

**RA-04 PROJECT SOUND ASSESSMENT  
INTERIM REPORT**

**SKAGIT RIVER HYDROELECTRIC PROJECT  
FERC NO. 553**

**Seattle City Light**

**Prepared by:  
HDR Engineering, Inc.**

**March 2022  
Initial Study Report**

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**List of Attachments**

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- Attachment A      Hourly Noise Measurement Summaries  
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## **List of Acronyms and Abbreviations**

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AEDT .....	Aviation Environmental Design Tool
BPA.....	Bonneville Power Administration
City Light.....	Seattle City Light
dB.....	decibel
FAA.....	Federal Aviation Administration
FERC.....	Federal Energy Regulatory Commission
GIS .....	Geographic Information System
Hz.....	hertz
ISO .....	International Standards Organization
ISR .....	Initial Study Report
L <sub>eq</sub> .....	equivalent sound level over a stated period of time, also a mean average noise level
L <sub>min</sub> .....	minimum instantaneous noise level
L <sub>max</sub> .....	maximum instantaneous noise level
L <sub>nat</sub> .....	natural ambient noise
L <sub>10</sub> .....	noise level exceeded 10 percent of an hour
L <sub>33</sub> .....	noise level exceeded 33 percent of an hour
L <sub>50</sub> .....	noise level exceeded 50 percent of an hour, also a median average noise level
L <sub>90</sub> .....	noise level exceeded 90 percent of an hour
LD 831C.....	Larson Davis Model 831C
lin .....	linear weighting
LP .....	licensing participant
NPS .....	National Park Service
Project .....	Skagit River Hydroelectric Project
RLNRA .....	Ross Lake National Recreation Area
RSP .....	Revised Study Plan
SPD .....	Study Plan Determination
USR.....	Updated Study Report

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## **1.0**

## **INTRODUCTION**

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The RA-04 Project Sound Assessment is being conducted in support of the relicensing of the Skagit River Hydroelectric Project (Project), Federal Energy Regulatory Commission (FERC) No. 553, as identified in the Revised Study Plan (RSP) submitted by Seattle City Light (City Light) on April 7, 2021 (City Light 2021). On June 9, 2021, City Light filed a “Notice of Certain Agreements on Study Plans for the Skagit Relicensing” (June 9, 2021 Notice)<sup>1</sup> that detailed additional modifications to the RSP agreed to between City Light and supporting licensing participants (LP) (which include the Swinomish Indian Tribal Community, Upper Skagit Indian Tribe, National Marine Fisheries Service, National Park Service [NPS], U.S. Fish and Wildlife Service, Washington State Department of Ecology, and Washington Department of Fish and Wildlife). The June 9, 2021 Notice proposed no changes to the Project Sound Assessment as described in the RSP.

In its July 16, 2021 Study Plan Determination (SPD), FERC approved the Project Sound Assessment with modifications. Specifically, FERC recommended that City Light consult with NPS and other interested LPs about the exact monitoring sites and recommended including natural ambient noise ( $L_{nat}$ ) values for each study site.

This interim report on the 2021 study efforts is being filed with FERC as part of City Light’s Initial Study Report (ISR). City Light will perform additional work for this study in 2022 and include a report in the Updated Study Report (USR) in March 2023.

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<sup>1</sup> Referred to by FERC in its July 16, 2021 Study Plan Determination as the “updated RSP.”

## **2.0**

## **STUDY GOALS AND OBJECTIVES**

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The goal of this study is to develop estimates of Project-related noise to facilitate analysis of how Project-related noise may affect other resources (e.g., wildlife, cultural resources, recreation resources, etc.). The objectives of the study include:

- Inventory and assess the Project facilities, equipment, and activities that emit noise throughout the Project Boundary, and measure or otherwise identify the spectral noise emissions characteristics of those Project features;
- Identify when those Project-related features, maintenance, and operations produce noise (i.e., day/night, what seasons, etc.);
- Identify and delineate noise-sensitive land uses that are also representative of other noise-sensitive land uses in the study area. Delineate those areas in Geographic Information System (GIS) for later use in the noise assessment;
- Perform unattended noise measurements for a continuous 7-day period during two seasons (i.e., spring and summer) to describe and document existing noise levels at those noise-sensitive locations (measured noise levels are assumed to be representative of comparable land uses); and
- Model Project-related noise and develop noise contour maps that show how Project-related noise propagates and attenuates throughout the noise study area.

### **3.0**

### **STUDY AREA**

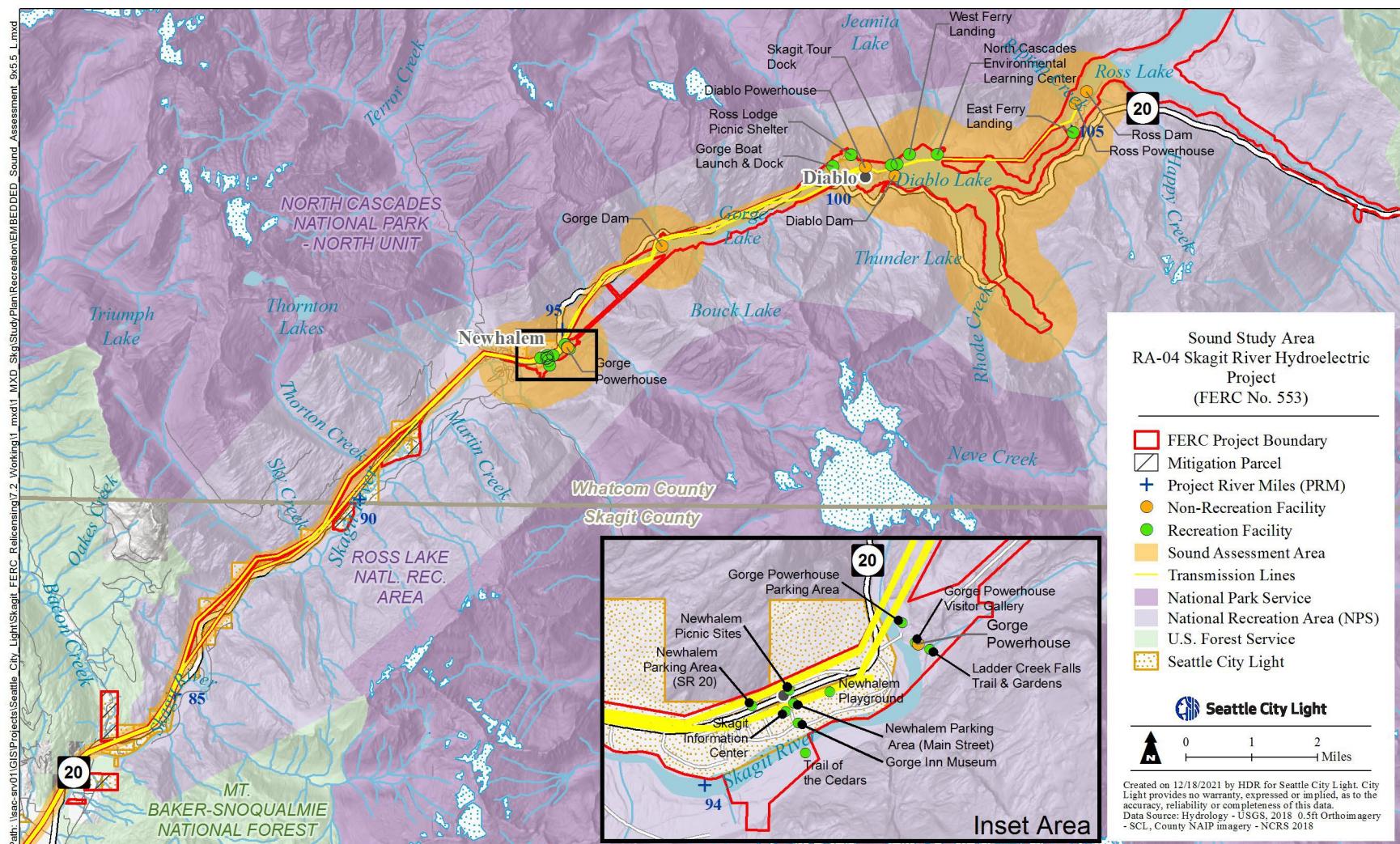
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The study area includes an area covering 0.6 mile from noise-generating facilities, activities, and ongoing/known maintenance and construction projects within the Project Boundary, and a 500-foot buffer on either side of Project transmission lines for corona noise assessment. The noise propagation equations in the international acoustical standard that will be used in the noise modeling task (International Standards Organization [ISO] 9613-2:1996, Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation) are considered accurate to distances of 0.6 mile. Beyond that distance, calculated noise levels are considered less accurate, particularly in areas where the terrain in the propagation path is not flat.

In response to requests from LPs, City Light agreed to extend the noise modeling study area within the Ross Lake National Recreation Area (RLNRA) and North Cascades National Park to the point at which modeled noise levels attenuate to the L<sub>90</sub> value measured at the nearest long-term unattended noise measurement location.<sup>2</sup> City Light recognizes that the point at which Project-related noise attenuates to the measured L<sub>90</sub> may be beyond 0.6 miles. Modeling Project-related noise to the measured L<sub>90</sub> will be limited to portions of the noise study area within the RLNRA and North Cascades National Park. Figure 3.0-1 shows the Project Sound Assessment study area.

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<sup>2</sup> Noise level exceeded 90 percent of an hour.



**Figure 3.0-1. Project Sound Assessment study area.**

## **4.0 METHODS**

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This section provides a broad overview of the Project Sound Assessment methods consisting of two measurement tasks and a modeling task. The first noise measurement task, measuring ambient noise, will produce a record that shows existing noise levels and how they vary in certain portions of the study area. Those measurement locations were selected at the conclusion of a land use assessment task, in consultation with NPS, and based on the extent to which they are representative of other noise-sensitive areas. In this manner, a limited number of existing noise measurement results can be used to quantify existing noise levels in a wider area. These measurements will have a duration of a continuous 7-day period, will be unattended, and will occur during a spring season and a summer season which correlate to the off-peak and peak recreation seasons, respectively.

The second noise measurement task, measuring Project-related noise, will produce detailed measurements of noise emissions from stationary noise sources that are unique to the Project and continuously emit noise into the outdoor environment. Those measurement results will be processed for use in the noise modeling task. City Light also developed an inventory of other Project-related noise sources for use in the noise modeling task. Noise emissions data for those noise sources will be obtained from publicly available and reasonably obtainable literature. The inventory also includes insight on where Project-related noise sources operate throughout the RLNRA.

The noise modeling task will estimate how Project-related noise travels and attenuates throughout the study area. It will also estimate how much Project-related noise reaches certain areas of concern. That will be achieved by modeling Project-related noise and creating multi-colored noise contours that are overlaid upon topographic maps or digital aerial photographs. Modeling results will provide information about Project-related noise to assess potential effects on noise-sensitive land uses and locations. Those noise contour images will also allow resource-specific assessments of the effects of Project-related noise on certain areas or other Project resources. Those resource-specific assessments will be presented in the license application.

The Project Sound Assessment methods include the following steps.

### **4.1 Inventory and Assess Noise-Emitting Project Facilities and Activities**

Information gathered in this task will be used in the noise modeling task to simulate Project-related noise emissions outdoors in the study area. City Light performed an inventory of activities, buildings, and equipment that emit noise into the outdoors environment. Through measurements and/or literature searches, the sound pressure level and spectrums of each activity and equipment were quantified for use in the modeling task.

### **4.2 Assess Land Use**

Information gathered in this task was used to select locations where long-term noise measurements would be performed. City Light reviewed land uses (areas or specific locations) within 0.6-mile of each Project dam and powerhouse, the townsite of Newhalem, one additional site on Diablo Lake, and within 500 feet of the transmission line. City Light categorized these areas and locations based on several characteristics including terrain, ground cover/vegetation, noise-sensitivity, and the overall noise environment (e.g., within 100-200 feet of a road corridor; areas surrounding

campgrounds; trails away from development; etc.). Using those categories, the study team subdivided the Project Sound Assessment study area into areas with similar soundscapes and noise sensitivities. The study team then selected six locations whose characteristics were representative of other areas within the Project Sound Assessment study area and therefore were suitable candidate locations for long-term unattended noise measurements. The soundscapes at these locations were expected to be similar to soundscapes at other locations in the study area. The study team also selected six alternate locations, for use if the original six locations were inaccessible; however, the alternate locations were not needed/used. The final six primary and six alternative measurement locations were reviewed and approved by NPS and City Light's cultural resources team.

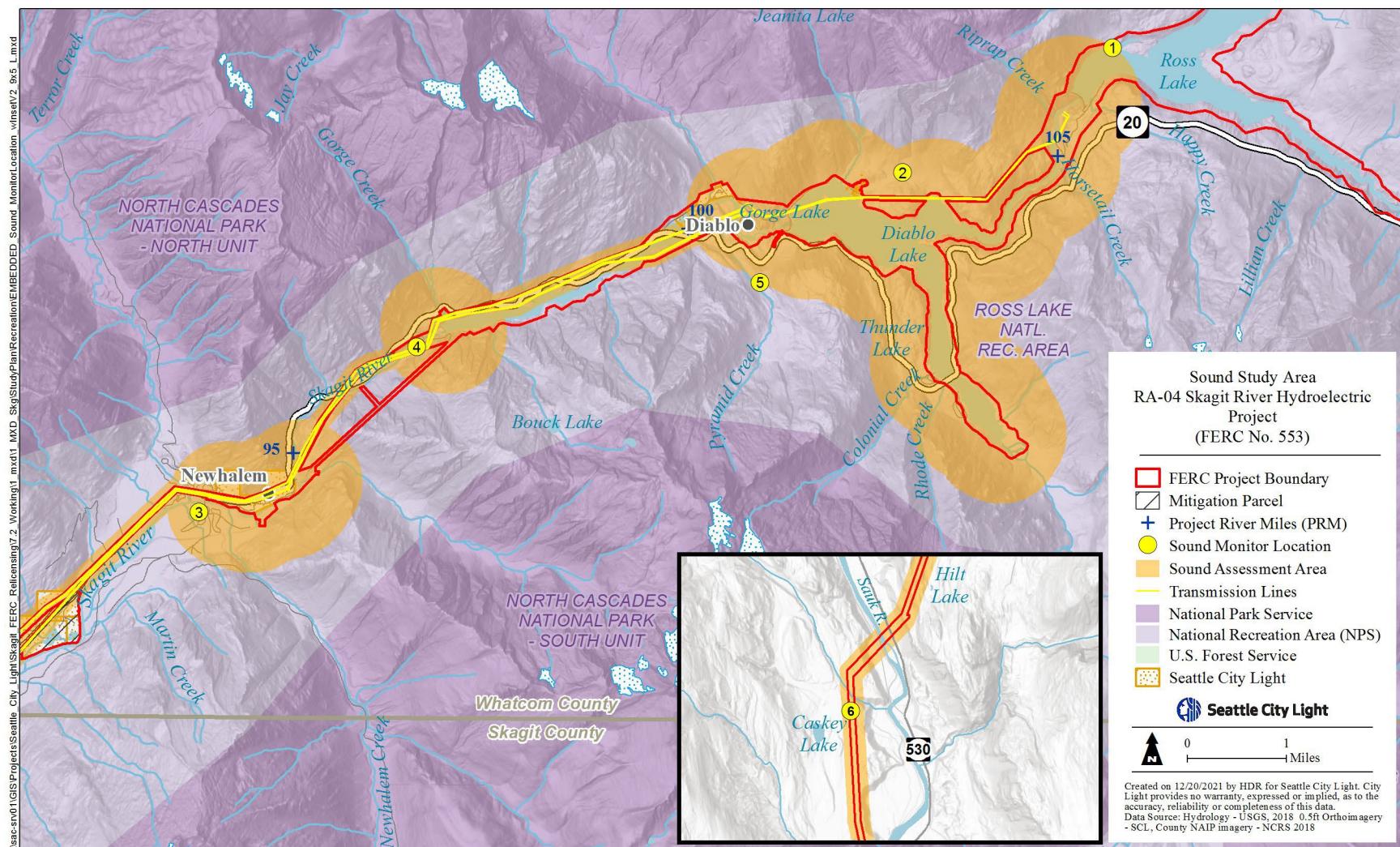
### **4.3 Noise Measurements**

The study team performed long-term (7-day) unattended noise measurements of the outdoor ambient soundscape, and also measured noise emissions from stationary noise sources that continuously emit noise into the environment as described below.

