APPENDIX G

NOISE IMPACT ASSESSMENT

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NOISE IMPACT ANALYSIS

PORTUGUESE BEND LANDSLIDE REMEDIATION PROJECT

CITY OF RANCHO PALOS VERDES

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ACRONYMS AND ABBREVIATIONS

ANSI	American National Standards Institute
Caltrans	California Department of Transportation
CEQA	California Environmental Quality Act
City	City of Rancho Palos Verdes
CNEL	Community Noise Equivalent Level
dB	Decibel
dBA	A-weighted decibels
DOT	Department of Transportation
FHWA	Federal Highway Administration
FTA	Federal Transit Administration
EPA	Environmental Protection Agency
Hz	Hertz
Ldn	Day-night average noise level
Leq	Equivalent sound level
Lmax	Maximum noise level
ONAC	Federal Office of Noise Abatement and Control
OSB	Oriented Strand Board
OSHA	Occupational Safety and Health Administration
PPV	Peak particle velocity
RMS	Root mean square
SEL	Single Event Level or Sound Exposure Level
STC	Sound Transmission Class
UMTA	Federal Urban Mass Transit Administration
VdB	Vibration velocity level in decibels

1.0 EXECUTIVE SUMMARY

1.1 Purpose of Analysis and Study Objectives

This Noise Impact Analysis has been prepared to determine the noise impacts associated with the proposed Portuguese Bend Landslide Remediation Project (proposed project). The following is provided in this report:

- A description of the study area and the proposed project;
- Information regarding the fundamentals of noise;
- Information regarding the fundamentals of vibration;
- A description of the local noise guidelines and standards;
- An evaluation of the current noise environment;
- An analysis of the potential short-term construction-related noise impacts from the proposed project; and,
- An analysis of long-term operations-related noise impacts from the proposed project.

1.2 Site Location and Study Area

The project site is located along the south section of the Palos Verdes Peninsula within the City of Rancho Palos Verdes (City). The project site consists of approximately 206 acres within the landslide complex, however the overall area of land which contributes to the landslide instability is much larger, at approximately 750 acres in size. The project site includes approximately 104 acres of land located within the City-owned Palos Verdes Nature Preserve (Preserve) and specifically within the Portuguese Bend and Abalone Cove Reserves.

Surrounding the project site are residential uses that include the Portuguese Bend Beach Club to the south, the Portuguese Bend Community Association to the west, and the Seaview neighborhood to the east. East of the project site is Klondike Canyon and directly north is the Portuguese Bend Reserve followed by additional residential uses. The southern portion of the project site can be accessed via Yacht Harbor Drive/Seawall Road, a private road within the Portuguese Bend Beach Club community. The Pacific Ocean is located to the south of the project site. Several residences exist adjacent to the northwestern boundary of the project site. Many neighborhoods are affected by this landslide such as the Portuguese Bend Community Association and Portuguese Bend Beach Club. The project study area is shown in Figure 1.

1.3 Proposed Project Description

The proposed project is intended to minimize movement in the existing landslide area by implementing a series of recommended geotechnical engineering solutions that will include relief of artesian pressure below the landslide basal surface and minimize storm water infiltration into the subsurface. Thus, the proposed improvements would include infilling surface fractures to reduce the infiltration of surface water into the ground, constructing surface swales and retention areas to collect, slow down, and convey surface water to the ocean, and installing a subsurface water extraction system (hydraugers) by means of directional drilling to alleviate artesian pressure and also lower groundwater levels within the landslide mass. The proposed project consists of the following three construction components.

- Construction Component I: Surface fracturing infilling;
- Construction Component II: Surface water improvements; and
- Construction Component III: Hydraugers.

Each component could be constructed in any order and the timing of each would depend on a number of factors such as funding, permitting, etc. The overall staging, access and hydrauger locations are shown in Figure 1. Although the project site includes approximately 104 acres of land, it is anticipated that permanent improvements would be located on 15.08 acres of land and an additional 22 acres would be temporarily impacted during construction activities. For a total of 37.08 acres that would be potentially disturbed as part of the proposed project. Descriptions of each construction component are provided below.

Construction Component I: Surface Fracture Infilling

Multiple fractures are present, and most are observable throughout the project site. A surface fracture can be defined as a long, narrow crack opening observable at the ground surface. Surface fractures are induced by landslide movement and once formed can be extended and eroded by stormwater runoff. They can be hazardous to people living on or near the affected surfaces and damaging to property and infrastructure, as well as to the general public visiting the area and utilizing the trails in the Preserve. The existing surface fractures within the project site are a few feet wide and some are as deep as 15 or more feet. These fractures collect stormwater runoff that discharges into the ground. The stormwater runoff enters the fractures where it percolates into the ground and becomes a part of the groundwater which exacerbates landslide movement. The surface fracture infilling will control stormwater runoff infiltrating the ground and will help in solving one aspect of the landslide movement.

The fractures would be infilled with appropriate materials such as bentonite chips. This type of infill has been used successfully at other sites impacted by landslides such as cut slopes at the Sunshine Canyon Landfill in Los Angeles. A key advantage of this material is its ability to deform and maintain a seal if a crack continues to develop after infilling. After the initial fracture infilling event, periodic monitoring of the filled fractures will be performed to observe if repaired fractures open in the future at these locations due to ongoing landslide movement. Fractures identified during the field periodic monitoring inspection visits should be infilled again if needed as part of post-construction maintenance that will be implemented by the City.

Construction Component II: Surface Water Improvements

The proposed project would include installing new surface water improvements and refurbishing existing pipes to minimize soil erosion loss and stormwater ponding and infiltration that contributes to landslide movement. These improvements are described below:

- Engineered Swales: Swales are designed to manage surface stormwater runoff and can be described as shallow channels with gently sloping sides. The Proposed Project would install a network of engineered swales that extend south from Burma Road and traverse through the Project Site. The engineered swales would convey surface runoff from the northern limits of the Project Site, connecting to a new flow reduction area, and travel south underneath Palos Verdes Drive South to the Pacific Ocean. The surface swales would be designed to be visually complimentary to the surrounding setting of the Preserve and lined with context-sensitive vegetation instead of concrete. The designs will be consistent with restoration requirements outlined in the City's Natural Community Conservation Plan and Habitat Conservation Plan (NCCP/HCP) and other resource/regulatory review requirements.

- Flow Reduction Area: A flow reduction area is a detention basin that helps manage the flow of excess stormwater runoff. These areas allow large flows of water to enter but limit the outflow through a small opening. The Proposed Project would install one permanent bentonite-lined flow detention basin that would be approximately 10 acres in size. It would be located approximately 250 feet north of Palos Verdes Drive South within the project limits and connect to the engineered surface swales. The flow reduction area would primarily prevent percolation but will release stormwater at a gradual rate slowing the flow and allowing fine particles of soil to settle within the flow reduction area resulting in sediment-free water to exit the flow reduction area, routing the water through an existing 60-inch pipe that runs under Palos Verdes Drive South, before conveying the water into the Pacific Ocean. It will be designed to use gravity flow only and no pumps are planned. It is anticipated that stormwater would accumulate in the detention basin only for a period of several hours or less than one day once rain stops. Due to its short duration, the additional weight would not have a substantial effect on landslide stability, however regular maintenance would be needed to remove fine soil particles.
- Underground pipes: Installation, replacement, and refurbishment of underground piping to properly convey stormwater runoff will be required throughout the Project Site. This includes installing a new durable 36-inch-diameter pipe located below Burma Road; replacing an existing and deteriorating 36-inch-diameter plastic pipe located south of Palos Verdes Drive South; and refurbishing an existing 60-inch-diameter pipe below Palos Verdes Drive South. The intent of this environmentally sensitive solution is to utilize the footprint of the existing pipes and adding pipes with the least impact on the affected areas.

Construction Component III: Hydraugers

A groundwater extraction system of pipes, or "hydraugers", would be installed to alleviate artesian water pressure below the PBL which is believed to be the main contributor to landslide movement. Where possible, hydraugers would be installed below the slide plane (to avoid shearing off by landslide movement). Water will exit by controlled pressure flow and/or gravity flow. It will be routed through a storm drain system into the Pacific Ocean. The hydraugers will be installed sequentially, in fan-shaped patterns. They will extend within City-owned right-of-way or property. The ultimate size of hydraugers would depend on field conditions (groundwater yield); Depending on site conditions, hydrauger length might reach up to 1,200 feet with a diameter of up to 6 inches. The hydrauger depth will vary, with deepest points reaching up to 400 feet below ground surface.

All five (5) hydrauger systems will initially include above ground water storage tanks. Depending on water quality, including sediment load, these tanks will be either blended into the environment or removed so water directly discharges to the ocean or to the sewer system. The hydrauger systems will be constructed in three sub-phases. The sub-phases generally consist of the following:

(i) Preparatory work, including commissioning of more frequent monitoring of landslide movement, installation of vibrating wire piezometers, and development/implementation of remote sensing system. This step is necessary to adequately monitor the progress of landslide mitigation and to develop and implement corrections, if required. Duration: 6 months.

(ii) Grading of access points and work platforms for up-gradient hydraugers (hydraugers at the top of PBL). Installation of up-gradient hydraugers using horizontal drilling technique. Monitoring of the impact of this system on the overall performance of the PBL. If successful, this system will prevent buildup of artesian pressure at the toe of the PBL, i.e., will minimize the impact of the most destabilizing force on the landslide. Duration: 1.5 years (including 1 year of monitoring following the construction).

(iii) Grading of access points and work platforms for down-gradient hydraugers (hydraugers at the bottom of PBL). Installation of these hydraugers will be directional (i.e., they will be drilled below the sliding plane to relieve artesian pressure at the point it acts on the PBL. Duration 1.5 years (including 1 year of monitoring). Expected to occur concurrently with (ii), depending on funding

The pace and sequence of construction within each sub-phase is likely to require adjustment based on field observations. An attempt will be made to use the existing access routes for construction equipment, including for drilling rigs. Minimal grading, if any, will be required for placement of aboveground water storage tanks. Drilling mud will be collected and disposed of offsite. Flow (and release water pressure at downstream) from hydraugers will be controlled by (pressure-control) valves. Collected water will be conveyed to tanks through 4-inch diameter pipes. Both horizontal and directional drilling operations will last 1 – 2 weeks. Depending on the water yield, drillers may return to ream (i.e., increase diameter) of the hydraugers, or properly close the drilling location(s) if achieved yield is deemed too low.

Construction Timing

It is anticipated that the duration of Construction Component I – Surface Fracturing Infilling would consist of up to six months of active construction that would be followed by 6 months of monitoring. Construction Component II – Surface Water Improvements would consist of a year of active construction. Construction Component III – Hydraugers would consist of 6 months of active construction that would be followed by a year of monitoring for a total duration of 1.5 years. Construction of Components I, II, and III, including monitoring of vibrating-wire piezometers and survey, would occur between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday and between the hours of 9:00 a.m. and 5:00 p.m. on Saturday with no construction occurring on with no construction occurring on Sundays and federal holidays, in accordance with City noise standards.

Construction Staging Areas and Access Routes

Three separate staging areas will be utilized to store construction related equipment and materials (such as construction equipment, construction worker vehicles, construction materials and stockpiles). Contractor access is anticipated to be from Palos Verdes Drive South and the primary staging area for construction equipment and materials will be outside of the Preserve near the proposed detention basin. Construction equipment would primarily utilize existing on-site trails that will accommodate vehicles to access work areas within the Project Site. Access to one project element (Hydrauger A1) for construction and operation/maintenance will either occur via Yacht Harbor Drive/Seawall Road, a private road within the Portuguese Bend Beach Club community or internally within the project site. An easement will be necessary if the Yacht Harbor access is to be used.

