	-3.8	3.4	6.9	10.0	11.2	7.1	4.3	3.8	1.8	-5.3	-2.9	-2.6	-1.0	2.6	3.9	9.2	7.8	13.2	16.3	17.0	18.7	19.4	16.9	15.5	11.4	3.3	
021 Vac	LrD	25.9	-4.3	2.9	6.4	9.5	10.8	6.7	3.8	3.3	1.3	-5.9	-3.6	-3.2	-1.6	2.0	3.2	8.7	7.2	12.7	15.8	16.5	18.2	18.9	16.4	14.9	10.7	2.5	
022 Vac	LrD	25.4	-4.8	2.5	6.0	9.1	10.3	6.2	3.3	2.9	0.8	-6.5	-4.2	-3.8	-2.3	1.3	2.6	8.2	6.7	12.2	15.3	16.0	17.7	18.4	15.8	14.2	10.0	1.6	
023 Vac	LrD	24.9	-5.2	2.0	5.5	8.6	9.9	5.8	2.9	2.4	0.4	-7.1	-4.8	-4.4	-2.8	0.8	2.0	7.7	6.3	11.7	14.9	15.6	17.2	17.9	15.3	13.7	9.4	0.8	
024 Vac	LrD	24.4	-5.6	1.6	5.1	8.2	9.5	5.4	2.4	2.0	-0.1	-7.7	-5.4	-5.0	-3.4	0.2	1.4	7.3	5.8	11.2	14.4	15.1	16.7	17.4	14.7	13.0	8.7	0.0	
025 Vac	LrD	23.9	-6.0	1.2	4.7	7.8	9.0	4.9	2.0	1.5	-0.5	-8.3	-5.9	-5.6	-4.0	-0.4	0.9	6.8	5.3	10.8	14.0	14.7	16.2	16.9	14.2	12.5	8.0	-0.8	
Queued Cars	LrD	24.7	-8.1	-6.9	-3.2	1.2	8.7	10.9	13.1	16.1	14.6	11.8	10.4	9.0	7.2	7.7	10.6	14.7	14.9	14.3	13.3	10.0	5.3	0.3	-2.7	-5.6	-9.0	-13.0	-18.8
Queued Cars	LrD	22.4	-7.8	-6.8	-3.1	1.0	8.3	10.3	12.3	15.0	13.2	10.5	8.9	7.2	5.0	5.1	7.8	11.2	11.1	10.1	8.8	5.3	0.4	-4.7	-7.4	-10.0	-13.1	-17.0	-22.7
Queued Cars	LrD	20.4	-8.5	-7.6	-4.1	-0.1	7.0	8.8	10.7	13.2	11.3	8.4	6.7	4.9	2.6	2.7	5.3	8.6	8.5	7.5	6.4	3.5	-0.7	-5.2	-7.7	-10.1	-13.2	-16.9	-22.4
Tunnel 15 Sonny Silenced - Lined-Facade 01	LrD	-3.8								-6.5			-7.9			-16.2			-26.1			-40.4			-56.8				
Tunnel 15 Sonny Silenced - Lined-Facade 02	LrD	1.8								-2.1			-2.5			-5.8			-12.2			-24.5			-39.5				
Tunnel 15 Sonny Silenced - Lined-Facade 03	LrD	5.4								2.8			0.3			-4.2			-10.3			-22.5			-37.6				

Los Coches
Contribution spectra - 001 - 15 Sonny Silenced - Lined - Wing Wall: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Tunnel 15 Sonny Silenced - Lined-Facade 04	LrD	-8.8								-12.5			-12.0			-18.9			-28.3			-42.4			-58.9				
Tunnel 15 Sonny Silenced - Lined-Roof 01	LrD	1.4								-3.7			-1.3			-7.4			-15.6			-28.1			-42.5				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	LrD	46.8								37.6			37.8			39.7			43.6			35.7			23.7				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	LrD	31.0								24.5			25.7			24.4			24.8			16.0			3.2				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	LrD	-3.4								-10.4			-5.7			-10.6			-18.4			-30.4			-44.7				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	LrD	-11.5								-15.1			-14.7			-22.3			-32.1			-45.8			-61.9				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	LrD	-1.7								-5.2			-6.7			-9.0			-15.1			-27.4			-42.4				
Receiver 11508938,3632304 Fl G LrD,lim dB(A) LrD 48.3 dB(A) Sigma(LrD) 0.0 dB(A)																													
26	LrD	35.0	-3.9	-2.5	1.5	6.0	13.8	16.7	20.3	23.6	22.4	16.2	15.3	14.4	13.4	14.4	17.9	26.2	27.0	27.1	26.6	24.1	20.2	16.0	13.8	11.7	9.1	6.0	1.3
001 Vac	LrD	27.4	-3.0	4.2	7.7	10.8	12.1	8.0	5.1	4.7	2.6	-4.1	-1.8	-1.4	0.1	3.7	5.0	10.1	8.6	14.1	17.1	17.9	19.6	20.4	17.9	16.5	12.7	4.7	
002 Vac	LrD	26.4	-3.9	3.4	6.8	9.9	11.2	7.1	4.2	3.8	1.7	-5.3	-3.0	-2.6	-1.0	2.6	3.8	9.2	7.7	13.2	16.3	17.0	18.6	19.4	16.9	15.4	11.4	3.2	
003 Vac	LrD	25.8	-4.4	2.9	6.4	9.5	10.7	6.6	3.7	3.3	1.2	-6.0	-3.6	-3.3	-1.6	2.0	3.2	8.7	7.2	12.7	15.7	16.5	18.1	18.8	16.3	14.8	10.7	2.4	
004 Vac	LrD	25.3	-4.8	2.4	5.9	9.0	10.3	6.2	3.3	2.8	0.7	-6.6	-4.3	-3.9	-2.3	1.3	2.6	8.2	6.7	12.1	15.3	16.0	17.6	18.3	15.7	14.2	10.0	1.5	
005 Vac	LrD	24.8	-5.3	2.0	5.5	8.6	9.8	5.7	2.8	2.3	0.3	-7.2	-4.9	-4.5	-2.9	0.7	2.0	7.7	6.2	11.7	14.8	15.5	17.1	17.8	15.2	13.6	9.3	0.7	
006 Vac	LrD	24.3	-5.7	1.6	5.1	8.1	9.4	5.3	2.4	1.9	-0.1	-7.8	-5.4	-5.1	-3.4	0.2	1.4	7.2	5.8	11.2	14.4	15.1	16.7	17.3	14.7	13.0	8.6	-0.1	
007 Vac	LrD	23.9	-6.1	1.2	4.6	7.7	9.0	4.9	1.9	1.5	-0.6	-8.3	-6.0	-5.6	-4.0	-0.4	0.8	6.8	5.3	10.7	13.9	14.6	16.2	16.8	14.2	12.4	7.9	-0.9	
008 Vac	LrD	23.4	-6.4	0.8	4.3	7.4	8.7	4.6	1.5	1.1	-1.0	-8.8	-6.5	-6.1	-4.5	-0.9	0.3	6.4	4.9	10.3	13.6	14.2	15.8	16.4	13.7	11.9	7.3	-1.7	
009 Vac	LrD	23.1	-6.6	0.6	4.1	7.2	8.5	4.4	1.2	0.8	-1.3	-9.3	-6.9	-6.6	-5.0	-1.4	-0.1	6.0	4.5	10.0	13.2	13.9	15.4	16.0	13.3	11.4	6.8	-2.3	
010 Vac	LrD	22.7	-6.9	0.4	3.8	6.9	8.2	4.1	0.9	0.4	-1.6	-9.7	-7.4	-7.0	-5.4	-1.8	-0.6	5.7	4.2	9.6	12.9	13.5	15.1	15.6	12.8	10.9	6.2	-3.1	
011 Vac	LrD	22.3	-7.1	0.1	3.6	6.7	8.0	3.9	0.6	0.1	-2.0	-10.1	-7.8	-7.4	-5.8	-2.2	-1.0	5.3	3.9	9.3	12.6	13.2	14.7	15.3	12.4	10.4	5.6	-3.7	
012 Vac	LrD	22.0	-7.3	-0.1	3.4	6.5	7.7	3.6	0.3	-0.2	-2.3	-10.5	-8.2	-7.8	-6.2	-2.6	-1.4	5.0	3.5	8.9	12.3	12.9	14.4	14.9	12.0	10.0	5.1	-4.4	
013 Vac	LrD	21.7	-7.6	-0.3	3.2	6.3	7.5	3.4	0.0	-0.5	-2.5	-10.9	-8.5	-8.2	-6.6	-3.0	-1.7	4.7	3.2	8.6	12.0	12.6	14.1	14.6	11.7	9.6	4.6	-5.0	
014 Vac	LrD	21.3	-7.8	-0.5	3.0	6.1	7.3	3.2	-0.3	-0.8	-2.8	-11.3	-8.9	-8.6	-7.1	-3.5	-2.2	4.4	2.9	8.3	11.7	12.3	13.8	14.2	11.3	9.1	4.0	-5.7	
015 Vac	LrD	22.7	-8.0	-0.8	2.7	5.8	7.1	3.0	-0.6	-1.1	-3.1	-11.6	-9.3	-8.9	-5.5	-1.9	-0.6	6.1	4.6	10.0	13.4	14.0	15.4	15.8	12.8	10.4	5.1	-5.0	
016 Vac	LrD	26.0	-4.2	3.0	6.5	9.6	10.9	6.8	3.9	3.4	1.4	-5.8	-3.4	-3.1	-1.5	2.1	3.3	8.8	7.3	12.8	15.9	16.6	18.3	19.0	16.5	15.0	10.9	2.6	
017 Vac	LrD	25.5	-4.6	2.6	6.1	9.2	10.5	6.4	3.5	3.0	0.9	-6.4	-4.0	-3.6	-2.1	1.5	2.8	8.4	6.9	12.3	15.5	16.2	17.8	18.5	16.0	14.4	10.2	1.9	
018 Vac	LrD	25.1	-5.0	2.2	5.7	8.8	10.1	6.0	3.0	2.6	0.5	-6.9	-4.6	-4.2	-2.6	1.0	2.2	7.9	6.4	11.9	15.0	15.7	17.4	18.1	15.5	13.9	9.6	1.1	
019 Vac	LrD	24.6	-5.4	1.8	5.3	8.4	9.6	5.5	2.6	2.1	0.1	-7.5	-5.1	-4.8	-3.2	0.4	1.7	7.5	6.0	11.4	14.6	15.3	16.9	17.6	15.0	13.3	9.0	0.4	
020 Vac	LrD	24.1	-5.8	1.4	4.9	8.0	9.2	5.2	2.2	1.7	-0.3	-8.0	-5.7	-5.3	-3.7	-0.1	1.1	7.0	5.6	11.0	14.2	14.9	16.5	17.1	14.5	12.8	8.3	-0.4	
021 Vac	LrD	25.7	-6.2	1.0	4.5	7.6	8.9	4.8	1.8	1.4	1.5	-6.3	-4.0	-3.6	-2.0	1.6	2.8	8.9	7.4	12.8	16.1	16.7	18.3	18.9	16.2	14.4	9.8	0.9	

