

CALICO RESOURCES USA CORP.
GRASSY MOUNTAIN MINE PROJECT
MALHEUR COUNTY, OREGON

**NOISE
BASELINE REPORT**

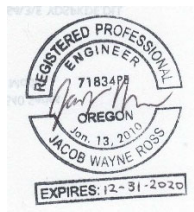
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NOISE BASELINE REPORT**

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LIST OF ABBREVIATIONS AND ACRONYMS

ANSI	American National Standards Institute
BLM	Bureau of Land Management
dB	Decibel
dBA	A-weighted decibel
dBc	C-weighted decibel
DEQ	Department of Environmental Quality
DOGAMI	Department of Geology and Mineral Industries
EMS	EM Strategies, Inc.
HDR	HDR Engineering, Inc.
L ₁	noise levels exceeded for one percent of each hour
L ₁₀	noise levels exceeded for ten percent of each hour
L ₃₃	noise levels exceeded for 33 percent of each hour
L ₅₀	noise levels exceeded for 50 percent of each hour
L ₆₇	noise levels exceeded for 67 percent of each hour
L ₉₀	noise levels exceeded for 90 percent of each hour
L _{dn}	day-night noise levels
L _{eq}	hourly average levels
L _{max}	hourly maximum levels
L _{max, slow}	maximum level with frequency response and slow time constant
L _{min}	hourly minimum levels
L _{peak}	maximum value reached by sound pressure
OAR	Oregon Administrative Rules
ORS	Oregon Revised Statutes
Project	Grassy Mountain Mine Project
SLM	Sound Level Meter

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1 INTRODUCTION

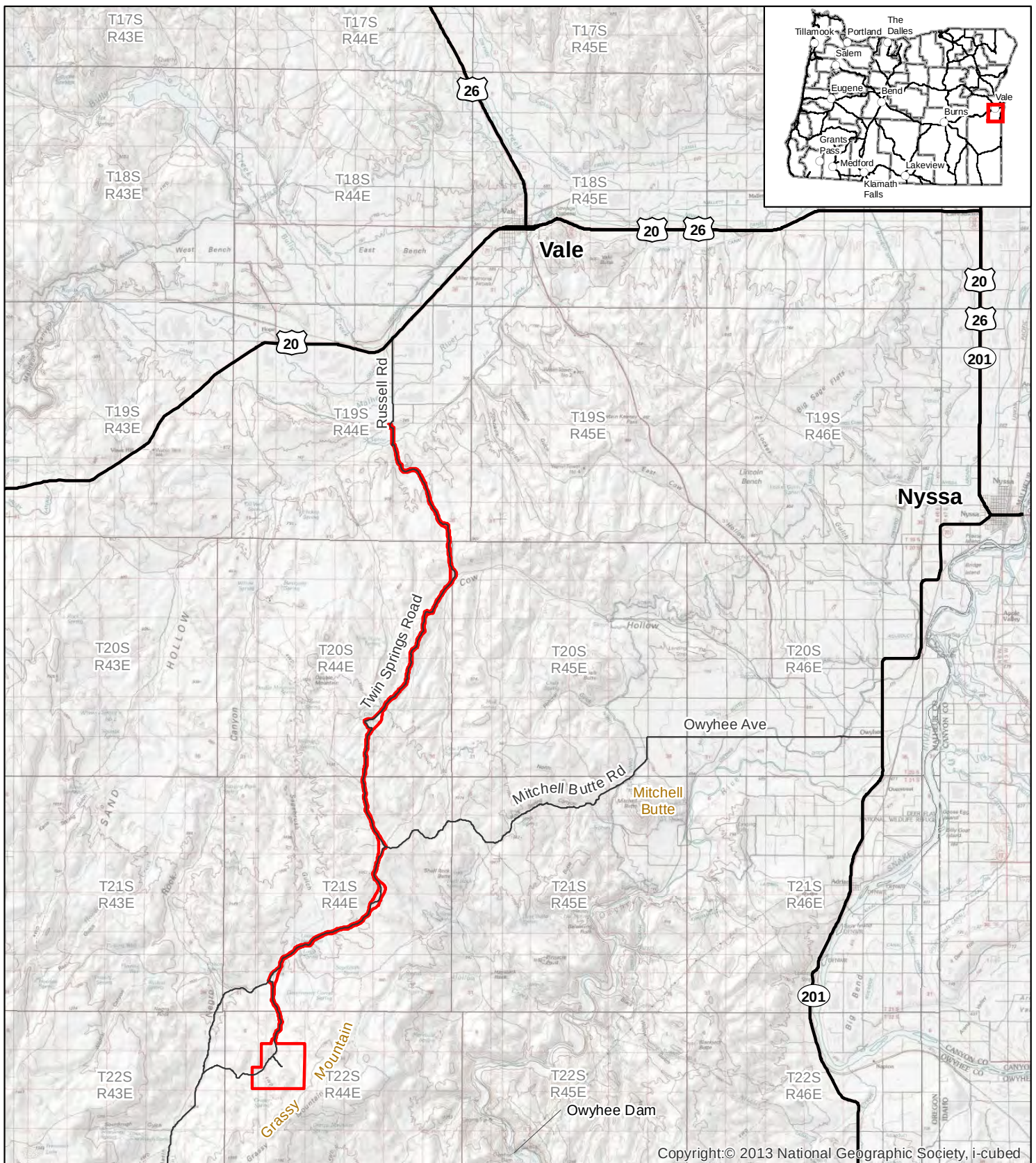
The purpose of this noise baseline report is to document existing ambient noise levels at representative locations in the study area prior to the start of proposed mining operations at the Grassy Mountain Mine Project (Project) near the city of Vale in Malheur County, Oregon. This baseline report will be used to support a National Environmental Policy Act evaluation for future mine site activities and will be included in the Consolidated Permit Application submitted to the Oregon Department of Geology and Mineral Industries (DOGAMI). The format of this report primarily follows the format of the January 2015 *Noise Baseline Study* prepared for the Project by HDR Engineering, Inc. (HDR), and primarily uses the same regulatory framework discussion. To reflect comments provided on the *Environmental Baseline Study Work Plan* (EM Strategies, Inc. [EMS] 2017) by DOGAMI, new noise measurements were conducted at four different locations. The results are included in this report.

2 RESOURCE STUDY AREA

The Project is located in Malheur County, Oregon, approximately 22 miles south-southwest of Vale (Figure 1) and consists of two areas: the Mine and Process Area and the Access Road Area (Figure 2).

The Mine and Process Area is located on three patented lode mining claims and unpatented lode mining claims that cover an estimated 886 acres. These patented and unpatented lode mining claims are part of a larger land position that includes 419 unpatented lode mining claims and nine mill site claims on lands administered by the Bureau of Land Management (BLM) (Figure 2). All proposed mining would occur on the patented claims, with some mine facilities on unpatented claims. The Mine and Process Area is in all or portions of Sections 5 through 8, Township 22 South, Range 44 East (T22S, R44E) (Willamette Meridian).

The Access Road Area is located on public land administered by the BLM, and private land controlled by others (Figure 2). A portion of the Access Road Area is a Malheur County Road named Twin Springs Road. The Access Road Area extends north from the Mine and Process Area to Russell Road, a paved Malheur County Road. The Access Road Area is in portions of Section 5, T22S, R44E, Sections 3, 10, 11, 14, 15, 21 through 23, 28, 29, and 32, T21S, R44E, Sections 1, 12 through 14, 23, 26, 27, and 34, T20S, R44E, Sections 6 and 7, T20S, R45E, and Sections 22, 23, 26, 35, and 36, T19S, R44E (Willamette Meridian). The width of the Access Road Area is 300 feet (150 feet on either side of the access road centerline) to accommodate possible minor widening or re-routing, and a potential powerline adjacent to the access road. There are several areas shown that are significantly wider than 300 feet on the Permit Area Map (Figure 2), which are areas where the final alignment has not yet been determined. The final engineering of the road will be consistent throughout, and within the Permit Area. The Access Road Area also includes a buffer on either side of the proposed road width for the collection of environmental baseline data. The road corridor will be 40 feet wide, which includes a 24-foot wide road travel width (12 feet on either side of the road centerline), four-foot wide shoulders on each side of the road, minimum one-foot wide ditches on each side of the road, and appropriate cut and fill. The Access Road Area totals approximately 876 acres. The Noise Study Area is shown on Figure 3.



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Explanation

- Permit Area
- Existing Road

Projection: UTM Zone 11 North, NAD83, meters

0 5,000 10,000
Feet
0 1 2
Miles



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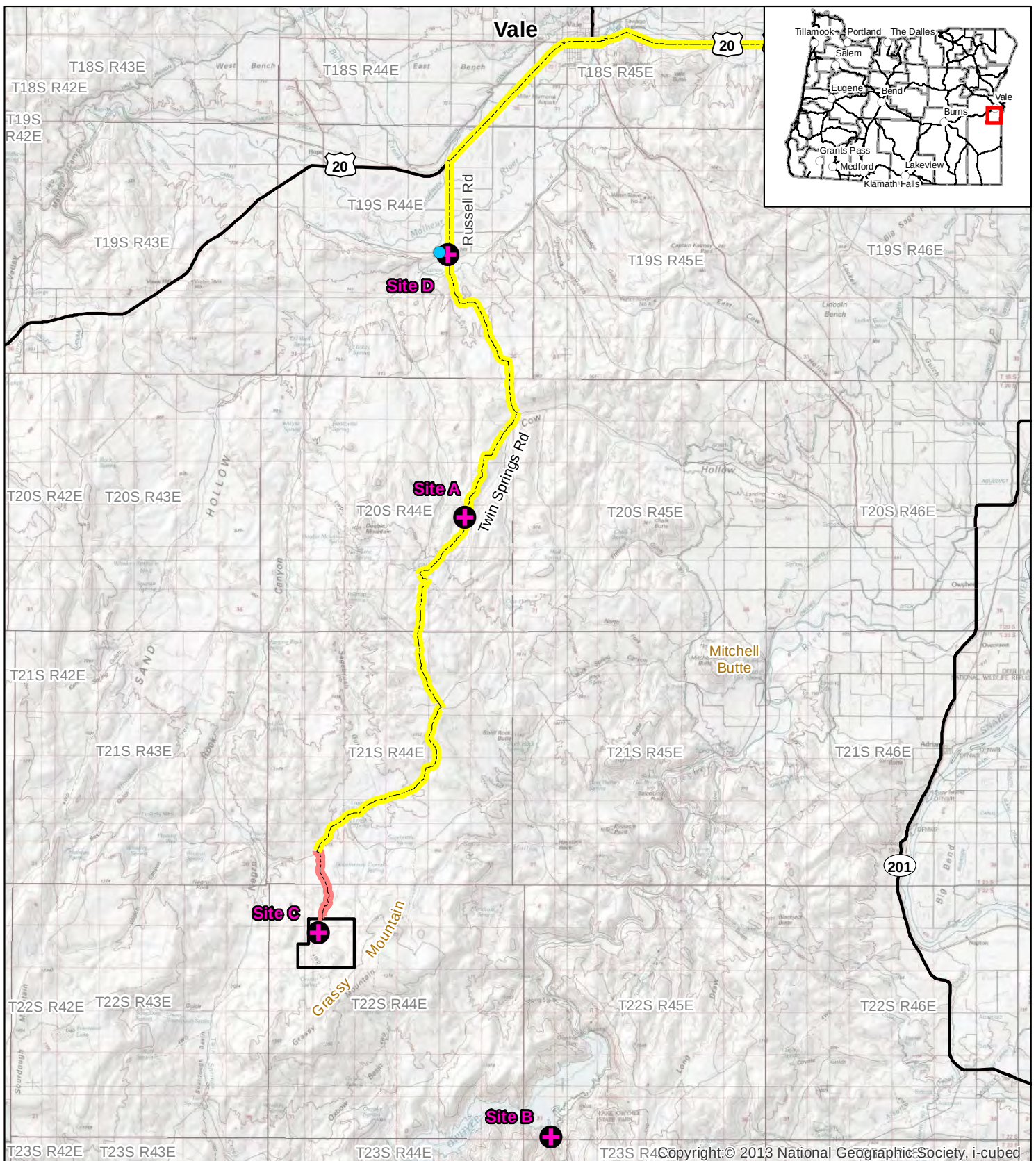
GRASSY MOUNTAIN MINE PROJECT

Location Map

Figure 1

Date: 12/19/2017	Drawn By: JDB
Revised:	Project No.: 3672
Base Map: USGS 100K quads: Boise, Brogan, Vale, Weiser	
File Name: 3672G_GrassyMtn_BL_Fig01_Location.mxd	

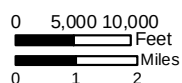




Explanation

- Mine and Process Area
- + Ambient Noise Measurement Site Locations
- Irrigation Pump
- Main Access Road
- Project Access Road

Projection: UTM Zone 11 North, NAD83, meters



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GRASSY MOUNTAIN MINE PROJECT

Noise Study Area

Figure 3

Date: 11/12/2018	Drawn by: JDB
Revised:	Project No.: 3672
Base Map: USGS 100K quad: Vale	
File Name: 3672G_GrassyMtn_BL_N_Fig03_StudyArea.mxd	



3 REGULATORY FRAMEWORK

Oregon Revised Statutes (ORS) Chapter 467, Noise Control, describes state policy for noise emissions. ORS 467.120 describes the state policy regarding agricultural, forestry, mining, or rock processing operations. Mining or rock processing noise sources are not exempt from state enforcement within one-half mile of noise-sensitive areas.

Oregon Administrative Rules (OAR) Chapter 340, Division 35, contains the noise control regulations and programs applicable to mining operations (OAR 340-035-0035). The rules establish statewide maximum permissible environmental noise levels for new industrial uses at the nearest noise-sensitive property. A noise-sensitive property means real property normally used for sleeping, or normally used as schools, churches, hospitals or public libraries. Property used for industrial or agricultural activities is not considered noise-sensitive property unless it meets the state criteria in more than an incidental manner. Since human hearing is not equally sensitive to all frequencies of sound, certain frequencies are typically given more or less “weight” in environmental noise analyses and measurements. The A-weighted decibel (dBA) scale corresponds to the sensitivity range for human hearing and will be used for all measurements made and presented in this baseline study report, except where specifically indicated.

OAR 340-035-0035 (1)(b)(B)(ii) states that “the ambient statistical noise level of a new industrial or commercial noise source on a previously unused industrial or commercial site shall include all noises generated or indirectly caused by or attributable to that source including all of its related activities.” The maximum permissible statistical noise levels at noise-sensitive properties from the Project’s operations are shown in Table 1.

Table 1: Maximum Permissible Project Noise Levels at Noise-Sensitive Properties

Noise Level Statistic	Day (7 A.M. to 10 P.M.)	Night (10 P.M. to 7 A.M.)
L ₅₀	55 dBA	50 dBA
L ₁₀	60 dBA	55 dBA
L ₁	75 dBA	60 dBA

L₅₀ = noise levels exceeded for fifty percent of each hour

L₁₀ = noise levels exceeded for ten percent of each hour

L₁ = noise levels exceeded for one percent of each hour

The maximum permissible environmental noise levels for new industrial facilities as measured at nearby quiet areas are more restrictive (lower) than the levels shown in Table 1. Quiet areas include wilderness areas, state parks, game reserves, wildlife breeding areas, and outdoor amphitheatres. For this Project, Lake Owyhee State Park (located approximately 6.5 miles from the Permit Area), which offers outdoor camping sites, would be considered a quiet area. The maximum permissible noise levels from the proposed Project noise levels in quiet areas are shown in Table 2.

Table 2: Maximum Permissible Project Noise Levels in Quiet Areas

Noise Level Statistic	Day (7 A.M. to 10 P.M.)	Night (10 P.M. to 7 A.M.)
L ₅₀	50 dBA	45 dBA
L ₁₀	55 dBA	50 dBA
L ₁	60 dBA	55 dBA

The noise limits specified in Table 1 and Table 2 must not be exceeded in any one-hour period of the day. In addition to meeting the maximum permissible project noise levels specified in Table 1 and Table 2, OAR 340-35-035 also requires that noise generated by the Project not cause the ambient noise levels (L_{50} and L_{10}) to increase by more than ten dBA in any one hour. As a result, determining the pre-existing ambient noise levels is very important to show compliance with OAR 340-35-035.

OAR 340-35-035 also imposes special noise limits on impulsive noise. The noise level limits for impulsive noise are not A-weighted, are lower at night than during the day, and the limits apply equally to noise-sensitive properties and quiet areas. Table 3 presents the maximum permissible project impulsive noise levels at nearby noise-sensitive properties and quiet areas. Note that the level, frequency weighting, and time weighting are different for blasting noise when compared to other impulsive sounds. For blasting noise, the C-weighting filter is used with a slow time response. For other impulsive sounds, there is no frequency weighting (sometimes called linear weighting).

Table 3: Maximum Permissible Project Impulsive Noise Levels

Source	Noise Level Statistic	Day (7 A.M. to 10 P.M.)	Night (10 P.M. to 7 A.M.)
Blasting	$L_{\max, \text{slow}}$	98 dBC	93 dBC
Other Impulsive	L_{peak}	100 dB	80 dB

$L_{\max, \text{slow}}$ = maximum level with frequency response and slow time constant

L_{peak} = maximum value reached by sound pressure

dB = decibel

dBC = C-weighted decibel

4 STUDY METHODOLOGY

4.1 Literature Review

The most recent noise surveys in the area occurred in May 2014 and were documented in the January 2015 *Noise Baseline Study* by HDR.

4.2 Field Studies

The data presented in this report were collected in April and May 2018. The existing statistical ambient noise levels were measured at four locations. All of the following protocols were used during the measurements:

- All measurement procedures as stated in OAR 340-035-0035 (Noise Control Regulations for Industry and Commerce), including Sound Measurement Procedures Manual (NPCS-1) and Requirements for Sound Measuring Instruments and Personnel (NPCS-2). Specific protocols spelled out in the NPCS-1 that were followed included: Site Selection; Equipment Set-Up; Weather Conditions; Meter Speed (the Fast meter response was used for all measurements); dBA Weighting Scale (used for all measurements); Statistical Noise (L_1 , L_{10} , L_{50} , and noise levels exceeded for 90 percent of each hour [L_{90}]) were measured directly with no post-processing computations; Noise levels exceeded for 33 and 67 percent

of each hour (L_{33} and L_{67} , respectively) were interpolated; and Ambient Noise Determination.

- All measurements as stated in the American National Standards Institute (ANSI) S12.9-1992/Part 2 *American National Standard Quantities and Procedures for Description and Measurement of Environmental Sound, Part 2: Measurement of Long-Term, Wide-Area Sound* (ANSI 1992); and
- A Sound Level Meter (SLM) and accompanying accessories (calibrator, windscreen, and proprietary data transfer software) conforming to ANSI S1.4 (1983) *Specifications for Sound Level Meters* were used for all measurements. The specific SLM used for all measurements was a Bruel & Kjaer 2270 (Serial Number 2706889), ½-inch Microphone 4190 (Serial Number 2408813), and Calibrator 4231 (Serial Number 3001166), all with valid annual calibration certificates. This is comparable to a Larson Davis Model 820, as outlined in the Work Plan (EMS 2017). The SLM was calibrated both before and after each measurement transition and was found to be within acceptable operating parameters.