1.4 Standard Noise Regulatory Conditions

The proposed project will be required to comply with the following regulatory conditions from the City of Rancho Palos Verdes and State of California.

City of Rancho Palos Verdes Noise Regulations

The following lists the noise regulations from the Municipal Code that are applicable, but not limited to the proposed project.

- Section 17.48.030: Setbacks that includes mechanical operational noise standards
- Section 17.56.020: Construction noise standards

State of California Noise Regulations

The following lists the State of California noise regulations that are applicable, but not limited to the proposed project.

- California Vehicle Code Section 2700-27207 – On Road Vehicle Noise Limits
- California Vehicle Code Section 38365-38350 – Off-Road Vehicle Noise Limits

1.5 Summary of Analysis Results

The following is a summary of the proposed project's impacts with regard to the State CEQA Guidelines noise checklist questions.

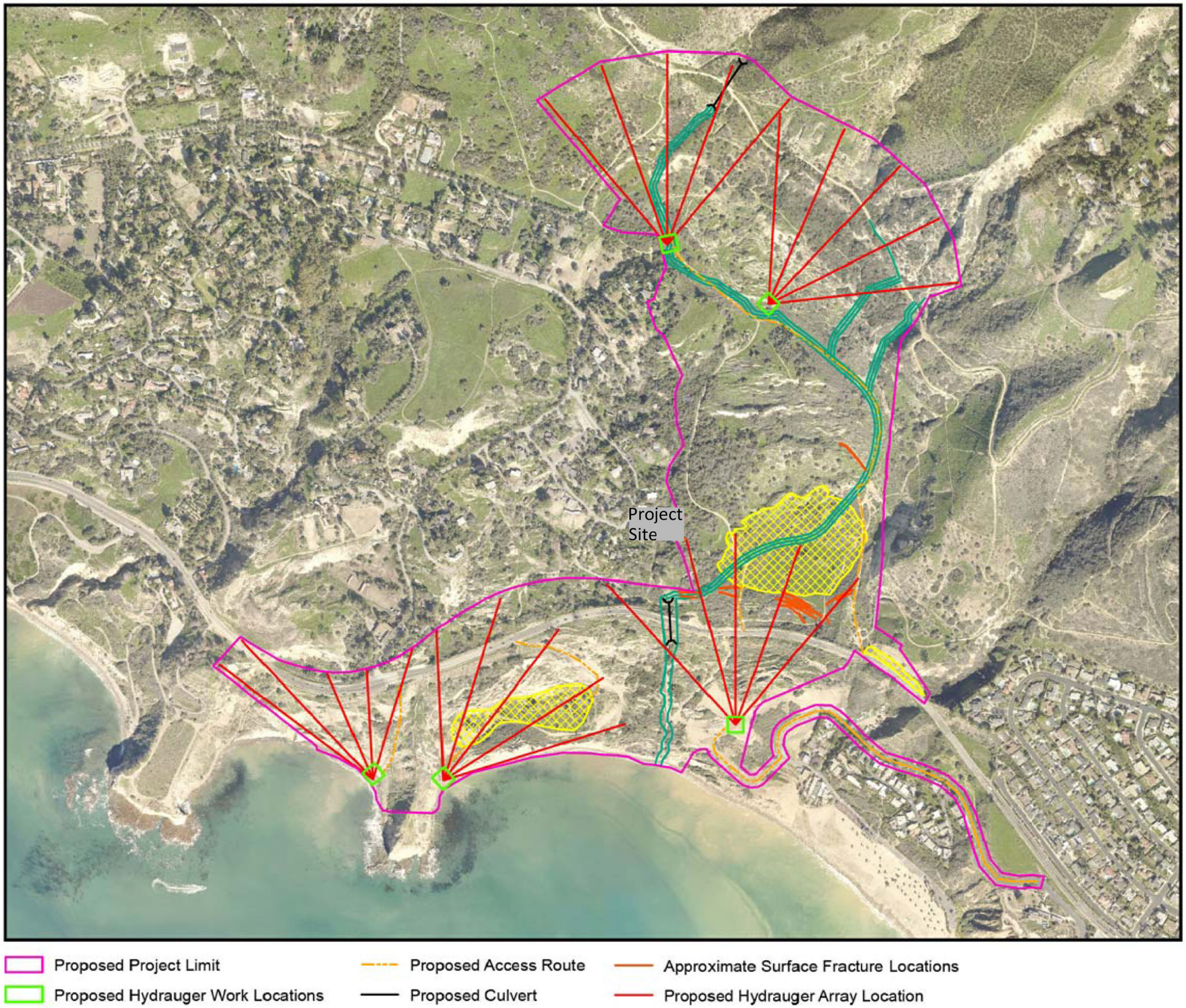
Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?
Less than significant impact.

Generation of excessive groundborne vibration or groundborne noise levels?
Less than significant impact.

For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?
No impact.

1.6 Mitigation Measures for the Proposed Project

This analysis found that through adherence to the noise and vibration regulations detailed in Section 1.4 above, all noise and vibration impacts would be reduced to less than significant levels and no mitigation is required.



SOURCE: Chambers Group, Inc.

VISTA ENVIRONMENTAL

Figure 1
Project Study Area and Access, Staging and Hydrauger Locations

2.0 NOISE FUNDAMENTALS

Noise is defined as unwanted sound. Sound becomes unwanted when it interferes with normal activities, when it causes actual physical harm or when it has adverse effects on health. Sound is produced by the vibration of sound pressure waves in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic unit which expresses the ratio of the sound pressure level being measured to a standard reference level. A-weighted decibels (dBA) approximate the subjective response of the human ear to a broad frequency noise source by discriminating against very low and very high frequencies of the audible spectrum. They are adjusted to reflect only those frequencies which are audible to the human ear.

2.1 Noise Descriptors

Noise Equivalent sound levels are not measured directly but are calculated from sound pressure levels typically measured in A-weighted decibels (dBA). The equivalent sound level (Leq) represents a steady state sound level containing the same total energy as a time varying signal over a given sample period. The peak traffic hour Leq is the noise metric used by California Department of Transportation (Caltrans) for all traffic noise impact analyses.

The Day-Night Average Level (Ldn) is the weighted average of the intensity of a sound, with corrections for time of day, and averaged over 24 hours. The time of day corrections require the addition of ten decibels to sound levels at night between 10 p.m. and 7 a.m. The Community Noise Equivalent Level (CNEL) is similar to the Ldn, except that it has an added 4.77 decibels to sound levels during the evening hours between 7 p.m. and 10 p.m. These additions are made to the sound levels at these time periods because during the evening and nighttime hours, when compared to daytime hours, there is a decrease in the ambient noise levels, which creates an increased sensitivity to sounds. For this reason, the sound appears louder in the evening and nighttime hours and is weighted accordingly. The City of Rancho Palos Verdes relies on the CNEL noise standard to assess transportation-related impacts on noise sensitive land uses.

2.2 Tone Noise

A pure tone noise is a noise produced at a single frequency and laboratory tests have shown that humans are more perceptible to changes in noise levels of a pure tone. For a noise source to contain a "pure tone," there must be a significantly higher A-weighted sound energy in a given frequency band than in the neighboring bands, thereby causing the noise source to "stand out" against other noise sources. A pure tone occurs if the sound pressure level in the one-third octave band with the tone exceeds the average of the sound pressure levels of the two contiguous one-third octave bands by:

- 5 dB for center frequencies of 500 hertz (Hz) and above
- 8 dB for center frequencies between 160 and 400 Hz
- 15 dB for center frequencies of 125 Hz or less

2.3 Noise Propagation

From the noise source to the receiver, noise changes both in level and frequency spectrum. The most obvious is the decrease in noise as the distance from the source increases. The manner in which noise reduces with distance depends on whether the source is a point or line source as well as ground absorption, atmospheric effects and refraction, and shielding by natural and manmade features. Sound from point sources, such as air conditioning condensers, radiate uniformly outward as it travels away from the source in a spherical pattern. The noise drop-off rate associated with this geometric spreading is 6 dBA per each doubling of the distance (dBA/DD). Transportation noise sources such as roadways are typically analyzed as line sources, since at any given moment the receiver may be impacted by noise from multiple vehicles at various locations along the roadway. Because of the geometry of a line source, the noise drop-off rate associated with the geometric spreading of a line source is 3 dBA/DD.

2.4 Ground Absorption

The sound drop-off rate is highly dependent on the conditions of the land between the noise source and receiver. To account for this ground-effect attenuation (absorption), two types of site conditions are commonly used in traffic noise models, soft-site and hard-site conditions. Soft-site conditions account for the sound propagation loss over natural surfaces such as normal earth and ground vegetation. For point sources, a drop-off rate of 7.5 dBA/DD is typically observed over soft ground with landscaping, as compared with a 6.0 dBA/DD drop-off rate over hard ground such as asphalt, concrete, stone and very hard packed earth. For line sources a 4.5 dBA/DD is typically observed for soft-site conditions compared to the 3.0 dBA/DD drop-off rate for hard-site conditions. Caltrans research has shown that the use of soft-site conditions is more appropriate for the application of the Federal Highway Administration (FHWA) traffic noise prediction model used in this analysis as most ground surfaces between the source and receptor will provide some noise absorption.

3.0 GROUND-BORNE VIBRATION FUNDAMENTALS

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

3.1 Vibration Descriptors

There are several different methods that are used to quantify vibration amplitude such as the maximum instantaneous peak in the vibrations velocity, which is known as the peak particle velocity (PPV) or the root mean square (rms) amplitude of the vibration velocity. Due to the typically small amplitudes of vibrations, vibration velocity is often expressed in decibels and is denoted as (L_v) and is based on the rms velocity amplitude. A commonly used abbreviation is vibration decibels (VdB), which in this text, is when L_v is based on the reference quantity of 1 micro inch per second.

3.2 Vibration Perception

Typically, developed areas are continuously affected by vibration velocities of 50 VdB or lower. These continuous vibrations are not noticeable to humans whose threshold of perception is around 65 VdB. Off-site sources that may produce perceptible vibrations are usually caused by construction equipment, steel-wheeled trains, and traffic on rough roads, while smooth roads rarely produce perceptible ground-borne noise or vibration.

3.3 Vibration Propagation

The propagation of ground-borne vibration is not as simple to model as airborne noise. This is due to the fact that noise in the air travels through a relatively uniform median, while ground-borne vibrations travel through the earth which may contain significant geological differences. There are three main types of vibration propagation; surface, compression, and shear waves. Surface waves, or Rayleigh waves, travel along the ground's surface. These waves carry most of their energy along an expanding circular wave front, similar to ripples produced by throwing a rock into a pool of water. P-waves, or compression waves, are body waves that carry their energy along an expanding spherical wave front. The particle motion in these waves is longitudinal (i.e., in a "push-pull" fashion). P-waves are analogous to airborne sound waves. S-waves, or shear waves, are also body waves that carry energy along an expanding spherical wave front. However, unlike P-waves, the particle motion is transverse or "side-to-side and perpendicular to the direction of propagation."

