ATTACHMENT 2

MD Acoustics, LLC,
Super Star Express Car Wash – Magnolia & Rockvill Noise Impact Study,
January 24, 2024.

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SuperStar Express Car Wash – Magnolia & Rockvill

Noise Impact Study

Santee, CA

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1.0 Executive Summary

This report has been prepared to provide the noise projections from the proposed SuperStar Express Car Wash ("Project") located at 8837 Magnolia Avenue, in the city of Santee, CA 92071 to the adjacent land uses. All calculations are compared to the city noise ordinance as well as the existing ambient condition.

1.1 Findings and Conclusions

Baseline ambient measurements were performed over a 24-hour period at the project site and represents the ambient noise condition within the project vicinity. The ambient noise data indicates that the average noise level is 53 dBA Ldn at or near the project site. The predominant noise source impacting the existing light industrial/commercial uses is traffic from Magnolia Avenue and Freeway/SH-65.

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.

The project site is located in a Light Industrial/General Commercial zone and the adjacent land uses includes existing general commercial to the east and west, and existing churches to the north and south. Since all the adjoining properties are within a general commercial land use zone, the project's operational noise levels are evaluated concerning the City's commercial limits.

The evaluation shows that the project only operational noise levels will range between 56 to 58 dBA Ldn (depending on the receiver's location). Besides, baseline noise condition is exceeded by the project's worst-case operational noise level. The increase in the ambient noise level to the impacted receivers is noticeable, still the impact is less than significant since the total combined noise level is below the threshold established by the applicable local noise regulations. Additionally, project operational noise levels are anticipated to not be disturbing or excessive or offensive to the impacted areas.

Finally, the project plus ambient noise projections to the adjacent uses range from 58 to 59 dBA Ldn and meet the City's noise regulation of not exceeding 65 dBA Ldn (see Section 4.3). The findings included in this report are based on the following assumptions:

1. The Project shall incorporate a 120 HP International Dryer Company dryer system or equivalent (See Appendix B) to meet the acoustical benchmarks. Any modification would require a re-evaluation.
2. The use of the 120 HP International Dryer Corporation equipment is proposed as a project design feature and is recommended for project approval.

2.0 Introduction

2.1 Purpose of Analysis and Study Objectives

This noise impact study aims to evaluate the potential noise impacts for the project study area and recommend noise mitigation measures, if necessary, to minimize the potential noise impacts. The assessment was conducted and compared to applicable noise standards set forth by the State and/or Local agencies. Consistent with the City's Noise Regulations, the project must comply with 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 at 8837 Magnolia Avenue, in the city of Santee, CA 92071, as shown in Exhibit A. The project site is located in a Light Industrial/General Commercial land use zone and the adjacent uses includes existing general commercial on the east and west. The properties at the north and south are churches within a general commercial land use zone.

2.3 Proposed Project Description

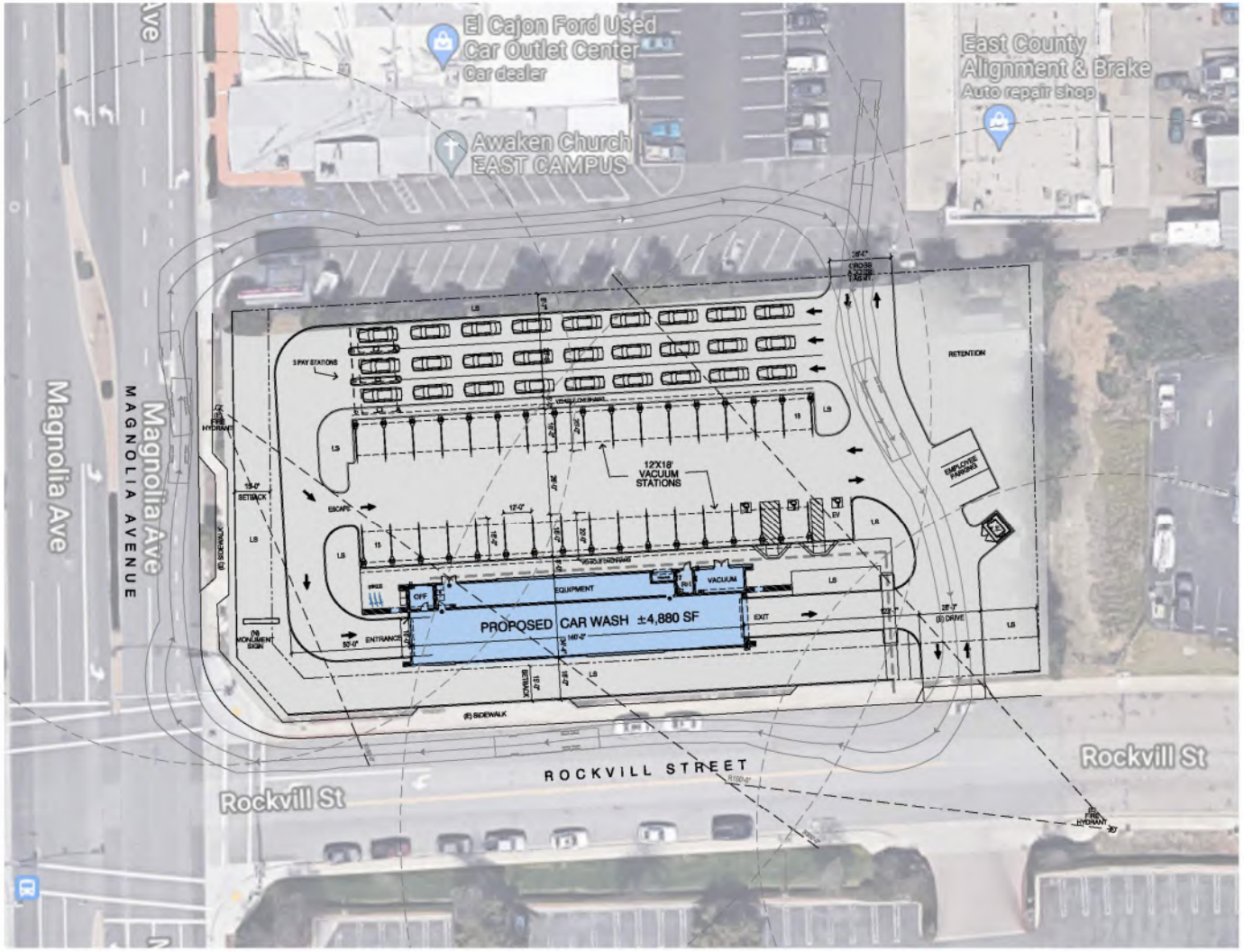
SuperStar Express proposes developing a 140-foot automatic car wash, including approximately 31 covered vacuum bays. Per the applicant's request, a noise study has been prepared, identifying the project's potential impact on the adjacent uses and comparing the noise level projections to the City's applicable noise ordinance. The site plan used for this is illustrated in Exhibit B.

Exhibit A

Location Map

Exhibit B

Site Plan



VICINITY MAP N.T.S.

PROJECT SUMMARY

APN:	384-470-3300
ZONING:	IL/GC
SITE AREA:	±1.26 AC (54,460 SF)
PROPOSED CAR WASH USE	
TOTAL BUILDING AREA:	±4,880 SF

- 140' CARWASH BAY / TUNNEL
- 3 PAY STATIONS
- 31 VACUUM STATIONS

CONSTRUCTION TYPE: V-B

OCCUPANCY: B

NOTE:
THE PRELIMINARY INFO ON THIS EXHIBIT ARE BASED ON A SCALED IMAGE, AND SUBJECT TO ADJUSTMENT. ANY FURTHER DEVELOPMENT IS SUBJECT TO A THOROUGH SITE INVESTIGATION, THE APPROVAL OF CLIENTS, AND GOVERNMENTAL AGENCIES.

SUPER STAR CAR WASH

MAGNOLIA AVE & ROCKVILL ST
8837 MAGNOLIA AVE | SANTEE, CA 92071

SITE PLAN
SCALE: 1" = 20'-0"

A-01

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.

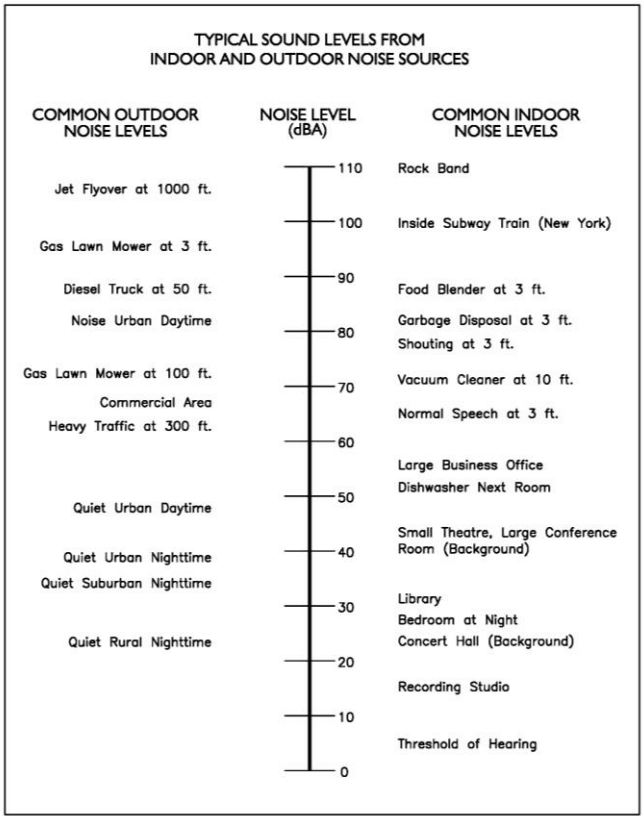
3.1 Sound, Noise and Acoustics

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 Santee, 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.

4.3 City of Santee Noise Regulations

The City of Santee outlines its noise regulations and standards within the Noise Element of the General Plan and the Noise Ordinance from the Municipal Code.

The guidelines rank noise land use compatibility in terms of normally acceptable, conditionally acceptable, normally unacceptable, and clearly unacceptable as illustrated in Exhibit D.

City of Santee General Plan

Relevant noise regulations and implementation program measures from the Noise Element that would reduce potential impacts on noise include the following.

Thresholds of Significance: The California Environmental Quality Act encourages jurisdictions to establish local thresholds for determining whether a particular impact is significant. Impacts exceeding these thresholds would require that measures be identified to avoid or reduce the severity of the impact. Noise impacts shall be considered significant if any of the following occur as a result of the proposed development:

1. If, as a direct result of the proposed development, noise levels for any existing or planned development will exceed the noise levels considered compatible for that use as identified in Figure 7-3, Noise / Land Use Compatibility Guide (Exhibit D).

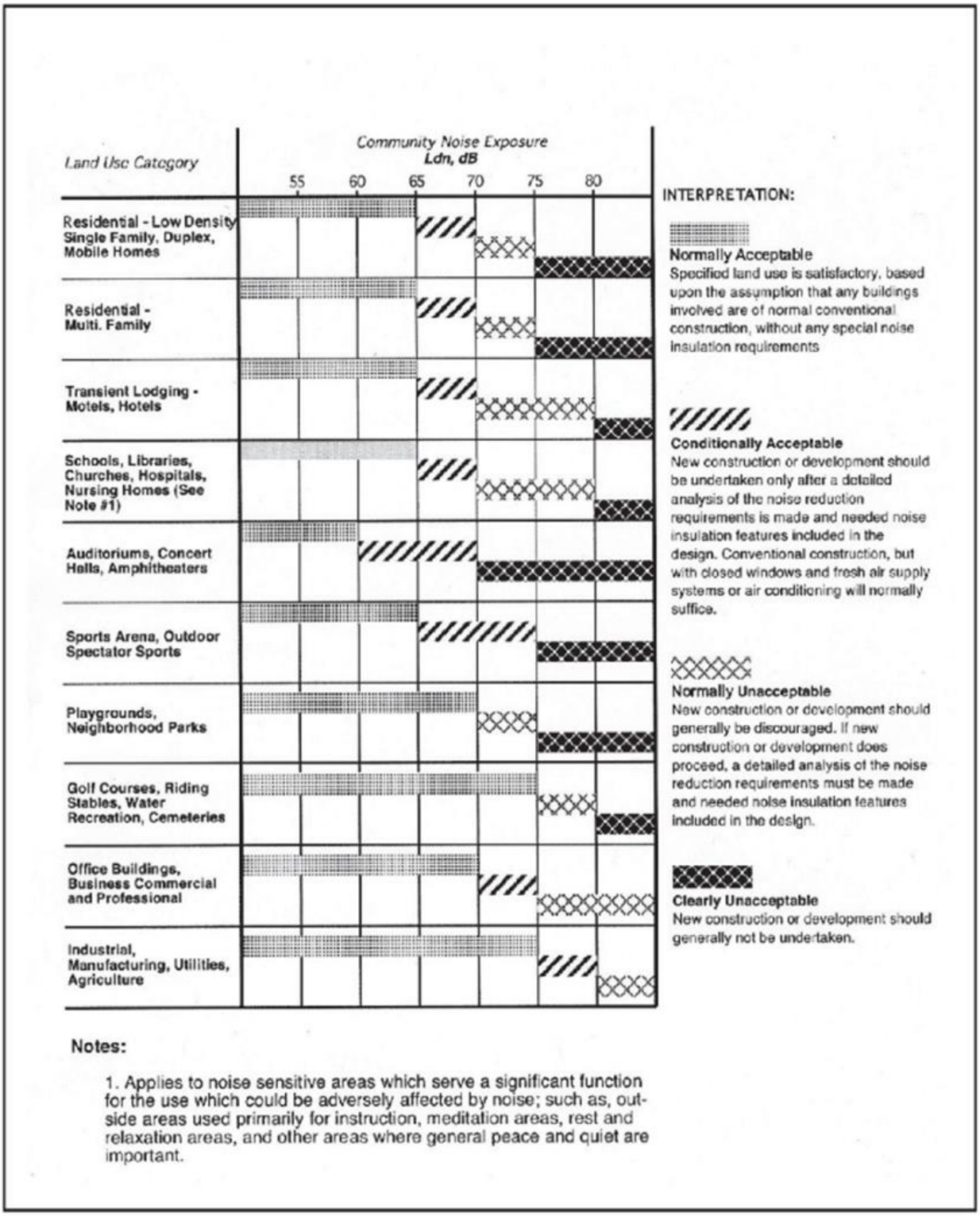
2. If, as a direct result of the proposed development, noise levels which already exceed the levels considered compatible for that use are increased by 3 or more decibels.