#### **4.3.1 Ambient Noise Measurements (Long-term)**

Using the outcome of the land use assessment, the study team conducted measurements at six locations that were representative of other locations in the study area, as follows. These six noise monitoring locations are listed below and shown in Figure 4.3-1.

- (1) Near Ross Dam and Ross Lake Resort;
- (2) On Diablo Lake Trail on the north side of Diablo Lake;
- (3) In the Newhalem area at Newhalem Creek Campground;
- (4) In the Gorge bypass reach area;
- (5) On Pyramid Lake Trail on the southwest side of Diablo Lake; and
- (6) In the transmission line right-of-way near Caskey Lake.



**Figure 4.3-1.** Ambient noise measurement monitoring locations.

The study team performed continuous 7-day, simultaneous, unattended outdoor noise measurements at these locations. Those measurements began on August 24 and 25, 2021, and ended on September 1, 2021, to coincide with the summer recreation season and minimize the adverse effects of seasonal meteorological conditions (rain, wind) which can adversely affect noise measurements. At each location, the study team measured wind speed, wind direction, and temperature using a Vaisala digital weather station. The study team used a Larson Davis Model 831C (LD 831C) real-time sound level analyzer to measure and store the noise measurements, and also continuously recorded a digital audio file on an external USB drive for the duration of the 7-day measurement.<sup>3</sup> Weather station measurement results were also stored in the LD831C. The analyzer and recorder systems were stored in weather-resistant Pelican cases during deployment. A windscreen covered the microphone, and the windscreens had a single spike on them to discourage birds from sitting on the windscreen. The power supply consisted of external batteries stored in Pelican cases. The study team will perform additional 7-day ambient noise measurements in the spring of 2022, with specific dates to be determined.

### **4.3.2 Project-related Noise Measurements (Short-term)**

City Light determined that the Project powerhouses and transmission lines are the primary features of the Project that continuously emit noise into the outdoor noise environment. The powerhouses emit a hum-like sound. The study team conducted noise measurements at several locations surrounding all three powerhouses to estimate noise emissions from the powerhouses. The results will be used for modeling purposes. City Light is obtaining noise emissions data for other Project-related noise sources from publicly available and reasonably obtainable literature.

Transmission lines and switchyards emit corona noise which is a crackling type of sound that varies somewhat with ambient relative humidity and is occasionally audible but partially obscured by other sounds. This makes it difficult to quantify using measurements. Therefore, corona noise will be calculated using CF18X (a corona noise model; Bonneville Power Administration [BPA] Corona and Fields Interactive 1989 Experimental model) or a functionally similar model, and results will be included in the revised “base” noise model described below and reported in the USR.

### **4.3.3 Process and Analyze 7-day Ambient Noise Measurement Results**

The study team processed each hour’s worth of the 7-day noise measurement results to produce the following characterizations of hourly outdoor noise levels:

- Minimum instantaneous noise level ( $L_{min}$ );
- Maximum instantaneous noise level ( $L_{max}$ );
- Energy-equivalent noise level ( $L_{eq}$ ), which is a mean average noise level; and
- Statistical descriptors ( $L_n$ ) that characterize noise levels exceeded n percent of the hour (i.e.,  $L_{10}$ ,  $L_{33}$ ,  $L_{50}$ , and  $L_{90}$ ).  $L_n$  descriptors help explain how much sound levels vary (or how consistent they are) during each hour. The  $L_{50}$  descriptor is a median average, and a comparison

<sup>3</sup> Because the 831C model sound level analyzer was used instead of the 831, an Edirol R-09 digital audio recorder as described in the RSP was not necessary to record and store audio data.

of the mean ( $L_{eq}$ ) and median ( $L_{50}$ ) is another way to evaluate the amount of variation in sound levels during an hour.

Selective audio review was performed on the digital audio files to identify anthropogenic noises that occurred during the measurement periods. For each day, the study team listened to the hour-long audio file containing the  $L_{max}$  for that day and identified the source of the  $L_{max}$ . The study team will perform further audio review in 2022, which will identify typical audible anthropogenic and natural noise sources at each location, which will be reported on in the USR.

City Light processed the 7-day noise measurement data to remove, when appropriate, certain instances, periods of time, or events from the dataset. These included:

- When the on-site weather station recorded precipitation or wind speeds in excess of 11 mph. Per Lynch et. al. 2011, wind speeds over 11 mph contaminate the measurement result, making it unusable;
- When the sound level meters reported overloads, which happens when measured sound levels exceed the upper level of the overall range of sound levels the meter is capable of processing. Part of the sound level meter configuration file is establishing the overall range of sound levels the meter can measure. LD831C's have a standard range from 20 to 140 decibels (dB) that can be adjusted up or down while still retaining the overall dynamic range of 120 dB;
- When Project staff were onsite setting up, inspecting, and retrieving the equipment; and
- When passers-by interacted with the sound level meters, as determined by audio review.

In these instances, City Light excluded data in increments of seconds (not minutes or hours). However, if any hour had more than 25 percent of its seconds excluded, results from that hour are considered excluded (NPS 2013).

#### **4.4 Noise Modeling**

The study team is in the process of performing noise modeling to show how sound propagates (travels) away from Project-related noise sources, how features in the propagation path (terrain and ground cover type) affect propagation, and how sound attenuates (decays as it moves farther from the source) throughout the Project Sound Assessment study area. Three types of acoustical modeling will be performed during this Project Sound Assessment. The study team will estimate corona noise using the CFI8X spreadsheet model created by BPA. The study team will also estimate helicopter noise using the Federal Aviation Administration (FAA)'s Aviation Environmental Design Tool (AEDT). Additionally, the study team will use the Cadna-A environmental noise model to estimate noise propagation from Project-related noise sources on land and in water.

The output of the CFI8X spreadsheet model will be entered into Cadna-A and combined with noise from other Project-related noise sources. The study team will combine the results of both the Cadna-A and AEDT modeling in GIS to produce overall noise contours representative of Project-related noise sources on the ground, on water, and in the air. Underwater noise modeling is not included in the Project Sound Assessment methods. The study team developed an initial noise

model in Cadna-A as discussed below; however, CFI8X and AEDT modeling will be performed in 2022 and will be reported on in the USR.

#### **4.4.1 Cadna-A Noise Modeling**

The study team is using Cadna-A environmental noise modeling software to model noise from Project-related noise sources located on the ground or on water. Cadna-A incorporates equations from ISO 9613—the international acoustical standard for outdoor sound propagation. The approach for noise modeling is to develop an initial model that includes Project-related noise sources that emit noise continuously, and terrain and information about the acoustical absorption or reflective characteristics of the ground surface throughout the Project Sound Assessment study area. The study team refers to this as the “base noise model.” The study team will make up to nine additional versions of the base noise model to simulate Project-related noise emissions from specific combinations of other noise sources, activities, events, or circumstances.

The study team’s first step in developing the base noise model was importing a digital terrain map that extends two miles beyond the powerhouses and dams, and 500 feet on either side of the transmission line centerline into Cadna-A. The terrain map was extended from 0.6 miles (the original plan) to two miles in response to an NPS request that modeling should propagate Project-related noise to the point where it is equivalent to the measured L<sub>90</sub>. This digital terrain map was overlaid with a Cartesian coordinate grid-in, and the model was configured to calculate noise levels at every point on the Cartesian coordinate grid. The complexity of the terrain and the areal extent (size) of the coordinate grid exceeded Cadna-A’s computational capacity. To reduce the complexity of the noise model, the study team reduced the resolution of the terrain map to 40-foot contour increments rather than the 10-foot terrain contour increments used for other GIS mapping purposes.

The ground surface cover types vary throughout the Cartesian coordinate grid, therefore the study team delineated ground cover type zones using GIS, assigned each zone a value that represents the extent to which each cover type absorbs or reflects sound, and then entered the zones into the base noise model.

These cover types include the acoustically reflective lake surfaces, acoustically absorptive tree and vegetated zones, reflective pavements, etc. The various ground surfaces in the Project area will absorb sound differently. To account for this, these ground surfaces were modeled with different (unitless) ground absorption factors, as shown in Table 4.4-1.

**Table 4.4-1. Measurement result summary (dBA).**

Ground Type	Ground Absorption
Asphalt	0.00
Lawn	1.00
Water	0.00
Loose Soil	0.59
Hard Soil	0.26

Source: Federal Highway Administration Traffic Noise Model Version 2.5 (FHWA 2004); Cadna-A Reference Manual (Datakustik GmbH 2021).

The study team selected meteorological settings used in Cadna-A modeling based on annual averages of the Project area, which resulted in an ambient temperature of 10 degrees Celsius and a humidity of 90 percent being used in Cadna-A. Incorporating the complex terrain, the acoustical absorptive or reflective characteristics of the ground cover, and local weather conditions allows the model to produce realistic depictions of sound propagating from Project-related noise sources. The base noise model only includes the Project-related noise sources that operate continuously (the powerhouses and transformers). The powerhouse facades are modeled in three dimensions as horizontal and vertical area sources that match the dimensions of each powerhouse, and the transformers are modeled as point sources at a height of 6.5 feet (2 meters) above the ground outside each powerhouse. The study team will add other Project-related noise sources to the base model to create up to nine additional versions of the base noise model. Each of those noise model versions will show sound propagation from a variety of Project-related noise sources or be representative of specific conditions and will be reported on in the USR.

## 5.0

## PRELIMINARY RESULTS

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### 5.1

### Ambient Noise Measurement Results

Table 5.1-1 presents averages of the hourly values across the entire 7-day ambient noise measurement duration at each location, with exclusions applied as described in Section 4.3.3 of this study report. Individual hourly values for each site can be found in Attachment A. Notably, City Light identified helicopters as one of the daily L<sub>max</sub> sources during the measurement period (Table 5.1-1). There were no Project-related helicopter flights during the 7-day ambient noise measurement period. However, NPS documented 29.5 hours of NPS-approved helicopter flight time in the month of August, including 25.1 hours related to wildland fire operations, 2.7 hours of search and rescue, and 1.7 hours of project work (Torres 2022). City Light assumes the daily L<sub>max</sub> helicopter noise sources identified during the 7-day ambient noise measurement period are associated with the helicopter use authorized by NPS.

**Table 5.1-1. Ambient noise measurement result summary (summer) (dBA).**

Measure- ment Location	Avg. Hourly L <sub>eq</sub>	Overall L <sub>min</sub>	Avg. Hourly L <sub>min</sub>	Overall L <sub>max</sub>	Avg. Hourly L <sub>max</sub>	Daily L <sub>max</sub> Sources	Avg. Hourly L <sub>10</sub>	Avg. Hourly L <sub>33</sub>	Avg. Hourly L <sub>50</sub>	Avg. Hourly L <sub>90</sub>
Ross Lake <sup>1</sup>	39	20	28	75	56	Dogs, bird, helicopter, jet	42	37	36	31
Diablo Lake Trail	33	17	24	70	50	Helicopter, foliage, jet overflights	35	32	30	27
Pyramid Lake Trail	43	40	41	71	53	Noon siren, bird, hikers, helicopter	43	42	42	42
Gorge Bypass Reach <sup>2</sup>	39	26	30	78	56	Helicopter, traffic, hiker	41	37	36	33
Newhalem Creek Campground	39	32	35	84	56	Noon siren, car horn	39	38	37	36
Caskey Lake	33	22	26	79	53	Helicopter, logging trucks, bird	33	31	30	28

1 The weather station at Ross Lake was not functioning properly, so weather-based exclusions were made using weather data from the nearest measurement location (Diablo Lake Trail). The measurement location was on a trail north of Ross Lake Resort between the resort and the Pacific Northwest Trail.

2 The measurement in the Gorge bypass reach downstream of Gorge Dam started on August 25, 2021.

### 5.2

### Powerhouse Noise Measurement Results

The base noise model assumes that the exterior walls and roof of each powerhouse emit noise. In other words, the entire surface area of the powerhouse building envelope radiates noise into the environment. These building surfaces are called horizontal area noise sources (roof) and vertical area noise sources (walls). In this context, an area source is different from a point noise source (i.e., stationary equipment) or a line noise source (i.e., transmission line). To model these area

noise sources, the study team measured noise emissions outside each building, and also measured the dimensions of the building. Both pieces of information were used to calculate the area noise sources needed to model noise emissions from the powerhouses. Calculation results were expressed as a spectral sound power level for each area source (walls and roof) for each powerhouse. This information was input into the Cadna-A base noise model, and the powerhouses were modeled as horizontal (roof) and vertical (external walls) area sources of noise.

Table 5.2-1 shows the physical dimensions of each powerhouse in the base noise model. Table 5.2-2 shows the resulting spectral sound power levels for each area noise source (wall or roof) at each powerhouse.

**Table 5.2-1. Powerhouse dimensions.**

Powerhouse	Length (feet)	Width (feet)	Height (feet)
Ross	280	130	60
Diablo	94.67	230.67	60
Gorge	280	120	60

Source: Johnson (2010).

**Table 5.2-2. Spectral sound power levels for powerhouse facades.**

Building Façade Name	Sound Power Level (dB)									dBA	Lin <sup>1</sup>		
	Octave Band Center Frequency (Hz)												
	31.5	63	125	250	500	1,000	2,000	4,000	8,000				
Ross West	92.3	92.7	95.9	101.9	96.4	89.5	85.2	76.9	69.1	97.6	104.6		
Ross East	92.3	92.7	95.9	101.9	96.4	89.5	85.2	76.9	69.1	97.6	104.6		
Ross North	85.5	87.4	89.3	83.7	79.9	75.2	69.3	58.7	52.8	81.7	93.3		
Ross South	97.0	98.2	99.4	96.1	90.5	88.5	82.0	72.0	60.7	93.6	104.2		
Ross Roof	91.7	93.6	95.5	89.9	86.1	81.4	75.5	64.9	59.0	87.9	99.5		
Diablo West	102.4	97.1	93.2	89.6	82.6	78.3	74.1	69.6	68.1	86.0	104.1		
Diablo East	104.1	98.1	92.0	86.7	83.0	79.6	77.1	71.1	66.7	86.0	105.4		
Diablo North	107.1	102.6	98.2	95.4	90.5	87.3	83.4	78.8	75.8	93.4	109.1		
Diablo South	107.1	102.6	98.2	95.4	90.5	87.3	83.4	78.8	75.8	93.4	109.1		
Diablo Roof	109.6	105.1	100.7	97.9	92.9	89.8	85.9	81.3	78.3	95.9	111.6		
Gorge West	96.4	96.2	94.3	86.5	83.8	78.3	74.3	67.8	58.9	85.6	100.8		
Gorge East	100.8	105.9	105.1	100.4	96.8	94.1	91.4	87.3	80.1	99.9	110.2		
Gorge South	102.6	106.8	105.9	101.0	97.4	94.6	91.9	87.7	80.5	100.5	111.1		
Gorge North	103.3	106.8	99.3	96.0	96.9	91.5	87.1	80.5	72.4	97.4	109.5		
Gorge Roof	102.6	107.4	98.2	94.8	96.6	86.2	79.6	73.6	66.2	95.4	109.4		

1 linear weighting

Each powerhouse also has a set of transformers abutting the building façade. These transformers are stationary (point) noise sources. The study team measured noise emissions from the transformers and used those results to develop sound power levels for use in the base noise model. Table 5.2-3 shows sound power levels for the transformers.

**Table 5.2-3.** Spectral sound power levels for powerhouse transformers.

Name	Sound Power Level (dB)									dBA	Lin <sup>1</sup>		
	Octave Band Center Frequency (Hz)												
	31.5	63	125	250	500	1,000	2,000	4,000	8,000				
Ross Transformers (Main)	103.4	99.3	94.7	92.3	91.8	90.2	86.6	83.2	78.1	94.8	105.8		
Ross Transformers (Auxiliary)	86.4	87.4	87.2	81.5	80.3	76.8	72.4	66.5	58.2	82.1	92.6		
Diablo Transformers	103.4	99.3	94.7	92.3	91.8	90.2	86.6	83.2	78.1	94.8	105.8		
Gorge Transformers	84.5	85.6	94.7	84.9	75.7	72	63.3	55.5	50.9	81.8	96		

1 linear weighting

Table 5.2-3 has two entries for the transformers at Ross Powerhouse. Ross Powerhouse has eight transformers, six of which are located on the bank of Diablo Lake (the main transformers). As a result, the study team was unable to safely measure noise from these six transformers at this location. Sound power levels of these transformers were estimated to be equal to the sound power levels of the transformers at Diablo Powerhouse as a temporary placeholder. Sound power levels for the main transformers at Ross Powerhouse will be recalculated based on transformer specifications and included in the updated base noise model for the USR.