The SLM for self-noise limit was checked prior to starting measurements by running the meter in a sealed container in a quiet area. Table 4 summarizes the self-noise test results.

Table 4: SLM Self-Noise Test Results (dBA)

Date/Time	L_{eq}	L_{min}	L_{max}	L_1	L_{10}	L_{33}^*	L_{50}	L_{67}^*	L_{90}
April 22, 2018	17.81	17.47	19.91	18.22	18.01	17.76	17.72	17.58	17.55

L_{eq} = Hourly average levels

L_{min} = Hourly minimum levels

L_{max} = Hourly maximum levels

*- The L_{33} and L_{67} results were not taken when the other test results were obtained. The L_{33} metric was interpolated from the L_{10} and L_{50} data; the L_{67} metric was interpolated from the L_{50} and L_{90} data.

L_{33} metric interpolation formula: $=20 \cdot \text{LOG}((((20 \mu\text{pascals} \cdot 10^{(L_{10}/20)}) - (20 \mu\text{pascals} \cdot 10^{(L_{50}/20)})) \cdot (0.133333)) + (20 \mu\text{pascals} \cdot 10^{(L_{50}/20)})) / 20 \mu\text{pascals}$

L_{67} metric interpolation formula: $=20 \cdot \text{LOG}((((20 \mu\text{pascals} \cdot 10^{(L_{50}/20)}) - (20 \mu\text{pascals} \cdot 10^{(L_{90}/20)})) \cdot (0.166667)) + (20 \mu\text{pascals} \cdot 10^{(L_{90}/20)})) / 20 \mu\text{pascals}$

Table 4 shows that the self-noise limit for the SLM is approximately 18 dBA. The Bruel & Kjaer specifications for the 2270 SLM with a Model 4190 microphone have a range of 14.6 to 146 dB (Bruel & Kjaer 2009).

4.2.1 Timing and Duration of Baseline Data Collection and Verification

- At each measurement location, ambient noise monitoring was conducted by taking hourly measurements for a period of 72 hours at each site (two weekdays and one weekend day) to capture diurnal, as well as typical day-to-day ambient noise levels. All measurements took place between April 27, 2018, and May 17, 2018. The following noise metrics were measured: L_{eq} ; L_{max} ; L_{min} ; L_1 ; L_{10} ; L_{33} ; L_{50} ; L_{67} ; and L_{90} .

L_{eq} noise levels were also used for the residential site to calculate the existing day-night noise levels (L_{dn}).

4.2.2 Ambient Noise Monitoring Sites

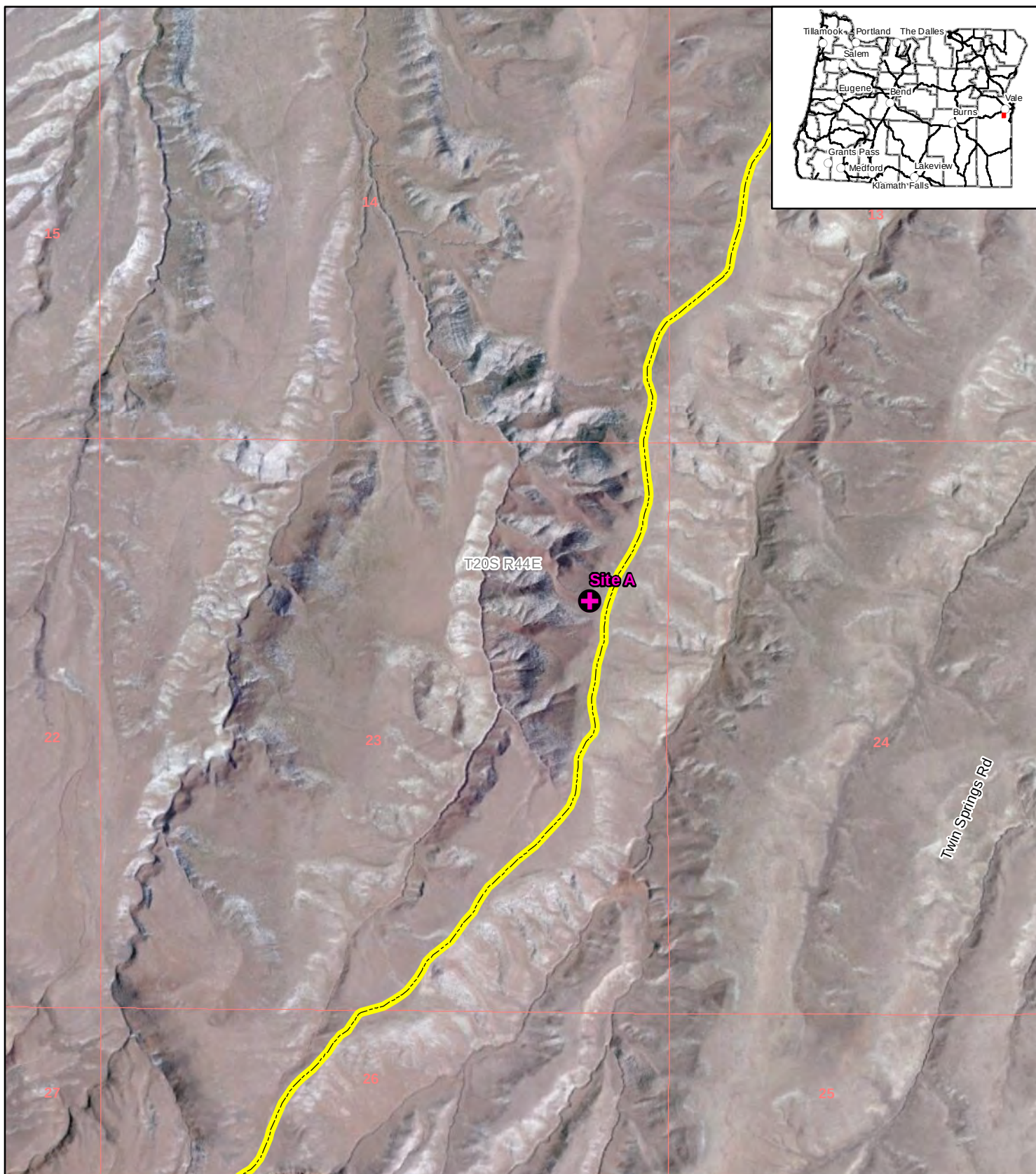
The four ambient noise monitoring site locations (Figure 3) are described as follows:

- Site A: An undeveloped location on BLM land approximately 170 feet west of Twin Springs Road and approximately three miles south of the intersection of Twin Springs Road and Cow Hollow Road. This measurement location, although not technically a noise-sensitive property, is intended to represent a location that could experience an environmental noise impact due to a change in road traffic accessing the Project site along Twin Springs Road.
- Site B: Lake Owyhee State Park, 1298 Lake Owyhee Dam Road, Adrian, Oregon, approximately 250 feet west of Fisherman Road (the access road into Indian Creek Campground) and approximately 600 feet south of the gate entrance into Indian Creek Campground). This measurement location was chosen to represent the closest noise-sensitive property to the Project site.
- Site C: A site within the Mine and Process Area, approximately 375 feet southwest of the entrance gate and 150 feet west of an unnamed access road. This measurement location, although not technically a noise-sensitive property, is intended to represent an undeveloped rural area.
- Site D: A residence located at 2025 Bishop Road, Vale, Oregon, approximately 250 feet east of Russell Road. This measurement location was selected to characterize a residential noise-sensitive property and to characterize a location that could experience a change in road traffic along Russell Road. The specific measurement location was selected to comply with NPCS-1 protocols dictating the SLM location in regard to the noise sensitive building and being a minimum of 100 feet from the Access Road.

The measurements at Sites A and C were conducted to provide data for reference only, as there are no noise sensitive properties near either measurement location. The Oregon Department of Environmental Quality (DEQ) noise regulations only apply at noise sensitive properties; therefore, the only two measurement sites for which the data have been used to apply DEQ noise regulations are Sites B and D.

Figures 4 through 7 show the specific locations of the measurement sites. The following activities were conducted at each location: 1) a global positioning system unit was used to record the coordinates; 2) photographs were taken of the equipment at each site to document the environment around each site; 3) a field data sheet was completed at each location to document the site; 4) observed noise sources present at the start of each measurement were observed and documented; and 5) potential sources of noise present at each site were also documented.

At each measurement location, for each one-hour interval, weather data including temperature, wind speed, wind direction, barometric pressure, precipitation, and humidity were recorded. Those data are included with the statistical ambient noise levels. At no point during the measurements did the weather conditions deteriorate to a point as to create a bias in the presented data.



Explanation

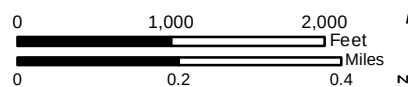
-  Ambient Noise Measurement Site Locations
-  Main Access Road

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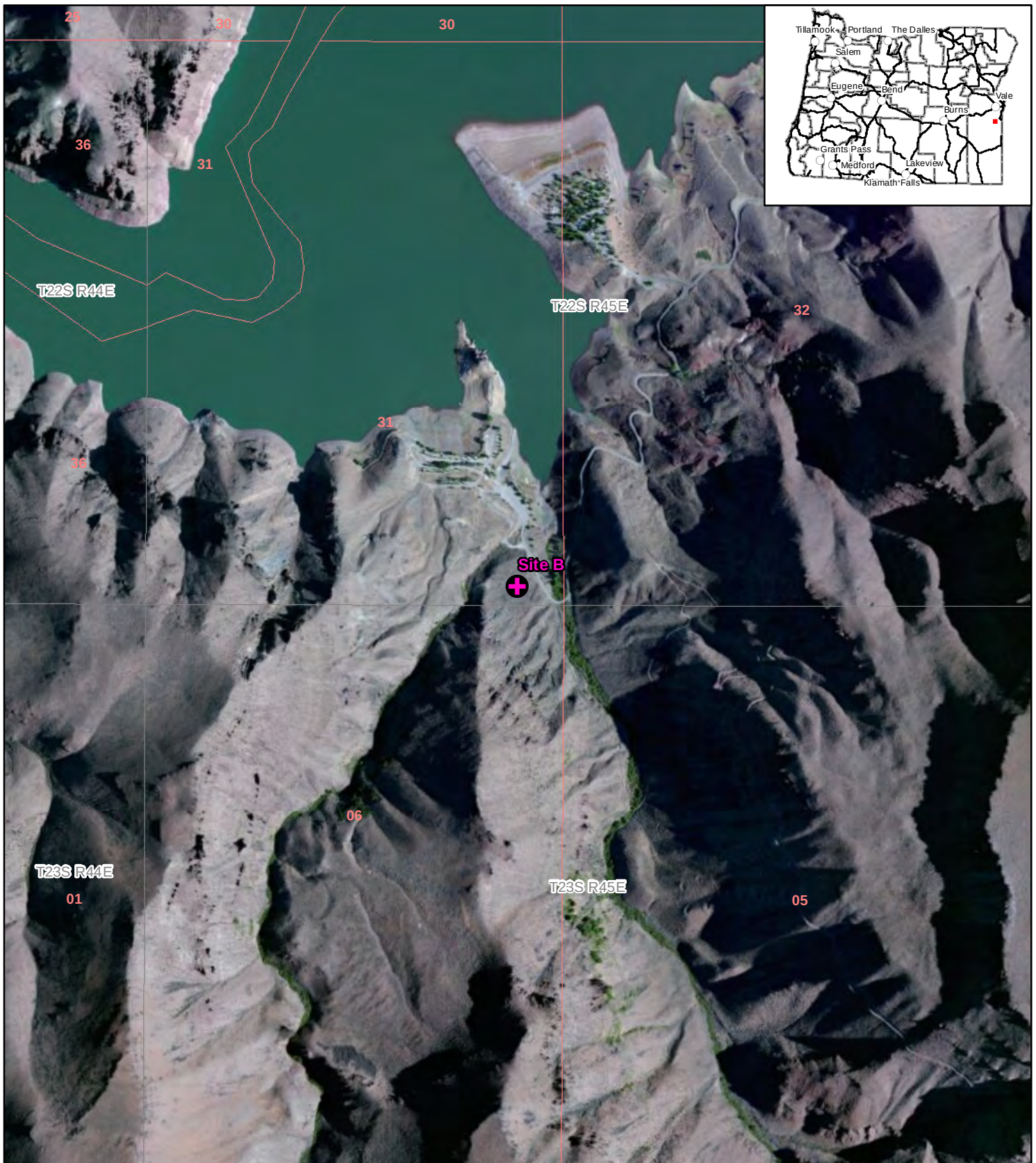
Ambient Noise Measurement Site A

Figure 4



Date: 09/10/2018	Drawn by: WDL
Revised:	Project No.: 3672
Base Map: ESRI World Imagery (Clarity)	
File Name: 3672W_GrassyMtn_BL_N_Fig04_NoiseA.mxd	





Explanation

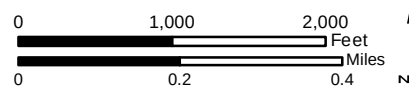
 Ambient Noise Measurement Site Locations

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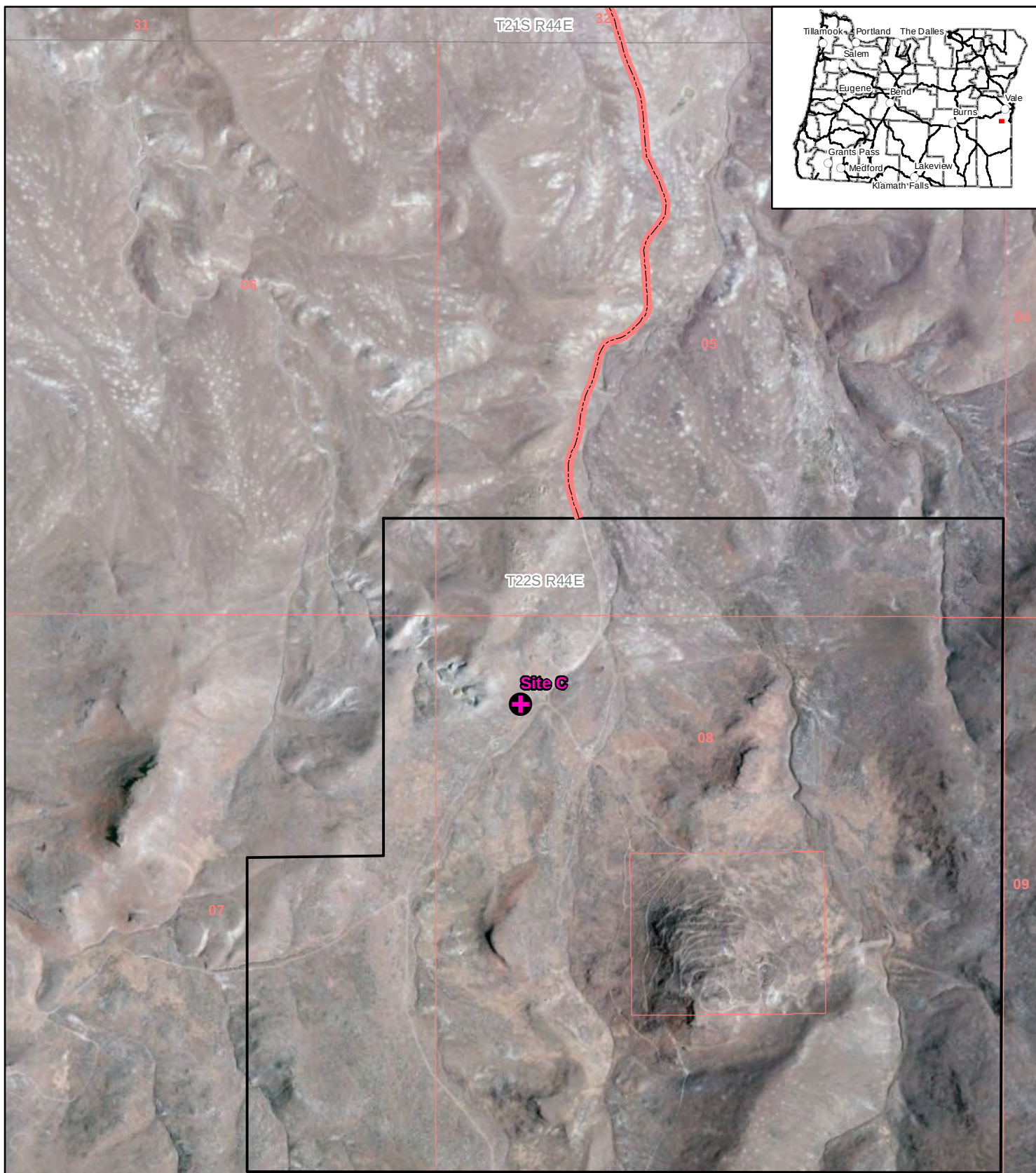
Ambient Noise Measurement Site B

Figure 5



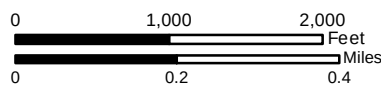
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Revised:	Project No.: 3672
Base Map: USGS 100K quad: Vale	
File Name: 3672W_GrassyMtn_BL_N_Fig05_NoiseB.mxd	





Explanation

- Mine and Process Area
- + Ambient Noise Measurement Site Locations
- Project Access Road