Development standards should be applied to future projects during the discretionary review process and should include the following:

1. Whenever it appears that new development will result in any existing or future noise sensitive uses being subjected to noise levels of 65 dB(A) Ldn, or greater, an acoustical study will be required.

   For residential uses, noise sensitive areas shall include rear yard areas on single family residences and ground floor common areas and private patio areas for multiple family residences. For other noise sensitive uses such as libraries, schools or hospitals, noise sensitive areas shall be those areas that serve a significant function for the use that could be adversely affected by noise. Examples include resting or patient recovery areas at hospitals, outdoor service areas for churches (excluding areas used for short-term social gatherings) or outdoor teaching or discussion areas at schools (does not include playgrounds or other active outdoor areas).

Exhibit D: Land Use Compatibility Guidelines



2. If the acoustical study shows that the noise levels at any noise sensitive area will exceed 65 dB(A) Ldn, the development should not be approved unless the following findings are made:

    a. Modifications to the development have been, or will be made, which will reduce the exterior noise level in noise sensitive areas to 65 dB(A) Ldn or less, or

    b. If, with current noise abatement technology, it is not feasible to reduce the exterior noise level to 65 dB(A) Ldn or less, then modifications to the development will have been, or will be made which reduce the exterior noise level to the maximum extent feasible and the interior noise level to 45 dB(A) Ldn or less. Particular attention shall be given to noise sensitive spaces such as bedrooms.

    For rooms in noise sensitive areas which are occupied only for a part of the day, (schools, libraries or similar), the interior one-hour average sound level during occupation, due to noise outside, should not exceed 45 dB(A) Leq (hour).

The City's noise maps will be used to determine whether a proposed project or land use is compatible with its surrounding land uses. Noise compatible land uses are assessed according to the categories depicted on Figure 7-3, Noise / Land Use Compatibility Guide (Exhibit D). The Noise / Land Use Compatibility Guide should not be misinterpreted as being prohibitive but should be used as a guide and a resource. If doubt exists as to the noise impact, whether it be the existing or future noise on the project or from the project on the surrounding community, an acoustical study will be required. Land use changes should be reviewed for potential noise impacts.

The acoustical study shall include existing and future noise levels on the site, the effect of the project on its surroundings, and regulatory measures, if necessary. Such measures may include, but not be limited to the following:

1. The use of site design techniques such as the provision of buffers to increase distances between the noise source and receiver, siting of buildings and parking areas and the careful siting of noise-sensitive outdoor features to minimize noise impacts;
2. Provision of berms, landscaping and other sound barriers, without the exclusive use of walls; i.e., a combination of a small wall and a berm in concert with the overall streetscape in the area could be appropriate; and
3. Insulation of buildings against noise, including thicker-than-standard glazing and mechanical ventilation.

City of Santee Municipal Code

Section 5.04.020 Definitions.

“Disturbing, excessive or offensive noise” means:

1. Any sound or noise which constitutes a nuisance involving discomfort or annoyance to persons of normal sensitivity residing in the area;

2. Any sound or noise conflicting with criteria standards or levels as set forth in this chapter for permissible noises;
3. Any sound or noise conflicting with criteria standards or levels established by Federal or State Government which are applicable in the City.

Section 5.04.030 Most restrictive limits apply.

If there is any conflict among sections in this chapter or between the sections in this chapter and any other applicable law or regulation, the provision which contains the most restrictive limits applies.

Section 5.04.040 General noise regulations.

A. General Prohibitions. It is unlawful for any person to make, continue, or cause to be made or continued, within the limits of the City, any disturbing, excessive or offensive noise which causes discomfort or annoyance to reasonable persons of normal sensitivity residing in the area. The characteristics and conditions which should be considered in determining whether a violation of the provisions of this section exists, include, but are not limited to, the following:

1. The level of the noise;
2. Whether the nature of the noise is usual or unusual;
3. Whether the origin of the noise is natural or unnatural;
4. The level of the background noise;
5. The proximity of the noise to sleeping facilities;
6. The nature and zoning of the area within which the noise emanates;
7. The density of the inhabitation of the area within which the noise emanates;
8. The time of day or night the noise occurs;
9. The duration of the noise;
10. Whether the noise is recurrent, intermittent, or constant; and
11. Whether the noise is produced by a commercial or noncommercial activity.

B. Disturbing, Excessive or Offensive Noises. The following acts, among others, are declared to be disturbing, excessive and offensive noises in violation of this section:

7. Schools, Courts, Churches, Hospitals. It is unlawful to create any noise that disrupts the workings of any of the following institutions while they are in use and if there are signs indicating the presence of such institution:

a. School, institution of learning (except recreational areas of schools), church, court or library;

b. A hospital, rest home, or long-term medical or mental health care facility. (Ord. 558 § 3, 2019)

Section 5.04.090 Construction equipment.

Prohibitions. Except for emergency work or work that has been expressly approved by the City, it is unlawful for any person to operate any single or combination of powered construction equipment at any construction site, as follows:

1. It is unlawful for any person to operate any single or combination of powered construction equipment at any construction site on Mondays through Saturdays except between the hours of 7:00 a.m. and 7:00 p.m., unless expressly approved by the Director of Development Services.
2. It is unlawful for any person to operate any single or combination of powered construction equipment at any construction site on Sundays or City recognized holidays unless expressly approved by the Director of Development Services.
3. No construction equipment is permitted to be started, idled, moved or operated at any location before 7:00 a.m. or after 7:00 p.m. on Mondays through Saturdays and all times on Sundays and holidays, described in subsection (A)(2) of this section. Specific exemptions may be authorized by the Director of Development Services.
4. Construction equipment with a manufacturer's noise rating of 85 $dBAL_{MAX}$ or greater, may only operate at a specific location for 10 consecutive workdays. If work involving such equipment will involve more than 10 consecutive workdays, a notice must be provided to all property owners and residents within 300 feet of the site no later than 10 days before the start of construction. The notice must be approved by the City and describe the project, the expected duration, and provide a point of contact to resolve noise complaints.

Section 5.04.160 Limitations on noise not otherwise addressed.

For any noise source not specifically addressed in this chapter, except where exempted or excluded by Section 5.04.170, the following general limitations apply:

A. Between 10:00 p.m. and 7:00 a.m., it is unlawful for any person to generate any noise on the public way that is louder than average conversational level at a distance of 50 feet or more, vertically or horizontally, from the source.

B. Between 10:00 p.m. and 7:00 a.m., no person is permitted to generate any noise on any private open space that is louder than average conversational level at a distance of 50 feet or more, measured from the property line of the property from which the noise is being generated.

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 were 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 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 wind screen 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
- Temperature and sky conditions were observed and documented

5.2 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) 24-hour noise measurement was conducted near the project site (approx. 110 feet from the centerline of Rockvill St and 1000 feet from the freeway). This measurement represents the existing noise level in the surrounding area. The location of the noise measurement is 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 on 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 (vacuums, vacuum turbine motors and car wash blowers at the exit). The model assumes that the car wash tunnel is approximately 140 feet long with a 10 foot tall by 16 foot wide entrance and exit opening.

The blowers (a 120 HP IDC blowers) were modeled at 10 to 12 feet high as point sources. The blowers will be located approximately 5 to 10 feet inside the exit of the tunnel. The reference equipment sound level data is provided in Appendix B.

The 31 vacuums of the covered vacuum bays were modeled as point sources in each bay area. The project proposes to house the vacuum turbine motor inside the equipment rooms of the car wash building. The reference vacuum equipment sound level data is provided in Appendix B and Table 1 below summarizes the source reference levels.

Table 1: Stationery Sound Source Reference Levels Summary

Noise Source	Source Type & Location	Reference Sound Pressure Level (dBA, Leq)	Distance to Reference Source (ft)
120 HP IDC Dryers	Point Source, inside tunnel	87	5
Vacuum Station	Point Source, parking lot	71	2
Source: MD Acoustics. Jan 2023.			

The SP model assumes all 31 vacuums and the dryer system are operating simultaneously (worst-case scenario), when in actuality, the noise will be intermittent and lower in noise level. All other noise-producing equipment (e.g., compressors, pumps) will be housed within mechanical equipment rooms. The inputs and outputs for the SoundPLAN model are provided in Appendix C.

Exhibit E

Measurement Locations

= Long-Term Monitoring Location

6.0 Existing Noise Environment

One (1) 24-hours ambient noise measurement was conducted at the project site, approximately 110 feet from the centerline of Rockvill St and 1000 feet from the freeway. The sound level meter measured the 1-hour 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 Magnolia Avenue and commercial uses are the primary source of noise impacting the site and the adjacent uses. This assessment utilizes the ambient noise data as a basis for comparison with project operational noise.

6.1 Long-Term Noise Measurements Results

The results of the long-term noise data are presented in Table 2.

Table 2: Long-Term Noise Measurement Data[1]

Date	Time	1-Hour dB(A)							
		L_{EQ}	L_{MAX}	L_{MIN}	L_2	L_8	L_{25}	L_{50}	L_{90}
12/21/2022	0:00AM-1:00AM	44.8	66.0	36.4	52.3	46.2	43.1	41.2	38.9
12/21/2022	1:00AM-2:00AM	42.4	63.6	34.0	49.9	43.8	40.7	38.8	36.5
12/21/2022	2:00AM-3:00AM	41.1	62.3	32.7	48.6	42.5	39.4	37.5	35.2
12/21/2022	3:00AM-4:00AM	39.4	60.6	31.0	46.9	40.8	37.7	35.8	33.5
12/21/2022	4:00AM-5:00AM	40.3	61.5	31.9	47.8	41.7	38.6	36.7	34.4
12/21/2022	5:00AM-6:00AM	44.1	65.3	35.7	51.6	45.5	42.4	40.5	38.2
12/21/2022	6:00AM-7:00AM	50.6	71.8	42.2	58.1	52.0	48.9	47.0	44.7
12/21/2022	7:00AM-8:00AM	52.8	74.0	44.4	60.3	54.2	51.1	49.2	46.9
12/21/2022	8:00AM-9:00AM	51.0	72.2	42.6	58.5	52.4	49.3	47.4	45.1
12/21/2022	9:00AM-10:00AM	50.0	71.2	41.6	57.5	51.4	48.3	46.4	44.1
12/21/2022	10:00AM-11:00AM	49.9	71.1	41.5	57.4	51.3	48.2	46.3	44.0
12/21/2022	11:00AM-12:00PM	50.1	71.3	41.7	57.6	51.5	48.4	46.5	44.2
12/21/2022	12:00PM-1:00PM	50.1	71.3	41.7	57.6	51.5	48.4	46.5	44.2
12/21/2022	1:00PM-2:00PM	50.2	71.4	41.8	57.7	51.6	48.5	46.6	44.3
12/21/2022	2:00PM-3:00PM	50.5	71.7	42.1	58.0	51.9	48.8	46.9	44.6
12/21/2022	3:00PM-4:00PM	51.7	72.9	43.3	59.2	53.1	50.0	48.1	45.8
12/21/2022	4:00PM-5:00PM	53.2	74.4	44.8	60.7	54.6	51.5	49.6	47.3
12/21/2022	5:00PM-6:00PM	52.8	74.0	44.4	60.3	54.2	51.1	49.2	46.9
12/21/2022	6:00PM-7:00PM	51.1	72.3	42.7	58.6	52.5	49.4	47.5	45.2
12/21/2022	7:00PM-8:00PM	49.8	71.0	41.4	57.3	51.2	48.1	46.2	43.9
12/21/2022	8:00PM-9:00PM	48.6	69.8	40.2	56.1	50.0	46.9	45.0	42.7
12/21/2022	9:00PM-10:00PM	48.0	69.2	39.6	55.5	49.4	46.3	44.4	42.1
12/21/2022	10:00PM-11:00PM	46.9	68.1	38.5	54.4	48.3	45.2	43.3	41.0
12/21/2022	11:00PM-12:00AM	46.3	67.5	37.9	53.8	47.7	44.6	42.7	40.4
Ldn		53.2							

Notes:
[1.] Long-term noise monitoring location (LT1) is illustrated in Exhibit E.

Noise data indicates the ambient noise level measured at 53 dBA Ldn near the project site and the surrounding area. The daily distribution shows a maximum equivalent hourly level of 53 dBA due to peak

traffic hours. The quietest equivalent noise level measured (during operational hours) was 48 dBA Leq (h) for the 9:00 p.m. to 10:00 p.m. hour. Additional field notes and photographs are provided in Appendix A.

For this evaluation, MD has utilized the Ldn level for the comparison with the project's projected noise levels.

