

Appendix B NOISE STUDY

LEO RECYCLE

NOISE STUDY

PREPARED BY

Michael Baker
INTERNATIONAL

FEBRUARY 2018

1.0 INTRODUCTION

1.1 Project Location..... 1
1.2 Project Description 1

2.0 NOISE SETTING

2.1 Fundamentals of Sound and Environmental Noise..... 3
2.2 Regulatory Framework 6
2.2 Existing Setting 10

3.0 NOISE IMPACT ASSESSMENT

3.1 Existing Operations Description..... 13
3.2 Existing Operational Noise Measurements 13
3.3 Noise Impact Calculations 17
3.4 Conclusion 18

4.0 REFERENCES

TABLES

Table 1 Definitions of Acoustical Terms 4
Table 2 Land Use Compatibility Guidelines for Community Noise in San José 8
Table 3 Noise Standards [for Industrial Land Uses] 10
Table 4 Existing Operational Noise Measurements 14

FIGURES

Figure 1 Noise Measurement Locations 15

APPENDICES

Appendix A: Noise Measurement Output Files

TABLE OF CONTENTS

This page intentionally left blank.

This report documents the results of a noise study for grinding operations of recycled materials at Leo Recycle located at 215 Leo Avenue in San José, California.

1.0 INTRODUCTION

1.1 PROJECT LOCATION

The project site is on the north side of Leo Avenue, approximately 540 feet west of South 7th Street, in San José. The site is generally surrounded by commercial and industrial uses in all directions.

1.2 PROJECT DESCRIPTION

The 2.51-acre project site is occupied by a 50,000-square-foot industrial building currently being used for the processing of recyclables including less than 175 tons per day of Construction Demolition and Inert Debris (CDI), less than 200 tons per day of chipping and grinding wood debris and green waste, and less than 1,500 tons per day of Type A, single stream source separated recyclable commodities. CDI material and green waste trimmings are processed with a Vermeer HG6000 horizontal grinder. The facility currently operates under a special use permit that allows grinding operations from 8:00 a.m. to 5:00 p.m. The proposed project is to amend the special use permit to extend the allowed hours of grinding operations until 11:00 p.m. The grinder would operate approximately 50 percent of the time, primarily between the hours of 2:00 p.m. and 11:00 p.m. This study examines the potential community noise impacts resulting from extending the grinding operations hours.

1.0 INTRODUCTION

This page intentionally left blank.

2.0 NOISE SETTING

2.1 FUNDAMENTALS OF SOUND AND ENVIRONMENTAL NOISE

Acoustics is the science of sound. Sound may be thought of as mechanical energy of a vibrating object transmitted by pressure waves through a medium to human (or animal) ears. If the pressure variations occur frequently enough (at least 20 times per second), they can be heard and are called sound. The number of pressure variations per second is called the frequency of sound and is expressed as cycles per second, or hertz (Hz).

Noise is a subjective reaction to different types of sounds. Noise is typically defined as airborne sound that is loud, unpleasant, unexpected, or undesired and may therefore be classified as a more specific group of sounds. A typical noise environment consists of a base of steady background noise that is the sum of many distant and indistinguishable noise sources. Superimposed on this background noise is the sound from individual local sources. These sources can vary from an occasional aircraft or train passing by to virtually continuous noise from, for example, traffic on a major highway. Perceptions of sound and noise are highly subjective from person to person.

The decibel scale is used to measure sound; it uses the hearing threshold (20 micropascals) as a point of reference, defined as 0 decibels (dB). Other sound pressures are then compared to this reference pressure, and the logarithm is taken to keep the numbers in a practical range. The decibel scale allows a million-fold increase in pressure to be expressed as 120 dB, and changes in levels (dB) correspond closely to human perception of relative loudness.

The perceived loudness of sounds is dependent on many factors, including sound pressure level and frequency content. However, within the usual range of environmental noise levels, perception of loudness is relatively predictable and can be approximated by A-weighted sound levels. There is a strong correlation between A-weighted sound levels (expressed as dBA) and the way the human ear perceives sound. For this reason, the A-weighted sound level has become the standard tool of environmental noise assessment. All noise levels reported in this report are in terms of A-weighted levels, but are expressed as dB, unless otherwise noted.

Addition of Decibels

The decibel scale is logarithmic, not linear, and therefore sound levels cannot be added or subtracted through ordinary arithmetic. Two sound levels 10 dB apart differ in acoustic energy by a factor of 10. When the standard logarithmic decibel is A-weighted, an increase of 10 dB is generally perceived as a doubling in loudness. For example, a 70 dB sound is half as loud as an 80 dB sound and twice as loud as a 60 dB sound. When two identical sources are each producing sound of the same loudness, the resulting sound level at a given distance would be 3 dB higher than one source under the same conditions (FTA 2006). Under the decibel scale, three sources of equal loudness together would produce an increase of 5 dB.

Sound Propagation and Attenuation

Sound spreads (propagates) uniformly outward in a spherical pattern, and the sound level decreases (attenuates) at a rate of approximately 6 dB for each doubling of distance from a stationary or point source. Sound from a line source, such as a highway, propagates outward in a cylindrical pattern, often referred to as cylindrical spreading. Sound levels attenuate at a rate of approximately 3 dB for each doubling of distance from a line source, such as a roadway, depending on ground surface characteristics (FHWA 2006). No excess attenuation is assumed for

2.0 NOISE SETTING

hard surfaces like a parking lot or a body of water. Soft surfaces, such as soft dirt or grass, can absorb sound, so an excess ground-attenuation value of 1.5 dB per doubling of distance is normally assumed. For line sources, an overall attenuation rate of 3 dB per doubling of distance is assumed (FHWA 2006).

Noise levels may also be reduced by intervening structures; generally, a single row of buildings between the receptor and the noise source reduces the noise level by about 5 dB, while a solid wall or berm reduces noise levels by 5 to 10 dB (FHWA 2006). The manner in which older homes in California were constructed generally provides a reduction of exterior-to-interior noise levels of about 20 to 25 dB with closed windows. The exterior-to-interior reduction of newer residential units is generally 30 dB or more.

Noise Descriptors

The decibel scale alone does not adequately characterize how humans perceive noise. The dominant frequencies of a sound have a substantial effect on the human response to that sound. Several rating scales have been developed to analyze the adverse effect of community noise on people. Because environmental noise fluctuates over time, these scales consider that the effect of noise on people is largely dependent on the total acoustical energy content of the noise, as well as the time of day when the noise occurs. The L_{eq} is a measure of ambient noise, while the L_{dn} and CNEL are measures of community noise. Each is applicable to this analysis and defined in Table 1.