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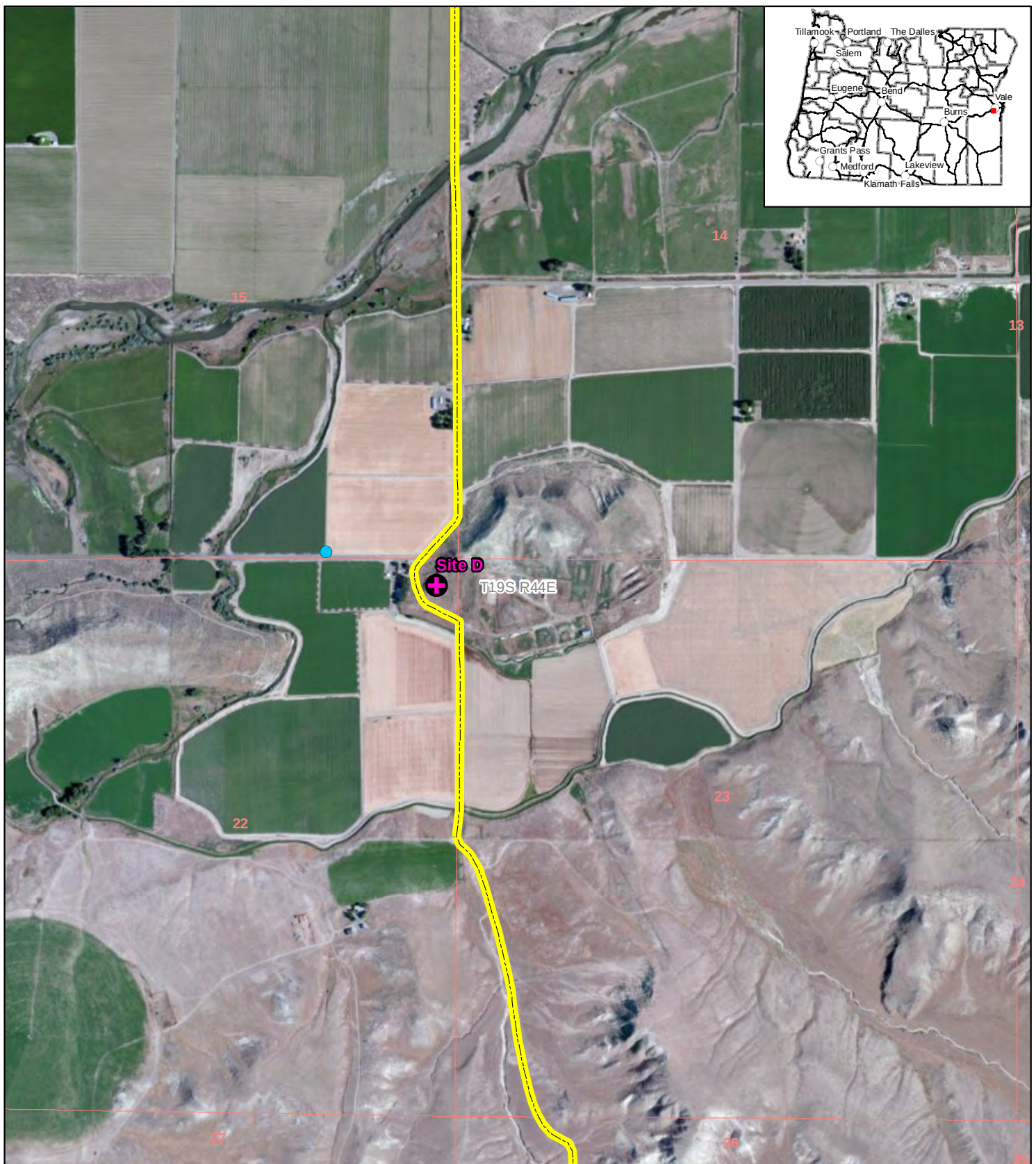
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Ambient Noise Measurement Site C

Figure 6

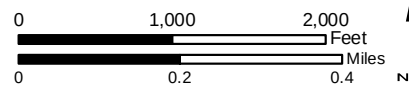
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Revised:	Project No.: 3672
Base Map: ESRI World Imagery (Clarity)	
File Name: 3672W_GrassyMn_BL_N_Fig06_NoiseC.mxd	





Explanation

- + Ambient Noise Measurement Site Locations
- Irrigation Pump
- Main Access Road



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Ambient Noise Measurement Site D

Figure 7

Date: 11/12/2018	Drawn By: WDL/JDB
Revised:	Project No.: 3672
Base Map: ESRI World Imagery (Clarity)	
File Name: 3672W_GrassyMtn_BL_N_Fig07_NoiseD.mxd	



During all measurements, the windscreen for the SLM was installed. A person was physically present next to the measurement microphone throughout all measurement periods, monitoring the environmental conditions and meter readings to ensure that the conditions of NPCCS-1 were met. In the moments when the wind speed exceeded ten miles per hour, the SLM was paused and momentary data were excluded from the hour duration measurement. For all the occasions where the SLM was paused to ignore wind noise, the total pause duration did not exceed seven minutes and 30 seconds in any given hour. Within a full 60-minute duration, this leaves 52 minutes and 30 seconds, which should adequately characterize the measured ambient levels.

5 BASELINE CHARACTERIZATION

5.1 Field Survey Results

Table 5 summarizes the ambient noise results. Appendix A includes a full summary of the ambient measured data. Appendix A also shows graphs of the average L_{eq} , L_{max} , and L_{50} for each hour for each site, which show a more simplified view of the pattern of observed noise levels.

Table 5: Ambient Noise Summary (dBA)

Metric	L_{eq}	L_{max}	L_{min}	L_1	L_{10}	L_{50}
Site A: Undeveloped location along Twin Springs Road						
Daytime Minimum	27.2	49.4	17.4	35.8	26.6	19.2
Daytime Average	35.9	58.3	19.0	45.7	39.1	30.3
Daytime Maximum	49.0	73.8	24.8	59.8	53.2	40.0
Nighttime Minimum	20.6	40.2	17.1	27.7	19.7	17.8
Nighttime Average	29.1	51.4	19.0	38.2	31.0	24.8
Nighttime Maximum	39.8	65.4	22.3	50.1	43.5	37.5
Site B: Lake Owyhee State Park						
Daytime Minimum	22.4	37.9	17.3	29.4	25.0	20.3
Daytime Average	28.1	49.7	20.2	37.9	28.5	24.0
Daytime Maximum	41.6	71.9	26.3	54.7	37.3	35.2
Nighttime Minimum	19.3	32.1	17.2	23.4	20.3	18.1
Nighttime Average	29.9	45.4	23.6	34.9	32.1	28.3
Nighttime Maximum	38.1	55.8	31.4	48.6	43.7	37.0
Site C: Grassy Mountain Mine and Process Area						
Daytime Minimum	32.5	55.5	17.1	44.2	28.8	20.7
Daytime Average	40.4	67.3	20.6	51.7	40.7	31.2
Daytime Maximum	56.7	94.4	31.9	64.7	56.0	46.8
Nighttime Minimum	19.3	40.8	16.9	23.8	20.2	17.9
Nighttime Average	26.6	50.7	18.4	34.2	27.4	22.5
Nighttime Maximum	48.8	81.3	21.9	53.4	41.7	30.2
Metric	L_{eq}	L_{max}	L_{min}	$L_{(1)}$	$L_{(10)}$	$L_{(50)}$
Site D: 2025 Bishop Road, Vale, Oregon						
Daytime Minimum	30.8	52.1	20.2	40.5	32.0	26.2
Daytime Average	37.8	60.0	24.5	47.1	39.8	33.2
Daytime Maximum	50.7	77.7	36.4	58.9	54.2	48.2
Nighttime Minimum	28.6	48.6	23.3	33.1	30.1	27.3
Nighttime Average	40.8	58.9	30.3	48.4	41.8	37.4
Nighttime Maximum	69.8	92.5	36.0	86.2	50.6	45.1

Daytime = 7:00 A.M. to 10:00 P.M.

Nighttime = 10:00 P.M. to 7:00 A.M.

At Site A, the undeveloped location along Twin Springs Road, the primary noise contributors included atmospheric (wind) movement, vegetation movement caused by the wind, occasional vehicular traffic, and bird activity (song and movement).

At Site B, Lake Owyhee State Park, the primary noise contributors included atmospheric (wind) movement, vegetation movement caused by the wind, vehicular traffic, boating activity on the lake, occupied campground activity, and bird activity (song and movement). At night, an added contributor was insect activity around the lake and although audible, was not excessive in loudness nor duration and should not have an impact on the proposed ambient noise limits (Table 6).

At Site C, within the Permit Area, the primary noise contributors included atmospheric (wind) movement, vegetation movement caused by the wind, and bird activity (song and movement). Although not necessarily quantifiable by the weather data obtained at ground level, some fluctuations in the measurement data can be explained by upper atmospheric wind gusts/turbulence (Table C1, Appendix A). There were no anthropogenic noise sources in the vicinity of Site C when the measurements were taken.

At Site D, the residential site along Russell Road, the primary noise contributors included atmospheric (wind) movement, vegetation movement caused by the wind, vehicular traffic along Russell Road and some along Bishop Road, and agricultural activity including irrigation pumping equipment and field implements. On two separate occasions, an irrigation pump (Figures 3 and 7) was in operation, at 6:00 a.m. on the second day and at 6:00 a.m. on the third day, both instances for less than a one-hour measurement interval. The noise contributions from the irrigation pump can be seen in the L_{10} data as a three dB increase on the second day and a five dB increase on the third day, and in the L_{50} data as a one dB increase on the second day and a three dB increase on the third day. At 4:00 p.m. and 5:00 p.m. on the third day, a tractor worked in a field to the southwest of the irrigation pump. These noise contributions can be seen in the L_{10} data as a seven to 12 dB increase, and in the L_{50} data as an eight to ten dB increase (Table D1, Appendix A). Over the course of 72 single hour duration measurements at Site D, the irrigation pump only impacted two intervals, and the tractor activity also only impacted two intervals; therefore, noise from these two sources would only occur sporadically.

The results show that there is both diurnal variability and a reasonable amount of general variability from hour to hour within both the daytime and nighttime periods at all sites. L_{max} levels are typically higher during the daytime, indicating that the loudest noise sources are likely to be man-made sounds. Average daytime L_{eqs} are lowest at the Lake Owyhee State Park and highest in the proposed Mine and Process Area. Nighttime average L_{eqs} are lowest in the proposed Mine and Process Area and highest at the Bishop Road site. Average daytime and nighttime observed L_{50} levels at all sites range from approximately 22 dBA in the proposed Mine and Process Area to 37 dBA at the Bishop Road site.

Generally, noise levels in the Permit Area are low with L_{eq} levels at 57 dBA or below at all times, except for a nighttime spike at the residential site on Bishop Road, which occurred at 6:00 A.M. with the use of farming equipment near the road. The quietest site is at Lake Owyhee State Park, with the Mine and Process Area being the quietest during daytime hours, and the Bishop Road site being the loudest during nighttime hours. The calculated L_{dn} at the residential site on Bishop Road was approximately 51 dBA for the first 48-hour period, with the calculated L_{dn} rising to 66 dBA on the third day due to the use of farming equipment.

A review of the lowest measured ambient noise levels indicates that only a few measured values approach the self-noise limits of the SLM. Table 4 shows the SLM self-noise limit is approximately 18 dBA. At three of the four monitoring locations (sites A, B, and C), the lowest nighttime L₅₀ measured was between 17.8 dBA and 18.1 dBA. These values approach the self-noise limit of the SLM; therefore, actual ambient sound levels could have been quieter than the data indicate during those periods. However, at the two measurement locations that are near noise sensitive properties (Sites B and D), there were only three measured nighttime L₅₀ values below 20 dBA (18.1, 19.0, and 19.2 dBA), all of which occurred at Site B. Only one of those hours approached the self-noise limit of the SLM, so the measurements are deemed to provide a valid representation of the existing ambient noise levels for the Project.

The representative ambient noise levels measured at the only two identified noise sensitive properties near the Permit Area are summarized in Table 6. The values in Table 6 were obtained using the statistical 5th percentile in each data category. The statistical 5th percentile was used rather than the L_{min} in each data category so that the representative levels would approach the lowest levels measured at each site without being biased by outlying quiet hours that occurred over the three-day measurement period. The proposed limits at the two sites (Table 7) are the representative ambient noise levels with the ten dBA increase described in the DEQ regulations.

Table 6: Representative Ambient Noise Levels Measured at Noise Sensitive Properties

Site	Daytime		Nighttime	
	L ₁₀	L ₅₀	L ₁₀	L ₅₀
Site B	25.6	22.4	21.3	19.1
Site D	34.0	26.7	30.2	28.1

Table 7: Proposed Ambient Noise Limits for the Project

Site	Daytime		Nighttime	
	L ₁₀	L ₅₀	L ₁₀	L ₅₀
Site B	35.6	32.4	31.3	29.1
Site D	44.0	36.7	40.2	38.1

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Ellen Farley – Editorial Review

APPENDIX A

Ambient Data, Data Sheets, and Photographs

Table A1 - Site A: Undeveloped Location along Twin Springs Road

	Day (7:00 am to 10:00pm)
	Night (10:00 pm to 7:00 am)

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
29-Apr	0:00	25.6	41.9	17.3	34.9	29.2	23.2	21.8	19.1	18.4	50	0	CALM	27.6	0	71
29-Apr	1:00	25.1	48.6	17.3	33.5	28.6	23.2	22.0	19.2	18.5	48	6	SW	27.6	0	74
29-Apr	2:00	26.9	49.1	17.6	36.6	30.4	24.6	23.3	19.9	19.1	46	6	W	27.6	0	76
29-Apr	3:00	24.9	48.6	17.2	36.1	28.1	20.7	18.7	17.8	17.6	48	5	W	27.6	0	71
29-Apr	4:00	25.6	41.9	17.3	34.9	29.2	23.2	21.8	19.1	18.4	47	0	CALM	27.6	0	86
29-Apr	5:00	21.8	47.2	17.1	30.3	21.8	18.4	17.8	17.5	17.4	46	6	WSW	27.6	0	89
29-Apr	6:00	37.9	65.4	17.3	50.1	34.1	24.9	21.9	19.1	18.5	46	6	W	27.6	0	83
29-Apr	7:00	43.2	66.5	17.5	54.2	48.4	34.8	27.3	21.6	19.9	48	8	W	27.6	0	83
29-Apr	8:00	38.1	61.9	17.4	48.3	42.1	34.2	32.0	22.6	18.3	50	10	W	27.6	0	71
29-Apr	9:00	32.2	59.3	19.4	37.8	32.8	29.5	28.9	25.9	25.2	54	10	NW	27.6	0	57
29-Apr	10:00	38.1	64.9	17.6	48.5	42.4	33.5	30.6	23.1	20.4	55	10	WNW	27.6	0	55
29-Apr	11:00	30.8	58.4	17.7	41.0	34.7	25.8	22.9	19.5	18.6	57	9	NNW	27.6	0	45
29-Apr	12:00	35.1	59.6	17.7	42.6	38.6	33.2	31.9	22.8	18.8	57	3	VAR	27.6	0	47
29-Apr	13:00	30.8	62.6	17.5	39.7	32.1	24.7	22.7	19.5	18.6	58	5	NE	27.6	0	46
29-Apr	14:00	33.1	55.9	17.6	44.3	36.1	28.4	26.3	21.1	19.5	59	3	VAR	27.6	0	39
29-Apr	15:00	29.3	49.4	17.4	40.0	33.2	25.1	22.8	19.1	18.1	59	10	W	27.6	0	44
29-Apr	16:00	30.1	55.6	17.7	41.8	32.4	24.1	21.6	19.5	19.0	58	9	NNE	27.6	0	46
29-Apr	17:00	39.9	57.6	18.4	50.3	43.7	36.3	34.3	28.4	26.5	59	10	NNE	27.6	0	48
29-Apr	18:00	38.0	63.7	18.1	49.1	39.9	33.6	32.0	26.5	24.8	55	5	NNE	27.6	0	49
29-Apr	19:00	49.0	73.8	20.3	59.8	53.2	43.1	39.5	31.2	27.9	54	6	W	27.6	0	57
29-Apr	20:00	40.0	60.7	22.1	50.1	44.4	36.8	34.7	28.7	26.8	50	6	WSW	27.6	0	63
29-Apr	21:00	34.0	58.6	20.7	43.5	37.5	31.5	30.0	25.3	23.9	48	3	SSW	27.6	0	71
29-Apr	22:00	36.2	55.0	21.0	45.5	40.1	33.5	31.8	26.5	25.0	48	0	CALM	27.6	0	68
29-Apr	23:00	39.8	55.5	22.3	47.6	43.5	38.5	37.5	32.3	30.8	47	10	W	27.7	0	71
30-Apr	0:00	39.2	53.8	22.0	46.9	42.9	38.1	37.1	32.1	30.6	44	8	W	27.7	0	71
30-Apr	1:00	33.7	52.1	19.9	42.3	37.4	31.9	30.6	25.3	23.6	43	5	W	27.7	0	74
30-Apr	2:00	30.2	52.1	19.4	39.8	34.1	27.1	25.3	21.7	20.8	46	10	WSW	27.7	0	63
30-Apr	3:00	33.0	54.3	19.8	43.0	37.0	30.2	28.4	23.9	22.6	43	8	WSW	27.7	0	71
30-Apr	4:00	38.4	56.5	22.0	46.9	41.9	36.9	35.8	30.9	29.5	41	10	WSW	27.7	0	73
30-Apr	5:00	39.6	56.8	21.3	48.2	43.2	38.2	37.0	31.6	29.9	41	8	W	27.7	0	73
30-Apr	6:00	38.3	58.3	21.0	46.3	42.0	36.7	35.5	30.4	28.9	41	10	WSW	27.7	0	73
30-Apr	7:00	35.9	59.1	21.1	44.9	38.4	33.7	32.6	28.0	26.6	47	8	W	27.7	0	61

