918 N Soto Street Car Wash
Noise Impact Study
City of Los Angeles, CA

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TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

1.0 Introduction

1.1 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 compare results to City and CEQA thresholds.. The assessment was conducted and compared to the noise standards set forth by the Federal, State and Local agencies. Consistent with the California Environmental Quality Act (CEQA) and CEQA Guidelines, a significant impact related to noise would occur if a proposed project is determined to result in:

- Exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or noise ordinance, or applicable agencies.
- Exposure of persons to or generation of excessive ground-borne vibration or ground-borne noise levels.
- A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project.
- A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project.

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 impacts from the project site to adjacent land uses
- Construction noise and vibration evaluation

1.2 Site Location and Study Area

The project site is located at 918 N Soto Street, in the City of Los Angeles, CA as shown in Exhibit A. The land uses directly surrounding the project include residential to the northwest, existing commercial to the northeast, existing residential to the east, and existing commercial to the south.

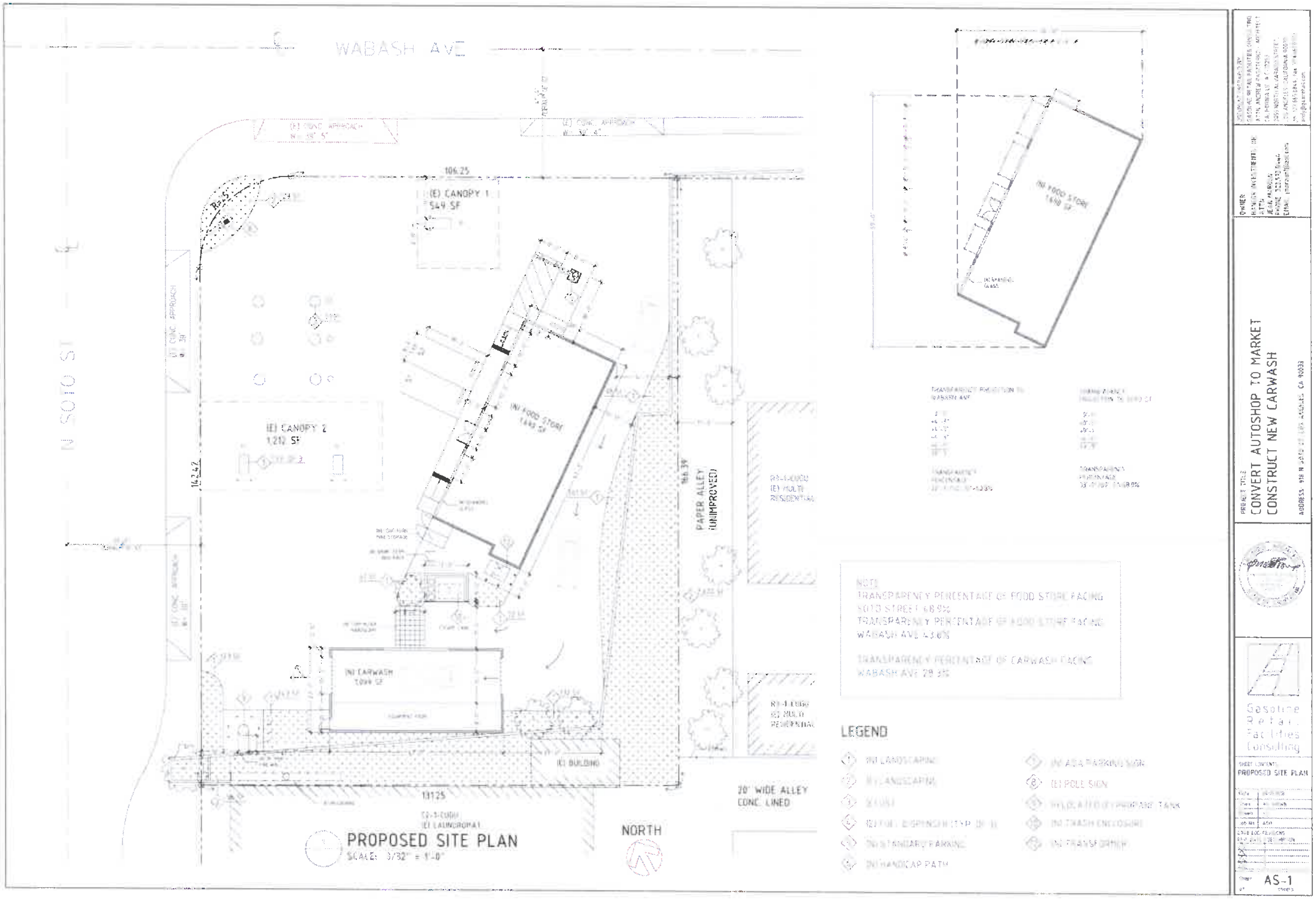
1.3 Proposed Project Description

The project proposes to develop an approximate 1,125 square foot car wash tunnel (45-foot length). The site plan used for this is illustrated in Exhibit B. The project operational hours are estimated to occur between 7AM to 10PM.

Exhibit A
Location Map

Exhibit B

Site Plan



2.0 *Fundamentals of Noise*

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

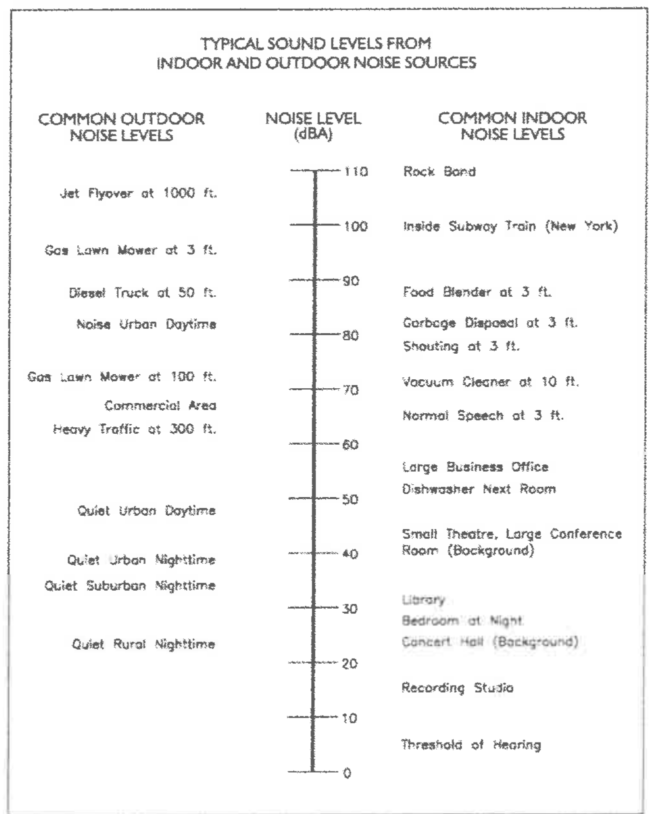
2.1 Sound, Noise and Acoustics

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.

2.2 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



2.3 Sound Pressure Levels and Decibels

The *amplitude* of a sound determines its loudness. The loudness of sound increases or decreases as the amplitude increases or decreases. Sound pressure amplitude is measured in units of micro-Newton per square inch meter ($\mu N/m^2$), 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.

2.4 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.

2.5 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, 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), a scale designed to account for the frequency-dependent sensitivity of the ear. Typically, the human ear can barely perceive a 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.

2.6 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: Any 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.

2.7 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.

2.8 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.

3.0 Ground-Borne Vibration Fundamentals

3.1 Vibration Descriptors

Ground-borne vibrations consist of rapidly fluctuating motions within the ground that have an average motion of zero. The effects of ground-borne vibrations typically only cause a nuisance to people, but at extreme vibration levels, damage to buildings may occur. Although ground-borne vibration can be felt outdoors, it is typically only an annoyance to people indoors where the associated effects of the shaking of a building can be notable. Ground-borne noise is an effect of ground-borne vibration and only exists indoors since it is produced from noise radiated from the motion of the walls and floors of a room and may also consist of the rattling of windows or dishes on shelves.

Several different methods are used to quantify vibration amplitude.

PPV – Known as the peak particle velocity (PPV) which is the maximum instantaneous peak in vibration velocity, typically given in inches per second.

RMS – Known as root mean squared (RMS) can be used to denote vibration amplitude

VdB – A commonly used abbreviation to describe the vibration level (VdB) for a vibration source.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Outdoor sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration. To counter the effects of ground-borne vibration, the Federal Transit Administration (FTA) has published guidance relative to vibration impacts. According to the FTA, fragile buildings can be exposed to ground-borne vibration levels of 0.3 inches per second without experiencing structural damage.

3.3 Vibration Perception

There are three main types of vibration propagation: surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wavefront, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wavefront. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wavefront. However, unlike P-waves, the particle motion is transverse, or side-to-side and perpendicular to the direction of propagation.

As vibration waves propagate from a source, the vibration energy decreases in a logarithmic nature and the vibration levels typically decrease by 6 VdB per doubling of the distance from the vibration source. As stated above, this drop-off rate can vary greatly depending on the soil but has been shown to be effective enough for screening purposes, in order to identify potential vibration impacts that may need to be studied through actual field tests.

4.0 Regulatory Setting

The proposed project is located in the City of Los Angeles, 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.

