554 S Main Street Extra Shine Car Wash

Noise Impact Study

City of Milpitas, CA

Prepared for:

Patrick Riley
4901 Warehouse Way
Sacramento, CA 95826

Prepared by:

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

Date: 7/10/2019

TABLE OF CONTENTS

LIST OF APPENDICES

LIST OF EXHIBITS

LIST OF TABLES

1.0 Executive Summary

This report has been prepared to provide the calculated noise projections from the proposed Extra Shine Car Wash project located at 554 S Main Street, in the City of Milpitas, CA. All noise projections were compared to the City of Milpitas General Plan and 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 represent the ambient noise condition within the project vicinity. Ambient noise data indicates the hourly average noise level during operational hours ranged from 67 to 71 dBA Leq(h). The predominant source of noise is traffic noise propagating from S Main Street and the currently operating car wash stations.

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

Project only operational noise levels are anticipated to range between 42 to 59 dBA Leq, depending on the location of the residential or park receptor. The "project only" noise projections to the adjacent residential uses are below the City's 65 dBA residential limit (see Section V-213-3 3.02).

Project plus ambient noise level projections are anticipated to range between 67.1 to 67.7 dBA at adjacent receptors. This assessment evaluates the baseline noise condition and compares the project's worst-case operational noise level to the existing noise levels (during the project's proposed hours of operation). The "project plus ambient" noise projections increase ranges from 0 – 5 dBA. Both residential receptors have 0 increase and the park receptor has a 5 dBA increase, which meets the residential limit of no increase in ambient level.

The project shall incorporate the use of a 6-blower Aerodry system (or equivalent).

2.0 Introduction

2.1 Purpose of Analysis and Study Objectives

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

The following is provided in this report:

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

2.2 Site Location and Study Area

The project site is located at 554 S Main Street in Milpitas, CA as shown in Exhibit A. The land uses directly surrounding the project site include existing residential to the east, and northwest, commercial to the south and west, and a park to the north.

2.3 Proposed Project Description

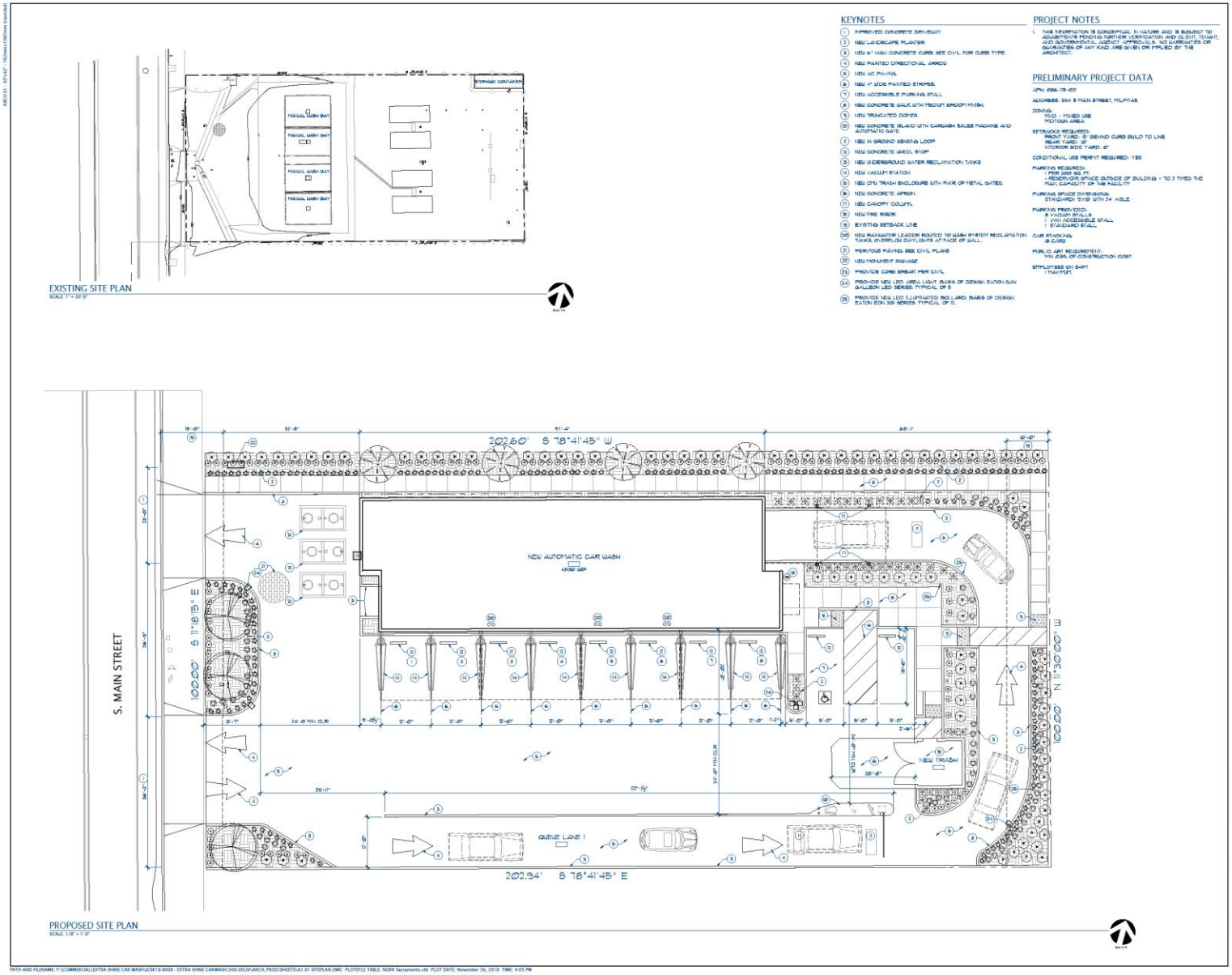
The project proposes to develop a 3,130 square foot automatic car wash and 9 vacuums. A noise study has been prepared which identifies the Project's worst-case potential impact to the adjacent uses and compares the noise level projections to the City's applicable noise ordinance. The site plan used for this is illustrated in Exhibit B.

Exhibit A

Location Map

Exhibit B

Site Plan



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.

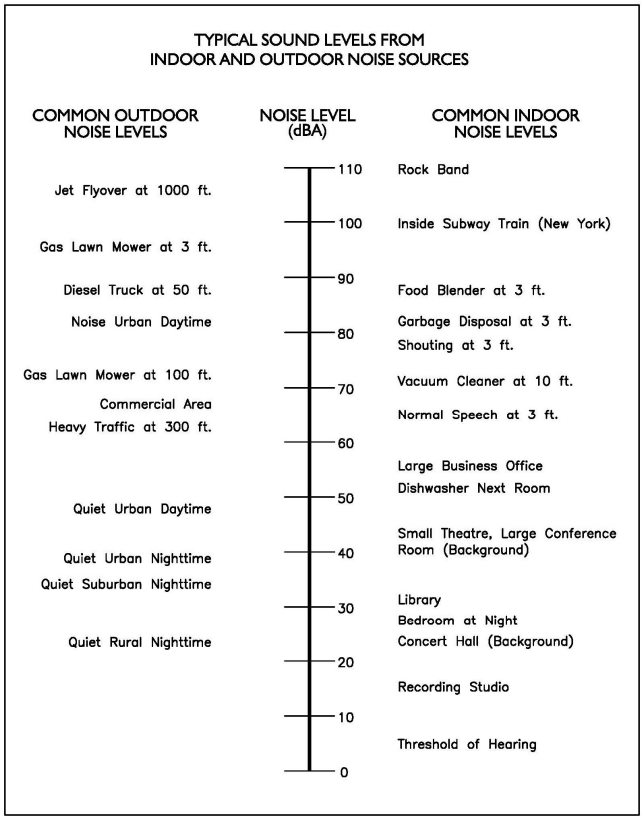
3.1 Sound, Noise and Acoustics

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 in the city of Milpitas, CA and noise regulations are addressed through the efforts of various federal, state and local government agencies. The agencies responsible for regulating noise are discussed below.