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
30-Apr	8:00	42.1	57.0	24.8	50.0	45.6	41.0	40.0	35.3	33.9	50	10	WNW	27.7	0	57
30-Apr	9:00	41.4	57.3	21.6	49.8	45.3	39.7	38.4	32.9	31.3	55	10	NW	27.7	0	47
30-Apr	10:00	38.1	60.5	20.9	48.5	41.0	35.5	34.3	29.2	27.7	58	9	NW	27.7	0	41
30-Apr	11:00	35.8	53.3	18.2	44.6	39.7	33.8	32.4	26.0	23.9	62	10	NW	27.7	0	34
30-Apr	12:00	33.9	56.1	18.0	44.5	37.5	30.1	28.1	22.5	20.8	64	11	NW	27.6	0	31
30-Apr	13:00	35.5	56.0	17.9	46.7	39.0	30.7	28.2	21.9	19.9	63	10	W	27.6	0	28
30-Apr	14:00	34.7	52.8	17.8	45.7	38.6	30.5	28.2	22.1	20.2	68	9	NNW	27.6	0	23
30-Apr	15:00	38.0	54.5	18.4	47.5	42.1	35.2	33.4	26.7	24.4	62	11	N	27.6	0	32
30-Apr	16:00	39.0	56.9	18.1	48.2	43.0	36.8	35.3	27.7	24.8	67	10	NNW	27.6	0	21
30-Apr	17:00	39.5	59.9	19.1	49.2	43.6	36.3	34.3	27.6	25.2	67	9	NNW	27.6	0	24
30-Apr	18:00	40.9	59.4	23.2	49.4	44.7	38.9	37.5	32.3	30.8	63	9	NNE	27.6	0	31
30-Apr	19:00	38.6	60.6	19.3	48.9	42.2	35.5	33.8	29.0	27.7	61	10	NNE	27.6	0	35
30-Apr	20:00	29.4	51.2	17.4	42.2	30.9	22.8	20.5	18.6	18.2	57	6	N	27.6	0	45
30-Apr	21:00	28.2	66.0	17.4	35.8	26.6	20.6	19.2	18.9	18.8	52	9	NNW	27.6	0	54
30-Apr	22:00	24.7	52.3	18.2	35.2	19.7	19.0	18.9	18.7	18.7	52	10	NNW	27.6	0	53
30-Apr	23:00	24.2	46.0	18.3	35.7	24.7	20.4	19.5	19.0	18.9	50	9	NW	27.6	0	57
1-May	0:00	25.5	50.8	18.5	37.1	26.7	20.9	19.5	19.0	18.9	49	12	WNW	27.6	0	54
1-May	1:00	22.3	40.2	18.4	30.2	25.1	20.6	19.7	19.0	18.9	48	10	NW	27.6	0	56
1-May	2:00	22.6	52.4	18.4	30.5	23.8	20.4	19.8	19.2	19.1	48	13	WNW	27.6	0	54
1-May	3:00	22.5	42.1	18.4	31.0	24.8	21.0	20.2	19.2	19.0	48	11	WNW	27.6	0	52
1-May	4:00	20.6	42.9	18.3	27.7	22.4	19.6	19.0	18.7	18.7	48	12	NW	27.6	0	52
1-May	5:00	28.8	57.3	18.1	38.0	25.2	20.1	19.0	18.7	18.6	47	13	NW	27.6	0	56
1-May	6:00	31.8	61.3	18.7	40.0	32.9	27.5	26.3	22.2	21.2	47	9	W	27.6	0	54
1-May	7:00	36.3	56.6	20.5	46.4	39.5	34.0	32.7	27.6	26.2	49	10	W	27.6	0	50
1-May	8:00	39.4	54.4	22.6	47.8	42.9	37.9	36.8	31.7	30.2	51	8	WSW	27.6	0	48
1-May	9:00	39.2	54.1	22.6	46.8	42.9	38.0	37.0	32.0	30.6	57	13	NW	27.6	0	42
1-May	10:00	34.8	53.2	18.0	44.1	38.7	32.4	30.9	24.6	22.6	60	13	NW	27.6	0	36
1-May	11:00	32.7	49.6	17.6	42.0	36.9	29.8	27.9	21.7	19.6	62	9	NW	27.6	0	32
1-May	12:00	33.1	52.7	17.9	43.6	36.5	30.1	28.5	22.6	20.7	63	8	WNW	27.6	0	31
1-May	13:00	33.8	63.4	18.1	44.1	37.2	30.1	28.2	22.8	21.2	64	10	NW	27.6	0	31
1-May	14:00	32.2	53.7	18.0	42.8	35.6	28.2	26.1	20.9	19.3	64	7	NW	27.6	0	30
1-May	15:00	32.5	60.6	17.6	43.1	35.7	28.8	27.0	21.7	20.1	65	10	NNW	27.6	0	28
1-May	16:00	33.5	52.4	17.6	43.9	37.8	29.6	27.3	22.0	20.5	67	10	NNW	27.6	0	25
1-May	17:00	34.5	64.8	17.8	44.4	37.6	31.4	30.0	23.7	21.6	67	8	N	27.6	0	27
1-May	18:00	35.2	57.5	18.0	46.2	38.2	31.9	30.4	24.4	22.5	67	12	NW	27.6	0	25
1-May	19:00	40.0	66.5	19.8	51.7	42.5	34.2	31.8	26.8	25.3	61	11	NNW	27.6	0	38

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
1-May	20:00	37.3	59.3	19.9	46.7	41.3	34.8	33.2	27.0	24.9	58	10	NNW	27.6	0	44
1-May	21:00	27.2	54.0	19.2	37.8	27.7	22.6	21.5	20.3	20.1	56	12	NNW	27.6	0	44
1-May	22:00	22.8	47.6	19.3	31.0	24.7	21.2	20.5	20.0	19.9	54	13	NW	27.6	0	45
1-May	23:00	23.1	58.7	18.2	31.3	23.5	20.9	20.4	20.0	19.9	51	13	NW	27.6	0	52

N - north; S - south; E - east; W - west; Var - variable

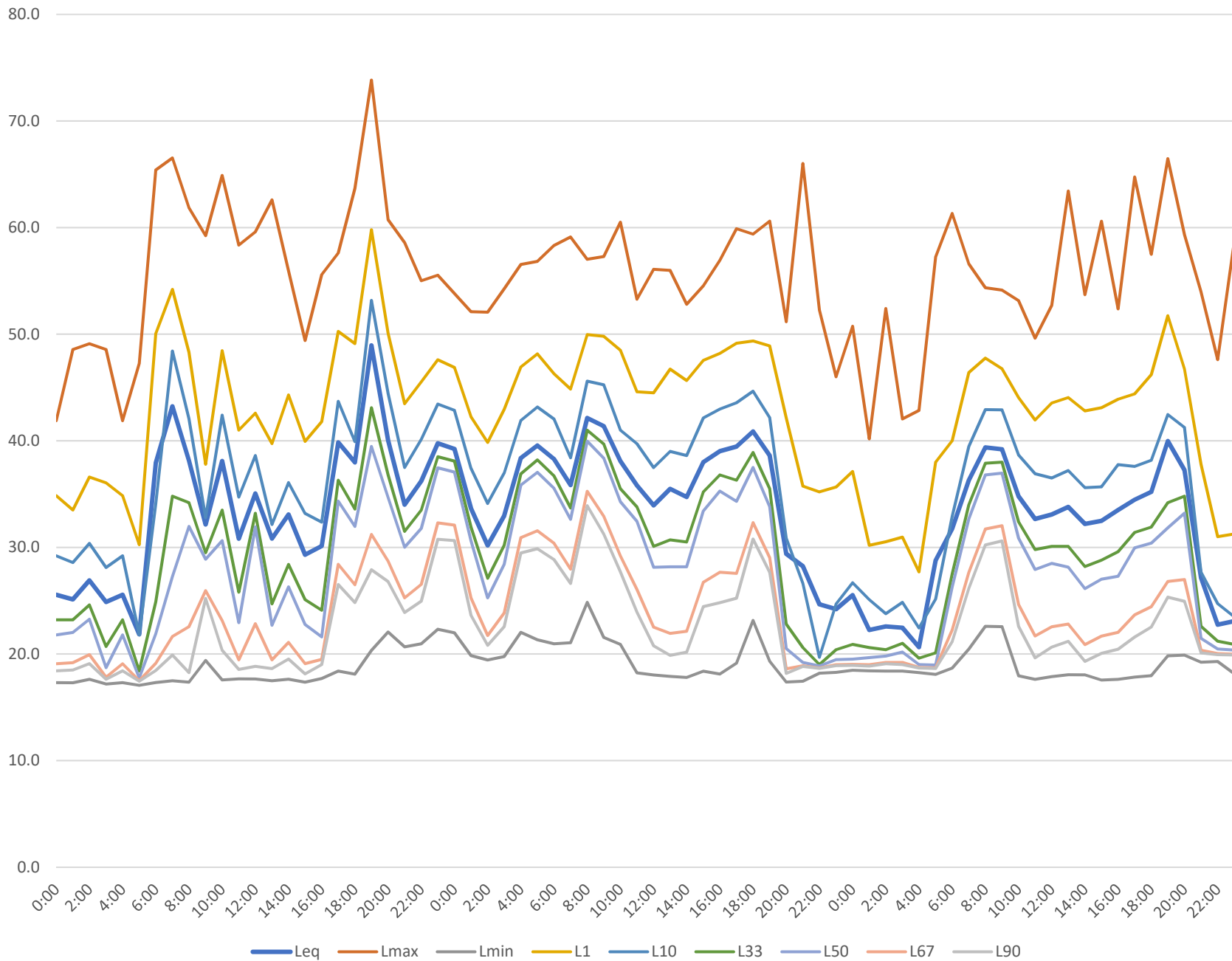
*The L33 and L67 results were not taken in the field. The L33 metric was interpolated from the L10 and L50 data; the L67 metric was interpolated from the L50 and L90 data.

L33 metric interpolation formula: $=20 \cdot \text{LOG}((((20 \mu\text{pascals} \cdot 10^{(L10/20)}) - (20 \mu\text{pascals} \cdot 10^{(L50/20)})) \cdot (0.133333)) + (20 \mu\text{pascals} \cdot 10^{(L50/20)})) / 20 \mu\text{pascals}$

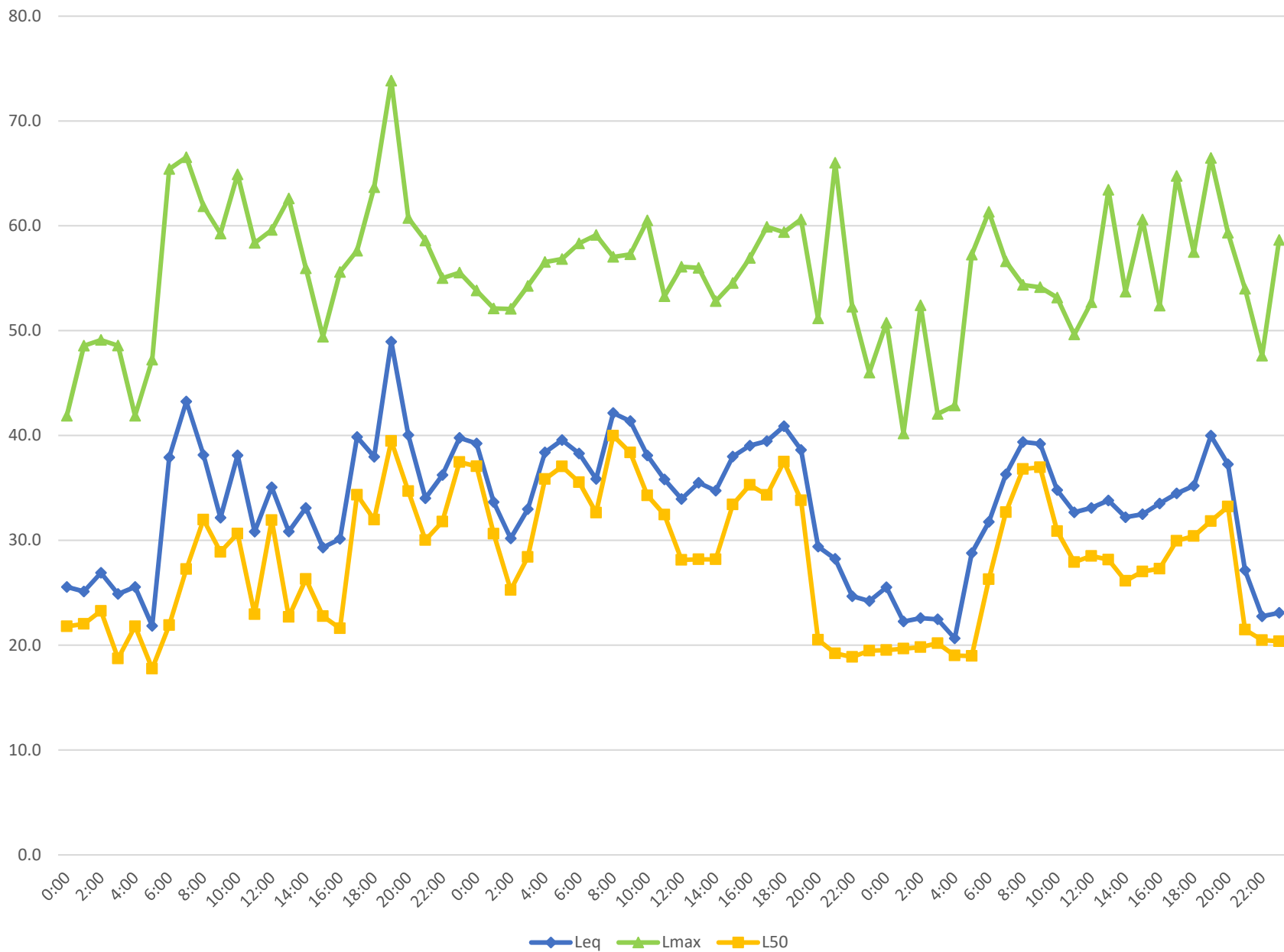
L67 metric interpolation formula: $=20 \cdot \text{LOG}((((20 \mu\text{pascals} \cdot 10^{(L50/20)}) - (20 \mu\text{pascals} \cdot 10^{(L90/20)})) \cdot (0.166667)) + (20 \mu\text{pascals} \cdot 10^{(L90/20)})) / 20 \mu\text{pascals}$

The error analysis of the formulas indicate that the interpolated value should be within 0.5 dBA of the actual measured value.

Figure A1: 24-Hour Noise Levels at Site A - Undeveloped Location along Twin Springs Road
(April 29, 2018 to May 1, 2018)



**Figure A2: Average Ambient Noise Statistics at Site A - Undeveloped Location along Twin Springs Road
(April 29, 2018 to May 1, 2018)**



DEPARTMENT OF ENVIRONMENTAL QUALITY

SOUND PRESSURE LEVEL DATA SHEETS

File Site A

County Malheur

SOURCE wind, brush, birds, vehicles

BY JWR

DATE April 29, 2018

SHEET 1

COMPLAINANT n/a

COMPLAINT DATE n/a

INSTRUMENTATION

EQT	TYPE	SERIAL
SLM	2270	2706889
MIC	4190	2408813
FLTR	n/a	
CAL	4231	3001166
Windscreen ☒ ON ☐ OFF		

in H₂O

Time	Bat. Ck.	Cal. dB	°F dry bulb	°F wet bulb	% RH	Press. mm Hg	Wind mph	Wind Direct
11:15 pm	✓	✓	51 F		70%	27.6	0	calm

Measurement Position	Meter Fast/Slow	A Scale	C Scale	Linear Scale	L ₁	L ₁₀	L ₅₀	Peak Impulse
170' west of road	Fast	X				See Table	See Table	

Comments measurement wait 3 days straight → Sunday, Monday, Tuesday
meter elevation slightly below road level as road is on crest and hillside drops away to the west

INSTRUMENT SET-UP
CHECK-OFF LIST

- ☒ Site Selection
- ☒ SLM Position
- ☒ Battery Check
- ☒ Calibration Adjustment
- ☒ Wind Below 10 MPH
- ☒ Humidity Below 95%
- ☒ Windscreen

1. Days of Operation

- A. Mon. - Fri.
- B. Mon. - Sat.
- C. Mon. - Sun.

2. Time of Operation

- A. 8 a.m. - 5 p.m.
- B. 9 a.m. - 4 p.m.

3. Number of Shifts

- A. One
- B. Two
- C. Three

4. Distance from Receiver to

source _____ feet.

5. Visibility to Source

- A. Direct _____
- B. Hill or Bank _____
- C. Trees _____
- D. Other _____

6. Zoning

- A. Residence _____
- B. Plant or Facility _____

7. Who came first?

- A. Residence... Date _____
- B. Plant or Facility _____

8. Petition Submitted

- A. Yes... Number _____
- B. No

SKETCH OF MEASUREMENT SITE AND SOURCE

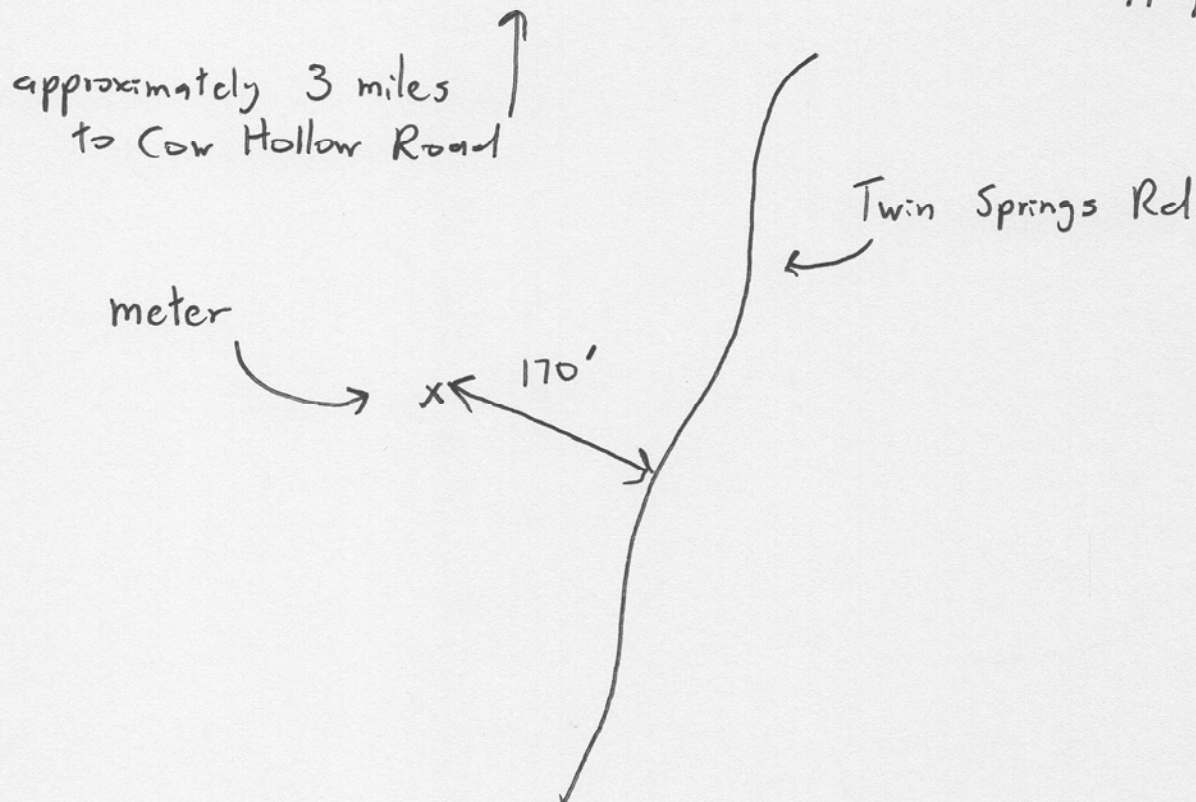




Photo 1: Site A Looking North



Photo 2: Site A Looking South



Photo 3: Site A Looking East



Photo 4: Site A Looking West

Table B1 - Site B: Lake Owhyee State Park

	Day (7:00 am to 10:00pm)
	Night (10:00 pm to 7:00 am)