The remaining two auxiliary transformers at the Ross Powerhouse are located along the south façade of the Powerhouse, and the study team measured noise emissions from those transformers for use in developing the sound power level estimates shown in Table 5.2-3.

### 5.3 Base Noise Model Results

The Cadna-A noise modeling software propagated noise from the powerhouses and transformers throughout the Cartesian coordinate grid, accounting for terrain, ground surface cover types, etc. Results are expressed as noise contour figures shown in the base noise modeling contour mapbook in Attachment B.

## 6.0

## SUMMARY

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The study team performed 7-day unattended noise measurements at six locations in the study area in summer 2021. Those locations were selected using a land use assessment whose outcome identified candidate measurement locations whose soundscapes were representative of other portions of the study area. The study team processed the 7-day noise measurement results at each of the six measurement locations, and reported the following parameters:

- Overall mean average sound pressure level measured over a 1-hour period;
- Overall and average minimum sound pressure level measured over a 1-hour period;
- Overall and average maximum sound pressure level measured over a 1-hour period; and
- Average 1-hour L<sub>10</sub>, L<sub>33</sub>, L<sub>50</sub>, and L<sub>90</sub> (noise levels exceeded 10 percent, 33 percent, 50 percent, and 90 percent of the hour).

Measurement results for each individual hour at each location are provided in Attachment A. The study team also performed a selective audio review and identified noises attributable to the overall L<sub>max</sub> values measured at each location.

The study team is in the process of performing additional audio review to determine the percent of time that anthropogenic noises are audible, as required by FERC's SPD. This information will be used to determine the L<sub>nat</sub> for each measurement location and both will be reported on in the USR.

The study team created a preliminary version of the base noise model using Cadna-A environmental noise modeling software. The base model includes terrain and information about ground surface types and their effects upon sound propagation. That model also includes the Project-related noise sources that continuously emit noise into the environment (i.e., the powerhouses and transformers). Noise contours calculated by this preliminary base model are shown in Attachment B.

In spring 2022, the study team will perform additional 7-day ambient noise measurements. The study team will complete the corona noise modeling and add the transmission line corona noise and switchyard noise sources to the base noise model since they are constant Project noise sources. This updated base noise model will become the basis for up to nine additional noise models whose purpose is to depict certain activities, circumstances, and/or events. Those models will include the continuous noise sources, and different combinations of other Project-related noise sources (i.e., vehicles, boats, equipment, etc.) and will be reported on in the USR.

## **7.0            VARIANCES FROM FERC-APPROVED STUDY PLAN AND                   PROPOSED MODIFICATIONS**

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There are no variances or proposed modifications to the FERC-approved study plan for the Project Sound Assessment.

## 8.0

## REFERENCES

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- National Park Service (NPS). 2013. Acoustic Monitoring Training Manual. National Park Service. U.S. Department of the Interior. Natural Sounds and Night Skies Division, Fort Collins, Colorado.
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- United States Department of Transportation, Federal Highway Administration (FHWA). 2004. Traffic Noise Model Version 2.5 [Computer software]. Washington, D.C.

**PROJECT SOUND ASSESSMENT INTERIM REPORT**

**ATTACHMENT A**

**HOURLY NOISE MEASUREMENT SUMMARIES**

**Table A-1. Hourly noise metrics, Ross Lake (dBA).**

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-24	14:00:00	42	26	64	44	38	35	29	0.0%
2021-08-24	15:00:00	41	24	59	43	33	30	27	0.0%
2021-08-24	16:00:00	42	26	62	45	37	33	28	0.0%
2021-08-24	17:00:00	40	27	63	42	36	33	30	0.0%
2021-08-24	18:00:00	39	29	56	42	36	34	31	0.0%
2021-08-24	19:00:00	31	24	50	32	31	30	28	0.0%
2021-08-24	20:00:00	30	23	48	34	29	28	26	0.0%
2021-08-24	21:00:00	33	23	55	36	34	32	27	0.0%
2021-08-24	22:00:00	33	23	42	36	34	33	28	0.0%
2021-08-24	23:00:00	32	23	45	35	32	30	27	0.0%
2021-08-25	00:00:00	33	24	41	35	34	32	28	0.0%
2021-08-25	01:00:00	31	23	46	34	31	30	27	0.0%
2021-08-25	02:00:00	28	23	34	30	29	28	26	0.1%
2021-08-25	03:00:00	28	22	36	30	29	28	25	0.0%
2021-08-25	04:00:00	27	21	44	29	27	26	24	0.0%
2021-08-25	05:00:00	24	21	44	26	25	24	23	0.0%
2021-08-25	06:00:00	24	21	40	26	24	24	23	0.0%
2021-08-25	07:00:00	37	22	61	32	27	26	24	0.0%
2021-08-25	08:00:00	48	24	68	52	43	41	29	0.0%
2021-08-25	09:00:00	42	31	69	44	38	35	33	0.0%
2021-08-25	10:00:00	38	26	60	39	34	34	28	0.0%
2021-08-25	11:00:00	42	26	59	46	39	35	30	0.0%
2021-08-25	12:00:00	42	28	68	44	38	35	30	0.0%
2021-08-25	13:00:00	49	29	69	53	49	46	37	18.7%
2021-08-25	14:00:00	50	35	60	54	50	47	40	22.1%
2021-08-25	15:00:00	50	38	63	54	50	48	42	16.3%
2021-08-25	16:00:00	47	33	68	51	46	43	37	11.1%
2021-08-25	17:00:00	45	32	70	47	42	40	35	3.1%
2021-08-25	18:00:00	41	26	67	44	37	35	29	0.8%
2021-08-25	19:00:00	36	26	56	39	32	30	28	0.0%
2021-08-25	20:00:00	35	25	53	41	31	30	28	0.0%
2021-08-25	21:00:00	41	26	50	44	43	42	29	0.0%
2021-08-25	22:00:00	44	25	51	47	45	43	30	0.0%
2021-08-25	23:00:00	46	27	53	49	48	46	32	0.1%
2021-08-26	00:00:00	36	27	55	42	31	31	29	0.0%
2021-08-26	01:00:00	30	26	39	31	30	30	29	0.0%
2021-08-26	02:00:00	31	26	39	33	32	31	30	0.1%
2021-08-26	03:00:00	29	24	37	31	30	29	27	0.0%
2021-08-26	04:00:00	29	25	42	31	30	29	27	0.0%
2021-08-26	05:00:00	35	25	46	38	34	32	28	0.3%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-26	06:00:00	32	26	44	34	32	31	29	0.0%
2021-08-26	07:00:00	35	25	70	35	30	29	27	0.0%
2021-08-26	08:00:00	44	27	60	46	44	43	37	0.0%
2021-08-26	09:00:00	47	42	61	49	47	46	44	1.4%
2021-08-26	10:00:00	46	32	69	49	45	44	39	0.9%
2021-08-26	11:00:00	47	35	62	49	46	45	41	2.3%
2021-08-26	12:00:00	42	31	62	45	40	38	35	0.5%
2021-08-26	13:00:00	42	33	62	44	40	38	35	0.3%
2021-08-26	14:00:00	51	35	67	55	47	44	38	1.1%
2021-08-26	15:00:00	53	35	69	59	50	46	40	6.4%
2021-08-26	16:00:00	46	35	71	50	46	44	39	4.3%
2021-08-26	17:00:00	45	33	63	49	45	42	37	4.5%
2021-08-26	18:00:00	38	31	60	40	36	35	32	0.0%
2021-08-26	19:00:00	40	27	63	40	34	33	31	0.0%
2021-08-26	20:00:00	33	26	49	36	33	32	29	0.0%
2021-08-26	21:00:00	30	25	40	31	30	29	28	0.0%
2021-08-26	22:00:00	29	24	37	30	29	29	27	0.0%
2021-08-26	23:00:00	31	25	42	34	30	29	27	0.0%
2021-08-27	00:00:00	32	27	50	34	32	32	29	1.7%
2021-08-27	01:00:00	34	27	44	37	34	33	30	0.0%
2021-08-27	02:00:00	33	27	49	35	32	31	30	0.1%
2021-08-27	03:00:00	33	28	44	36	32	31	30	0.1%
2021-08-27	04:00:00	39	30	52	43	37	35	32	1.8%
2021-08-27	05:00:00	39	29	53	42	37	36	32	1.3%
2021-08-27	06:00:00	40	29	54	44	37	35	32	2.3%
2021-08-27	07:00:00	38	30	61	39	35	34	32	0.3%
2021-08-27	08:00:00	47	31	65	51	46	44	36	0.8%
2021-08-27	09:00:00	45	34	63	48	43	41	37	1.1%
2021-08-27	10:00:00	45	35	60	47	44	42	39	2.5%
2021-08-27	11:00:00	47	34	69	50	46	44	39	24.5%
2021-08-27	12:00:00	46	35	60	48	44	43	39	2.6%
2021-08-27	13:00:00	44	30	67	44	40	37	34	0.8%
2021-08-27	14:00:00	44	31	62	47	41	39	35	0.6%
2021-08-27	15:00:00	44	34	62	48	44	41	38	3.1%
2021-08-27	16:00:00	47	38	63	50	47	46	42	10.6%
2021-08-27	17:00:00	44	31	65	47	44	40	35	3.3%
2021-08-27	18:00:00	39	30	62	41	37	35	33	0.0%
2021-08-27	19:00:00	41	29	62	43	35	34	31	0.0%
2021-08-27	20:00:00	33	26	55	34	31	30	29	0.0%
2021-08-27	21:00:00	34	25	57	38	32	30	28	0.0%
2021-08-27	22:00:00	35	25	53	40	35	30	27	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-27	23:00:00	32	23	46	35	29	28	26	0.0%
2021-08-28	00:00:00	27	22	54	29	28	27	25	0.0%
2021-08-28	01:00:00	29	24	44	31	29	28	27	0.0%
2021-08-28	02:00:00	30	25	42	32	30	29	28	0.1%
2021-08-28	03:00:00	30	25	48	32	31	30	28	0.0%
2021-08-28	04:00:00	31	26	45	34	32	31	29	0.0%
2021-08-28	05:00:00	28	24	36	30	28	28	26	0.0%
2021-08-28	06:00:00	37	23	58	35	29	28	26	0.0%
2021-08-28	07:00:00	32	24	50	32	29	28	26	0.0%
2021-08-28	08:00:00	41	26	61	43	36	35	29	0.0%
2021-08-28	09:00:00	42	27	62	45	39	36	31	0.1%
2021-08-28	10:00:00	45	26	67	48	45	42	32	0.1%
2021-08-28	11:00:00	44	27	62	47	39	36	31	0.0%
2021-08-28	12:00:00	45	27	64	48	42	39	33	0.1%
2021-08-28	13:00:00	43	28	60	47	42	39	32	1.9%
2021-08-28	14:00:00	49	35	62	53	50	48	41	16.9%
2021-08-28	15:00:00	48	34	65	52	48	46	40	7.4%
2021-08-28	16:00:00	48	35	66	52	48	45	39	5.9%
2021-08-28	17:00:00	51	32	75	53	47	45	38	3.1%
2021-08-28	18:00:00	41	30	59	43	39	37	33	0.9%
2021-08-28	19:00:00	38	27	65	41	34	32	30	0.0%
2021-08-28	20:00:00	43	27	54	49	34	32	29	0.0%
2021-08-28	21:00:00	47	26	55	51	48	46	33	0.0%
2021-08-28	22:00:00	43	24	56	47	43	41	30	0.0%
2021-08-28	23:00:00	47	25	58	52	48	45	34	0.0%
2021-08-29	00:00:00	44	23	53	48	44	43	31	0.0%
2021-08-29	01:00:00	44	23	54	48	45	44	30	0.0%
2021-08-29	02:00:00	43	22	53	47	43	41	26	0.1%
2021-08-29	03:00:00	28	22	43	31	29	27	25	0.0%
2021-08-29	04:00:00	26	22	38	27	27	26	25	0.0%
2021-08-29	05:00:00	25	21	43	26	25	24	23	0.0%
2021-08-29	06:00:00	32	22	50	27	26	25	24	0.0%
2021-08-29	07:00:00	33	24	57	34	29	28	26	0.0%
2021-08-29	08:00:00	44	27	64	46	42	39	31	0.0%
2021-08-29	09:00:00	49	40	72	52	45	44	42	0.0%
2021-08-29	10:00:00	44	27	72	46	39	36	31	0.0%
2021-08-29	11:00:00	44	29	71	47	40	38	32	0.0%
2021-08-29	12:00:00	50	28	75	50	42	38	33	0.0%
2021-08-29	13:00:00	47	32	61	50	46	44	39	5.0%
2021-08-29	14:00:00	48	36	70	52	48	46	41	9.3%
2021-08-29	15:00:00	49	34	60	53	49	47	41	13.4%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-29	16:00:00	48	36	64	52	48	47	41	9.6%
2021-08-29	17:00:00	41	30	63	44	40	37	32	0.8%
2021-08-29	18:00:00	48	31	73	51	40	37	33	0.8%
2021-08-29	19:00:00	37	29	54	40	36	35	33	0.5%
2021-08-29	20:00:00	34	28	60	36	33	32	30	0.6%
2021-08-29	21:00:00	33	28	63	35	32	31	30	0.0%
2021-08-29	22:00:00	38	27	51	43	33	32	30	0.0%
2021-08-29	23:00:00	43	28	49	46	44	44	31	0.0%
2021-08-30	00:00:01	45	27	50	48	46	45	32	0.0%
2021-08-30	01:00:00	44	27	52	48	45	43	31	0.0%
2021-08-30	02:00:00	45	25	55	50	46	42	29	0.1%
2021-08-30	03:00:00	47	26	54	50	48	47	32	0.0%
2021-08-30	04:00:00	43	25	52	47	43	40	28	0.0%
2021-08-30	05:00:00	36	25	46	42	32	30	27	0.1%
2021-08-30	06:00:00	39	26	63	42	37	33	29	0.6%
2021-08-30	07:00:00	41	27	62	41	35	34	30	0.3%
2021-08-30	08:00:00	46	33	66	49	45	42	37	2.8%
2021-08-30	09:00:00	Excluded							32.9%
2021-08-30	10:00:00	Excluded							26.9%
2021-08-30	11:00:00	Excluded							32.0%
2021-08-30	12:00:00	Excluded							49.4%
2021-08-30	13:00:00	Excluded							62.7%
2021-08-30	14:00:00	Excluded							87.9%
2021-08-30	15:00:00	Excluded							78.9%
2021-08-30	16:00:00	Excluded							61.1%
2021-08-30	17:00:00	Excluded							29.3%
2021-08-30	18:00:00	43	28	66	46	40	37	32	2.0%
2021-08-30	19:00:00	43	27	67	44	38	35	30	2.0%
2021-08-30	20:00:00	41	33	51	44	41	39	36	1.0%
2021-08-30	21:00:00	35	27	51	37	35	34	31	0.6%
2021-08-30	22:00:00	32	25	41	35	33	31	28	0.1%
2021-08-30	23:00:00	38	25	53	42	39	37	28	0.1%
2021-08-31	00:00:00	37	25	53	40	38	35	28	0.0%
2021-08-31	01:00:00	36	24	52	42	29	28	26	0.0%
2021-08-31	02:00:00	30	24	44	31	29	29	26	0.1%
2021-08-31	03:00:00	30	24	49	33	30	29	27	0.1%
2021-08-31	04:00:00	38	29	51	41	37	36	32	1.1%
2021-08-31	05:00:00	41	30	50	45	41	39	35	3.7%
2021-08-31	06:00:00	34	26	48	37	33	32	28	0.6%
2021-08-31	07:00:00	32	24	51	35	30	29	27	0.2%
2021-08-31	08:00:00	43	28	68	45	40	38	33	0.5%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-31	09:00:00	42	28	64	45	40	38	32	2.1%
2021-08-31	10:00:00	44	30	62	47	42	40	34	1.9%
2021-08-31	11:00:00	49	35	61	53	49	46	40	21.0%
2021-08-31	12:00:00	50	37	62	53	49	48	43	15.1%
2021-08-31	13:00:00	48	36	61	52	48	47	39	14.7%
2021-08-31	14:00:00	Excluded							39.5%
2021-08-31	15:00:00	Excluded							27.2%
2021-08-31	16:00:00	46	34	61	50	46	44	39	9.4%
2021-08-31	17:00:00	47	36	59	50	47	46	40	12.1%
2021-08-31	18:00:00	45	33	65	48	44	42	37	3.2%
2021-08-31	19:00:00	47	32	71	46	40	38	34	1.1%
2021-08-31	20:00:00	33	27	47	35	33	32	30	0.1%
2021-08-31	21:00:00	30	26	47	31	30	30	28	0.0%
2021-08-31	22:00:00	30	24	52	33	31	30	27	0.0%
2021-08-31	23:00:00	28	23	50	30	28	27	25	0.0%
2021-09-01	00:00:00	29	23	50	29	28	27	25	0.0%
2021-09-01	01:00:00	27	23	34	28	27	27	25	0.0%
2021-09-01	02:00:00	28	23	44	29	28	27	25	0.1%
2021-09-01	03:00:00	28	22	52	28	27	27	25	0.0%
2021-09-01	04:00:00	26	20	39	28	26	25	22	0.0%
2021-09-01	05:00:00	25	20	38	26	25	24	22	0.0%
2021-09-01	06:00:00	33	20	59	30	26	24	22	0.0%
2021-09-01	07:00:00	31	21	51	31	27	26	23	0.0%
2021-09-01	08:00:00	42	26	60	45	40	36	29	0.0%
2021-09-01	09:00:00	44	28	73	48	39	36	32	0.0%
2021-09-01	10:00:00	43	32	64	46	40	38	35	0.2%