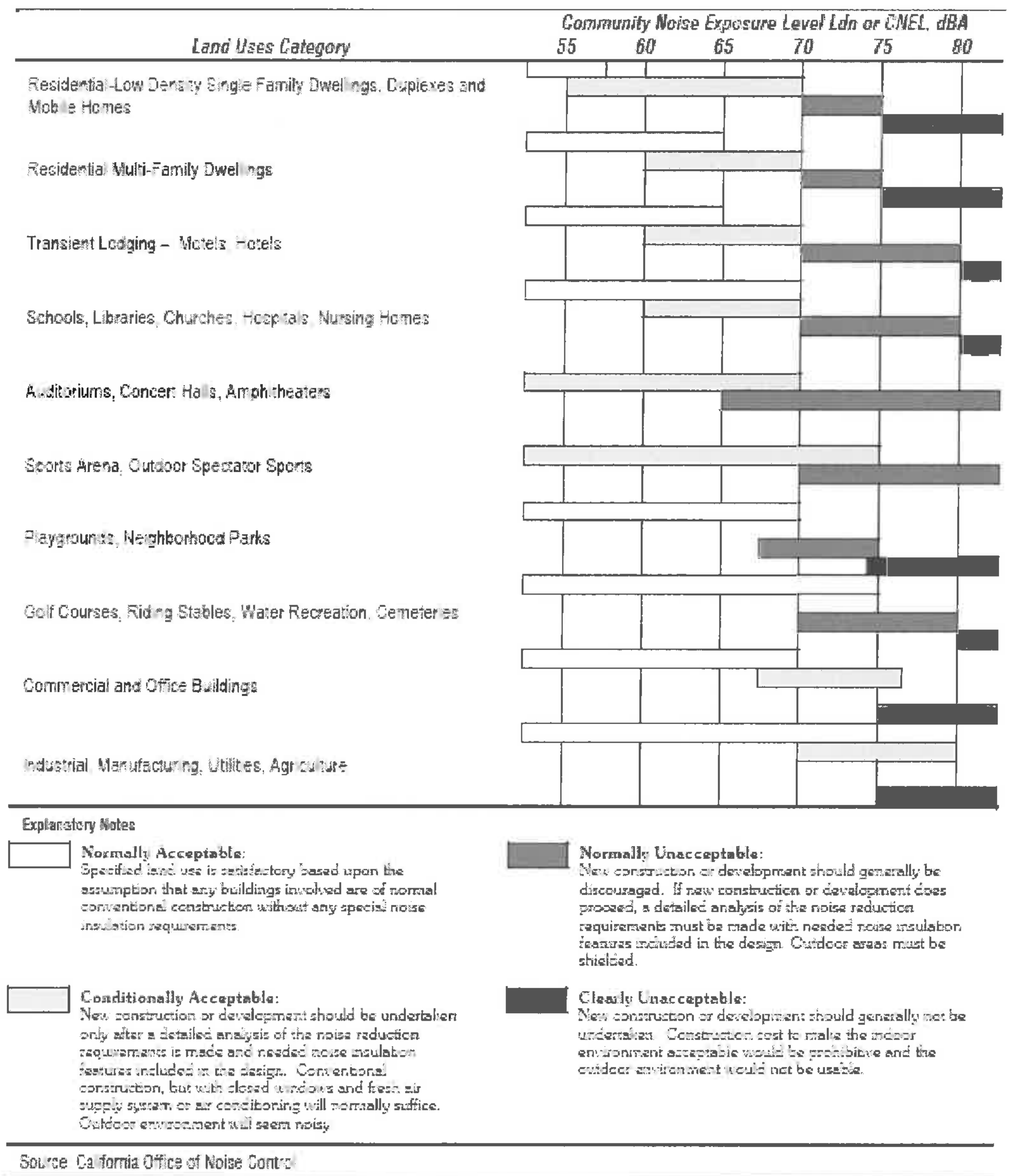
Since the federal government has preempted the setting of standards for noise levels that can be emitted by the transportation source, the City is restricted to regulating the noise generated by the transportation system through nuisance abatement ordinances and land use planning.

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 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



4.3 City of Los Angeles Noise Regulations

The City of Los Angeles outlines their noise regulations and standards within the Municipal Code, the Noise Element of the Los Angeles General Plan, and the City of Los Angeles CEQA Thresholds Guide.

City of Los Angeles Municipal Code

SEC 13.18.F2(I)(1)

(I) **Noise** (applies to project types: NEW, MAJOR IMPROVEMENT, ADDITION, CHANGE OF USE).

(1) A noise generating use or activity shall not exceed the presumed ambient noise level specified by zone in Table II of Section 111.03 of the LAMC.

(i) An applicant shall submit to the Department of City Planning an acoustic evaluation report issued by a licensed noise consulting professional which identifies compliance options for noise mitigation. An applicant shall comply with the stated performance-based mitigation measures.

(ii) Baseline and other ambient noise levels shall be measured at the property line. If the ambient sound levels at the site exceed the allowable ambient levels in Table II, the existing site's ambient level becomes the new allowable baseline and no increase in that level shall be allowed.

(2) An applicant whose project include a noise generating use or activity shall submit an acoustic evaluation report prepared by a licensed consulting professional which includes current and projected noise levels at the site. The report shall include compliance options for noise mitigation measures. An applicant shall comply with all mitigated measures. Noise levels shall be measured per Section 13.18 F.2.(I)(1)(ii) of this Code.

SEC. 41.40 NOISE DUE TO CONSTRUCTION, EXCAVATION WORK – WHEN PROHIBITED

(a) No person shall, between the hours of 9:00 P.M. and 7:00 A.M. of the following day, perform any construction or repair work of any kind upon, or any excavating for, any building or structure, where any of the foregoing entails the use of any power driven drill, riveting machine excavator or any other machine, tool, device or equipment which makes loud noises to the disturbance of persons occupying sleeping quarters in any dwelling hotel or apartment or other place of residence. In addition, the operation, repair or servicing of construction equipment and the job-site delivering of construction materials in such areas shall be prohibited during the hours herein specified. Any person who knowingly and willfully violates the foregoing provision shall be deemed guilty of a misdemeanor punishable as elsewhere provided in this Code.

(c) No person, other than an individual homeowner engaged in the repair or construction of his single-family dwelling shall perform any construction or repair work of any kind upon, or any earth grading for, any building or structure located on land developed with residential buildings under the provisions of Chapter I of this Code, or perform such work within 500 feet of land so occupied, before 8:00 a.m. or after 6:00 p.m. on any Saturday or national holiday nor at any time on any Sunday. In addition, the operation, repair or servicing of construction equipment and the job-site delivering of construction materials in such areas shall be prohibited on Saturdays and on Sundays during the hours herein specified. The provisions of this subsection shall not apply to persons engaged in the emergency repair of:

1. Any building or structure.
2. Earth supporting or endangering any building or structure.
3. Any public utility.
4. Any public way or adjacent earth.

SEC. 112.04. POWER EQUIPMENT INTENDED FOR REPETITIVE USE IN RESIDENTIAL AREAS AND OTHER MACHINERY, EQUIPMENT, AND DEVICES.

(a) Between the hours of 10:00 p.m. and. 7:00 a.m. of the following day, no person shall operate any lawn mower, backpack blower, lawn edger, riding tractor, or any other machinery, equipment, or other mechanical or electrical device, or any hand tool which creates a loud, raucous or impulsive sound, within any residential zone or within 500 feet of a residence.

(b) Except as to the equipment and operations specifically mentioned and related elsewhere in this Chapter or for emergency work as that term is defined in Section 111.01(d), and except as to aircraft, tow tractors, aircraft auxiliary power units, trains and motor vehicles in their respective operations governed by State or federal regulations, no person shall operate or cause to be operated any machinery, equipment, tools, or other mechanical or electrical device, or engage in any other activity in such manner as to create any noise which would cause the noise level on the premises of any other occupied property, or, if a condominium, apartment house, duplex, or attached business, within any adjoining unit, to exceed the ambient noise level by more than five (5) decibels.

SEC. 111.03. MINIMUM AMBIENT NOISE LEVEL

Where the ambient noise level is less than the presumed ambient noise level designated in this section, the presumed ambient noise level in this section shall be deemed to be the minimum ambient noise level for purposes of this chapter.

TABLE II
SOUND LEVEL "A" DECIBELS

(In this chart, daytime levels are to be used from 7:00 a.m. to 10:00 p.m. and nighttime levels from 10:00 p.m. to 7:00 a.m.)

	PRESUMED AMBIENT NOISE LEVEL (dB(A))	
ZONE	**DAY**	**NIGHT**
A1, A2, RA, RE, RS, RD, RW1, RW2, R1, R2, R3, R4, and R5	50	40
P, PB, CR, C1, C1.5, C2, C4, C5, and CM	60	55
M1, MR1, and MR2	60	55
M2 and M3	65	65

At the boundary line between two zones, the presumed ambient noise level of the quieter zone shall be used.

SEC. 112.05. MAXIMUM NOISE LEVEL OF POWERED EQUIPMENT OR POWERED HAND TOOLS.

Between the hours of 7:00 a.m. and 10:00 p.m., in any residential zone of the City or within 500 feet thereof, no person shall operate or cause to be operated any powered equipment or powered hand tool that produces a maximum noise level exceeding the following noise limits at a distance of 50 feet therefrom:

(a) 75dB(A) for construction, industrial, and agricultural machinery including crawler-tractors, dozers, rotary drills and augers, loaders, power shovels, cranes, derricks, motor graders, paving machines, off-highway trucks, ditchers, trenchers, compactors, scrapers, wagons, pavement breakers, compressors and pneumatic or other powered equipment;

(b) 75dB(A) for powered equipment of 20 HP or less intended for infrequent use in residential areas, including chain saws, log chippers and powered hand tools;

(c) 65dB(A) for powered equipment intended for repetitive use in residential areas, including lawn mowers, backpack blowers, small lawn and garden tools and riding tractors;

The noise limits for particular equipment listed above in (a), (b) and (c) shall be deemed to be superseded and replaced by noise limits for such equipment from and after their establishment by final regulations adopted by the Federal Environmental Protection Agency and published in the Federal Register.

Said noise limitations shall not apply where compliance therewith is technically infeasible The burden of proving that compliance is technically infeasible shall be upon the person or persons charged with a violation of this section. Technical infeasibility shall mean that said noise limitations cannot be complied with despite the use of mufflers, shields, sound barriers and/or other noise reduction device or techniques during the operation of the equipment.

City of Los Angeles General Plan

The general plan presents a table (Land Use Compatibility Matrix) similar to Exhibit D.

City of Los Angeles CEQA Thresholds Guide

1.1 CONSTRUCTION NOISE

2. DETERMINATION OF SIGNIFICANCE

A project would normally have a significant impact on noise levels from construction if:

- Construction activities lasting more than one day would exceed existing ambient exterior noise levels by 10 dBA or more at a noise sensitive use;
- Construction activities lasting more than 10 days in a three-month period would exceed existing ambient exterior noise levels by 5 dBA or more at a noise sensitive use; or
- Construction activities would exceed the ambient noise level by 5 dBA at a noise sensitive use between the hours of 9:00 p.m. and 7:00 a.m. Monday through Friday, before 8:00 a.m. or after 6:00 p.m. on Saturday, or at anytime on Sunday.