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
3-May	0:00	37.6	55.8	23.2	48.6	43.7	33.1	29.1	27.0	26.5	50	7	W	27.7	0	59
3-May	1:00	30.9	39.5	25.7	34.1	32.7	30.8	30.5	29.1	28.8	51	5	W	27.7	0	56
3-May	2:00	31.4	52.1	24.7	34.7	33.5	31.3	30.9	29.1	28.7	52	8	NW	27.7	0	54
3-May	3:00	20.9	51.8	17.7	25.1	21.6	19.5	19.2	18.7	18.6	54	9	NW	27.8	0	49
3-May	4:00	19.3	36.5	17.4	23.4	20.3	19.1	19.0	18.2	18.1	49	0	CALM	27.8	0	61
3-May	5:00	21.4	37.9	17.2	29.8	24.7	19.3	18.1	17.6	17.5	46	7	WSW	27.8	0	63
3-May	6:00	25.4	50.5	17.4	34.0	29.4	23.4	22.0	19.1	18.4	47	8	W	27.8	0	61
3-May	7:00	22.4	37.9	17.3	31.0	25.0	21.1	20.3	18.6	18.3	49	9	WSW	27.8	0	59
3-May	8:00	24.8	43.8	17.6	33.7	27.6	22.6	21.4	19.3	18.8	57	8	W	27.8	0	47
3-May	9:00	27.8	49.1	17.9	38.4	29.7	23.5	22.1	20.0	19.5	61	3	VAR	27.9	0	42
3-May	10:00	26.7	55.7	18.4	38.7	27.1	22.8	21.9	20.4	20.1	65	3	SE	27.9	0	39
3-May	11:00	31.3	54.6	18.7	45.8	29.3	23.6	22.3	20.6	20.2	69	6	VAR	27.9	0	30
3-May	12:00	26.5	45.5	22.4	33.6	28.5	25.7	25.2	24.2	24.0	72	5	NE	27.9	0	27
3-May	13:00	26.8	42.7	22.7	33.4	29.0	25.9	25.3	24.2	24.0	73	6	SW	27.8	0	27
3-May	14:00	26.5	47.8	23.4	32.6	28.0	26.0	25.7	24.8	24.6	75	0	CALM	27.8	0	24
3-May	15:00	30.3	50.9	22.8	43.5	29.7	26.0	25.3	24.2	24.0	77	0	CALM	27.8	0	22
3-May	16:00	29.1	52.7	22.3	43.9	27.0	24.7	24.3	23.5	23.3	78	6	VAR	27.8	0	21
3-May	17:00	27.7	52.7	22.4	41.3	26.5	24.6	24.3	23.6	23.5	77	5	VAR	27.8	0	22
3-May	18:00	29.5	53.2	22.5	41.4	28.7	25.8	25.3	24.3	24.1	77	5	ESE	27.8	0	22
3-May	19:00	25.6	46.4	22.7	30.6	26.6	25.1	24.9	24.2	24.1	76	6	ESE	27.8	0	23
3-May	20:00	27.9	47.9	23.4	36.4	29.2	27.0	26.7	25.4	25.1	70	0	CALM	27.8	0	33
3-May	21:00	32.6	51.2	26.0	37.5	34.5	32.3	31.9	29.8	29.4	67	3	SSE	27.8	0	34
3-May	22:00	33.8	55.3	26.0	38.4	35.8	33.5	33.0	31.4	31.0	63	0	CALM	27.8	0	41
3-May	23:00	31.8	53.6	24.2	35.5	33.9	31.5	31.1	29.5	29.1	60	3	ENE	27.8	0	47
4-May	0:00	30.9	39.5	25.7	34.1	32.7	30.8	30.5	29.1	28.8	58	0	CALM	27.8	0	51
4-May	1:00	31.4	52.1	24.7	34.7	33.5	31.3	30.9	29.1	28.7	54	3	W	27.8	0	57
4-May	2:00	37.6	55.8	23.2	48.6	43.7	33.1	29.1	27.0	26.5	52	0	CALM	27.9	0	61
4-May	3:00	26.3	36.5	20.8	30.4	28.5	26.0	25.5	24.2	23.9	49	3	W	27.9	0	69
4-May	4:00	23.1	32.1	19.1	26.8	24.3	23.0	22.7	21.8	21.6	48	0	CALM	27.9	0	68
4-May	5:00	23.4	49.1	18.3	32.0	25.3	21.9	21.2	20.0	19.7	47	5	W	27.9	0	71
4-May	6:00	25.4	43.4	17.4	35.6	27.6	23.1	22.2	19.8	19.2	46	0	CALM	27.9	0	71
4-May	7:00	23.3	38.3	17.5	31.7	26.6	21.8	20.8	19.1	18.7	49	5	WSW	27.9	0	71

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
4-May	8:00	29.2	53.3	17.7	42.1	28.9	23.9	22.8	20.5	19.9	54	3	WSW	27.9	0	59
4-May	9:00	29.2	50.4	18.5	43.6	27.1	23.5	22.8	21.0	20.6	61	0	CALM	27.9	0	52
4-May	10:00	29.0	50.7	18.9	42.5	27.0	23.3	22.6	20.9	20.6	67	5	VAR	27.9	0	40
4-May	11:00	30.4	58.3	19.2	39.6	25.5	22.6	22.1	20.8	20.5	72	8	SSE	27.9	0	35
4-May	12:00	24.1	47.8	19.7	31.0	26.2	23.2	22.6	21.3	21.0	75	5	VAR	27.9	0	28
4-May	13:00	25.3	48.8	19.4	35.4	26.8	23.2	22.5	20.9	20.6	78	5	SSE	27.9	0	25
4-May	14:00	25.8	51.2	19.8	34.3	27.9	23.9	23.1	21.4	21.0	81	0	CALM	27.9	0	21
4-May	15:00	25.8	48.2	19.3	35.9	28.0	23.5	22.6	21.1	20.7	81	6	VAR	27.8	0	25
4-May	16:00	26.4	44.9	20.0	35.3	29.0	25.0	24.2	22.1	21.6	80	6	NE	27.8	0	24
4-May	17:00	27.0	49.4	19.3	38.0	28.5	23.9	22.9	21.2	20.8	80	5	NE	27.8	0	24
4-May	18:00	28.7	55.2	18.6	41.1	28.2	23.1	21.9	20.4	20.0	81	5	NNE	27.8	0	26
4-May	19:00	28.4	52.3	19.5	40.2	28.8	24.6	23.7	22.0	21.6	79	0	CALM	27.8	0	30
4-May	20:00	28.3	50.4	20.5	35.8	31.2	27.1	26.2	23.8	23.2	73	9	NNW	27.8	0	35
4-May	21:00	35.5	46.6	26.3	39.7	37.3	35.5	35.2	33.2	32.7	71	7	NNE	27.8	0	34
4-May	22:00	35.6	49.2	31.1	37.5	36.7	35.6	35.4	34.5	34.3	63	5	NNW	27.8	0	50
4-May	23:00	34.5	43.9	29.6	36.5	35.7	34.7	34.5	33.1	32.8	60	0	CALM	27.8	0	55
5-May	0:00	38.1	48.1	29.3	42.9	41.2	37.7	37.0	34.0	33.3	57	8	WSW	27.8	0	62
5-May	1:00	34.4	46.5	27.2	40.1	38.0	32.7	31.6	30.3	30.1	57	7	WSW	27.8	0	67
5-May	2:00	30.2	35.7	25.8	32.5	31.5	30.3	30.1	29.0	28.7	54	3	WSW	27.8	0	69
5-May	3:00	29.4	35.6	25.4	31.5	30.5	29.5	29.3	28.4	28.2	54	5	WSW	27.8	0	69
5-May	4:00	29.3	38.3	25.2	32.0	30.5	29.3	29.1	28.2	28.1	53	8	WSW	27.8	0	74
5-May	5:00	29.5	49.3	24.7	35.7	30.2	28.7	28.5	27.6	27.4	53	6	SW	27.8	0	71
5-May	6:00	26.1	46.0	18.4	31.8	28.8	25.1	24.4	21.2	20.3	53	3	W	27.8	0	74
5-May	7:00	24.2	39.3	18.0	32.5	27.0	22.7	21.8	20.0	19.6	55	0	CALM	27.8	0	72
5-May	8:00	23.3	40.4	18.2	30.7	25.8	22.1	21.3	19.9	19.6	59	0	CALM	27.8	0	62
5-May	9:00	24.1	47.9	18.5	33.0	26.3	22.5	21.8	20.4	20.1	63	0	CALM	27.8	0	56
5-May	10:00	25.9	44.0	19.3	35.9	28.0	24.1	23.3	21.6	21.2	66	5	NNE	27.8	0	48
5-May	11:00	23.3	44.6	19.5	29.4	25.5	22.5	22.0	20.8	20.5	69	0	CALM	27.8	0	44
5-May	12:00	25.1	45.8	19.4	33.3	27.6	23.6	22.7	21.1	20.8	74	3	VAR	27.8	0	38
5-May	13:00	30.2	53.3	19.7	42.4	31.4	24.8	23.1	21.3	20.9	76	0	CALM	27.8	0	35
5-May	14:00	27.5	51.7	20.0	38.4	27.9	24.2	23.5	21.9	21.6	78	5	VAR	27.7	0	30
5-May	15:00	29.4	52.1	20.1	41.1	29.1	24.4	23.5	21.8	21.4	78	3	VAR	27.7	0	32
5-May	16:00	41.6	68.6	19.6	53.1	27.6	23.7	22.9	21.3	21.0	80	5	N	27.7	0	30
5-May	17:00	29.0	55.3	19.0	41.7	30.7	24.0	22.3	20.6	20.2	79	3	NNW	27.7	0	31
5-May	18:00	29.2	51.7	19.7	39.8	31.6	26.0	24.7	21.9	21.3	78	5	VAR	27.7	0	35
5-May	19:00	25.3	47.1	19.5	34.9	26.6	24.0	23.5	21.7	21.3	76	3	NE	27.7	0	35

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
5-May	20:00	39.4	71.9	20.1	54.7	29.4	26.2	25.5	23.5	23.1	72	14	WSW	27.7	0	43
5-May	21:00	34.7	44.9	25.8	37.3	35.9	34.9	34.8	32.8	32.3	68	14	NNW	27.7	0	50
5-May	22:00	34.9	45.5	31.4	36.5	35.6	35.0	34.9	34.3	34.2	68	10	N	27.7	0	49
5-May	23:00	35.5	46.6	26.3	39.7	37.3	35.5	35.2	33.2	32.7	64	3	NNW	27.7	0	56

N - north; S - south; E - east; W - west; Var - variable

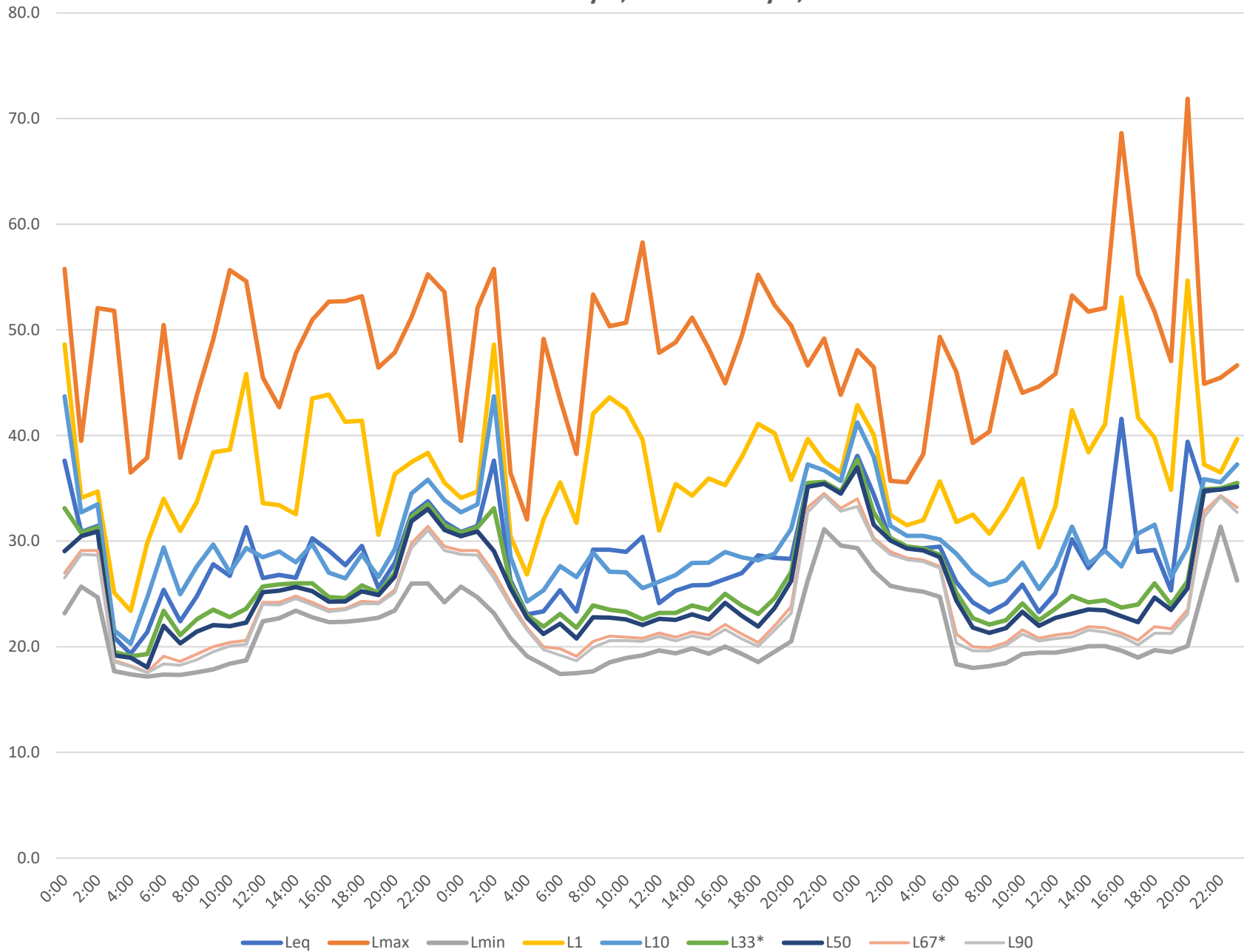
*The L33 and L67 results were not taken in the field. The L33 metric was interpolated from the L10 and L50 data; the L67 metric was interpolated from the L50 and L90 data.

L33 metric interpolation formula: $=20 \cdot \text{LOG}((((20 \mu\text{pascals} \cdot 10^{(L10/20)}) - (20 \mu\text{pascals} \cdot 10^{(L50/20)})) \cdot (0.133333)) + (20 \mu\text{pascals} \cdot 10^{(L50/20)})) / 20 \mu\text{pascals}$

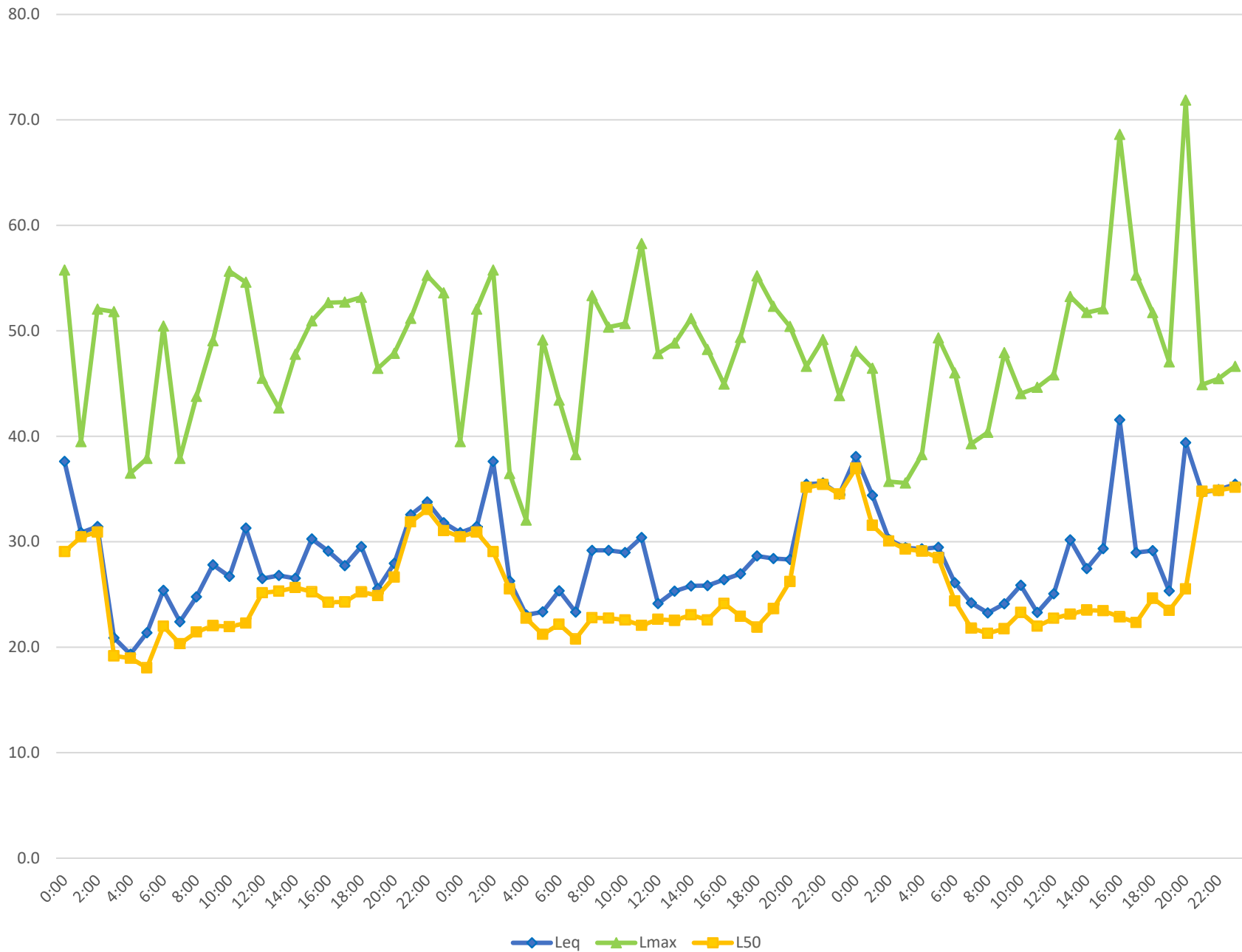
L67 metric interpolation formula: $=20 \cdot \text{LOG}((((20 \mu\text{pascals} \cdot 10^{(L50/20)}) - (20 \mu\text{pascals} \cdot 10^{(L90/20)})) \cdot (0.166667)) + (20 \mu\text{pascals} \cdot 10^{(L90/20)})) / 20 \mu\text{pascals}$

The error analysis of the formulas indicate that the interpolated value should be within 0.5 dBA of the actual measured value.