**Table A-2. Hourly noise metrics, Diablo Lake Trail (dBA).**

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-24	18:00:00	29	20	49	31	25	24	22	0.0%
2021-08-24	19:00:00	24	20	41	27	24	23	21	0.0%
2021-08-24	20:00:00	23	19	41	25	23	22	20	0.0%
2021-08-24	21:00:00	22	19	34	24	22	21	20	0.0%
2021-08-24	22:00:00	21	19	42	23	22	21	20	0.0%
2021-08-24	23:00:00	25	19	38	30	23	21	20	0.0%
2021-08-25	00:00:00	28	19	44	32	30	24	20	0.0%
2021-08-25	01:00:00	30	18	38	33	31	29	20	0.0%
2021-08-25	02:00:00	22	18	38	22	21	21	20	0.1%
2021-08-25	03:00:00	21	18	42	23	21	21	20	0.0%

Project Sound Assessment Interim Report

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Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-25	04:00:00	22	18	38	23	21	20	19	0.0%
2021-08-25	05:00:00	19	18	37	20	19	19	19	0.0%
2021-08-25	06:00:00	22	18	43	24	21	20	19	0.0%
2021-08-25	07:00:00	25	18	45	26	23	22	20	0.0%
2021-08-25	08:00:00	26	18	52	28	24	22	20	0.0%
2021-08-25	09:00:00	24	18	43	26	22	21	20	0.0%
2021-08-25	10:00:00	26	18	46	29	24	22	20	0.0%
2021-08-25	11:00:00	24	19	48	26	23	22	20	0.0%
2021-08-25	12:00:00	31	21	44	35	29	27	23	0.0%
2021-08-25	13:00:00	42	36	61	45	42	41	39	0.0%
2021-08-25	14:00:00	40	34	51	42	40	39	36	0.0%
2021-08-25	15:00:00	44	37	54	46	43	42	39	0.1%
2021-08-25	16:00:00	44	33	55	47	43	42	38	0.0%
2021-08-25	17:00:00	40	32	60	43	40	39	35	0.0%
2021-08-25	18:00:00	35	22	53	38	34	31	26	0.0%
2021-08-25	19:00:00	35	25	59	36	32	31	28	0.0%
2021-08-25	20:00:00	29	22	42	32	28	27	25	0.0%
2021-08-25	21:00:00	28	23	41	30	27	26	25	0.0%
2021-08-25	22:00:00	29	23	48	31	29	28	25	0.0%
2021-08-25	23:00:00	35	27	51	38	34	32	30	0.0%
2021-08-26	00:00:00	38	27	49	41	37	35	30	0.0%
2021-08-26	01:00:00	40	22	52	44	39	35	25	0.0%
2021-08-26	02:00:00	26	20	41	29	25	24	22	0.1%
2021-08-26	03:00:00	25	19	39	24	22	22	21	0.0%
2021-08-26	04:00:00	23	19	40	24	22	22	21	0.0%
2021-08-26	05:00:00	36	20	52	39	35	31	22	0.0%
2021-08-26	06:00:00	31	20	41	34	31	29	23	0.0%
2021-08-26	07:00:00	26	19	49	28	24	23	20	0.0%
2021-08-26	08:00:00	26	19	43	28	25	23	21	0.0%
2021-08-26	09:00:00	37	22	63	36	31	28	24	0.0%
2021-08-26	10:00:00	39	26	62	39	33	32	29	0.0%
2021-08-26	11:00:00	33	22	47	37	32	30	26	0.0%
2021-08-26	12:00:00	40	29	54	42	39	37	32	0.0%
2021-08-26	13:00:00	38	30	49	41	38	37	33	0.0%
2021-08-26	14:00:00	43	33	52	46	42	41	36	0.0%
2021-08-26	15:00:00	41	31	54	45	41	39	35	0.0%
2021-08-26	16:00:00	44	29	66	46	39	37	33	0.1%
2021-08-26	17:00:00	42	31	58	45	41	40	36	0.0%
2021-08-26	18:00:00	38	19	61	40	33	27	22	0.0%
2021-08-26	19:00:00	35	20	61	36	26	23	21	0.0%
2021-08-26	20:00:00	38	25	52	43	36	33	28	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-26	21:00:00	28	20	57	30	26	25	22	0.0%
2021-08-26	22:00:00	22	19	41	24	22	21	20	0.0%
2021-08-26	23:00:00	38	19	58	42	36	25	21	0.0%
2021-08-27	00:00:00	39	26	58	42	38	36	30	1.7%
2021-08-27	01:00:00	34	28	48	36	33	32	30	0.0%
2021-08-27	02:00:00	35	27	50	37	33	32	29	0.1%
2021-08-27	03:00:00	34	25	50	38	31	30	28	0.0%
2021-08-27	04:00:00	30	23	46	33	28	28	26	0.0%
2021-08-27	05:00:00	31	22	43	34	31	28	24	0.0%
2021-08-27	06:00:00	35	23	45	39	34	31	26	0.0%
2021-08-27	07:00:00	28	21	47	30	26	25	23	0.0%
2021-08-27	08:00:00	30	19	61	29	26	24	22	0.0%
2021-08-27	09:00:00	29	20	48	32	29	28	24	0.0%
2021-08-27	10:00:00	38	27	55	42	38	36	30	0.0%
2021-08-27	11:00:00	40	26	52	44	39	36	30	0.0%
2021-08-27	12:00:00	38	28	49	41	38	36	32	0.0%
2021-08-27	13:00:00	36	28	60	40	36	35	32	14.2%
2021-08-27	14:00:00	40	30	50	43	39	38	34	0.0%
2021-08-27	15:00:00	41	31	52	45	40	38	35	0.0%
2021-08-27	16:00:00	38	29	50	41	37	36	32	0.0%
2021-08-27	17:00:00	38	30	49	41	38	37	33	0.0%
2021-08-27	18:00:00	38	30	59	41	37	35	33	0.0%
2021-08-27	19:00:00	37	25	51	40	35	32	27	0.0%
2021-08-27	20:00:00	35	21	51	40	35	33	26	0.0%
2021-08-27	21:00:00	29	19	47	33	30	26	22	0.0%
2021-08-27	22:00:00	22	18	31	24	23	22	19	0.0%
2021-08-27	23:00:00	22	18	32	24	23	22	19	0.0%
2021-08-28	00:00:00	22	18	40	24	22	21	19	0.0%
2021-08-28	01:00:00	22	18	41	24	23	22	19	0.0%
2021-08-28	02:00:00	22	18	40	23	23	22	19	0.1%
2021-08-28	03:00:00	22	18	38	24	23	22	20	0.0%
2021-08-28	04:00:00	21	18	39	23	21	21	20	0.0%
2021-08-28	05:00:00	20	17	33	22	20	19	18	0.0%
2021-08-28	06:00:00	22	18	42	25	22	21	19	0.0%
2021-08-28	07:00:00	23	18	40	25	22	21	19	0.0%
2021-08-28	08:00:00	24	18	44	26	24	23	20	0.0%
2021-08-28	09:00:00	26	19	51	28	24	23	21	0.0%
2021-08-28	10:00:00	30	19	51	32	25	23	21	0.0%
2021-08-28	11:00:00	31	21	53	34	29	27	23	0.0%
2021-08-28	12:00:00	36	21	59	36	31	29	24	0.0%
2021-08-28	13:00:00	39	29	50	42	40	38	34	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-28	14:00:00	41	35	54	43	41	40	37	0.0%
2021-08-28	15:00:00	42	35	50	45	42	41	38	0.0%
2021-08-28	16:00:00	43	35	55	46	44	42	39	0.0%
2021-08-28	17:00:00	43	29	68	44	39	37	32	0.0%
2021-08-28	18:00:00	32	26	50	34	32	31	29	0.0%
2021-08-28	19:00:00	33	22	56	36	30	28	25	0.0%
2021-08-28	20:00:00	26	20	36	28	26	25	23	0.0%
2021-08-28	21:00:00	28	19	38	32	27	25	22	0.0%
2021-08-28	22:00:00	31	19	41	36	25	23	21	0.0%
2021-08-28	23:00:00	34	19	43	38	36	34	22	0.0%
2021-08-29	00:00:00	36	18	43	40	38	37	22	0.0%
2021-08-29	01:00:00	35	18	41	38	37	35	21	0.0%
2021-08-29	02:00:00	31	18	45	36	25	24	21	0.1%
2021-08-29	03:00:00	35	18	44	39	37	34	21	0.0%
2021-08-29	04:00:00	27	18	41	28	22	22	20	0.0%
2021-08-29	05:00:00	24	17	52	21	20	20	18	0.0%
2021-08-29	06:00:00	27	18	53	25	21	20	19	0.0%
2021-08-29	07:00:00	23	18	50	23	20	20	19	0.0%
2021-08-29	08:00:00	29	18	60	29	23	22	19	0.0%
2021-08-29	09:00:00	25	18	55	26	22	21	20	0.0%
2021-08-29	10:00:00	32	19	68	28	24	23	21	0.0%
2021-08-29	11:00:00	36	19	60	32	26	25	22	0.0%
2021-08-29	12:00:00	46	23	70	41	35	32	26	0.0%
2021-08-29	13:00:00	44	34	56	47	44	42	39	0.0%
2021-08-29	14:00:00	43	35	57	46	43	42	38	0.0%
2021-08-29	15:00:00	46	37	68	49	46	44	41	0.0%
2021-08-29	16:00:00	45	36	54	47	45	44	40	0.0%
2021-08-29	17:00:00	41	32	51	43	40	39	36	0.0%
2021-08-29	18:00:00	45	28	68	44	39	37	32	0.0%
2021-08-29	19:00:00	34	27	47	36	33	32	30	0.0%
2021-08-29	20:00:00	34	27	57	37	34	33	30	0.0%
2021-08-29	21:00:00	42	26	55	47	41	38	30	0.0%
2021-08-29	22:00:00	36	24	52	39	33	31	27	0.0%
2021-08-29	23:00:00	28	23	40	30	28	27	25	0.0%
2021-08-30	00:00:00	26	21	41	28	26	25	23	0.0%
2021-08-30	01:00:00	29	21	50	27	25	24	22	0.0%
2021-08-30	02:00:00	24	20	36	26	25	24	22	0.1%
2021-08-30	03:00:00	25	20	41	27	25	24	22	0.0%
2021-08-30	04:00:00	25	21	41	26	25	24	23	0.0%
2021-08-30	05:00:00	24	20	46	25	24	24	21	0.0%
2021-08-30	06:00:00	37	25	52	39	34	32	27	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-30	07:00:00	37	27	48	41	37	36	30	0.0%
2021-08-30	08:00:00	39	28	51	42	38	37	32	0.0%
2021-08-30	09:00:00	48	36	64	50	45	44	40	0.2%
2021-08-30	10:00:00	50	38	66	54	49	46	41	0.8%
2021-08-30	11:00:00	54	41	65	57	54	52	46	3.0%
2021-08-30	12:00:00	48	34	63	53	46	43	39	1.5%
2021-08-30	13:00:00	49	36	61	52	48	46	41	0.5%
2021-08-30	14:00:00	54	42	67	57	54	52	47	2.1%
2021-08-30	15:00:00	49	38	65	52	48	47	43	0.9%
2021-08-30	16:00:00	49	37	60	53	49	47	42	1.0%
2021-08-30	17:00:00	45	33	58	48	45	43	39	0.1%
2021-08-30	18:00:00	41	29	58	44	40	38	34	0.0%
2021-08-30	19:00:00	45	34	63	48	45	43	39	0.0%
2021-08-30	20:00:00	40	32	50	43	40	39	36	0.0%
2021-08-30	21:00:00	39	29	56	42	38	36	33	0.0%
2021-08-30	22:00:00	39	32	49	41	39	37	34	0.0%
2021-08-30	23:00:00	41	31	54	44	40	38	35	0.0%
2021-08-31	00:00:00	40	25	57	45	38	35	31	0.0%
2021-08-31	01:00:00	35	24	50	36	32	31	27	0.0%
2021-08-31	02:00:00	30	23	44	32	29	28	25	0.1%
2021-08-31	03:00:00	34	24	50	37	32	29	25	0.0%
2021-08-31	04:00:00	30	23	48	32	29	28	25	0.0%
2021-08-31	05:00:00	32	25	41	35	31	30	28	0.0%
2021-08-31	06:00:00	26	22	38	28	26	25	24	0.0%
2021-08-31	07:00:00	27	21	48	29	26	25	24	0.0%
2021-08-31	08:00:00	28	22	43	30	28	27	25	0.0%
2021-08-31	09:00:00	29	24	54	31	29	28	26	0.0%
2021-08-31	10:00:00	36	26	45	39	36	34	29	0.0%
2021-08-31	11:00:00	37	30	47	40	37	36	33	0.0%
2021-08-31	12:00:00	42	33	58	45	42	40	36	0.0%
2021-08-31	13:00:00	44	34	58	47	43	41	37	0.0%
2021-08-31	14:00:00	46	31	58	50	45	42	37	0.0%
2021-08-31	15:00:00	45	32	57	49	44	42	37	0.0%
2021-08-31	16:00:00	44	36	54	47	45	43	40	0.0%
2021-08-31	17:00:00	42	28	54	46	42	39	30	0.0%
2021-08-31	18:00:00	39	27	63	40	36	33	30	0.0%
2021-08-31	19:00:00	42	23	66	42	36	31	26	0.0%
2021-08-31	20:00:00	32	18	46	37	28	22	20	0.0%
2021-08-31	21:00:00	24	18	48	22	20	20	19	0.0%
2021-08-31	22:00:00	21	18	37	23	21	20	19	0.0%
2021-08-31	23:00:00	21	17	35	23	21	20	18	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-09-01	00:00:01	28	17	55	21	21	20	18	0.0%
2021-09-01	01:00:00	19	17	35	21	20	18	17	0.0%
2021-09-01	02:00:00	23	17	44	22	21	20	17	0.1%
2021-09-01	03:00:00	24	17	51	22	19	18	17	0.0%
2021-09-01	04:00:00	21	17	41	21	18	18	17	0.0%
2021-09-01	05:00:00	22	17	39	25	20	19	18	0.0%
2021-09-01	06:00:00	22	17	40	24	21	20	19	0.0%
2021-09-01	07:00:00	26	18	52	27	23	22	20	0.0%
2021-09-01	08:00:00	28	18	50	30	25	23	21	0.0%
2021-09-01	09:00:00	24	19	40	26	24	23	21	0.0%
2021-09-01	10:00:00	26	19	42	28	24	23	21	0.0%