1.2 OPERATIONAL NOISE

2. DETERMINATION OF SIGNIFICANCE

A project would normally have a significant impact on noise levels from project operations if the project causes the ambient noise level measured at the property line of affected uses to increase by 3 dBA in CNEL to or within the "normally unacceptable" or "clearly unacceptable" category, or any 5 dBA or greater noise increase (see Exhibit D).

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

Noise measurements are taken to determine the existing noise levels. A noise receiver or receptor is any location in the noise analysis in which noise might produce an impact. The following criteria are used to select measurement locations and receptors:

- Locations expected to receive the highest noise impacts, such as the first row of houses
- Locations that are acoustically representative and equivalent of the area of concern
- Human land usage
- Sites clear of major obstruction and contamination

MD conducted the sound level measurements in accordance to Federal Highway Transportation (FHWA) and Caltrans (TeNS) technical noise specifications. All measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA). The following gives a brief description of the Caltrans Technical Noise Supplement procedures for sound level measurements:

- Microphones for sound level meters were placed 5-feet above the ground for all measurements
- Sound level meters were calibrated (Larson Davis CAL 200) before and after each measurement
- Following the calibration of equipment, a windscreen was placed over the microphone
- Frequency weighting was set on "A" and slow response
- Results of the long-term noise measurements were recorded on field data sheets
- During any short-term noise measurements, any noise contaminations such as barking dogs, local traffic, lawn mowers, or aircraft fly-overs were noted
- Temperature and sky conditions were observed and documented

5.2 Long-Term Noise Measurement Locations

Noise monitoring locations were selected based on the distance of the project's stationary noise sources to the nearest sensitive receptors. One (1) long-term 24-hour noise measurement was conducted at or near the project site and are illustrated in Exhibit E. Appendix A includes photos, field sheet, and measured noise data.

5.3 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 reference sound level data for the car wash equipment (e.g. blowers). The model assumes that the car wash tunnel is fully enclosed and is approximately 45 feet long. SP modeling inputs and outputs are provided in Appendix B.

Aerodry Systems 15 HP blowers were modeled approximately 3 feet from exit and approximately 8 feet high. The manufacturer's noise cutsheet data is provided in Appendix C. MD utilized the manufacturer's cut sheet data which includes the sound pressure level 5 feet from the blower. This information was inputted into the model and MD verified output level results by implementing a calibration point. To determine the sound at the entrance and exits of the tunnel, approximate spherical spreading was assumed.

5.4 FTA Construction Noise Model

The construction noise analysis utilizes the Federal Transit Administration (FTA) Noise and Vibration During Construction model/methodology, 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 demolition and finishing phases of construction. The construction noise calculation output worksheet is located in Appendix D. The following assumptions relevant to short-term construction noise impacts were used:

5.5 Interior Noise Modeling

The interior noise level is the difference between the projected exterior noise level at the structure's façade and the noise reduction provided by the structure itself. Typical building construction will provide a conservative 12 dBA noise level reduction with a "windows open" condition and a very conservative 20 dBA noise level reduction with "windows closed". MD estimated the interior noise level by assuming a "windows closed" condition and subtracting the 20 dBA from the predicted exterior noise level.

1 = Long-term Monitoring Location

Exhibit E

Measurement Locations

6.0 Existing Noise Environment

A twenty-four hour (24) ambient noise measurement was conducted at or near the project site. Noise measurements were taken to determine the existing ambient noise levels. Noise data indicates that traffic along Soto St and Wabash Ave is the primary source of noise impacting the site and the surrounding area. The ambient data confirms that the existing noise levels exceeds the presumed ambient noise levels as indicated in the City's noise ordinance. Therefore, this assessment will utilize the ambient noise data as a basis and compare levels to said data.

6.1 Long-Term Noise Measurement Results

The results of the long-term noise data are presented in Table 1.

Table 1: Long-Term Noise Measurement Data[1]

Date	Time	dB(A)							
		L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
9/13/2018	10AM-11AM	67.3	75.8	54.5	74.6	73.7	66.0	63.1	57.3
9/13/2018	11AM-12PM	64.3	79.9	53.6	73.5	66.9	63.8	60.9	57.1
9/13/2018	12PM-1PM	67.9	78.1	54.6	74.8	73.7	66.3	63.8	59.8
9/13/2018	1PM-2PM	71.0	83.5	59.2	75.4	74.4	73.7	67.8	63.4
9/13/2018	2PM-3PM	68.0	87.8	59.4	74.4	73.8	66.7	64.3	60.8
9/13/2018	3PM-4PM	64.0	87.5	56.1	69.2	66.2	64.1	62.4	60.2
9/13/2018	4PM-5PM	67.5	83.1	57.0	74.9	73.5	66.5	64.2	60.9
9/13/2018	5PM-6PM	69.7	84.8	60.0	76.2	74.1	69.5	67.1	63.8
9/13/2018	6PM-7PM	66.6	90.6	55.9	74.5	69.7	64.6	62.1	59.1
9/13/2018	7PM-8PM	63.1	81.1	54.4	69.8	65.9	63.4	61.2	57.6
9/13/2018	8PM-9PM	64.1	82.5	54.5	70.9	66.7	64.1	61.2	57.5
9/13/2018	9PM-10PM	67.3	92.7	54.8	72.5	65.6	63.0	61.2	57.7
9/13/2018	10PM-11PM	62.0	85.8	54.9	68.5	64.3	61.6	59.5	56.8
9/13/2018	11PM-12AM	63.7	88.7	56.0	68.4	64.0	61.3	59.5	57.6
9/14/2018	12AM-1AM	63.6	83.6	52.5	76.9	63.2	59.3	57.8	54.3
9/14/2018	1AM-2AM	60.8	86.6	52.9	66.9	61.9	58.8	57.1	54.3
9/14/2018	2AM-3AM	58.6	74.6	52.5	64.6	61.4	58.8	57.2	55.0
9/14/2018	3AM-4AM	60.8	78.8	54.5	66.4	63.0	61.1	59.7	57.2
9/14/2018	4AM-5AM	62.6	83.9	55.5	68.2	64.9	63.0	60.9	57.7
9/14/2018	5AM-6AM	65.8	80.8	61.4	71.5	67.7	65.9	64.7	62.9
9/14/2018	6AM-7AM	65.1	75.6	60.4	70.3	67.6	65.6	64.0	62.2
9/14/2018	7AM-8AM	65.3	89.7	56.4	70.9	67.0	64.3	62.4	59.6
9/14/2018	8AM-9AM	68.6	82.2	54.4	75.6	74.2	67.5	64.8	57.9
9/14/2018	9AM-10AM	69.7	83.5	54.9	75.4	74.5	72.8	65.8	58.7
CNEL		70.8							

Notes:
[1] Long-term noise monitoring location (LT1) is illustrated in Exhibit E. The lowest hourly day/evening noise interval is highlighted in orange.

Noise data indicates the ambient noise level ranges between 58.6 dBA Leq to 71.0 dBA Leq. The measured CNEL is 70.8. Additional field notes and photographs are provided in Appendix A.

For this evaluation, MD has utilized the quietest hourly level (during proposed hours of operation) and has compared the project's projected noise levels to the quietest hourly ambient. The quietest (lowest) relevant day/evening hourly level occurred from 7PM to 8PM (63.1 dBA, Leq(h)).

7.0 Future Noise Environment Impacts and Design Features

This assessment analyzes future noise impacts as a result of the project. The analysis details the estimated exterior/interior noise levels. Stationary noise impacts are analyzed from the on-site noise sources such as dryers/blowers (associated with car wash equipment).

7.1 Future Exterior Noise

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

7.1.1 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 west, north east, and east and existing commercial uses to the northwest, northeast, and south. The worst-case stationary noise was modeled using SoundPLAN acoustical modeling software. Worst-case assumes the blowers are always operational when in reality the noise will be intermittent and cycle on/off depending on customer usage. In addition, the model includes an approximation of the terrain features at the project site.

Project operational are assumed to occur within the City's allowable daytime hours (7AM to 10PM). Operating outside the allowable hours has the potential to exceed the City's noise ordinance (Section 112.04).

A total of nine (9) receptors were modeled to evaluate the proposed project's operational impact. A receptor is denoted by a yellow dot. All yellow dots represent either a property line or a sensitive receptor such as a building facade. Receptor number one (R1) was used as a calibration point to ensure accuracy for the blower output noise levels and compared to the manufacturer's sound level cutsheet data.

Exhibit F shows the future noise levels at the sensitive receptor areas. As demonstrated in Table 2, operational noise levels are anticipated to range between 37.7 to 56.1 dBA, Leq(h) and 37.6 to 56.1 dBA, CNEL, depending on the location of the receptors. The operational noise level would meet the City's not-to-exceed 75 dBA noise criterion as outlined in Section 112.05 of the municipal code at the various sensitive receptors.

As a conservative approach, Table 2 compares the project's operational noise level to the quietest (or lowest) ambient noise level and provides a final combined noise level at the various receptors. As shown in Table 2, the operational levels will result in a maximum change of 0.8 dBA, Leq(h) and 0.1 dBA, CNEL. The change in noise level is below the City's CEQA Guideline Threshold of +5 dBA Leq(h) (above ambient) and below the +3 dBA, CNEL noise criterion. The impact is considered less than significant.

When comparing the project's operational noise levels to the City's Noise Compatibility Matrix (Exhibit D), Receptor 2 will experience an increase up to 0.2 dBA, Receptor 3 will experience an increase up to 0.5 dBA, and Receptor 4 will experience an increase up to 0.8 dBA. The increased noise level is below the City's normally acceptable 70 dBA CNEL guideline for schools and commercial uses. Therefore, the impact is considered less than significant.

Exhibits G and H illustrate the noise contours at the project site and illustrate how the noise will propagate at the site for both Leq(h) and CNEL, respectively.