TABLE 1
DEFINITIONS OF ACOUSTICAL TERMS

Term	Definition
Decibel, dB	A unit describing the amplitude of 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. The reference pressure for air is 20.
Sound Pressure Level	Sound pressure is the sound force per unit area, usually expressed in micropascals (or 20 micronewtons per square meter), where 1 pascal is the pressure resulting from a force of 1 newton exerted over an area of 1 square meter. The sound pressure level is expressed in decibels as 20 times the logarithm to the base 10 of the ratio between the pressures exerted by the sound to a reference sound pressure (e.g., 20 micropascals). Sound pressure level is the quantity that is directly measured by a sound level meter.
Frequency, Hz	The number of complete pressure fluctuations per second above and below atmospheric pressure. Normal human hearing is between 20 Hz and 20,000 Hz. Infrasonic sound are below 20 Hz and ultrasonic sounds are above 20,000 Hz.
A-Weighted Sound Level, dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting 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 frequency response of the human ear and correlates well with subjective reactions to noise.
Equivalent Noise Level, L_{eq}	The average acoustic energy content of noise for a stated period of time. Thus, the L_{eq} of a time-varying noise and that of a steady noise are the same if they deliver the same acoustic energy to the ear during exposure. For evaluating community impacts, this rating scale does not vary, regardless of whether the noise occurs during the day or the night.
L_{max} , L_{min}	The maximum and minimum A-weighted noise level during the measurement period.
L_{01} , L_{10} , L_{50} , L_{90}	The A-weighted noise levels that are exceeded 1%, 10%, 50%, and 90% of the time during the measurement period.

Term	Definition
Day/Night Noise Level, L_{dn} or DNL	A 24-hour average L_{eq} with a 10 dBA “weighting” added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the nighttime. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.4 dBA L_{dn} .
Community Noise Equivalent Level, CNEL	A 24-hour average L_{eq} with a 5 dBA “weighting” during the hours of 7:00 p.m. to 10:00 p.m. and a 10 dBA “weighting” added to noise during the hours of 10:00 p.m. to 7:00 a.m. to account for noise sensitivity in the evening and nighttime, respectively. The logarithmic effect of these additions is that a 60 dBA 24-hour L_{eq} would result in a measurement of 66.7 dBA CNEL.
Ambient Noise Level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.
Intrusive	That noise which intrudes over and above the existing ambient noise at a given location. The relative intrusiveness of a sound depends on its amplitude, duration, frequency, and time of occurrence and tonal or informational content as well as the prevailing ambient noise level.

Source: Harris 1979

The A-weighted decibel sound level scale gives greater weight to the frequencies of sound to which the human ear is most sensitive. Because sound levels can vary markedly over a short period of time, a method for describing either the average character of the sound or the statistical behavior of the variations must be utilized. Most commonly, environmental sounds are described in terms of an average level that has the same acoustical energy as the summation of all the time-varying events.

The scientific instrument used to measure noise is the sound level meter, which can accurately measure environmental noise levels to within about plus or minus 1 dB. Various computer models are used to predict environmental noise levels from sources, such as roadways and airports. The accuracy of the predicted models depends on the distance between the receptor and the noise source. Close to the noise source, the models are accurate to within about plus or minus 1 to 2 dB.

Human Response to Noise

The human response to environmental noise is subjective and varies considerably from individual to individual. Noise in the community has often been cited as a health problem, not in terms of actual physiological damage, such as hearing impairment, but in terms of inhibiting general well-being and contributing to undue stress and annoyance. The health effects of noise in the community arise from interference with human activities, including sleep, speech, recreation, and tasks that demand concentration or coordination. Hearing loss can occur at the highest noise intensity levels.

Noise environments and consequences of human activities are usually well represented by median noise levels during the day or night or over a 24-hour period. Environmental noise levels are generally considered low when the CNEL is below 60 dB, moderate in the 60 to 70 dB range, and high above 70 dB. Examples of low daytime levels are isolated, natural settings with noise levels as low as 20 dB and quiet, suburban, residential streets with noise levels around 40 dBA. Noise levels above 45 dB at night can disrupt sleep. Examples of moderate-level noise environments are urban residential or semi-commercial areas (typically 55 to 60 dB) and commercial locations (typically 60 dB). People may consider louder environments adverse, but most will accept the higher levels associated with noisier urban residential or residential-commercial areas (60 to 75 dB) or dense urban or industrial areas (65 to 80 dB). Regarding increases in A-weighted noise levels, the following relationships should be noted in understanding this analysis:

2.0 NOISE SETTING

- Except in carefully controlled laboratory experiments, a change of 1 dB cannot be perceived by humans.
- Outside of the laboratory, a 3 dB change is considered a just-perceivable difference.
- A change in level of at least 5 dB is required before any noticeable change in community response would be expected. An increase of 5 dB is typically considered substantial.
- A 10 dB change is subjectively heard as an approximate doubling in loudness and would almost certainly cause an adverse change in community response.

Effects of Noise on People

Hearing Loss

While physical damage to the ear from an intense noise impulse is rare, a degradation of auditory acuity can occur even in a community noise environment. Hearing loss occurs mainly due to chronic exposure to excessive noise but may be the result of a single event such as an explosion. Natural hearing loss associated with aging may also be accelerated by chronic exposure to loud noise.

The Occupational Safety and Health Administration (OSHA) has a workplace noise exposure standard that is set at the noise threshold where hearing loss may occur from long-term exposures. The maximum allowable level is 90 dB averaged over 8 hours. If the noise is above 90 dB, the allowable exposure time is correspondingly shorter.

Annoyance

Attitude surveys are used for measuring the annoyance felt in a community for noises intruding into homes or affecting outdoor activity areas. In these surveys, it was determined that causes of annoyance include interference with speech, radio and television, house vibrations, and interference with sleep and rest. The $L_{dn}/CNEL$ as a measure of noise has been found to provide a valid correlation of noise level and the percentage of people annoyed. People have been asked to judge the annoyance caused by aircraft noise and ground transportation noise. There continues to be disagreement about the relative annoyance of these different sources. For ground vehicles, a noise level of about 55 dB L_{dn} is the threshold at which a substantial percentage of people begin to report annoyance.

2.2 REGULATORY FRAMEWORK

State

California Noise Control Act of 1973

California Health and Safety Code Sections 46000 through 46080, known as the California Noise Control Act, find that excessive noise is a serious hazard to public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. The act also finds that there is a continuous and increasing bombardment of noise in urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens through the control, prevention, and abatement of noise. It is the State's policy to provide an environment for all Californians that is free from noise which jeopardizes their health or welfare.