**Table A-3. Hourly noise metrics, Pyramid Lake Trail (dBA).**

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-24	14:00:00	42	41	51	42	42	42	41	0.0%
2021-08-24	15:00:00	42	40	45	42	42	42	41	0.0%
2021-08-24	16:00:00	42	41	52	42	42	42	42	0.0%
2021-08-24	17:00:00	42	41	48	43	42	42	42	0.0%
2021-08-24	18:00:00	43	41	60	43	43	42	42	0.0%
2021-08-24	19:00:00	42	41	46	43	42	42	42	0.0%
2021-08-24	20:00:00	42	41	44	42	42	42	42	0.0%
2021-08-24	21:00:00	42	41	45	42	42	42	42	0.0%
2021-08-24	22:00:00	42	41	44	42	42	42	42	0.0%
2021-08-24	23:00:00	42	41	43	42	42	42	42	0.0%
2021-08-25	00:00:00	42	41	43	42	42	42	42	0.0%
2021-08-25	01:00:00	42	41	43	42	42	42	41	0.0%
2021-08-25	02:00:00	42	41	43	42	42	42	42	0.1%
2021-08-25	03:00:00	42	41	43	42	42	42	41	0.0%
2021-08-25	04:00:00	42	41	43	42	42	42	41	0.0%
2021-08-25	05:00:00	42	41	43	42	42	42	41	0.0%
2021-08-25	06:00:00	42	41	46	42	42	42	41	0.0%
2021-08-25	07:00:00	42	41	46	42	42	42	41	0.0%
2021-08-25	08:00:00	42	41	47	42	42	42	41	0.0%
2021-08-25	09:00:00	42	41	59	42	42	42	41	0.0%
2021-08-25	10:00:00	42	41	63	42	42	41	41	0.0%
2021-08-25	11:00:00	42	40	62	42	41	41	41	0.0%
2021-08-25	12:00:00	42	40	66	42	41	41	41	0.0%
2021-08-25	13:00:00	43	40	62	42	41	41	41	0.1%
2021-08-25	14:00:00	41	40	56	42	41	41	41	0.4%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-25	15:00:00	42	40	57	42	41	41	41	0.5%
2021-08-25	16:00:00	41	40	56	42	41	41	41	0.6%
2021-08-25	17:00:00	42	40	60	42	41	41	41	0.4%
2021-08-25	18:00:00	42	40	61	42	41	41	41	0.0%
2021-08-25	19:00:00	42	40	60	42	42	41	41	0.0%
2021-08-25	20:00:00	42	41	54	42	42	42	41	0.0%
2021-08-25	21:00:00	42	41	46	42	42	42	42	0.0%
2021-08-25	22:00:00	42	40	51	43	42	42	41	0.1%
2021-08-25	23:00:00	42	41	47	43	42	42	42	0.4%
2021-08-26	00:00:00	43	40	50	45	43	42	41	2.3%
2021-08-26	01:00:00	43	40	50	44	43	42	41	0.9%
2021-08-26	02:00:00	42	40	46	42	42	41	41	0.1%
2021-08-26	03:00:00	41	40	46	42	42	41	41	0.0%
2021-08-26	04:00:00	42	40	46	42	42	42	41	0.0%
2021-08-26	05:00:00	45	41	62	48	43	42	41	7.4%
2021-08-26	06:00:00	44	41	57	47	43	42	41	3.2%
2021-08-26	07:00:00	41	40	48	42	41	41	41	0.0%
2021-08-26	08:00:00	41	40	45	42	41	41	41	0.0%
2021-08-26	09:00:00	44	41	61	45	43	42	42	0.2%
2021-08-26	10:00:00	44	41	62	45	43	42	42	0.1%
2021-08-26	11:00:00	43	41	63	44	42	42	41	0.0%
2021-08-26	12:00:00	45	41	69	46	44	43	42	1.9%
2021-08-26	13:00:00	44	41	55	46	44	43	42	0.6%
2021-08-26	14:00:00	43	41	59	45	43	42	42	0.5%
2021-08-26	15:00:00	44	40	67	44	43	42	41	0.3%
2021-08-26	16:00:00	43	41	58	44	42	42	41	0.2%
2021-08-26	17:00:00	Excluded							33.3%
2021-08-26	18:00:00	42	41	57	42	42	42	41	8.6%
2021-08-26	19:00:00	43	41	60	43	42	42	42	19.8%
2021-08-26	20:00:00	43	41	64	43	42	42	42	13.0%
2021-08-26	21:00:00	42	41	62	42	42	42	42	3.1%
2021-08-26	22:00:00	42	42	57	43	42	42	42	0.0%
2021-08-26	23:00:00	43	42	62	44	43	43	42	2.9%
2021-08-27	00:00:00	43	42	62	44	43	43	43	1.0%
2021-08-27	01:00:00	44	42	58	45	44	43	43	6.9%
2021-08-27	02:00:00	46	42	59	48	44	44	43	5.9%
2021-08-27	03:00:00	47	42	59	50	46	45	43	6.7%
2021-08-27	04:00:00	46	42	56	48	45	44	43	3.4%
2021-08-27	05:00:00	43	42	50	44	43	43	42	1.0%
2021-08-27	06:00:00	43	41	50	44	43	43	42	1.6%
2021-08-27	07:00:00	42	41	46	43	42	42	42	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-27	08:00:00	42	41	45	43	42	42	42	18.4%
2021-08-27	09:00:00	42	41	53	43	42	42	42	0.8%
2021-08-27	10:00:00	43	41	55	45	43	42	42	0.8%
2021-08-27	11:00:00	44	41	62	46	43	42	42	0.8%
2021-08-27	12:00:00	44	41	66	44	43	42	42	1.3%
2021-08-27	13:00:00	43	41	54	43	42	42	42	0.2%
2021-08-27	14:00:00	44	42	55	46	44	43	43	1.1%
2021-08-27	15:00:00	43	42	50	44	43	43	42	0.3%
2021-08-27	16:00:00	44	42	70	44	43	43	43	0.6%
2021-08-27	17:00:00	44	41	53	45	43	43	42	2.9%
2021-08-27	18:00:00	45	42	58	48	44	44	43	2.6%
2021-08-27	19:00:00	45	41	55	47	44	43	42	3.5%
2021-08-27	20:00:00	43	41	55	44	43	42	42	1.7%
2021-08-27	21:00:00	42	41	52	43	42	42	42	0.3%
2021-08-27	22:00:00	42	41	43	42	42	42	42	0.0%
2021-08-27	23:00:00	42	41	49	42	42	42	42	0.0%
2021-08-28	00:00:00	42	41	43	42	42	42	42	0.0%
2021-08-28	01:00:00	42	41	67	42	42	42	42	0.0%
2021-08-28	02:00:00	42	41	43	42	42	42	42	0.1%
2021-08-28	03:00:00	42	41	43	42	42	42	42	0.0%
2021-08-28	04:00:00	42	41	47	42	42	42	42	0.0%
2021-08-28	05:00:00	42	41	44	42	42	42	41	0.0%
2021-08-28	06:00:00	42	41	52	42	42	42	41	0.0%
2021-08-28	07:00:00	41	41	53	42	42	41	41	0.0%
2021-08-28	08:00:00	41	41	49	42	42	41	41	0.0%
2021-08-28	09:00:00	42	41	46	42	42	42	41	0.0%
2021-08-28	10:00:00	42	40	56	42	42	42	41	0.0%
2021-08-28	11:00:00	47	41	69	43	42	42	41	0.0%
2021-08-28	12:00:00	47	41	71	43	42	42	41	0.0%
2021-08-28	13:00:00	42	40	56	42	42	42	41	0.0%
2021-08-28	14:00:00	42	40	52	42	42	42	41	0.0%
2021-08-28	15:00:00	42	40	54	43	42	42	41	0.1%
2021-08-28	16:00:00	42	40	51	42	42	42	41	0.0%
2021-08-28	17:00:00	42	40	51	42	42	42	41	0.0%
2021-08-28	18:00:00	42	41	62	43	42	42	42	0.0%
2021-08-28	19:00:00	43	41	57	44	43	42	41	1.7%
2021-08-28	20:00:00	42	41	46	43	42	42	41	0.1%
2021-08-28	21:00:00	42	41	43	42	42	42	41	0.0%
2021-08-28	22:00:00	42	41	44	42	42	42	42	0.0%
2021-08-28	23:00:00	42	41	43	42	42	42	41	0.0%
2021-08-29	00:00:00	42	41	43	42	42	42	41	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-29	01:00:00	42	41	42	42	42	42	41	0.0%
2021-08-29	02:00:00	42	41	43	42	42	42	41	0.1%
2021-08-29	03:00:00	42	41	42	42	42	42	41	0.0%
2021-08-29	04:00:00	42	41	42	42	42	42	41	0.0%
2021-08-29	05:00:00	41	41	42	42	42	41	41	0.0%
2021-08-29	06:00:00	42	41	53	42	42	42	41	0.0%
2021-08-29	07:00:00	41	41	44	42	42	41	41	0.0%
2021-08-29	08:00:00	42	41	45	42	42	42	41	0.0%
2021-08-29	09:00:00	42	41	58	42	42	42	41	0.0%
2021-08-29	10:00:00	41	40	48	42	42	41	41	0.0%
2021-08-29	11:00:00	42	40	67	42	42	41	41	0.0%
2021-08-29	12:00:00	46	41	69	44	42	42	41	1.3%
2021-08-29	13:00:00	42	40	57	44	42	41	41	0.4%
2021-08-29	14:00:00	42	40	56	43	42	41	41	0.0%
2021-08-29	15:00:00	42	40	53	42	42	42	41	0.0%
2021-08-29	16:00:00	43	40	66	42	42	42	41	0.0%
2021-08-29	17:00:00	42	41	53	43	42	42	41	0.0%
2021-08-29	18:00:00	45	41	65	43	42	42	42	0.0%
2021-08-29	19:00:00	42	41	46	43	42	42	42	0.0%
2021-08-29	20:00:00	44	41	54	47	44	43	42	2.9%
2021-08-29	21:00:00	45	41	56	48	45	43	42	3.6%
2021-08-29	22:00:00	42	41	51	43	42	42	42	0.2%
2021-08-29	23:00:00	42	41	45	42	42	42	42	0.0%
2021-08-30	00:00:01	42	41	43	42	42	42	41	0.0%
2021-08-30	01:00:00	41	41	42	42	42	42	41	0.0%
2021-08-30	02:00:00	41	41	44	42	41	41	41	0.1%
2021-08-30	03:00:00	41	41	43	42	42	41	41	0.0%
2021-08-30	04:00:00	41	41	44	42	41	41	41	0.0%
2021-08-30	05:00:00	41	40	49	42	41	41	41	0.0%
2021-08-30	06:00:00	41	41	46	42	41	41	41	0.3%
2021-08-30	07:00:00	42	40	54	42	41	41	41	0.9%
2021-08-30	08:00:00	48	41	61	52	48	46	42	14.9%
2021-08-30	09:00:00	49	42	64	52	47	46	43	10.6%
2021-08-30	10:00:00				Excluded				31.8%
2021-08-30	11:00:00				Excluded				26.2%
2021-08-30	12:00:00	48	44	60	51	48	47	45	7.0%
2021-08-30	13:00:00	51	44	66	54	51	50	46	10.0%
2021-08-30	14:00:00	47	42	58	50	47	45	43	3.5%
2021-08-30	15:00:00	44	41	64	44	43	42	42	3.0%
2021-08-30	16:00:00	43	41	55	45	43	42	42	0.2%
2021-08-30	17:00:00	42	40	52	42	42	41	41	0.2%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-30	18:00:00	43	40	65	43	42	41	41	0.0%
2021-08-30	19:00:00	43	41	64	44	42	42	41	14.8%
2021-08-30	20:00:00	43	41	52	44	43	42	41	19.1%
2021-08-30	21:00:00	42	41	51	43	42	42	41	0.5%
2021-08-30	22:00:00	42	40	55	43	42	42	41	7.4%
2021-08-30	23:00:00	42	41	54	43	42	42	41	21.0%
2021-08-31	00:00:00	42	40	54	42	42	41	41	14.9%
2021-08-31	01:00:00	41	40	46	42	41	41	41	2.1%
2021-08-31	02:00:00	42	40	53	42	41	41	41	4.8%
2021-08-31	03:00:00	41	40	50	41	41	41	41	9.6%
2021-08-31	04:00:00	42	41	48	42	42	42	41	0.0%
2021-08-31	05:00:00	42	41	50	42	42	42	41	0.0%
2021-08-31	06:00:00	42	41	44	42	42	42	41	0.0%
2021-08-31	07:00:00	42	41	52	42	42	42	41	0.5%
2021-08-31	08:00:00	42	40	46	42	42	41	41	1.6%
2021-08-31	09:00:00	43	41	49	44	43	42	41	1.6%
2021-08-31	10:00:00	42	41	50	43	42	42	41	2.9%
2021-08-31	11:00:00	43	41	66	43	42	42	42	0.6%
2021-08-31	12:00:00	46	41	70	47	44	43	42	1.1%
2021-08-31	13:00:00	47	42	58	50	47	46	43	5.8%
2021-08-31	14:00:00	48	42	62	51	48	47	44	5.4%
2021-08-31	15:00:00	48	42	58	51	48	47	44	7.3%
2021-08-31	16:00:00	45	41	54	46	44	44	42	1.7%
2021-08-31	17:00:00	44	41	53	45	43	43	42	0.3%
2021-08-31	18:00:00	43	41	64	43	42	42	42	0.4%
2021-08-31	19:00:00	44	41	66	46	43	42	42	1.4%
2021-08-31	20:00:00	42	41	53	43	42	42	41	0.0%
2021-08-31	21:00:00	41	41	45	42	42	42	41	0.0%
2021-08-31	22:00:00	41	41	43	42	42	41	41	0.0%
2021-08-31	23:00:00	41	41	43	42	42	41	41	0.0%
2021-09-01	00:00:00	42	40	59	42	41	41	41	0.0%
2021-09-01	01:00:00	41	40	42	42	41	41	41	0.0%
2021-09-01	02:00:00	41	40	46	41	41	41	41	0.1%
2021-09-01	03:00:00	41	40	59	42	41	41	41	0.0%
2021-09-01	04:00:00	41	40	43	41	41	41	41	0.0%
2021-09-01	05:00:00	41	40	44	41	41	41	41	0.0%
2021-09-01	06:00:00	41	40	50	42	41	41	41	0.0%
2021-09-01	07:00:00	41	40	44	42	41	41	41	0.0%