Los Coches
Contribution spectra - 001 - 15 Sonny Silenced - Lined - Wing Wall: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
022 Vac	LrD	25.4	-6.4	0.8	4.3	7.4	8.7	4.6	1.5	1.0	1.2	-6.7	-4.4	-4.0	-2.4	1.2	2.4	8.6	7.1	12.5	15.8	16.4	18.0	18.6	15.8	13.9	9.3	0.2	
023 Vac	LrD	25.1	-6.7	0.6	4.1	7.2	8.4	4.3	1.2	0.7	1.0	-7.1	-4.8	-4.4	-2.8	0.8	2.0	8.3	6.8	12.2	15.5	16.1	17.7	18.2	15.4	13.5	8.8	-0.4	
024 Vac	LrD	24.7	-6.9	0.3	3.8	6.9	8.2	4.1	0.9	0.4	0.6	-7.5	-5.2	-4.8	-3.2	0.4	1.6	7.9	6.5	11.9	15.2	15.8	17.3	17.9	15.0	13.1	8.3	-1.1	
025 Vac	LrD	24.4	-7.1	0.1	3.6	6.7	8.0	3.9	0.6	0.1	-2.0	-7.9	-5.5	-5.2	-3.6	0.0	1.2	7.6	6.1	11.5	14.9	15.5	17.0	17.5	14.7	12.6	7.8	-1.7	
Queued Cars	LrD	33.4	-4.1	-2.7	1.3	5.9	13.7	16.2	18.8	22.1	21.0	14.3	13.4	12.5	11.4	12.4	16.0	24.7	25.5	25.5	25.1	22.6	18.6	14.3	12.0	9.7	6.8	3.2	-2.0
Queued Cars	LrD	33.5	-4.1	-2.7	1.3	5.9	13.7	16.2	18.8	22.1	21.0	14.3	13.4	12.5	11.5	12.4	16.0	24.7	25.5	25.5	25.2	22.6	18.6	14.3	12.0	9.8	6.9	3.3	-1.9
Queued Cars	LrD	33.5	-4.0	-2.6	1.4	6.0	13.8	16.3	18.9	22.2	21.1	14.4	13.5	12.6	11.5	12.5	16.0	24.7	25.6	25.6	25.2	22.7	18.7	14.4	12.1	9.8	7.0	3.4	-1.8
Tunnel 15 Sonny Silenced - Lined-Facade 01	LrD	-2.6								-5.4			-6.6			-14.5			-24.2			-38.4			-54.9				
Tunnel 15 Sonny Silenced - Lined-Facade 02	LrD	2.2								-1.6			-2.0			-5.6			-12.3			-24.6			-39.5				
Tunnel 15 Sonny Silenced - Lined-Facade 03	LrD	-3.9								-7.2			-7.4			-15.3			-24.8			-38.4			-54.2				
Tunnel 15 Sonny Silenced - Lined-Facade 04	LrD	-10.4								-15.0			-13.0			-20.3			-30.2			-43.9			-60.1				
Tunnel 15 Sonny Silenced - Lined-Roof 01	LrD	2.1								-3.3			-0.6			-6.1			-12.6			-24.5			-39.2				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	LrD	47.0								38.0			38.4			40.2			43.6			35.7			23.7				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	LrD	29.2								21.5			24.5			22.7			22.5			14.6			2.3				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	LrD	-1.9								-10.0			-4.7			-7.9			-14.0			-26.3			-41.3				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	LrD	-10.0								-13.6			-13.3			-20.3			-29.6			-43.4			-59.9				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	LrD	-11.1								-15.4			-14.0			-21.2			-30.8			-44.5			-60.7				
Receiver 11509004,3632316 Fl G LrD,lim dB(A) LrD 47.1 dB(A) Sigma(LrD) 0.0 dB(A)																													
26	LrD	21.1	-9.4	-8.4	-4.8	-0.1	7.1	9.0	11.2	13.7	11.8	10.1	8.2	6.3	3.9	3.9	6.5	9.3	9.2	8.3	7.0	3.9	-0.6	-5.0	-7.2	-9.2	-11.7	-14.6	-18.9
001 Vac	LrD	17.5	-4.7	2.3	5.6	8.5	9.6	5.3	2.2	1.4	-1.1	-4.1	-2.4	-2.8	-2.3	0.5	0.9	1.2	-1.1	3.5	5.5	5.3	6.1	6.1	2.8	0.7	-3.9	-12.3	
002 Vac	LrD	17.8	-4.6	2.4	5.7	8.7	9.7	5.4	2.4	1.6	-0.9	-3.8	-1.9	-2.2	-1.8	1.0	1.4	1.6	-0.7	3.8	5.8	5.7	6.5	6.5	3.2	1.1	-3.4	-11.9	
003 Vac	LrD	15.3	-5.8	1.1	4.2	6.9	7.7	3.1	-0.2	-1.3	-4.0	-7.0	-5.1	-5.5	-5.1	-2.4	-2.0	-1.8	-4.2	0.3	2.3	2.1	3.0	3.6	1.3	0.1	-3.5	-11.0	
004 Vac	LrD	11.2	-8.0	-1.4	1.4	3.8	4.3	-0.7	-4.4	-5.9	-9.1	-12.8	-11.0	-11.6	-11.7	-9.6	-9.7	-9.8	-12.1	-6.8	-4.0	-3.2	-1.6	-0.8	-3.2	-4.4	-8.1	-15.7	
005 Vac	LrD	11.2	-8.1	-1.4	1.4	3.8	4.2	-0.7	-4.4	-5.9	-9.1	-12.8	-11.0	-11.6	-11.8	-9.6	-9.7	-9.9	-12.2	-6.9	-4.0	-3.3	-1.6	-0.8	-3.2	-4.5	-8.2	-15.8	
006 Vac	LrD	11.1	-8.1	-1.5	1.3	3.7	4.2	-0.8	-4.5	-6.0	-9.2	-12.9	-11.0	-11.6	-11.8	-9.6	-9.7	-9.9	-12.2	-6.9	-4.1	-3.4	-1.7	-0.9	-3.3	-4.6	-8.3	-15.9	
007 Vac	LrD	11.0	-8.3	-1.6	1.2	3.6	4.1	-0.9	-4.6	-6.1	-9.3	-13.0	-11.1	-11.7	-11.9	-9.7	-9.8	-10.0	-12.4	-7.1	-4.2	-3.5	-1.8	-1.0	-3.5	-4.8	-8.5	-16.2	
008 Vac	LrD	10.8	-8.5	-1.8	1.0	3.4	3.9	-1.1	-4.8	-6.3	-9.5	-13.2	-11.3	-11.9	-12.0	-9.8	-9.9	-10.2	-12.6	-7.4	-4.6	-3.8	-2.2	-1.4	-3.8	-5.1	-8.9	-16.5	