Table 2: Worst-case Predicted Operational Leq/CNEL Noise Level[1]

Receptor	Level	Noise Metric	Existing Ambient Noise Level (dBA, Leq)	Project Noise Level (dBA, Leq)	Total Combined Noise Level (dBA, Leq)	Change in Noise Level as Result of Project
1 (Calibration Point)	Floor 1	Leq(h)	63.1	87.3	87.3	24.2
		CNEL	70.8	87.2	87.3	16.5
2	Floor 1	Leq(h)	63.1	50.3	63.3	0.2
		CNEL	70.8	50.2	70.8	0.0
3	Floor 1	Leq(h)	63.1	54.3	63.6	0.5
		CNEL	70.8	54.2	70.9	0.1
	Floor 2	Leq(h)	63.1	54.9	63.7	0.6
		CNEL	70.8	54.8	70.9	0.1
4	Floor 1	Leq(h)	63.1	55.6	63.8	0.7
		CNEL	70.8	55.6	70.9	0.1
	Floor 2	Leq(h)	63.1	56.1	63.9	0.8
		CNEL	70.8	56.0	70.9	0.1
5	Floor 1	Leq(h)	63.1	43.6	63.1	0.0
		CNEL	70.8	43.5	70.8	0.0
6	Floor 1	Leq(h)	63.1	47.6	63.2	0.1
		CNEL	70.8	47.6	70.8	0.0
7	Floor 1	Leq(h)	63.1	41.3	63.1	0.0
		CNEL	70.8	41.3	70.8	0.0
	Floor 2	Leq(h)	63.1	47.1	63.2	0.1
		CNEL	70.8	47.0	70.8	0.0
8	Floor 1	Leq(h)	63.1	37.7	63.1	0.0
		CNEL	70.8	37.6	70.8	0.0
	Floor 2	Leq(h)	63.1	43.2	63.1	0.0
		CNEL	70.8	43.2	70.8	0.0
9	Floor 1	Leq(h)	64.0	53.4	64.4	0.4
		CNEL	70.8	53.3	70.9	0.1

Notes:
[1.] Receptor locations are indicated in Exhibit C.
[2.] Receptor 1 Calibrated location, Receptors 4 and 5 are commercial use. Receptors 2, 3, 6, 7, 8, and 9 are residential properties.

7.2 Future Interior Noise

Typical "windows closed" condition assumes a 20 dBA noise reduction from building construction techniques. The existing ambient noise condition is estimated to result in a 50.8 dBA CNEL (70.8 – 20 = 50.8) with the "windows closed", which already exceeds the City's 45 dBA CNEL allowable limit for residential properties by 5.8 dBA. The noise level from project operation will increase the CNEL less than 0.5 dBA CNEL, which is nominal, as it takes a change in 3 dB to create a discernable difference. The change in noise level is less than the City's +3 dBA criterion, therefore the impact is less than significant.