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

4.0 REGULATORY SETTING

The project site is located in the City of Rancho Palos Verdes. 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:

- Promulgating noise emission standards for interstate commerce
- Assisting state and local abatement efforts
- Promoting noise education and research

The Federal Office of Noise Abatement and Control (ONAC) was initially tasked with implementing the Noise Control Act. However, the ONAC has since been eliminated, leaving the development of federal noise policies and programs to other federal agencies and interagency committees. For example, the Occupational Safety and Health Administration (OSHA) agency prohibits exposure of workers to excessive sound levels. The Department of Transportation (DOT) assumed a significant role in noise control through its various operating agencies. The Federal Aviation Administration (FAA) regulates noise of aircraft and airports. Surface transportation system noise is regulated by a host of agencies, including the Federal Transit Administration (FTA). Transit noise is regulated by the federal Urban Mass Transit Administration (UMTA), while freeways that are part of the interstate highway system are regulated by the Federal Highway Administration (FHWA). Finally, the federal government actively 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 sited adjacent to a highway or, alternately that the developments are planned and constructed in such a manner that potential noise impacts are minimized.

Although the proposed project is not under the jurisdiction of the FTA, the FTA is the only agency that has defined what constitutes a significant noise impact from implementing a project. The FTA recommends developing construction noise criteria on a project-specific basis that utilizes local noise ordinances if possible. However, local noise ordinances usually relates to nuisance and hours of allowed activity and sometimes specify limits in terms of maximum levels, but are generally not practical for assessing the noise impacts of a construction project. Project construction noise criteria should take into account the existing noise environment, the absolute noise levels during construction activities, the duration of the construction, and the adjacent land uses. The FTA standards are based on extensive studies by the FTA and other governmental agencies on the human effects and reaction to noise and a summary of the FTA findings for a detailed construction noise assessment are provided below in Table A.

Table A – FTA Construction Noise Criteria

Land Use	Day (dBA $Leq_{(8\text{-hour})}$)	Night (dBA $Leq_{(8\text{-hour})}$)	30-day Average (dBA Ldn)
Residential	80	70	75
Commercial	85	85	80(1)
Industrial	90	90	85(1)

Notes:
(1) Use a 24-hour $Leq_{(24\text{ hour})}$ instead of $Ldn_{(30\text{ day})}$.
Source: Federal Transit Administration, 2018.

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

4.2 State Regulations

Noise Standards

California Department of Health Services Office of Noise Control

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," which allows the local jurisdiction to clearly delineate compatibility of sensitive uses with various incremental levels of noise.

California Noise Insulation Standards

Title 24, Chapter 1, Article 4 of the California Administrative Code (California Noise Insulation Standards) requires noise insulation in new hotels, motels, apartment houses, and dwellings (other than single-family detached housing) that provides an annual average noise level of no more than 45 dBA CNEL. When such structures are located within a 60-dBA CNEL (or greater) noise contour, an acoustical analysis is required to ensure that interior levels do not exceed the 45-dBA CNEL annual threshold. In addition, Title 21, Chapter 6, Article 1 of the California Administrative Code requires that all habitable rooms, hospitals, convalescent homes, and places of worship shall have an interior CNEL of 45 dB or less due to aircraft noise.

Government Code Section 65302

Government Code Section 65302 mandates that the legislative body of each county and city in California 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.

Vibration Standards

Title 14 of the California Administrative Code Section 15000 requires that all state and local agencies implement the California Environmental Quality Act (CEQA) Guidelines, which requires the analysis of exposure of persons to excessive groundborne vibration. However, no statute has been adopted by the state that quantifies the level at which excessive groundborne vibration occurs.

Caltrans issued the *Transportation- and Construction-Induced Vibration Guidance Manual* in 2004. The manual provides practical guidance to Caltrans engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. However, this manual is also used as a reference point by many lead agencies and CEQA practitioners throughout California, as it provides numeric thresholds for vibration impacts. Thresholds are established for continuous (construction-related) and transient (transportation-related) sources of vibration, which found that the human response becomes distinctly perceptible at 0.25 inch per second PPV for transient sources and 0.04 inch per second PPV for continuous sources.

4.3 Local Regulations

The *City of Rancho Palos Verdes General Plan*, adopted September 2018 and the *Rancho Palos Verdes Municipal Code,* October 18, 2022 establishes the following applicable policies related to noise and vibration.

City of Rancho Palos Verdes General Plan

The following lists the applicable goals, policies and programs for the proposed project from Chapter IX Noise Element of the City of Rancho Palos Verdes General Plan.

Goal 1: Through proper land use planning and regulations, to provide for a quiet and serene residential community with a minimum of restriction on citizen activity.

Policies

Transportation Noise

1. Encourage through traffic to existing arterials and collectors so that local roads are not used as by-passes or shortcuts, in order to minimize noise.
2. Control traffic flows of heavy construction vehicles en route to and from construction sites to minimize noise.
3. Encourage the state and federal governments to actively control and reduce vehicle noise emissions.
4. Encourage state law enforcement agencies to vigorously enforce all laws that call for the control and/or reduction of noise emissions.

Community Noise

5. Develop an ordinance to control noise commensurate with local ambiance.
6. Maintain current and up-to-date information on noise control measures, on both fixed-point and vehicular noise sources.
7. Coordinate with all public agencies, especially our adjoining jurisdictions to study and/or control noise emissions.

Land Use Planning and Noise Control

8. Mitigate impacts generated by steady state noise intrusion (e.g., with land strip buffers, landscaping, and site design.
9. Regulate land use so that there is a minimal degree of noise impact on adjacent land uses.
10. Require strict noise attenuation measures where appropriate.
11. Review noise attenuation measures applicable to home, apartment, and office building construction, make appropriate proposals for the City zoning ordinance, and make appropriate recommendations for modifying the Los Angeles County Building Code as it applies to the City.
12. Require the minimization of noise emissions from commercial activities by screening and buffering techniques.

City of Rancho Palos Verdes Municipal Code

Section 17.48.030 – Setbacks

Except as otherwise provided in this chapter, no building, structure or portion of any building or structure, located under or above the ground, shall be constructed or extended closer to any street side, interior side, front or rear property line than the respective front, side or rear setback required in the district in which the property is located. On lots abutting a private street, setbacks shall be measured from the street easement line for measuring setbacks.

E. Exceptions.

   5. Minor Structures and Mechanical Equipment. Trash enclosures, storage sheds or playhouses less than 120 square feet, doghouses, play/sports equipment, fountains, light fixtures on a standard or a pole, flagpoles, enclosed water heaters, barbecues, outdoor kitchens, garden walls, air conditioners, pool filters, vents and other minor structures or mechanical equipment shall not be located in any setback area in residential districts except as specified below:

      b. Minor structures and mechanical equipment which exceed six inches in height, as measured from adjacent finished grade, may be permitted within an interior side or rear setback area by the director, through a site plan review application, unless the minor structure is a play house less than 120 square feet, a dog house, or play/sports equipment, then a site plan review application shall not be required; provided that no significant adverse impacts will result and provided that:

         i. Noise levels from mechanical equipment do not exceed 65 dBA as measured from the closest property line.

Section 17.56.020 – Conduct of Construction and Landscaping Activities.

B. It is unlawful to carry on construction grading or landscaping activities or to operate heavy equipment except between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday and between 9:00 a.m. to 5:00 p.m. on Saturday. No such activity shall be permitted on Sunday or the legal holidays listed in Section 17.96.920 (Holiday, Legal) of this code, unless a special construction permit is obtained from the director. Said special construction permit must be requested at least 48 hours before such work is to begin. Emergency work, as defined in Section 17.96.630 (Emergency Work) of this code, and typical residential activities, such as lawn mowing, gardening (without the use of weed and debris blowers),and minor home repair/maintenance, shall be exempted from these time and day restrictions. The hours of operation for weed and debris blowers are specified in Chapter 8.16 (Weed and Debris Blowers) of this code.

5.0 EXISTING NOISE CONDITIONS

To determine the existing noise levels, noise measurements have been taken in the vicinity of the project site. The field survey noted that noise within the proposed project area is generally characterized by vehicle traffic on Palos Verdes Drive South that runs through the project site in an east-west direction. There is also noise created from the nearby residential uses and birds in the vicinity of the project site. The following describes the measurement procedures, measurement locations, noise measurement results, and the modeling of the existing noise environment.

5.1 Noise Measurement Equipment

The noise measurements were taken using a Larson-Davis Model 831 Type 1 precision sound level meter programmed in “slow” mode to record noise levels in “A” weighted form as well as the frequency spectrum of the noise broken down into 1/3 octaves. The sound level meter and microphone were mounted on a tripod five feet above the ground and were equipped with a windscreen during all measurements. The sound level meter was calibrated before and after the monitoring using a Larson-Davis calibrator, Model CAL 200. The accuracy of the calibrator is maintained through a program established through the manufacturer and is traceable to the National Bureau of Standards. The unit meets the requirements of ANSI Standard S1.4-1984 and IEC Standard 942: 1988 for Class 1 equipment. All noise level measurement equipment meets American National Standards Institute (ANSI) specifications for sound level meters (S1.4-1983 identified in Chapter 19.68.020.AA).

Noise Measurement Locations

The noise monitoring locations were selected in order to obtain the existing noise levels on the project site and in the vicinity of the nearby residential uses. Descriptions of the noise monitoring sites are provided below in Table B and the noise measurement locations are shown in Figure 3. Appendix A includes a photo index of the study area and noise level measurement locations.

Noise Measurement Timing and Climate

The noise measurements were recorded between 12:16 p.m. and 1:13 p.m. on Friday, August 7, 2020. At the start of the noise measurements, the sky was clear, the temperature was 72 degrees Fahrenheit, the humidity was 63 percent, barometric pressure was 29.70 inches of mercury, and the wind was blowing at an average rate of four miles per hour. At the conclusion of the noise measurements, the sky was clear, the temperature was 73 degrees Fahrenheit, the humidity was 58 percent, barometric pressure was 29.73 inches of mercury, and the wind was blowing at an average rate of two miles per hour.

5.2 Noise Measurement Results

The results of the noise level measurements are presented in Table B and the noise monitoring data printouts are included in Appendix B.

Table B – Existing (Ambient) Noise Level Measurements

Site No.	Description	Primary Noise Sources	Start Time of Measurement	Measured Noise Level	
				dBA Leq	dBA Lmax
1	Located on the eastern Staging Area, approximately 50 feet north of Palos Verdes Drive centerline.	Vehicles on Palos Verdes Drive and aircraft overflights.	12:16 p.m.	58.5	67.3
2	Located near the north portion of project site, in front of home at 94 Narcissa Drive.	Landscape equipment and wildlife	12:32 p.m.	43.8	59.8
3	Located near the west portion of project site, in front of home at 1 Peppertree Drive and approximately 190 feet north of Palos Verdes Drive centerline.	Vehicles on Palos Verdes Drive and Peppertree Drive	12:50 p.m.	49.8	65.0
4	Located on the southern portion of the project site on driveway to the South Bay Archery Club and approximately 110 feet south of Palos Verdes Drive centerline.	Vehicles on Palos Verdes Drive	1:03 p.m.	51.9	61.9

Source: Noise measurements taken on August 7, 2020.

SOURCE: Google Maps.

VISTA ENVIRONMENTAL

Figure 2
Field Noise Monitoring Locations

6.0 MODELING PARAMETERS AND ASSUMPTIONS

6.1 Construction Noise

The noise impacts from construction of the proposed project have been analyzed through use of the FHWA's Roadway Construction Noise Model (RCNM). The FHWA compiled noise measurement data regarding the noise generating characteristics of several different types of construction equipment used during the Central Artery/Tunnel project in Boston. Table C below provides a list of the construction equipment anticipated to be used for each component of construction as detailed in *Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis Portuguese Bend Landslide Remediation Project* (Air Quality Analysis), prepared by Vista Environmental, January 20, 2023.