Los Coches
Contribution spectra - 001 - 15 Sonny Silenced - Lined - Wing Wall: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
009 Vac	LrD	10.5	-8.6	-2.0	0.9	3.3	3.7	-1.2	-5.0	-6.5	-9.7	-13.4	-12.4	-12.9	-13.1	-10.8	-10.9	-11.1	-13.6	-8.3	-5.4	-4.2	-2.4	-1.6	-4.1	-5.4	-9.3	-17.0	
010 Vac	LrD	10.1	-8.9	-2.2	0.6	3.0	3.5	-1.5	-5.2	-6.7	-10.0	-13.7	-12.7	-13.8	-14.0	-11.7	-11.8	-11.9	-14.5	-9.0	-6.1	-5.4	-3.3	-2.5	-4.9	-6.2	-10.0	-17.7	
011 Vac	LrD	9.8	-9.1	-2.5	0.4	2.8	3.3	-1.7	-5.5	-7.0	-10.3	-13.9	-13.0	-14.1	-14.2	-12.0	-12.0	-12.2	-14.8	-9.4	-6.5	-5.7	-4.0	-3.2	-5.6	-6.8	-10.6	-18.3	
012 Vac	LrD	9.5	-9.4	-2.7	0.2	2.5	3.0	-2.0	-5.7	-7.3	-10.6	-14.2	-13.3	-14.4	-14.5	-12.2	-12.3	-12.4	-15.0	-9.7	-6.8	-6.1	-4.4	-3.6	-6.0	-7.3	-11.0	-18.8	
013 Vac	LrD	9.3	-9.6	-2.9	-0.1	2.3	2.8	-2.1	-5.9	-7.5	-10.7	-14.5	-13.5	-14.6	-14.7	-12.4	-12.4	-12.4	-15.0	-9.9	-7.0	-6.3	-4.7	-3.9	-6.3	-7.7	-11.5	-19.4	
014 Vac	LrD	9.0	-9.9	-3.3	-0.4	2.0	2.5	-2.4	-6.2	-7.8	-11.1	-14.8	-13.9	-14.9	-15.0	-12.7	-12.7	-12.7	-15.3	-10.4	-7.4	-6.7	-5.1	-4.3	-6.8	-8.2	-12.1	-20.0	
015 Vac	LrD	8.7	-10.2	-3.5	-0.6	1.8	2.3	-2.7	-6.5	-8.1	-11.4	-15.1	-14.2	-15.2	-15.3	-13.0	-13.0	-13.0	-15.5	-10.8	-7.8	-7.1	-5.5	-4.7	-7.2	-8.7	-12.6	-20.7	
016 Vac	LrD	12.6	-8.4	-1.4	1.8	4.7	5.7	1.3	-2.0	-3.0	-5.7	-8.7	-7.3	-7.9	-7.7	-5.1	-4.8	-5.0	-7.4	-2.9	-0.8	-1.1	-0.4	-0.6	-4.1	-6.5	-11.5	-20.7	
017 Vac	LrD	12.0	-9.5	-2.6	0.6	3.3	4.1	-0.5	-3.9	-5.0	-7.7	-10.6	-9.0	-9.5	-9.0	-6.3	-5.9	-6.0	-8.4	-3.8	-0.2	-0.5	0.3	1.1	-1.5	-3.0	-7.2	-15.5	
018 Vac	LrD	12.5	-9.4	-2.5	0.6	3.3	4.1	1.2	-2.2	-3.3	-6.0	-8.9	-7.3	-7.7	-7.3	-4.5	-4.2	-4.3	-6.7	-2.2	0.0	-0.3	0.6	1.4	-1.1	-2.7	-6.8	-15.1	
019 Vac	LrD	9.2	-10.7	-4.0	-1.0	1.4	2.0	-1.1	-4.9	-6.3	-9.5	-12.9	-11.9	-13.0	-13.2	-11.0	-11.1	-11.0	-13.5	-9.1	-6.1	-5.4	-3.8	-3.1	-5.8	-7.4	-11.6	-20.0	
020 Vac	LrD	9.0	-10.7	-4.0	-1.0	1.4	2.0	-2.9	-4.9	-6.3	-9.5	-12.9	-11.9	-13.0	-13.2	-11.0	-11.1	-11.0	-13.5	-9.1	-6.1	-5.4	-3.8	-3.2	-5.8	-7.4	-11.6	-20.0	
021 Vac	LrD	9.1	-10.7	-4.0	-1.1	1.4	1.9	-1.2	-4.9	-6.4	-9.5	-13.0	-12.0	-13.0	-13.2	-11.0	-11.1	-11.1	-13.5	-9.1	-6.1	-5.5	-3.9	-3.2	-5.8	-7.5	-11.7	-20.1	
022 Vac	LrD	9.0	-10.7	-4.0	-1.1	1.3	1.9	-3.0	-5.0	-6.4	-9.6	-13.0	-12.0	-13.1	-13.2	-11.0	-11.1	-11.1	-13.5	-9.2	-6.2	-5.5	-3.9	-3.3	-5.9	-7.5	-11.8	-20.2	
023 Vac	LrD	8.3	-10.8	-4.1	-1.2	1.3	1.8	-3.0	-6.8	-8.2	-11.4	-14.9	-13.9	-15.0	-15.1	-12.9	-13.0	-12.8	-15.4	-11.1	-8.0	-7.4	-5.8	-5.1	-7.7	-9.2	-13.4	-21.6	
024 Vac	LrD	8.4	-10.9	-4.2	-1.3	1.2	1.8	-3.1	-6.9	-8.3	-11.5	-15.0	-14.0	-15.1	-15.2	-13.0	-13.1	-12.8	-14.2	-9.9	-7.0	-6.3	-4.7	-4.1	-6.7	-8.4	-12.7	-21.1	
025 Vac	LrD	8.1	-11.0	-4.3	-1.4	1.1	1.7	-3.2	-7.0	-8.4	-11.6	-15.1	-14.1	-15.2	-15.3	-13.1	-13.2	-12.9	-15.6	-11.2	-8.3	-7.7	-6.0	-5.4	-8.0	-9.6	-13.8	-22.1	
Queued Cars	LrD	44.0	1.5	2.9	6.9	11.6	19.4	21.9	25.2	28.6	27.6	26.7	25.9	25.2	24.1	25.5	29.6	34.2	36.3	36.9	36.0	33.7	30.0	26.1	24.4	23.2	21.9	20.7	18.9
Queued Cars	LrD	39.8	0.4	1.8	5.8	10.4	18.2	20.7	23.9	27.2	26.1	25.7	25.0	24.1	22.6	23.4	27.0	30.6	31.4	31.5	30.5	28.2	24.4	20.6	18.9	17.7	16.4	15.1	13.3
Queued Cars	LrD	40.1	-0.1	1.3	5.2	9.8	17.5	20.4	24.5	28.2	27.2	26.2	25.3	24.3	22.9	23.8	27.3	30.9	31.7	31.6	30.7	28.2	24.3	20.2	18.3	16.8	15.2	13.5	11.1
Tunnel 15 Sonny Silenced - Lined-Facade 01	LrD	11.8								6.9			8.8			3.6			-4.1			-16.2			-30.1				
Tunnel 15 Sonny Silenced - Lined-Facade 02	LrD	1.7								-3.0			-1.3			-6.8			-15.2			-27.8			-42.2				
Tunnel 15 Sonny Silenced - Lined-Facade 03	LrD	-1.5								-3.9			-5.6			-16.0			-26.9			-40.2			-54.7				
Tunnel 15 Sonny Silenced - Lined-Facade 04	LrD	-5.9								-9.9			-8.7			-17.2			-28.6			-42.9			-57.8				
Tunnel 15 Sonny Silenced - Lined-Roof 01	LrD	6.7								2.6			3.8			-3.5			-13.2			-27.6			-43.7				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	LrD	35.6								30.2			31.7			28.3			26.2			17.9			6.6				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	LrD	32.9								26.7			28.9			25.6			24.6			16.6			5.5				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	LrD	1.3								-4.9			-1.0			-7.1			-16.4			-30.5			-46.6				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	LrD	3.7								-2.5			1.0			-3.4			-10.8			-22.4			-36.0				