Exhibit F
Operational Noise Levels Leq(h)/CNEL

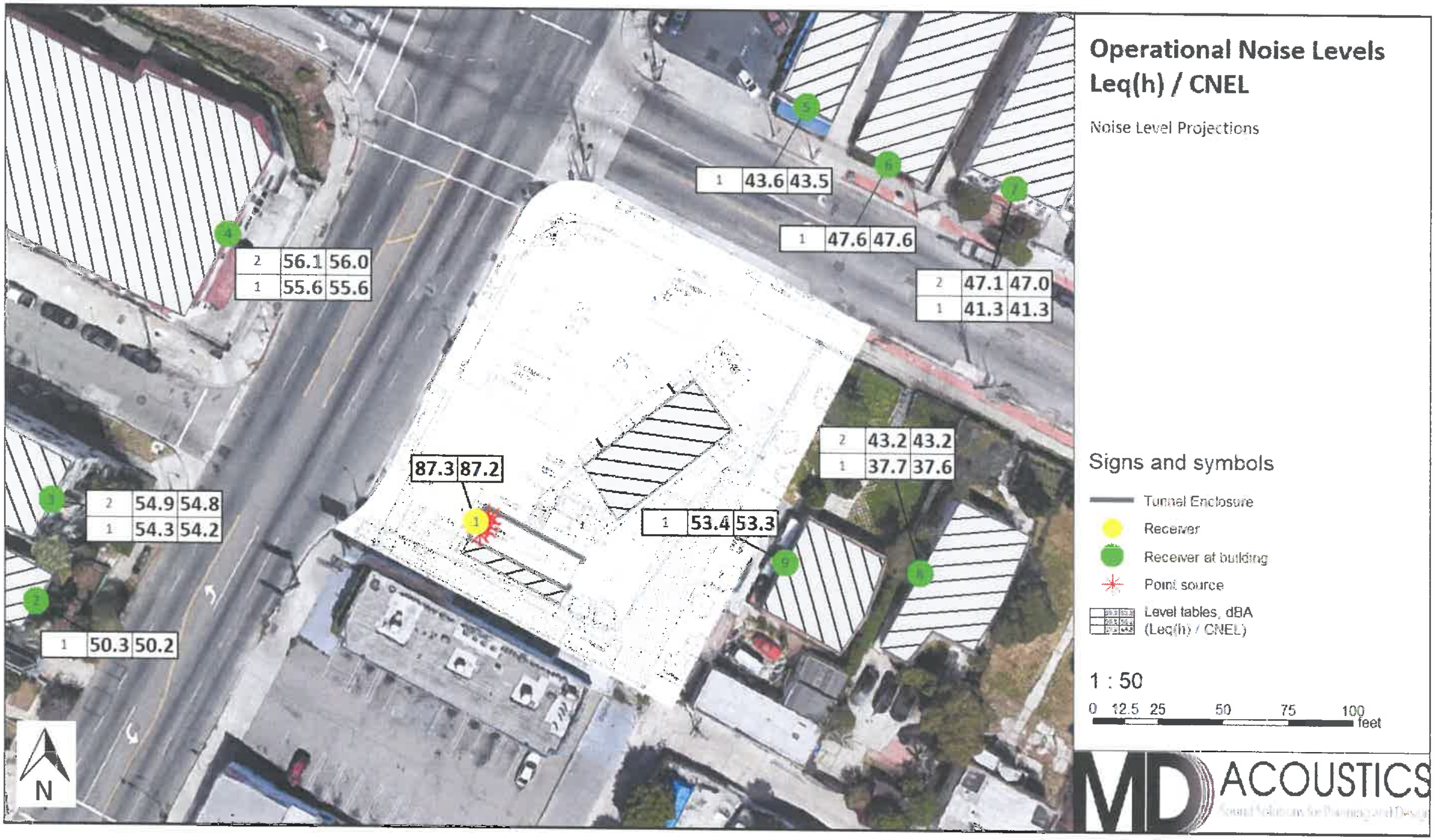


Exhibit G

Operational Leq(h) Contours

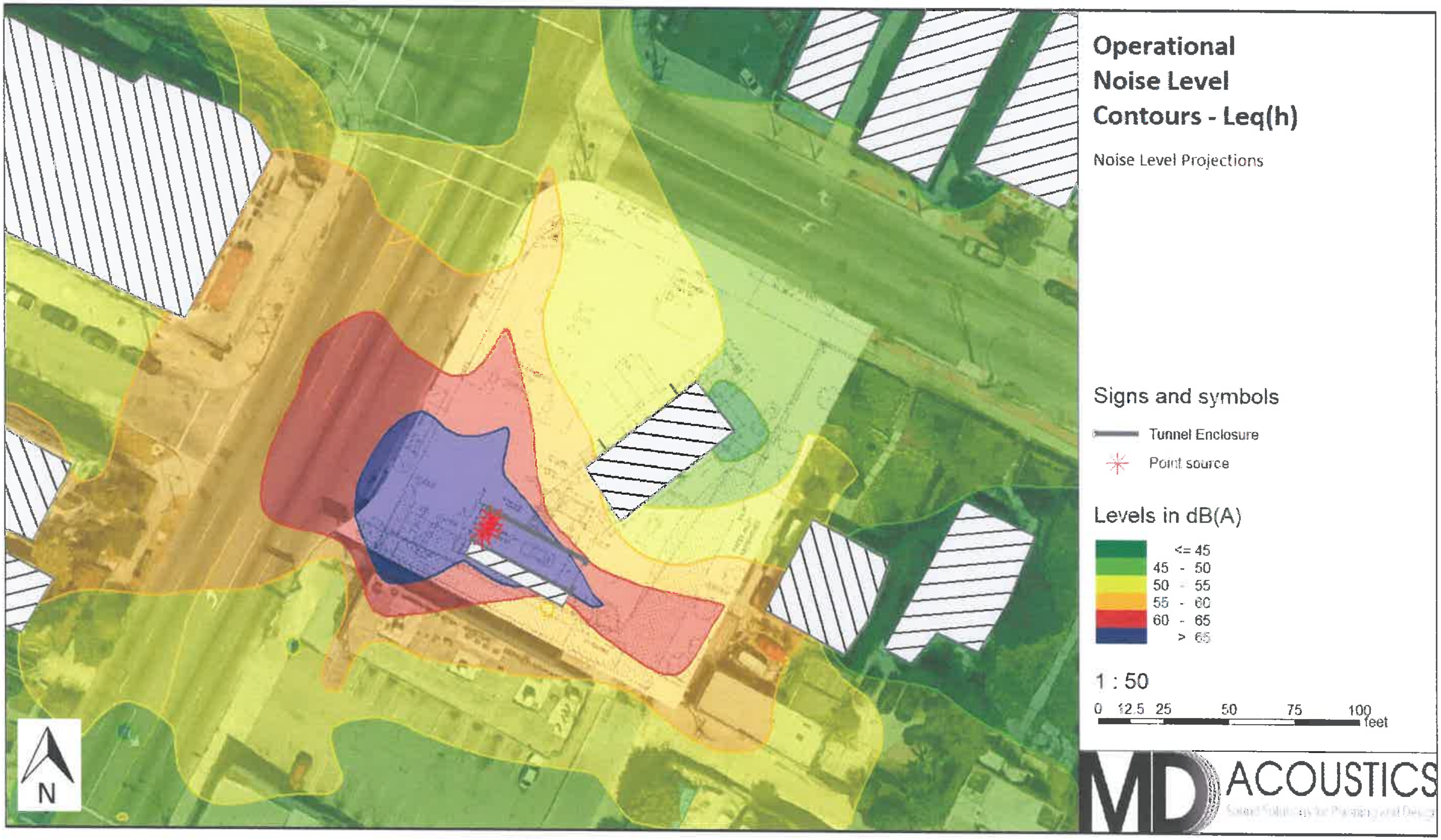
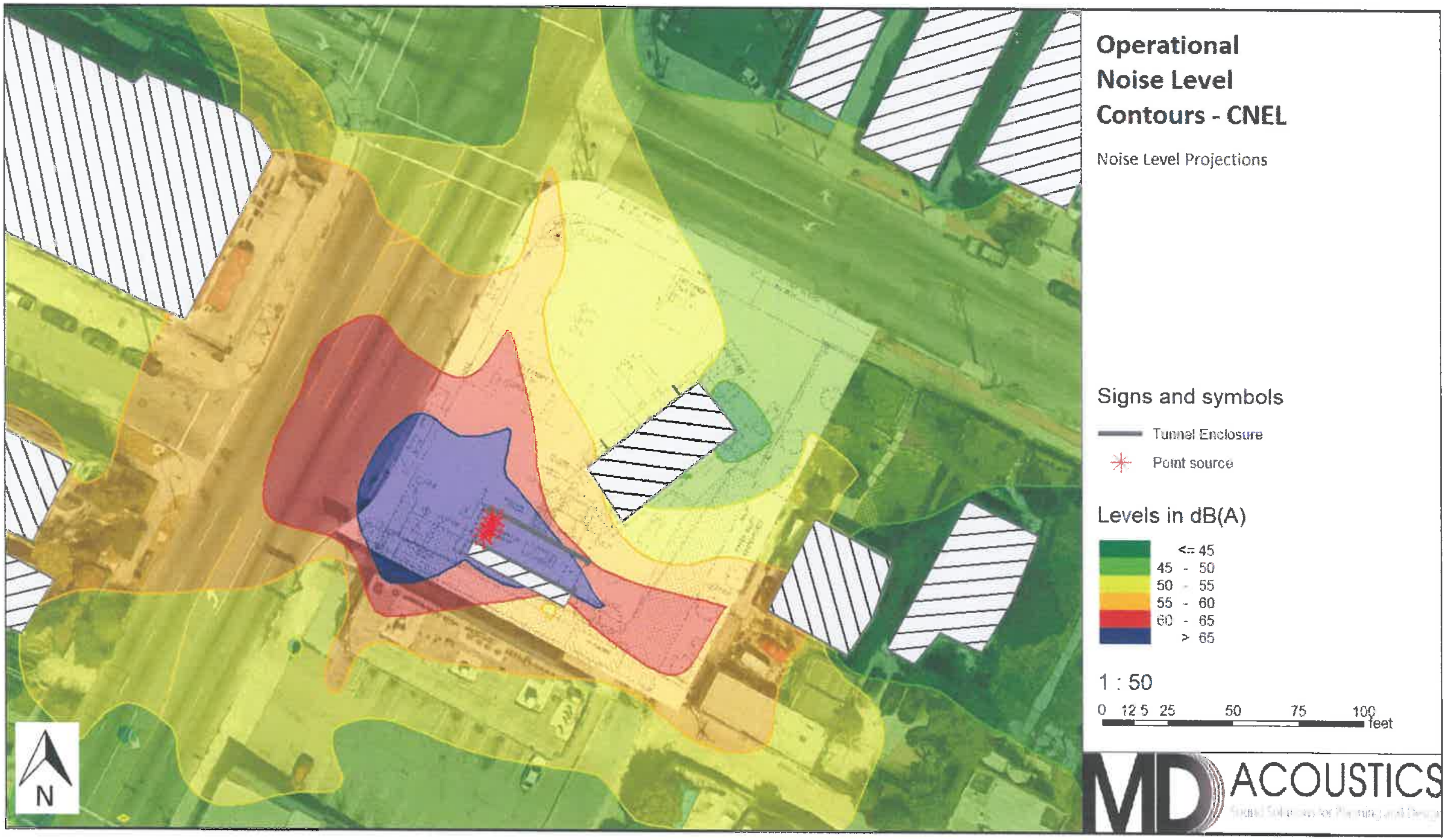


Exhibit H -
Operational CNEL Contours



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. The data is presented in Table 3. The projected construction noise levels to the nearest sensitive receptors (east and south) property lines are presented in Table 4, with the ambient levels being the quietest (lowest) hourly ambient levels recorded from anticipated construction operation times of 7AM to 9PM.

Table 3: Typical Construction Equipment Noise Levels[1]

Type	Lmax (dBA) at 50 Feet
Backhoe	80
Truck	88
Concrete Mixer	85
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.

Table 4: Projected Construction Noise Levels (dBA, Leq(h))

Location[1]	Phase	Construction Noise Level[2]	Ambient Leq(h)	Reduction with Mufflers	Regulated Noise Level	Change in Ambient Level
East (Residence)	Base	69.6	63.1	-15.0	63.7	0.6
	Build	72.2	63.1	-15.0	64.1	1.0
	Finish	78.4	63.1	-15.0	66.3	3.2
West (Residence)	Base	64.1	63.1	-15.0	63.3	0.2
	Build	66.6	63.1	-15.0	63.4	0.3
	Finish	72.9	63.1	-15.0	64.2	1.1

Notes:
1. Distance projected from center of car wash to side of building.
2. See City Construction Noise Threshold Criteria and Control Plan and Appendix D.

The model assumes that construction equipment will be fitted with appropriate buffers to ensure that the ambient level remains below the City's CEQA guideline threshold. In addition, the construction levels are never above 58.7 dBA at the residential property line, fulfilling Section 112.05 of the municipal code. Additional noise reduction features are presented below:

1. Construction will occur during the permissible hours as defined in Section 41.40 and the CEQA Thresholds Guide.

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.

The following outlines the project design features (PDFs) incorporated:

> **PDF-1:** The construction equipment shall be fitted with appropriate mufflers during at least the finishing phase such that a 15 dB reduction is achieved above normal operation.

Construction must occur during the permissible hours according to the City's Municipal Code (Section 41.40). Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity.

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 piece of equipment with the most potential to cause vibratory impact is the truck. According to the FTA Noise and Vibration Impact Assessment manual, a loaded truck has a PPV of 0.076 in/sec (86 VdB) at 25 feet. The nearest vibration-sensitive building is located 25 feet from the center of the car wash. Therefore, the maximum transient PPV at the nearest noise-sensitive location is 0.25 in/sec (86 VdB) for the truck. These levels have no likely damage or annoyance impact according to the FTA manual, because it is only slightly above the threshold of being barely perceptible to humans. Therefore, no additional vibration reduction measures are required.

9.0 References

State of California General Plan Guidelines: 1998. Governor's Office of Planning and Research

City of Los Angeles: City of Los Angeles CEQA Guidelines Noise Element. 2006.

City of Los Angeles: City of Los Angeles Municipal Code. Oct. 2018.

Appendix A:

Photographs and 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

24-Hour Continuous Noise Measurement Datasheet

Project: Soto St Car Wash
Site Address/Location: 918 N Soto Street, Los Angeles CA
Date: 9/13/2018 to 9/14/2018
Field Tech/Engineer: Mike Dickerson, INCE

Site Observations: Clear sky, measurement was performed within 3-feet of existing 10-foot tall eastern property line wall. Ambient noise consisted of traffic along North Soto st and Wabah Ave. I-10 freeway is approx 500 feet to the north Car wash employees placed a chair approx 10 feet from meter where they would sit.

General Location:
Sound Meter: LD 831 **SN:** 3168
Settings: A-weighted, slow, 1-sec, 1-hour interval, 24-hour duration
Meteorological Con.: 90-55 degrees F, no wind
Site ID: LT-1

Site Topo: Flat
Ground Type: Soft site, w/ street surface hard

Noise Source(s) w/ Distance:
C/L of N soto St is 150ft from meter
C/L of Wabah Ave is 190ft from meter

Figure 1: LT-1 Monitoring Location

Figure 2: LT-1 Photo

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24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Soto St Car Wash
Site Address/Location: 918 N Soto Street, Los Angeles CA
Site ID: LT-1
Day: 1 of 1

Date	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
9/13/2018	10:00 AM	11:00 AM	67.3	75.8	54.5	74.6	73.7	66.0	63.1	57.3
9/13/2018	11:00 AM	12:00 PM	64.3	79.9	53.6	73.5	66.9	63.8	60.9	57.1
9/13/2018	12:00 PM	1:00 PM	67.9	78.1	54.6	74.8	73.7	66.3	63.8	59.8
9/13/2018	1:00 PM	2:00 PM	71.0	83.5	59.2	75.4	74.4	73.7	67.8	63.4
9/13/2018	2:00 PM	3:00 PM	68.0	87.8	59.4	74.4	73.8	66.7	64.3	60.8
9/13/2018	3:00 PM	4:00 PM	64.0	87.5	56.1	69.2	66.2	64.1	62.4	60.2
9/13/2018	4:00 PM	5:00 PM	67.5	83.1	57.0	74.9	73.5	66.5	64.2	60.9
9/13/2018	5:00 PM	6:00 PM	69.7	84.8	60.0	76.2	74.1	69.5	67.1	63.8
9/13/2018	6:00 PM	7:00 PM	66.6	90.6	55.9	74.5	69.7	64.6	62.1	59.1
9/13/2018	7:00 PM	8:00 PM	63.1	81.1	54.4	69.8	65.9	63.4	61.2	57.6
9/13/2018	8:00 PM	9:00 PM	64.1	82.5	54.5	70.9	66.7	64.1	61.2	57.5
9/13/2018	9:00 PM	10:00 PM	67.3	92.7	54.8	72.5	65.6	63.0	61.2	57.7
9/13/2018	10:00 PM	11:00 PM	62.0	85.8	54.9	68.5	64.3	61.6	59.5	56.8
9/13/2018	11:00 PM	12:00 AM	63.7	88.7	56.0	68.4	64.0	61.3	59.5	57.6
9/14/2018	12:00 AM	1:00 AM	63.6	83.6	52.5	76.9	63.2	59.3	57.8	54.3
9/14/2018	1:00 AM	2:00 AM	60.8	86.6	52.9	66.9	61.9	58.8	57.1	54.3
9/14/2018	2:00 AM	3:00 AM	58.6	74.6	52.5	64.6	61.4	58.8	57.2	55.0
9/14/2018	3:00 AM	4:00 AM	60.8	78.8	54.5	66.4	63.0	61.1	59.7	57.2
9/14/2018	4:00 AM	5:00 AM	62.6	83.9	55.5	68.2	64.9	63.0	60.9	57.7
9/14/2018	5:00 AM	6:00 AM	65.8	80.8	61.4	71.5	67.7	65.9	64.7	62.9
9/14/2018	6:00 AM	7:00 AM	65.1	75.6	60.4	70.3	67.6	65.6	64.0	62.2
9/14/2018	7:00 AM	8:00 AM	65.3	89.7	56.4	70.9	67.0	64.3	62.4	59.6
9/14/2018	8:00 AM	9:00 AM	68.6	82.2	54.4	75.6	74.2	67.5	64.8	57.9
9/14/2018	9:00 AM	10:00 AM	69.7	83.5	54.9	75.4	74.5	72.8	65.8	58.7