4.1 Federal Regulations

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

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

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

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

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

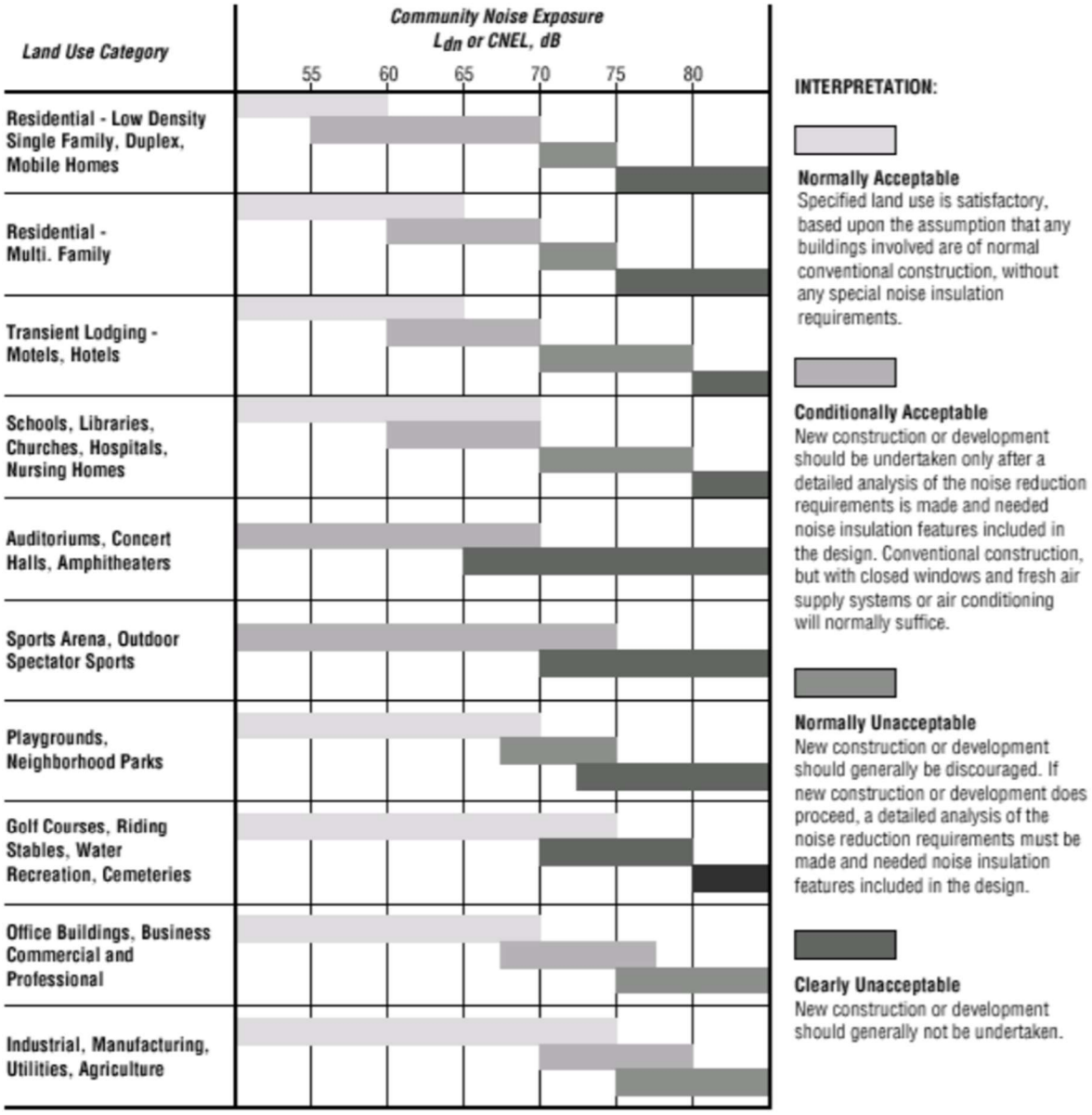
4.2 State Regulations

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

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

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

Exhibit D: Land Use Compatibility Guidelines



4.3 City of Milpitas Noise Regulations

City of Milpitas General Plan

The General Plan presents a table almost identical to Exhibit D.

6-I-1 Use the guidelines in Table 6-1 (Noise and Land Use Compatibility) as review criteria for development projects.

6-I-7 Avoid residential DNL exposure increases of more than 3 dB or more than 65 dB at the property line, whichever is more restrictive

6-I-12 New noise-producing facilities introduced near sensitive land uses which may increase noise levels in excess of "acceptable" levels will be evaluated for impact prior to approval; adequate mitigation at the noise source will be required to protect noise-sensitive land uses.

6-I-13 Restrict the hours of operation, technique, and equipment used in all public and private construction activities to minimize noise impact. Include noise specifications in requests for bids and equipment information.

City of Milpitas Ordinance
V-213-3 - Unlawful to Create or Permit Disturbing Noise

(a) Residential Zone Regulations.

3.01 It shall be unlawful for any person in any district zoned for residential use (under the provisions of Chapter 10, Title XI of the Milpitas Municipal Code) to make, continue, maintain, permit or cause to be made, continued, maintained, or permitted any Disturbing Noise that increases the noise exposure level by three dB over the local ambient noise level measured from the property line of the noise source, or more than 65 dB measured from the property line of the noise source, whichever is more restrictive.

3.02 It shall be unlawful for any person who owns, possesses, or controls any real property in any district zoned for residential use (under the provisions of Chapter 10, Title XI of the Milpitas Municipal Code) to make, continue, maintain, permit or cause to be made, continued, maintained or permitted any Disturbing Noise that increases the noise exposure level by three dB over the local ambient noise level measured from the property line of the noise source, or more than 65 dB measured from the property line of the noise source, whichever is more restrictive.

3.03 Notwithstanding any other provision of this Chapter and in addition thereto, it is unlawful for any person or any person who owns, possesses, or controls real property in any district zoned for residential use (under provisions of Chapter 10, Title XI of the Milpitas Municipal Code) to

make, continue, maintain, permit, or cause to be made, continued, maintained or permitted any Disturbing Noise. It shall be prima facie violation of this Section if any Disturbing Noise is audible during the hours of 10:00 p.m. to 7:00 a.m. from a distance of 50 feet from the property line of the noise source or from a distance of 100 feet from any nonstationary noise source. It shall also be prima facie violation of this Section if any Disturbing Noise is audible during the hours of 7:01 a.m. to 9:59 p.m. from a distance of 100 feet from the property line of the noise source or any nonstationary noise source.

3.04 The above prohibition against making, continuing, maintaining or permitting any Disturbing Noise in any district zoned for residential use shall not apply to the authorized collection of solid waste, recyclables, and/or yard trimmings by an authorized collector beginning at 6:00 a.m.

(b) Site Construction Regulations.

3.05 No person shall engage or permit others to engage in construction of any building or related road or walkway, pool or landscape improvement or in the construction operations related thereto, including, delivery of construction materials, supplies, or improvements on or to a construction site except within the hours of 7:00 a.m. to 7:00 p.m. on weekdays and weekends. No construction work shall be conducted or performed on the holidays indicated in Section V-213-2-2.05 of this Chapter.

4.4 Summary of Regulations

The proposed car wash must not increase the ambient level over 3 dB at any residential property line and have a level under 65 dBA at said property lines. Construction must occur between the hours of 7 am and 7 pm except on holidays when prohibited. The car wash must be inaudible past 100 ft of the residential property line during the day and 50 ft at night, which means the car wash must be inaudible at the residential properties since they are over 50 ft away from the car wash property. The DNL level must not increase beyond the status it holds in the noise compatibility guideline given in the general plan. These conditions are met by the proposed car wash.

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 the City and the Federal Highway Transportation (FHWA) technical noise specifications. All measurements 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 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 location was selected based on the distance of the project’s stationary noise sources to the nearest sensitive receptors. One (1) long-term, 24-hour noise measurement was conducted at the project site and represents the noise level from the existing conditions and 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 to the adjacent land uses. SP can evaluate 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.

The blowers (six (6) Aerodry blowers) were modeled at 10 feet high as a point source, and the Aerodry blower system will be located approximately 5 to 10 feet inside the exit of the tunnel.

The model was calibrated to match the reference sound level data provided by the manufacturer. The reference equipment sound level data is provided in Appendix C. All other noise producing equipment (e.g., compressors, pumps) will be housed within mechanical equipment rooms.

Exhibit E

Measurement Locations

1 = Long-term Monitoring Location

6.0 Existing Noise Environment

One (1) long-term 24-hour noise measurement was conducted at the project site and represents the noise level from the existing conditions. The measurement measured the 1-minute Leq, Lmin, Lmax and other statistical data (e.g. L1, L5…). The noise measurements were taken to determine the existing ambient noise levels. This assessment utilizes the ambient noise data as a basis and compares project operational levels to said data.

6.1 Long-Term Noise Measurement Results

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

Table 1: Long-Term Noise Measurement Data (dBA)[1]

Date	Time	dB(A)							
		L_{EQ}	L_{MAX}	L_{MIN}	L_1	L_5	L_{10}	L_{50}	L_{90}
3/14/2019	12PM-1PM	68	84	56	77	73	72	66	61
3/14/2019	1PM-2PM	68	87	54	77	74	72	66	61
3/14/2019	2PM-3PM	68	94	52	79	74	72	65	59
3/14/2019	3PM-4PM	68	87	54	78	74	72	66	61
3/14/2019	4PM-5PM	68	88	55	78	74	72	66	61
3/14/2019	5PM-6PM	70	97	53	81	76	73	67	62
3/14/2019	6PM-7PM	69	87	56	77	74	72	67	62
3/14/2019	7PM-8PM	68	83	56	76	73	72	66	62
3/14/2019	8PM-9PM	68	86	55	77	73	72	65	60
3/14/2019	9PM-10PM	67	82	54	76	73	71	64	59
3/14/2019	10PM-11PM	64	81	46	75	71	68	59	55
3/14/2019	11PM-12AM	61	81	47	74	68	64	54	50
3/15/2019	12AM-1AM	62	83	47	74	68	64	56	51
3/15/2019	1AM-2AM	56	82	45	70	62	58	50	49
3/15/2019	2AM-3AM	55	79	44	69	61	57	48	47
3/15/2019	3AM-4AM	56	80	45	68	62	58	50	48
3/15/2019	4AM-5AM	58	82	47	70	63	60	53	51
3/15/2019	5AM-6AM	62	81	50	74	68	64	56	54
3/15/2019	6AM-7AM	65	82	52	76	71	68	59	55
3/15/2019	7AM-8AM	68	83	54	78	74	72	64	58
3/15/2019	8AM-9AM	71	97	54	82	78	76	66	61
3/15/2019	9AM-10AM	69	89	48	78	75	73	66	61
3/15/2019	10AM-11AM	68	84	52	77	74	72	65	60
3/15/2019	11AM-12PM	69	86	52	78	74	72	66	61
DNL		70							

Notes:
[1.] Long-term noise monitoring location (LT1) is illustrated in Exhibit E. The quietest hourly noise interval is highlighted in orange when project operations could occur and blue during the park operational hours.