Los Coches
Contribution spectra - 001 - 15 Sonny Silenced - Lined - Wing Wall: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	LrD	-9.3								-12.4			-12.8			-22.1			-32.5			-45.5			-59.9				
Receiver 11509044,3632307 Fl G LrD,lim dB(A) LrD 49.7 dB(A) Sigma(LrD) 0.0 dB(A)																													
26	LrD	17.5	-11.0	-10.2	-6.9	-2.1	4.9	6.6	8.5	10.8	8.5	6.4	4.2	1.8	-0.9	-1.2	1.2	3.6	3.7	2.9	2.1	-0.4	-4.4	-8.7	-11.0	-13.1	-15.8	-19.1	-24.0
001 Vac	LrD	8.0	-11.1	-4.4	-1.5	1.0	1.6	-3.3	-7.1	-8.6	-11.8	-15.5	-13.4	-14.5	-14.6	-12.3	-12.3	-12.3	-14.9	-10.6	-8.2	-7.6	-6.1	-5.5	-8.3	-10.1	-14.5	-23.2	
002 Vac	LrD	7.9	-11.1	-4.4	-1.5	0.9	1.3	-3.7	-7.6	-9.3	-12.6	-16.3	-14.0	-15.1	-15.1	-12.8	-12.8	-13.0	-15.5	-11.1	-8.0	-7.4	-5.8	-5.2	-7.8	-9.5	-13.8	-22.3	
003 Vac	LrD	8.1	-10.9	-4.2	-1.4	1.0	1.5	-3.5	-7.4	-9.0	-12.4	-16.0	-13.8	-14.8	-14.9	-12.6	-12.6	-12.8	-15.4	-10.8	-7.7	-7.1	-5.5	-4.4	-7.1	-8.7	-13.1	-21.5	
004 Vac	LrD	8.2	-10.6	-4.0	-1.1	1.3	1.8	-3.2	-7.1	-8.7	-12.0	-15.7	-14.8	-15.8	-15.9	-13.6	-13.5	-13.7	-16.3	-11.4	-8.4	-7.7	-5.3	-4.6	-7.2	-8.8	-12.9	-21.2	
005 Vac	LrD	8.5	-10.2	-3.6	-0.7	1.7	2.1	-2.9	-6.8	-8.4	-11.7	-15.4	-14.5	-15.5	-15.6	-13.3	-13.3	-13.4	-15.9	-11.0	-8.0	-7.3	-5.6	-4.9	-7.3	-8.8	-12.7	-20.8	
006 Vac	LrD	8.8	-9.9	-3.3	-0.5	1.9	2.4	-2.6	-6.5	-8.1	-11.4	-15.1	-14.2	-15.2	-15.3	-13.0	-13.0	-13.1	-15.7	-10.6	-7.6	-6.9	-5.2	-4.4	-6.9	-8.3	-12.2	-20.1	
007 Vac	LrD	9.1	-9.7	-3.0	-0.2	2.2	2.6	-2.3	-6.2	-7.7	-11.0	-14.8	-13.8	-14.9	-15.0	-12.7	-12.7	-12.9	-15.4	-10.2	-7.2	-6.5	-4.8	-4.0	-6.4	-7.8	-11.6	-19.5	
008 Vac	LrD	9.4	-9.4	-2.8	0.0	2.4	2.9	-2.1	-5.9	-7.5	-10.8	-14.5	-13.5	-14.6	-14.7	-12.5	-12.5	-12.6	-15.2	-9.8	-6.8	-6.1	-4.4	-3.6	-6.0	-7.3	-11.1	-18.8	
009 Vac	LrD	9.7	-9.2	-2.6	0.3	2.6	3.1	-1.9	-5.7	-7.2	-10.5	-14.2	-13.3	-14.4	-14.5	-12.3	-12.3	-12.4	-14.8	-9.4	-6.5	-5.7	-4.0	-3.2	-5.6	-6.9	-10.6	-18.3	
010 Vac	LrD	9.9	-8.9	-2.3	0.5	2.9	3.3	-1.7	-5.4	-7.0	-10.2	-13.9	-13.0	-14.1	-14.2	-12.0	-12.1	-12.2	-14.4	-9.0	-6.1	-5.4	-3.7	-2.8	-5.2	-6.4	-10.1	-17.7	
011 Vac	LrD	10.2	-8.7	-2.1	0.7	3.1	3.5	-1.5	-5.2	-6.8	-10.0	-13.7	-12.8	-13.9	-14.0	-11.8	-11.9	-12.0	-14.1	-8.7	-5.8	-5.1	-3.4	-2.2	-4.6	-5.9	-9.6	-17.2	
012 Vac	LrD	10.4	-8.6	-2.0	0.9	3.2	3.7	-1.3	-5.1	-6.6	-9.8	-13.5	-12.6	-13.7	-13.9	-11.6	-11.7	-11.8	-13.8	-8.4	-5.5	-4.8	-3.1	-1.9	-4.2	-5.4	-9.1	-16.8	
013 Vac	LrD	10.6	-8.3	-1.7	1.1	3.4	3.9	-1.1	-4.9	-6.4	-9.7	-13.4	-12.4	-13.5	-13.7	-11.5	-11.6	-11.6	-13.6	-8.1	-5.3	-4.6	-2.8	-2.0	-4.2	-5.4	-9.0	-16.5	
014 Vac	LrD	11.0	-8.0	-1.4	1.4	3.8	4.3	-0.6	-4.2	-5.6	-8.6	-12.0	-10.8	-11.7	-11.8	-9.7	-9.9	-10.2	-13.1	-8.0	-5.1	-4.4	-2.7	-1.6	-4.0	-5.2	-8.8	-16.2	
015 Vac	LrD	15.3	-6.1	0.8	3.9	6.5	7.3	2.7	-0.7	-1.7	-4.5	-7.6	-6.0	-6.4	-6.0	-3.2	-2.8	-2.7	-5.1	-0.5	1.4	1.2	2.4	5.8	3.5	2.3	-1.2	-8.6	
016 Vac	LrD	6.7	-12.8	-6.1	-3.2	-0.7	-0.1	-5.0	-6.9	-8.4	-11.7	-15.2	-14.2	-15.3	-15.4	-13.1	-13.1	-13.4	-16.0	-11.7	-9.1	-8.5	-7.0	-6.4	-8.8	-10.7	-15.5	-24.6	
017 Vac	LrD	6.8	-12.6	-5.9	-3.0	-0.5	0.0	-4.9	-6.8	-8.3	-11.5	-15.0	-14.1	-15.1	-15.2	-12.9	-13.0	-13.3	-15.9	-11.5	-8.9	-8.3	-6.7	-6.1	-8.9	-10.7	-15.3	-24.3	
018 Vac	LrD	7.1	-12.3	-5.6	-2.7	-0.3	0.3	-4.6	-6.6	-8.1	-11.3	-14.8	-13.9	-14.9	-15.0	-12.8	-12.8	-13.1	-15.7	-11.4	-8.6	-8.0	-6.5	-5.8	-8.6	-10.4	-14.9	-23.8	
019 Vac	LrD	7.2	-12.2	-5.5	-2.6	-0.1	0.4	-4.5	-6.4	-7.9	-11.2	-14.7	-13.7	-14.8	-14.9	-12.6	-12.7	-13.0	-15.6	-11.3	-8.4	-7.8	-6.2	-5.6	-8.3	-10.1	-14.5	-23.3	
020 Vac	LrD	7.4	-12.1	-5.3	-2.4	0.0	0.6	-4.3	-6.3	-7.8	-11.0	-14.5	-13.5	-14.6	-14.7	-12.5	-12.5	-12.9	-15.5	-11.2	-8.2	-7.6	-6.0	-5.3	-8.0	-9.7	-14.2	-22.9	
021 Vac	LrD	7.8	-11.9	-5.2	-2.3	0.2	0.7	-4.2	-6.2	-7.6	-10.9	-14.3	-13.4	-14.5	-14.6	-12.4	-12.4	-12.8	-15.4	-10.0	-7.0	-6.3	-4.7	-4.1	-6.8	-8.6	-13.0	-21.8	
022 Vac	LrD	7.2	-11.6	-4.9	-2.0	0.4	0.9	-4.0	-7.8	-9.3	-12.5	-16.1	-15.1	-16.2	-16.3	-14.1	-14.1	-14.4	-17.0	-12.6	-9.6	-8.9	-7.3	-6.6	-9.2	-10.8	-15.1	-23.5	
023 Vac	LrD	7.4	-11.5	-4.8	-1.9	0.5	1.1	-3.9	-7.7	-9.2	-12.4	-15.9	-15.0	-16.0	-16.2	-13.9	-14.0	-14.3	-16.9	-12.4	-9.4	-8.7	-7.1	-6.4	-9.0	-10.6	-14.7	-23.1	
024 Vac	LrD	7.7	-11.3	-4.6	-1.7	0.7	1.2	-3.7	-7.5	-9.0	-12.2	-15.8	-14.8	-15.9	-16.0	-13.8	-13.9	-14.2	-16.8	-12.2	-8.1	-7.4	-5.8	-5.2	-7.8	-9.4	-13.7	-22.2	
025 Vac	LrD	7.8	-11.2	-4.5	-1.6	0.8	1.3	-3.6	-7.4	-8.9	-12.1	-15.6	-14.7	-15.7	-15.9	-13.7	-13.8	-14.1	-16.7	-12.0	-9.0	-7.3	-5.7	-5.0	-7.6	-9.2	-13.5	-21.9	
Queued Cars	LrD	44.5	2.6	4.0	8.0	12.6	20.5	23.0	26.3	29.6	28.6	27.6	26.8	26.1	24.9	26.1	30.1	34.5	36.3	37.2	36.5	34.5	30.9	27.2	25.6	24.5	23.2	22.1	20.4
Queued Cars	LrD	40.5	1.7	3.0	6.9	11.5	19.3	21.7	24.9	28.2	27.1	26.4	25.6	24.6	23.1	24.0	27.6	31.3	32.2	32.2	31.2	28.8	25.0	21.1	19.3	18.0	16.6	15.2	13.3
Queued Cars	LrD	39.7	0.6	1.9	5.9	10.4	18.2	20.6	25.0	28.6	27.4	26.3	25.3	24.5	22.9	23.8	27.2	30.6	31.3	31.1	29.9	27.1	23.0	18.7	16.4	14.6	12.6	10.5	7.7
Tunnel 15 Sonny Silenced - Lined-Facade 01	LrD	9.6								5.0			6.6			0.6			-6.9			-19.0			-33.0				
Tunnel 15 Sonny Silenced - Lined-Facade 02	LrD	-8.3								-11.8			-11.4			-20.3			-31.9			-46.5			-62.0				

Los Coches
Contribution spectra - 001 - 15 Sonny Silenced - Lined - Wing Wall: Outdoor SP

Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Tunnel 15 Sonny Silenced - Lined-Facade 03	LrD	-3.1								-5.3			-7.4			-17.7			-28.4			-41.7			-56.2				
Tunnel 15 Sonny Silenced - Lined-Facade 04	LrD	5.9								-0.1			3.3			-2.1			-9.6			-21.3			-34.5				
Tunnel 15 Sonny Silenced - Lined-Roof 01	LrD	5.3								1.0			2.4			-5.0			-14.8			-29.3			-45.6				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	LrD	30.1								25.1			25.9			22.0			21.2			12.8			0.9				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	LrD	46.3								37.4			41.8			40.8			39.8			29.4			16.8				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	LrD	4.2								-1.7			1.8			-4.3			-13.5			-27.3			-42.7				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	LrD	7.2								1.4			4.5			-0.4			-7.6			-19.4			-32.7				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	LrD	-6.0								-9.2			-9.4			-18.8			-29.6			-42.6			-56.6				
Receiver 11509078,3632277 Fl G LrD,lim dB(A) LrD 46.1 dB(A) Sigma(LrD) 0.0 dB(A)																													
26	LrD	20.2	-11.0	-9.9	-6.3	-2.0	5.4	7.9	10.4	13.0	11.2	9.4	7.6	5.6	3.2	3.2	5.8	8.1	8.1	7.1	5.9	2.4	-2.4	-7.5	-10.7	-13.8	-17.6	-22.2	-28.3
001 Vac	LrD	6.4	-14.2	-7.6	-4.9	-2.7	-2.4	-7.6	-12.2	-13.7	-16.8	-20.2	-18.9	-13.5	-13.2	-10.7	-10.4	-10.6	-11.0	-6.6	-4.2	-4.6	-3.9	-4.2	-8.0	-10.9	-16.7	-27.1	
002 Vac	LrD	7.1	-13.8	-7.1	-4.4	-2.2	-1.9	-7.1	-11.6	-13.1	-16.3	-19.6	-18.3	-12.9	-12.7	-10.1	-9.9	-7.9	-10.4	-5.9	-3.6	-4.0	-3.3	-3.6	-7.3	-10.1	-15.8	-26.0	
003 Vac	LrD	7.4	-13.5	-6.9	-4.1	-1.9	-1.6	-6.8	-11.2	-12.8	-15.9	-19.3	-18.0	-12.5	-12.3	-9.7	-9.5	-7.5	-10.0	-5.5	-3.2	-3.6	-2.9	-3.2	-6.8	-9.6	-15.2	-25.3	
004 Vac	LrD	7.8	-13.3	-6.6	-3.8	-1.6	-1.3	-6.5	-10.8	-12.4	-15.6	-18.9	-17.6	-12.1	-11.9	-9.3	-9.1	-7.1	-9.5	-5.1	-2.8	-3.2	-2.5	-2.7	-6.3	-9.0	-14.6	-24.5	
005 Vac	LrD	7.2	-13.0	-6.4	-3.6	-1.3	-1.0	-6.2	-10.5	-12.0	-15.2	-18.5	-17.2	-11.7	-11.5	-8.9	-8.7	-8.8	-11.3	-6.9	-4.7	-5.0	-4.2	-4.3	-7.7	-10.2	-15.5	-25.1	
006 Vac	LrD	7.6	-12.8	-6.1	-3.3	-1.0	-0.7	-5.8	-10.0	-11.6	-14.8	-18.1	-16.9	-11.3	-11.1	-8.5	-8.2	-8.4	-10.9	-6.4	-4.2	-4.6	-3.7	-3.8	-7.2	-9.7	-14.9	-24.4	
007 Vac	LrD	8.0	-12.5	-5.8	-2.9	-0.6	-0.3	-5.5	-9.6	-11.2	-14.4	-17.7	-16.4	-10.8	-10.6	-8.0	-7.7	-7.9	-10.4	-5.9	-3.8	-4.1	-3.2	-3.3	-6.7	-9.1	-14.2	-23.6	
008 Vac	LrD	11.5	-10.5	-3.5	-0.2	2.7	3.7	-0.8	-4.2	-5.2	-7.9	-10.9	-9.4	-7.7	-7.4	-4.7	-4.5	-4.6	-7.0	-2.6	-0.4	-0.7	-0.1	-0.4	-4.1	-6.8	-12.2	-22.0	
009 Vac	LrD	12.0	-10.2	-3.1	0.2	3.1	4.1	-0.3	-3.7	-4.7	-7.4	-10.4	-6.6	-7.2	-6.8	-4.2	-3.9	-4.1	-6.5	-2.0	0.1	-0.2	0.5	0.2	-3.4	-6.1	-11.5	-21.1	
010 Vac	LrD	12.8	-9.0	-2.0	1.2	3.9	4.9	0.4	-3.0	-4.0	-6.7	-9.8	-6.0	-6.5	-6.2	-3.6	-3.3	-3.4	-5.8	-1.3	0.8	0.6	1.2	1.0	-2.6	-5.2	-10.5	-20.0	
011 Vac	LrD	13.3	-8.6	-1.6	1.6	4.4	5.3	0.9	-2.4	-3.4	-6.2	-9.2	-5.4	-5.9	-5.6	-2.9	-2.6	-2.7	-5.1	-0.6	1.5	1.3	2.0	1.7	-1.8	-4.4	-9.6	-19.0	
012 Vac	LrD	14.0	-8.2	-1.2	2.0	4.8	5.8	1.4	-1.9	-2.9	-5.5	-8.6	-4.7	-5.3	-4.9	-2.2	-1.9	-2.0	-4.4	0.1	2.3	2.0	2.7	2.5	-1.0	-3.5	-8.6	-17.8	
013 Vac	LrD	14.6	-7.8	-0.8	2.5	5.3	6.3	1.9	-1.3	-2.3	-4.9	-7.9	-4.1	-4.6	-4.2	-1.5	-1.1	-1.2	-3.6	0.9	3.1	2.9	3.6	3.4	-0.1	-2.5	-7.5	-16.7	
014 Vac	LrD	15.3	-8.0	-0.8	2.6	5.5	6.7	2.3	-0.8	-1.7	-4.3	-4.9	-3.3	-3.7	-3.3	-0.6	-0.2	-0.3	-2.6	1.9	4.0	3.8	4.6	4.4	1.0	-1.4	-6.3	-15.3	
015 Vac	LrD	16.4	-6.8	0.2	3.5	6.4	7.5	3.2	0.0	-0.8	-3.3	-4.0	-2.3	-2.7	-2.3	0.5	0.9	0.9	-1.4	3.1	5.2	5.0	5.8	5.7	2.3	0.0	-4.8	-13.7	
016 Vac	LrD	7.6	-12.7	-5.7	-2.4	0.4	1.3	-3.2	-7.3	-8.4	-11.2	-14.5	-13.1	-13.8	-13.6	-11.0	-10.7	-10.9	-13.4	-9.0	-6.6	-7.0	-6.5	-7.0	-11.0	-14.1	-20.3	-31.1	
017 Vac	LrD	7.9	-12.5	-5.5	-2.3	0.6	1.5	-3.0	-7.0	-8.1	-10.9	-14.2	-12.8	-13.5	-13.2	-10.7	-10.4	-10.6	-13.0	-8.6	-6.3	-6.7	-6.1	-6.6	-10.6	-12.4	-18.3	-28.9	
018 Vac	LrD	8.1	-12.4	-5.3	-2.1	0.8	1.7	-2.8	-6.7	-7.8	-10.6	-13.8	-12.5	-13.2	-12.9	-10.3	-10.1	-10.2	-12.7	-8.3	-6.0	-6.3	-5.8	-6.3	-10.2	-13.3	-19.2	-29.8	
019 Vac	LrD	8.4	-12.2	-5.1	-1.8	1.0	2.0	-2.5	-6.4	-7.5	-10.3	-13.5	-12.1	-12.8	-12.5	-9.9	-9.7	-9.9	-12.3	-7.9	-5.6	-6.0	-5.4	-5.9	-9.7	-12.8	-18.6	-29.1	

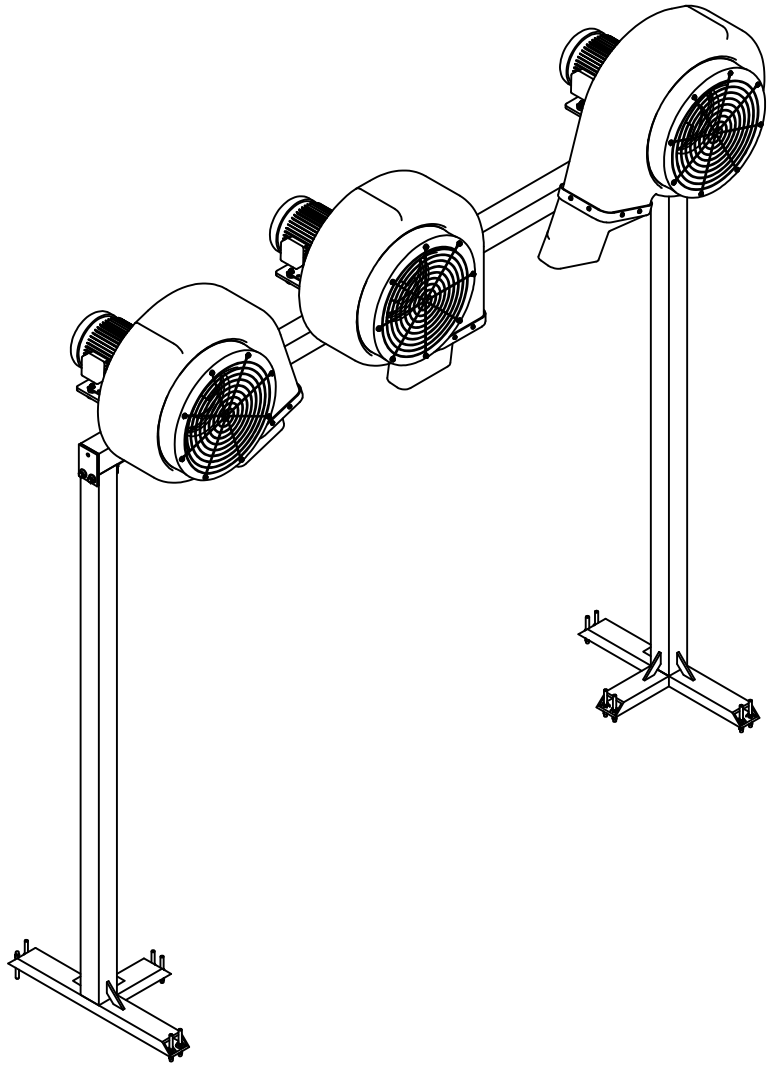
Los Coches
Contribution spectra - 001 - 15 Sonny Silenced - Lined - Wing Wall: Outdoor SP