Table C – Construction Equipment Noise Emissions and Usage Factors

Equipment Description	Number of Equipment	Acoustical Use Factor[1] (percent)	Spec 721.560 Lmax at 50 feet[2] (dBA, slow[3])	Actual Measured Lmax at 50 feet[4] (dBA, slow[3])
Staging Areas & Access Routes				
Rubber Tired Dozers	3	40	85	82
Tractors	2	40	84	N/A
Front End Loader	1	40	80	79
Backhoe	1	40	80	78
Surface Fracturing Infilling				
Excavator	1	40	85	81
Pump	1	50	77	81
Rubber Tired Dozer	1	40	85	82
Tractor	1	40	84	N/A
Front End Loader	1	40	80	79
Surface Water Improvements				
Excavator	1	40	85	81
Forklift (Gradall)	3	40	85	83
Pump	1	50	77	81
Tractor	1	40	84	N/A
Front End Loader	1	40	80	79
Backhoe	1	40	80	78
Paving				
Bore/Drill Rig	1	20	84	79
Forklift (Gradall)	1	40	85	83
Generator	1	50	82	81
Pump	1	50	77	81
Tractor	1	40	84	N/A
Welder	1	40	73	74

Notes:
[1] Acoustical use factor is the percentage of time each piece of equipment is operational during a typical workday.
[2] Spec 721.560 is the equipment noise level utilized by the RCNM program.
[3] The "slow" response averages sound levels over 1-second increments. A "fast" response averages sound levels over 0.125-second increments.
[4] Actual Measured is the average noise level measured of each piece of equipment during the Central Artery/Tunnel project in Boston, Massachusetts primarily during the 1990s.
Source: Federal Highway Administration, 2006 and CalEEMod default equipment mix.

Table C also shows the associated measured noise emissions for each piece of equipment from the RCNM model and measured percentage of typical equipment use per day. Construction noise impacts to the nearest homes have been calculated according to the equipment noise levels and usage factors listed in Table C and through use of the RCNM. For each component of construction, all construction equipment was analyzed based on being placed in the middle of the nearest construction area to each sensitive receptor analyzed, which is based on the analysis methodology detailed in the *Transit Noise and Vibration Impact Assessment Manual* (FTA Manual), prepared by FTA, September 2018, for a General Assessment. The RCNM model printouts are provided in Appendix C.

6.2 Vibration

Construction activity can result in varying degrees of ground vibration, depending on the equipment used on the site. Operation of construction equipment causes ground vibrations that spread through the ground and diminish in strength with distance. Buildings in the vicinity of the project site respond to these vibrations with varying results ranging from no perceptible effects at the low levels to slight damage to the structures at the highest levels. Table D gives approximate vibration levels for particular construction equipment that is provided by the FTA, however it should be noted that not all of these equipment types would be used during construction of the proposed project. The data in Table D provides a reasonable estimate for a wide range of soil conditions.

Table D – Vibration Source Levels for Construction Equipment

Equipment		Peak Particle Velocity (inches/second)	Approximate Vibration Level (L_v)at 25 feet
Pile driver (impact)	Upper range	1.518	112
	typical	0.644	104
Pile driver (sonic)	Upper range	0.734	105
	typical	0.170	93
Clam shovel drop (slurry wall)		0.202	94
Vibratory Roller		0.210	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

Source: Federal Transit Administration, 2018.

The construction-related vibration impacts have been calculated through the vibration levels shown above in Table D and through typical vibration propagation rates. The equipment assumptions were based on the equipment lists provided above in Table C.

7.0 IMPACT ANALYSIS

7.1 CEQA Thresholds of Significance

Consistent with the California Environmental Quality Act (CEQA) and the State CEQA Guidelines, a significant impact related to noise would occur if a proposed project is determined to result in:

- Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies;
- Generation of excessive groundborne vibration or groundborne noise levels; or
- For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels.

7.2 Generation of Noise Levels in Excess of Standards

The proposed project would not generate a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies. The following section calculates the potential noise emissions from the proposed project and compares the noise levels to the City standards. The proposed project consists of landslide remediation activities, which are considered as construction activity types, as such no operational emissions would be created from the proposed project. It should be noted that the proposed hydraugers may include water pumps that would operate post construction activities, however these pumps would be located underground and would not create any noise on the surface. As such, no further analysis is provided on these pumps.

Potential noise impacts associated with the proposed project would be from project-generated vehicular traffic on the nearby roadways and from onsite construction activities, which have been analyzed separately below.

Onsite Noise Impacts

Noise impacts from onsite activities associated with the proposed project would be a function of the noise generated by construction equipment, equipment location, sensitivity of nearby land uses, and the timing and duration of the construction activities.

Section 17.56.020 of the City's Municipal Code exempts construction noise from the City noise standards provided that construction activities occur between 7:00 a.m. and 6:00 p.m. Monday through Friday and between 9:00 a.m. and 5:00 p.m. on Saturdays. No construction activities are allowed on Sundays or legal holidays. However, the City construction noise standards do not provide any limits to the noise levels that may be created from construction activities and even with adherence to the City standards, the resultant construction noise levels may result in a significant substantial temporary noise increase to the nearby residents.

In order to determine if the proposed construction activities would create a significant substantial temporary noise increase, the FTA construction noise criteria thresholds detailed above in Section 4.1 have been utilized, which shows that a significant construction noise impact would occur if construction noise exceeds 80 dBA Leq over an eight hour period during the daytime at the nearby homes or exceeds 85 dBA Leq over an eight hour period during the daytime at the church to the east, which is considered a commercial use. Construction noise impacts to the nearby sensitive receptors have been calculated through use of the RCNM and the parameters and assumptions detailed in Section 6.1 of this report including Table C – Construction Equipment Noise Emissions and Usage Factors. The results are shown below in Table E and the RCNM printouts are provided in Appendix C.

Table E – Noise Levels at the Nearby Sensitive Receptors

Construction Component	Noise Level (dBA Leq) at:			
	Homes to North[1]	Homes to West[2]	Homes to Southeast[3]	Homes to East[4]
Staging Areas & Access Routes	71	68	70	66
Surface Fracturing Infilling	69	67	68	64
Surface Water Improvements	70	67	69	65
Hydraugers	70	67	68	64
Noise Threshold[5]	**80**	**80**	**80**	**80**
Exceed Thresholds?	**No**	**No**	**No**	**No**

Notes:

[1] The nearest homes to the north were determined to be on Narcissa Drive that are located as near as 300 feet from the center of the nearest construction area.

[2] The nearest homes to the west were determined to be on Peppertree Drive that are located as near as 400 feet from the center of the nearest construction area.

[3] The nearest homes to the southeast were determined to be on Yacht Harbor Drive that are located as near as 350 feet from the center of the nearest construction area.

[4] The nearest homes to the east were determined to be on Admirable Drive that are located as near as 550 feet from the center of the nearest construction area.

[5] The Noise Threshold was obtained from Table A above.

Source: RCNM, Federal Highway Administration, 2006

Table E shows that greatest construction noise impacts would occur during the staging areas and access routes component, with a noise level as high as 71 dBA Leq at the nearest homes to the north of the project site on Narcissa Drive. The calculated construction noise levels shown in Table E are within the within the FTA daytime construction noise standard of 80 dBA at the nearby homes. Therefore, through adherence to the limitation of allowable construction times provided in Section 17.56.020 of the City's Municipal Code, project-related noise levels would not exceed any standards established in the General Plan or Noise Ordinance nor would project activities create a substantial temporary increase in ambient noise levels. As such, onsite project-related noise impacts would be less than significant.

Roadway Vehicular Noise

According to the *Transportation Assessment Portuguese Bend Landslide Remediation Project* (Traffic Analysis), prepared by Linscott, Law & Greenspan, January 19, 2023, the proposed project is anticipated to generate up to 22 worker trips and 60 truck trips per day, or a total of 82 vehicle trips per day. Vehicle noise is a combination of the noise produced by the engine, exhaust and tires. In order for project-generated vehicular traffic to increase the noise level on any of the nearby roadways by 3 dB, the roadway traffic volumes would have to double. According to the Traffic Analysis, Palos Verdes Drive South in the vicinity of the project site currently has 16,500 vehicle trips per day. The vehicle trips generated by the proposed project would increase the traffic volume on Palos Verdes Drive South by up to 0.50 percent, which is well below the doubling of traffic volumes required to increase roadway noise levels by 3 dBA. As such, the proposed project's roadway noise impacts would be well below a 3 dBA noise increase, which is the threshold of perception of an increase in noise levels. Therefore, roadway noise impacts would be less than significant.

Level of Significance

Less than significant impact.

7.3 Generation of Excessive Groundborne Vibration

The proposed project would not expose persons to or generation of excessive groundborne vibration or groundborne noise levels. Vibration impacts from the proposed project would typically be created from the operation of heavy off-road equipment. The nearest sensitive receptors to the project site are homes located on Narcissa Drive, where construction activities would occur as close as 220 feet to the homes.

Since neither the Municipal Code nor the General Plan provides a quantifiable vibration threshold level, Caltrans guidance that is detailed above in Section 4.2 has been utilized, which defines the threshold of perception from transient sources at 0.25 inch per second PPV.

The primary source of vibration created from the proposed project would be from the operation of a bulldozer. From Table D above a large bulldozer would create a vibration level of 0.089 inch per second PPV at 25 feet. Based on typical propagation rates, the vibration level at the nearest homes (220 feet away) would be 0.08 inch per second PPV, which would be below the 0.25 inch per second PPV threshold detailed above. Impacts would be less than significant.

Level of Significance

Less than significant impact.

7.4 Aircraft Noise

The proposed project would not expose people residing or working in the project area to excessive noise levels from aircraft. The nearest airport is Zamperini Field Airport that is located as near as four miles north of the project site. The project site is located outside of the 60 dBA CNEL noise contours of Zamperini Field Airport. No impacts would occur from aircraft noise.

Level of Significance

No impact.

8.0 REFERENCES

California Department of Transportation (Caltrans), *Technical Noise Supplement to the Traffic Noise Analytics Protocol*, September 2013.

California Department of Transportation, *Transportation and Construction Vibration Guidance Manual*, April 2020.

City of Rancho Palos Verdes, *City of Rancho Palos Verdes General Plan,* Adopted September 2018.

City of Rancho Palos Verdes, *Rancho Palos Verdes Municipal Code*, October 18, 2022.

Federal Transit Administration, *Transit Noise and Vibration Impact Assessment,* September 2018.

Linscott, Law & Greenspan, *Transportation Assessment Portuguese Bend Landslide Remediation Project,* January 19, 2023.

U.S. Department of Transportation, *FHWA Roadway Construction Noise Model User's Guide,* January, 2006.

Vista Environmental, *Air Quality, Energy, and Greenhouse Gas Emissions Impact Analysis Portuguese Bend Landslide Remediation Project,* January 20, 2023.