Noise data indicates that at and near the project site the ambient noise level ranged between 55 dBA to 71 dBA (hourly Leq) with the DNL measuring 70 dBA. Additional field notes and photographs are provided in Appendix A.

For this evaluation, MD has utilized the quietest hourly level (during potential operational hours) and has compared the project's projected noise levels to the said ambient level. The quietest (lowest) hourly level occurred between 2AM to 3AM (55 dBA, Leq(h)). The lowest level during the operational hours of the park occurred from 6AM to 7AM (65 dBA, Leq(h)). It should be noted that from 7AM to 10PM, the ambient level exceeds the residential zone limit of 65 dBA, Leq and the DNL exceeds the standard of 65 dBA.

7.0 Future Noise Environment Impacts and Mitigation

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 which include the project design features. The analysis details the estimated exterior noise levels.

7.1 Stationary Source Noise

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

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

Sensitive receptors that may be affected by project operational noise include existing residences to the north, and east, with commercial properties to the south, and west. The worst-case stationary noise was modeled using SoundPLAN acoustical modeling software. Worst-case assumes the blowers, vacuums and equipment are always operational when the noise will really be intermittent and cycle on/off depending on the customer usage. Project operations are assumed to occur 24 hours a day.

A total of three (3) receptors R1 – R3 were modeled to evaluate the proposed project's operational impact to the nearest residential and commercial receptors to the project site. A receptor is denoted by a yellow dot. All yellow dots represent either a property line or a sensitive receptor such as an outdoor sensitive area (e.g. courtyard, patio, backyard, etc).

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

Project Operational Noise Levels
Exhibit 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 42 dBA to 59 dBA at adjacent uses (depending on the location).

Project Plus Ambient Operational Noise Levels
Table 2 demonstrates the project plus the ambient noise levels. Project plus ambient noise level projections are anticipated to be 56 dBA, Leq at residential receptors (R1, R3) and 66 dBA, Leq at the park receptor (R2). The car wash operations are not anticipated to increase the ambient level or the DNL at the residential receptors. The park receptor is expected to increase 0-1 dB during operational hours of the park and 1 dB DNL (see Appendix E).

The DNL levels for the residential properties will remain in the conditionally acceptable level. The DNL level for the park will remain in the conditionally unacceptable level. Most of the increased impact for the DNL level at the park is due to an increase in noise at night when the park is not open.

The project does not exceed the residential +3 dB limit in V-213-3 3.02 of the municipal code and 6-I-7 of the general plan. The 65 dB limit is already exceeded by the ambient level during daytime hours and DNL.

Table 2: Worst-Case Predicted Operational Noise Levels (dBA)[1]

Receptor[1]	Existing Ambient Noise Level (dBA, Leq)[2]	Project Noise Level (dBA, Leq)[3]	Total Combined Noise Level (dBA, Leq)	Change in Noise Level as Result of Project[4]
1	55	42	56	0
2	65	59	66	1
3	55	46	56	0

Notes:
1. Receptor 1-3 are sensitive receptors.
2. Existing noise level during operational hours.
3. See Exhibit E for the operational noise level projections at said receptors.
4. Change is less than 0.5 dB which rounds to 0 but rounds the ambient noise level up to 56 dBA.

As shown in Table 2 the existing noise levels are anticipated to change between 0 to 1 dBA at adjacent land uses.

Table 3 provides the characteristics associated with changes in noise levels.

Table 3: Change in Noise Level Characteristics[1]

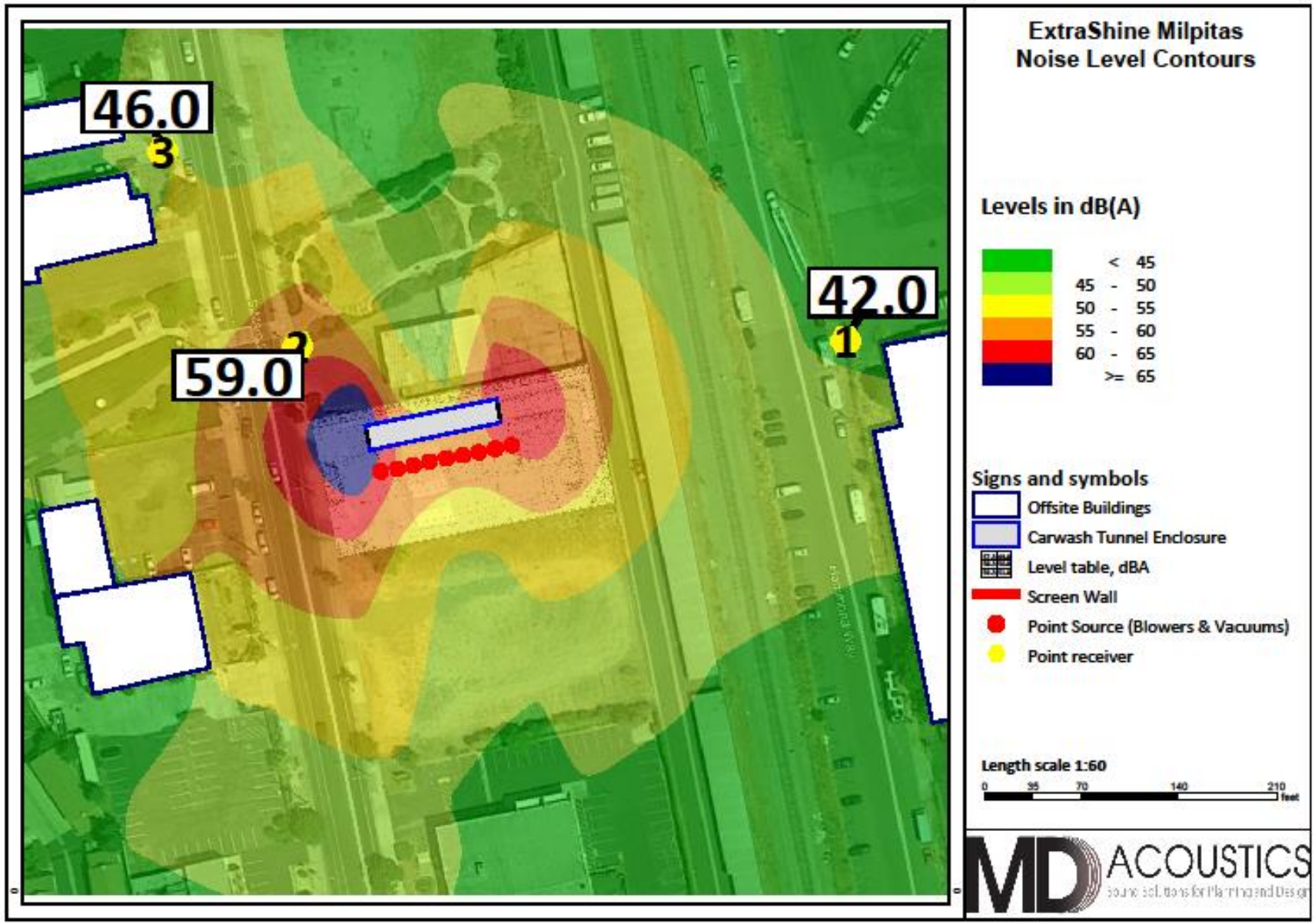
Changes in Intensity Level, dBA	Changes in Apparent Loudness
1	Not perceptible
3	Just perceptible
5	Clearly noticeable
10	Twice (or half) as loud

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

The change in noise level would be considered “Not Perceptible” at the residences and the park. The overall raise in noise level at the park should only be noticeable at night. Therefore, the project meets the condition in V-213-3 3.03 that the car wash must not be audible at 50 ft from the property line.

Exhibit F

Operational Noise Levels Leq(h)



8.0 Construction Noise Impact

The degree of construction noise may vary for different areas of the project site and also vary depending on the construction activities. Noise levels associated with the construction will vary with the different phases of construction. Construction output calculations are in Appendix D.

8.1 Construction Noise

The Environmental Protection Agency (EPA) has compiled data regarding the noise generated characteristics of typical construction activities. The data is presented in Table 4.

Table 4: Typical Construction Equipment Noise Levels[1]

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

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

Construction noise will have a temporary or periodic increase in the ambient noise level above the existing within the project vicinity. Construction must occur between the hours of 7 am and 7 pm not on holidays in order to comply with the construction ordinance (Section V-213-3 3.05).

To further ensure that construction activities do not disrupt the adjacent land uses, the following measures should be taken:

1. The construction equipment shall be fitted with appropriate mufflers such that a 10 to 15-dB reduction is achieved above normal operation.

2. Construction should occur during the permissible hours as defined in City's Municipal Code (Section V-213-3 3.05).

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

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

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

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

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 two (2) pieces of equipment with the most potential to cause vibratory impact are the truck and the roller. According to the FTA Noise and Vibration Impact Assessment manual, a loaded truck has a PPV of 0.076 in/sec (86 VdB) at 25 feet, and a vibratory roller has a PPV of 0.210 in/sec (94 VdB) at 25 ft.

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 5 (below) provides general thresholds and guidelines as to the vibration damage potential from vibratory impacts.