Governor's Office of Planning and Research

The Governor's Office of Planning and Research (OPR) (2017), published the General Plan Guidelines, which provide guidance for the acceptability of projects in specific noise environments based on average daily noise conditions (CNEL/L_{dn}). However, it is important to note that the OPR guidance does not take local conditions into account, including a particular community's sensitivity to noise, noise reduction goals, or assessment of the relative importance of noise pollution. As a result, noise standards developed by local jurisdictions typically differ somewhat from the OPR guidance. In the case of the proposed project, the City of San José has adopted local noise standards, which are most relevant to the noise conditions in the city. Therefore, this analysis is based on local standards, and the OPR guidance is not considered.

Local

City of San José General Plan

The applicable plan pertaining to the evaluation of noise impacts of the proposed project is the City's Envision San José 2040 General Plan, which includes established noise level standards that are intended to protect community residents from harmful and annoying noise levels (San José 2011). General Plan Table EC-1, Land Use Compatibility Guidelines for Community Noise in San José [included below as **Table 2**], and Policies EC-1.1, EC-1.2, and EC-1.6 are applicable to the proposed project.

2.0 NOISE SETTING

**TABLE 2
LAND USE COMPATIBILITY GUIDELINES FOR COMMUNITY NOISE IN SAN JOSÉ**

Land Use Category	Exterior Noise Exposure (L _{dn} dBA)					
	55	60	65	70	75	80
1. Residential, Hotels and Motels, Hospitals and Residential Care		■			■	
2. Outdoor Sports and Recreation, Neighborhood Parks and Playgrounds	■		■			■
3. Schools, Libraries, Museums, Meeting Halls, Churches		■			■	
4. Office Buildings, Business Commercial, and Professional Offices	■			■		■
5. Sports Arena, Outdoor Spectator Sports	■			■		■
6. Public and Quasi-Public Auditoriums, Concert Halls, Amphitheaters	■			■		

Normally Acceptable:
 Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction, without any special noise insulation requirements.

Conditionally Acceptable:
 Specified land use may be permitted only after detailed analysis of the noise reduction requirements and needed noise insulation features included in the design.

Unacceptable:
 New construction or development should generally not be undertaken because mitigation is usually not feasible to comply with noise element policies.

Source: San José 2011, Table EC-1

EC-1.1 Locate new development in areas where noise levels are appropriate for the proposed uses. Consider federal, state and City noise standards and guidelines as a part of new development review. Applicable standards and guidelines for land uses in San José include:

Interior Noise Levels

- *The City's standard for interior noise levels in residences, hotels, motels, residential care facilities, and hospitals is 45 dBA DNL. Include appropriate site and building design, building construction and noise attenuation techniques in new development to meet this standard. For sites with exterior noise levels of 60 dBA DNL or more, an acoustical analysis following protocols in the City-adopted California Building Code is required to demonstrate that development projects can meet this standard. The acoustical analysis shall base required noise attenuation techniques on expected Envision General Plan traffic volumes to ensure land use compatibility and General Plan consistency over the life of this plan.*

Exterior Noise Levels

- The City's acceptable exterior noise level objective is 60 dBA DNL or less for residential and most institutional land uses (Table EC-1). The acceptable exterior noise level objective is established for the City, except in the environs of the San José International Airport and the Downtown, as described below:
 - For new multi-family residential projects and for the residential component of mixed-use development, use a standard of 60 dBA DNL in usable outdoor activity areas, excluding balconies and residential stoops and porches facing existing roadways. Some common use areas that meet the 60 dBA DNL exterior standard will be available to all residents. Use noise attenuation techniques such as shielding by buildings and structures for outdoor common use areas. On sites subject to aircraft overflights or adjacent to elevated roadways, use noise attenuation techniques to achieve the 60 dBA DNL standard for noise from sources other than aircraft and elevated roadway segments.
 - For single family residential uses, use a standard of 60 dBA DNL for exterior noise in private usable outdoor activity areas, such as backyards

EC-1.2 Minimize the noise impacts of new development on land uses sensitive to increased noise levels (Categories 1, 2, 3 and 6) by limiting noise generation and by requiring use of noise attenuation measures such as acoustical enclosures and sound barriers, where feasible. The City considers significant noise impacts to occur if a project would:

- Cause the DNL at noise sensitive receptors to increase by five dBA DNL or more where the noise levels would remain "Normally Acceptable"; or
- Cause the DNL at noise sensitive receptors to increase by three dBA DNL or more where noise levels would equal or exceed the "Normally Acceptable" level.

EC-1.6 Regulate the effects of operational noise from existing and new industrial and commercial development on adjacent uses through noise standards in the City's Municipal Code.

City of San José Municipal Code

Noise standards for industrial zones are defined in Municipal Code Chapter 20.50, Section 20.050.300.

20.50.300 – Performance standards.

- A. In the IP, LI and HI industrial districts no primary, secondary, incidental or conditional use or activity related thereto shall be conducted or permitted:
1. In a manner that causes or results in the harmful discharge of any waste materials into or upon the ground, into or within any sanitary or storm sewer system, into or within any water system or water, or into the atmosphere; or
 2. In a manner that constitutes a menace to persons or property or in a manner that is dangerous, obnoxious, or offensive by reason of the creation of a fire, explosion,

2.0 NOISE SETTING

or other physical hazard, or by reason of air pollution, odor, smoke, noise, dust vibration, radiation, or fumes; or

3. In a manner that creates a public or private nuisance.
- B. Without limiting the generality of the preceding subsection, the following specific standards shall apply in the industrial zoning districts:
1. Incineration. There shall be no incineration on any site of any waste material.
 2. Vibration. There shall be no activity on any site that causes ground vibration which is perceptible without instruments at the property line of the site.
 3. Air pollution. Total emissions from any use or combination of uses on a site shall not exceed the emissions and health risk thresholds as established by the director of planning.
 4. Noise.
 - a. The sound pressure level generated by any use or combination of uses shall not exceed the decibel level at any property line as shown in Table 20-135 [included below as **Table 3**], except upon issuance and in compliance with a special use permit as provided in Chapter 20.100.