APPENDIX A

Field Noise Measurements Photo Index

Noise Monitoring Site 1 - looking north

Noise Monitoring Site 1 - looking northeast

Noise Monitoring Site 1 - looking east

Noise Monitoring Site 1 - looking southeast

Noise Monitoring Site 1 - looking south

Noise Monitoring Site 1 - looking southwest

Noise Monitoring Site 1 - looking west

Noise Monitoring Site 1 - looking northwest


Noise Monitoring Site 2 - looking north


Noise Monitoring Site 2 - looking northeast


Noise Monitoring Site 2 - looking east


Noise Monitoring Site 2 - looking southeast


Noise Monitoring Site 2 - looking south


Noise Monitoring Site 2 - looking southwest


Noise Monitoring Site 2 - looking west


Noise Monitoring Site 2 - looking northwest


Noise Monitoring Site 3 - looking north


Noise Monitoring Site 3 - looking northeast


Noise Monitoring Site 3 - looking east


Noise Monitoring Site 3 - looking southeast


Noise Monitoring Site 3 - looking south


Noise Monitoring Site 3 - looking southwest


Noise Monitoring Site 3 - looking west


Noise Monitoring Site 3 - looking northwest


Noise Monitoring Site 4 - looking north


Noise Monitoring Site 4 - looking northeast


Noise Monitoring Site 4 - looking east


Noise Monitoring Site 4 - looking southeast


Noise Monitoring Site 4 - looking south


Noise Monitoring Site 4 - looking southwest


Noise Monitoring Site 4 - looking west


Noise Monitoring Site 4 - looking northwest

APPENDIX B

Field Noise Measurements Printouts

Measurement Report

Report Summary

Meter's File Name	831_Data.001	Computer's File Name	SLM_0002509_831_Data_001.00.ldbin
Meter	831		
Firmware	2.314		
User	GT	Location	
Description	Portuguese Bend Landslide Mitigation		
Note	Located at Staging Area on East Side		

Start Time	2020-08-07 12:16:07	Duration	0:10:00.0		
End Time	2020-08-07 12:26:07	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	58.5 dB		
LAE	86.3 dB	SEA	--- dB
EA	47.5 µPa²h		
LZ_{peak}	103.2 dB	2020-08-07 12:16:07	
LAS_{max}	67.3 dB	2020-08-07 12:20:04	
LAS_{min}	34.3 dB	2020-08-07 12:22:25	
LA_{eq}	58.5 dB		
LC_{eq}	67.7 dB	LC_{eq} - LA_{eq}	9.2 dB
LAI_{eq}	59.6 dB	LAI_{eq} - LA_{eq}	1.1 dB

Exceedances

Exceedances	Count	Duration
LAS > 65.0 dB	2	0:00:08.4
LAS > 85.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
58.5 dB	58.5 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
58.5 dB	58.5 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	58.5 dB		67.7 dB		72.1 dB	
$Ls_{(max)}$	67.3 dB	2020-08-07 12:20:04	78.3 dB	2020-08-07 12:21:58	93.5 dB	2020-08-07 12:16:07
$LF_{(max)}$	71.7 dB	2020-08-07 12:20:04	80.1 dB	2020-08-07 12:19:04	98.9 dB	2020-08-07 12:16:07
$LI_{(max)}$	73.2 dB	2020-08-07 12:20:04	81.2 dB	2020-08-07 12:19:04	101.3 dB	2020-08-07 12:16:07
$LS_{(min)}$	34.3 dB	2020-08-07 12:22:25	50.5 dB	2020-08-07 12:19:49	55.0 dB	2020-08-07 12:19:49
$LF_{(min)}$	31.7 dB	2020-08-07 12:22:26	48.2 dB	2020-08-07 12:19:49	53.0 dB	2020-08-07 12:19:49
$LI_{(min)}$	33.6 dB	2020-08-07 12:22:25	50.9 dB	2020-08-07 12:19:49	56.7 dB	2020-08-07 12:19:49
$L_{Peak(max)}$	83.1 dB	2020-08-07 12:20:04	88.3 dB	2020-08-07 12:20:04	103.2 dB	2020-08-07 12:16:07

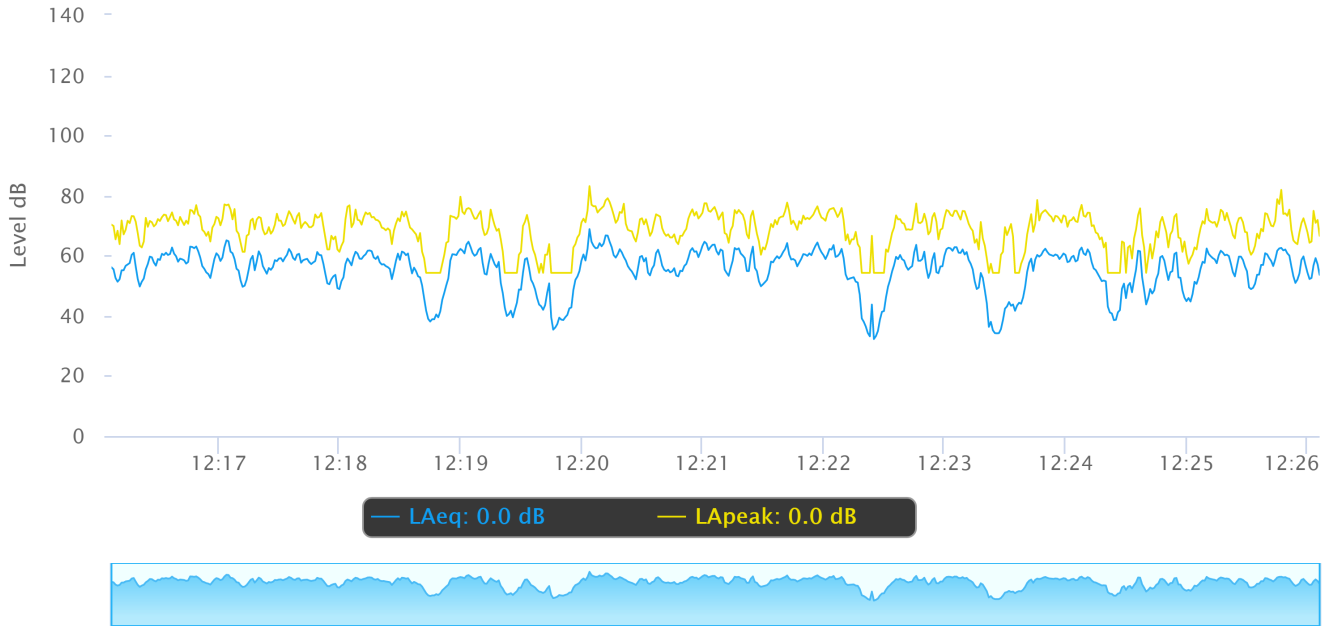
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

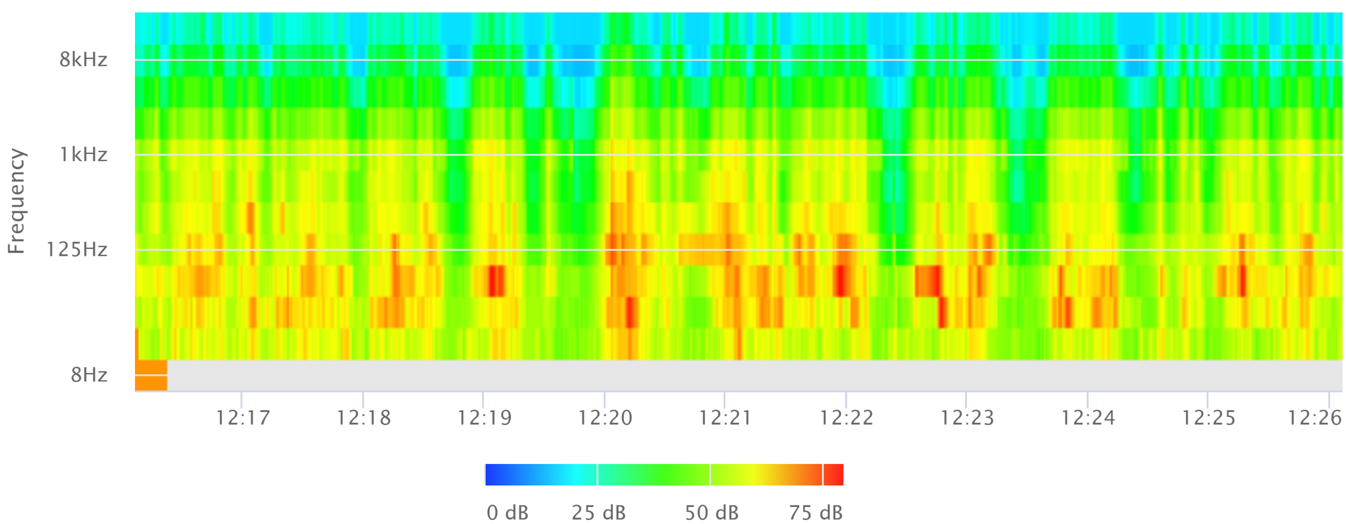
Statistics

LAS 5.0	62.6 dB
LAS 10.0	61.7 dB
LAS 33.3	59.5 dB
LAS 50.0	57.8 dB
LAS 66.6	55.1 dB
LAS 90.0	44.7 dB

Time History



OBA 1/1 Leq



Measurement Report

Report Summary

Meter's File Name	831_Data.002	Computer's File Name	SLM_0002509_831_Data_002.00.ldbin
Meter	831		
Firmware	2.314		
User	GT		Location
Description	Portuguese Bend Landslide Mitigation		
Note	Located on north portion of Landslide area in front of 94 Narcissa Drive		

Start Time	2020-08-07 12:32:57	Duration	0:10:00.0		
End Time	2020-08-07 12:42:57	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	43.8 dB		
LAE	71.5 dB	SEA	--- dB
EA	1.6 µPa²h		
LZ_{peak}	100.4 dB	2020-08-07 12:32:57	
LAS_{max}	59.8 dB	2020-08-07 12:40:31	
LAS_{min}	28.5 dB	2020-08-07 12:36:08	
LA_{eq}	43.8 dB		
LC_{eq}	56.2 dB	LC_{eq} - LA_{eq}	12.5 dB
LAI_{eq}	46.1 dB	LAI_{eq} - LA_{eq}	2.4 dB

Exceedances

Exceedances		Count	Duration
LAS >	65.0 dB	0	0:00:00.0
LAS >	85.0 dB	0	0:00:00.0
LZpeak >	135.0 dB	0	0:00:00.0
LZpeak >	137.0 dB	0	0:00:00.0
LZpeak >	140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
43.8 dB	43.8 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
43.8 dB	43.8 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	43.8 dB		56.2 dB		67.2 dB	
$Ls_{(max)}$	59.8 dB	2020-08-07 12:40:31	73.0 dB	2020-08-07 12:32:57	92.5 dB	2020-08-07 12:32:57
$LF_{(max)}$	62.4 dB	2020-08-07 12:40:30	76.4 dB	2020-08-07 12:32:57	96.6 dB	2020-08-07 12:32:57
$LI_{(max)}$	63.1 dB	2020-08-07 12:40:30	80.4 dB	2020-08-07 12:32:57	98.9 dB	2020-08-07 12:32:57
$LS_{(min)}$	28.5 dB	2020-08-07 12:36:08	46.1 dB	2020-08-07 12:35:29	52.3 dB	2020-08-07 12:35:22
$LF_{(min)}$	27.4 dB	2020-08-07 12:35:20	44.3 dB	2020-08-07 12:34:57	49.2 dB	2020-08-07 12:34:58
$LI_{(min)}$	27.9 dB	2020-08-07 12:35:22	47.5 dB	2020-08-07 12:35:22	54.3 dB	2020-08-07 12:35:21
$L_{Peak(max)}$	77.0 dB	2020-08-07 12:42:24	87.1 dB	2020-08-07 12:32:57	100.4 dB	2020-08-07 12:32:57