Table 5: 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 6 gives approximate vibration levels for particular construction activities. This data provides a reasonable estimate for a wide range of soil conditions.

Table 6: Vibration Source Levels for Construction Equipment[1]

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.

The nearest vibration-sensitive area is located at least 50 feet from the edge of the construction site (the park). Therefore, the maximum PPV at the noise-sensitive locations is 0.027 in/sec for the truck and 0.074 in/sec for the roller. These levels have no likely damage or annoyance impact according to the FTA manual. Therefore, no additional vibration mitigation measures are required. The impact is less than significant, and no mitigation is required.

9.0 References

City of Milpitas Code of Ordinances – Chapter 3213 – Noise Abatement, 2014

City of Milpitas General Plan – Chapter 6 – Noise Element, 1994

Caltrans Transportation and Construction Induced Vibration Guidance Manual, 2013

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

Appendix A:

Photographs and Field Measurement Data

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

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

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

24-Hour Continuous Noise Measurement Datasheet

Project: Extra Shine Car Wash Noise Impact Study
Site Address/Location: 554 S. Main St, Milpitas, CA
Date: 3/14/2019 to 3/15/2019
Field Tech/Engineer: Mei Wu Acoustics

Site Observations: Clear sky, measurement was performed on pole 10 ft high on western property line (to protect SLM).

General Location:
Sound Meter: LD 831 **SN:** 8312
Settings: A-weighted, slow, 1-min, 1-hour interval, 24-hour duration
Meteorological Con.: Between 39 and 70 degrees. Clear.
Site ID: LT-1

Site Topo: Flat
Ground Type: Hard

Noise Source(s) w/ Distance:
C/L of S Main St is 20 ft from meter

Figure 1: LT-1 Monitoring Location

Figure 2: LT-1 Photo

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

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

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

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Extra Shine Car Wash Noise Impact Study **Day:** 1 of 1
Site Address/Location: 554 S. Main St, Milpitas, CA
Site ID: LT-1

Date	Start	Stop	Leq	Lmax	Lmin	L1	L5	L10	L50	L90
3/14/2019	12:00 PM	1:00 PM	68.2	84.3	55.5	76.6	73.3	71.8	65.9	60.5
3/14/2019	1:00 PM	2:00 PM	68.5	86.5	53.6	77.4	73.9	72.0	65.9	60.9
3/14/2019	2:00 PM	3:00 PM	68.5	93.8	52.2	79.2	74.0	72.0	64.8	59.0
3/14/2019	3:00 PM	4:00 PM	68.4	86.5	54.2	77.6	73.5	71.8	65.8	60.9
3/14/2019	4:00 PM	5:00 PM	68.4	88.3	54.7	77.6	73.7	71.6	65.9	60.8
3/14/2019	5:00 PM	6:00 PM	70.3	97.3	52.7	81.3	76.3	73.2	66.9	61.8
3/14/2019	6:00 PM	7:00 PM	68.9	86.8	55.8	76.6	73.5	72.3	67.3	62.3
3/14/2019	7:00 PM	8:00 PM	68.4	82.7	56.2	76.3	73.2	71.8	66.4	61.7
3/14/2019	8:00 PM	9:00 PM	67.8	85.6	55.3	76.7	73.3	71.6	64.9	60.4
3/14/2019	9:00 PM	10:00 PM	67.1	82.2	53.6	76.4	72.9	71.1	63.7	58.7
3/14/2019	10:00 PM	11:00 PM	64.1	80.8	45.5	75.4	70.7	67.8	58.8	54.6
3/14/2019	11:00 PM	12:00 AM	61.1	80.7	46.7	73.8	67.9	64.1	54.2	50.4
3/15/2019	12:00 AM	1:00 AM	61.6	83.4	46.7	74.4	67.5	64.2	56.2	51.4
3/15/2019	1:00 AM	2:00 AM	56.4	81.9	44.8	69.8	62.5	58.3	50.5	48.7
3/15/2019	2:00 AM	3:00 AM	55.4	78.9	44.3	69.3	61.3	57.1	48.0	46.6
3/15/2019	3:00 AM	4:00 AM	55.8	80.1	45.1	68.3	62.1	58.1	49.7	48.4
3/15/2019	4:00 AM	5:00 AM	57.6	81.9	46.8	70.1	63.3	59.7	53.2	51.4
3/15/2019	5:00 AM	6:00 AM	61.5	80.8	49.5	74.3	68.0	63.9	55.6	53.8
3/15/2019	6:00 AM	7:00 AM	64.5	81.7	51.5	76.3	71.2	68.1	58.6	55.2
3/15/2019	7:00 AM	8:00 AM	68.1	82.8	53.5	77.9	74.3	72.4	63.7	58.5
3/15/2019	8:00 AM	9:00 AM	71.4	97.0	54.0	81.7	77.9	75.6	66.1	60.8
3/15/2019	9:00 AM	10:00 AM	69.1	89.1	47.7	78.4	74.8	72.9	65.6	61.0
3/15/2019	10:00 AM	11:00 AM	68.2	84.4	52.0	77.1	73.9	72.1	64.8	60.1
3/15/2019	11:00 AM	12:00 PM	68.8	85.5	51.5	78.0	73.9	72.3	66.1	61.2

CNEL: 70.4

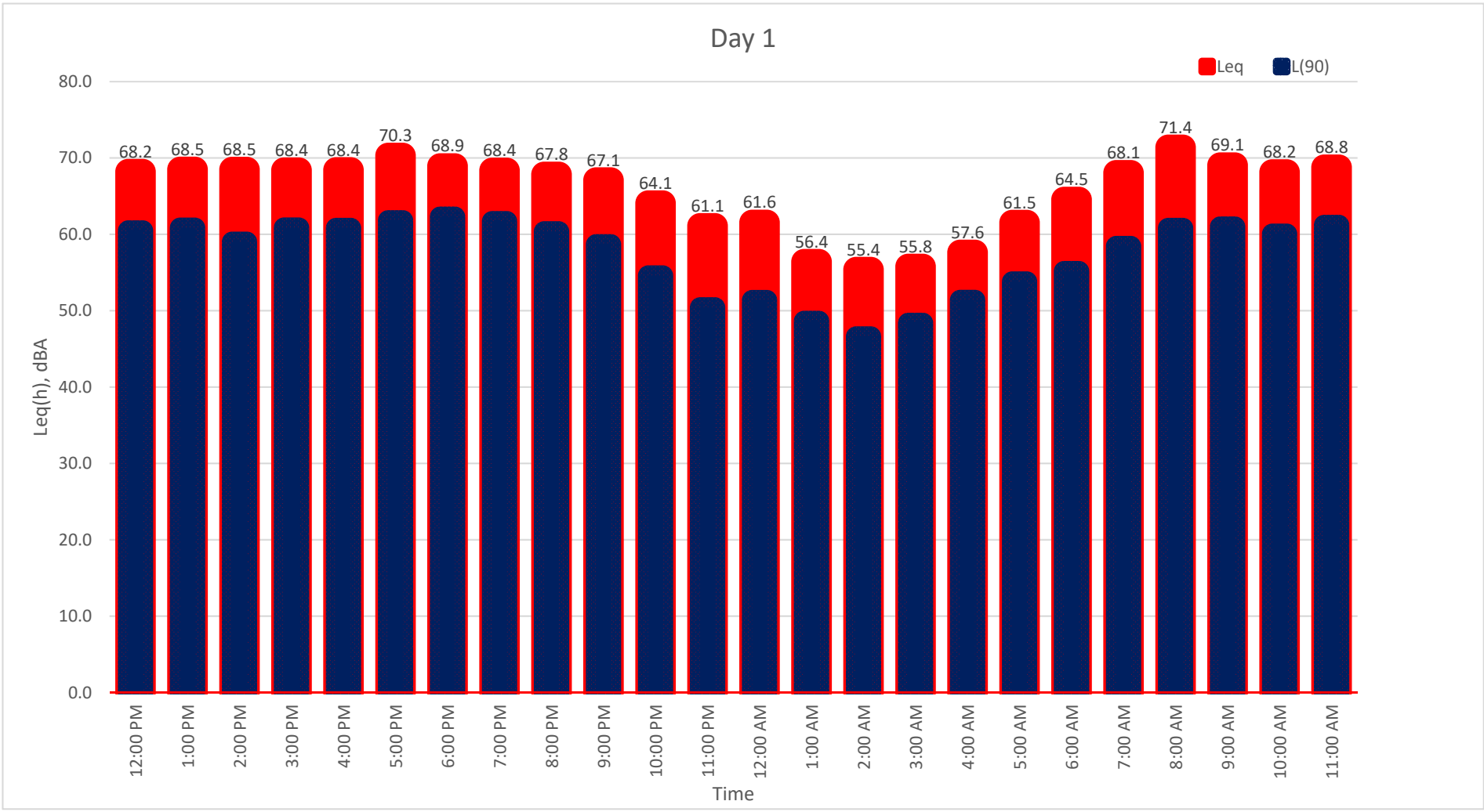
MD ACOUSTICS
Sound Solutions for Planning and Design
www.mdacoustics.com

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

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

24-Hour Continuous Noise Measurement Datasheet - Cont.