Figure B1: 24-Hour Noise Levels at Site B - Lake Owyhee State Park
May 3, 2018 to May 5, 2018



**Figure B2: Average Ambient Noise Statistics at Site B - Lake Owyhee State Park
(May 3, 2018 to May 5, 2018)**



DEPARTMENT OF ENVIRONMENTAL QUALITY

SOUND PRESSURE LEVEL DATA SHEETS

File Site B

County Malheur

SOURCE wind, brush, boats, campers (voices)
auto and campers, birds
nighttime, crickets and other insects

BY JWR

DATE May 3, 2018

SHEET 1

COMPLAINANT n/a

COMPLAINT DATE n/a

INSTRUMENTATION

EQT	TYPE	SERIAL
SLM	2270	2706889
MIC	4190	2408813
FLTR	n/a	
CAL	4231	3201166
Windscreen ☒ ON ☐ OFF		

(52)

in H₂O

Time	Bat. Ck.	Cal. dB	°F dry bulb	°F wet bulb	% RH	Press. mm Hg	Wind mph	Wind Direct
11:55pm	X	X	51°F		61%	27.7	6	West

Measurement Position	Meter Fast/Slow	A Scale	C Scale	Linear Scale	L ₁	L ₁₀	L ₅₀	Peak Impulse
South of Indian Creek Campground	Fast	X				see table	see table	

Comments measurement went 3 days straight, Thursday
Friday Saturday
measurement location up hillside, moderate elevation change
line of sight to water and Fisherman Rd. no line of
sight to Campground

Form NPCS-4

INSTRUMENT SET-UP
CHECK-OFF LIST

- ☒ Site Selection
- ☒ SIM Position
- ☒ Battery Check
- ☒ Calibration Adjustment
- ☒ Wind Below 10 MPH
- ☒ Humidity Below 95%
- ☒ Windscreen

1. Days of Operation

- A. Mon. - Fri.
- B. Mon. - Sat.
- C. Mon. - Sun.

2. Time of Operation

- A. 8 a.m. - 5 p.m.
- B. 9 a.m. - 4 p.m.

3. Number of Shifts

- A. One
- B. Two
- C. Three

4. Distance from Receiver to
source _____ feet.

5. Visibility to Source

- A. Direct _____
- B. Hill or Bend _____
- C. Trees _____
- D. Other _____

6. Zoning

- A. Residence _____
- B. Plant or Facility _____

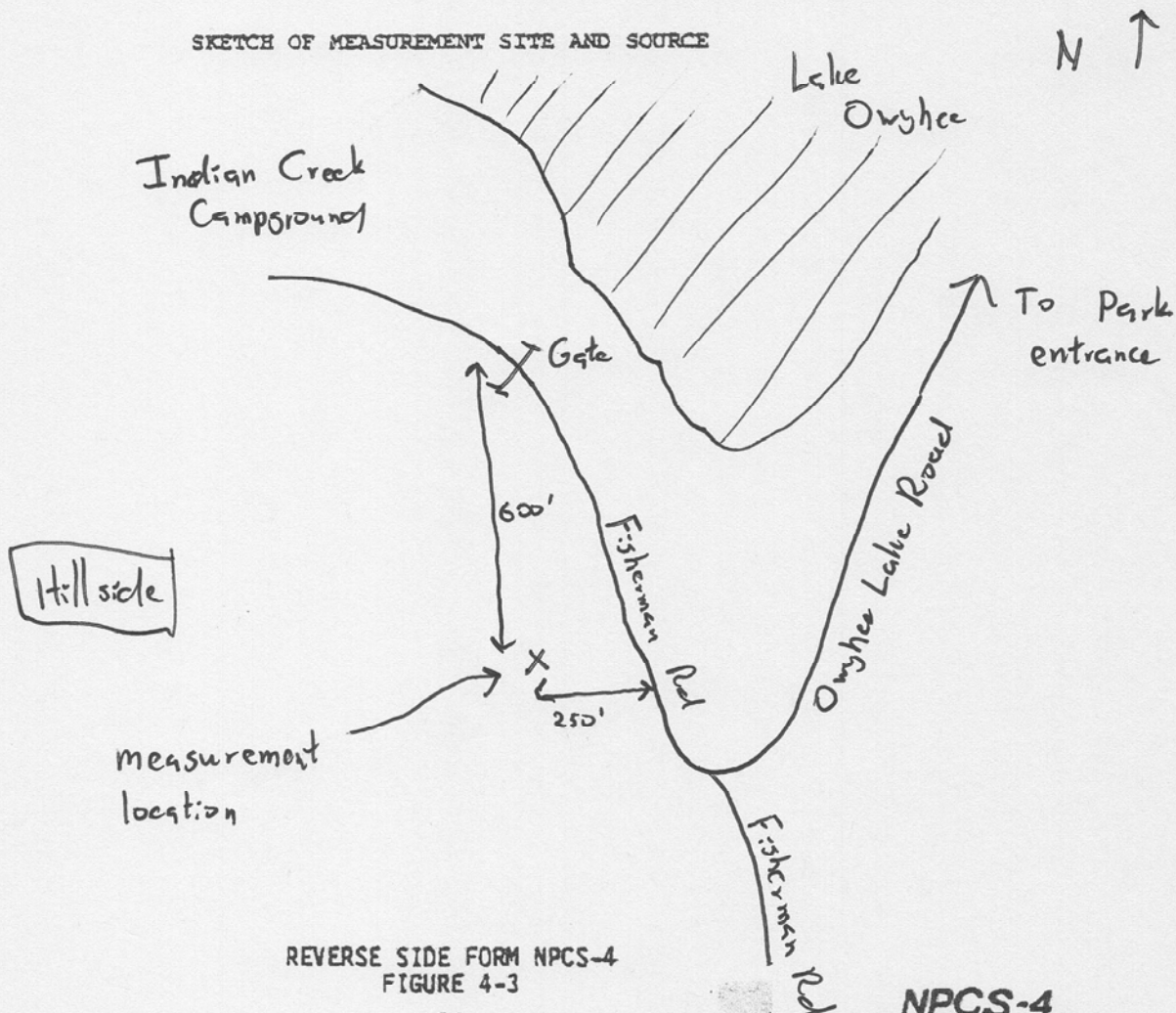
7. Who came first?

- A. Residence... Date _____
- B. Plant or Facility _____

8. Petition Submitted

- A. Yes... Number _____
- B. No

SKETCH OF MEASUREMENT SITE AND SOURCE



REVERSE SIDE FORM NPCS-4
FIGURE 4-3

NPCS-4



Photo 5: Site B Looking North



Photo 6: Site B Looking South



Photo 7: Site B Looking East



Photo 8: Site B Looking West

Table C1 - Site C: Grassy Mountain Mine and Process Area

	Day (7:00 am to 10:00pm)
	Night (10:00 pm to 7:00 am)

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
2-May	0:00	24.2	50.0	19.0	30.5	26.7	22.8	22.0	20.6	20.3	49	9	WNW	27.7	0	56
2-May	1:00	21.1	44.2	17.3	26.7	23.2	20.6	20.1	18.8	18.5	49	11	NW	27.7	0	59
2-May	2:00	22.9	53.9	17.0	33.2	22.7	19.8	19.3	18.1	17.9	48	10	NW	27.7	0	61
2-May	3:00	19.3	43.2	17.0	24.3	20.2	18.5	18.2	17.6	17.5	48	11	NW	27.7	0	61
2-May	4:00	21.1	49.7	17.0	28.2	22.0	19.4	18.9	17.7	17.5	47	10	NW	27.7	0	63
2-May	5:00	22.9	54.8	16.9	32.9	21.5	18.4	17.9	17.4	17.3	46	5	VAR	27.7	0	66
2-May	6:00	48.8	81.3	17.1	52.2	38.4	27.2	22.8	18.8	17.7	46	3	E	27.7	0	66
2-May	7:00	47.2	77.7	17.1	59.6	38.7	29.7	26.8	20.5	18.4	50	3	ENE	27.7	0	59
2-May	8:00	43.2	72.3	17.4	50.9	40.1	29.1	24.8	19.7	18.3	55	12	NNW	27.7	0	51
2-May	9:00	36.1	66.9	17.6	48.5	36.8	28.5	26.1	21.0	19.5	58	3	N	27.7	0	47
2-May	10:00	44.5	73.7	17.9	55.4	39.5	30.4	27.5	22.6	21.2	61	0	CALM	27.7	0	39
2-May	11:00	43.4	74.5	18.2	57.2	36.7	29.0	26.9	22.0	20.5	64	3	VAR	27.7	0	34
2-May	12:00	38.1	68.1	18.1	50.4	37.1	28.6	26.1	21.4	20.1	66	7	N	27.7	0	30
2-May	13:00	38.1	64.7	18.1	52.5	37.5	28.8	26.1	21.2	19.7	69	8	N	27.7	0	27
2-May	14:00	43.3	73.6	18.4	56.0	37.5	29.9	27.8	22.6	21.1	69	6	VAR	27.7	0	26
2-May	15:00	37.0	62.7	19.0	49.1	38.6	31.2	29.2	24.1	22.5	72	7	VAR	27.7	0	24
2-May	16:00	32.9	60.7	18.8	44.2	34.1	26.4	24.3	21.1	20.3	74	13	NW	27.7	0	18
2-May	17:00	35.7	63.8	19.0	47.7	36.6	28.7	26.4	21.8	20.6	73	10	N	27.7	0	17
2-May	18:00	35.4	64.9	19.3	47.0	36.8	29.2	27.2	22.8	21.6	72	12	NNW	27.6	0	23
2-May	19:00	35.0	63.0	19.8	48.1	36.0	27.8	25.4	22.8	22.2	70	8	N	27.7	0	28
2-May	20:00	32.5	55.5	17.9	46.2	34.3	25.3	22.5	19.4	18.7	65	3	N	27.7	0	34
2-May	21:00	33.5	69.3	18.2	45.0	28.8	22.3	20.7	19.5	19.2	59	3	N	27.7	0	42
2-May	22:00	23.9	46.4	18.1	32.8	25.9	22.8	22.2	20.4	20.0	55	6	NNW	27.7	0	49
2-May	23:00	27.3	50.9	19.1	33.9	29.0	26.4	26.0	23.5	22.9	52	6	WNW	27.7	0	54
6-May	0:00	30.9	45.5	20.8	36.4	33.2	30.6	30.2	28.4	28.0	58	3	WSW	27.7	0	70
6-May	1:00	24.2	50.0	19.0	30.5	26.7	22.8	22.0	20.6	20.3	57	5	WSW	27.7	0	74
6-May	2:00	23.4	44.9	18.9	30.5	25.6	22.7	22.1	20.1	19.6	55	8	WSW	27.7	0	80
6-May	3:00	23.4	59.0	18.8	26.3	22.9	20.8	20.4	19.4	19.1	54	9	WSW	27.7	0	80
6-May	4:00	20.9	43.9	18.6	25.4	22.7	20.4	20.0	19.2	19.1	53	8	WSW	27.7	0	80
6-May	5:00	30.5	60.2	18.5	41.6	26.5	21.6	20.5	19.3	19.1	53	8	WSW	27.7	0	80
6-May	6:00	39.8	63.3	18.5	53.4	41.7	31.4	27.6	22.5	20.9	51	6	WSW	27.7	0	86
6-May	7:00	41.0	70.4	18.4	52.0	41.1	32.6	30.0	24.4	22.6	54	6	SW	27.7	0	77

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
6-May	8:00	44.1	66.8	19.4	56.8	46.1	36.3	32.9	25.9	23.5	59	0	CALM	27.7	0	69
6-May	9:00	40.9	62.2	23.3	52.6	42.5	37.8	36.8	33.1	32.2	66	5	NE	27.7	0	54
6-May	10:00	39.1	70.2	20.7	48.5	40.0	37.3	36.7	33.9	33.3	69	5	E	27.6	0	47
6-May	11:00	38.6	69.0	20.0	47.7	35.7	31.5	30.6	25.4	23.8	74	6	VAR	27.6	0	41
6-May	12:00	38.7	65.9	19.3	51.3	41.0	31.8	28.9	23.8	22.3	76	5	SSE	27.6	0	36
6-May	13:00	40.6	61.7	21.0	50.3	44.4	37.7	36.1	29.8	27.7	77	5	SW	27.6	0	36
6-May	14:00	40.0	66.5	18.9	51.4	42.6	34.6	32.3	25.3	22.8	81	14	NW	27.6	0	28
6-May	15:00	40.7	69.0	19.0	51.2	42.1	33.0	30.1	23.5	21.3	84	13	WNW	27.6	0	25
6-May	16:00	41.6	64.5	18.9	53.4	45.2	35.2	31.7	24.1	21.2	85	10	WNW	27.6	0	20
6-May	17:00	46.4	71.6	20.1	57.6	50.2	40.8	37.7	29.8	26.8	78	3	NE	27.6	0	37
6-May	18:00	53.1	82.9	26.5	64.2	56.0	48.7	46.8	39.9	37.5	76	14	NW	27.6	0	30
6-May	19:00	42.8	62.7	29.3	52.4	45.7	40.8	39.7	36.9	36.2	71	13	NNW	27.6	0	32
6-May	20:00	35.2	56.2	19.1	44.6	37.7	34.1	33.4	27.1	25.1	67	3	NNE	27.7	0	37
6-May	21:00	35.5	63.8	19.4	47.4	34.6	32.4	32.0	27.1	25.7	59	6	NW	27.7	0	48
6-May	22:00	30.0	43.5	21.6	34.8	32.9	29.9	29.3	25.6	24.6	56	3	WNW	27.7	0	55
6-May	23:00	28.0	47.6	18.3	37.8	30.7	26.1	25.1	22.5	21.8	53	8	NW	27.7	0	64
16-May	0:00	23.9	46.4	18.1	32.8	25.9	22.8	22.2	20.4	20.0	62	3	N	27.6	0	65
16-May	1:00	23.4	42.4	18.6	32.7	25.2	21.9	21.3	20.2	20.0	61	0	CALM	27.6	0	67
16-May	2:00	22.3	44.1	18.1	32.9	22.6	20.6	20.3	19.3	19.2	57	3	W	27.6	0	74
16-May	3:00	19.5	40.8	17.5	23.8	20.3	19.2	19.0	18.5	18.4	56	0	CALM	27.6	0	75
16-May	4:00	21.3	47.0	17.5	27.0	21.0	19.0	18.7	18.1	18.0	57	3	N	27.6	0	77
16-May	5:00	33.0	58.7	17.4	46.5	32.3	23.0	20.0	18.5	18.1	58	3	NE	27.6	0	78
16-May	6:00	37.7	60.4	17.3	50.3	40.0	31.0	28.2	21.7	19.5	58	0	CALM	27.6	0	75
16-May	7:00	37.1	66.4	17.7	49.8	39.1	31.1	28.8	22.9	21.1	59	0	CALM	27.7	0	72
16-May	8:00	38.9	57.8	23.9	48.4	41.0	37.4	36.7	33.5	32.7	60	0	CALM	27.7	0	72
16-May	9:00	45.4	68.4	31.0	57.8	46.6	40.6	39.1	36.7	36.2	63	0	CALM	27.7	0	65
16-May	10:00	42.6	62.1	31.9	49.6	43.9	42.2	42.0	39.3	38.7	68	5	VAR	27.6	0	55
16-May	11:00	37.4	62.2	19.4	47.3	40.7	34.1	32.4	26.5	24.6	70	3	VAR	27.6	0	47
16-May	12:00	37.1	66.4	18.0	48.4	38.5	29.1	26.0	21.8	20.7	72	6	VAR	27.6	0	48
16-May	13:00	37.8	67.8	18.7	51.2	36.0	27.0	24.2	21.3	20.5	77	7	ENE	27.6	0	37
16-May	14:00	33.0	56.2	18.3	44.5	35.9	28.0	25.7	22.1	21.1	76	3	NE	27.6	0	36
16-May	15:00	56.7	94.4	19.1	60.3	51.5	40.3	35.7	27.7	24.5	79	9	NNE	27.6	0	36
16-May	16:00	52.5	79.6	25.6	64.7	52.5	43.6	40.8	35.1	33.4	76	9	NNW	27.6	0	36
16-May	17:00	40.1	62.7	20.0	52.4	42.5	35.4	33.5	28.2	26.6	73	13	WNW	27.6	0	41
16-May	18:00	44.0	67.6	29.4	51.0	47.0	42.4	41.5	36.9	35.6	70	8	WSW	27.6	0	49

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
16-May	19:00	43.1	68.8	26.2	52.2	45.7	41.1	40.1	34.6	32.8	67	13	WSW	27.6	0	59
16-May	20:00	43.8	70.4	19.6	58.2	40.1	32.4	30.3	26.0	24.9	64	12	S	27.6	0	67
16-May	21:00	36.3	61.1	19.5	49.4	38.1	28.0	24.4	22.2	21.7	63	13	SSE	27.6	0	65
16-May	22:00	28.2	56.1	21.9	32.2	29.9	27.5	27.1	25.1	24.7	60	6	SE	27.6	0	80
16-May	23:00	27.0	40.6	19.9	34.2	29.9	26.3	25.6	22.7	22.0	59	3	ENE	27.6	0	83

N - north; S - south; E - east; W - west; Var - variable

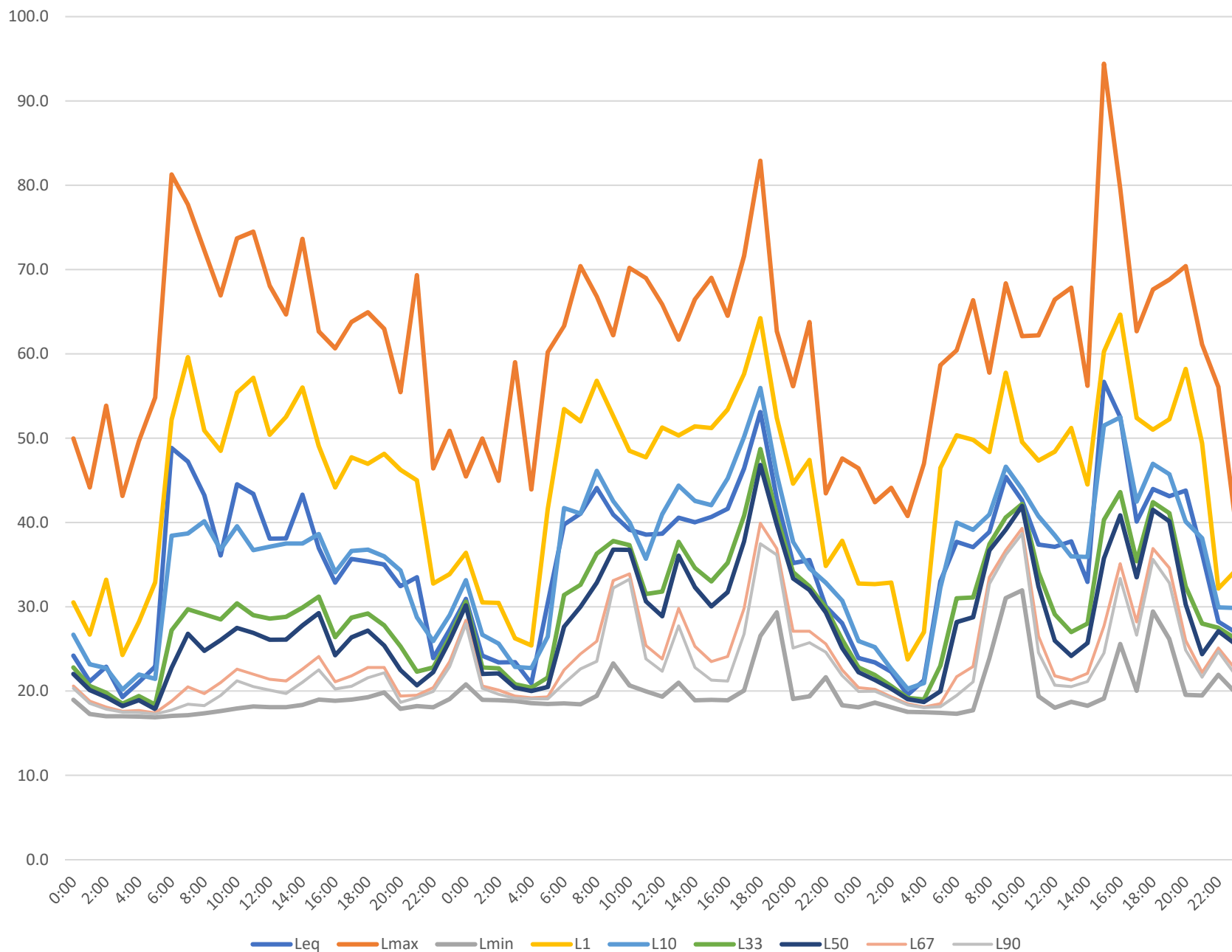
*The L33 and L67 results were not taken in the field. The L33 metric was interpolated from the L10 and L50 data; the L67 metric was interpolated from the L50 and L90 data.