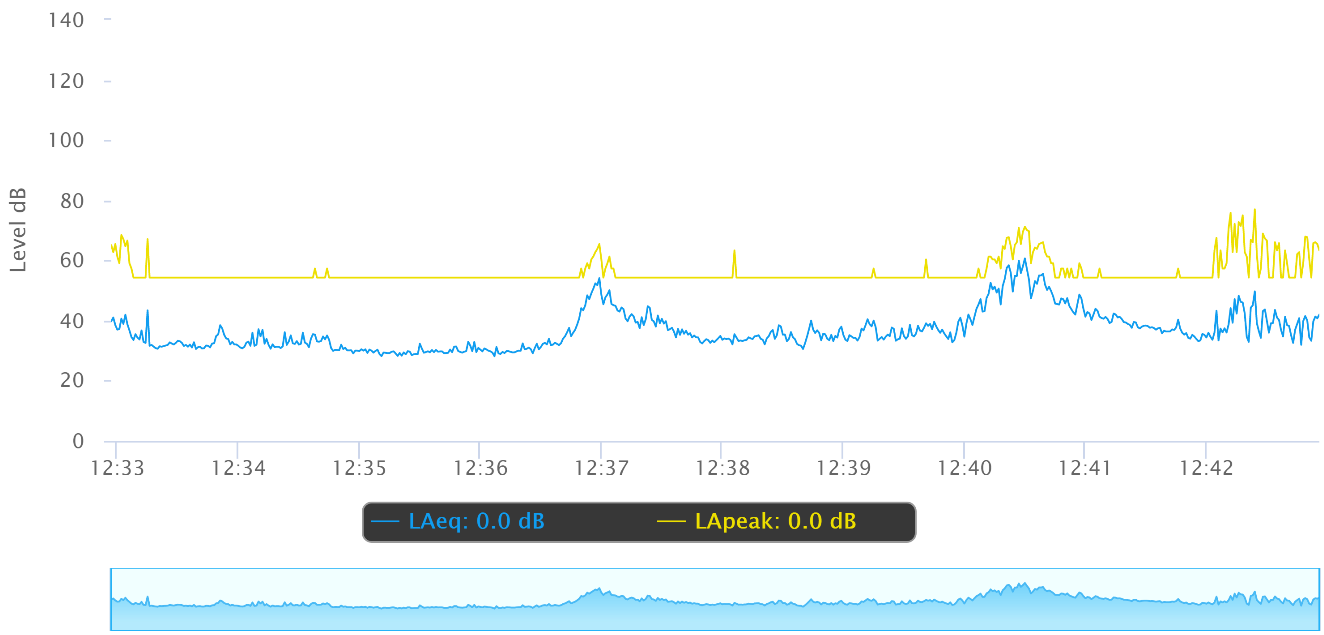
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

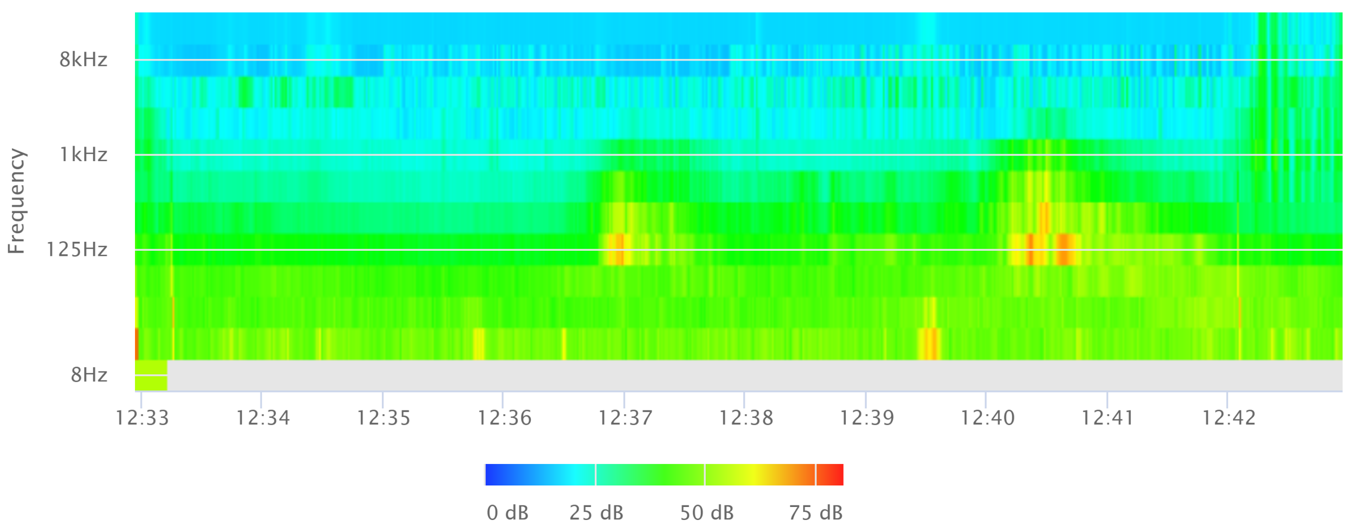
Statistics

LAS 5.0	50.8 dB
LAS 10.0	46.2 dB
LAS 33.3	37.9 dB
LAS 50.0	35.3 dB
LAS 66.6	33.5 dB
LAS 90.0	30.0 dB

Time History



OBA 1/1 Leq



Measurement Report

Report Summary

Meter's File Name	831_Data.003	Computer's File Name	SLM_0002509_831_Data_003.00.ldbin
Meter	831		
Firmware	2.314		
User	GT	Location	
Description	Portuguese Bend Landslide Mitigation		
Note	Located on west side of Landslide Area at 1 Peppertree Dr (Villa Francesca)		

Start Time	2020-08-07 12:50:06	Duration	0:10:00.0		
End Time	2020-08-07 13:00:06	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	49.8 dB		
LAE	77.6 dB	SEA	--- dB
EA	6.3 µPa²h		
LZ_{peak}	101.6 dB	2020-08-07 12:50:06	
LAS_{max}	65.0 dB	2020-08-07 12:55:26	
LAS_{min}	31.1 dB	2020-08-07 12:56:54	
LA_{eq}	49.8 dB		
LC_{eq}	62.8 dB	LC_{eq} - LA_{eq}	13.0 dB
LAI_{eq}	52.4 dB	LAI_{eq} - LA_{eq}	2.6 dB

Exceedances

Exceedances	Count	Duration
LAS > 65.0 dB	1	0:00:01.2
LAS > 85.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
49.8 dB	49.8 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
49.8 dB	49.8 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	49.8 dB		62.8 dB		74.6 dB	
$Ls_{(max)}$	65.0 dB	2020-08-07 12:55:26	75.8 dB	2020-08-07 12:58:33	92.9 dB	2020-08-07 12:50:07
$LF_{(max)}$	66.5 dB	2020-08-07 12:55:26	77.8 dB	2020-08-07 12:58:32	97.1 dB	2020-08-07 12:50:06
$LI_{(max)}$	67.4 dB	2020-08-07 12:52:56	81.9 dB	2020-08-07 12:57:43	99.8 dB	2020-08-07 12:50:06
$LS_{(min)}$	31.1 dB	2020-08-07 12:56:54	52.5 dB	2020-08-07 12:56:54	64.5 dB	2020-08-07 12:52:12
$LF_{(min)}$	30.1 dB	2020-08-07 12:56:53	50.9 dB	2020-08-07 12:56:54	58.7 dB	2020-08-07 12:53:57
$LI_{(min)}$	31.3 dB	2020-08-07 12:56:54	53.7 dB	2020-08-07 12:56:54	65.8 dB	2020-08-07 12:51:21
$L_{Peak(max)}$	85.1 dB	2020-08-07 12:50:11	90.2 dB	2020-08-07 12:57:43	101.6 dB	2020-08-07 12:50:06

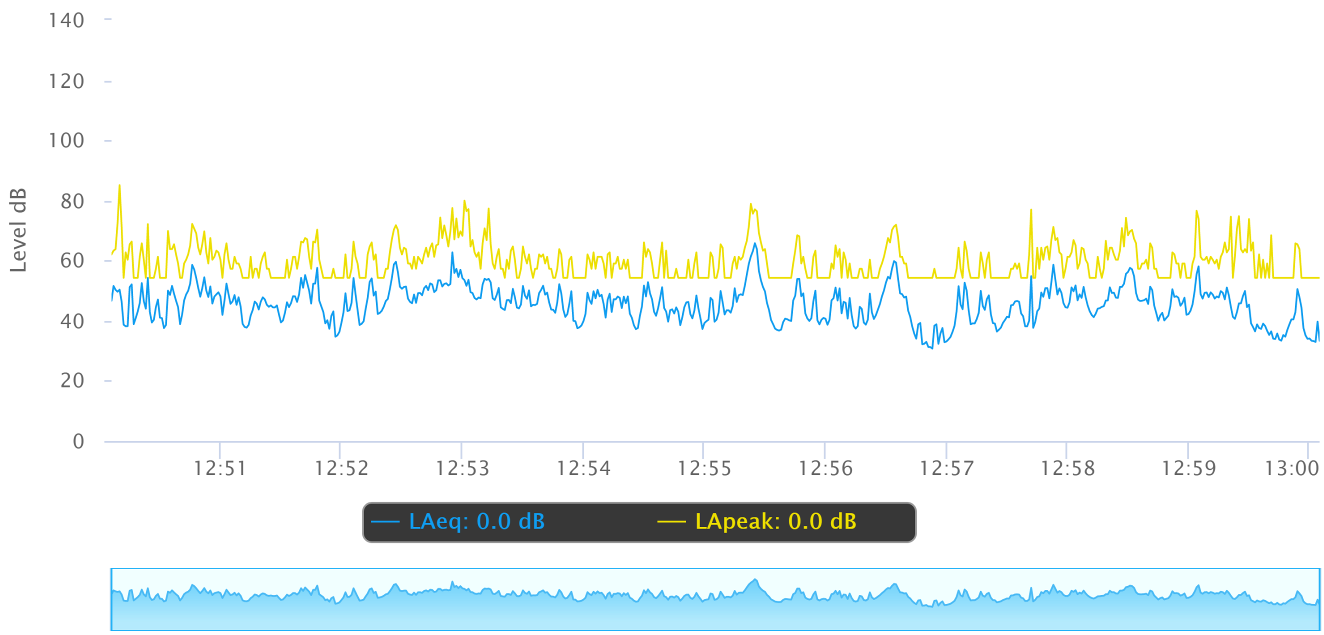
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

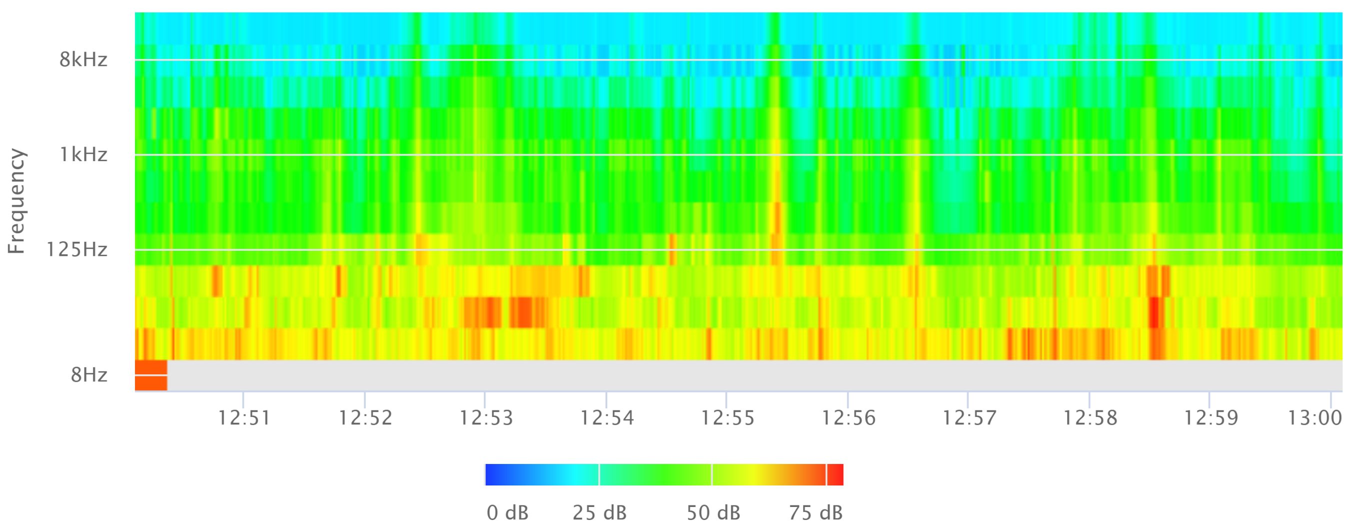
Statistics

LAS 5.0	55.3 dB
LAS 10.0	52.5 dB
LAS 33.3	48.5 dB
LAS 50.0	46.5 dB
LAS 66.6	44.2 dB
LAS 90.0	38.8 dB