Project: Extra Shine Car Wash Noise Impact Study **Day:** 1 of 1
Site Address/Location: 554 S. Main St, Milpitas, CA
Site ID: LT-1



Appendix B:

SoundPLAN Input/Output

ExtraShine Milpitas
Contribution spectra - Situation 1: Outdoor SP

Source	Time slice	Sum	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	12.5kHz	16kHz	
		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)	
Receive East Fl G LrD,lim 59 dB(A LrD 42.0 dB(A Sigma(LrD 0.0 dB(A																													
Facade 01	LrD	-0.6					-3.8			-6.8			-6.5			-17.6			-21.4			-37.3							
Facade 02	LrD	-5.6					-9.1			-11.9			-11.0			-21.5			-25.4			-40.7							
Facade 03	LrD	-0.7					-3.9			-7.0			-6.7			-17.9			-22.0			-38.1							
Facade 04	LrD	-14.4					-16.9			-20.6			-21.7			-38.1			-44.7			-62.1							
Roof 01	LrD	26.3					16.9			19.0			24.4			11.5			6.7			-7.5							
Transmissive area 01	LrD	25.9					19.1			15.2			22.7			16.1			16.3			7.1							
Transmissive area 02	LrD	41.6					29.3			27.1			36.8			34.2			36.7			29.3							
Vac 1	LrD	16.5	-14.9	-7.6	-0.4	-0.4	2.7	4.0	-7.7	-8.3	-8.8	-12.6	-14.1	-11.8	-4.5	-2.7	0.8	4.9	5.3	3.4	8.0	8.7	7.7	6.7	3.6	-4.5	-13.6	-27.6	
Vac 2	LrD	16.9	-14.6	-7.3	-0.1	-0.1	3.0	4.3	-7.3	-8.0	-8.4	-12.2	-13.7	-11.4	-4.2	-2.4	1.1	5.1	5.6	3.7	8.4	9.1	8.1	7.3	4.3	-3.6	-12.4	-26.0	
Vac 3	LrD	17.1	-14.3	-7.1	0.1	0.3	3.3	4.6	-7.0	-7.6	-8.0	-11.8	-13.3	-11.0	-3.8	-2.6	0.9	4.9	5.4	3.6	8.4	9.3	8.4	7.8	5.0	-2.7	-11.2	-24.4	
Vac 4	LrD	17.5	-14.1	-6.8	0.4	0.6	3.7	5.0	-6.6	-7.2	-7.6	-11.3	-12.9	-10.6	-3.5	-2.2	1.2	5.3	5.8	3.9	8.8	9.7	8.9	8.3	5.7	-1.7	-10.0	-22.7	
Vac 5	LrD	18.0	-13.8	-6.5	0.7	0.9	4.0	5.3	-6.1	-6.7	-7.2	-10.9	-12.4	-10.1	-3.1	-1.9	1.6	5.6	6.1	4.3	9.2	10.1	9.4	8.9	6.5	-0.8	-8.7	-21.1	
Vac 6	LrD	18.5	-13.5	-6.2	1.0	1.3	4.4	5.6	-5.7	-6.3	-6.7	-10.4	-11.9	-9.7	-2.7	-1.5	2.0	6.0	6.5	4.7	9.6	10.6	9.9	9.5	7.2	0.2	-7.4	-19.4	
Vac 7	LrD	18.9	-13.2	-5.9	1.3	1.6	4.7	6.0	-5.2	-5.8	-6.3	-9.9	-11.4	-9.2	-2.3	-1.1	2.4	6.3	6.9	5.1	10.0	11.0	10.5	10.1	8.0	1.2	-6.2	-17.8	
Vac 8	LrD	19.5	-12.9	-5.6	1.6	2.0	5.1	6.4	-4.7	-5.3	-5.8	-9.4	-10.9	-8.6	-1.9	-0.7	2.8	6.7	7.3	5.5	10.4	11.5	11.0	10.8	8.8	2.2	-4.9	-16.1	
Vac 9	LrD	20.0	-12.6	-5.3	1.9	2.4	5.5	6.8	-4.2	-4.8	-5.2	-8.8	-10.4	-8.1	-1.5	-0.2	3.3	7.1	7.7	5.9	10.9	12.0	11.6	11.4	9.5	3.2	-3.6	-14.4	
Receive North Fl G LrD,lim 59 dB(A LrD 59.0 dB(A Sigma(LrD 0.0 dB(A																													
Facade 01	LrD	2.1					-1.5			-3.2			-3.7			-20.8			-28.9			-44.8							
Facade 02	LrD	-8.1					-12.1			-13.7			-13.1			-29.7			-38.1			-54.7							
Facade 03	LrD	15.4					9.3			8.9			12.3			-1.3			-7.0			-21.0							
Facade 04	LrD	11.2					5.0			5.0			8.1			-5.8			-11.3			-25.0							
Roof 01	LrD	35.7					26.2			27.9			34.0			21.1			15.4			2.3							
Transmissive area 01	LrD	59.0					43.4			44.7			56.8			50.4			50.9			45.1							
Transmissive area 02	LrD	33.3					23.9			22.6			31.5			22.4			20.6			12.2							
Vac 1	LrD	29.3	-6.5	0.8	8.0	9.3	12.4	13.7	6.0	5.3	4.9	4.1	2.6	4.9	7.8	9.0	12.6	14.2	14.9	13.4	18.6	20.3	20.6	21.6	21.5	17.7	14.5	8.4	
Vac 2	LrD	14.2	-10.6	-3.7	3.0	3.8	6.3	6.9	-0.4	-1.9	-3.3	-5.5	-8.0	-6.7	-5.1	-4.7	-2.1	-1.5	-1.7	-4.1	0.4	1.2	0.8	1.1	0.2	-4.3	-8.2	-14.9	
Vac 3	LrD	11.3	-12.2	-5.5	1.1	1.6	3.9	4.3	-2.7	-4.4	-6.0	-8.8	-11.5	-10.4	-9.3	-9.1	-6.6	-6.0	-6.3	-8.6	-3.9	-2.8	-3.0	-2.5	-3.1	-7.4	-11.1	-17.8	
Vac 4	LrD	10.0	-13.2	-6.5	0.0	0.5	2.7	3.1	-3.7	-5.4	-7.1	-10.1	-12.9	-11.8	-11.0	-10.9	-8.4	-7.8	-8.1	-10.4	-5.6	-4.4	-4.5	-3.9	-4.5	-8.8	-12.6	-19.4	
Vac 5	LrD	9.2	-14.0	-7.3	-0.7	-0.3	2.0	2.3	-4.3	-6.1	-7.8	-10.9	-13.7	-12.6	-12.0	-11.9	-9.4	-8.8	-9.1	-11.6	-6.7	-5.5	-5.5	-4.9	-5.5	-9.9	-13.9	-20.9	
Vac 6	LrD	8.6	-14.5	-7.8	-1.3	-0.9	1.4	1.7	-4.8	-6.6	-8.3	-11.4	-14.2	-13.2	-12.7	-12.6	-10.1	-9.5	-9.8	-12.4	-7.5	-6.3	-6.4	-5.8	-6.5	-11.0	-15.2	-22.4	
Vac 7	LrD	8.1	-15.0	-8.3	-1.7	-1.3	1.0	1.3	-5.2	-7.0	-8.7	-11.9	-14.7	-13.6	-13.2	-13.0	-10.6	-9.9	-10.3	-12.9	-8.3	-7.0	-7.1	-6.6	-7.4	-12.1	-16.4	-24.0	
Vac 8	LrD	7.7	-15.3	-8.6	-2.0	-1.6	0.6	0.9	-5.6	-7.4	-9.1	-12.3	-15.1	-14.0	-13.6	-13.4	-10.9	-10.3	-10.7	-13.3	-8.8	-7.6	-7.8	-7.3	-8.2	-13.1	-17.6	-25.5	
Vac 9	LrD	7.6	-15.4	-8.7	-2.1	-1.7	0.5	0.9	-5.8	-7.6	-9.3	-12.3	-15.0	-13.9	-13.1	-12.9	-10.4	-9.7	-10.1	-12.7	-8.5	-7.4	-7.8	-7.5	-8.6	-13.7	-18.6	-26.8	