**TABLE 3
NOISE STANDARDS [FOR INDUSTRIAL LAND USES]**

	Maximum Noise Level in Decibels (dBA) at Property Line
Industrial use adjacent to a property used or zoned for residential purposes	55
Industrial use adjacent to a property used or zoned for commercial purposes	60
Industrial use adjacent to a property used or zoned for industrial or use other than commercial or residential purposes	70

Source: San José 2017, Table 20-135

2.2 EXISTING SETTING

Noise-Sensitive Receptors

Noise-sensitive land uses are those that may be subject to stress and/or interference from excessive noise. Noise-sensitive land uses include schools, hospitals, and institutional uses such as churches and museums. Typically, residential uses are also considered noise-sensitive receptors. Industrial and commercial land uses are generally not considered sensitive to noise. However, Table EC-1 in the City's General Plan includes hotels and motels in the same land use category as residential. Residential land uses in the project area include mobile home and trailer parks to the east, southwest, and southeast, ranging from 0.12 mile to 0.34 mile from the project site, and single-family homes 0.32 mile to the northwest. The closest noise-sensitive receptor is a mobile home/trailer park across South 7th Street, approximately 617 feet (0.12 mile) to the east (see **Figure 1**), beyond several industrial buildings. Hotels and motels in the project area are located to the west and southwest. The closest motel to the project site is approximately 340 feet to the west beyond railroad tracks and an intervening metal recycling business.

Existing Noise Environment

The project site is zoned Heavy Industrial. Surrounding land uses include Heavy Industrial to the west and north, Heavy Industrial to the east across the railroad tracks, and Light Industrial to the south across Leo Avenue. The primary businesses on the surrounding properties are metal recycling facilities and automotive repair and salvage. Dominant noise sources in the area include operational noise from the industrial business; heavy truck and light vehicle traffic on area streets; traffic noise from State Route 82, State Route 87, Interstate 280, and US Highway 101; noise from commuter and freight rail lines to the west; and air traffic from Norman Y. Mineta San José International Airport to the north.

The environmental noise assessment prepared for the Envision San José 2040 General Plan Comprehensive Update provides existing and predicted future noise contours. In the City's South Planning Area, existing and future noise ranges from L_{dn} 55 to 75 dBA. The project site is located in an L_{dn} 60 to 65 dB contour (Illingworth & Rodkin 2010).

2.0 NOISE SETTING

This page intentionally left blank.

3.0 NOISE IMPACT ASSESSMENT

3.1 EXISTING OPERATIONS DESCRIPTION

Leo Recycle collects green waste and CDI material via truck deliveries and self-hauling by customers. Material is delivered to staging areas in the yard to the west of the building. Shredding and grinding operations are performed by a Vermeer HG6000 horizontal grinder mounted on tracks. When processing green waste and wood, the grinder is positioned in the door at the northwest of the building. When processing other CDI material, the grinder is positioned inside the building. The grinder is fed by a track-mounted excavator equipped with a claw or a rubber-tire bucket loader.

The building is of reinforced concrete construction with vehicle access openings on the west and south sides. Land uses to the east and south are shielded primarily by the building. A 6-foot masonry wall surrounds the yard and shields land uses to the west.

Noise sources associated with operation of the recycling facility include: operation of the grinder; operation of loading equipment; heavy duty trucks entering and exiting the facility; and light duty cars and trucks entering and exiting the facility. The recycling facility is located in an area zoned Heavy Industrial. Therefore, the facility is located in an area where noise levels are appropriate for the proposed uses and operation of the facility would be consistent with General Plan Policy EC-1.1. Noise levels resulting from operation of the facility, the impact of the operational noise on sensitive receptors, and compliance with General Plan Policy EC-1.2 and Noise Ordinances are discussed below in subsection 3.3.

3.2 EXISTING OPERATIONAL NOISE MEASUREMENTS

Operational noise in the project area was measured on January 10, 2018. Three short-term noise measurements were taken at the project property line closest to the nearest residential land use (approximately 340 feet from the grinder) under three conditions:

Condition 1 – existing operational noise while the grinder is not running

Condition 2 – existing operational noise while the grinder is running inside the building

Condition 3 – existing operational noise while the grinder is running in the doorway of the building

An additional short-term measurement was taken in proximity of the grinder to determine a reference noise level of the grinder at a distance of 100 feet. The measurements were taken with a Larson Davis SoundExpert LxT precision sound level meter, which satisfies the American National Standards Institute (ANSI) for general environmental noise measurement instrumentation. Prior to the measurements, the SoundExpert LxT sound level meter was calibrated according to manufacturer specifications with a Larson Davis CAL200 Class I Calibrator (see **Appendix A** for measurement output files). The 15-minute measurements were taken between 2:30 and 4:30 p.m. on Wednesday, January 10, 2018. Noise measurement locations are shown in **Figure 1**. The noise levels and sources of noise measured are listed in **Table 4**.