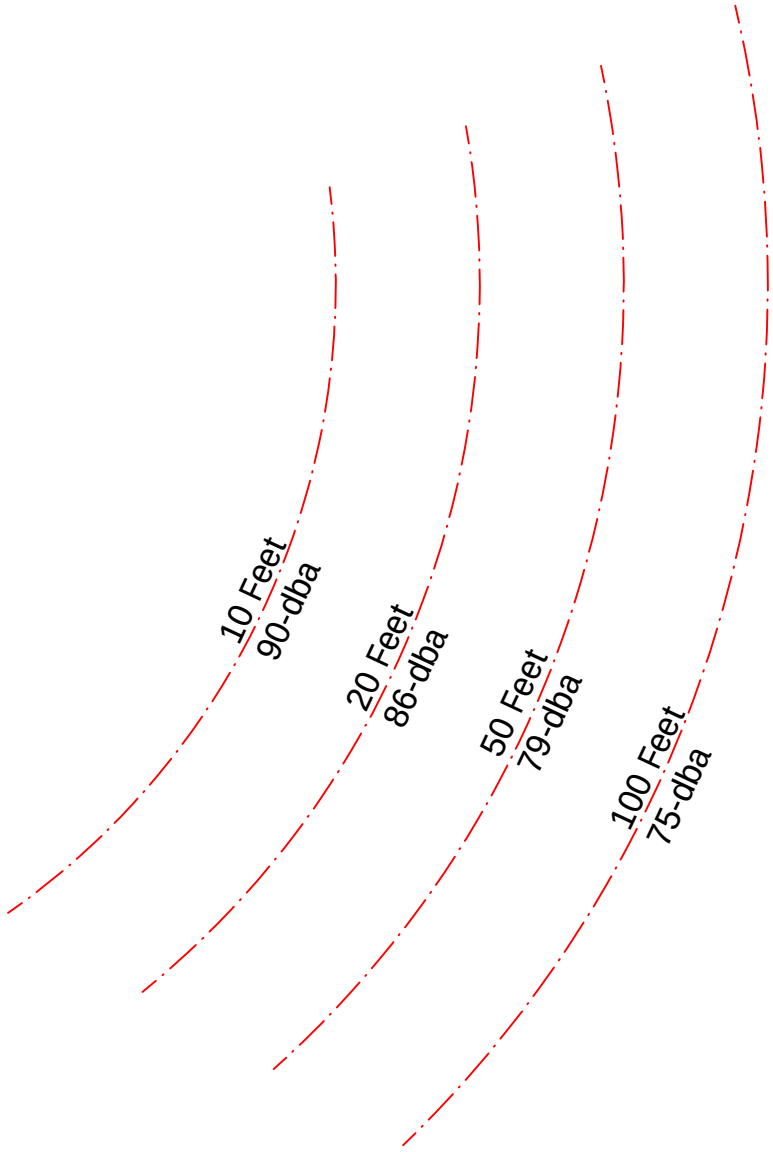
Source	Time slice	Sum	25Hz	31.5Hz	40Hz	50Hz	63Hz	80Hz	100Hz	125Hz	160Hz	200Hz	250Hz	315Hz	400Hz	500Hz	630Hz	800Hz	1kHz	1.25kHz	1.6kHz	2kHz	2.5kHz	3.15kHz	4kHz	5kHz	6.3kHz	8kHz	10kHz
		dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
020 Vac	LrD	8.6	-12.1	-5.0	-1.7	1.1	2.1	-2.3	-6.1	-7.2	-10.0	-13.1	-11.7	-12.4	-12.1	-9.6	-9.3	-9.5	-11.9	-7.5	-5.3	-5.6	-5.0	-5.5	-9.3	-12.3	-18.1	-28.4	
021 Vac	LrD	8.9	-11.9	-4.8	-1.5	1.4	2.4	-2.1	-5.8	-6.8	-9.7	-12.7	-11.4	-12.0	-11.8	-9.2	-8.9	-9.1	-11.6	-7.1	-4.9	-5.2	-4.7	-5.1	-8.9	-11.8	-17.5	-27.7	
022 Vac	LrD	9.2	-11.7	-4.6	-1.3	1.6	2.6	-1.9	-5.5	-6.5	-9.3	-12.4	-11.0	-11.6	-11.3	-8.8	-8.5	-8.7	-11.1	-6.7	-4.5	-4.8	-4.2	-4.6	-8.4	-11.2	-16.9	-27.0	
023 Vac	LrD	9.5	-11.5	-4.4	-1.1	1.8	2.8	-1.6	-5.1	-6.2	-8.9	-11.9	-10.6	-11.2	-10.9	-8.3	-8.1	-8.3	-10.7	-6.3	-4.1	-4.4	-3.8	-4.2	-7.9	-10.7	-16.3	-26.3	
024 Vac	LrD	10.1	-10.6	-3.6	-0.4	2.4	3.3	-1.1	-4.6	-5.6	-8.4	-11.5	-10.1	-10.7	-10.4	-7.8	-7.6	-7.7	-10.1	-5.7	-3.6	-3.9	-3.3	-3.6	-7.3	-10.0	-15.5	-25.4	
025 Vac	LrD	10.5	-10.3	-3.3	-0.1	2.8	3.7	-0.8	-4.2	-5.2	-8.0	-11.0	-9.6	-10.2	-9.9	-7.3	-7.0	-7.2	-9.6	-5.2	-3.0	-3.3	-2.7	-3.0	-6.7	-9.4	-14.8	-24.5	
Queued Cars	LrD	27.3	-4.5	-3.4	0.4	4.7	12.2	14.3	17.0	19.8	18.2	16.4	14.7	12.9	10.6	10.6	13.1	15.8	15.6	14.6	13.1	9.7	4.8	-0.2	-3.2	-5.9	-9.0	-12.4	-16.9
Queued Cars	LrD	27.6	-4.3	-3.2	0.6	4.9	12.4	14.6	17.2	20.1	18.4	16.5	14.9	13.1	10.8	10.9	13.5	16.2	16.2	15.2	13.7	10.3	5.5	0.4	-2.5	-5.2	-8.3	-11.7	-16.2
Queued Cars	LrD	27.4	-4.8	-3.7	0.1	4.4	12.0	14.2	16.8	19.7	18.1	16.5	14.9	13.2	10.9	11.0	13.7	16.2	16.1	15.2	13.7	10.3	5.6	0.5	-2.4	-5.1	-8.2	-11.6	-16.0
Tunnel 15 Sonny Silenced - Lined-Facade 01	LrD	2.3								-1.2			-0.9			-8.6			-18.4			-32.6			-49.3				
Tunnel 15 Sonny Silenced - Lined-Facade 02	LrD	-15.0								-20.0			-17.3			-25.8			-36.3			-49.9			-65.7				
Tunnel 15 Sonny Silenced - Lined-Facade 03	LrD	-2.1								-11.6			-3.2			-11.8			-22.5			-37.6			-54.9				
Tunnel 15 Sonny Silenced - Lined-Facade 04	LrD	3.3								-3.0			1.0			-4.8			-13.3			-26.3			-41.4				
Tunnel 15 Sonny Silenced - Lined-Roof 01	LrD	-0.9								-5.6			-3.4			-11.9			-22.7			-38.2			-56.0				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	LrD	24.9								16.7			20.7			18.4			18.3			10.1			-2.4				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 01	LrD	45.8								35.8			40.7			40.5			40.1			30.4			17.3				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 03	LrD	1.1								-5.7			-1.0			-7.1			-16.3			-30.2			-46.2				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 04	LrD	1.0								-4.0			-1.8			-7.9			-16.6			-29.6			-44.8				
Tunnel 15 Sonny Silenced - Lined-Transmissive area 05	LrD	-2.7								-13.7			-3.9			-10.9			-20.9			-35.3			-51.8				

Appendix C:

Manufacturer Acoustic Treatments

Enviromental Noise with Dryer OFF: 70 dba





THIRD ANGLE PROJECTION	*MACHINING TOLERANCES*	DRAWN LVerdecia	8/26/2011
BREAK ALL SHARP CORNERS. PART TO BE FREE OF BURRS.	FRACTION± 1/16"	APPROVED	8/1/2012
UNLESS OTHERWISE SPECIFIED, ALL DIMENSIONS ARE IN INCHES	.XX DECIMAL ± 0.030	CATEGORY BLOWER	
MATERIAL	.XXX DECIMAL ± 0.005		
	ANGULARITY ± 2°		
	FINISH 125		

SONNY'S ENTERPRISES
THE CARWASH FACTORY

DESCRIPTION	BLOWER ASSEMBLY, ONE ARCH 45HP		
PART NUMBER	BL1-45HP-1		
SHEET 2 OF 2	SIZE A	SCALE N.T.S.	

Appendix F

VACUTECH

SOUND LEVEL METER READINGS

MODEL: FT-CO-T350HP4 (50HP TURBINE COUPLED VACUUM PRODUCER) **WITH EXHAUST SILENCER**

READING ONE: 61 DB-A, 3 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING TWO: 62 DB-A, 5 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING THREE: 59 DB-A, 10 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING FOUR: 54 DB-A, 20 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE

READINGS WERE TAKEN OUTSIDE, ON CONCRETE PAD WITH NO ENCLOSURE. NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE WAS PRESENT DURING READINGS.

SOUND LEVEL METER USED:

SIMPSON MODEL #40003 – MSHA APPROVED.
MEETS OSHA & WALSH-HEALY REQUIREMENTS FOR NOISE CONTROL.
CONFORMS TO ANSI S1.4-1983, IEC 651 SPECS FOR METER TYPE

Vacutech
1350 Hi-Tech Drive, Sheridan WY, 82801
PHONE: (800) 917-9444 FAX: (303) 675-1988
EMAIL: info@vacutechllc.com
WEB SITE: www.vacutechllc.com

MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

AZ Office
4960 S. Gilbert Rd, Ste 1-461
Chandler, AZ 85249
p. (602) 774-1950

CA Office
1197 Los Angeles Ave, Ste C-256
Simi Valley, CA 93065
p. (805) 426-4477

Project: SuperStar Car Wash Chula Vista
Site Location: 1555 W Warner Rd, Gilbert, AZ 85233
Date: 4/5/2018
Field Tech/Engineer: Robert Pearson
Source/System: Vacutec System

Location: Vac Bay 1
Sound Meter: NTi XL2 **SN:** A2A-05967-E0
Settings: Z-weighted, slow, 1-sec, 10-sec duration
Meteorological Cond.: 80 degrees F, 2 mph wind

Site Observations:
Clear sky, measurements were performed within 1.5ft of source. Measurements were performed while the vacuum was positiioned at threee (3) different positions. Holstered, unholstered and inside a car. This data is utilized for acoustic modeling purposes and represents an average sound level at a vacuum station.

Table 1: Summary Measurement Data

Source	System	Overall dB(A)	3rd Octave Band Data (dBA)																														
			20	25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1K	1.25K	1.6K	2K	2.5K	3.15K	4K	5K	6.3K	8K	10K	12.5K	16K	20K
Vacutech (Holstered)	Vacuum	63.3	9	17	22	29	31	35	40	41	44	43	46	48	47	49	51	51	51	52	53	52	52	50	52	53	50	47	47	48	45	39	30
Vacutech (Un Holstered)	Vacuum	80.7	6	19	22	28	34	37	40	43	47	46	48	48	48	49	54	55	58	58	62	65	68	70	74	75	73	69	67	65	63	60	55
Vacutech (Inside Car)	Vacuum	69.6	16	28	31	38	42	45	49	51	52	55	60	61	57	55	59	53	55	56	54	57	57	57	57	57	55	54	51	48	46	42	36
Arth. Average Level*	Vacuum	71.2	11	21	25	32	36	39	43	45	47	48	52	53	51	51	55	53	55	55	56	58	59	59	61	62	59	56	55	53	51	47	40

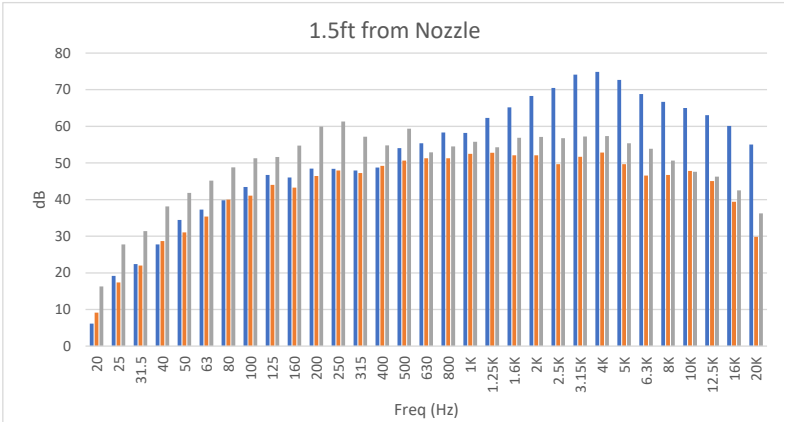
* Refers to the arthitmetic average of all measurements. This measurement represents an average of the multiple vacuum positions.