ExtraShine Milpitas
Contribution spectra - Situation 1: Outdoor SP

Source	Time slice	Sum	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	12.5kHz	16kHz	
		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)	
Receive NorthWest Fl G LrD,lim 59 dB(A LrD 46.0 dB(A Sigma(LrD 0.0 dB(A																													
Facade 01	LrD	-6.6					-9.6			-11.9			-13.4			-31.1			-37.9			-54.6							
Facade 02	LrD	-13.9					-17.0			-19.6			-20.1			-35.6			-42.4			-60.5							
Facade 03	LrD	4.1					1.0			-2.6			-1.9			-11.9			-15.5			-30.8							
Facade 04	LrD	-1.6					-4.8			-8.0			-7.4			-17.8			-21.3			-36.1							
Roof 01	LrD	27.2					17.9			19.9			25.3			12.6			8.2			-5.4							
Transmissive area 01	LrD	45.9					34.0			31.4			40.9			38.5			41.2			34.2							
Transmissive area 02	LrD	27.6					20.0			17.0			24.9			17.4			17.4			8.0							
Vac 1	LrD	18.8	-13.3	-6.0	1.2	1.5	4.6	5.9	-5.3	-6.0	-6.4	-10.0	-11.6	-9.3	-2.4	-1.2	2.3	6.2	6.8	5.0	9.9	10.9	10.3	10.0	7.8	0.9	-6.5	-18.2	
Vac 2	LrD	5.7	-17.1	-10.3	-3.5	-3.8	-1.3	-0.7	-9.7	-11.4	-12.9	-16.7	-19.4	-18.3	-15.2	-14.9	-12.4	-9.7	-10.1	-12.8	-8.7	-8.4	-9.7	-10.7	-13.6	-21.1	-29.2	-41.5	
Vac 3	LrD	3.5	-18.5	-11.8	-5.2	-5.7	-3.4	-3.0	-10.8	-12.6	-14.3	-17.8	-20.7	-19.8	-18.7	-18.6	-16.1	-13.7	-14.2	-16.9	-12.5	-12.0	-13.0	-13.8	-16.5	-23.7	-31.6	-43.9	
Vac 4	LrD	2.6	-19.2	-12.5	-6.0	-6.5	-4.2	-3.8	-11.2	-13.0	-14.7	-18.2	-21.1	-20.2	-19.9	-19.8	-17.4	-15.1	-15.7	-18.3	-13.8	-13.2	-14.1	-14.8	-17.4	-24.7	-32.6	-44.9	
Vac 5	LrD	2.2	-19.6	-12.9	-6.4	-6.9	-4.6	-4.2	-11.4	-13.2	-14.9	-18.4	-21.4	-20.4	-20.4	-20.3	-18.0	-15.8	-16.3	-19.1	-14.5	-13.8	-14.7	-15.4	-18.0	-25.4	-33.4	-45.9	
Vac 6	LrD	1.9	-19.8	-13.1	-6.6	-7.1	-4.8	-4.5	-11.6	-13.4	-15.1	-18.6	-21.5	-20.6	-20.7	-20.7	-18.3	-16.2	-16.7	-19.5	-15.0	-14.2	-15.1	-15.9	-18.5	-26.0	-34.2	-46.9	
Vac 7	LrD	1.9	-19.9	-13.2	-6.6	-7.2	-4.9	-4.5	-11.7	-13.5	-15.2	-18.6	-21.6	-20.6	-20.8	-20.8	-18.4	-16.3	-16.9	-19.7	-15.3	-14.5	-15.5	-16.3	-19.0	-26.6	-34.9	-47.8	
Vac 8	LrD	2.0	-19.7	-13.0	-6.4	-7.0	-4.8	-4.4	-11.7	-13.5	-15.3	-18.8	-21.7	-20.7	-20.8	-20.8	-18.5	-16.3	-16.9	-19.8	-14.5	-13.9	-15.0	-16.0	-19.0	-26.9	-35.5	-48.7	
Vac 9	LrD	2.8	-19.0	-12.3	-5.7	-6.3	-4.0	-3.6	-11.6	-13.3	-15.0	-18.6	-21.4	-20.4	-19.3	-19.2	-16.8	-14.3	-14.8	-17.7	-13.0	-12.6	-13.9	-15.2	-18.4	-26.6	-35.5	-49.1	

ExtraShine Milpitas
Assessed contribution level - Situation 1: Outdoor SP

Source	Group	Source ty	Tr. lane	LrD dB(A)	A dB	
Receiver East	Fl G	LrD,lim 59 dB(A)	LrD 42.0 dB(A)	Sigma(LrD 0.0 dB(A)		
Vac 1	Default industrial noise	Point		16.5	0.0	
Vac 2	Default industrial noise	Point		16.9	0.0	
Vac 3	Default industrial noise	Point		17.1	0.0	
Vac 4	Default industrial noise	Point		17.5	0.0	
Vac 5	Default industrial noise	Point		18.0	0.0	
Vac 6	Default industrial noise	Point		18.5	0.0	
Vac 7	Default industrial noise	Point		18.9	0.0	
Vac 8	Default industrial noise	Point		19.5	0.0	
Vac 9	Default industrial noise	Point		20.0	0.0	
Roof 01	Default industrial noise	Area		26.3	0.0	
Facade 01	Default industrial noise	Area		-0.6	0.0	
Facade 02	Default industrial noise	Area		-5.6	0.0	
Transmissive area 02	Default industrial noise	Area		41.6	0.0	
Facade 03	Default industrial noise	Area		-0.7	0.0	
Facade 04	Default industrial noise	Area		-14.4	0.0	
Transmissive area 01	Default industrial noise	Area		25.9	0.0	
Receiver North	Fl G	LrD,lim 59 dB(A)	LrD 59.0 dB(A)	Sigma(LrD 0.0 dB(A)		
Vac 1	Default industrial noise	Point		29.3	0.0	
Vac 2	Default industrial noise	Point		14.2	0.0	
Vac 3	Default industrial noise	Point		11.3	0.0	
Vac 4	Default industrial noise	Point		10.0	0.0	
Vac 5	Default industrial noise	Point		9.2	0.0	
Vac 6	Default industrial noise	Point		8.6	0.0	
Vac 7	Default industrial noise	Point		8.1	0.0	
Vac 8	Default industrial noise	Point		7.7	0.0	
Vac 9	Default industrial noise	Point		7.6	0.0	
Roof 01	Default industrial noise	Area		35.7	0.0	
Facade 01	Default industrial noise	Area		2.1	0.0	
Facade 02	Default industrial noise	Area		-8.1	0.0	
Transmissive area 02	Default industrial noise	Area		33.3	0.0	
Facade 03	Default industrial noise	Area		15.4	0.0	
Facade 04	Default industrial noise	Area		11.2	0.0	
Transmissive area 01	Default industrial noise	Area		59.0	0.0	
Receiver NorthWest	Fl G	LrD,lim 59 dB(A)	LrD 46.0 dB(A)	Sigma(LrD 0.0 dB(A)		
Vac 1	Default industrial noise	Point		18.8	0.0	
Vac 2	Default industrial noise	Point		5.7	0.0	
Vac 3	Default industrial noise	Point		3.5	0.0	
Vac 4	Default industrial noise	Point		2.6	0.0	
Vac 5	Default industrial noise	Point		2.2	0.0	
Vac 6	Default industrial noise	Point		1.9	0.0	
Vac 7	Default industrial noise	Point		1.9	0.0	
Vac 8	Default industrial noise	Point		2.0	0.0	
Vac 9	Default industrial noise	Point		2.8	0.0	

ExtraShine Milpitas
Assessed contribution level - Situation 1: Outdoor SP

Source	Group	Source ty	Tr. lane	LrD dB(A)	A dB	
Roof 01	Default industrial noise	Area		27.2	0.0	
Facade 01	Default industrial noise	Area		-6.6	0.0	
Facade 02	Default industrial noise	Area		-13.9	0.0	
Transmissive area 02	Default industrial noise	Area		27.6	0.0	
Facade 03	Default industrial noise	Area		4.1	0.0	
Facade 04	Default industrial noise	Area		-1.6	0.0	
Transmissive area 01	Default industrial noise	Area		45.9	0.0	

ExtraShine Milpitas
Octave spectra of the sources in dB(A) - Situation 1: Outdoor SP

Name	Source type	l or A	Li	R'w	L'w	Lw	KI	KT	LwMax	DO-Wall	Day 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(A)			dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)	dB(A)
Facade 01	Area	131.41	84.8	54.0	33.1	54.3	0.0	0.0		3	100%/24h	31_Facade 01_		46.6	49.0	51.4	36.1	30.1	16.7		
Facade 02	Area	14.29	84.2	54.0	32.5	44.0	0.0	0.0		3	100%/24h	32_Facade 02_		36.2	38.7	41.2	25.8	19.7	6.1		
Facade 03	Area	132.08	84.7	54.0	33.0	54.2	0.0	0.0		3	100%/24h	33_Facade 03_		46.5	48.9	51.3	35.9	30.0	16.6		
Facade 04	Area	15.29	87.6	54.0	36.0	47.8	0.0	0.0		3	100%/24h	34_Facade 04_		40.3	42.6	44.8	29.6	23.7	10.6		
Roof 01	Area	156.68	85.2	27.0	60.2	82.2	0.0	0.0		0	100%/24h	29_Roof 01_		71.9	74.3	80.6	67.2	62.3	50.9		
Transmissive area 01	Area	9.30	86.1	0.0	86.1	95.7	0.0	0.0		3	100%/24h	35_Transmissive area 01_		78.5	82.9	94.1	85.9	86.0	80.8		
Transmissive area 02	Area	9.30	82.0	0.0	82.0	91.7	0.0	0.0		3	100%/24h	36_Transmissive area 02_		74.1	78.4	90.2	81.7	81.5	76.0		
Vac 1	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech	47.3	57.5	54.5	51.8	55.8	59.5	66.1	69.3	65.0
Vac 2	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech	47.3	57.5	54.5	51.8	55.8	59.5	66.1	69.3	65.0
Vac 3	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech	47.3	57.5	54.5	51.8	55.8	59.5	66.1	69.3	65.0
Vac 4	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech	47.3	57.5	54.5	51.8	55.8	59.5	66.1	69.3	65.0
Vac 5	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech	47.3	57.5	54.5	51.8	55.8	59.5	66.1	69.3	65.0
Vac 6	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech	47.3	57.5	54.5	51.8	55.8	59.5	66.1	69.3	65.0
Vac 7	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech	47.3	57.5	54.5	51.8	55.8	59.5	66.1	69.3	65.0
Vac 8	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech	47.3	57.5	54.5	51.8	55.8	59.5	66.1	69.3	65.0
Vac 9	Point				72.6	72.6	0.0	0.0		0	100%/24h	Vacutech	47.3	57.5	54.5	51.8	55.8	59.5	66.1	69.3	65.0

Appendix C:
Blower Noise Data

D. L. ADAMS ASSOCIATES
acoustics | performing arts | technology

1536 Ogden Street
Denver, CO 80218
www.dlaa.com
303.455.1900

August 11, 2016

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

Re: Aerodry – Spectral Sound Measurements (DLAA #16-131) Summary Report

Dear Cheryl,

The following is a summary of the blower sound level measurements taken at the site on August 4, 2016. Attached is Table 1 which is a summary of the 1/3 octave band sound measurements taken at the site.