CNEL: 70.8

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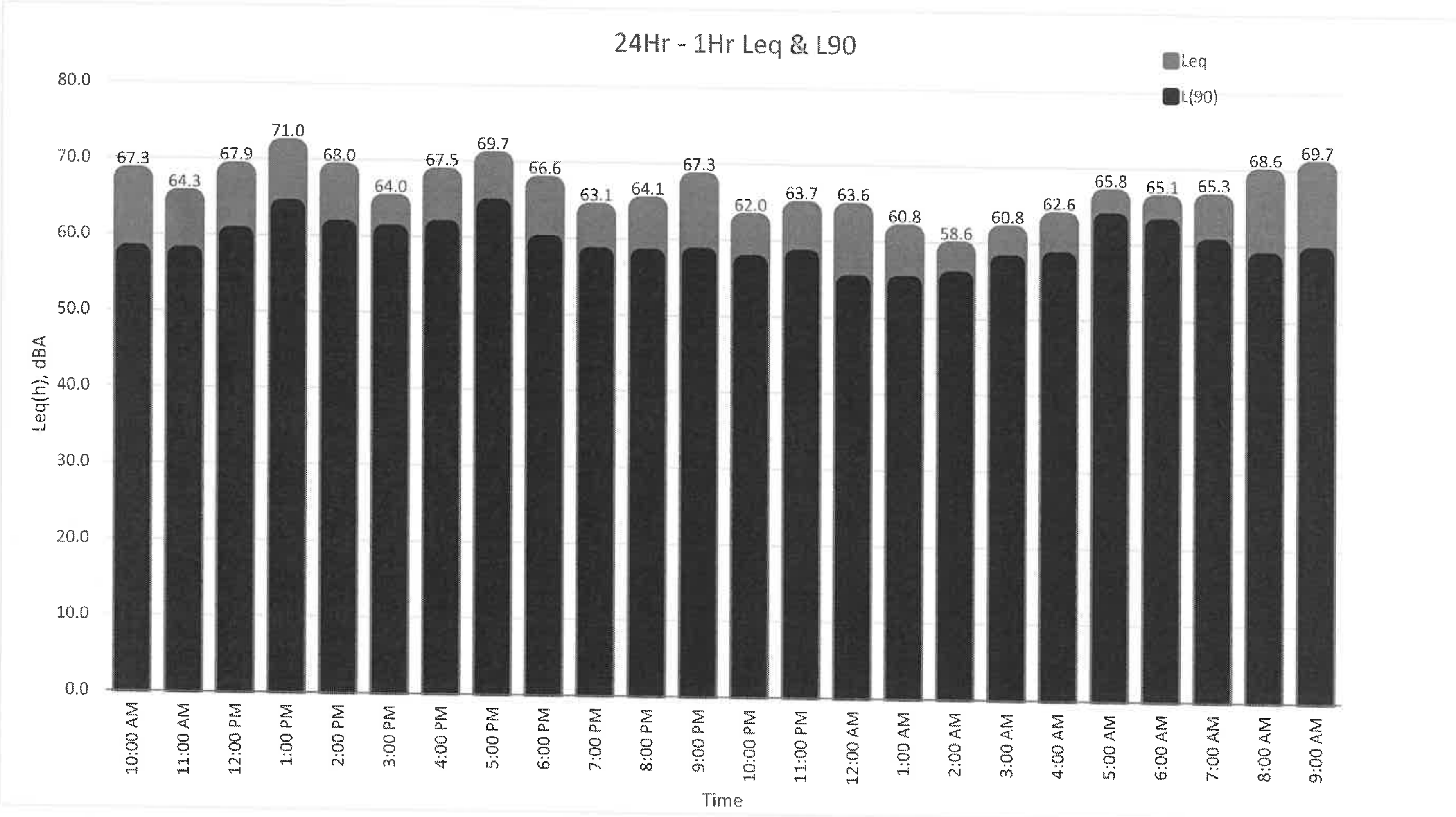

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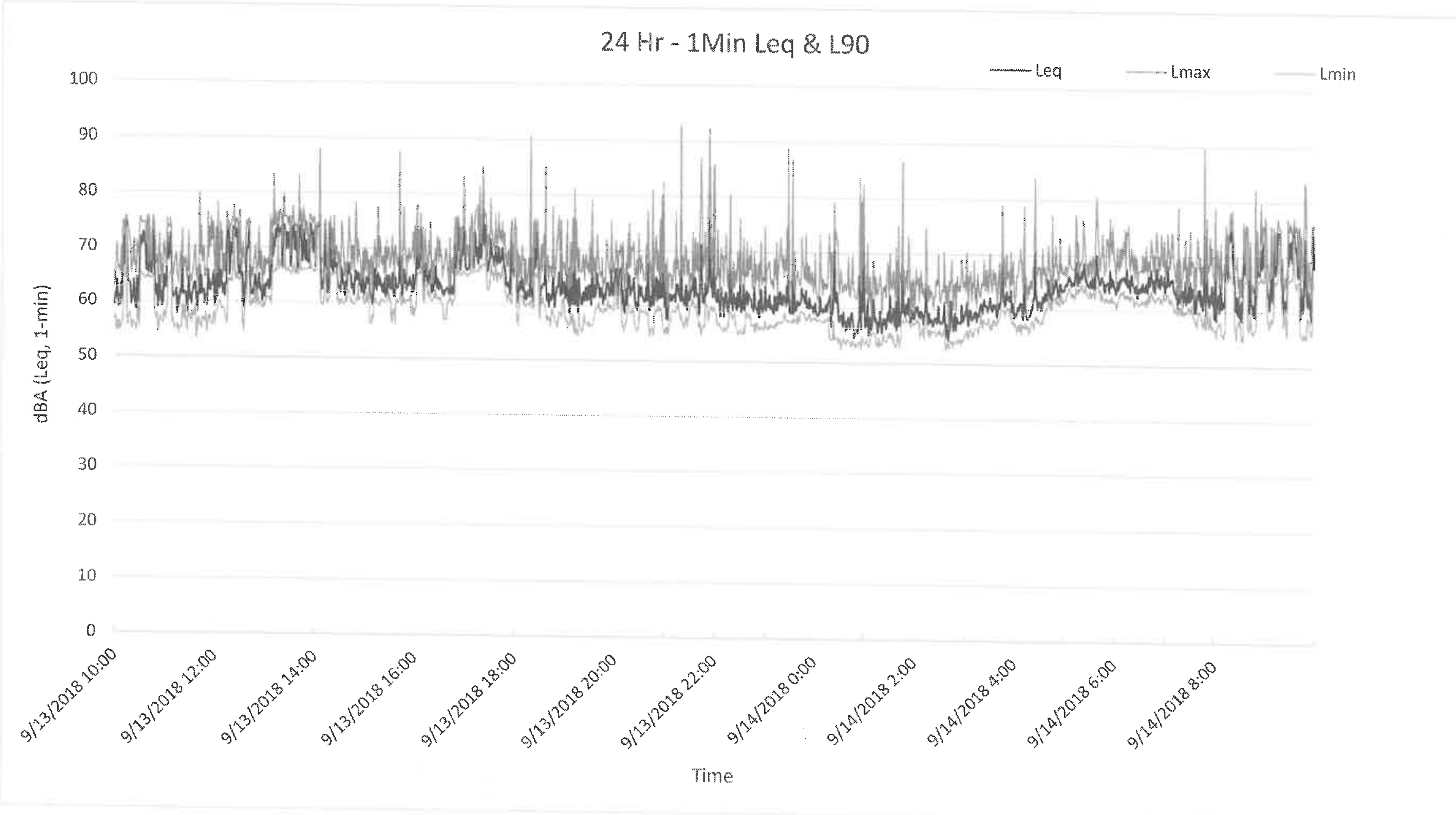


Appendix B:

SoundPLAN Input/Outputs

Noise emissions of industry sources

Source name	Refe	Level		Frequency spectrum [dB(A)]																														Correction		
			dB(	25 Hz	31 Hz	40 Hz	50 Hz	63 Hz	80 Hz	100 Hz	125 Hz	160 Hz	200 Hz	250 Hz	315 Hz	400 Hz	500 Hz	630 Hz	800 Hz	1 kHz	1.3 kHz	1.6 kHz	2 kHz	2.5 kHz	3.2 kHz	4 kHz	5 kHz	6.3 kHz	8 kHz	10 kHz	12. kHz	16 kHz	20 kHz	Cw dB(	CI dB(	CT dB(
Aerodry Blow	Lw/r	Da	82.	31.	37.	42.	48.	51.	54.	59.	63.	62.	66.	73.	72.	78.	73.	65.	66.	66.	65.	66.	65.	62.	62.	60.	58.	54.	50.	47.	42.	38.	29.	-	-	-
		Eve	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Da	82.	31.	37.	42.	48.	51.	54.	59.	63.	62.	66.	73.	72.	78.	73.	65.	66.	66.	65.	66.	65.	62.	62.	60.	58.	54.	50.	47.	42.	38.	29.	-	-	-
		Eve	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Da	10	50.	55.	60.	66.	70.	73.	77.	82.	81.	84.	91.	91.	97.	92.	83.	85.	85.	83.	85.	84.	81.	81.	79.	77.	73.	68.	65.	61.	57.	48.	-	-	-
		Eve	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		Da	84.	33.	39.	44.	50.	53.	56.	60.	65.	64.	67.	74.	74.	80.	75.	66.	68.	68.	66.	68.	67.	64.	64.	62.	60.	56.	52.	48.	44.	40.	31.	-	-	-
		Eve	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Contribution levels of the receivers