**Table A-4. Hourly noise metrics, Gorge Bypass Reach (dBA).**

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-25	11:00:00	38	27	54	41	38	36	31	0.0%
2021-08-25	12:00:00	40	28	58	43	39	38	32	0.2%
2021-08-25	13:00:00	43	30	61	46	41	40	34	2.2%
2021-08-25	14:00:00	44	37	57	47	44	43	41	7.0%
2021-08-25	15:00:00	47	40	56	50	48	47	44	9.8%
2021-08-25	16:00:00	45	37	59	47	45	44	41	3.5%
2021-08-25	17:00:00	46	34	63	47	44	43	39	5.7%
2021-08-25	18:00:00	39	29	56	43	38	35	31	0.4%
2021-08-25	19:00:00	39	28	61	41	36	33	29	0.0%
2021-08-25	20:00:00	35	28	55	38	33	31	29	0.0%
2021-08-25	21:00:00	37	27	56	38	31	30	29	0.0%
2021-08-25	22:00:00	36	29	56	36	33	32	31	0.1%
2021-08-25	23:00:00	32	29	43	34	32	32	30	0.1%
2021-08-26	00:00:00	30	27	39	32	30	30	29	0.1%
2021-08-26	01:00:00	31	28	42	33	31	31	30	0.0%
2021-08-26	02:00:00	41	28	63	36	34	33	30	0.1%
2021-08-26	03:00:00	34	28	41	36	34	33	31	0.5%
2021-08-26	04:00:00	37	29	59	35	33	33	31	0.2%
2021-08-26	05:00:00	37	32	46	39	36	36	34	0.3%
2021-08-26	06:00:00	38	29	58	39	35	34	31	0.0%
2021-08-26	07:00:00	38	30	54	41	37	36	33	1.0%
2021-08-26	08:00:00	39	29	57	42	38	36	32	0.0%
2021-08-26	09:00:00	43	30	70	44	40	37	33	0.3%
2021-08-26	10:00:00	47	30	70	46	41	38	32	0.4%
2021-08-26	11:00:00	42	30	62	44	40	38	33	0.5%
2021-08-26	12:00:00	46	29	72	43	40	38	33	0.5%
2021-08-26	13:00:00	43	29	61	45	41	40	34	0.6%
2021-08-26	14:00:00	41	31	59	44	40	38	34	0.9%
2021-08-26	15:00:00	43	32	69	44	41	40	36	1.3%
2021-08-26	16:00:00	47	33	73	45	42	40	36	1.4%
2021-08-26	17:00:00	Excluded							49.6%
2021-08-26	18:00:00	47	28	70	46	41	37	31	8.0%
2021-08-26	19:00:00	Excluded							36.2%
2021-08-26	20:00:00	41	34	52	44	41	40	36	6.4%
2021-08-26	21:00:00	37	30	53	39	36	35	32	0.0%
2021-08-26	22:00:00	33	28	49	35	32	31	29	0.0%
2021-08-26	23:00:00	43	28	54	46	43	40	29	2.2%
2021-08-27	00:00:00	40	34	52	43	40	39	36	2.4%
2021-08-27	01:00:00	39	32	49	41	39	38	35	1.6%
2021-08-27	02:00:00	33	29	45	35	33	32	31	0.2%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-27	03:00:00	33	29	50	34	32	32	30	0.3%
2021-08-27	04:00:00	34	29	46	37	35	33	30	0.3%
2021-08-27	05:00:00	36	30	51	38	35	34	32	0.3%
2021-08-27	06:00:00	38	29	56	41	34	33	30	0.3%
2021-08-27	07:00:00	36	28	54	39	34	31	29	0.1%
2021-08-27	08:00:00	40	29	59	42	38	36	32	2.1%
2021-08-27	09:00:00	41	31	57	44	40	38	34	16.1%
2021-08-27	10:00:00	45	35	68	44	42	40	37	2.9%
2021-08-27	11:00:00	45	37	65	47	44	43	40	5.5%
2021-08-27	12:00:00	45	38	59	47	45	44	41	3.8%
2021-08-27	13:00:00	45	35	62	48	45	43	40	4.7%
2021-08-27	14:00:00	46	36	62	48	45	44	41	6.8%
2021-08-27	15:00:00	46	39	59	48	46	45	42	12.4%
2021-08-27	16:00:00	43	36	58	45	44	42	39	5.1%
2021-08-27	17:00:00	42	32	57	44	42	40	36	1.7%
2021-08-27	18:00:00	42	34	56	45	42	40	37	1.3%
2021-08-27	19:00:00	42	31	65	44	40	38	34	0.1%
2021-08-27	20:00:00	40	28	59	43	38	35	31	0.0%
2021-08-27	21:00:00	37	28	59	39	34	31	29	0.0%
2021-08-27	22:00:00	32	27	47	34	30	29	28	0.0%
2021-08-27	23:00:00	32	27	51	31	29	29	28	0.0%
2021-08-28	00:00:00	31	28	42	33	31	30	29	0.0%
2021-08-28	01:00:00	36	28	59	34	33	32	29	0.0%
2021-08-28	02:00:00	31	28	43	33	32	32	29	0.1%
2021-08-28	03:00:00	32	28	43	34	33	32	30	0.0%
2021-08-28	04:00:00	34	29	51	34	32	31	30	0.0%
2021-08-28	05:00:00	34	28	50	36	30	29	29	0.0%
2021-08-28	06:00:00	36	28	54	39	33	30	29	0.0%
2021-08-28	07:00:00	38	28	56	41	36	33	29	0.0%
2021-08-28	08:00:00	39	29	50	43	40	38	31	0.0%
2021-08-28	09:00:00	40	31	59	43	40	38	33	0.0%
2021-08-28	10:00:00	43	28	69	45	40	37	31	0.0%
2021-08-28	11:00:00	44	27	60	47	42	40	32	0.0%
2021-08-28	12:00:00	47	31	68	48	43	42	37	1.6%
2021-08-28	13:00:00	43	31	61	46	42	40	35	1.1%
2021-08-28	14:00:00	44	31	64	47	43	41	37	0.5%
2021-08-28	15:00:00	44	31	65	46	43	41	36	1.6%
2021-08-28	16:00:00	43	31	62	46	43	41	36	1.7%
2021-08-28	17:00:00	41	29	56	44	41	39	34	0.9%
2021-08-28	18:00:00	41	28	56	44	41	38	32	0.0%
2021-08-28	19:00:00	40	27	58	44	39	37	30	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-28	20:00:00	38	27	51	41	38	35	30	0.0%
2021-08-28	21:00:00	35	28	49	38	33	32	30	0.0%
2021-08-28	22:00:00	33	27	45	36	34	30	28	0.0%
2021-08-28	23:00:00	31	27	51	33	31	30	28	0.0%
2021-08-29	00:00:01	31	27	50	32	30	29	28	0.0%
2021-08-29	01:00:00	29	27	44	30	29	29	28	0.0%
2021-08-29	02:00:00	29	27	42	30	29	29	28	0.1%
2021-08-29	03:00:00	30	27	46	31	30	29	28	0.0%
2021-08-29	04:00:00	31	28	42	31	30	30	29	0.0%
2021-08-29	05:00:00	32	28	47	34	32	31	30	0.0%
2021-08-29	06:00:00	34	27	50	36	32	31	29	0.0%
2021-08-29	07:00:00	36	29	49	39	35	34	32	0.0%
2021-08-29	08:00:00	41	32	55	43	41	39	35	0.0%
2021-08-29	09:00:00	40	29	61	41	38	36	32	0.2%
2021-08-29	10:00:00	41	27	60	43	40	38	31	0.0%
2021-08-29	11:00:00	43	28	62	46	42	40	34	0.0%
2021-08-29	12:00:00	48	34	71	49	45	43	39	1.8%
2021-08-29	13:00:00	49	35	69	50	44	43	39	1.5%
2021-08-29	14:00:00	47	33	64	50	45	43	39	3.3%
2021-08-29	15:00:00	45	31	78	47	44	42	38	3.6%
2021-08-29	16:00:00	45	35	65	47	45	44	41	3.8%
2021-08-29	17:00:00	43	32	54	46	43	41	37	1.5%
2021-08-29	18:00:00	45	27	70	45	40	38	32	0.0%
2021-08-29	19:00:00	39	28	57	43	38	36	30	0.0%
2021-08-29	20:00:00	36	27	52	40	35	32	29	0.0%
2021-08-29	21:00:00	34	27	52	37	32	31	29	0.0%
2021-08-29	22:00:00	35	30	48	37	34	33	32	0.0%
2021-08-29	23:00:00	36	30	44	38	36	35	32	0.7%
2021-08-30	00:00:00	37	32	51	39	37	36	35	0.9%
2021-08-30	01:00:00	38	34	45	40	39	38	36	2.5%
2021-08-30	02:00:00	38	33	48	40	38	38	36	1.1%
2021-08-30	03:00:00	39	34	51	40	39	38	37	1.8%
2021-08-30	04:00:00	40	34	60	40	39	38	36	2.4%
2021-08-30	05:00:00	39	33	50	42	38	37	35	2.3%
2021-08-30	06:00:00	42	34	54	45	42	41	37	2.8%
2021-08-30	07:00:00	43	37	52	45	43	42	39	4.3%
2021-08-30	08:00:00	46	38	58	48	46	45	42	8.8%
2021-08-30	09:00:00	45	37	60	47	45	44	41	4.3%
2021-08-30	10:00:00	43	35	59	45	43	42	39	2.9%
2021-08-30	11:00:00	44	38	51	47	45	44	41	6.7%
2021-08-30	12:00:00	43	35	58	46	43	42	38	6.1%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-30	13:00:00	43	33	57	45	42	41	37	2.7%
2021-08-30	14:00:00	44	31	65	44	41	39	33	1.8%
2021-08-30	15:00:00	45	30	56	49	46	43	36	3.9%
2021-08-30	16:00:00	46	37	58	49	47	45	42	7.5%
2021-08-30	17:00:00	42	30	53	46	43	41	34	3.7%
2021-08-30	18:00:00	41	30	60	43	39	37	33	0.8%
2021-08-30	19:00:00	42	33	61	45	41	40	36	22.2%
2021-08-30	20:00:00				Excluded				40.6%
2021-08-30	21:00:00	37	29	56	39	36	34	31	3.0%
2021-08-30	22:00:00	37	30	50	39	36	35	33	2.0%
2021-08-30	23:00:00				Excluded				39.8%
2021-08-31	00:00:00	33	28	53	34	32	31	30	7.8%
2021-08-31	01:00:00	33	28	50	35	32	32	30	0.6%
2021-08-31	02:00:00	32	28	54	34	32	31	29	3.2%
2021-08-31	03:00:00	34	28	52	37	30	30	29	18.1%
2021-08-31	04:00:00	32	27	51	33	31	30	29	0.2%
2021-08-31	05:00:00	33	28	47	36	33	32	29	0.2%
2021-08-31	06:00:00	35	28	50	39	34	32	29	2.1%
2021-08-31	07:00:00	38	29	53	41	37	34	31	4.2%
2021-08-31	08:00:00	38	30	50	41	38	36	33	0.6%
2021-08-31	09:00:00	39	30	54	43	39	37	33	0.6%
2021-08-31	10:00:00				Excluded				46.9%
2021-08-31	11:00:00				Excluded				62.9%
2021-08-31	12:00:00	43	30	73	45	42	40	35	5.6%
2021-08-31	13:00:00	42	31	59	45	42	40	36	3.9%
2021-08-31	14:00:00	42	33	55	44	42	40	36	0.8%
2021-08-31	15:00:00	42	32	64	44	41	40	36	5.1%
2021-08-31	16:00:00	40	31	54	43	40	39	34	2.0%
2021-08-31	17:00:00	41	28	64	43	40	38	33	1.6%
2021-08-31	18:00:00	41	29	64	42	37	35	31	0.1%
2021-08-31	19:00:00	38	28	59	41	35	32	30	0.1%
2021-08-31	20:00:00	35	29	50	37	33	32	30	0.3%
2021-08-31	21:00:00	32	27	47	34	30	29	28	0.0%
2021-08-31	22:00:00	32	27	45	34	32	30	28	0.0%
2021-08-31	23:00:00	31	26	46	34	31	28	27	0.0%
2021-09-01	00:00:01	35	26	61	28	27	27	27	0.0%
2021-09-01	01:00:00	28	26	41	29	28	28	27	0.0%
2021-09-01	02:00:00	29	27	51	30	28	28	27	0.1%
2021-09-01	03:00:00	30	26	50	31	28	27	27	0.0%
2021-09-01	04:00:00	37	26	62	33	28	28	27	0.0%
2021-09-01	05:00:00	37	27	58	37	30	28	27	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-09-01	06:00:00	35	27	50	38	33	31	29	0.0%

**Table A-5. Hourly noise metrics, Newhalem Creek Campground (dBA).**

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-24	17:00:00	41	37	57	41	40	39	38	0.0%
2021-08-24	18:00:00	42	38	65	42	40	40	39	0.0%
2021-08-24	19:00:00	40	36	62	41	39	39	38	0.0%
2021-08-24	20:00:00	39	36	66	40	39	38	38	0.0%
2021-08-24	21:00:00	37	36	52	38	38	37	37	0.0%
2021-08-24	22:00:00	37	36	46	38	37	37	37	0.0%
2021-08-24	23:00:00	37	36	52	38	37	37	37	0.0%
2021-08-25	00:00:00	38	36	40	38	38	38	37	0.0%
2021-08-25	01:00:00	38	36	43	39	38	38	37	0.0%
2021-08-25	02:00:00	38	37	46	39	38	38	38	0.1%
2021-08-25	03:00:00	40	37	66	39	39	39	38	0.0%
2021-08-25	04:00:00	39	37	44	40	39	39	38	0.0%
2021-08-25	05:00:00	39	37	44	40	40	39	39	0.0%
2021-08-25	06:00:00	40	38	49	41	40	39	39	0.0%
2021-08-25	07:00:00	40	37	51	41	40	40	39	0.0%
2021-08-25	08:00:00	44	37	65	42	40	40	39	0.7%
2021-08-25	09:00:00	41	36	71	42	40	40	38	0.0%
2021-08-25	10:00:00	38	35	55	39	38	37	36	0.0%
2021-08-25	11:00:00	39	34	71	39	38	37	36	0.0%
2021-08-25	12:00:00	45	34	74	39	37	37	35	0.0%
2021-08-25	13:00:00	39	35	60	40	38	37	36	0.0%
2021-08-25	14:00:00	42	35	68	43	40	39	37	0.1%
2021-08-25	15:00:00	42	37	64	44	41	40	38	0.0%
2021-08-25	16:00:00	39	35	54	41	39	39	37	0.0%
2021-08-25	17:00:00	40	35	63	40	39	38	37	0.0%
2021-08-25	18:00:00	39	35	59	41	38	37	36	0.0%
2021-08-25	19:00:00	45	35	65	45	39	38	36	0.1%
2021-08-25	20:00:00	39	35	56	40	38	38	37	0.0%
2021-08-25	21:00:00	37	35	57	38	37	37	36	0.0%
2021-08-25	22:00:00	37	35	48	38	37	37	36	0.0%
2021-08-25	23:00:00	37	35	42	37	37	37	36	0.0%
2021-08-26	00:00:00	36	35	58	37	36	36	36	0.0%
2021-08-26	01:00:00	36	34	47	36	36	35	35	0.0%
2021-08-26	02:00:00	35	33	43	35	35	35	34	0.1%
2021-08-26	03:00:00	35	34	43	35	35	35	34	0.0%