We measured a variety of configurations with various model numbers that correspond to different groupings of dryers. The system sizes ranging from 45 HP to 120 HP consisted of configurations utilizing 1 and 2 overhead towers and 1 set of 6-outlet side columns..

Measurements were taken in ANSI-standard 1/3-octave bands between 25 Hertz (Hz) and 20,000 Hz. The blowers were located as shown in Figure 1. Sound measurements were taken outside the building at four distances: 1m, 20', 50', and 90' from the exterior edge of the building at centerline of the opening as shown in Figure 1.

Table 1 (enclosed) summarizes the measurements taken at the four measurement locations under six different operating conditions as described below Table 1.

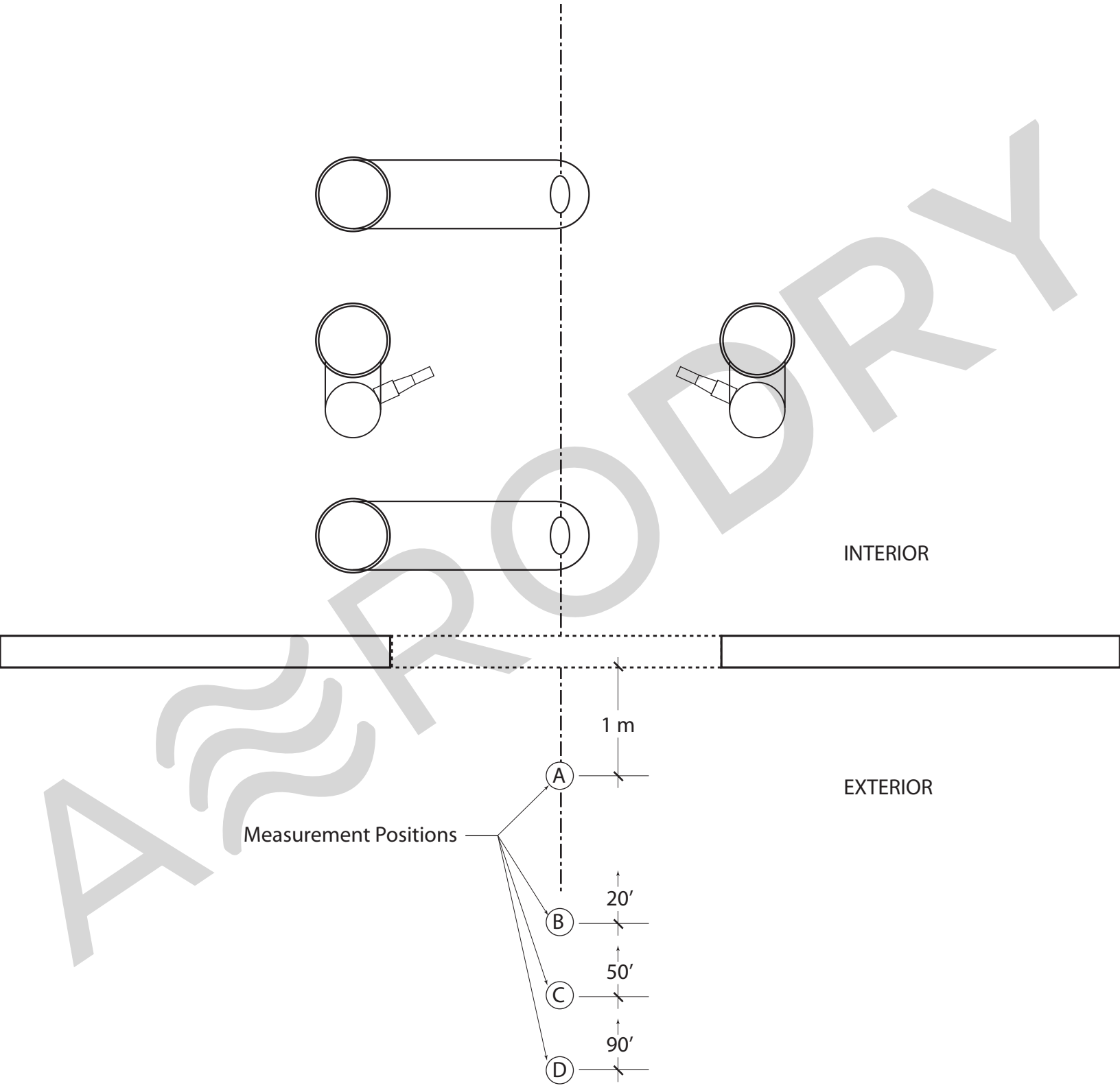
Measurements were taken with a Larson Davis Model 831 Type 1 sound level meter and a PCB Piezotronics Model 377B02 condensing microphone. Immediately prior to measuring, the sound level meter's calibration was checked and recorded. Calibration was again verified at the conclusion of the measurements. All of our equipment has been calibrated within the recommended time period set by the manufacturer. Documentation verifying measurement calibration compliance is available upon request,

If you have any questions, please call me.

Sincerely,

Mick Barnhardt
Senior Consultant

Encl: Figure 1; Table 1



Dryer Configuration

D. L. ADAMS ASSOCIATES
acoustics | performing arts | technology
1536 Ogden Street Denver, Colorado 80218
303/455-1900 FAX 303/455-9187

Aerodry

scale: 1/4" = 1' - 0"

Figure 1

8-11-16 | Project No. 16-161 | Drawn by MBB

TABLE 1: Sound Measurement Summary (in dB)

		1/3 Octave Band Frequency																													
Location	**Condition**	**25.0**	**31.5**	**40.0**	**50.0**	**63.0**	**80.0**	**100**	**125**	**160**	**200**	**250**	**315**	**400**	**500**	**630**	**800**	**1000**	**1250**	**1600**	**2000**	**2500**	**3150**	**4000**	**5000**	**6300**	**8000**	**10000**	**12500**	**16000**	**20000**	**dBA**
A	Condition 1	75	75	76	79	79	78	73	72	76	73	67	75	83	81	66	65	66	65	66	65	65	62	60	59	57	56	55	52	47	39	**82**
B	Condition 1	63	67	69	70	74	67	66	61	64	62	60	64	76	71	55	57	55	56	54	56	54	51	51	50	48	46	45	42	36	29	**74**
C	Condition 1	60	61	60	64	68	65	62	61	59	57	54	59	68	64	50	50	48	50	49	49	48	45	44	43	40	37	34	30	24	16	**67**
D	Condition 1	57	55	57	61	62	63	64	56	53	52	49	55	64	58	45	46	45	45	45	44	43	40	39	37	34	30	27	22	16	10	**62**
A	Condition 2	69	73	74	76	79	80	80	74	74	77	73	68	73	81	81	74	66	69	67	67	66	66	63	62	61	59	58	56	53	49	**81**
B	Condition 2	65	65	68	70	74	70	66	64	65	63	58	66	73	71	60	57	57	57	57	56	57	53	52	51	49	47	46	43	38	30	**73**
C	Condition 2	60	60	62	64	69	66	61	61	59	58	53	60	67	65	59	52	51	52	51	50	50	47	45	44	41	39	36	32	26	17	**67**
D	Condition 2	61	57	59	64	64	62	59	58	54	54	49	55	62	59	46	48	47	47	47	46	46	41	41	39	36	32	29	23	16	9	**62**
A	Condition 3	76	76	77	78	80	82	74	76	78	73	71	75	84	80	68	67	69	68	69	67	68	64	63	63	60	59	57	54	51	44	**83**
B	Condition 3	65	67	68	70	74	73	66	64	66	63	59	67	77	72	59	58	57	56	57	56	56	54	53	52	49	47	46	42	37	29	**75**
C	Condition 3	61	62	63	64	69	68	61	60	61	59	55	62	70	65	51	52	51	52	51	50	50	47	46	45	42	39	36	32	26	17	**68**
D	Condition 3	59	58	58	60	63	65	58	58	55	53	51	56	65	60	45	47	46	46	47	45	45	43	41	39	35	32	28	23	16	9	**63**
A	Condition 4	74	75	76	80	81	80	75	76	78	75	69	72	80	84	73	67	71	69	69	68	68	65	64	62	61	59	57	55	50	42	**84**
B	Condition 4	65	65	68	72	75	73	68	66	66	65	59	63	72	74	63	59	58	59	59	59	58	56	54	53	51	49	48	45	39	31	**74**
C	Condition 4	61	62	62	66	70	67	63	61	61	60	55	59	65	67	58	52	51	53	53	52	51	49	47	46	43	41	38	34	28	19	**68**
D	Condition 4	58	57	59	63	64	64	60	58	56	55	52	54	60	62	58	49	47	48	49	48	46	44	42	41	37	34	30	25	18	11	**63**
A	Condition 5	77	77	79	80	84	84	77	79	81	76	73	74	81	83	73	69	73	71	72	71	71	67	66	66	63	62	60	58	54	46	**85**
B	Condition 5	68	69	71	72	77	75	69	67	68	65	61	67	75	75	64	61	60	60	61	61	60	57	56	56	53	51	50	47	42	34	**76**
C	Condition 5	63	63	63	66	72	70	63	62	63	61	57	61	67	68	60	54	54	55	54	54	53	50	49	48	45	42	40	36	30	21	**69**
D	Condition 5	59	59	60	62	64	66	61	61	58	56	51	56	62	63	54	49	49	49	50	49	48	45	44	42	38	35	32	26	19	11	**64**
A	Condition 6	76	76	78	79	82	82	75	77	79	74	72	76	83	81	75	68	70	69	69	68	69	65	64	63	61	59	58	55	51	43	**84**
B	Condition 6	66	68	69	71	76	74	67	65	67	64	60	68	76	72	63	59	57	58	59	58	58	55	54	53	50	49	47	44	39	31	**75**
C	Condition 6	62	62	62	64	71	69	62	60	61	59	56	61	68	64	55	53	52	52	52	51	51	48	47	46	42	39	37	33	27	18	**68**
D	Condition 6	58	58	58	62	63	65	60	59	58	55	51	55	63	60	50	48	46	47	48	47	46	44	41	40	36	32	29	24	17	10	**63**