L33 metric interpolation formula: $=20 \cdot \text{LOG}(\frac{((20 \mu\text{pascals} \cdot 10^{(L10/20)}) - (20 \mu\text{pascals} \cdot 10^{(L50/20)})) \cdot (0.133333) + (20 \mu\text{pascals} \cdot 10^{(L50/20)})}{20 \mu\text{pascals}})$

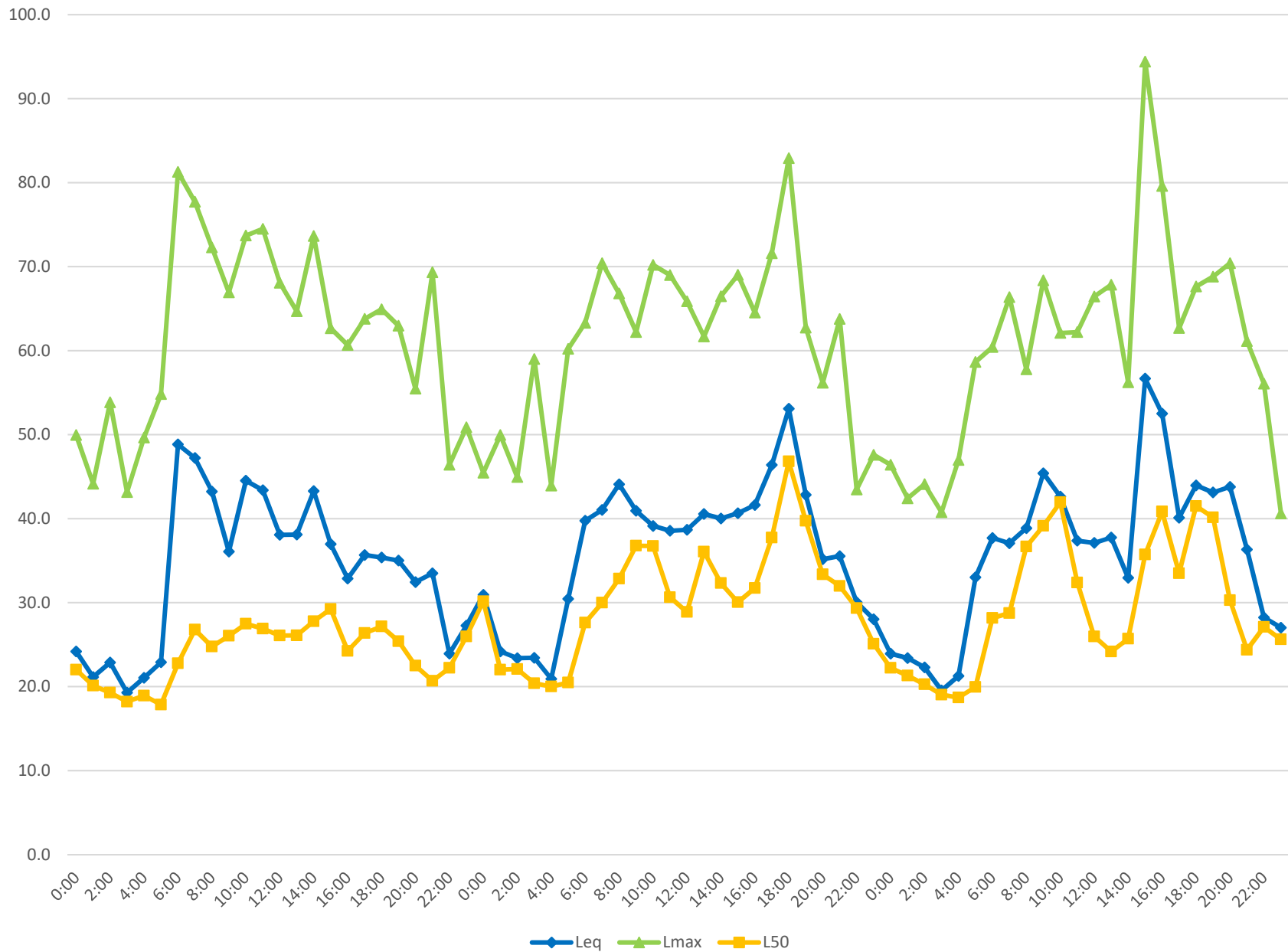
L67 metric interpolation formula: $=20 \cdot \text{LOG}(\frac{((20 \mu\text{pascals} \cdot 10^{(L50/20)}) - (20 \mu\text{pascals} \cdot 10^{(L90/20)})) \cdot (0.166667) + (20 \mu\text{pascals} \cdot 10^{(L90/20)})}{20 \mu\text{pascals}})$

The error analysis of the formulas indicate that the interpolated value should be within 0.5 dBA of the actual measured value.

**Figure C1: 24-Hour Noise Levels at Site C - Grassy Mountain Mine and Process Area
(May 2, 2018, May 6, 2018, and May 16, 2018)**



**Figure C2: Average Ambient Noise Statistics at Site C: Grassy Mountain Mine and
Process Area
(May 2, 2018, May 6, 2018, and May 16, 2018)**



DEPARTMENT OF ENVIRONMENTAL QUALITY

SOUND PRESSURE LEVEL DATA SHEETS

File Site C

County Walheur

SOURCE wind, brush, birds

BY JWR

DATE May 2, 2018

SHEET 1

COMPLAINANT n/g

COMPLAINT DATE n/g

INSTRUMENTATION

EQT	TYPE	SERIAL
SLM	2270	2706889
MIC	4190	2408813
FLTR	n/g	
CAL	4231	3001166
Windscreens <u>ON</u> OFF		

in H₂O

Time	Bat. Ck.	Cal. dB	°F dry bulb	°F wet bulb	% RH	Press. mm Hg	Wind mph	Wind Direct
(5-1) 11:55pm	X	X	49		54	27.7	8	WNW
(5-5) 11:53pm	X	X	64		56	27.7	3	NNW
(5-15) 11:55pm	X	X	61		62	27.6	7	N

Measurement Position	Meter Fast/Slow	A Scale	C Scale	Linear Scale	L ₁	L ₁₀	L ₅₀	Peak Impulse
150' west of road	Fast	X				see table	see table	

Comments measurement broken of 3 different days
Wednesday May 2nd, Sunday May 6, and Wednesday May 16
meter slightly uphill from road

INSTRUMENT SET-UP
CHECK-OFF LIST

- ☒ Site Selection
- ☒ SLM Position
- ☒ Battery Check
- ☒ Calibration Adjustment
- ☒ Wind Below 10 MPH
- ☒ Humidity Below 95%
- ☒ Windscreen

1. Days of Operation

- A. Mon. - Fri.
- B. Mon. - Sat.
- C. Mon. - Sun.

2. Time of Operation

- A. 8 a.m. - 5 p.m.
- B. 9 a.m. - 4 p.m.

3. Number of Shifts

- A. One
- B. Two
- C. Three

4. Distance from Receiver to
source _____ feet.

5. Visibility to Source

- A. Direct _____
- B. Hill or Barn _____
- C. Trees _____
- D. Other _____

6. Zoning

- A. Residence _____
- B. Plant or Facility _____

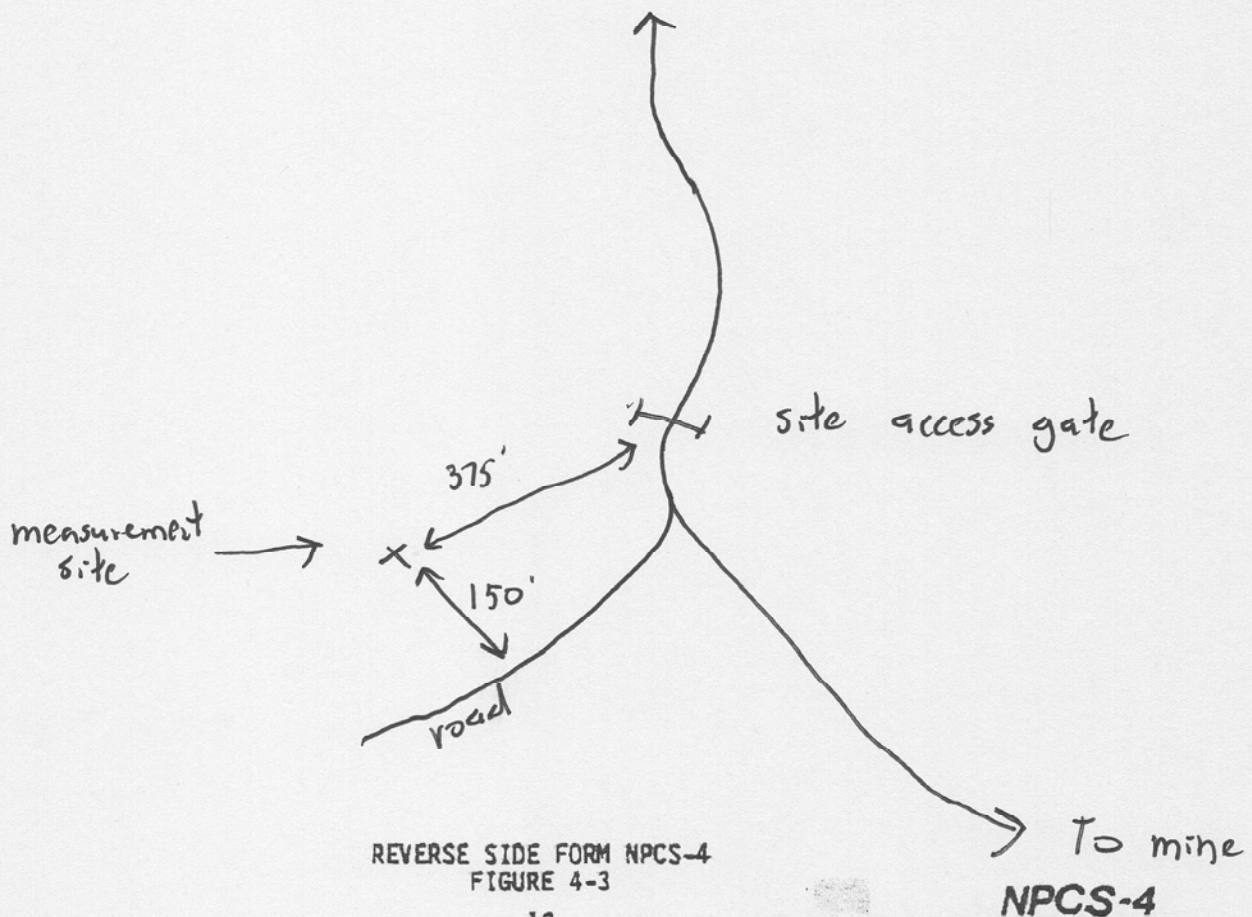
7. Who came first?

- A. Residence...Data _____
- B. Plant or Facility _____

8. Petition Submitted

- A. Yes... Number _____
- B. No

SKETCH OF MEASUREMENT SITE AND SOURCE



REVERSE SIDE FORM NPCS-4
FIGURE 4-3



Photo 9: Site C Looking North



Photo 10: Site C Looking South



Photo 11: Site C Looking East



Photo 12: Site C Looking West

Table D1 - Site D: 2025 Bishop Road, Vale, Oregon

	Day (7:00 am to 10:00pm)
	Night (10:00 pm to 7:00 am)

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
13-May	0:00	45.4	63.4	32.1	54.1	48.8	43.7	42.5	38.7	37.6	58	7	SE	27.6	0	67
13-May	1:00	46.7	64.8	32.7	55.1	50.3	45.1	43.9	40.5	39.7	57	7	SE	27.6	0	72
13-May	2:00	44.4	64.4	33.2	52.2	47.7	43.1	42.0	38.8	38.0	57	8	ESE	27.6	0	69
13-May	3:00	40.1	49.6	31.5	46.4	43.0	39.5	38.8	36.2	35.6	56	7	ESE	27.6	0	69
13-May	4:00	42.1	51.4	32.4	47.6	44.8	41.9	41.3	38.0	37.1	55	7	ESE	27.7	0	74
13-May	5:00	42.6	51.4	34.5	47.9	45.1	42.4	41.9	39.5	39.0	55	7	E	27.7	0	77
13-May	6:00	42.9	55.1	31.8	48.2	45.5	42.7	42.2	38.8	37.9	53	3	VAR	27.7	0	86
13-May	7:00	41.0	56.5	27.9	47.7	44.6	39.9	38.9	34.2	32.9	53	6	VAR	27.7	0	83
13-May	8:00	41.6	72.5	21.7	54.2	40.1	33.5	31.9	28.2	27.3	53	6	E	27.7	0	83
13-May	9:00	38.6	59.0	22.1	46.7	41.8	37.4	36.5	32.1	30.9	54	5	ESE	27.7	0	77
13-May	10:00	40.1	73.2	23.7	42.5	37.9	33.5	32.6	29.3	28.4	56	6	E	27.7	0	72
13-May	11:00	35.9	55.0	23.9	45.5	39.5	33.6	32.2	29.2	28.4	59	0	CALM	27.7	0	62
13-May	12:00	37.6	59.7	23.6	49.0	39.4	33.6	32.2	29.0	28.2	61	0	CALM	27.7	0	56
13-May	13:00	36.6	65.3	24.2	46.0	38.8	33.7	32.6	29.4	28.6	64	5	SSE	27.7	0	52
13-May	14:00	37.0	58.8	25.0	47.2	40.2	34.5	33.2	29.6	28.6	66	0	CALM	27.7	0	47
13-May	15:00	34.0	52.6	23.5	43.7	37.5	31.7	30.3	27.5	26.8	66	5	N	27.7	0	42
13-May	16:00	41.6	57.8	25.5	48.6	45.2	40.5	39.5	33.5	31.6	68	5	N	27.7	0	40
13-May	17:00	42.3	52.1	29.8	47.5	45.0	42.2	41.7	38.0	37.0	70	5	NNW	27.7	0	36
13-May	18:00	43.3	59.1	34.4	49.2	45.7	42.9	42.4	40.0	39.4	70	5	NNE	27.7	0	36
13-May	19:00	42.5	53.1	34.4	47.0	44.8	42.4	41.9	39.7	39.2	70	3	NNW	27.7	0	35
13-May	20:00	43.2	57.8	36.4	51.0	44.7	42.4	42.0	40.4	40.1	65	0	CALM	27.7	0	45
13-May	21:00	45.0	57.0	34.7	51.8	47.6	44.3	43.7	40.9	40.3	62	0	CALM	27.7	0	56
13-May	22:00	45.2	64.7	34.4	52.0	48.4	44.2	43.4	39.9	39.0	59	0	CALM	27.7	0	60
13-May	23:00	44.1	55.1	31.0	51.1	46.9	43.3	42.6	39.8	39.1	56	0	CALM	27.7	0	67
14-May	0:00	46.7	59.0	35.3	54.1	50.0	45.7	44.8	41.6	40.8	53	0	CALM	27.7	0	77
14-May	1:00	43.9	56.0	33.0	51.0	46.8	43.2	42.5	39.5	38.8	48	3	WSW	27.7	0	80
14-May	2:00	44.7	54.8	35.4	51.5	47.7	44.0	43.3	40.5	39.8	47	0	CALM	27.7	0	80
14-May	3:00	45.9	58.0	34.3	53.5	49.6	44.7	43.7	40.7	39.9	45	3	W	27.8	0	86
14-May	4:00	45.7	58.0	33.8	53.2	49.0	44.8	43.9	40.3	39.3	44	0	CALM	27.8	0	85
14-May	5:00	46.1	57.7	35.6	52.7	48.8	45.5	44.9	42.1	41.4	41	0	CALM	27.8	0	93
14-May	6:00	51.3	89.0	36.0	53.7	50.6	46.0	45.1	41.4	40.4	41	0	CALM	27.8	0	89
14-May	7:00	44.7	57.1	31.6	50.6	47.2	44.5	44.0	40.0	39.0	47	5	SW	27.8	0	80