7.0 Future Noise Environment Impacts and Project Design Features

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. The analysis details the estimated exterior noise levels.

7.1 Stationary Source Noise

The exterior noise levels associated with the project are analyzed as follows:

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

Sensitive receptors that may be affected by project operational noise include the light industrial and two churches on commercial uses surrounding the project site. The worst-case stationary noise was modeled using SoundPLAN acoustical modeling software. Worst-case assumes the 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 are assumed to occur between 7AM – 8PM which is within the City's allowable daytime (7 a.m. to 10 p.m.) hours.

A total of four (4) receptors were modeled to evaluate the proposed project's operational impact. Receptors 1 and 2 represent the noise level at the existing church to the north located at 240 and 190 feet respectively. Receptors 3 represent the light industrial use located 200 feet to the east and receiver 4 represent the church façade located 230 feet to the south across Rockvill Street. A receptor is denoted by a yellow dot in Exhibit F. All yellow dots represent either a property line or a sensitive receptor such as a building.

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

Project Only Operational Noise Levels
Exhibit F shows the "project only" operational noise levels at the property lines and/or sensitive receptor area. Operational noise levels are anticipated to range between 56 dBA to 58 dBA Ldn at adjacent uses (depending on the location).

The "project only" noise projections to the adjacent uses exceed the measured ambient noise level of 54 dBA. Besides, "project only" noise projections at the adjacent properties does not exceed the City's 65 dBA Ldn limit, see Section 4.3 of this report.

Project Plus Ambient Operational Noise Levels
Table 3 demonstrates the project plus the measured ambient noise levels. "Project plus ambient" noise level projections are anticipated to range between 58 to 59 dBA Ldn at adjacent impacted receptors.

Table 3: Worst-case Predicted Operational Noise Level (dBA)

Receptor[1,2]	Existing Ambient Noise Level[3] (dBA, Ldn)	Project Noise Level[4] (dBA, Ldn)	Total Combined Noise Level (dBA, Ldn)	Change in Noise Level as Result of Project
1	53	57	59	5.3
2		56	58	4.6
3		58	59	6.0
4		56	58	4.6

Notes:
1. Receptor locations are indicated in Exhibit F.
2. Receptors 1 and 2 represent the existing church to the north. Receptors 3 is the industrial use to the east and 4 represent the church façade to the south.
3. Day night noise level measured at or near the project site. See Section 6.1 and Appendix A.
4. "Project only" operational noise levels shown in Exhibit F.

In addition, Table 3 provides the anticipated change in noise level as a result of the proposed project. As shown in Table 3, the existing noise levels are anticipated to change between 4.6 to 6.0 dBA, Ldn at adjacent land uses. These anticipated changes to the noise level are within the City's regulations, see Section 4.3 of this report.

Table 4 provides the characteristics associated with changes in noise levels.

Table 4: 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

Although the change in noise level at all receptors falls within the clearly noticeable range, the impact is less than significant since is still within the applicable local noise regulations.

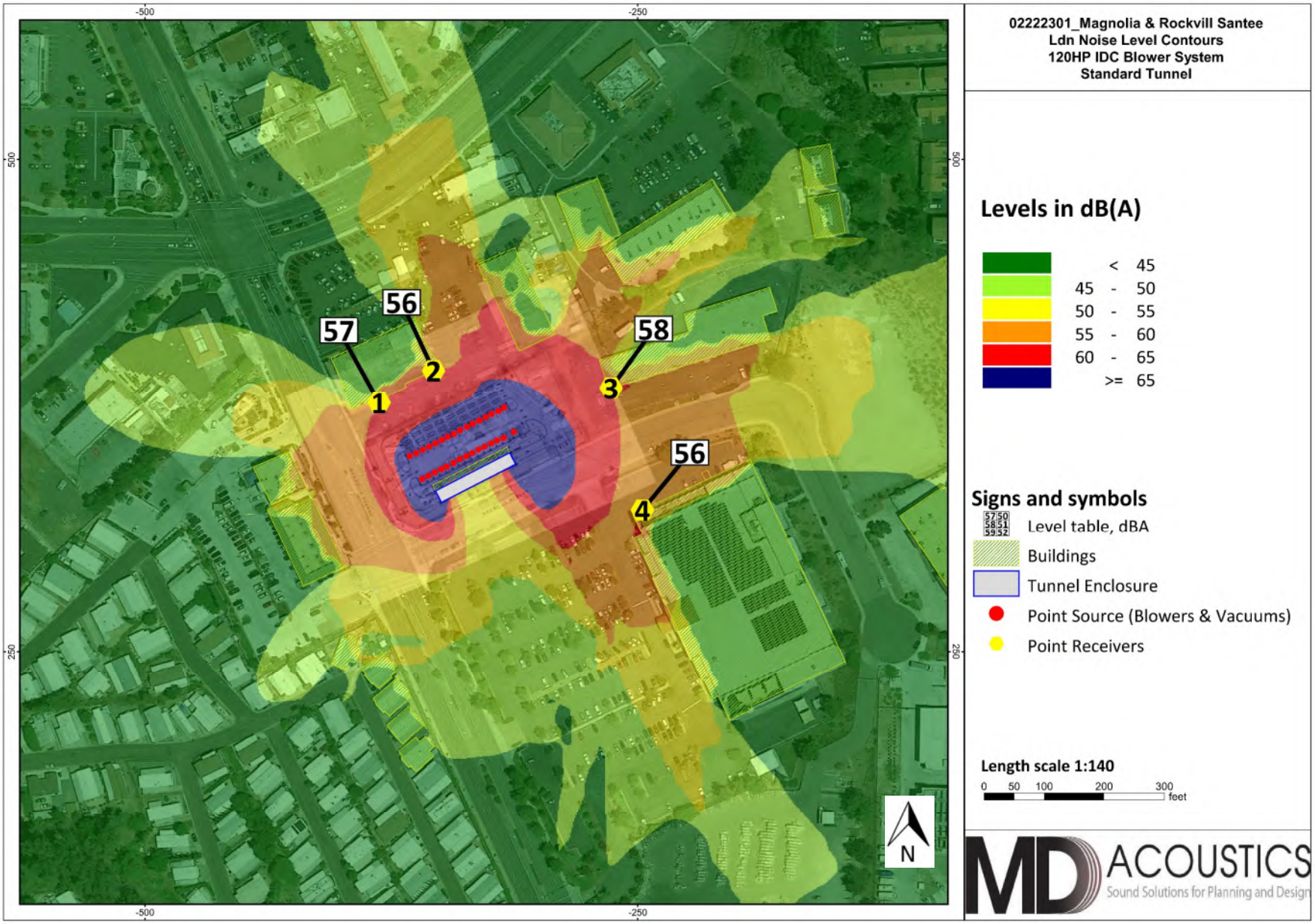
7.2 Project Design Features

The findings presented in this report are made to ensure compliance with the City's noise regulations and are based on the following project design features:

1. The Project shall incorporate a 120 HP International Dryer Company dryer system or equivalent (See Appendix B) to meet the acoustical benchmarks. Any modification will require a re-evaluation.
2. The use of the 120 HP International Dryer Corporation equipment is proposed as a project design feature and is recommended for project approval.

Exhibit F

Operational Noise Levels Contours 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 5.

Table 5: 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 City's Municipal Code Chapter 5.04.090. Construction is anticipated to occur during the permissible hours according to the City'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 the paving phase. A likely worst-case construction noise scenario during paving assumes the use of a paver, two rollers, a backhoe, a paving equipment, and a concrete mix truck operating at 140 feet from the nearest sensitive receptor (center of the site to the church façade to the north).

Assuming a usage factor of 40 percent for each piece of equipment, unregulated noise levels at 140 feet have the potential to reach 79 dBA L_{eq} at the nearest sensitive receptors. Noise levels for the other construction phases would be lower and range from 67 to 78 dBA. Noise levels at 140 feet were selected as the majority of construction work will be performed in the center of the project site which is approximately 140 feet north of the nearest sensitive receptors. Appendix D provides the calculation sheets for noise and vibration.

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:

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

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

D_{rec} = 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 6 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 6: 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 7 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 7: 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 65 feet (distance to the church facade from the property line), a large bulldozer would yield a worst-case 0.031 PPV (in/sec) which may be perceptible for short periods of time during grading along the northern property line of the project site, but is below any threshold of damage. The impact is less than significant, and no mitigation is required. Appendix D provides the calculation sheets for noise and vibration.

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 will be taken:

1. Construction shall occur during the permissible hours as defined Section 5.04.090.
2. During construction, the contractor shall ensure all construction equipment is equipped with appropriate noise attenuating devices.
3. The contractor shall 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 shall 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

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

City of Santee: Chapter 5.04 Municipal Code. October 2022.

City of Santee: General Plan Chapter 7 Noise Element. 2020.

Appendix A:

Photographs and Field Measurement Data

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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: Super Star Car Wash Magnolia & Rockvill
Site Address/Location: NE of Magnolia Ave & Rockvill St, Santee CA
Date: 1/24/2023
Field Tech/Engineer: Jason Schuyler / Francisco Irarrazabal

Site Observations: Eastern property line. Thwe meter was located in a buffer zone with grading to the east. Vegetation and earthen slope terrain. The sources of noise consisted of traffic along Rockvill St. Additionally SH-65 Highway was 1000' to the east.

General Location:
Sound Meter: NTi XL2 **SN:** A2A-07095-EO
Settings: A-weighted, slow, 1-hour, 24-hour duration
Meteorological Con.: 63°F, sunny, winds 0-3 mph WNW
Site ID: LT-1

Site Topo: slopes and plateau
Ground Type: Buffer Area, Vegetation, earthen Berm and As

Noise Source(s) w/ Distance:
1 - 110' from Rockvill St CL

Figure 1: LT Monitoring Locations

Figure 2: LT-1 Photo

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Chandler, AZ 85249

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Simi Valley, CA 93065

24-Hour Noise Measurement Datasheet - Cont.

Project: Super Star Car Wash Magnolia & Rockvill **Day:** 1 of 1

Site Address/Location: NE of Magnolia Ave & Rockvill St, Santee CA

Site ID: LT-1

Date	Start	Stop	Leq	Lmax	Lmin	L2	L8	L25	L50	L90
10/27/2022	12:00 AM	1:00 AM	44.8	66.0	36.4	52.3	46.2	43.1	41.2	38.9
10/27/2022	1:00 AM	2:00 AM	42.4	63.6	34.0	49.9	43.8	40.7	38.8	36.5
10/27/2022	2:00 AM	3:00 AM	41.1	62.3	32.7	48.6	42.5	39.4	37.5	35.2
10/27/2022	3:00 AM	4:00 AM	39.4	60.6	31.0	46.9	40.8	37.7	35.8	33.5
10/27/2022	4:00 AM	5:00 AM	40.3	61.5	31.9	47.8	41.7	38.6	36.7	34.4
10/27/2022	5:00 AM	6:00 AM	44.1	65.3	35.7	51.6	45.5	42.4	40.5	38.2
10/27/2022	6:00 AM	7:00 AM	50.6	71.8	42.2	58.1	52.0	48.9	47.0	44.7
10/27/2022	7:00 AM	8:00 AM	52.8	74.0	44.4	60.3	54.2	51.1	49.2	46.9
10/27/2022	8:00 AM	9:00 AM	51.0	72.2	42.6	58.5	52.4	49.3	47.4	45.1
10/27/2022	9:00 AM	10:00 AM	50.0	71.2	41.6	57.5	51.4	48.3	46.4	44.1
10/27/2022	10:00 AM	11:00 AM	49.9	71.1	41.5	57.4	51.3	48.2	46.3	44.0
10/27/2022	11:00 AM	12:00 PM	50.1	71.3	41.7	57.6	51.5	48.4	46.5	44.2
10/27/2022	12:00 PM	1:00 PM	50.1	71.3	41.7	57.6	51.5	48.4	46.5	44.2
10/27/2022	1:00 PM	2:00 PM	50.2	71.4	41.8	57.7	51.6	48.5	46.6	44.3
10/27/2022	2:00 PM	3:00 PM	50.5	71.7	42.1	58.0	51.9	48.8	46.9	44.6
10/27/2022	3:00 PM	4:00 PM	51.7	72.9	43.3	59.2	53.1	50.0	48.1	45.8
10/27/2022	4:00 PM	5:00 PM	53.2	74.4	44.8	60.7	54.6	51.5	49.6	47.3
10/27/2022	5:00 PM	6:00 PM	52.8	74.0	44.4	60.3	54.2	51.1	49.2	46.9
10/27/2022	6:00 PM	7:00 PM	51.1	72.3	42.7	58.6	52.5	49.4	47.5	45.2
10/27/2022	7:00 PM	8:00 PM	49.8	71.0	41.4	57.3	51.2	48.1	46.2	43.9
10/27/2022	8:00 PM	9:00 PM	48.6	69.8	40.2	56.1	50.0	46.9	45.0	42.7
10/27/2022	9:00 PM	10:00 PM	48.0	69.2	39.6	55.5	49.4	46.3	44.4	42.1
10/27/2022	10:00 PM	11:00 PM	46.9	68.1	38.5	54.4	48.3	45.2	43.3	41.0
10/27/2022	11:00 PM	12:00 AM	46.3	67.5	37.9	53.8	47.7	44.6	42.7	40.4