Figure 1: Example Measurement Position

Figure 1: Holstered

Figure 2: Un Holstered

Figure 3: Inside Car



Vacutech sound levels

Appendix I

Acoustiblok® quieting the world

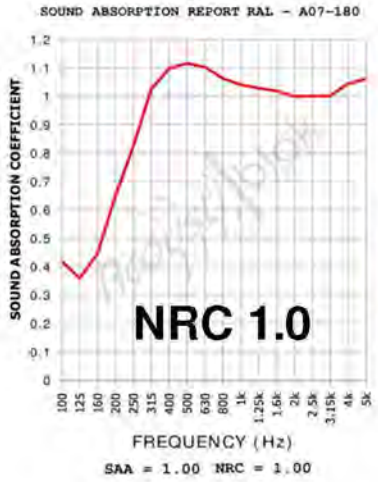
WORLDWIDE MADE IN USA

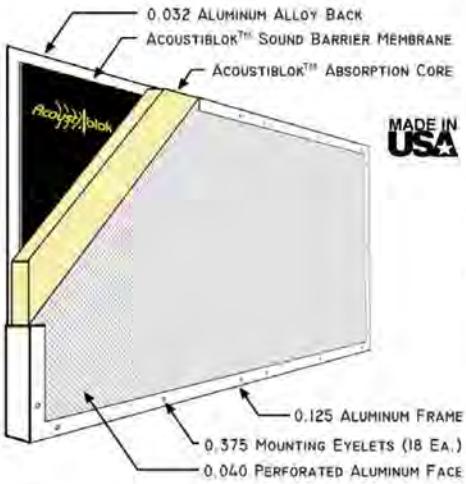
MOLD PROOF 100% CERTIFIED

100% Recyclable

North American Office
Acoustiblok, Inc.
6900 Interbay Boulevard
Tampa, FL 33616 USA
Phone: 813-980-1400
Fax: 813-549-2653
www.acoustiblok.com
sales@acoustiblok.com

Industrial Model All Weather Sound Panel™ (Pat. Pend)
Technical Data





Acoustiblok All Weather Sound Panels™ achieve high STC and NRC ratings. They have been specifically designed to withstand outdoor exposure in full sunlight, extreme weather conditions, and harsh industrial environments. (NRC of 1.0 is the highest sound absorption rating possible)

All Weather Sound Panels include an internal layer of U.L. classified Acoustiblok sound isolation material plus a specifically engineered 2" thick weather proof sound absorbing material.

Specifications:		
NRC (Noise Reduction Coefficient):	1.00 *	Gross dimensions: up to 48" x 120"x 2.423", ± 0.125" custom sizes available on special order.
STC (Sound Transmission Class):	29 *	Frame construction: 0.125" welded corrosion resistant 6063-T5 aluminum, mill finish, eyelets: 0.375" (18 ea.)
Weight: (8' panel)	104 lbs	Front face: 0.040 corrosion resistant 5052-H32 aluminum alloy, 3/32" round holes staggered on 5/32" centers.
UL Std 723 fire resistance: Flame spread 0, smoke developed 0.		Back face: 0.032 corrosion resistant 5052-H32 aluminum alloy, mill finish.
UV tolerant, animal resistant, washable, does not support mold growth.		

* Independent Testing by accredited NVLAP testing facility in compliance with ASTM E90, E 413, and other applicable industry standards.

Subject to change without notice, contact Acoustiblok for details.

Product Data Sheet

Product Name

QuietFiber® Hydrophobic Noise Absorption Material – QF2

For Manufacturer Info:

Contact:
Acoustiblok, Inc.
6900 Interbay Boulevard
Tampa, FL 33616
Call - (813) 980-1400
Fax - (813)849-6347
Email - sales@acoustiblok.com
www.acoustiblok.com

Product Description

Basic Use

QuietFiber hydrophobic noise absorption material is an easily installed solution to many noise problems. It is engineered specifically for maximum noise absorption and is used extensively for industrial and commercial applications and is now being successfully introduced into non-industrial environments where reverberant sound and echo is a problem.

QuietFiber® QF2

QuietFiber is rated at the highest noise reduction level – NRC 1.00. Areas of high noise levels including sound reverberation can be resolved easily and economically by introducing QuietFiber into as much of the area as possible. The amount of noise reduction in highly reflective rooms will be directly relative to how much of the QuietFiber material can be installed into the room.

Unlike other fibrous materials which do not have the same high NRC ratings, QuietFiber is hydrophobic, meaning it will not absorb nor combine with water. Marine noise reduction applications are endless.

QuietFiber® QF2

- Highest noise absorption rating of NRC 1.00
- Non Silica
- Virtually fireproof – Class A fire rating
  - 0 Smoke + 0 Flame Development
- Hydrophobic – will not combine with water
- Will not support mold or mildew growth
- Available in plain, black or white face
- Full outdoor weather and U.V. tolerant
- Significant sound benefit v. fiberglass
- Install on top of acoustical ceiling tiles
- High temperature capable
- Comprised of up to 90% recycled material
- 100% recyclable

Product Data Sheet

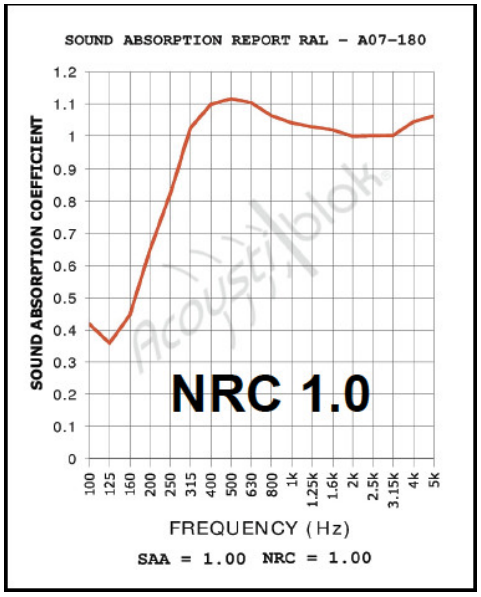
Product Name

QuietFiber® Hydrophobic Noise Absorption Material – QF2

NRC 1.0 Rated	125hz	250hz	500hz	1000hz	2000hz	4000hz
	0.36	0.79	1.15	1.04	1.01	1.04

Technical Data:

- ASTM C 423 – NRC 1.00
- ASTM E 84 – Class 1, 0 Flame 0 Smoke
- ASTM C 518 – R 4.2 per inch
- ASTM C 518 – 0.24 @ 75°F (24°C)



Standards Compliance:

- ASTM C 665 Non-Corrosive Type I
- ASTM C 612 1A, 1B, II, III
- ASTM E 136 Rated Non-combustible per NFPA Standard 220
- ASTM C 1104 Absorption less than 1% by volume
- ASTM C 356 Linear shrinkage <2% @ 1200°F (650°C)

6900 Interbay Blvd
Tampa, Florida USA 33616
Telephone: (813)980-1440
www.Acoustiblok.com
sales@acoustiblok.com

Appendix D:

Traffic Calculation Sheet

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Los Coches Rd Car Wash
ROADWAY Los Coches Road
SEGMENT Aurora Dr to Project Dwy
LOCATION: City of Lakeside SCENARIO: Existing

JOB #: 0623-2019-01
DATE: 15-Jun-23
ENGINEER: R.Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	16,000
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIST =	44
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	1,600

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

HTH WALL =	0 FT
AMBIENT =	0
BARRIER =	0 (0=WALL,1=BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	45.0	- -
MEDIUM TRUCKS=	4.00	44.9	- -
HEAVY TRUCKS =	8.01	45.0	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.3	65.3	64.0	58.0	66.4	67.1
MEDIUM TRUCKS	59.1	55.2	47.7	56.4	62.6	62.6
HEAVY TRUCKS	59.9	55.9	52.5	57.2	63.4	63.4
VEHICULAR NOISE	68.6	66.2	64.4	62.0	69.2	**69.6**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	47	101	218	470
LDN	44	96	206	444

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Los Coches Rd Car Wash
ROADWAY Los Coches Road
SEGMENT I-8 to Ora Belle Lane
LOCATION: City of Lakeside SCENARIO: Existing

JOB #: 0623-2019-01
DATE: 15-Jun-23
ENGINEER: R.Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	17,700
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIST =	44
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	1,770

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

HTH WALL =	0 FT
AMBIENT =	0
BARRIER =	0 (0=WALL,1=BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	45.0	- -
MEDIUM TRUCKS=	4.00	44.9	- -
HEAVY TRUCKS =	8.01	45.0	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.8	65.8	64.5	58.4	66.9	67.5
MEDIUM TRUCKS	59.5	55.6	48.2	56.9	63.0	63.1
HEAVY TRUCKS	60.4	56.3	52.9	57.6	63.8	63.9
VEHICULAR NOISE	69.0	66.6	64.9	62.5	69.7	**70.0**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	50	108	234	503
LDN	48	102	221	475

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Los Coches Rd Car Wash
ROADWAY Los Coches Road
SEGMENT Aurora Dr to Project Dwy
LOCATION: City of Lakeside SCENARIO: E+P

JOB #: 0623-2019-01
DATE: 15-Jun-23
ENGINEER: R.Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	18,300
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIST =	44
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	1,830

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

HTH WALL =	0 FT
AMBIENT =	0
BARRIER =	0 (0=WALL,1=BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	45.0	- -
MEDIUM TRUCKS=	4.00	44.9	- -
HEAVY TRUCKS =	8.01	45.0	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.9	65.9	64.6	58.6	67.0	67.6
MEDIUM TRUCKS	59.7	55.8	48.3	57.0	63.2	63.2
HEAVY TRUCKS	60.5	56.5	53.1	57.7	63.9	64.0
VEHICULAR NOISE	69.2	66.7	65.0	62.6	69.8	**70.2**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	51	111	239	514
LDN	49	105	226	486