Source name		Level w/o NP Day	Level w/o NP Lden	Level w NP Day	Level w NP Lden
		dB(A)		dB(A)	
1	GF	87.3	87.2	0.0	0.0
Aerodry Blower		68.4	68.4	0.0	0.0
Aerodry Blower		67.5	67.5	0.0	0.0
Aerodry Blower		87.1	87.0	0.0	0.0
Aerodry Blower		69.9	69.8	0.0	0.0
2	GF	50.3	50.2	0.0	0.0
Aerodry Blower		30.9	30.9	0.0	0.0
Aerodry Blower		34.8	34.7	0.0	0.0
Aerodry Blower		50.1	50.0	0.0	0.0
Aerodry Blower		21.5	21.5	0.0	0.0
3	GF	54.3	54.2	0.0	0.0
Aerodry Blower		35.5	35.4	0.0	0.0
Aerodry Blower		35.4	35.3	0.0	0.0
Aerodry Blower		54.1	54.1	0.0	0.0
Aerodry Blower		32.5	32.4	0.0	0.0
3	1.Fl	54.9	54.8	0.0	0.0
Aerodry Blower		36.1	36.0	0.0	0.0
Aerodry Blower		36.0	35.9	0.0	0.0
Aerodry Blower		54.8	54.7	0.0	0.0
Aerodry Blower		33.1	33.0	0.0	0.0
4	GF	55.6	55.6	0.0	0.0
Aerodry Blower		36.7	36.6	0.0	0.0
Aerodry Blower		31.9	31.9	0.0	0.0
Aerodry Blower		55.5	55.4	0.0	0.0
Aerodry Blower		38.5	38.4	0.0	0.0
4	1.Fl	56.1	56.0	0.0	0.0
Aerodry Blower		37.2	37.1	0.0	0.0
Aerodry Blower		32.4	32.3	0.0	0.0
Aerodry Blower		55.9	55.9	0.0	0.0
Aerodry Blower		39.0	38.9	0.0	0.0
5	GF	43.6	43.5	0.0	0.0
Aerodry Blower		24.7	24.7	0.0	0.0
Aerodry Blower		24.2	24.1	0.0	0.0
Aerodry Blower		43.2	43.1	0.0	0.0
Aerodry Blower		31.5	31.4	0.0	0.0
6	GF	47.6	47.6	0.0	0.0
Aerodry Blower		28.8	28.7	0.0	0.0
Aerodry Blower		24.1	24.1	0.0	0.0
Aerodry Blower		47.5	47.4	0.0	0.0
Aerodry Blower		30.7	30.7	0.0	0.0
7	GF	41.3	41.3	0.0	0.0
Aerodry Blower		22.4	22.4	0.0	0.0
Aerodry Blower		19.0	19.0	0.0	0.0
Aerodry Blower		41.2	41.1	0.0	0.0
Aerodry Blower		24.3	24.3	0.0	0.0
7	1.Fl	47.1	47.0	0.0	0.0
Aerodry Blower		28.2	28.1	0.0	0.0
Aerodry Blower		23.2	23.1	0.0	0.0
Aerodry Blower		46.9	46.8	0.0	0.0
Aerodry Blower		30.0	30.0	0.0	0.0
8	GF	37.7	37.6	0.0	0.0
Aerodry Blower		18.9	18.9	0.0	0.0
Aerodry Blower		18.5	18.4	0.0	0.0
Aerodry Blower		37.5	37.4	0.0	0.0
Aerodry Blower		20.9	20.9	0.0	0.0
8	1.Fl	43.2	43.2	0.0	0.0
Aerodry Blower		24.6	24.5	0.0	0.0
Aerodry Blower		23.9	23.9	0.0	0.0

Contribution levels of the receivers

Source name	Level w/o NP Day dB(A)	Level w/o NP Lden dB(A)	Level w NP Day dB(A)	Level w NP Lden dB(A)
Aerodry Blower	43.0	43.0	0.0	0.0
Aerodry Blower	26.9	26.8	0.0	0.0
9 GF	53.4	53.3	0.0	0.0
Aerodry Blower	34.9	34.8	0.0	0.0
Aerodry Blower	38.1	38.0	0.0	0.0
Aerodry Blower	53.1	53.1	0.0	0.0
Aerodry Blower	37.0	37.0	0.0	0.0

Appendix C:

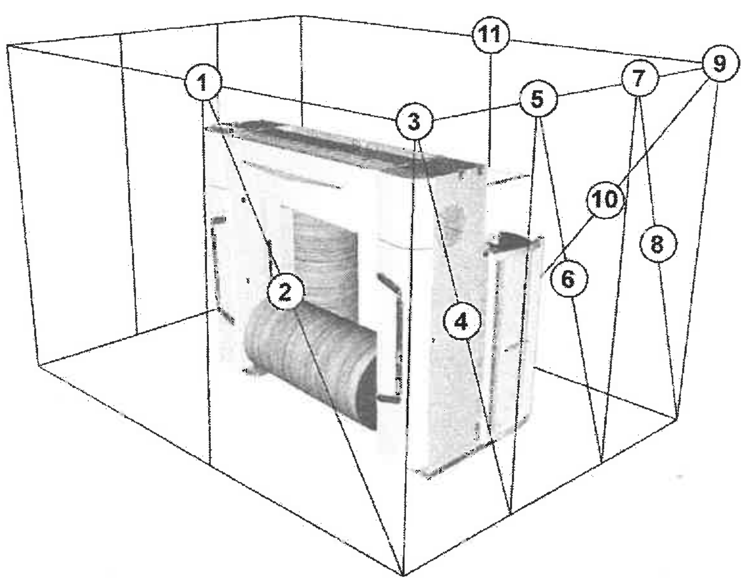
Manufacturer's Noise Cutsheet Data

2.4. NOISE CONTROL

Table summarising the results of the NOISE LEVEL READINGS performed by AIMME (The Metal-Mechanical Technological Institute) in reports T09-01005, T09-01076 and T14-01316, as per standard EN ISO 3744, carried out for M'NEX22 rollovers, with the drying configurations described and with three polyethylene brushes.

For the readings, the rollover was installed in an open, clear space, away from any building as defined in standard EN ISO 3744 in the section "Test environment".

Parameter	Description	DRYER TYPE				Unit
		Top 2x4kW 2x5,36 H.P.	Top Smartflow	Top 2x4kW 2x5,36 H.P. + Side 2x3kW 2x4,02 H.P.	Top Smartflow + Side 2x3kW 2x4,02 H.P.	
N	Number of positions of the microphone.	11	11	11	11	-
d	Measurement distances.	2 6'- 6 3/4"	2 6'- 6 3/4"	2 6'- 6 3/4"	2 6'- 6 3/4"	m ft-in
S	Surface area of the parallelepiped of measurement.	308.92 3325-28	308.92 3325-28	308.92 3325-28	308.92 3325-28	m^2 ft^2-in^2
L'p	Average level of sound pressure on the surface (Level of sound pressure source 'A' weighed).	74.1	68.9	74.7	73	dB (A)
L"p	Average level of background noise pressure.	52.6	48.1	52.6	48.1	dB (A)
K1	Correction factor for background noise.	0	0	0	0	-
K2	Ambient correction factor.	0	0	0	0	-
Lw	Sound power level.	103.0	94	103.0	98	dB (A)



36FW100B

DAVID L. ADAMS ASSOCIATES, INC.
Consultants in Acoustics and Performing Arts Technologies

September 26, 2002

Ms. Cheryl Dobie
Aerodry Systems, LLC
P.O. Box 907
Broomfield, Colorado 80038

Re: Aerodry - Spectral Sound Measurements (DLAA Reference No. 6595)

Dear Ms. Dobie:

The following is a summary of the blower sound level measurements taken at the site on September 19, 2002. Attached, please find the printed results of the measurements.

Measurement Conditions

While at the site, spectral sound pressure levels were measured for the Aerodry Systems 15 horsepower blowers, using 4 motors. It is my understanding that the 4 motor configuration we measured is typical for this model. For our measurements, the following motor configuration was used: 1 for the left blower, 1 for the right blower, and 2 used in the overhead (top of vehicle) blower.

Measurements were taken in ANSI-standard ⅓-octave bands between 25 Hertz (Hz) and 20,000 Hz, as well as a 200-line FFT (narrow-band analysis, to better show if discrete tones are present) between 0 Hz and 10,000 Hz. The blowers were located in the center of the warehouse, approximately 20' from the garage door, which was open. The warehouse dimensions were approximately 70' x 100', and had a 14' ceiling. The warehouse contained a lay-in acoustical tile ceiling, a vinyl floor covering, and painted gypsum board walls. I have determined that background noise, which was comprised mainly of Hwy-36 traffic noise, did not effect the results of the sound level measurements.

As shown in Figure No. 1, attached, the blowers were centered in the warehouse. Measurements were taken at various positions within the warehouse, however, we are providing data from measurements taken on the "exit" side of the blowers, as this is the side of the blowers that will be closest to the outside of a car wash building. Measurements were taken at approximately 5-feet and 20-feet from the blower outlets. All measurements were taken 90 degrees off-axis, shown in Figure No. 1, as any measurements taken on-axis with the blowers would be effected by the high velocity airflow. The height of the microphone during all measurements was approximately 5-feet above the floor. We have **not** attempted to adjust the measured data for the effect of reverberant noise within the warehouse, but we believe the measurement location 5' away is in the blower's direct sound field and relatively unaffected by the warehouse.

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Measurement Results

The results of all measurements, in the form of print-outs directly from the sound level meter, can be found following this report. All measurements were taken as 15-second averages. For clarity, the results of the ⅓-octave band measurements are listed below. For comparison, I have included the test results from our measurements taken on your original blower (1 motor configuration) in 1998.