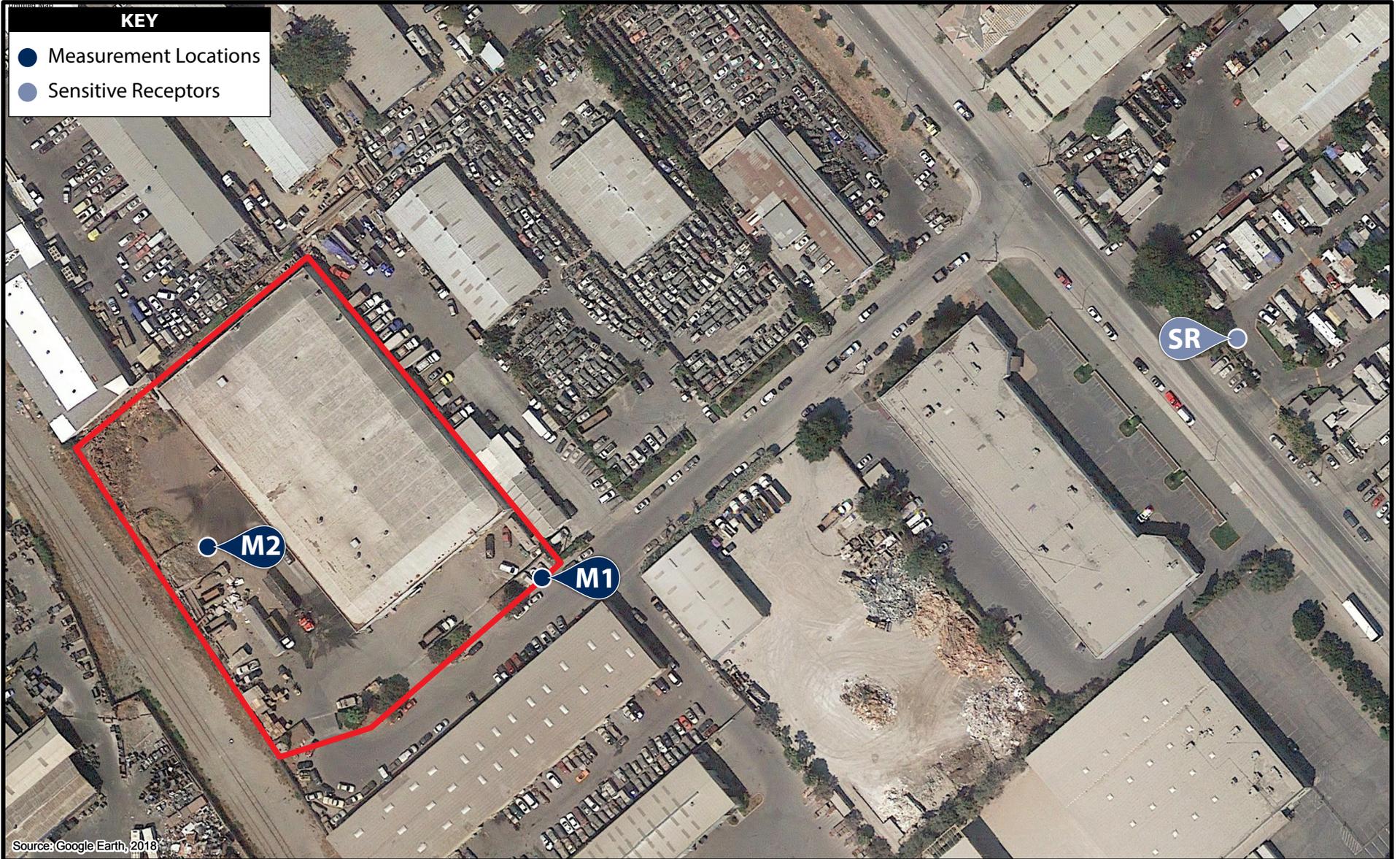
3.0 NOISE IMPACT ASSESSMENT

**TABLE 4
EXISTING OPERATIONAL NOISE MEASUREMENTS**

Location	Condition	Date and Time	Primary Noise Sources	Noise Level Statistics		
				L _{eq} (dBA)	L _{min} (dBA)	L _{max} (dBA)
1	Existing operational noise while the grinder is not running	Jan. 10, 2018 2:45 p.m.	Truck traffic, truck backup alarms, aircraft	65.2	51.0	79.5
1	Existing operational noise while the grinder is running in the doorway of the building	Jan. 10, 2018 3:11 p.m.	Truck traffic, truck backup alarms, aircraft, grinder	68.8	61.2	81.7
1	Existing operational noise while the grinder is running inside the building	Jan. 10, 2018 3:41 p.m.	Truck traffic, truck backup alarms, aircraft, grinder	67.9	63.1	76.9
2	Grinder reference noise level (100 feet)	Jan. 10, 2018 4:06 p.m.	Grinder, loading equipment, trucks	86.7	77.6	94.0

See **Appendix 1** for noise measurement outputs.

As shown, the recorded 15-minute L_{eq} ranged from 65.2 to 68.8 dB at the property line. With the grinder running, the L_{eq} increased by 2.7 to 3.6 dB, which would be considered a just-perceivable noise increase. Significant noise sources (other than the grinder) in the area during the measurements included truck and car traffic on the street, truck traffic in the Leo Recycle yard, truck backup alarms, train horns, and aircraft.



Not To Scale

FIGURE 1
Noise Measurement Locations

3.0 NOISE IMPACT ASSESSMENT

This page intentionally left blank.

3.3 NOISE IMPACT CALCULATIONS

Residential Community Noise Impacts

The closest residential use to the project site is a mobile home/trailer park, approximately 617 feet to the east beyond several industrial buildings. Traffic noise contour maps in the environmental noise assessment prepared for the Envision San José 2040 General Plan Comprehensive Update indicate the closest residences to the project are in an area with an L_{dn} (or DNL) of 60 to 65 dB (Illingworth & Rodkin 2010). These existing residences are in an area that exceeds the standard of L_{dn} 60 dB for new residential uses specified in General Plan Policy EC-1.1 and the area is identified as “conditionally acceptable” per Table EC-1 (see **Table 2**).

The highest measured L_{eq} was 68.8 dB, 340 feet from the grinder. Using the Federal Highway Administration (FHWA) estimate of 5 dB attenuation for a single row of buildings (FHWA 2006), the resulting noise at the residential property line would be L_{eq} 58.6 dB. Assuming an existing L_{dn} of 60 dB in the residential area and assuming a worst case of the grinder operating continuously from 8:00 a.m. to 11:00 p.m., the resulting L_{dn} at the nearest residential land use would be 62.4 dB. This is less than the 3 dB increase identified as significant in Policy EC-1.2 of the San José General Plan. Therefore, changes in noise levels at the closest existing residential use resulting from increased operational hours of grinding operations would be consistent with the General Plan Policy EC-1.2.

Commercial Community Noise Impacts

The closest hotel or motel to the project site is approximately 340 feet to the west beyond a metal recycling building. According to the traffic noise contour maps in the environmental noise assessment prepared for the Envision San José 2040 General Plan, this commercial property has an existing noise contour of L_{dn} (or DNL) 70 to 75 dB (Illingworth & Rodkin 2010). This existing commercial use is in an area that exceeds the standard of L_{dn} 60 dB for a motel specified in General Plan Policy EC-1.1 and the area is identified as “conditionally acceptable” per Table EC-1 (see **Table 2**).

The distance from the grinder to the motel is similar to the distance from the grinder to the noise measurement at location M1, and there are intervening buildings between the grinder and the motel. Therefore, it is assumed the resulting noise from grinding operations at the motel property line would not exceed L_{eq} 68.8 dB, as measured at location M1. Assuming an existing L_{dn} of 70 dB in the commercial area and assuming a worst case of the grinder operating continuously from 8:00 a.m. to 11:00 p.m., the resulting L_{dn} would be 72.3 dB. This is less than the 3 dB increase identified as significant in General Plan Policy EC-1.2. Therefore, changes in noise levels at the closest existing hotel or motel resulting from increased operational hours of grinding operations would be consistent with the General Plan Policy EC-1.2.