Project Sound Assessment Interim Report

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-26	04:00:00	35	33	43	35	35	34	34	0.0%
2021-08-26	05:00:00	35	33	51	36	35	35	34	0.0%
2021-08-26	06:00:00	36	34	47	37	36	36	35	0.0%
2021-08-26	07:00:00	39	35	61	39	37	37	36	0.0%
2021-08-26	08:00:00	38	34	53	39	38	37	36	0.0%
2021-08-26	09:00:00	44	34	66	43	39	37	36	0.0%
2021-08-26	10:00:00	44	34	65	43	38	37	35	0.0%
2021-08-26	11:00:00	38	34	67	40	37	37	35	0.0%
2021-08-26	12:00:00	45	33	74	39	37	36	35	0.0%
2021-08-26	13:00:00	37	33	61	39	37	36	35	0.0%
2021-08-26	14:00:00	37	33	57	39	37	36	34	0.0%
2021-08-26	15:00:00	41	34	64	40	38	37	36	0.0%
2021-08-26	16:00:00	43	34	68	42	39	38	36	0.2%
2021-08-26	17:00:00	Excluded							35.1%
2021-08-26	18:00:00	40	35	63	40	38	37	36	13.4%
2021-08-26	19:00:00	Excluded							33.0%
2021-08-26	20:00:00	38	34	67	39	37	36	35	1.7%
2021-08-26	21:00:00	36	33	65	37	35	35	34	0.1%
2021-08-26	22:00:00	35	32	62	35	34	34	33	0.0%
2021-08-26	23:00:00	Excluded							27.5%
2021-08-27	00:00:00	37	34	65	37	36	36	35	0.0%
2021-08-27	01:00:00	36	35	51	37	36	36	35	0.0%
2021-08-27	02:00:00	35	34	44	36	35	35	35	0.1%
2021-08-27	03:00:00	35	34	43	35	35	35	34	0.0%
2021-08-27	04:00:00	35	33	40	35	35	35	34	0.0%
2021-08-27	05:00:00	35	33	49	36	35	35	34	0.0%
2021-08-27	06:00:00	35	33	49	36	35	34	34	0.0%
2021-08-27	07:00:00	36	33	57	37	35	35	34	0.0%
2021-08-27	08:00:00	39	33	65	39	36	36	35	0.0%
2021-08-27	09:00:00	43	34	68	43	38	37	35	0.1%
2021-08-27	10:00:00	38	33	59	39	37	37	35	0.0%
2021-08-27	11:00:00	41	35	69	40	38	38	37	0.0%
2021-08-27	12:00:00	43	35	71	41	39	39	37	0.0%
2021-08-27	13:00:00	39	35	58	40	39	38	37	0.0%
2021-08-27	14:00:00	40	36	55	41	40	39	38	12.5%
2021-08-27	15:00:00	41	36	60	43	40	40	38	2.9%
2021-08-27	16:00:00	38	34	62	40	38	38	36	0.0%
2021-08-27	17:00:00	37	34	60	39	37	37	35	0.0%
2021-08-27	18:00:00	39	34	54	41	38	37	36	0.0%
2021-08-27	19:00:00	39	34	59	41	38	37	36	0.0%
2021-08-27	20:00:00	38	34	56	40	38	37	35	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-27	21:00:00	37	34	51	38	37	36	35	0.0%
2021-08-27	22:00:00	36	33	56	37	36	35	34	0.0%
2021-08-27	23:00:00	36	33	54	38	36	35	34	0.0%
2021-08-28	00:00:00	35	33	55	35	35	35	34	0.0%
2021-08-28	01:00:00	35	34	43	36	35	35	35	0.0%
2021-08-28	02:00:00	36	34	41	36	36	35	35	0.1%
2021-08-28	03:00:00	36	35	38	36	36	36	35	0.0%
2021-08-28	04:00:00	36	35	39	37	36	36	36	0.0%
2021-08-28	05:00:00	37	35	41	37	37	37	36	0.0%
2021-08-28	06:00:00	37	35	55	38	37	37	36	0.0%
2021-08-28	07:00:00	38	35	57	39	38	37	36	0.0%
2021-08-28	08:00:00	40	36	59	41	40	39	38	0.0%
2021-08-28	09:00:00	41	37	62	43	41	40	38	0.0%
2021-08-28	10:00:00	41	35	62	43	40	39	38	0.1%
2021-08-28	11:00:00	41	35	72	42	39	38	36	0.0%
2021-08-28	12:00:00	46	34	74	45	42	41	37	0.0%
2021-08-28	13:00:00	40	34	63	41	39	38	36	0.0%
2021-08-28	14:00:00	42	35	60	44	41	40	37	0.0%
2021-08-28	15:00:00	42	37	61	45	42	41	39	0.1%
2021-08-28	16:00:00	41	37	54	43	41	40	39	0.0%
2021-08-28	17:00:00	41	37	56	42	40	40	39	0.0%
2021-08-28	18:00:00	41	37	57	43	41	40	39	0.0%
2021-08-28	19:00:00	40	36	61	42	40	39	38	0.0%
2021-08-28	20:00:00	39	36	63	40	39	38	37	0.0%
2021-08-28	21:00:00	40	35	71	39	37	37	36	0.0%
2021-08-28	22:00:00	37	35	53	38	37	37	36	0.0%
2021-08-28	23:00:00	37	35	55	37	37	37	36	0.0%
2021-08-29	00:00:00	37	35	60	37	37	37	36	0.0%
2021-08-29	01:00:00	37	36	41	37	37	37	36	0.0%
2021-08-29	02:00:00	37	35	39	37	37	37	36	0.1%
2021-08-29	03:00:00	37	36	40	38	37	37	37	0.0%
2021-08-29	04:00:00	37	36	47	38	38	37	37	0.0%
2021-08-29	05:00:00	38	36	48	39	38	38	37	0.0%
2021-08-29	06:00:00	38	37	54	39	39	38	38	0.0%
2021-08-29	07:00:00	40	36	60	39	39	38	38	0.0%
2021-08-29	08:00:00	40	37	58	42	40	40	38	0.0%
2021-08-29	09:00:00	40	36	64	42	40	40	38	0.0%
2021-08-29	10:00:00	40	35	64	42	40	39	37	0.1%
2021-08-29	11:00:00	42	35	71	42	40	39	37	0.0%
2021-08-29	12:00:00	47	35	71	45	41	40	38	0.0%
2021-08-29	13:00:00	43	36	69	44	41	40	39	0.2%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-29	14:00:00	43	37	60	45	43	42	40	0.0%
2021-08-29	15:00:00	43	37	62	45	43	41	39	0.0%
2021-08-29	16:00:00	43	37	66	44	41	41	39	0.0%
2021-08-29	17:00:00	41	36	61	42	40	40	38	0.0%
2021-08-29	18:00:00	44	35	64	42	40	39	38	0.2%
2021-08-29	19:00:00	39	35	60	40	39	38	37	0.0%
2021-08-29	20:00:00	39	35	59	39	38	37	37	0.0%
2021-08-29	21:00:00	37	35	49	38	37	37	36	0.0%
2021-08-29	22:00:00	37	36	46	38	37	37	37	0.0%
2021-08-29	23:00:00	37	35	42	37	37	37	36	0.0%
2021-08-30	00:00:01	37	35	39	37	37	37	36	0.0%
2021-08-30	01:00:00	36	35	44	37	36	36	36	0.0%
2021-08-30	02:00:00	36	35	49	36	36	36	35	0.1%
2021-08-30	03:00:00	36	34	41	37	36	36	35	0.0%
2021-08-30	04:00:00	36	34	41	37	36	36	35	0.0%
2021-08-30	05:00:00	35	34	39	36	35	35	35	0.0%
2021-08-30	06:00:00	36	33	42	37	36	35	34	0.0%
2021-08-30	07:00:00	36	33	52	37	36	35	34	0.0%
2021-08-30	08:00:00	43	34	66	42	37	36	35	0.1%
2021-08-30	09:00:00	42	33	69	42	37	37	35	0.0%
2021-08-30	10:00:00	39	34	63	40	38	37	36	0.1%
2021-08-30	11:00:00	44	34	75	46	41	38	37	0.1%
2021-08-30	12:00:00	44	35	73	41	39	38	37	0.1%
2021-08-30	13:00:00	40	35	58	43	40	39	37	0.0%
2021-08-30	14:00:00	41	37	57	42	41	40	39	0.0%
2021-08-30	15:00:00	42	38	60	44	42	41	40	0.0%
2021-08-30	16:00:00	40	36	54	42	40	40	38	0.0%
2021-08-30	17:00:00	40	35	62	42	38	38	36	0.2%
2021-08-30	18:00:00	43	34	62	45	39	38	36	0.0%
2021-08-30	19:00:00	40	34	61	41	39	38	36	1.8%
2021-08-30	20:00:00	37	34	57	40	37	36	35	7.3%
2021-08-30	21:00:00	35	33	55	35	34	34	34	0.0%
2021-08-30	22:00:00	34	32	47	35	34	34	33	0.0%
2021-08-30	23:00:00	36	34	54	38	35	35	34	6.9%
2021-08-31	00:00:00	35	33	46	35	35	35	34	0.0%
2021-08-31	01:00:00	35	33	42	35	35	35	34	0.0%
2021-08-31	02:00:00	34	33	37	35	35	34	34	0.1%
2021-08-31	03:00:00	36	33	58	36	36	35	34	0.6%
2021-08-31	04:00:00	35	33	54	35	34	34	34	0.1%
2021-08-31	05:00:00	34	33	40	35	34	34	34	0.0%
2021-08-31	06:00:00	35	32	53	35	35	34	34	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-31	07:00:00	36	33	59	36	35	34	34	0.0%
2021-08-31	08:00:00	37	33	57	39	37	36	34	0.0%
2021-08-31	09:00:00	40	33	61	42	38	37	35	0.1%
2021-08-31	10:00:00				Excluded				42.3%
2021-08-31	11:00:00	48	34	69	45	39	38	36	11.6%
2021-08-31	12:00:00	46	35	72	42	39	38	37	0.8%
2021-08-31	13:00:00	40	35	53	42	40	39	37	0.0%
2021-08-31	14:00:00	40	35	51	41	40	39	37	0.0%
2021-08-31	15:00:00	39	34	61	40	38	37	36	0.0%
2021-08-31	16:00:00	39	34	58	40	38	37	35	0.0%
2021-08-31	17:00:00	38	34	60	39	37	37	35	0.0%
2021-08-31	18:00:00	41	34	66	41	37	37	35	0.0%
2021-08-31	19:00:00	38	33	65	39	37	36	35	0.0%
2021-08-31	20:00:00	35	33	53	36	35	35	34	0.0%
2021-08-31	21:00:00	36	33	54	36	36	35	35	0.0%
2021-08-31	22:00:00	36	34	44	36	36	36	35	0.0%
2021-08-31	23:00:00	36	34	49	36	36	36	35	0.0%
2021-09-01	00:00:00	38	34	59	36	36	35	35	0.0%
2021-09-01	01:00:00	36	34	39	36	36	36	35	0.0%
2021-09-01	02:00:00	36	34	48	37	36	36	35	0.1%
2021-09-01	03:00:00	36	34	43	37	36	36	35	0.0%
2021-09-01	04:00:00	36	35	44	37	36	36	36	0.0%
2021-09-01	05:00:00	37	35	49	37	37	36	36	0.0%
2021-09-01	06:00:00	37	35	55	38	37	37	36	0.0%
2021-09-01	07:00:00	38	35	61	39	38	37	36	0.0%
2021-09-01	08:00:00	38	35	56	39	38	38	37	0.0%
2021-09-01	09:00:00	41	35	67	43	38	38	36	0.0%
2021-09-01	10:00:00	42	35	59	44	41	39	36	0.0%
2021-09-01	11:00:00	47	39	77	48	45	43	41	5.4%
2021-09-01	12:00:00	51	39	84	48	45	44	42	5.8%

**Table A-6. Hourly noise metrics, Caskey Lake (dBA).**

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-24	19:00:00				Excluded				100.00%
2021-08-24	20:00:00				Excluded				100.00%
2021-08-24	21:00:00				Excluded				100.00%
2021-08-24	22:00:00				Excluded				100.00%
2021-08-24	23:00:00				Excluded				100.00%
2021-08-25	00:00:00	30	27	40	31	30	29	28	0.0%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-25	01:00:00	31	27	47	32	31	30	29	0.0%
2021-08-25	02:00:00	30	27	45	31	30	30	28	0.1%
2021-08-25	03:00:00	31	27	46	32	30	29	29	0.0%
2021-08-25	04:00:00	32	27	44	35	31	30	29	0.0%
2021-08-25	05:00:00	32	26	65	33	30	30	27	0.0%
2021-08-25	06:00:00	34	27	49	37	33	32	29	0.0%
2021-08-25	07:00:00	33	27	52	36	32	31	28	0.0%
2021-08-25	08:00:00	31	25	47	33	31	30	28	0.0%
2021-08-25	09:00:00	29	24	43	31	29	29	27	0.0%
2021-08-25	10:00:00	29	24	43	30	29	29	27	0.0%
2021-08-25	11:00:00	33	25	52	36	29	29	28	0.4%
2021-08-25	12:00:00	42	25	66	38	30	29	28	0.2%
2021-08-25	13:00:00	31	26	47	34	31	30	28	10.3%
2021-08-25	14:00:00	36	30	58	36	34	33	31	16.5%
2021-08-25	15:00:00	Excluded							33.2%
2021-08-25	16:00:00	Excluded							33.2%
2021-08-25	17:00:00	36	25	58	38	35	33	28	18.6%
2021-08-25	18:00:00	33	24	55	34	30	30	27	1.6%
2021-08-25	19:00:00	30	25	46	31	30	29	28	0.2%
2021-08-25	20:00:00	42	26	68	33	30	29	27	0.5%
2021-08-25	21:00:00	27	25	38	29	28	27	26	0.0%
2021-08-25	22:00:00	28	24	50	28	26	26	25	0.0%
2021-08-25	23:00:00	27	24	37	28	27	27	26	0.0%
2021-08-26	00:00:00	26	24	40	28	27	26	25	0.0%
2021-08-26	01:00:00	29	25	45	31	28	27	26	0.0%
2021-08-26	02:00:00	26	24	43	28	26	25	25	0.1%
2021-08-26	03:00:00	26	24	41	28	26	25	25	0.0%
2021-08-26	04:00:00	29	24	50	30	27	27	25	0.0%
2021-08-26	05:00:00	35	24	64	31	28	27	25	0.0%
2021-08-26	06:00:00	32	25	57	34	30	29	26	0.0%
2021-08-26	07:00:00	32	25	46	34	32	31	28	0.0%
2021-08-26	08:00:00	30	25	46	32	30	29	27	0.0%
2021-08-26	09:00:00	42	24	67	33	30	29	26	0.0%
2021-08-26	10:00:00	40	25	63	33	31	29	27	0.1%
2021-08-26	11:00:00	33	26	53	34	32	31	29	0.0%
2021-08-26	12:00:00	34	27	52	36	33	32	30	1.9%
2021-08-26	13:00:00	33	27	50	35	33	32	30	3.1%
2021-08-26	14:00:00	35	24	53	38	35	33	31	0.3%
2021-08-26	15:00:00	42	24	64	45	40	38	34	1.7%
2021-08-26	16:00:00	Excluded							38.5%
2021-08-26	17:00:00	38	24	60	35	30	30	26	0.7%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-26	18:00:00	43	24	67	40	33	31	25	21.4%
2021-08-26	19:00:00	31	24	54	32	30	28	26	0.0%
2021-08-26	20:00:00	37	28	60	38	32	31	30	13.8%
2021-08-26	21:00:00	Excluded							92.8%
2021-08-26	22:00:00	Excluded							68.1%
2021-08-26	23:00:00	41	32	65	44	41	39	36	0.3%
2021-08-27	00:00:00	34	29	58	36	34	33	31	0.0%
2021-08-27	01:00:00	32	28	57	33	32	31	30	0.0%
2021-08-27	02:00:00	31	28	61	32	31	31	30	0.1%
2021-08-27	03:00:00	31	27	56	33	31	30	29	0.0%
2021-08-27	04:00:00	30	27	59	31	30	29	28	0.0%
2021-08-27	05:00:00	32	27	56	35	32	30	28	0.0%
2021-08-27	06:00:00	33	28	61	35	33	32	30	0.0%
2021-08-27	07:00:00	31	26	53	34	31	30	28	0.0%
2021-08-27	08:00:00	31	26	51	32	30	29	28	0.2%
2021-08-27	09:00:00	33	27	44	36	34	33	29	0.2%
2021-08-27	10:00:00	35	27	57	35	34	33	30	3.2%
2021-08-27	11:00:00	48	27	76	42	34	33	30	3.1%
2021-08-27	12:00:00	36	28	58	37	34	33	31	9.7%
2021-08-27	13:00:00	Excluded							30.1%
2021-08-27	14:00:00	34	29	50	36	34	33	32	18.1%
2021-08-27	15:00:00	32	26	44	34	32	31	29	19.0%
2021-08-27	16:00:00	37	24	60	32	29	28	25	0.0%
2021-08-27	17:00:00	27	23	51	29	27	26	24	0.0%
2021-08-27	18:00:00	32	23	57	28	25	25	24	0.0%
2021-08-27	19:00:00	29	24	47	30	27	26	25	0.0%
2021-08-27	20:00:00	26	23	58	27	25	25	24	0.0%
2021-08-27	21:00:00	25	22	45	25	25	24	24	0.0%
2021-08-27	22:00:00	25	23	35	27	25	25	24	0.0%
2021-08-27	23:00:00	25	24	31	26	25	25	24	0.0%
2021-08-28	00:00:00	25	23	44	26	26	25	25	0.0%
2021-08-28	01:00:00	25	23	40	26	25	25	24	0.0%
2021-08-28	02:00:00	25	23	36	26	26	25	24	0.1%
2021-08-28	03:00:00	25	23	38	26	25	25	24	0.0%
2021-08-28	04:00:00	25	23	36	25	25	25	24	0.0%
2021-08-28	05:00:00	26	23	52	26	24	24	24	0.0%
2021-08-28	06:00:00	26	23	39	27	25	25	24	0.0%
2021-08-28	07:00:00	29	23	53	29	27	26	25	0.0%
2021-08-28	08:00:00	39	26	62	38	32	30	27	0.0%
2021-08-28	09:00:00	31	25	63	31	29	28	27	0.1%
2021-08-28	10:00:00	30	24	45	31	29	29	27	0.1%