CNEL 53.6

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CA Office
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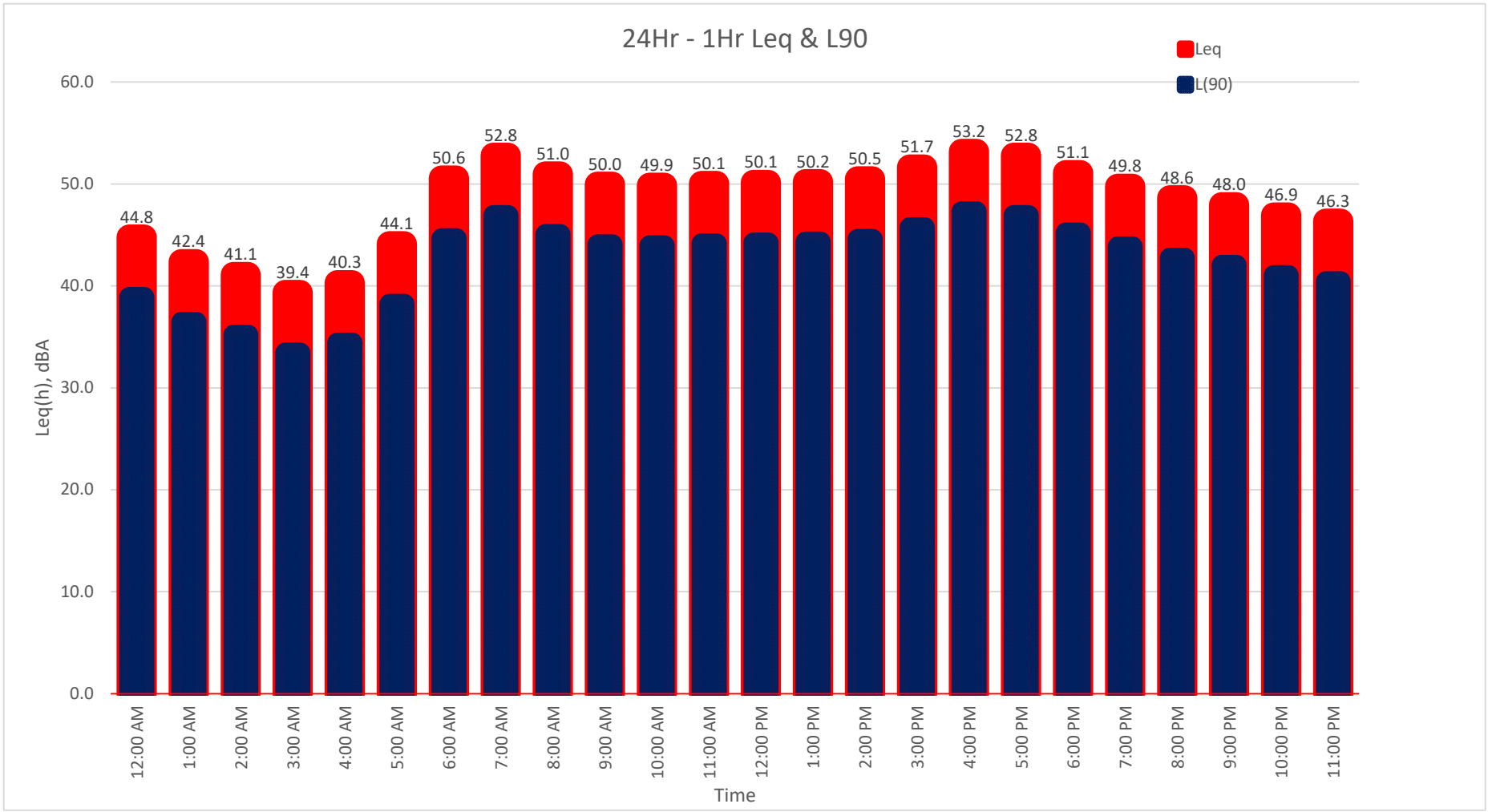
24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Super Star Car Wash Magnolia & Rockville **Day:** 1 of 1

Site Address/Location: NE of Magnolia Ave & Rockville St, Santee CA

Site ID: LT-1



Appendix B:

Manufacturers Reference Data

Project: Car Wash Tunnel Exit 100HP IDC Stealth System

Job Number: 0403-21-02

Site Address/Location:

Date: 03/04/2022

Field Tech/Engineer: Fco. Irarrazabal

Source/System: Car Wash Tunnel Exit with 100HP IDC Stealth

General Location: At the Tunnel Exit, approx 5-10'

Sound Meter: CoCo80 and PCB Mic's **SN:** PCB ending 86 &a

Settings:

Meteorological Cond.: 70 degrees F, 31 mph wind, southwest direction, partially cloud.

Site Observations:

Intensity measurements were taken at the existing tunnel exit. The whole Car Wash system was working, and cars passing by. Measurements were at 13 points across the tunnel exit opening, and the final Intensity level was averaged over the full area. There were strong winds at the site. Sound Power LwA was 94.27 dBA and Leq_A was 87.1 dBA.

Leq	Lmin	Lmax
87.1	86.6	87.8

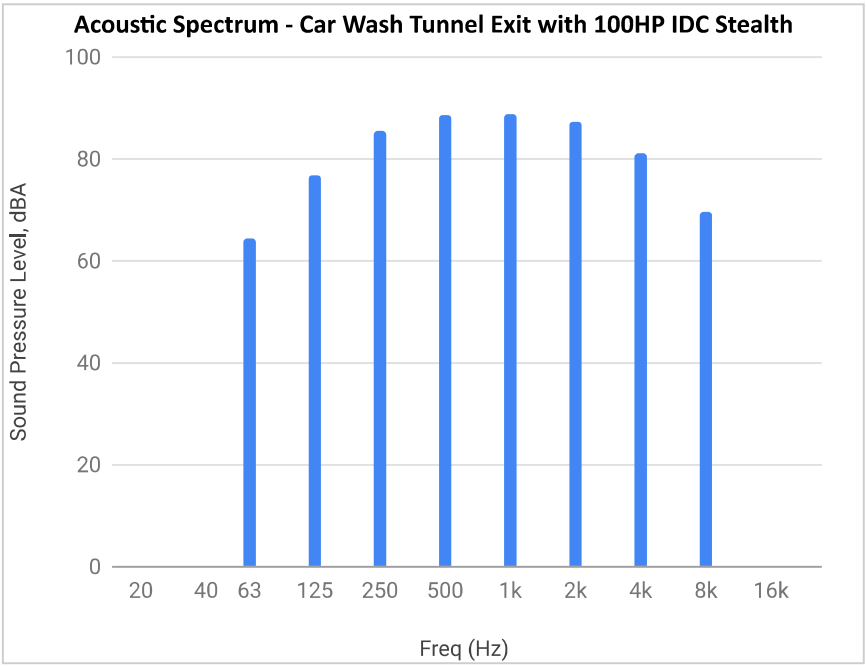
Ln 2	Ln 8	Ln 25	Ln 50	Ln 90	Ln 99
0.0	87.3	87.2	87.0	86.6	0.0

Table 1: Summary Measurement Data

Source/System	Overall Source	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	12.5	1.6k	2k	2.5k	3.15	4k	5k	6.3k	8k	10k	12.5	16k	20k
Car Wash Tunnel Exit with 100	Car Wash Dryer	94.3	0.0	0.0	0.0	0.0	0.0	64.6	0.0	0.0	77.0	0.0	0.0	85.7	0.0	0.0	88.8	0.0	0.0	89.0	0.0	0.0	87.5	0.0	0.0	81.3	0.0	0.0	69.8	0.0	0.0	0.0	0.0

Figure 1:

Figure 2:



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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

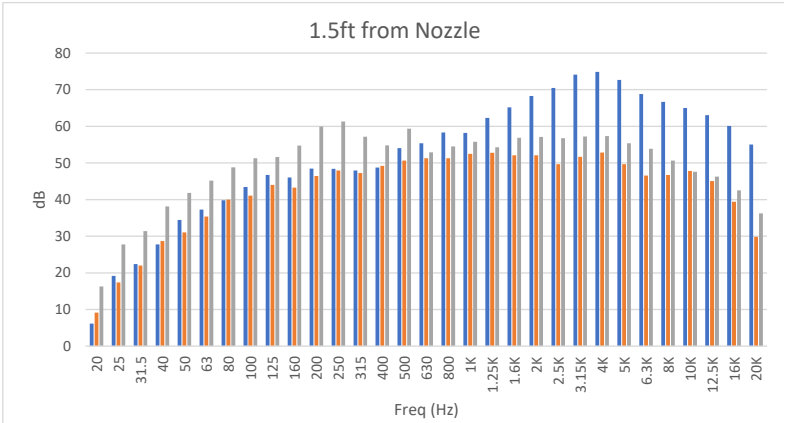
* Refers to the arthitmetic average of all measurements. This measurement represents an average of the multiple vacuum positions.

Figure 1: Example Measurement Position

Figure 1: Holstered

Figure 2: Un Holstered

Figure 3: Inside Car



SOUND LEVEL METER READINGS

MODEL: FT-DD-T340HP4 (40hp VACSTAR TURBINE VACUUM PRODUCER)

READING ONE: 43 DB-A, 3 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING TWO: 36 DB-A, 10 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING THREE: 24 DB-A, 20 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

READING FOUR: 12 DB-A, 30 FEET FROM TURBINE @ 45° ANGLE
AND NO BACKGROUND NOISE OR OUTSIDE INTERFERENCE.

NOTE: THESE READINGS WERE TAKEN OUTSIDE OF 8'x10'x8' CINDER BLOCK ENCLOSURE WITH CONCRETE SLAB AND WOOD JOIST ROOF.

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
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Appendix C:

SoundPLAN Input/Outputs

Magnolia & Rockvill Santee
Octave spectra of the sources in dB(A) - 003 - 120HP IDC - Standard: Outdoor SP

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)
001 - 120HP IDC - Standard Tunnel-Facade 01	Area	233.16	82.8	57.0	34.1	57.8	0.0	0.0		3	100%/24h	133_Facade 01	50.4	44.5	55.5	50.3	37.8	31.4	21.4	9.2	
001 - 120HP IDC - Standard Tunnel-Facade 02	Area	20.35	85.3	57.0	36.2	49.3	0.0	0.0		3	100%/24h	134_Facade 02	42.1	36.3	46.7	42.1	30.3	24.3	14.5	3.0	
001 - 120HP IDC - Standard Tunnel-Facade 03	Area	233.16	82.8	57.0	34.1	57.8	0.0	0.0		3	100%/24h	136_Facade 03	50.4	44.5	55.5	50.3	37.8	31.4	21.4	9.2	
001 - 120HP IDC - Standard Tunnel-Facade 04	Area	20.35	76.7	57.0	29.4	42.5	0.0	0.0		3	100%/24h	137_Facade 04	33.1	26.6	41.2	33.6	15.3	-0.4			
001 - 120HP IDC - Standard Tunnel-Roof 01	Area	277.12	82.7	57.0	34.0	58.4	0.0	0.0		0	100%/24h	128_Roof 01_	51.0	45.1	56.1	50.9	38.4	32.1	22.0	9.9	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Area	15.61	76.7	0.0	76.7	88.6	0.0	0.0		3	100%/24h	138_Transmissive area 01	61.8	69.3	86.0	84.4	75.0	63.0	47.2	30.1	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Area	15.61	85.3	0.0	85.3	97.3	0.0	0.0		3	100%/24h	135_Transmissive area 01	70.9	79.1	91.6	92.9	90.2	88.2	81.4	68.2	
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1

Magnolia & Rockvill Santee
Octave spectra of the sources in dB(A) - 003 - 120HP IDC - Standard: Outdoor SP

Name	Source type	I or A m,m²	Li dB(A)	R'w dB	L'w dB(A)	Lw dB(A)	KI dB	KT dB	LwMax dB(A)	DO-Wall dB	Time histogram	Emission spectrum	63Hz dB(A)	125Hz dB(A)	250Hz dB(A)	500Hz dB(A)	1kHz dB(A)	2kHz dB(A)	4kHz dB(A)	8kHz dB(A)	16kHz dB(A)
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1
Vac	Point				81.0	81.0	0.0	0.0		0	100%/24h	Vacutech - in car	61.6	69.0	76.6	72.9	71.4	73.2	72.6	67.6	58.1

Magnolia & Rockvill Santee
Contribution level - 003 - 120HP IDC - Standard: Outdoor SP

Source	Source group	Source type	Tr. lane	Ldn dB(A)	A dB	
Receiver R1 Fl G dB(A) Ldn 57.3 dB(A)						
Vac	Default industrial noise	Point		42.0	0.0	
Vac	Default industrial noise	Point		39.1	0.0	
Vac	Default industrial noise	Point		40.5	0.0	
Vac	Default industrial noise	Point		40.3	0.0	
Vac	Default industrial noise	Point		40.2	0.0	
Vac	Default industrial noise	Point		39.7	0.0	
Vac	Default industrial noise	Point		39.5	0.0	
Vac	Default industrial noise	Point		39.4	0.0	
Vac	Default industrial noise	Point		39.1	0.0	
Vac	Default industrial noise	Point		38.6	0.0	
Vac	Default industrial noise	Point		38.0	0.0	
Vac	Default industrial noise	Point		37.7	0.0	
Vac	Default industrial noise	Point		37.2	0.0	
Vac	Default industrial noise	Point		37.0	0.0	
Vac	Default industrial noise	Point		35.1	0.0	
Vac	Default industrial noise	Point		36.4	0.0	
Vac	Default industrial noise	Point		36.9	0.0	
Vac	Default industrial noise	Point		37.4	0.0	
Vac	Default industrial noise	Point		40.6	0.0	
Vac	Default industrial noise	Point		41.1	0.0	
Vac	Default industrial noise	Point		41.5	0.0	
Vac	Default industrial noise	Point		42.0	0.0	
Vac	Default industrial noise	Point		42.6	0.0	
Vac	Default industrial noise	Point		43.2	0.0	
Vac	Default industrial noise	Point		43.7	0.0	
Vac	Default industrial noise	Point		44.2	0.0	
Vac	Default industrial noise	Point		44.6	0.0	
Vac	Default industrial noise	Point		45.0	0.0	
Vac	Default industrial noise	Point		45.3	0.0	
Vac	Default industrial noise	Point		45.3	0.0	
Vac	Default industrial noise	Point		45.5	0.0	
001 - 120HP IDC - Standard Tunnel-Roof 01	Default industrial noise	Area		13.6	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 01	Default industrial noise	Area		8.2	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 02	Default industrial noise	Area		1.2	0.0	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Default industrial noise	Area		39.4	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 03	Default industrial noise	Area		12.3	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 04	Default industrial noise	Area		4.2	0.0	