Compliance with the Municipal Code

As shown in the measurement results, the L_{max} measured at the property line to the southeast (location M1) was not substantially affected by grinding operations. The dominant noise source was truck traffic on Leo Avenue. Therefore, grinding operations would not cause noise to exceed 70 dB on the north, east, or south property lines. To the west, the Leo Recycle yard is surrounded by a 6-foot-high masonry wall. The metal recycling business across the railroad tracks is surrounded by a 12-foot-high masonry wall, 220 feet from the grinder when it is positioned in the doorway of the building. The attenuation due to the walls, estimated using the Kurze-Anderson Spherical Barrier Insertion Loss formula, is between 16.5 and 18.0 dB, depending on the frequency of the noise. The attenuation due to distance is 7 dB (6 dB for every doubling of distance). Using the L_{max} of 94 dB from noise measurements, the resulting predicted maximum noise from the grinder at the

3.0 NOISE IMPACT ASSESSMENT

industrial business to the west is 69.5 dB. Therefore, the predicted noise from grinding operations at adjacent industrial uses would not exceed the standards established in Municipal Code Section 20.50.300 and would be consistent with General Plan Policy EC-1.6.

3.4 CONCLUSION

The project site is in an area zoned Heavy Industrial and is surrounded by industrial uses and is in an area where noise levels are appropriate for the proposed uses, consistent with General Plan Policy EC-1.1. Grinding operations are substantially shielded by buildings on three sides and by two walls on the fourth side. Extending the permitted hours of grinding operations would not result in exceeding the standards of San José Municipal Code Section 20.50.300 and would be consistent with General Plan Policy EC-1.6. The closest residential or commercial uses (hotel/motel) are separated by multiple industrial buildings and walls. Assuming a worst-case scenario of the grinder operating continuously from 8:00 a.m. to 11:00 p.m., the maximum predicted increase in L_{dn} at the nearest residential or commercial use would be 2.4 dB. Extending the hours of grinding operations to 11:00 p.m. would not result in exceeding the standards established in General Plan Policy EC-1.2. Therefore, the impact of noise resulting from modifying the conditional use permit to allow Leo Recycle to extend the hours of grinding operations to 11:00 p.m. would be less than significant.

4.0 REFERENCES

FHWA (Federal Highway Administration). 2006. *Highway Construction Noise Handbook*.

FTA (Federal Transit Administration). 2006. *Transit Noise and Vibration Impact Assessment*.

Harris, Cyril M. 1979. *Handbook of Noise Control*.

Illingworth & Rodkin, Inc. 2010. *Envision San José 2040 General Plan Comprehensive Update Environmental Noise Assessment San José, California*.

OPR (Governor's Office of Planning and Research). 2017. *General Plan Guidelines*.

San José, City of. 2011. *Envision San José 2040 General Plan*.

———. 2017. *City of San José Municipal Code*. Accessed January 15, 2018.
<http://www.sanjoseca.gov/index.aspx?NID=441>.

**APPENDIX A:
NOISE MEASUREMENT OUTPUT FILES**

1

Measurement 1 – Location 1 without the grinder running

Summary

File Name on Meter AF___.005
 File Name on PC SLM_0003788_AF___.005.01.ldbin
 Serial Number 0003788
 Model SoundExpert® LxT
 Firmware Version 2.301
 User
 Location
 Job Description
 Note

Measurement

Description AF _ademy Project
 Start 2018-01-10 14:45:15
 Stop 2018-01-10 15:00:15
 Duration 00:15:00.0
 Run Time 00:15:00.0
 Pause 00:00:00.0

 Pre Calibration 2018-01-10 14:43:19
 Post Calibration None
 Calibration Deviation ---

Overall Settings

RMS Weight A Weighting
 Peak Weight A Weighting
 Detector Slow
 Preamp PRMLxT1L
 Microphone Correction Off
 Integration Method Exponential
 OBA Range Normal
 OBA Bandwidth 1/1 and 1/3
 OBA Freq. Weighting A Weighting
 OBA Max Spectrum At LMax
 Overload 120.0 dB

	A	C	Z
Under Range Peak	76.3	73.3	78.3 dB
Under Range Limit	25.2	24.8	31.2 dB
Noise Floor	15.9	15.6	21.3 dB

Results

LASeq 65.2 dB
 LA SE 94.8 dB
 EAS 332.011 µPa²h
 LASpeak (max) 2018-01-10 14:48:22 92.3 dB
 LASmax 2018-01-10 14:53:53 79.5 dB
 LASmin 2018-01-10 14:50:11 51.0 dB
 SEA -99.9 dB

LAS > 85.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LAS > 115.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 135.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 137.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 140.0 dB (Exceedance Counts / Duration) 0 0.0 s

Community Noise

	Ldn	LDay 07:00-23:00	LNight 23:00-07:00	Lden	LDay 07:00-19:00	LEvening 19:00-23:00
	65.2	65.2	-99.9	65.2	65.2	-99.9

LCSeq 74.4 dB
 LASeq 65.2 dB
 LCSeq - LASeq 9.2 dB
 LAleq 66.9 dB
 LAeq 65.2 dB
 LAleq - LAeq 1.7 dB

	A		C		Z	
	dB	Time Stamp	dB	Time Stamp	dB	Time Stamp
Leq	65.2					
Ls(max)	79.5	2018/01/10 14:53:53				
Ls(min)	51.0	2018/01/10 14:50:11				
LPeak(max)	92.3	2018/01/10 14:48:22				

Overloads 0
 Overload Duration 0.0 s
 # OBA Overloads 0
 OBA Overload Duration 0.0 s

Statistics

LAS5.00 72.1 dB
 LAS10.00 68.5 dB
 LAS33.30 62.5 dB
 LAS50.00 60.7 dB
 LAS66.60 58.8 dB
 LAS90.00 55.1 dB

Calibration History

	Date	dB re. 1V/Pa	6.3	8.0	10.0
Preamp					
Direct	2017-01-03 10:54:35	-27.0	2.5	1.9	3.3
Direct	2017-01-03 10:30:13	-26.0			
Direct	2014-07-01 09:45:44	-27.0	61.7	59.8	59.2
PRMLxT1L	2018-01-10 14:43:11	-26.4	82.7	77.6	101.5
PRMLxT1L	2018-01-10 12:58:50	-26.6	96.2	82.6	79.8
PRMLxT1L	2018-01-05 10:50:51	-26.7	45.1	51.0	61.7
PRMLxT1L	2017-12-06 16:53:45	-26.7	47.2	60.5	57.3
PRMLxT1L	2017-09-01 20:44:20	-26.5	71.4	64.6	54.7
PRMLxT1L	2017-08-25 17:23:31	-26.6	53.8	49.8	55.0
PRMLxT1L	2017-07-03 11:23:13	-26.4	52.6	54.8	52.8
PRMLxT1L	2017-06-27 16:21:22	-26.6	64.6	55.5	59.0
PRMLxT1L	2017-06-26 11:13:28	-26.6	61.3	59.9	62.9
PRMLxT1L	2017-06-20 10:09:05	-26.6	61.9	63.5	53.7
PRMLxT1L	2017-06-12 12:50:10	-26.6	48.3	50.2	49.4