Time History



OBA 1/1 Leq



Measurement Report

Report Summary

Meter's File Name	831_Data.004	Computer's File Name	SLM_0002509_831_Data_004.00.ldbin
Meter	831		
Firmware	2.314		
User	GT	Location	
Description	Portuguese Bend Landslide Mitigation		
Note	Located on south side of Landslide area on driveway to South Bay Archery Club		

Start Time	2020-08-07 13:03:38	Duration	0:10:00.0		
End Time	2020-08-07 13:13:38	Run Time	0:10:00.0	Pause Time	0:00:00.0

Results

Overall Metrics

LA_{eq}	51.9 dB		
LAE	79.7 dB	SEA	--- dB
EA	10.3 µPa²h		
LZ_{peak}	102.0 dB	2020-08-07 13:03:38	
LAS_{max}	61.9 dB	2020-08-07 13:08:52	
LAS_{min}	37.8 dB	2020-08-07 13:10:05	
LA_{eq}	51.9 dB		
LC_{eq}	64.2 dB	LC_{eq} - LA_{eq}	12.3 dB
LAI_{eq}	53.5 dB	LAI_{eq} - LA_{eq}	1.6 dB

Exceedances

Exceedances	Count	Duration
LAS > 65.0 dB	0	0:00:00.0
LAS > 85.0 dB	0	0:00:00.0
LZpeak > 135.0 dB	0	0:00:00.0
LZpeak > 137.0 dB	0	0:00:00.0
LZpeak > 140.0 dB	0	0:00:00.0

Community Noise

LDN	LDay	LNight	
51.9 dB	51.9 dB	0.0 dB	
LDEN	**LDay**	**LEve**	**LNight**
51.9 dB	51.9 dB	--- dB	--- dB

Any Data

	A		C		Z	
	Level	Time Stamp	Level	Time Stamp	Level	Time Stamp
L_{eq}	51.9 dB		64.2 dB		75.8 dB	
$Ls_{(max)}$	61.9 dB	2020-08-07 13:08:52	78.4 dB	2020-08-07 13:08:52	95.2 dB	2020-08-07 13:03:38
$LF_{(max)}$	65.0 dB	2020-08-07 13:08:52	81.2 dB	2020-08-07 13:08:52	97.6 dB	2020-08-07 13:11:21
$LI_{(max)}$	66.4 dB	2020-08-07 13:08:52	82.4 dB	2020-08-07 13:08:52	100.0 dB	2020-08-07 13:03:38
$LS_{(min)}$	37.8 dB	2020-08-07 13:10:05	54.3 dB	2020-08-07 13:10:05	60.9 dB	2020-08-07 13:10:51
$LF_{(min)}$	37.1 dB	2020-08-07 13:10:02	52.9 dB	2020-08-07 13:10:03	57.2 dB	2020-08-07 13:07:03
$LI_{(min)}$	37.4 dB	2020-08-07 13:10:04	54.9 dB	2020-08-07 13:10:04	62.0 dB	2020-08-07 13:04:31
$L_{Peak(max)}$	82.2 dB	2020-08-07 13:09:30	87.7 dB	2020-08-07 13:08:52	102.0 dB	2020-08-07 13:03:38

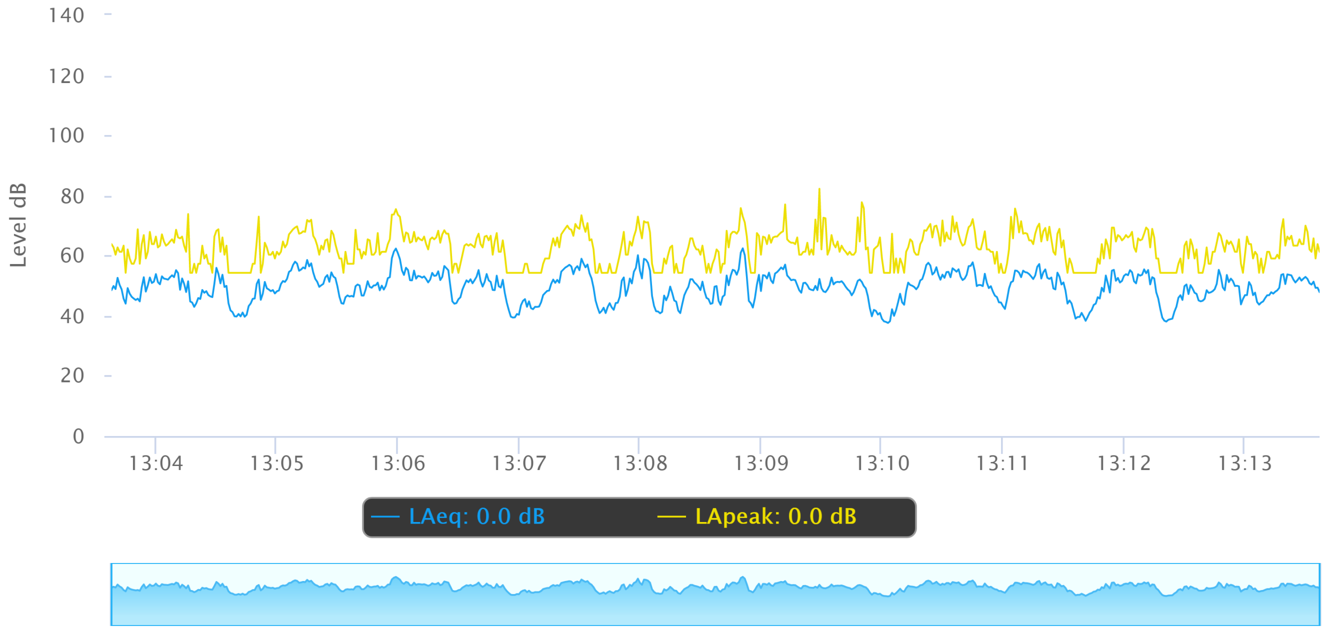
Overloads

Count	Duration	OBA Count	OBA Duration
0	0:00:00.0	0	0:00:00.0

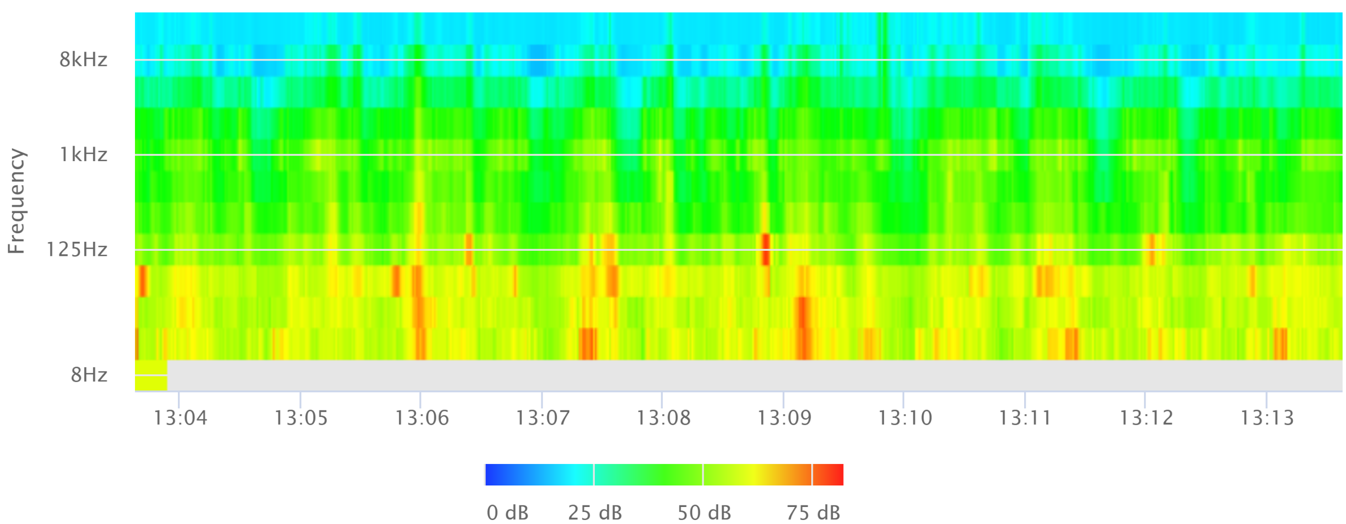
Statistics

LAS 5.0	56.5 dB
LAS 10.0	55.2 dB
LAS 33.3	52.1 dB
LAS 50.0	50.4 dB
LAS 66.6	48.3 dB
LAS 90.0	43.1 dB

Time History



OBA 1/1 Leq



APPENDIX C

RCNM Model Construction Noise Calculations

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Staging Areas & Access Routes

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to North	Residential	43.8	43.8	43.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	300	0
Dozer	No	40		81.7	300	0
Dozer	No	40		81.7	300	0
Tractor	No	40	84		300	0
Front End Loader	No	40		79.1	300	0
Backhoe	No	40		77.6	300	0
Tractor	No	40	84		300	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Dozer		66.1	62.1	N/A	N/A	N/A	N/A
Dozer		66.1	62.1	N/A	N/A	N/A	N/A
Dozer		66.1	62.1	N/A	N/A	N/A	N/A
Tractor		68.4	64.5	N/A	N/A	N/A	N/A
Front End Loader		63.5	59.6	N/A	N/A	N/A	N/A
Backhoe		62.0	58.0	N/A	N/A	N/A	N/A
Tractor		68.4	64.5	N/A	N/A	N/A	N/A
	Total	**68**	**71**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Staging Areas & Access Routes

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to West	Residential	49.8	49.8	49.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40		81.7	400	0
Dozer	No	40		81.7	400	0
Dozer	No	40		81.7	400	0
Tractor	No	40	84		400	0
Front End Loader	No	40		79.1	400	0
Backhoe	No	40		77.6	400	0
Tractor	No	40	84		400	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Dozer		63.6	59.6	N/A	N/A	N/A	N/A
Dozer		63.6	59.6	N/A	N/A	N/A	N/A
Dozer		63.6	59.6	N/A	N/A	N/A	N/A
Tractor		65.9	62.0	N/A	N/A	N/A	N/A
Front End Loader		61.0	57.1	N/A	N/A	N/A	N/A
Backhoe		59.5	55.5	N/A	N/A	N/A	N/A
Tractor		65.9	62.0	N/A	N/A	N/A	N/A
	Total	**66**	**68**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Staging Areas & Access Routes