FHWA-RD-77-108 ROADWAY TRAFFIC NOISE PREDICTION MODEL (CNEL) - CALVENO

PROJECT: Los Coches Rd Car Wash
ROADWAY Los Coches Road
SEGMENT I-8 to Ora Belle Lane
LOCATION: City of Lakeside SCENARIO: E+P

JOB #: 0623-2019-01
DATE: 15-Jun-23
ENGINEER: R.Pearson

NOISE INPUT DATA

ROADWAY CONDITIONS

ADT =	18,300
SPEED =	40
PK HR % =	10
NEAR LANE/FAR LANE DIST =	44
ROAD ELEVATION =	0
GRADE =	0
PK HR VOL =	1,830

RECEIVER INPUT DATA

RECEIVER DISTANCE =		50
DIST C/L TO WALL =		0
RECEIVER HEIGHT =		5
WALL DISTANCE FROM RECEIVER =		50
PAD ELEVATION =		0
ROADWAY VIEW:	LF ANGLE	-90
	RT ANGLE	90
	DF ANGLE	180

SITE CONDITIONS

AUTOMOBILES	15	
MED TRUCKS	15	(HARD SITE=10, SOFT SITE=15)
HVY TRUCKS	15	

WALL INFORMATION

HTH WALL =	0 FT
AMBIENT =	0
BARRIER =	0 (0=WALL,1=BERM)

VEHICLE MIX DATA

VEHICLE TYPE	DAY	EVE	NIGHT	DAILY
AUTOMOBILES	0.755	0.140	0.105	0.974
MEDIUM TRUCKS	0.489	0.022	0.489	0.018
HEAVY TRUCKS	0.473	0.054	0.473	0.007

MISC. VEHICLE INFO

VEHICLE TYPE	HEIGHT	SLE DISTANCE	GRADE ADJUSTMENT
AUTOMOBILES =	2.00	45.0	- -
MEDIUM TRUCKS=	4.00	44.9	- -
HEAVY TRUCKS =	8.01	45.0	0.0

NOISE OUTPUT DATA

NOISE IMPACTS (WITHOUT TOPO OR BARRIER SHIELDING)

VEHICLE TYPE	PK HR LEQ	DAY LEQ	EVEN LEQ	NIGHT LEQ	LDN	CNEL
AUTOMOBILES	67.9	65.9	64.6	58.6	67.0	67.6
MEDIUM TRUCKS	59.7	55.8	48.3	57.0	63.2	63.2
HEAVY TRUCKS	60.5	56.5	53.1	57.7	63.9	64.0
VEHICULAR NOISE	69.2	66.7	65.0	62.6	69.8	**70.2**

NOISE CONTOUR (FT)				
NOISE LEVELS	70 dBA	65 dBA	60 dBA	55 dBA
CNEL	51	111	239	514
LDN	49	105	226	486

Appendix E:

Construction Noise Modeling Output

Activity	L_{eq} at 80 feet dBA	L_{Max} at 80 feet dBA
Grading	74	78
Building Construction	72	76
Paving	74	78

Equipment Summary	Reference (dBA) 50 ft Lmax
Rock Drills	96
Jack Hammers	82
Pneumatic Tools	85
Source: MD Acoustics, February 2020.	80
Dozers	85
Scrappers	87
Haul Trucks	88
Cranes	82
Portable Generators	80
Rollers	80
Tractors	80
Front-End Loaders	86
Hydraulic Excavators	86
Graders	85
Air Compressors	86
Trucks	86

Grading

		Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements								
No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
1	Grader	85	1	40	80	0.5	0	79.9	75.9	39062500
2	Dozer	85	1	40	80	0.5	0	79.9	75.9	39062500
3	Tractor/Backhoe	80	1	40	80	0.5	0	74.9	70.9	12352647.1
4										
							Lmax*	**84**	**Leq**	**80**
							Lw	**115**	**Lw**	**111**

Source: MD Acoustics, May 2021.

1- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	15.2	0.5	80	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65
60	18.3	0.5	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63
70	21.3	0.5	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61
80	**24.4**	**0.5**	**74**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**
90	27.4	0.5	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58
100	30.5	0.5	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57
110	33.5	0.5	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56
120	36.6	0.5	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55
130	39.6	0.5	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54
140	42.7	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
150	45.7	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
160	48.8	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
170	51.8	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
180	54.9	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
190	57.9	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
200	61.0	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
210	64.0	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
220	67.1	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
230	70.1	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
240	73.1	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
250	76.2	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
260	79.2	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
270	82.3	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
280	85.3	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
290	88.4	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
300	91.4	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
310	94.5	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
320	97.5	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
330	100.6	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
340	103.6	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
350	106.7	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
360	109.7	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
370	112.8	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43

Building Construction

		Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements								
No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Calculated (dBA) Leq	Energy
1	Cranes	82	1	40	80	0.5	0	76.9	72.9	19577626.3
2	Forklift/Tractor	80	1	40	80	0.5	0	74.9	70.9	12352647.1
3	Generator	80	1	40	80	0.5	0	74.9	70.9	12352647.1
4	Tractor/Backhoe	80	1	40	80	0.5	0	74.9	70.9	12352647.1
							Lmax*	**79**	**Leq**	**78**
							Lw	**111**	**Lw**	**109**

Source: MD Acoustics, May 2021.

1- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	15.2	0.5	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63
60	18.3	0.5	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61
70	21.3	0.5	74	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59
80	**24.4**	**0.5**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**	**58**	**57**
90	27.4	0.5	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56
100	30.5	0.5	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55
110	33.5	0.5	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54
120	36.6	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
130	39.6	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
140	42.7	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
150	45.7	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
160	48.8	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
170	51.8	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
180	54.9	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
190	57.9	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
200	61.0	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
210	64.0	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
220	67.1	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
230	70.1	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
240	73.1	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
250	76.2	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
260	79.2	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
270	82.3	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
280	85.3	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
290	88.4	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
300	91.4	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
310	94.5	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
320	97.5	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
330	100.6	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
340	103.6	0.5	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42
350	106.7	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
360	109.7	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41
370	112.8	0.5	56	55	54	53	52	51	50	49	48	47	46	45	44	43	42	41

Paving

		Noise Level Calculation Prior to Implementation of Noise Attenuation Requirements								
No.	Equipment Description	Reference (dBA) 50 ft Lmax	Quantity	Usage Factor[1]	Distance to Receptor (ft)	Ground Effect	Shielding (dBA)	Calculated (dBA) Lmax	Leq	Energy
1	Pavers	86	1	40	80	0.5	0	80.9	76.9	49176773.9
2	Rollers	80	1	40	80	0.5	0	74.9	70.9	12352647.1
3	Paving Equipment	80	1	40	80	0.5	0	74.9	70.9	12352647.1
4	Tractor/Backhoe	80	1	40	80	0.5	0	74.9	70.9	12352647.1
							Lmax*	**82**	**Leq**	**79**
							Lw	**114**	**Lw**	**111**

Source: MD Acoustics, May 2021.

1- Percentage of time that a piece of equipment is operating at full power.

dBA – A-weighted Decibels

Lmax- Maximum Level

Leq- Equivalent Level

Feet	Meters	Ground Effect	No Shielding Leq dBA	1 dBA Shielding Leq dBA	2 dBA Shielding Leq dBA	3 dBA Shielding Leq dBA	4 dBA Shielding Leq dBA	5 dBA Shielding Leq dBA	6 dBA Shielding Leq dBA	7 dBA Shielding Leq dBA	8 dBA Shielding Leq dBA	9 dBA Shielding Leq dBA	10 dBA Shielding Leq dBA	11 dBA Shielding LeqdBA	12 dBA Shielding Leq dBA	13 dBA Shielding Leq dBA	14 dBA Shielding Leq dBA	15 dBA Shielding Leq dBA
50	15.2	0.5	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
60	18.3	0.5	77	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62
70	21.3	0.5	76	75	74	73	72	71	70	69	68	67	66	65	64	63	62	61
80	**24.4**	**0.5**	**74**	**73**	**72**	**71**	**70**	**69**	**68**	**67**	**66**	**65**	**64**	**63**	**62**	**61**	**60**	**59**
90	27.4	0.5	73	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58
100	30.5	0.5	72	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57
110	33.5	0.5	71	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56
120	36.6	0.5	70	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55
130	39.6	0.5	69	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54
140	42.7	0.5	68	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53
150	45.7	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
160	48.8	0.5	67	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52
170	51.8	0.5	66	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51
180	54.9	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
190	57.9	0.5	65	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50
200	61.0	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
210	64.0	0.5	64	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49
220	67.1	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
230	70.1	0.5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
240	73.1	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
250	76.2	0.5	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47
260	79.2	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
270	82.3	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
280	85.3	0.5	61	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46
290	88.4	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
300	91.4	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
310	94.5	0.5	60	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45
320	97.5	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
330	100.6	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
340	103.6	0.5	59	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44
350	106.7	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
360	109.7	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43
370	112.8	0.5	58	57	56	55	54	53	52	51	50	49	48	47	46	45	44	43

VIBRATION LEVEL IMPACT

Project:	Los Coches Road/Express Car Wash	Date: 5/13/21
Source:	Large Bulldozer	
Scenario:	Unmitigated	
Location:	Project Site	
Address:		

PPV = PPVref(25/D)^n (in/sec)

DATA INPUT

Equipment = Type	2	Large Bulldozer	INPUT SECTION IN BLUE
PPVref =	0.089	Reference PPV (in/sec) at 25 ft.	
D =	80.00	Distance from Equipment to Receiver (ft)	
n =	1.10	Vibration attenuation rate through the ground	

Note: Based on reference equations from Vibration Guidance Manual, California Department of Transportation, 2006, pgs 38-43.

DATA OUT RESULTS

PPV =	**0.025**	IN/SEC	OUTPUT IN RED