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
14-May	8:00	39.8	77.1	25.7	44.8	40.2	35.9	35.0	32.0	31.2	54	6	W	27.8	0	69
14-May	9:00	38.3	67.0	24.9	49.2	40.3	33.5	31.7	29.1	28.5	59	3	W	27.8	0	60
14-May	10:00	35.8	52.2	21.8	46.2	39.3	33.0	31.4	27.2	26.0	64	0	CALM	27.8	0	56
14-May	11:00	36.4	73.6	21.2	43.6	38.6	31.7	29.8	25.9	24.8	70	3	VAR	27.7	0	44
14-May	12:00	36.9	60.9	20.5	49.7	37.0	28.9	26.6	23.7	22.9	74	3	VAR	27.7	0	33
14-May	13:00	33.3	57.4	21.0	45.0	35.6	29.8	28.4	24.9	24.0	76	0	CALM	27.7	0	31
14-May	14:00	36.6	65.8	21.6	42.2	34.5	30.3	29.4	26.1	25.2	77	5	VAR	27.7	0	25
14-May	15:00	36.1	66.2	21.4	44.4	35.7	30.0	28.6	25.7	25.0	79	6	VAR	27.7	0	25
14-May	16:00	31.3	52.5	20.8	42.7	33.0	28.4	27.4	24.6	24.0	80	0	CALM	27.7	0	21
14-May	17:00	30.8	53.4	20.9	40.5	33.9	28.8	27.7	24.4	23.5	81	5	S	27.6	0	20
14-May	18:00	33.0	55.5	21.6	43.1	35.3	30.7	29.7	26.1	25.2	79	5	SE	27.6	0	20
14-May	19:00	35.5	56.0	20.5	48.4	34.5	28.4	26.9	24.1	23.4	78	5	S	27.6	0	21
14-May	20:00	36.6	56.1	20.2	49.1	37.8	29.9	27.7	24.2	23.3	72	6	S	27.6	0	35
14-May	21:00	33.0	55.2	22.1	45.2	34.9	29.3	28.0	26.4	26.0	65	3	NW	27.6	0	37
14-May	22:00	29.3	52.4	25.5	34.9	30.4	28.5	28.2	27.3	27.1	62	0	CALM	27.6	0	50
14-May	23:00	33.1	51.3	26.2	43.3	35.2	31.2	30.3	28.5	28.1	58	0	CALM	27.6	0	60
15-May	0:00	31.3	50.8	25.8	39.2	33.4	30.2	29.6	28.2	27.9	57	0	CALM	27.6	0	51
15-May	1:00	28.6	49.3	25.4	33.7	29.5	28.3	28.0	27.3	27.2	51	3	SW	27.6	0	71
15-May	2:00	33.5	56.2	25.4	43.2	30.6	28.7	28.4	27.4	27.2	49	3	W	27.6	0	69
15-May	3:00	30.6	64.7	25.7	33.1	30.1	29.0	28.8	27.6	27.3	50	0	CALM	27.6	0	66
15-May	4:00	30.0	59.6	25.8	38.2	31.0	28.7	28.2	27.5	27.3	51	0	CALM	27.7	0	63
15-May	5:00	35.1	58.4	25.5	47.3	37.0	31.8	30.7	28.2	27.6	49	0	CALM	27.7	0	77
15-May	6:00	69.8	92.5	27.3	86.2	42.8	35.6	33.7	31.1	30.5	49	0	CALM	27.7	0	71
15-May	7:00	40.5	57.9	28.6	52.5	43.1	36.9	35.3	32.9	32.4	55	0	CALM	27.7	0	59
15-May	8:00	38.0	57.4	24.7	49.8	39.3	34.8	33.8	30.5	29.7	60	3	NNE	27.7	0	53
15-May	9:00	40.0	77.7	23.0	47.8	40.2	33.1	31.2	27.9	27.0	66	6	ENE	27.7	0	48
15-May	10:00	32.8	58.1	21.3	42.6	35.8	30.3	29.1	25.9	25.1	69	5	S	27.7	0	47
15-May	11:00	32.9	54.2	21.4	41.9	36.3	31.1	30.0	26.5	25.6	74	8	SE	27.7	0	40
15-May	12:00	33.0	53.0	20.9	43.9	35.6	29.4	28.0	24.3	23.4	77	7	SSE	27.6	0	36
15-May	13:00	34.6	54.3	21.0	43.8	37.9	32.2	30.8	26.3	25.0	80	3	VAR	27.6	0	29
15-May	14:00	31.6	58.0	20.6	41.7	34.6	28.1	26.5	23.9	23.2	81	5	VAR	27.6	0	27
15-May	15:00	38.2	64.4	21.7	50.9	38.2	31.8	30.2	26.5	25.6	83	6	ESE	27.6	0	26
15-May	16:00	46.1	65.7	23.2	56.0	50.5	42.9	40.8	32.1	28.4	80	18	SE	27.6	0	29
15-May	17:00	50.7	68.4	33.1	58.9	54.2	49.3	48.2	42.9	41.3	77	13	E	27.6	0	30
15-May	18:00	44.4	69.3	28.4	54.4	47.4	41.5	40.1	36.0	34.8	73	14	NE	27.6	0	34

Date	Time	Leq	Lmax	Lmin	L1	L10	L33*	L50	L67*	L90	Temperature (degrees Fahrenheit)	Wind Speed (miles per hour)	Wind Direction	Barometric Pressure (inches)	Precipitation (inches)	Humidity (Percent)
15-May	19:00	36.1	56.9	23.3	45.8	39.1	33.9	32.8	28.4	27.2	73	12	NE	27.6	0	34
15-May	20:00	32.6	54.9	22.5	43.8	34.8	29.9	28.8	26.0	25.4	70	5	VAR	27.6	0	42
15-May	21:00	31.7	56.2	22.1	44.1	32.0	27.2	26.2	24.5	24.1	67	3	VAR	27.6	0	51
15-May	22:00	31.9	53.6	23.3	44.3	32.1	28.1	27.3	25.8	25.5	62	6	NW	27.6	0	60
15-May	23:00	31.2	48.6	24.2	38.2	33.8	30.2	29.5	27.5	27.1	61	7	N	27.6	0	62

N - north; S - south; E - east; W - west; Var - variable

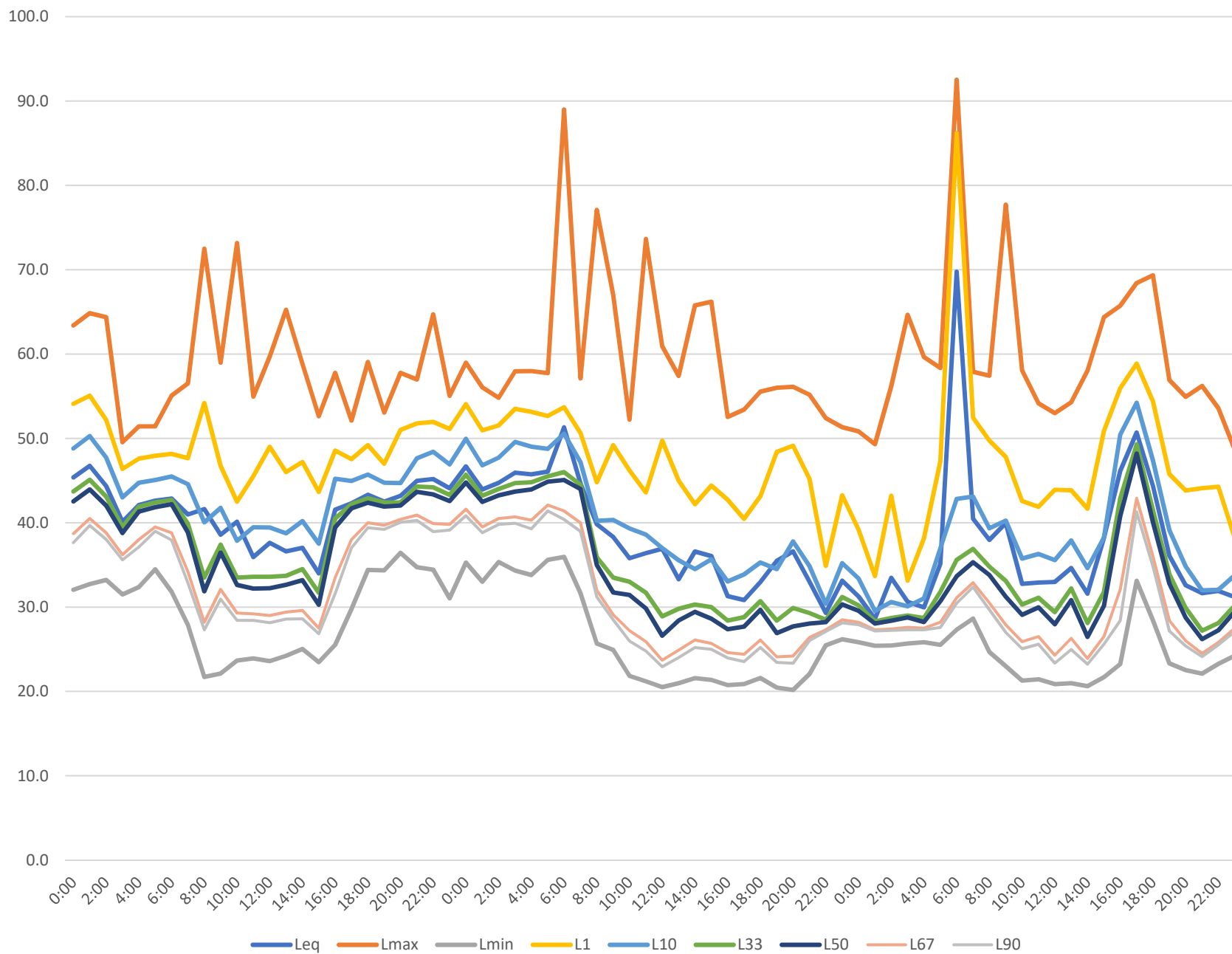
*The L33 and L67 results were not taken in the field. The L33 metric was interpolated from the L10 and L50 data; the L67 metric was interpolated from the L50 and L90 data.

L33 metric interpolation formula: $=20 \cdot \text{LOG}((((20 \mu\text{pascals} \cdot 10^{(L10/20)}) - (20 \mu\text{pascals} \cdot 10^{(L50/20)})) \cdot (0.133333)) + (20 \mu\text{pascals} \cdot 10^{(L50/20)})) / 20 \mu\text{pascals}$

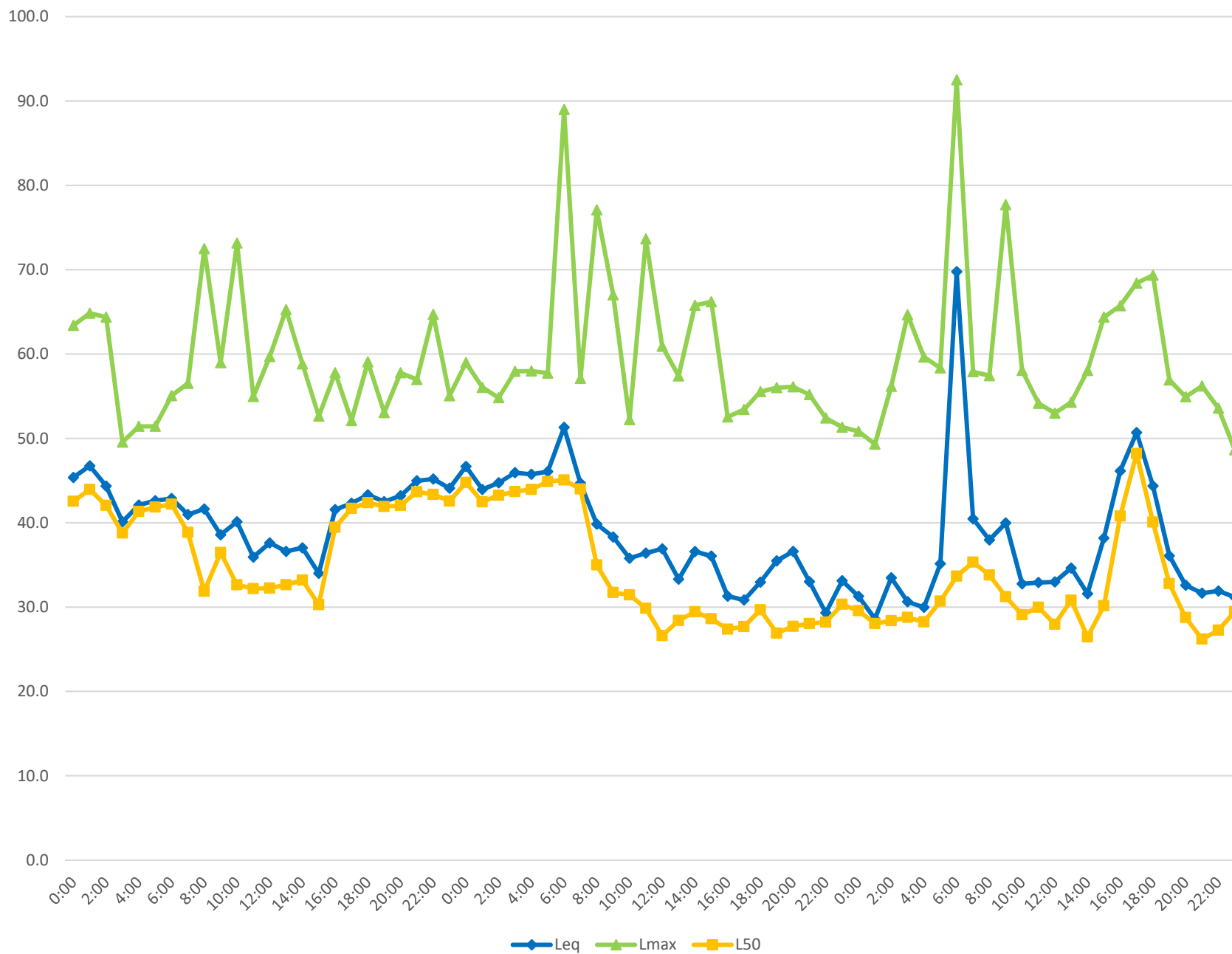
L67 metric interpolation formula: $=20 \cdot \text{LOG}((((20 \mu\text{pascals} \cdot 10^{(L50/20)}) - (20 \mu\text{pascals} \cdot 10^{(L90/20)})) \cdot (0.166667)) + (20 \mu\text{pascals} \cdot 10^{(L90/20)})) / 20 \mu\text{pascals}$

The error analysis of the formulas indicate that the interpolated value should be within 0.5 dBA of the actual measured value.

Figure D1: 24-Hour Noise Levels at Site D - 2025 Bishop Road, Vale, Oregon
May 13, 2018 to May 15, 2018



**Figure D2: Average Ambient Noise Statistics at Site D - 2025 Bishop Road
(May 13, 2018 to May 15, 2018)**



DEPARTMENT OF ENVIRONMENTAL QUALITY

SOUND PRESSURE LEVEL DATA SHEETS

File Site D

County Malheur

SOURCE wind, brush, irrigation pump,
traffic - Russell (some Bishop), birds
tractors

BY JWR

DATE May 13, 2018

SHEET 1

COMPLAINANT n/g

COMPLAINT DATE n/g

INSTRUMENTATION

EQT	TYPE	SERIAL
SLM	2270	2706889
MIC	4190	2408813
FLTR	n/g	
CAL	4231	3001166
Windscreens <u>ON</u> OFF		

in H₂O

Time	Bat. Ck.	Cal. dB	°F dry bulb	°F wet bulb	% RH	Press. mm Hg	Wind mph	Wind Direct
11:51 pm	X	X	60		68	27.6	7	SE

(5-12)

Measurement Position	Meter Fast/Slow	A Scale	C Scale	Linear Scale	L ₁	L ₁₀	L ₅₀	Peak Impulse
250 feet east of Russell Rd	Fast	X				see table	see table	

Comments measurement went 3 days straight, Sunday
Monday Tuesday

measurement site uphill and across Russell Rd from house
with no line of sight to house → to west line of sight
exists to Russell st north and south, and Bishop
further west

Form NPCS-4

INSTRUMENT SET-UP
CHECK-OFF LIST

- ☒ Site Selection
- ☒ SIM Position
- ☒ Battery Check
- ☒ Calibration Adjustment
- ☒ Wind Below 10 MPH
- ☒ Humidity Below 95%
- ☒ Windscreen

1. Days of Operation

- A. Mon. - Fri.
- B. Mon. - Sat.
- C. Mon. - Sun.

2. Time of Operation

- A. 8 a.m. - 5 p.m.
- B. 9 a.m. - 1 p.m.

3. Number of Shifts

- A. One
- B. Two
- C. Three

4. Distance from Receiver to
Source _____ feet.

5. Visibility to Source

- A. Direct _____
- B. Hill or Bend _____
- C. Trees _____
- D. Other _____

6. Zoning

- A. Residence _____
- B. Plant or Facility _____

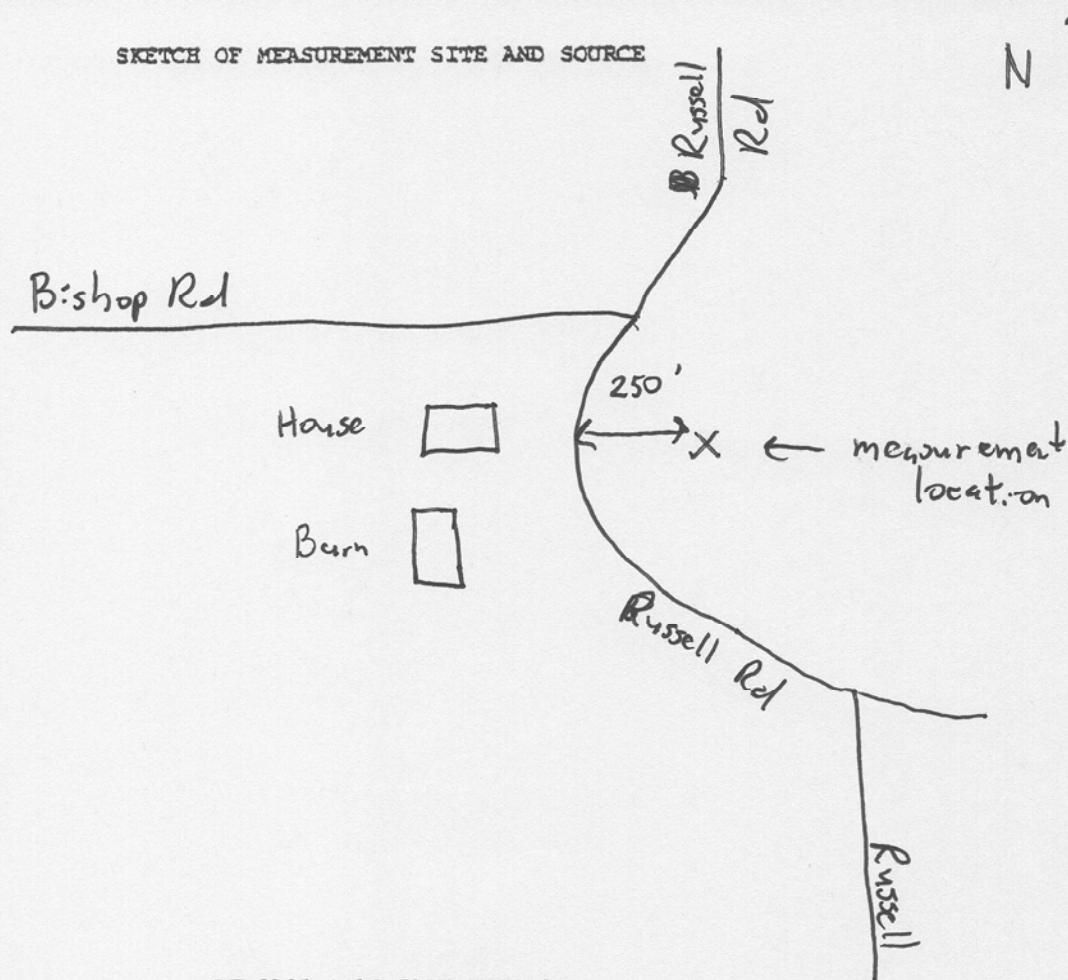
7. Who came first?

- A. Residence...Date _____
- B. Plant or Facility _____

8. Petition Submitted

- A. Yes... Number _____
- B. No

SKETCH OF MEASUREMENT SITE AND SOURCE



REVERSE SIDE FORM NPC-4
FIGURE 4-3

NPC-4



Photo 13: Site D Looking North



Photo 14: Site D Looking South



Photo 15: Site D Looking East



Photo 16: Site D Looking West