⅓-Octave Band Sound Pressure Levels, in decibels (dB)

Center Frequency (Hz)	5 Feet from Blowers (4 motor system)	20 Feet from Blowers (4 motor system)	*5 Feet from Blower (1 motor - **1998 test**)*
25	76.1	70.2	*67.3*
31.5	76.6	71.9	*71.4*
40	76.8	72.0	*75.5*
50	78.4	74.2	*79.3*
63	77.8	72.8	*85.3*
80	77.3	74.8	*81.9*
100	78.1	74.0	*83.7*
125	80.0	73.7	*83.3*
160	75.9	73.8	*86.4*
200	77.0	73.9	*85.9*
250	81.7	73.7	*88.5*
315	79.3	75.0	*90.5*
400	83.6	80.5	*97.0*
500	76.9	73.7	*96.2*
630	67.0	70.8	*96.5*
800	67.1	63.7	*89.7*
1,000	66.4	64.9	*88.5*
1,250	64.5	64.5	*84.7*
1,600	65.8	63.7	*82.4*
2,000	64.5	61.5	*83.0*
2,500	61.4	59.4	*80.3*
3,150	61.5	58.3	*78.5*
4,000	59.5	56.8	*76.4*
5,000	57.9	54.1	*74.0*
6,300	54.5	49.9	*72.5*
8,000	51.3	48.8	*70.6*
10,000	49.6	44.5	*68.9*
12,500	47.2	42.2	*67.1*
16,000	44.9	38.4	*64.3*
20,000	38.9	32.8	*59.9*
Overall (sum):	90.5 dB	86.4 dB	*103.0 dB*
A-Weighted:	**82.5 dBA**	**79.4 dBA**	***99.8 dBA***

Please note that even though the data are listed to the nearest 0.1 decibel, accuracy beyond the nearest whole decibel should not be expected.

Measurement Equipment

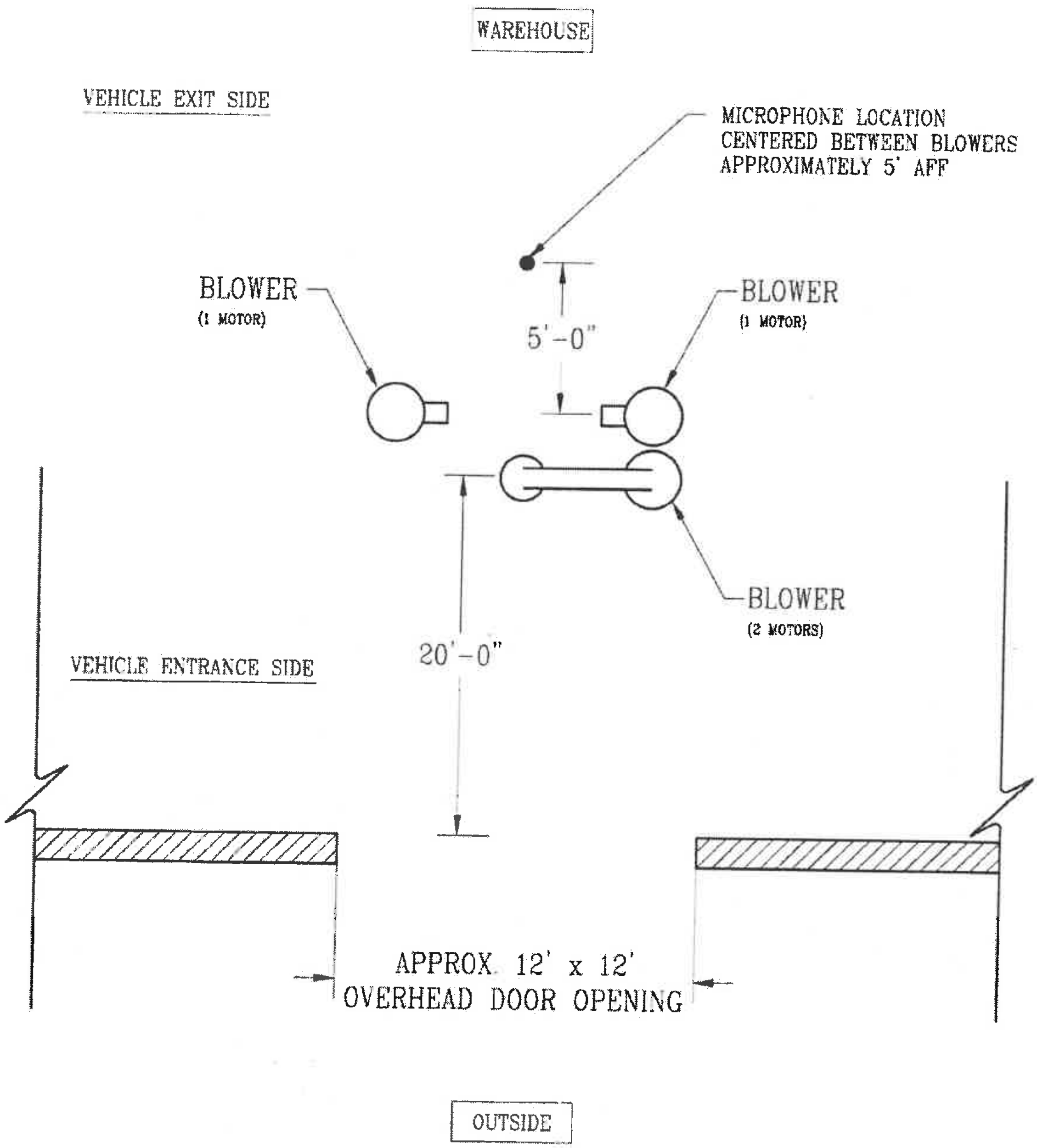
Measurements were taken with a Larson Davis model 2900 Type 1 sound level meter and a Brüel and Kjaer model 4165 condenser microphone. Immediately prior to measuring, the sound level meter was calibrated with a Larson Davis model CAL250 acoustic calibrator. Calibration was again verified at the conclusion of the measurements. All of our test equipment has been calibrated within the recommended time period set by the manufacturer. Documentation verifying measurement equipment calibration is available upon request.

If you have any questions please feel free to contact me.

Sincerely,

Andrew J. Kowalyshyn
Staff Consultant

Encl: Figure No. 1
Measurement Data



DAVID L. ADAMS ASSOCIATES, INC.
1701 BOULDER STREET
DENVER, COLORADO 80211
303/455-1900 FAX 303/455-9187

Measurement Configuration

AeroDry Systems, LLC

Not to Scale

Date	Project No.	Drawn By	Figure No.
26 September 2002	6595	DMP	1

Appendix D:

Construction Noise Modeling Output

Receptor - West (Residence)

A	B	C	D	E	F	G	H	I	J
Construction Phase Equipment Item	# of Items	Item Leq at 50 feet, dBA	Dist. To Recptr.	Ground Const	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Recptr. Item Leq, dBA
BASE									
1. Concrete Mixer	1	85	170	0	4	0.04	-10.6	-14.0	60.4
2. Pneumatic Tool	1	85	170	0	4	0.04	-10.6	-14.0	60.4
3. Pump	1	76	170	0	7	0.07	-10.6	-11.5	53.8
4. Saw, Electric	1	76	170	0	4	0.04	-10.6	-14.0	51.4
								Log Sum	64.1
BUILD									
1. Air Compressor	1	81	170	0	10	0.10	-10.6	-10.0	60.4
2. Generator	1	81	170	0	4	0.04	-10.6	-14.0	56.4
3. Pneumatic Tool	1	85	170	0	10	0.10	-10.6	-10.0	64.4
4. Saw, Electric	1	76	170	0	10	0.10	-10.6	-10.0	55.4
								Log Sum	66.6
FINISH									
1. Air Compressor	1	81	170	0	25	0.25	-10.6	-6.0	64.3
2. Generator	1	81	170	0	4	0.04	-10.6	-14.0	56.4
3. Pneumatic Tool	1	85	170	0	4	0.04	-10.6	-14.0	60.4
4. Paver	1	89	170	0	3	0.03	-10.6	-15.2	63.1
5. Concrete Mixer	1	85	170	0	16	0.16	-10.6	-8.0	66.4
6. Truck	1	88	170	0	16	0.16	-10.6	-8.0	69.4
7. Roller	1	74	170	0	4	0.04	-10.6	-14.0	49.4
								Log Sum	72.9

Receptor - East (Residence)

A	B	C	D	E	F	G	H	I	J
Construction Phase Equipment Item	# of Items	Item Leq at 50 feet, dBA	Dist. To Recptr.	Ground Const	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Recptr. Item Leq. dBA
BASE									
1. Concrete Mixer	1	85	90	0	4	0.04	-5.1	-14.0	65.9
2. Pneumatic Tool	1	85	90	0	4	0.04	-5.1	-14.0	65.9
3. Pump	1	76	90	0	7	0.07	-5.1	-11.5	59.3
4. Saw, Electric	1	76	90	0	4	0.04	-5.1	-14.0	56.9
								Log Sum	69.6
BUILD									
1. Air Compressor	1	81	90	0	10	0.10	-5.1	-10.0	65.9
2. Generator	1	81	90	0	4	0.04	-5.1	-14.0	61.9
3. Pneumatic Tool	1	85	90	0	10	0.10	-5.1	-10.0	69.9
4. Saw, Electric	1	76	90	0	10	0.10	-5.1	-10.0	60.9
								Log Sum	72.2
FINISH									
1. Air Compressor	1	81	90	0	25	0.25	-5.1	-6.0	69.9
2. Generator	1	81	90	0	4	0.04	-5.1	-14.0	61.9
3. Pneumatic Tool	1	85	90	0	4	0.04	-5.1	-14.0	65.9
4. Paver	1	89	90	0	3	0.03	-5.1	-15.2	68.7
5. Concrete Mixer	1	85	90	0	16	0.16	-5.1	-8.0	71.9
6. Truck	1	88	90	0	16	0.16	-5.1	-8.0	74.9
7. Roller	1	74	90	0	4	0.04	-5.1	-14.0	54.9
								Log Sum	78.4

VIBRATION LEVEL IMPACT			
Project:	Soto Car Wash Project		Date: 10/5/18
Source:	Truck		
Scenario:	Unmitigated		
Location:	Project Site - Residential		
Address:			
PPV = PPVref(25/D)^n (in/sec)			

DATA INPUT

Equipment = Type	4	Loaded Trucks	INPUT SECTION IN BLUE
PPVref =	0.076	Reference PPV (in/sec) at 25 ft.	
D =	90.00	Distance from Equipment to Receiver (ft)	
n =	1.50	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 =	0.011	IN/SEC	OUTPUT IN RED