2

Measurement 2 – Location 1 with the grinder running in the doorway

Summary

File Name on Meter AF__006
 File Name on PC SLM_0003788_AF__006.01.ldbin
 Serial Number 0003788
 Model SoundExpert® LxT
 Firmware Version 2.301
 User
 Location
 Job Description
 Note

Measurement

Description AF _ademy Project
 Start 2018-01-10 15:11:09
 Stop 2018-01-10 15:26:09
 Duration 00:15:00.0
 Run Time 00:15:00.0
 Pause 00:00:00.0

 Pre Calibration 2018-01-10 14:43:11
 Post Calibration None
 Calibration Deviation ---

Overall Settings

RMS Weight A Weighting
 Peak Weight A Weighting
 Detector Slow
 Preamp PRMLxT1L
 Microphone Correction Off
 Integration Method Exponential
 OBA Range Normal
 OBA Bandwidth 1/1 and 1/3
 OBA Freq. Weighting A Weighting
 OBA Max Spectrum At LMax
 Overload 120.0 dB

	A	C	Z
Under Range Peak	76.3	73.3	78.3 dB
Under Range Limit	25.2	24.8	31.2 dB
Noise Floor	15.9	15.6	21.3 dB

Results

LASeq 68.8 dB
 LA SE 98.4 dB
 EAS 761.245 µPa²h
 LASpeak (max) 2018-01-10 15:14:47 96.0 dB
 LASmax 2018-01-10 15:14:57 81.7 dB
 LASmin 2018-01-10 15:16:37 61.2 dB
 SEA -99.9 dB

LAS > 85.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LAS > 115.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 135.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 137.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 140.0 dB (Exceedance Counts / Duration) 0 0.0 s

Community Noise

	Ldn	LDay 07:00-23:00	LNight 23:00-07:00	Lden	LDay 07:00-19:00	LEvening 19:00-23:00
	68.8	68.8	-99.9	68.8	68.8	-99.9

LCSeq 76.2 dB
 LASeq 68.8 dB
 LCSeq - LASeq 7.4 dB
 LAleq 70.6 dB
 LAeq 68.8 dB
 LAleq - LAeq 1.8 dB

	A		C		Z	
	dB	Time Stamp	dB	Time Stamp	dB	Time Stamp
Leq	68.8					
Ls(max)	81.7	2018/01/10 15:14:57				
Ls(min)	61.2	2018/01/10 15:16:37				
LPeak(max)	96.0	2018/01/10 15:14:47				

Overloads 0
 Overload Duration 0.0 s
 # OBA Overloads 0
 OBA Overload Duration 0.0 s

Statistics

LAS5.00 73.8 dB
 LAS10.00 71.6 dB
 LAS33.30 67.5 dB
 LAS50.00 66.7 dB
 LAS66.60 66.0 dB
 LAS90.00 64.9 dB

Calibration History

	Date	dB re. 1V/Pa	6.3	8.0	10.0
Preamp					
Direct	2017-01-03 10:54:35	-27.0	2.5	1.9	3.3
Direct	2017-01-03 10:30:13	-26.0			
Direct	2014-07-01 09:45:44	-27.0	61.7	59.8	59.2
PRMLxT1L	2018-01-10 14:43:11	-26.4	82.7	77.6	101.5
PRMLxT1L	2018-01-10 12:58:50	-26.6	96.2	82.6	79.8
PRMLxT1L	2018-01-05 10:50:51	-26.7	45.1	51.0	61.7
PRMLxT1L	2017-12-06 16:53:45	-26.7	47.2	60.5	57.3
PRMLxT1L	2017-09-01 20:44:20	-26.5	71.4	64.6	54.7
PRMLxT1L	2017-08-25 17:23:31	-26.6	53.8	49.8	55.0
PRMLxT1L	2017-07-03 11:23:13	-26.4	52.6	54.8	52.8
PRMLxT1L	2017-06-27 16:21:22	-26.6	64.6	55.5	59.0
PRMLxT1L	2017-06-26 11:13:28	-26.6	61.3	59.9	62.9
PRMLxT1L	2017-06-20 10:09:05	-26.6	61.9	63.5	53.7
PRMLxT1L	2017-06-12 12:50:10	-26.6	48.3	50.2	49.4

3

Measurement 3 – Location 1 with the grinder running inside

Summary

File Name on Meter AF_007
 File Name on PC SLM_0003788_AF_007.01.ldbin
 Serial Number 0003788
 Model SoundExpert® LxT
 Firmware Version 2.301
 User
 Location
 Job Description
 Note

Measurement

Description AF _ademy Project
 Start 2018-01-10 15:41:52
 Stop 2018-01-10 15:56:52
 Duration 00:15:00.0
 Run Time 00:15:00.0
 Pause 00:00:00.0

 Pre Calibration 2018-01-10 14:43:11
 Post Calibration None
 Calibration Deviation ---

Overall Settings

RMS Weight A Weighting
 Peak Weight A Weighting
 Detector Slow
 Preamp PRMLxT1L
 Microphone Correction Off
 Integration Method Exponential
 OBA Range Normal
 OBA Bandwidth 1/1 and 1/3
 OBA Freq. Weighting A Weighting
 OBA Max Spectrum At LMax
 Overload 120.0 dB

	A	C	Z
Under Range Peak	76.3	73.3	78.3 dB
Under Range Limit	25.2	24.8	31.2 dB
Noise Floor	15.9	15.6	21.3 dB

Results

LASeq 67.9 dB
 LA SE 97.5 dB
 EAS 617.948 µPa²h
 LASpeak (max) 2018-01-10 15:56:18 102.6 dB
 LASmax 2018-01-10 15:47:14 76.9 dB
 LASmin 2018-01-10 15:55:30 63.1 dB
 SEA -99.9 dB

LAS > 85.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LAS > 115.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 135.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 137.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 140.0 dB (Exceedance Counts / Duration) 0 0.0 s

Community Noise

	Ldn	LDay 07:00-23:00	LNight 23:00-07:00	Lden	LDay 07:00-19:00	LEvening 19:00-23:00
	67.9	67.9	-99.9	67.9	67.9	-99.9