Source	Source group	Source type	Tr. lane	Ldn dB(A)	A dB	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Default industrial noise	Area		49.3	0.0	
Receiver R2 Fl G dB(A) Ldn 56.3 dB(A)						
Vac	Default industrial noise	Point		36.9	0.0	
Vac	Default industrial noise	Point		38.7	0.0	
Vac	Default industrial noise	Point		38.9	0.0	
Vac	Default industrial noise	Point		38.7	0.0	
Vac	Default industrial noise	Point		38.6	0.0	
Vac	Default industrial noise	Point		38.6	0.0	
Vac	Default industrial noise	Point		38.7	0.0	
Vac	Default industrial noise	Point		38.9	0.0	
Vac	Default industrial noise	Point		39.1	0.0	
Vac	Default industrial noise	Point		39.1	0.0	
Vac	Default industrial noise	Point		39.1	0.0	
Vac	Default industrial noise	Point		39.0	0.0	
Vac	Default industrial noise	Point		38.9	0.0	
Vac	Default industrial noise	Point		38.9	0.0	
Vac	Default industrial noise	Point		37.2	0.0	
Vac	Default industrial noise	Point		39.3	0.0	
Vac	Default industrial noise	Point		40.2	0.0	
Vac	Default industrial noise	Point		40.8	0.0	
Vac	Default industrial noise	Point		44.3	0.0	
Vac	Default industrial noise	Point		44.6	0.0	
Vac	Default industrial noise	Point		44.9	0.0	
Vac	Default industrial noise	Point		45.0	0.0	
Vac	Default industrial noise	Point		41.9	0.0	
Vac	Default industrial noise	Point		42.3	0.0	
Vac	Default industrial noise	Point		42.0	0.0	
Vac	Default industrial noise	Point		41.9	0.0	
Vac	Default industrial noise	Point		41.6	0.0	
Vac	Default industrial noise	Point		40.5	0.0	
Vac	Default industrial noise	Point		39.9	0.0	
Vac	Default industrial noise	Point		39.4	0.0	
Vac	Default industrial noise	Point		39.1	0.0	
001 - 120HP IDC - Standard Tunnel-Roof 01	Default industrial noise	Area		14.0	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 01	Default industrial noise	Area		8.0	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 02	Default industrial noise	Area		5.3	0.0	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Default industrial noise	Area		46.6	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 03	Default industrial noise	Area		12.6	0.0	

Magnolia & Rockvill Santee
Contribution level - 003 - 120HP IDC - Standard: Outdoor SP

Source	Source group	Source type	Tr. lane	Ldn dB(A)	A dB	
001 - 120HP IDC - Standard Tunnel-Facade 04	Default industrial noise	Area		-4.0	0.0	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Default industrial noise	Area		36.5	0.0	
Receiver R3 Fl G dB(A) Ldn 58.5 dB(A)						
Vac	Default industrial noise	Point		33.3	0.0	
Vac	Default industrial noise	Point		33.6	0.0	
Vac	Default industrial noise	Point		34.1	0.0	
Vac	Default industrial noise	Point		34.4	0.0	
Vac	Default industrial noise	Point		34.8	0.0	
Vac	Default industrial noise	Point		35.1	0.0	
Vac	Default industrial noise	Point		35.5	0.0	
Vac	Default industrial noise	Point		35.9	0.0	
Vac	Default industrial noise	Point		36.3	0.0	
Vac	Default industrial noise	Point		36.8	0.0	
Vac	Default industrial noise	Point		37.2	0.0	
Vac	Default industrial noise	Point		37.7	0.0	
Vac	Default industrial noise	Point		38.2	0.0	
Vac	Default industrial noise	Point		38.7	0.0	
Vac	Default industrial noise	Point		39.7	0.0	
Vac	Default industrial noise	Point		34.5	0.0	
Vac	Default industrial noise	Point		34.3	0.0	
Vac	Default industrial noise	Point		33.9	0.0	
Vac	Default industrial noise	Point		33.6	0.0	
Vac	Default industrial noise	Point		23.2	0.0	
Vac	Default industrial noise	Point		22.9	0.0	
Vac	Default industrial noise	Point		32.6	0.0	
Vac	Default industrial noise	Point		32.2	0.0	
Vac	Default industrial noise	Point		31.9	0.0	
Vac	Default industrial noise	Point		31.6	0.0	
Vac	Default industrial noise	Point		32.4	0.0	
Vac	Default industrial noise	Point		31.9	0.0	
Vac	Default industrial noise	Point		31.6	0.0	
Vac	Default industrial noise	Point		31.3	0.0	
Vac	Default industrial noise	Point		30.6	0.0	
Vac	Default industrial noise	Point		30.3	0.0	
001 - 120HP IDC - Standard Tunnel-Roof 01	Default industrial noise	Area		11.7	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 01	Default industrial noise	Area		11.3	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 02	Default industrial noise	Area		9.4	0.0	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Default industrial noise	Area		57.9	0.0	

Source	Source group	Source type	Tr. lane	Ldn dB(A)	A dB	
001 - 120HP IDC - Standard Tunnel-Facade 03	Default industrial noise	Area		14.1	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 04	Default industrial noise	Area		-10.7	0.0	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Default industrial noise	Area		29.0	0.0	
Receiver R4 Fl G dB(A) Ldn 56.4 dB(A)						
Vac	Default industrial noise	Point		25.0	0.0	
Vac	Default industrial noise	Point		24.0	0.0	
Vac	Default industrial noise	Point		21.2	0.0	
Vac	Default industrial noise	Point		21.6	0.0	
Vac	Default industrial noise	Point		21.5	0.0	
Vac	Default industrial noise	Point		21.0	0.0	
Vac	Default industrial noise	Point		23.5	0.0	
Vac	Default industrial noise	Point		19.6	0.0	
Vac	Default industrial noise	Point		19.8	0.0	
Vac	Default industrial noise	Point		20.2	0.0	
Vac	Default industrial noise	Point		20.9	0.0	
Vac	Default industrial noise	Point		21.9	0.0	
Vac	Default industrial noise	Point		32.8	0.0	
Vac	Default industrial noise	Point		33.1	0.0	
Vac	Default industrial noise	Point		34.4	0.0	
Vac	Default industrial noise	Point		32.5	0.0	
Vac	Default industrial noise	Point		32.4	0.0	
Vac	Default industrial noise	Point		32.3	0.0	
Vac	Default industrial noise	Point		31.9	0.0	
Vac	Default industrial noise	Point		31.5	0.0	
Vac	Default industrial noise	Point		31.1	0.0	
Vac	Default industrial noise	Point		31.1	0.0	
Vac	Default industrial noise	Point		26.0	0.0	
Vac	Default industrial noise	Point		25.5	0.0	
Vac	Default industrial noise	Point		25.1	0.0	
Vac	Default industrial noise	Point		24.9	0.0	
Vac	Default industrial noise	Point		25.1	0.0	
Vac	Default industrial noise	Point		25.9	0.0	
Vac	Default industrial noise	Point		25.5	0.0	
Vac	Default industrial noise	Point		25.2	0.0	
Vac	Default industrial noise	Point		24.9	0.0	
001 - 120HP IDC - Standard Tunnel-Roof 01	Default industrial noise	Area		11.4	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 01	Default industrial noise	Area		15.4	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 02	Default industrial noise	Area		9.0	0.0	

Magnolia & Rockvill Santee
Contribution level - 003 - 120HP IDC - Standard: Outdoor SP

Source	Source group	Source type	Tr. lane	Ldn dB(A)	A dB	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Default industrial noise	Area		56.1	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 03	Default industrial noise	Area		9.3	0.0	
001 - 120HP IDC - Standard Tunnel-Facade 04	Default industrial noise	Area		-8.4	0.0	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Default industrial noise	Area		30.2	0.0	

Magnolia & Rockvill Santee
Contribution spectra - 003 - 120HP IDC - Standard: 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 R1 Fl G dB(A) Ldn 57.3 dB(A)																													
001 - 120HP IDC - Standard Tunnel-Facade 01	Ldn	8.2					6.6			-4.8			1.8			-6.4			-20.1			-28.1			-40.7			-59.1	
001 - 120HP IDC - Standard Tunnel-Facade 02	Ldn	1.2					-0.5			-11.6			-5.3			-12.9			-26.4			-35.0			-48.2			-67.3	
001 - 120HP IDC - Standard Tunnel-Facade 03	Ldn	12.3					9.8			-0.8			7.5			0.2			-13.2			-20.8			-33.2			-51.1	
001 - 120HP IDC - Standard Tunnel-Facade 04	Ldn	4.2					-1.8			-11.0			1.8			-4.2			-20.6			-36.3			-57.0			-77.6	
001 - 120HP IDC - Standard Tunnel-Roof 01	Ldn	13.6					9.0			-0.2			10.4			4.6			-7.4			-15.5			-29.2			-49.8	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Ldn	49.3					24.5			31.2			45.6			45.9			39.0			27.1			10.0			-11.9	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Ldn	39.4					26.7			29.5			35.3			33.6			30.4			27.3			17.9			-2.5	
Vac	Ldn	42.6	5.0	8.0	15.0	19.0	22.0	26.0	25.9	26.9	29.9	29.8	30.8	26.7	24.4	28.4	22.5	29.0	30.0	27.9	32.8	32.6	32.4	32.0	31.4	28.5	26.2	21.3	15.7
Vac	Ldn	43.2	5.5	8.5	15.5	19.5	22.5	26.5	26.4	27.4	30.4	30.4	31.4	28.1	25.0	29.0	23.1	29.5	30.4	28.4	33.2	33.1	32.8	32.5	31.9	29.1	26.8	22.1	16.6
Vac	Ldn	43.7	6.0	9.0	16.0	20.0	23.0	27.0	26.9	27.9	30.9	31.1	32.1	28.8	25.7	29.7	23.8	30.0	31.0	28.9	33.7	33.5	33.3	33.0	32.4	29.6	27.5	22.8	17.5
Vac	Ldn	41.1	3.9	6.9	13.9	17.9	20.9	24.9	24.5	25.5	28.5	27.8	28.8	24.8	22.7	26.6	20.7	27.5	28.4	26.3	31.4	31.2	30.9	30.4	29.7	26.6	24.1	19.0	12.9
Vac	Ldn	41.5	4.2	7.2	14.2	18.2	21.2	25.2	25.0	26.0	28.9	28.5	29.5	25.4	23.2	27.2	21.3	28.0	28.9	26.8	31.8	31.6	31.3	30.8	30.2	27.2	24.8	19.7	13.8
Vac	Ldn	42.0	4.5	7.5	14.5	18.5	21.5	25.5	25.4	26.4	29.4	29.0	30.0	26.0	23.7	27.7	21.8	28.5	29.4	27.3	32.3	32.1	31.8	31.4	30.7	27.8	25.4	20.5	14.7
Vac	Ldn	45.3	7.5	10.5	17.5	21.5	24.5	28.5	28.5	29.5	32.5	33.2	34.2	30.7	27.7	31.7	25.8	31.4	32.4	30.3	34.9	34.8	34.6	34.4	34.0	31.3	29.4	25.0	20.1
Vac	Ldn	45.3	7.7	10.7	17.7	21.7	24.7	28.7	28.7	29.7	32.7	33.5	34.5	30.5	27.5	31.5	25.6	31.3	32.3	30.3	34.8	34.7	34.6	34.3	33.9	31.4	29.5	25.2	20.3
Vac	Ldn	45.5	7.9	10.9	17.9	21.9	24.9	28.9	28.8	29.8	32.8	33.7	34.7	30.7	27.8	31.8	25.9	31.5	32.5	30.5	35.0	34.9	34.7	34.5	34.1	31.6	29.7	25.4	20.6
Vac	Ldn	44.2	6.4	9.4	16.4	20.4	23.4	27.4	27.3	28.3	31.3	31.7	32.7	29.3	26.2	30.2	24.4	30.4	31.4	29.3	34.0	33.9	33.7	33.3	32.8	30.1	28.0	23.4	18.2
Vac	Ldn	44.6	6.9	9.9	16.9	20.9	23.9	27.8	27.8	28.8	31.8	32.3	33.3	29.8	26.8	30.8	24.9	30.9	31.8	29.8	34.5	34.3	34.1	33.8	33.3	30.6	28.6	24.1	18.9
Vac	Ldn	45.0	7.2	10.2	17.2	21.2	24.2	28.2	28.1	29.1	32.1	32.8	33.8	30.3	27.3	31.3	25.4	31.2	32.2	30.1	34.8	34.7	34.5	34.2	33.7	31.0	29.0	24.6	19.5
Vac	Ldn	39.7	0.0	2.9	9.8	13.7	16.7	20.6	20.3	23.2	26.3	30.2	31.1	27.1	24.0	28.0	22.1	25.6	26.5	24.4	28.6	28.4	28.0	27.4	26.6	23.4	20.7	15.3	8.9
Vac	Ldn	39.5	0.0	2.9	9.8	13.7	16.6	20.5	20.2	23.0	26.0	29.9	30.9	26.8	23.7	27.6	21.8	25.5	26.4	24.3	28.5	28.3	27.8	27.2	26.3	23.0	20.2	14.6	8.1
Vac	Ldn	39.4	0.1	2.9	9.7	13.6	16.5	20.4	20.0	22.8	25.8	29.6	30.6	26.5	23.3	27.3	21.5	25.6	26.4	24.3	28.8	28.4	28.0	27.3	26.3	22.8	19.8	14.0	7.3
Vac	Ldn	39.1	0.0	2.8	9.6	13.5	16.4	20.3	19.7	22.6	25.5	29.3	30.3	26.2	22.9	26.9	20.9	25.3	26.2	24.1	28.6	28.3	27.8	27.1	26.1	22.7	19.7	13.9	7.1
Vac	Ldn	40.2	1.5	4.3	11.1	14.9	17.7	21.5	22.8	23.8	26.8	30.5	31.5	27.4	24.3	28.3	22.4	26.1	27.0	24.9	29.1	28.9	28.5	28.0	27.2	24.1	21.4	16.1	9.9
Vac	Ldn	42.0	4.8	7.8	14.8	18.8	21.8	25.8	25.7	26.7	29.7	29.5	30.5	26.5	23.3	27.3	21.6	28.1	29.1	27.0	31.9	31.7	31.5	31.2	30.6	27.8	25.6	20.8	15.2
Vac	Ldn	39.1	2.7	5.5	12.3	16.1	18.9	22.7	22.4	23.2	26.0	29.4	30.3	26.2	23.2	27.2	21.5	24.6	25.5	23.4	27.6	27.4	27.1	26.7	26.1	23.2	20.9	16.1	10.4
Vac	Ldn	40.5	1.9	4.6	11.4	15.2	18.0	21.8	23.2	24.1	27.1	30.9	31.8	27.8	24.7	28.7	22.9	26.0	26.9	24.9	29.1	28.9	28.6	28.3	27.7	24.7	22.4	17.4	11.5
Vac	Ldn	40.3	1.2	4.0	10.8	14.6	17.5	21.3	22.8	23.7	26.8	30.6	31.6	27.6	24.5	28.5	22.7	26.1	27.0	24.9	29.1	28.9	28.6	28.2	27.5	24.5	22.0	16.8	10.8
Vac	Ldn	38.6	-0.6	2.3	9.2	13.0	16.0	19.9	19.3	20.2	25.2	29.0	29.9	25.9	22.5	26.5	20.5	24.8	25.6	23.5	27.8	27.5	27.1	26.4	25.4	22.0	19.1	13.3	6.4