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-28	11:00:00	40	26	69	36	31	30	28	1.4%
2021-08-28	12:00:00	33	25	56	31	29	29	28	0.7%
2021-08-28	13:00:00	30	25	43	31	30	29	28	1.9%
2021-08-28	14:00:00	35	27	55	34	31	30	29	7.2%
2021-08-28	15:00:00	31	26	48	31	30	30	28	2.5%
2021-08-28	16:00:00	34	27	53	37	33	32	29	15.1%
2021-08-28	17:00:00	33	29	52	35	33	32	30	13.3%
2021-08-28	18:00:00	33	28	50	34	32	32	30	2.4%
2021-08-28	19:00:00	33	27	46	35	32	32	30	0.0%
2021-08-28	20:00:00	31	26	57	31	30	29	28	0.0%
2021-08-28	21:00:00	30	25	38	32	30	29	27	0.0%
2021-08-28	22:00:00	29	26	40	30	29	28	27	0.0%
2021-08-28	23:00:00	28	25	44	29	28	27	26	0.0%
2021-08-29	00:00:00	28	25	36	29	28	27	26	0.0%
2021-08-29	01:00:00	28	25	43	29	28	27	26	0.0%
2021-08-29	02:00:00	27	25	39	27	27	26	26	0.1%
2021-08-29	03:00:00	27	25	39	28	27	27	26	0.0%
2021-08-29	04:00:00	27	25	39	29	27	27	26	0.0%
2021-08-29	05:00:00	31	25	57	30	29	28	26	0.0%
2021-08-29	06:00:00	33	28	47	35	33	33	30	0.0%
2021-08-29	07:00:00	35	32	49	36	35	35	34	0.0%
2021-08-29	08:00:00	32	25	51	35	32	30	27	0.0%
2021-08-29	09:00:00	28	24	47	30	28	27	26	0.0%
2021-08-29	10:00:00	34	24	59	31	29	28	27	0.6%
2021-08-29	11:00:00	39	27	65	34	31	31	29	9.1%
2021-08-29	12:00:00	40	27	63	35	31	30	29	7.6%
2021-08-29	13:00:00	36	27	58	32	30	29	28	2.3%
2021-08-29	14:00:00	33	27	57	33	31	31	29	16.7%
2021-08-29	15:00:00	Excluded							32.1%
2021-08-29	16:00:00	Excluded							37.4%
2021-08-29	17:00:00	36	30	49	38	35	34	32	17.9%
2021-08-29	18:00:00	38	29	60	37	34	33	31	6.4%
2021-08-29	19:00:00	35	28	57	33	32	32	30	0.1%
2021-08-29	20:00:00	31	27	47	33	32	31	29	0.0%
2021-08-29	21:00:00	31	27	46	33	31	30	29	0.0%
2021-08-29	22:00:00	28	25	43	29	28	27	26	0.0%
2021-08-29	23:00:00	27	25	36	29	27	27	26	0.0%
2021-08-30	00:00:01	28	24	40	29	28	28	27	0.0%
2021-08-30	01:00:00	27	24	40	28	27	26	25	0.0%
2021-08-30	02:00:00	27	24	38	27	27	26	26	0.1%
2021-08-30	03:00:00	28	25	37	30	28	27	26	0.0%

Project Sound Assessment Interim Report

Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-30	04:00:00	33	24	61	30	28	28	26	0.0%
2021-08-30	05:00:00	32	25	55	34	32	31	28	0.0%
2021-08-30	06:00:00	37	29	56	39	36	35	32	0.0%
2021-08-30	07:00:00	34	28	52	38	32	31	30	0.0%
2021-08-30	08:00:00	37	29	50	39	37	36	34	0.0%
2021-08-30	09:00:00	34	26	47	37	34	33	30	0.1%
2021-08-30	10:00:00	32	25	54	31	30	29	28	0.4%
2021-08-30	11:00:00	29	25	44	30	29	28	27	0.4%
2021-08-30	12:00:00	32	24	55	31	29	28	26	0.2%
2021-08-30	13:00:00	28	24	38	30	28	27	26	0.1%
2021-08-30	14:00:00	37	27	64	37	35	34	30	1.5%
2021-08-30	15:00:00	35	27	56	37	34	33	30	2.2%
2021-08-30	16:00:00	32	24	54	32	31	31	28	0.2%
2021-08-30	17:00:00	27	23	38	28	27	26	25	0.0%
2021-08-30	18:00:00	38	24	61	37	33	32	29	5.6%
2021-08-30	19:00:00	36	27	51	39	37	35	31	17.7%
2021-08-30	20:00:00	38	26	53	43	38	36	29	10.1%
2021-08-30	21:00:00	30	25	55	32	30	29	26	0.0%
2021-08-30	22:00:00	31	25	62	34	30	28	27	8.8%
2021-08-30	23:00:00	26	24	42	27	26	26	25	0.0%
2021-08-31	00:00:00	25	23	36	26	25	25	24	0.0%
2021-08-31	01:00:00	25	23	42	26	25	25	24	0.0%
2021-08-31	02:00:00	27	23	44	28	27	26	24	0.1%
2021-08-31	03:00:00	32	25	56	31	29	28	26	0.0%
2021-08-31	04:00:00	47	25	75	38	32	30	27	0.2%
2021-08-31	05:00:00	32	27	52	33	31	31	29	0.0%
2021-08-31	06:00:00	34	27	58	36	33	32	29	2.7%
2021-08-31	07:00:00	47	26	75	36	32	30	28	5.9%
2021-08-31	08:00:00	Excluded							33.7%
2021-08-31	09:00:00	50	28	77	40	37	34	31	0.1%
2021-08-31	10:00:00	50	26	79	50	35	32	28	0.9%
2021-08-31	11:00:00	43	26	73	38	34	33	30	3.4%
2021-08-31	12:00:00	47	31	70	42	38	36	33	23.7%
2021-08-31	13:00:00	42	29	72	37	35	34	32	0.0%
2021-08-31	14:00:00	Excluded							28.1%
2021-08-31	15:00:00	35	25	59	38	34	32	27	8.1%
2021-08-31	16:00:00	33	25	54	35	30	29	27	0.6%
2021-08-31	17:00:00	32	23	53	29	27	26	24	0.0%
2021-08-31	18:00:00	29	23	49	29	25	24	24	0.0%
2021-08-31	19:00:00	30	23	54	26	25	24	24	0.0%
2021-08-31	20:00:00	35	24	62	31	27	26	25	0.0%

Project Sound Assessment Interim Report

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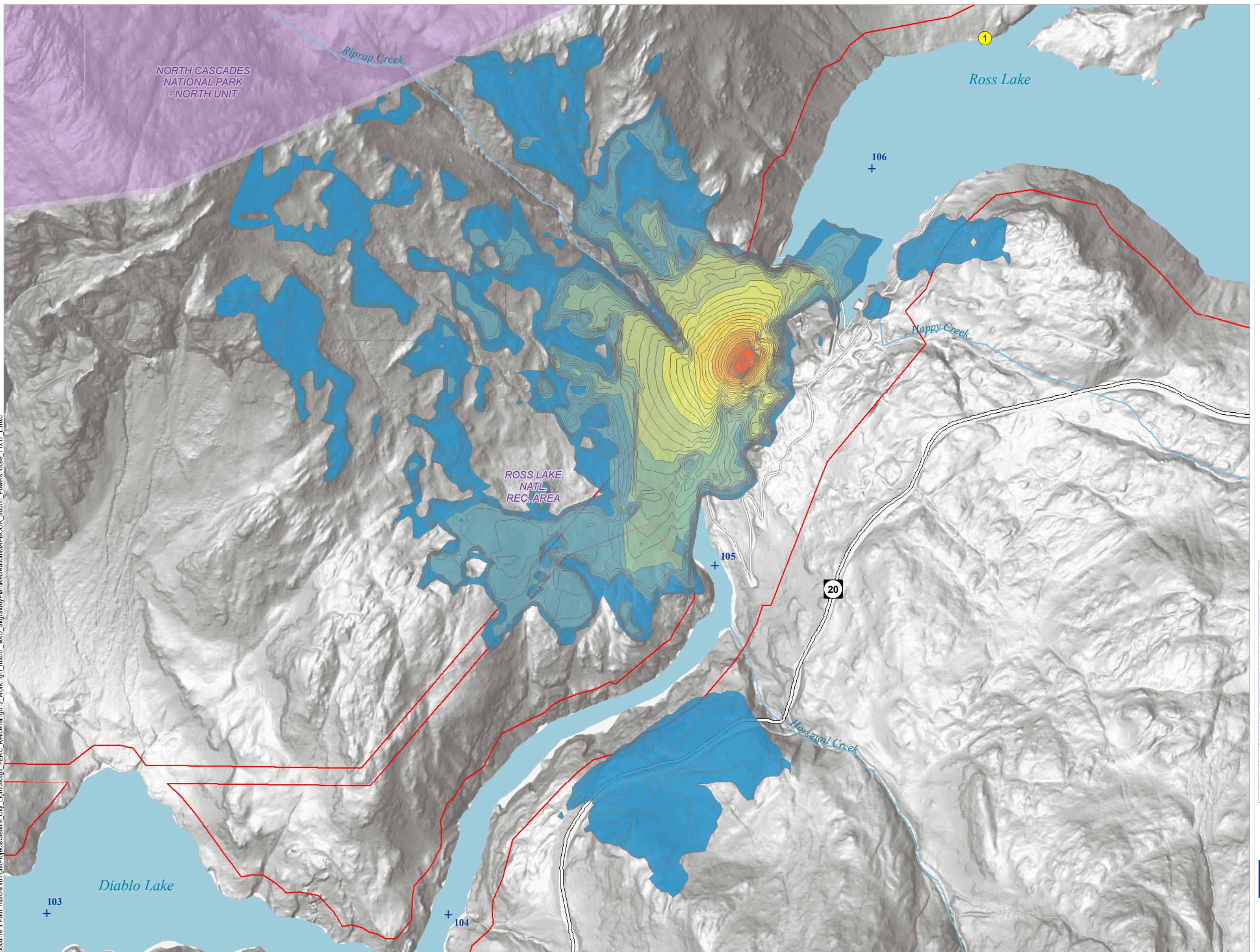
Date	Time	L <sub>eq</sub>	L <sub>min</sub>	L <sub>max</sub>	L <sub>10</sub>	L <sub>33</sub>	L <sub>50</sub>	L <sub>90</sub>	Percent Excluded
2021-08-31	21:00:00	28	24	50	27	26	26	25	0.0%
2021-08-31	22:00:00	26	23	33	27	26	25	24	0.0%
2021-08-31	23:00:00	26	23	34	27	26	25	25	0.0%
2021-09-01	00:00:00	26	24	37	27	26	26	25	0.0%
2021-09-01	01:00:00	26	24	37	27	26	26	25	0.0%
2021-09-01	02:00:00	28	25	38	29	28	27	26	0.1%
2021-09-01	03:00:00	33	28	48	34	33	33	30	0.0%
2021-09-01	04:00:00	52	31	76	42	36	35	33	0.5%
2021-09-01	05:00:00	50	30	76	44	38	37	33	0.1%
2021-09-01	06:00:00	49	30	74	42	39	37	33	0.0%
2021-09-01	07:00:00	46	27	72	41	37	36	32	0.0%
2021-09-01	08:00:00	50	31	77	49	44	41	35	0.2%
2021-09-01	09:00:00	51	29	76	44	39	38	34	0.6%
2021-09-01	10:00:00	47	27	74	39	36	34	32	0.0%
2021-09-01	11:00:00	47	27	77	40	36	34	31	1.4%
2021-09-01	12:00:00	49	28	74	39	36	35	33	16.6%
2021-09-01	13:00:00	44	28	73	40	37	36	32	3.4%
2021-09-01	14:00:00	42	27	72	39	36	35	32	11.8%

**PROJECT SOUND ASSESSMENT INTERIM REPORT**

**ATTACHMENT B**

**BASE NOISE MODELING CONTOUR MAPBOOK**

**RA-04 PROJECT SOUND  
ASSESSMENT  
BASE NOISE MODELING  
CONTOURS  
ROSS POWERHOUSE**

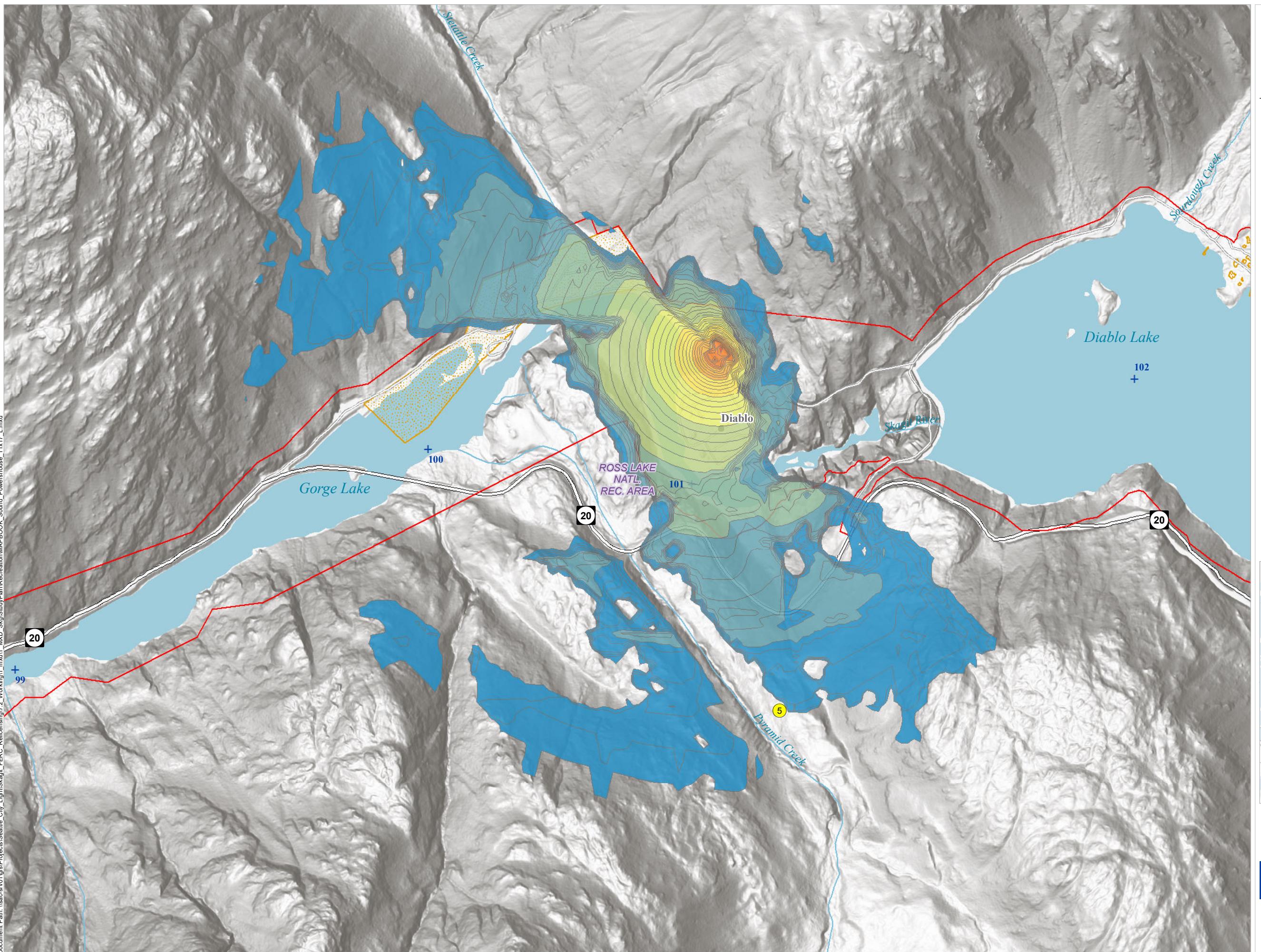


Seattle City Light

**SKAGIT RIVER HYDROELECTRIC  
PROJECT (FERC NO. 553)**

Created on 2/1/2022 by HDR for Seattle City Light.  
City Light provides no warranty, expressed or implied, as to the accuracy, reliability or completeness of this data.  
Data Source: Sound, HDR.

**RA-04 PROJECT SOUND ASSESSMENT BASE NOISE MODELING CONTOURS DIABLO POWERHOUSE**



- FERC Project Boundary
  - Mitigation Parcel
  - Project River Miles (PRM)
  - Sound Monitor Location
- dBA Leq**
- |       |
|-------|
| 26-30 |
| 30-35 |
| 35-40 |
| 40-45 |
| 45-50 |
| 50-55 |
| 55-60 |
| 60-65 |
| 65-70 |
| 70-72 |
- National Recreation Area (NPS)  
Seattle City Light



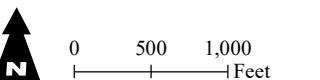
Seattle City Light

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Data Source: Sound, HDR.

**RA-04 PROJECT SOUND  
ASSESSMENT  
BASE NOISE MODELING  
CONTOURS  
GORGE POWERHOUSE**

- FERC Project Boundary
  - Mitigation Parcel
  - + Project River Miles (PRM)
  - Sound Monitor Location
- | dBA Leq |
|---------|
| 26-30   |
| 30-35   |
| 35-40   |
| 40-45   |
| 45-50   |
| 50-55   |
| 55-60   |
| 60-65   |
| 65-70   |
| 70-72   |
- National Park Service  
National Recreation Area (NPS)  
Seattle City Light



Seattle City Light

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PROJECT (FERC NO. 553)**

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Data Source: Sound, HDR.