LCSeq 74.5 dB
 LASeq 67.9 dB
 LCSeq - LASeq 6.5 dB
 LAleq 69.9 dB
 LAeq 67.9 dB
 LAleq - LAeq 2.0 dB

	A		C		Z	
	dB	Time Stamp	dB	Time Stamp	dB	Time Stamp
Leq	67.9					
Ls(max)	76.9	2018/01/10 15:47:14				
Ls(min)	63.1	2018/01/10 15:55:30				
LPeak(max)	102.6	2018/01/10 15:56:18				

Overloads 0
 Overload Duration 0.0 s
 # OBA Overloads 0
 OBA Overload Duration 0.0 s

Statistics

LAS5.00 70.3 dB
 LAS10.00 69.4 dB
 LAS33.30 68.1 dB
 LAS50.00 67.3 dB
 LAS66.60 66.6 dB
 LAS90.00 65.1 dB

Calibration History

	Date	dB re. 1V/Pa	6.3	8.0	10.0
Preamp					
Direct	2017-01-03 10:54:35	-27.0	2.5	1.9	3.3
Direct	2017-01-03 10:30:13	-26.0			
Direct	2014-07-01 09:45:44	-27.0	61.7	59.8	59.2
PRMLxT1L	2018-01-10 14:43:11	-26.4	82.7	77.6	101.5
PRMLxT1L	2018-01-10 12:58:50	-26.6	96.2	82.6	79.8
PRMLxT1L	2018-01-05 10:50:51	-26.7	45.1	51.0	61.7
PRMLxT1L	2017-12-06 16:53:45	-26.7	47.2	60.5	57.3
PRMLxT1L	2017-09-01 20:44:20	-26.5	71.4	64.6	54.7
PRMLxT1L	2017-08-25 17:23:31	-26.6	53.8	49.8	55.0
PRMLxT1L	2017-07-03 11:23:13	-26.4	52.6	54.8	52.8
PRMLxT1L	2017-06-27 16:21:22	-26.6	64.6	55.5	59.0
PRMLxT1L	2017-06-26 11:13:28	-26.6	61.3	59.9	62.9
PRMLxT1L	2017-06-20 10:09:05	-26.6	61.9	63.5	53.7
PRMLxT1L	2017-06-12 12:50:10	-26.6	48.3	50.2	49.4

4

Measurement 4 – Location 2 with the grinder running in the doorway

Summary

File Name on Meter AF__008
 File Name on PC SLM_0003788_AF__008.01.ldbin
 Serial Number 0003788
 Model SoundExpert® LxT
 Firmware Version 2.301
 User
 Location
 Job Description
 Note

Measurement

Description AF _ademy Project
 Start 2018-01-10 16:06:48
 Stop 2018-01-10 16:21:48
 Duration 00:15:00.0
 Run Time 00:15:00.0
 Pause 00:00:00.0

 Pre Calibration 2018-01-10 14:43:11
 Post Calibration None
 Calibration Deviation ---

Overall Settings

RMS Weight A Weighting
 Peak Weight A Weighting
 Detector Slow
 Preamp PRMLxT1L
 Microphone Correction Off
 Integration Method Exponential
 OBA Range Normal
 OBA Bandwidth 1/1 and 1/3
 OBA Freq. Weighting A Weighting
 OBA Max Spectrum At LMax
 Overload 120.0 dB

	A	C	Z
Under Range Peak	76.3	73.3	78.3 dB
Under Range Limit	25.2	24.8	31.2 dB
Noise Floor	15.9	15.6	21.3 dB

Results

LASeq 86.7 dB
 LA SE 116.2 dB
 EAS 46.457 mPa²h
 LASpeak (max) 2018-01-10 16:14:34 111.7 dB
 LASmax 2018-01-10 16:19:09 94.0 dB
 LASmin 2018-01-10 16:15:01 77.6 dB
 SEA -99.9 dB

LAS > 85.0 dB (Exceedance Counts / Duration) 27 668.5 s
 LAS > 115.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 135.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 137.0 dB (Exceedance Counts / Duration) 0 0.0 s
 LASpeak > 140.0 dB (Exceedance Counts / Duration) 0 0.0 s

Community Noise

	Ldn	LDay 07:00-23:00	LNight 23:00-07:00	Lden	LDay 07:00-19:00	LEvening 19:00-23:00
	86.7	86.7	-99.9	86.7	86.7	-99.9

LCSeq 91.8 dB
 LASeq 86.7 dB
 LCSeq - LASeq 5.1 dB
 LAleq 88.1 dB
 LAeq 86.7 dB
 LAleq - LAeq 1.4 dB

	A		C		Z	
	dB	Time Stamp	dB	Time Stamp	dB	Time Stamp
Leq	86.7					
Ls(max)	94.0	2018/01/10 16:19:09				
Ls(min)	77.6	2018/01/10 16:15:01				
LPeak(max)	111.7	2018/01/10 16:14:34				

Overloads 0
 Overload Duration 0.0 s
 # OBA Overloads 0
 OBA Overload Duration 0.0 s

Statistics

LAS5.00 89.8 dB
 LAS10.00 89.2 dB
 LAS33.30 87.3 dB
 LAS50.00 86.0 dB
 LAS66.60 84.5 dB
 LAS90.00 82.2 dB

Calibration History

	Date	dB re. 1V/Pa	6.3	8.0	10.0
Preamp					
Direct	2017-01-03 10:54:35	-27.0	2.5	1.9	3.3
Direct	2017-01-03 10:30:13	-26.0			
Direct	2014-07-01 09:45:44	-27.0	61.7	59.8	59.2
PRMLxT1L	2018-01-10 14:43:11	-26.4	82.7	77.6	101.5
PRMLxT1L	2018-01-10 12:58:50	-26.6	96.2	82.6	79.8
PRMLxT1L	2018-01-05 10:50:51	-26.7	45.1	51.0	61.7
PRMLxT1L	2017-12-06 16:53:45	-26.7	47.2	60.5	57.3
PRMLxT1L	2017-09-01 20:44:20	-26.5	71.4	64.6	54.7
PRMLxT1L	2017-08-25 17:23:31	-26.6	53.8	49.8	55.0
PRMLxT1L	2017-07-03 11:23:13	-26.4	52.6	54.8	52.8
PRMLxT1L	2017-06-27 16:21:22	-26.6	64.6	55.5	59.0
PRMLxT1L	2017-06-26 11:13:28	-26.6	61.3	59.9	62.9
PRMLxT1L	2017-06-20 10:09:05	-26.6	61.9	63.5	53.7
PRMLxT1L	2017-06-12 12:50:10	-26.6	48.3	50.2	49.4