Magnolia & Rockvill Santee
Contribution spectra - 003 - 120HP IDC - Standard: 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)
Vac	Ldn	36.4	-1.1	1.7	8.6	12.4	15.3	19.2	18.3	19.3	22.2	25.5	26.5	22.5	19.1	24.4	18.5	22.9	23.8	21.7	26.2	25.9	25.5	24.9	24.0	20.6	17.6	11.6	4.5
Vac	Ldn	36.9	-0.6	2.2	9.1	12.9	15.8	19.7	18.9	19.8	22.7	26.0	27.0	23.0	19.6	24.9	19.0	23.4	24.3	22.2	26.7	26.4	26.0	25.4	24.5	21.1	18.2	12.4	5.5
Vac	Ldn	37.4	0.0	2.8	9.6	13.5	16.3	20.2	19.5	20.3	23.2	26.6	27.6	23.6	21.3	25.4	19.6	23.8	24.7	22.6	27.0	26.8	26.4	25.9	25.0	21.7	18.9	13.3	6.6
Vac	Ldn	40.6	3.6	6.6	13.6	17.6	20.5	24.5	24.1	25.1	28.0	27.2	28.2	24.2	22.1	26.1	20.2	27.1	28.1	26.0	31.1	30.9	30.5	30.0	29.3	26.2	23.6	18.3	12.0
Vac	Ldn	35.1	-2.1	0.8	7.6	11.5	14.4	18.3	17.4	18.3	21.3	24.4	25.7	21.6	18.1	22.4	16.3	21.5	22.4	20.2	25.0	24.6	24.1	23.4	22.3	18.7	15.4	9.3	2.0
Vac	Ldn	38.0	-0.8	2.0	8.9	12.8	15.7	19.6	18.9	19.8	24.9	28.6	29.5	25.5	22.1	26.0	20.1	24.3	25.1	22.9	27.2	26.8	26.3	25.5	24.3	20.8	17.5	11.5	4.3
Vac	Ldn	37.7	-0.8	2.0	8.9	12.7	15.6	19.5	18.8	19.7	24.7	28.1	29.1	25.1	21.6	25.7	19.7	24.0	24.8	22.6	26.9	26.5	25.9	25.1	24.0	20.4	17.1	11.0	3.7
Vac	Ldn	37.2	-1.8	1.1	8.1	12.0	15.0	18.9	18.2	19.1	24.2	27.6	28.7	24.7	21.2	25.3	19.3	23.7	24.5	22.2	26.6	26.1	25.5	24.6	23.4	19.6	16.2	9.8	2.3
Vac	Ldn	37.0	-1.8	1.1	8.0	11.9	14.8	18.7	17.9	18.8	24.0	27.2	28.3	24.2	20.8	24.9	18.9	23.4	24.3	22.1	26.5	26.1	25.5	24.7	23.6	19.9	16.5	10.2	2.7
Receiver R2 Fl G dB(A) Ldn 56.3 dB(A)																													
001 - 120HP IDC - Standard Tunnel-Facade 01	Ldn	8.0					6.3			-5.2			1.6			-7.1			-21.1			-28.8			-41.1			-59.4	
001 - 120HP IDC - Standard Tunnel-Facade 02	Ldn	5.3					3.0			-7.1			-0.7			-5.2			-18.2			-26.0			-39.7			-60.8	
001 - 120HP IDC - Standard Tunnel-Facade 03	Ldn	12.6					10.0			-0.7			7.8			0.3			-13.4			-21.4			-34.1			-52.7	
001 - 120HP IDC - Standard Tunnel-Facade 04	Ldn	-4.0					-7.1			-18.5			-7.8			-17.8			-30.4			-46.7			-69.6			-97.1	
001 - 120HP IDC - Standard Tunnel-Roof 01	Ldn	14.0					9.3			0.1			10.7			5.3			-7.2			-15.3			-29.1			-49.8	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Ldn	36.5					20.3			22.9			33.9			30.3			28.1			15.7			-2.6			-31.5	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Ldn	46.6					29.5			33.4			40.1			43.0			39.3			35.3			24.1			2.2	
Vac	Ldn	41.9	7.3	7.4	14.2	18.0	20.8	24.6	24.3	25.2	28.1	31.8	32.7	29.3	27.1	31.1	25.0	27.4	28.4	26.3	30.5	30.3	30.0	29.7	29.1	26.4	24.4	20.0	15.0
Vac	Ldn	42.3	7.2	8.4	15.3	19.2	22.1	25.9	25.7	26.6	29.4	32.4	33.3	29.7	27.2	31.2	25.2	27.9	28.7	26.6	30.8	30.5	30.2	29.8	29.2	26.4	24.3	19.9	14.8
Vac	Ldn	42.0	5.1	8.0	14.8	18.7	21.5	25.4	25.1	25.9	28.8	31.9	32.8	29.3	27.0	31.0	24.9	27.5	28.4	26.3	30.5	30.2	29.9	29.5	28.9	26.1	24.1	19.6	14.5
Vac	Ldn	44.6	7.1	10.1	17.1	21.1	24.1	28.1	28.0	29.0	32.0	32.6	33.5	29.5	27.0	31.0	25.0	30.6	31.7	29.6	34.2	34.1	33.9	33.6	33.2	30.6	28.6	24.2	19.2
Vac	Ldn	44.9	7.3	10.3	17.3	21.3	24.3	28.3	28.2	29.2	32.2	32.9	33.8	29.8	27.3	31.3	25.2	30.9	31.9	29.9	34.5	34.3	34.2	33.9	33.5	30.8	28.9	24.5	19.6
Vac	Ldn	45.0	7.3	10.3	17.3	21.3	24.3	28.3	28.3	29.3	32.3	32.9	33.9	29.9	27.4	31.4	25.4	31.1	32.0	30.0	34.6	34.4	34.3	34.0	33.6	30.9	29.0	24.6	19.7
Vac	Ldn	39.9	0.9	3.9	10.9	14.9	17.9	21.9	21.7	22.7	25.7	29.8	30.8	27.5	25.1	29.1	23.0	25.6	26.6	24.5	28.6	28.4	28.1	27.7	27.2	24.3	22.2	17.4	12.0
Vac	Ldn	39.4	0.4	3.4	10.4	14.4	17.4	21.4	21.2	22.2	25.2	29.4	30.3	27.1	24.5	28.4	22.3	25.1	26.1	24.0	28.1	27.9	27.6	27.2	26.6	23.7	21.4	16.6	11.1
Vac	Ldn	39.1	0.0	3.0	10.0	14.0	17.0	20.9	20.8	21.8	24.8	28.9	29.9	26.7	23.9	27.9	21.8	24.8	25.9	23.7	27.9	27.7	27.4	27.0	26.4	23.5	21.3	16.5	11.0
Vac	Ldn	41.9	2.0	5.0	12.0	16.0	19.0	23.0	23.0	24.0	27.0	31.1	32.1	28.7	26.6	30.6	24.6	27.1	28.1	26.1	30.5	30.5	30.4	30.3	30.2	28.0	26.9	23.9	18.8
Vac	Ldn	41.6	1.7	4.7	11.7	15.7	18.7	22.7	22.6	23.6	26.6	30.7	31.7	28.4	26.2	30.2	24.1	26.8	27.9	25.9	30.3	30.3	30.3	30.2	30.2	28.3	27.6	23.3	18.1
Vac	Ldn	40.5	1.3	4.3	11.3	15.3	18.3	22.3	22.2	23.2	26.2	30.3	31.2	27.9	25.7	29.7	23.6	26.2	27.2	25.0	29.3	29.1	28.8	28.4	27.7	24.9	22.7	18.0	12.7
Vac	Ldn	38.6	0.0	2.9	9.8	13.7	16.6	20.6	20.3	23.1	26.2	30.1	31.0	26.9	24.1	28.1	22.0	24.1	25.1	22.7	26.6	25.9	25.1	24.1	22.7	19.0	15.7	9.7	2.8