Location A: 1 meter from exterior door opening
Location B: 20 feet from exterior door opening
Location C: 50 feet from exterior door opening
Location D: 90 feet from exterior door opening

Condition 1: Model A45
Condition 2: Model A60
Condition 3: Model A60+
Condition 4: Model A90
Condition 5: Model A120
Condition 6: Model A75

Results are exclusive to the Advantage Drying System manufactured by Aerodry Systems, LLC. Use and interpretation for other equipment models or brands is expressly prohibited. Aerodry Systems, LLC is an independent, certified WBE.

Appendix D:

Construction Noise Modeling Output

VIBRATION LEVEL IMPACT

Project:	554 S Main Street Extra Shine Car Wash	Date: 3/29/19
Source:	Truck	
Scenario:	Unmitigated	
Location:	Project Site	
Address:		

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

DATA INPUT

Equipment = Type	1	Vibratory Roller	INPUT SECTION IN BLUE
PPVref =	0.21	Reference PPV (in/sec) at 25 ft.	
D =	50.00	Distance from Equipment to Receiver (ft)	
n =	1.50	Vibration attenuation rate through the ground	

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

DATA OUT RESULTS

PPV =	**0.074**	IN/SEC	OUTPUT IN RED

Appendix E:
DNL Calculation

DNL Calculation R1

Time	Existing	Project	Project Plus Existing	Energy E		Energy E+P	CNEL Energy E+P	dB Change
0:00	62	42	62	14301423.1	158489.319	1445991.24	14459912.4	0
1:00	56	42	57	4371285.71	158489.319	452977.503	4529775.03	0
2:00	55	42	56	3443953.03	158489.319	360244.235	3602442.35	0
3:00	56	42	56	3789781.42	158489.319	394827.073	3948270.73	0
4:00	58	42	58	5794087.41	158489.319	595257.673	5952576.73	0
5:00	62	42	62	14223968.8	158489.319	1438245.81	14382458.1	0
6:00	65	42	65	28481401.2	158489.319	2863989.05	28639890.5	0
7:00	68	42	68	6389734.75	15848.9319	6405583.68	6405583.68	0
8:00	71	42	71	13782148.7	15848.9319	13797997.6	13797997.6	0
9:00	69	42	69	8051259.65	15848.9319	8067108.58	8067108.58	0
10:00	68	42	68	6536142.94	15848.9319	6551991.87	6551991.87	0
11:00	69	42	69	7529014.54	15848.9319	7544863.47	7544863.47	0
12:00	68	42	68	6606934.48	15848.9319	6622783.41	6622783.41	0
13:00	68	42	68	7058983.15	15848.9319	7074832.08	7074832.08	0
14:00	68	42	68	7039177.17	15848.9319	7055026.1	7055026.1	0
15:00	68	42	68	6911538.49	15848.9319	6927387.42	6927387.42	0
16:00	68	42	68	6954671.43	15848.9319	6970520.36	6970520.36	0
17:00	70	42	70	10756938.2	15848.9319	10772787.1	10772787.1	0
18:00	69	42	69	7843138.48	15848.9319	7858987.41	7858987.41	0
19:00	68	42	68	6862586.69	15848.9319	6878435.62	6878435.62	0
20:00	68	42	68	6079127.99	15848.9319	6094976.92	6094976.92	0
21:00	67	42	67	5125513.08	15848.9319	5141362.02	5141362.02	0
22:00	64	42	64	25591969.6	158489.319	2575045.89	25750458.9	0
23:00	61	42	61	12909898.3	158489.319	1306838.76	13068387.6	0
				226434678	1664137.85		228098816	
DNL	70	48	70					0

DNL Calculation R2

Time	Existing	Project	Project Plus Existing	Energy E		Energy E+P	CNEL Energy E+P	dB Change
0:00	62	59	63	14301423.1	7943282.35	2224470.55	22244705.5	2
1:00	56	59	61	4371285.71	7943282.35	1231456.81	12314568.1	4
2:00	55	59	61	3443953.03	7943282.35	1138723.54	11387235.4	5
3:00	56	59	61	3789781.42	7943282.35	1173306.38	11733063.8	5
4:00	58	59	61	5794087.41	7943282.35	1373736.98	13737369.8	4
5:00	62	59	63	14223968.8	7943282.35	2216725.11	22167251.1	2
6:00	65	59	66	28481401.2	7943282.35	3642468.36	36424683.6	1
7:00	68	59	69	6389734.75	794328.235	7184062.98	7184062.98	1
8:00	71	59	72	13782148.7	794328.235	14576476.9	14576476.9	0
9:00	69	59	69	8051259.65	794328.235	8845587.89	8845587.89	0
10:00	68	59	69	6536142.94	794328.235	7330471.17	7330471.17	0
11:00	69	59	69	7529014.54	794328.235	8323342.77	8323342.77	0
12:00	68	59	69	6606934.48	794328.235	7401262.71	7401262.71	0
13:00	68	59	69	7058983.15	794328.235	7853311.38	7853311.38	0
14:00	68	59	69	7039177.17	794328.235	7833505.41	7833505.41	0
15:00	68	59	69	6911538.49	794328.235	7705866.73	7705866.73	0
16:00	68	59	69	6954671.43	794328.235	7748999.67	7748999.67	0
17:00	70	59	71	10756938.2	794328.235	11551266.4	11551266.4	0
18:00	69	59	69	7843138.48	794328.235	8637466.71	8637466.71	0
19:00	68	59	69	6862586.69	794328.235	7656914.93	7656914.93	0
20:00	68	59	68	6079127.99	794328.235	6873456.23	6873456.23	1
21:00	67	59	68	5125513.08	794328.235	5919841.32	5919841.32	1
22:00	64	59	65	25591969.6	7943282.35	3353525.2	33535252	1
23:00	61	59	63	12909898.3	7943282.35	2085318.07	20853180.7	2
				226434678	83404464.6		309839143	
DNL	70	65	71					1

DNL Calculation R3

Time	Existing	Project	Project Plus Existing	Energy E		Energy E+P	CNEL Energy E+P	dB Change
0:00	62	46	62	14301423.1	398107.171	1469953.03	14699530.3	0
1:00	56	46	57	4371285.71	398107.171	476939.288	4769392.88	0
2:00	55	46	56	3443953.03	398107.171	384206.02	3842060.2	0
3:00	56	46	56	3789781.42	398107.171	418788.859	4187888.59	0
4:00	58	46	58	5794087.41	398107.171	619219.458	6192194.58	0
5:00	62	46	62	14223968.8	398107.171	1462207.6	14622076	0
6:00	65	46	65	28481401.2	398107.171	2887950.84	28879508.4	0
7:00	68	46	68	6389734.75	39810.7171	6429545.47	6429545.47	0
8:00	71	46	71	13782148.7	39810.7171	13821959.4	13821959.4	0
9:00	69	46	69	8051259.65	39810.7171	8091070.37	8091070.37	0
10:00	68	46	68	6536142.94	39810.7171	6575953.65	6575953.65	0
11:00	69	46	69	7529014.54	39810.7171	7568825.25	7568825.25	0
12:00	68	46	68	6606934.48	39810.7171	6646745.2	6646745.2	0
13:00	68	46	69	7058983.15	39810.7171	7098793.86	7098793.86	0
14:00	68	46	68	7039177.17	39810.7171	7078987.89	7078987.89	0
15:00	68	46	68	6911538.49	39810.7171	6951349.21	6951349.21	0
16:00	68	46	68	6954671.43	39810.7171	6994482.15	6994482.15	0
17:00	70	46	70	10756938.2	39810.7171	10796748.9	10796748.9	0
18:00	69	46	69	7843138.48	39810.7171	7882949.19	7882949.19	0
19:00	68	46	68	6862586.69	39810.7171	6902397.41	6902397.41	0
20:00	68	46	68	6079127.99	39810.7171	6118938.71	6118938.71	0
21:00	67	46	67	5125513.08	39810.7171	5165323.8	5165323.8	0
22:00	64	46	64	25591969.6	398107.171	2599007.68	25990076.8	0
23:00	61	46	61	12909898.3	398107.171	1330800.55	13308005.5	0
				226434678	4180125.29		230614804	
DNL	70	52	70					0