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to Southeast	Residential	51.9	51.9	51.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40.0		81.7	350	0
Dozer	No	40.0		81.7	350	0
Dozer	No	40.0		81.7	350	0
Tractor	No	40.0	84		350	0
Front End Loader	No	40.0		79.1	350	0
Backhoe	No	40.0		77.6	350	0
Tractor	No	40.0	84		350	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Dozer		64.8	60.8	N/A	N/A	N/A	N/A
Dozer		64.8	60.8	N/A	N/A	N/A	N/A
Dozer		64.8	60.8	N/A	N/A	N/A	N/A
Tractor		67.1	63.1	N/A	N/A	N/A	N/A
Front End Loader		62.2	58.2	N/A	N/A	N/A	N/A
Backhoe		60.7	56.7	N/A	N/A	N/A	N/A
Tractor		67.1	63.1	N/A	N/A	N/A	N/A
	Total	**67**	**70**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Staging Areas & Access Routes

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to East	Residential	58.5	58.5	58.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Dozer	No	40.0		81.7	550	0
Dozer	No	40.0		81.7	550	0
Dozer	No	40.0		81.7	550	0
Tractor	No	40.0	84		550	0
Front End Loader	No	40.0		79.1	550	0
Backhoe	No	40.0		77.6	550	0
Tractor	No	40.0	84		550	0

Results

Equipment		Calculated (dBA) *Lmax	Leq	Noise Limits (dBA) Day Lmax	Day Leq	Evening Lmax	Evening Leq
Dozer		60.8	56.9	N/A	N/A	N/A	N/A
Dozer		60.8	56.9	N/A	N/A	N/A	N/A
Dozer		60.8	56.9	N/A	N/A	N/A	N/A
Tractor		63.2	59.2	N/A	N/A	N/A	N/A
Front End Loader		58.3	54.3	N/A	N/A	N/A	N/A
Backhoe		56.7	52.8	N/A	N/A	N/A	N/A
Tractor		63.2	59.2	N/A	N/A	N/A	N/A
	Total	**63**	**66**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Surface Fracturing Infilling

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to North	Residential	43.8	43.8	43.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	300	0
Pumps	No	50		80.9	300	0
Dozer	No	40		81.7	300	0
Tractor	No	40	84		300	0
Front End Loader	No	40		79.1	300	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Excavator		65.1	61.2	N/A	N/A	N/A	N/A
Pumps		65.4	62.4	N/A	N/A	N/A	N/A
Dozer		66.1	62.1	N/A	N/A	N/A	N/A
Tractor		68.4	64.5	N/A	N/A	N/A	N/A
Front End Loader		63.5	59.6	N/A	N/A	N/A	N/A
	Total	**68**	**69**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Surface Fracturing Infilling

---- Receptor #2 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to West	Residential	49.8	49.8	49.8

Equipment

Description	Impact Device	Usage(%)	Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	400	0
Pumps	No	50		80.9	400	0
Dozer	No	40		81.7	400	0
Tractor	No	40	84		400	0
Front End Loader	No	40		79.1	400	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Excavator		62.6	59	N/A	N/A	N/A	N/A
Pumps		63	60	N/A	N/A	N/A	N/A
Dozer		64	60	N/A	N/A	N/A	N/A
Tractor		65.9	62	N/A	N/A	N/A	N/A
Front End Loader		61	57.1	N/A	N/A	N/A	N/A
	Total	**66**	**67**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Surface Fracturing Infilling

---- Receptor #3 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to Southeast	Residential	51.9	51.9	51.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40.0		80.7	350	0
Pumps	No	50		80.9	350	0
Dozer	No	40.0		81.7	350	0
Tractor	No	40.0	84		350	0
Front End Loader	No	40.0		79.1	350	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Excavator		63.8	59.8	N/A	N/A	N/A	N/A
Pumps		64.0	61.0	N/A	N/A	N/A	N/A
Dozer		64.8	60.8	N/A	N/A	N/A	N/A
Tractor		67.1	63.1	N/A	N/A	N/A	N/A
Front End Loader		62.2	58.2	N/A	N/A	N/A	N/A
	Total	**67**	**68**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Surface Fracturing Infilling

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to East	Residential	58.5	58.5	58.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	550	0
Pumps	No	50		80.9	550	0
Dozer	No	40		81.7	550	0
Tractor	No	40	84		550	0
Front End Loader	No	40		79.1	550	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Excavator		59.9	55.9	N/A	N/A	N/A	N/A
Pumps		60.1	57.1	N/A	N/A	N/A	N/A
Dozer		60.8	56.9	N/A	N/A	N/A	N/A
Tractor		63.2	59.2	N/A	N/A	N/A	N/A
Front End Loader		58.3	54.3	N/A	N/A	N/A	N/A
	Total	**63**	**64**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Surface Water Improvements

---- Receptor #1 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to North	Residential	43.8	43.8	43.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	300	0
Gradall	No	40		83.4	300	0
Pumps	No	50		80.9	300	0
Tractor	No	40	84		300	0
Front End Loader	No	40		79.1	300	0
Backhoe	No	40		77.6	300	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Excavator		65.1	61.2	N/A	N/A	N/A	N/A
Gradall		67.8	63.9	N/A	N/A	N/A	N/A
Pumps		65.4	62.4	N/A	N/A	N/A	N/A
Tractor		68.4	64.5	N/A	N/A	N/A	N/A
Front End Loader		63.5	59.6	N/A	N/A	N/A	N/A
Backhoe		62.0	58.0	N/A	N/A	N/A	N/A
	Total	**68**	**70**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Surface Water Improvements

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to West	Residential	49.8	49.8	49.8

Description	Impact Device	Usage(%)	Equipment **Spec** Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40.0		80.7	400	0
Gradall	No	40		83.4	400	0
Pumps	No	50		80.9	400	0
Tractor	No	40	84		400	0
Front End Loader	No	40		79.1	400	0
Backhoe	No	40		77.6	400	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		*Lmax	Leq	Lmax	Leq	Lmax	Leq
Excavator		62.6	58.7	N/A	N/A	N/A	N/A
Gradall		65.3	61.4	N/A	N/A	N/A	N/A
Pumps		62.9	59.9	N/A	N/A	N/A	N/A
Tractor		65.9	62.0	N/A	N/A	N/A	N/A
Front End Loader		61.0	57.1	N/A	N/A	N/A	N/A
Backhoe		59.5	55.5	N/A	N/A	N/A	N/A
	Total	**66**	**67**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Surface Water Improvements

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to Southeast	Residential	51.9	51.9	51.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	350	0
Gradall	No	40		83.4	350	0
Pumps	No	50		80.9	350	0
Tractor	No	40	84		350	0
Front End Loader	No	40		79.1	350	0
Backhoe	No	40		77.6	350	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Excavator		63.8	59.8	N/A	N/A	N/A	N/A
Gradall		66.5	62.5	N/A	N/A	N/A	N/A
Pumps		64.0	61.0	N/A	N/A	N/A	N/A
Tractor		67.1	63.1	N/A	N/A	N/A	N/A
Front End Loader		62.2	58.2	N/A	N/A	N/A	N/A
Backhoe		60.7	56.7	N/A	N/A	N/A	N/A
	Total	**67**	**69**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Surface Water Improvements

---- Receptor #4 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to East	Residential	58.5	58.5	58.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Excavator	No	40		80.7	550	0
Gradall	No	40		83.4	550	0
Pumps	No	50		80.9	550	0
Tractor	No	40	84		550	0
Front End Loader	No	40		79.1	550	0
Backhoe	No	40		77.6	550	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Excavator		59.9	55.9	N/A	N/A	N/A	N/A
Gradall		62.6	58.6	N/A	N/A	N/A	N/A
Pumps		60.1	57.1	N/A	N/A	N/A	N/A
Tractor		63.2	59.2	N/A	N/A	N/A	N/A
Front End Loader		58.3	54.3	N/A	N/A	N/A	N/A
Backhoe		56.7	52.8	N/A	N/A	N/A	N/A
	Total	**63**	**65**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Hydraugers

---- Receptor #1 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to North	Residential	43.8	43.8	43.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Drill Rig Truck	No	20		79.1	300	0
Gradall	No	40		83.4	300	0
Generator	No	50		80.6	300	0
Pumps	No	50		80.9	300	0
Tractor	No	40	84		300	0
Welder / Torch	No	40		74	300	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Drill Rig Truck		63.6	56.6	N/A	N/A	N/A	N/A
Gradall		67.8	63.9	N/A	N/A	N/A	N/A
Generator		65.1	62.1	N/A	N/A	N/A	N/A
Pumps		65.4	62.4	N/A	N/A	N/A	N/A
Tractor		68.4	64.5	N/A	N/A	N/A	N/A
Welder / Torch		58.4	54.5	N/A	N/A	N/A	N/A
	Total	**68**	**70**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Hydraugers

---- Receptor #2 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to West	Residential	49.8	49.8	49.8

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Drill Rig Truck	No	20		79.1	400	0
Gradall	No	40		83.4	400	0
Generator	No	50		80.6	400	0
Pumps	No	50		80.9	400	0
Tractor	No	40	84		400	0
Welder / Torch	No	40		74	400	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Drill Rig Truck		61.1	54.1	N/A	N/A	N/A	N/A
Gradall		65.3	61.4	N/A	N/A	N/A	N/A
Generator		62.6	59.6	N/A	N/A	N/A	N/A
Pumps		62.9	59.9	N/A	N/A	N/A	N/A
Tractor		65.9	62.0	N/A	N/A	N/A	N/A
Welder / Torch		55.9	52.0	N/A	N/A	N/A	N/A
	Total	**66**	**67**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Hydraugers

---- Receptor #3 ----

Description	Land Use	Baselines (dBA) Daytime	Evening	Night
Homes to Southeast	Residential	51.9	51.9	51.9

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Drill Rig Truck	No	20		79.1	350	0
Gradall	No	40		83.4	350	0
Generator	No	50		80.6	350	0
Pumps	No	50		80.9	350	0
Tractor	No	40	84		350	0
Welder / Torch	No	40		74	350	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Drill Rig Truck		62.2	55.2	N/A	N/A	N/A	N/A
Gradall		66.5	62.5	N/A	N/A	N/A	N/A
Generator		63.7	60.7	N/A	N/A	N/A	N/A
Pumps		64.0	61.0	N/A	N/A	N/A	N/A
Tractor		67.1	63.1	N/A	N/A	N/A	N/A
Welder / Torch		57.1	53.1	N/A	N/A	N/A	N/A
	Total	**67**	**68**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.

Roadway Construction Noise Model (RCNM),Version 1.1

Report date: 11/5/2022
Case Description: Portuguese Bend Landlslide Remediation - Hydraugers

---- Receptor #4 ----

		Baselines (dBA)		
Description	Land Use	Daytime	Evening	Night
Homes to East	Residential	58.5	58.5	58.5

Description	Impact Device	Usage(%)	Equipment Spec Lmax (dBA)	Actual Lmax (dBA)	Receptor Distance (feet)	Estimated Shielding (dBA)
Drill Rig Truck	No	20		79.1	550	0
Gradall	No	40		83.4	550	0
Generator	No	50		80.6	550	0
Pumps	No	50		80.9	550	0
Tractor	No	40	84		550	0
Welder / Torch	No	40		74	550	0

Results

		Calculated (dBA)		Noise Limits (dBA)			
				Day		Evening	
Equipment		***Lmax**	**Leq**	Lmax	Leq	Lmax	Leq
Drill Rig Truck		58.3	51.3	N/A	N/A	N/A	N/A
Gradall		62.6	58.6	N/A	N/A	N/A	N/A
Generator		59.8	56.8	N/A	N/A	N/A	N/A
Pumps		60.1	57.1	N/A	N/A	N/A	N/A
Tractor		63.2	59.2	N/A	N/A	N/A	N/A
Welder / Torch		53.2	49.2	N/A	N/A	N/A	N/A
	Total	**63**	**64**	N/A	N/A	N/A	N/A

*Calculated Lmax is the Loudest value.