Magnolia & Rockvill Santee
Contribution spectra - 003 - 120HP IDC - Standard: 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)
Vac	Ldn	38.7	0.5	3.3	10.2	14.0	16.9	20.8	20.5	23.3	26.4	30.3	31.2	27.0	24.3	28.3	22.1	24.2	25.2	22.7	26.6	25.9	25.1	24.0	22.7	18.9	15.7	9.8	2.9
Vac	Ldn	38.9	0.8	3.6	10.4	14.3	17.1	21.0	20.7	23.4	26.5	30.4	31.3	27.1	24.4	28.4	22.2	24.5	25.4	23.0	26.9	26.2	25.4	24.4	23.2	19.5	16.3	10.4	3.6
Vac	Ldn	39.1	1.2	4.0	10.7	14.5	17.4	21.2	20.9	23.6	26.5	30.5	31.4	27.3	24.6	28.5	22.3	24.6	25.8	23.3	27.4	26.8	26.0	24.9	23.6	19.8	16.5	10.6	3.7
Vac	Ldn	38.6	-0.2	2.7	9.6	13.5	16.5	20.4	20.1	23.0	26.1	29.9	30.9	26.7	23.8	27.9	21.9	24.5	25.3	22.9	26.8	26.2	25.4	24.3	23.0	19.3	16.0	10.0	3.0
Vac	Ldn	36.9	-1.3	1.7	8.7	12.7	15.7	19.7	19.2	20.2	23.4	27.2	28.2	24.1	20.8	24.9	18.8	22.6	23.5	21.4	25.7	25.5	25.1	24.7	24.0	20.9	18.4	13.2	7.0
Vac	Ldn	38.7	0.7	3.5	10.3	14.0	16.8	20.7	20.1	22.8	25.8	29.4	30.3	26.3	22.9	27.0	21.0	24.4	25.3	23.1	27.4	27.1	26.7	26.1	25.3	22.1	19.4	13.9	7.3
Vac	Ldn	38.9	1.1	3.8	10.6	14.4	17.2	21.0	20.5	23.1	26.1	29.7	30.6	26.6	23.3	27.3	21.3	24.7	25.5	23.3	27.5	27.2	26.8	26.1	25.3	22.0	19.2	13.7	7.2
Vac	Ldn	38.7	1.4	4.2	11.0	14.8	17.7	21.5	20.9	23.4	26.4	29.9	30.8	26.7	23.6	27.7	21.6	24.7	25.4	23.0	27.0	26.3	25.5	24.5	23.2	19.4	16.1	10.1	3.2
Vac	Ldn	39.1	0.5	3.3	10.2	14.1	17.0	20.9	20.7	23.5	26.4	30.5	31.4	27.3	24.6	28.5	22.5	24.7	25.7	23.3	27.3	26.7	25.9	24.9	23.6	19.8	16.6	10.6	3.8
Vac	Ldn	39.3	1.5	4.4	11.3	15.2	18.1	22.1	21.9	22.8	25.8	29.8	30.8	26.7	24.5	28.5	22.5	24.5	25.6	23.5	27.6	27.3	26.9	26.4	25.7	22.7	20.3	15.3	9.6
Vac	Ldn	40.2	1.9	4.8	11.7	15.6	18.5	22.5	22.3	23.3	26.2	30.2	31.2	27.1	25.7	29.6	23.6	25.8	26.8	24.8	28.9	28.6	28.3	27.8	27.1	24.1	21.6	16.7	10.9
Vac	Ldn	40.8	2.8	5.6	12.4	16.3	19.2	23.1	22.9	23.8	26.8	30.7	31.7	27.6	26.2	30.1	24.1	26.3	27.3	25.3	29.4	29.2	29.0	28.5	27.9	25.1	22.9	18.1	12.7
Vac	Ldn	44.3	6.8	9.8	16.8	20.8	23.8	27.8	27.7	28.7	31.7	32.2	33.1	29.1	26.6	30.6	24.6	30.3	31.4	29.3	34.0	33.9	33.7	33.4	32.9	30.2	28.3	23.8	18.7
Vac	Ldn	37.2	0.2	3.0	9.8	13.7	16.6	20.5	20.0	20.9	23.9	27.7	28.7	24.6	21.8	25.8	19.8	22.5	24.0	21.8	26.1	25.7	25.1	24.3	23.2	19.8	16.8	11.1	4.5
Vac	Ldn	39.1	0.2	3.1	10.0	13.9	16.9	20.8	20.6	23.4	26.3	30.4	31.3	27.2	24.5	28.5	22.4	24.8	25.8	23.4	27.4	26.8	25.9	24.9	23.5	19.7	16.3	10.3	3.4
Vac	Ldn	39.0	0.2	3.1	10.0	13.9	16.8	20.7	20.5	23.3	26.2	30.3	31.2	27.1	24.4	28.3	22.3	24.6	25.5	23.2	27.2	26.7	26.1	25.3	24.2	20.7	17.7	12.0	5.4
Vac	Ldn	38.9	0.2	3.1	9.9	13.8	16.7	20.7	20.4	23.2	26.1	30.1	31.0	26.9	24.2	28.2	22.1	24.4	25.5	23.2	27.2	26.7	26.1	25.2	24.1	20.6	17.5	11.7	5.0
Vac	Ldn	38.9	0.2	3.0	9.9	13.8	16.7	20.6	20.2	23.1	26.0	30.0	30.9	26.8	24.0	27.9	21.9	24.4	25.5	23.2	27.3	26.9	26.3	25.5	24.4	20.9	17.9	12.2	5.4
Receiver R3 Fl G dB(A) Ldn 58.5 dB(A)																													
001 - 120HP IDC - Standard Tunnel-Facade 01	Ldn	11.3					9.2			-0.9			5.3			-0.3			-12.4			-20.6			-34.5			-54.8	
001 - 120HP IDC - Standard Tunnel-Facade 02	Ldn	9.4					3.6			-4.3			5.9			2.8			-6.7			-12.5			-23.7			-40.4	
001 - 120HP IDC - Standard Tunnel-Facade 03	Ldn	14.1					10.5			1.0			9.7			5.3			-5.7			-12.8			-25.2			-43.7	
001 - 120HP IDC - Standard Tunnel-Facade 04	Ldn	-10.7					-13.1			-25.7			-15.2			-24.9			-35.1			-52.0			-76.5				
001 - 120HP IDC - Standard Tunnel-Roof 01	Ldn	11.7					6.7			-2.3			8.6			3.4			-8.4			-14.9			-26.8			-45.4	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Ldn	29.0					14.0			14.9			25.2			21.6			24.1			11.4			-9.1			-42.9	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Ldn	57.9					32.2			38.3			49.5			52.2			52.7			51.5			43.3			24.8	
Vac	Ldn	32.2	-2.7	0.2	7.0	10.9	13.8	17.7	16.6	17.5	20.4	18.9	19.7	15.6	12.1	15.9	9.8	17.9	18.8	17.5	23.1	22.7	22.2	21.5	20.4	16.8	13.6	7.3	-0.4
Vac	Ldn	31.9	-2.9	-0.1	6.8	10.6	13.5	17.4	16.2	17.1	20.1	18.4	19.3	15.2	11.6	15.5	9.4	17.5	19.3	17.2	22.8	22.5	22.0	21.2	20.1	16.4	13.1	6.7	-1.2
Vac	Ldn	31.6	-3.2	-0.3	6.5	10.4	13.3	17.2	15.9	16.8	19.7	18.0	18.9	14.7	11.2	15.0	8.9	17.1	19.1	16.9	22.6	22.2	21.7	20.9	19.7	16.0	12.5	6.0	-2.1
Vac	Ldn	23.2	-6.5	-4.4	1.6	4.5	6.5	9.5	7.7	7.7	9.7	11.7	11.7	6.7	3.5	6.3	-0.9	0.9	1.7	9.7	15.5	14.8	13.7	11.9	9.3	3.6	-2.0	-9.7	-17.3

Magnolia & Rockvill Santee
Contribution spectra - 003 - 120HP IDC - Standard: 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)
Vac	Ldn	22.9	-8.4	-6.2	-0.1	3.0	5.1	8.2	6.3	6.3	8.3	11.0	11.0	5.9	2.8	5.7	-1.5	-0.4	0.5	9.8	15.6	14.9	13.7	12.0	9.4	3.6	-2.3	-10.5	-18.4
Vac	Ldn	32.6	-2.3	0.5	7.4	11.2	14.1	18.0	16.9	17.9	20.8	19.4	20.2	16.1	12.6	16.5	10.4	18.3	19.2	17.8	23.3	23.0	22.5	21.8	20.8	17.2	14.0	7.9	0.3
Vac	Ldn	31.3	-4.7	-1.8	5.1	9.0	11.9	15.8	14.4	15.3	18.3	20.4	21.4	17.4	13.7	17.6	11.6	16.7	18.8	16.7	21.6	21.2	20.6	19.6	18.1	14.0	9.9	2.5	-6.6
Vac	Ldn	30.6	-5.6	-2.6	4.4	8.4	11.4	15.3	13.9	14.9	17.8	20.1	21.0	17.0	13.3	17.2	11.2	17.0	17.9	15.7	20.4	20.0	19.4	18.5	17.1	13.1	9.1	1.7	-7.6
Vac	Ldn	30.3	-5.2	-2.3	4.5	8.4	11.3	15.3	13.7	14.7	17.6	19.7	20.7	16.6	12.9	16.8	10.8	16.8	17.7	15.5	20.2	19.8	19.3	18.4	17.0	12.9	8.9	1.4	-8.0
Vac	Ldn	32.4	-2.7	0.1	6.9	10.7	13.6	17.4	16.0	16.9	19.7	21.7	22.6	18.6	15.0	18.9	12.9	17.8	19.6	17.5	22.4	22.0	21.4	20.6	19.4	15.6	12.0	5.3	-3.0
Vac	Ldn	31.9	-4.4	-1.5	5.5	9.4	12.3	16.3	14.9	15.9	18.9	21.2	22.2	18.2	14.5	18.5	12.4	17.3	19.3	17.1	22.0	21.6	21.0	20.1	18.7	14.8	10.9	3.9	-4.7
Vac	Ldn	31.6	-4.6	-1.7	5.2	9.2	12.1	16.1	14.7	15.6	18.6	20.8	21.8	17.8	14.1	18.0	12.0	17.0	19.1	16.9	21.9	21.5	20.8	19.9	18.5	14.5	10.6	3.5	-5.4
Vac	Ldn	35.1	-4.3	-1.2	5.8	9.9	13.0	17.1	16.0	17.2	20.4	21.8	22.8	18.8	15.1	19.1	13.1	21.6	22.9	20.8	26.5	26.2	25.7	25.0	23.9	20.3	16.9	10.3	2.1
Vac	Ldn	35.5	-4.0	-1.0	6.1	10.2	13.3	17.4	16.3	17.5	20.8	22.3	23.3	19.2	15.6	19.6	13.5	22.0	23.3	21.2	26.8	26.5	26.1	25.4	24.4	20.8	17.5	11.0	3.1
Vac	Ldn	35.9	-3.7	-0.7	6.4	10.5	13.6	17.7	16.7	17.9	21.1	22.8	23.7	19.7	16.1	20.1	14.1	22.4	23.3	21.5	27.1	26.8	26.4	25.8	24.8	21.3	18.1	11.8	4.1
Vac	Ldn	36.3	-3.4	-0.4	6.7	10.8	13.9	18.0	17.0	18.2	21.5	23.2	24.2	20.2	16.6	20.6	14.6	22.8	23.7	21.9	27.5	27.2	26.8	26.2	25.2	21.8	18.7	12.6	5.0
Vac	Ldn	34.8	-4.6	-1.5	5.5	9.6	12.7	16.8	15.6	16.8	20.1	21.4	22.3	18.3	14.6	18.6	12.6	21.2	22.6	20.5	26.1	25.8	25.4	24.6	23.5	19.8	16.2	9.5	1.1
Vac	Ldn	33.3	-5.6	-2.6	4.5	8.6	11.7	15.8	14.5	15.7	18.9	19.8	20.8	16.8	13.0	17.0	11.0	20.2	21.1	19.0	24.7	24.4	23.8	23.1	21.8	17.9	14.0	6.7	-2.5
Vac	Ldn	33.6	-5.4	-2.3	4.7	8.8	11.9	16.0	14.7	15.9	19.2	20.2	21.2	17.1	13.4	17.4	11.3	20.2	21.4	19.3	25.0	24.6	24.2	23.4	22.2	18.3	14.6	7.4	-1.6
Vac	Ldn	34.1	-5.1	-2.1	5.0	9.1	12.2	16.3	15.1	16.3	19.5	20.6	21.6	17.5	13.8	17.8	11.7	20.5	22.0	19.9	25.6	25.3	24.8	24.0	22.8	18.9	15.2	8.1	-0.7
Vac	Ldn	34.4	-4.8	-1.8	5.3	9.3	12.4	16.5	15.4	16.6	19.8	21.0	22.0	17.9	14.2	18.2	12.2	20.9	22.3	20.2	25.9	25.6	25.1	24.3	23.1	19.4	15.7	8.9	0.3
Vac	Ldn	36.8	-3.1	0.0	7.0	11.1	14.2	18.3	17.4	18.6	21.8	23.8	24.8	20.7	17.2	21.2	15.2	23.2	24.2	22.3	27.8	27.6	27.2	26.6	25.7	22.4	19.4	13.4	6.0
Vac	Ldn	34.5	-0.3	2.5	9.4	13.3	16.1	20.0	19.5	20.4	23.3	22.7	23.5	19.4	16.0	19.8	13.7	20.7	21.5	19.6	24.6	24.2	23.6	22.8	21.7	18.2	15.1	9.4	2.5
Vac	Ldn	34.3	-0.7	2.2	9.0	12.9	15.8	19.7	19.0	19.9	22.9	22.1	23.0	18.8	15.4	19.3	13.1	20.3	21.2	19.4	24.5	24.1	23.6	22.8	21.8	18.3	15.3	9.5	2.5
Vac	Ldn	33.9	-1.0	1.8	8.7	12.6	15.4	19.3	18.6	19.5	22.4	21.5	22.3	18.2	14.8	18.7	12.5	19.9	20.8	19.1	24.3	23.9	23.4	22.7	21.6	18.2	15.1	9.2	2.2
Vac	Ldn	33.6	-1.4	1.5	8.3	12.2	15.1	19.0	18.1	19.1	22.0	20.9	21.8	17.7	14.2	18.1	12.0	19.5	20.4	18.8	24.1	23.7	23.2	22.5	21.5	18.0	15.0	9.0	1.9
Vac	Ldn	39.7	-1.1	2.0	9.0	13.1	16.1	20.2	19.9	21.0	24.2	27.3	28.3	24.2	20.9	24.9	18.9	26.1	27.1	25.1	30.3	30.1	29.8	29.4	28.8	25.8	23.3	18.2	12.0
Vac	Ldn	37.2	-2.7	0.3	7.3	11.4	14.5	18.6	17.8	19.0	22.2	24.3	25.3	21.3	17.8	21.8	15.7	23.7	24.6	22.8	28.2	28.0	27.6	27.1	26.2	22.9	20.0	14.2	7.0
Vac	Ldn	37.7	-2.4	0.6	7.7	11.7	14.8	18.9	18.2	19.4	22.6	24.9	25.9	21.9	18.4	22.4	16.4	24.2	25.1	23.2	28.6	28.4	28.0	27.5	26.7	23.5	20.7	15.0	8.1
Vac	Ldn	38.2	-2.1	1.0	8.0	12.1	15.1	19.2	18.6	19.8	23.0	25.5	26.5	22.4	19.0	23.0	17.0	24.7	25.6	23.7	29.0	28.8	28.5	28.0	27.2	24.1	21.4	15.8	9.1
Vac	Ldn	38.7	-1.7	1.3	8.4	12.4	15.5	19.6	19.1	20.2	23.4	26.1	27.1	23.1	19.7	23.7	17.7	25.2	26.1	24.2	29.5	29.3	29.0	28.5	27.8	24.7	22.1	16.7	10.2
Receiver R4 FI G dB(A) Ldn 56.4 dB(A)																													
001 - 120HP IDC - Standard Tunnel-Facade 01	Ldn	15.4					11.0			2.7			11.3			8.0			-2.3			-8.5			-20.2			-39.3	
001 - 120HP IDC - Standard Tunnel-Facade 02	Ldn	9.0					4.9			-3.2			4.5			1.6			-8.1			-14.1			-25.5			-43.0	
001 - 120HP IDC - Standard Tunnel-Facade 03	Ldn	9.3					7.6			-3.9			3.1			-4.5			-16.5			-23.7			-36.2			-55.6	
001 - 120HP IDC - Standard Tunnel-Facade 04	Ldn	-8.4					-11.4			-22.9			-12.3			-21.8			-39.6			-57.5			-81.5				

Magnolia & Rockvill Santee
Contribution spectra - 003 - 120HP IDC - Standard: 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)
001 - 120HP IDC - Standard Tunnel-Roof 01	Ldn	11.4					6.6			-2.6			8.1			2.9			-8.9			-15.5			-27.5			-46.8	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Ldn	30.2					15.7			17.5			28.0			24.4			14.7			0.7			-19.2			-46.0	
001 - 120HP IDC - Standard Tunnel-Transmissive area 01	Ldn	56.1					31.3			37.3			47.9			50.9			50.7			49.5			41.0			21.7	
Vac	Ldn	26.0	-5.6	-2.9	3.8	7.4	10.0	13.6	11.7	12.1	14.4	17.3	17.5	12.4	9.3	12.0	4.6	5.5	5.2	10.4	16.0	15.3	14.1	12.4	9.7	3.7	-3.0	-13.4	-24.5
Vac	Ldn	25.5	-5.8	-3.1	3.6	7.2	9.7	13.2	11.2	11.5	13.6	16.3	16.2	10.9	7.6	10.2	2.9	4.2	4.1	10.4	16.1	15.4	14.3	12.5	9.9	3.9	-2.8	-13.4	-24.9
Vac	Ldn	25.1	-5.9	-3.3	3.4	7.0	9.5	12.9	10.8	10.9	12.9	15.5	15.2	10.0	6.7	9.5	2.3	3.7	3.7	10.5	16.2	15.5	14.4	12.7	10.1	4.2	-2.6	-13.4	-25.3
Vac	Ldn	31.5	-4.2	-1.4	5.5	9.4	12.3	16.3	14.9	15.9	18.8	21.1	22.1	18.1	14.4	18.4	12.4	17.1	18.0	16.7	21.5	21.0	20.3	19.3	17.8	13.7	9.7	2.4	-6.5
Vac	Ldn	31.1	-4.5	-1.6	5.3	9.2	12.1	16.0	14.6	15.6	18.6	20.9	21.9	17.8	14.1	18.1	12.1	17.0	17.8	16.1	20.7	20.3	19.7	18.8	17.5	13.5	9.7	2.5	-6.4
Vac	Ldn	31.1	-4.6	-1.8	5.1	9.0	12.0	15.9	14.5	15.5	18.4	20.7	21.7	17.6	13.9	17.9	11.9	16.9	17.8	16.1	20.8	20.5	19.9	19.1	17.9	14.0	10.3	3.2	-5.6
Vac	Ldn	25.5	-7.2	-4.5	2.1	5.7	8.2	11.6	9.2	9.2	11.1	13.6	13.4	8.2	4.9	7.8	6.5	11.7	14.2	12.0	16.8	16.3	15.5	14.3	12.4	7.5	2.2	-7.1	-19.0
Vac	Ldn	25.2	-7.6	-4.9	1.8	5.3	7.8	11.2	8.7	8.8	10.6	13.2	12.9	7.7	4.5	7.3	6.3	11.5	14.1	11.8	16.6	16.0	15.2	13.9	11.9	6.9	1.3	-8.4	-20.9
Vac	Ldn	24.9	-7.6	-4.9	1.7	5.3	7.7	11.0	8.6	8.6	10.5	12.9	12.7	7.5	4.3	7.1	6.1	11.4	13.9	11.6	16.3	15.7	14.8	13.5	11.4	6.3	0.7	-9.2	-21.9
Vac	Ldn	24.9	-6.8	-4.0	2.7	6.4	9.0	12.4	10.2	10.3	12.3	14.9	14.7	9.4	6.2	9.1	2.0	3.3	3.3	10.6	16.3	15.6	14.5	12.9	10.3	4.4	-2.4	-13.3	-25.6
Vac	Ldn	25.1	-6.3	-3.6	3.0	6.6	9.0	12.4	10.1	10.2	12.1	14.5	14.3	9.1	5.8	8.7	1.7	2.7	13.1	10.7	16.5	15.8	14.7	13.1	10.5	4.6	-2.1	-13.1	-25.8
Vac	Ldn	25.9	-6.6	-4.0	2.6	6.2	8.7	12.0	9.7	9.7	11.6	14.1	13.8	8.6	5.4	8.2	6.7	12.0	14.4	12.2	17.0	16.5	15.8	14.7	13.0	8.5	3.7	-4.7	-17.3
Vac	Ldn	21.0	-7.2	-4.8	1.5	4.7	6.8	9.8	7.3	7.0	8.6	10.8	10.4	5.1	1.8	4.6	-2.6	-1.5	-1.6	7.0	11.8	11.1	10.1	8.5	6.1	0.5	-5.6	-15.0	-25.1
Vac	Ldn	23.5	-7.0	-4.6	1.8	5.0	7.2	10.2	7.7	7.5	9.1	11.3	10.9	5.5	2.2	5.0	-2.1	-1.1	-1.2	10.3	16.2	15.5	14.4	12.8	10.2	4.3	-2.4	-12.9	-24.1
Vac	Ldn	19.6	-6.9	-4.5	1.8	5.1	7.2	10.2	7.8	7.6	9.2	11.4	11.0	5.7	2.4	5.1	-2.0	0.4	0.6	0.2	4.6	3.8	3.0	1.9	0.4	-3.5	-7.3	-14.3	-23.0
Vac	Ldn	19.8	-6.7	-4.3	2.0	5.3	7.4	10.5	8.1	7.8	9.5	11.7	11.3	6.0	2.6	5.4	-1.8	0.6	0.8	-0.6	3.8	3.2	2.5	1.7	0.4	-3.3	-6.9	-13.8	-22.4
Vac	Ldn	21.5	-6.2	-3.9	2.4	5.6	7.8	10.8	8.3	8.1	9.9	10.9	10.6	5.3	1.9	4.7	-2.4	0.0	-0.1	7.3	12.0	11.4	10.4	8.8	6.4	0.8	-5.3	-14.9	-25.4
Vac	Ldn	25.0	-7.7	-5.3	0.9	4.1	6.1	9.0	6.3	5.9	7.6	9.5	9.2	3.9	0.6	3.4	-3.7	11.2	14.0	11.9	16.9	16.6	16.2	15.6	14.4	9.2	3.2	-7.1	-20.5
Vac	Ldn	24.0	-7.5	-5.2	1.1	4.2	6.3	9.2	6.5	6.1	7.8	9.7	9.3	4.0	0.7	3.6	-3.6	10.7	13.6	11.4	16.1	15.6	14.7	13.3	11.1	5.8	-0.2	-10.4	-23.3
Vac	Ldn	21.2	-7.3	-4.9	1.3	4.5	6.6	9.5	6.8	6.5	8.1	10.0	9.7	4.4	1.1	3.9	-3.2	-1.5	9.8	7.5	12.2	11.6	10.6	9.1	6.7	1.1	-5.1	-15.2	-26.7
Vac	Ldn	21.6	-6.6	-4.2	2.1	5.3	7.4	10.5	7.9	7.7	9.5	10.7	10.3	5.1	1.7	4.5	-2.7	-0.3	9.7	7.4	12.1	11.5	10.5	8.9	6.5	1.0	-5.2	-15.1	-26.0
Vac	Ldn	20.2	-6.6	-4.1	2.3	5.6	7.8	10.8	8.6	8.4	10.0	12.2	11.8	6.4	3.1	5.8	-1.4	0.9	1.1	-0.6	3.9	3.4	2.7	1.9	0.7	-3.0	-6.6	-13.3	-21.7
Vac	Ldn	32.5	-4.3	-1.3	5.7	9.7	12.7	16.7	15.4	16.4	19.4	22.0	23.0	19.0	15.3	19.3	13.3	18.1	19.0	16.9	22.4	22.0	21.6	20.8	19.7	16.1	12.8	6.4	-1.5
Vac	Ldn	32.4	-4.4	-1.4	5.6	9.6	12.5	16.5	15.3	16.3	19.3	21.8	22.8	18.8	15.1	19.1	13.1	18.0	18.9	16.8	22.3	22.0	21.6	20.8	19.8	16.2	13.0	6.6	-1.2
Vac	Ldn	32.3	-4.6	-1.6	5.4	9.4	12.4	16.4	15.1	16.1	19.1	21.6	22.6	18.5	14.9	18.9	12.9	17.8	18.8	16.8	22.3	22.0	21.6	20.9	19.9	16.5	13.3	7.1	-0.5
Vac	Ldn	31.9	-3.9	-1.0	5.8	9.7	12.6	16.5	15.2	16.1	19.1	21.4	22.4	18.3	14.7	18.6	12.6	17.5	18.4	17.0	21.9	21.5	20.9	20.0	18.7	14.9	11.2	4.3	-4.2
Vac	Ldn	34.4	-2.6	0.2	7.1	11.0	13.9	17.9	16.8	17.7	20.7	23.5	24.5	20.4	16.9	20.9	14.9	19.2	20.2	18.1	22.6	24.7	24.3	23.8	22.9	19.6	16.5	10.5	3.0
Vac	Ldn	20.9	-6.3	-3.9	2.6	5.9	8.1	11.3	9.2	9.1	11.0	13.3	12.9	7.4	3.9	6.5	-0.8	1.3	1.4	-0.4	4.0	3.5	2.9	2.1	1.0	-2.7	-6.2	-12.9	-21.1
Vac	Ldn	21.9	-6.2	-3.7	2.7	6.1	8.4	11.6	9.7	9.8	11.9	14.5	14.4	9.3	5.9	8.5	1.7	2.5	2.3	0.0	4.2	3.7	3.1	2.3	1.2	-2.4	-5.8	-12.4	-20.5
Vac	Ldn	32.8	-3.3	-0.4	6.5	10.4	13.3	17.3	16.1	17.1	20.1	22.7	23.7	19.7	16.1	20.1	14.1	18.6	19.5	17.4	22.0	21.8	21.4	20.8	19.9	16.4	13.3	7.0	-0.8
Vac	Ldn	33.1	-2.9	-0.1	6.8	10.7	13.7	17.6	16.4	17.4	20.3	23.1	24.0	20.0	16.4	20.4	14.4	18.9	19.8	17.7	22.3	22.0	21.7	21.1	20.2	16.8	13.7	7.5	-0.1

Appendix D:
Construction Calculation Sheets

Receptor - Church to the North

A	B	C	D	E	F	G	H	I	J
Construction Phase Equipment Item	# of Items	Item Lmax at 50 feet, dBA	Dist. To Recptr.	Item Usage Percent	Usage Factor	Dist. Correction dB	Usage Adj. dB	Recptr. Item Lmax, dBA	Recptr. Item Leq, dBA
DEMO									
1. Concrete Saw	1	90	140	20	0.20	-8.9	-7.0	81.1	74.1
2. Dozer	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
3. Tractor/Loader/Backhoe	3	80	140	40	1.20	-8.9	0.8	71.1	71.8
							Log Sum	82.6	77.6
SITE PREP									
1. Grader	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
2. Scraper	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
3. Tractor/Loader/Backhoe	1	80	140	40	0.40	-8.9	-4.0	71.1	67.1
							Log Sum	79.7	75.7
GRADE									
1. Dozer	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
2. Tractor/Loader/Backhoe	2	80	140	40	0.80	-8.9	-1.0	71.1	70.1
3. Grader	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
							Log Sum	79.7	76.3
BUILD									
1. Crane	1	85	140	16	0.16	-8.9	-8.0	76.1	68.1
2. Forklift	2	85	140	40	0.80	-8.9	-1.0	76.1	75.1
3. Tractor/Loader/Backhoe	1	80	140	40	0.40	-8.9	-4.0	71.1	67.1
4. Generator	1	82	140	50	0.50	-8.9	-3.0	73.1	70.0
5. Welder	3	73	140	40	1.20	-8.9	0.8	64.1	64.8
							Log Sum	80.7	77.6
PAVE									
1. Paver	1	85	140	50	0.50	-8.9	-3.0	76.1	73.0
2. Roller	2	85	140	20	0.40	-8.9	-4.0	76.1	72.1
3. Tractor/Loader/Backhoe	1	80	140	40	0.40	-8.9	-4.0	71.1	67.1
4. Paving Equipment	1	85	140	50	0.50	-8.9	-3.0	76.1	73.0
5. Concrete Mixer Truck	1	85	140	40	0.40	-8.9	-4.0	76.1	72.1
							Log Sum	82.4	78.9
ARCH COAT									
1. Compressor (air)	1	80	140	40	0.40	-8.9	-4.0	71.1	67.1
							Log Sum	71.1	67.1

VIBRATION LEVEL IMPACT

Project:	SSCW Magnolia and Rockvill	Date: 8/25/23
Source:	Large Bulldozer	
Scenario:	Unmitigated	
Location:	65 feet to the north edge of the site	
Address:	8837 Magnolia Ave, Santee, CA	

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 =	65.00	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 =	**0.031**	IN/SEC	OUTPUT IN RED