Fulton-Fitch Mountain Reconductoring Project

Noise Study Report

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1 INTRODUCTION

1.1 PURPOSE OF STUDY

The purpose of this noise study is to evaluate existing noise in the surrounding environment for the Pacific Gas and Electric Company (PG&E) Fulton-Fitch Mountain Reconductoring Project (proposed project) and analyze noise and vibration that would result from implementation of the proposed project. This study supports the basis for an evaluation of noise and vibration impacts for the proposed project required under the California Environmental Quality Act (CEQA).

This report presents the results of background noise measurements collected by The RCH Group (RCH), and an assessment of noise and vibration that would result from the proposed project during construction, operation, and maintenance, including recommendations to address the effects of noise and vibration increases.

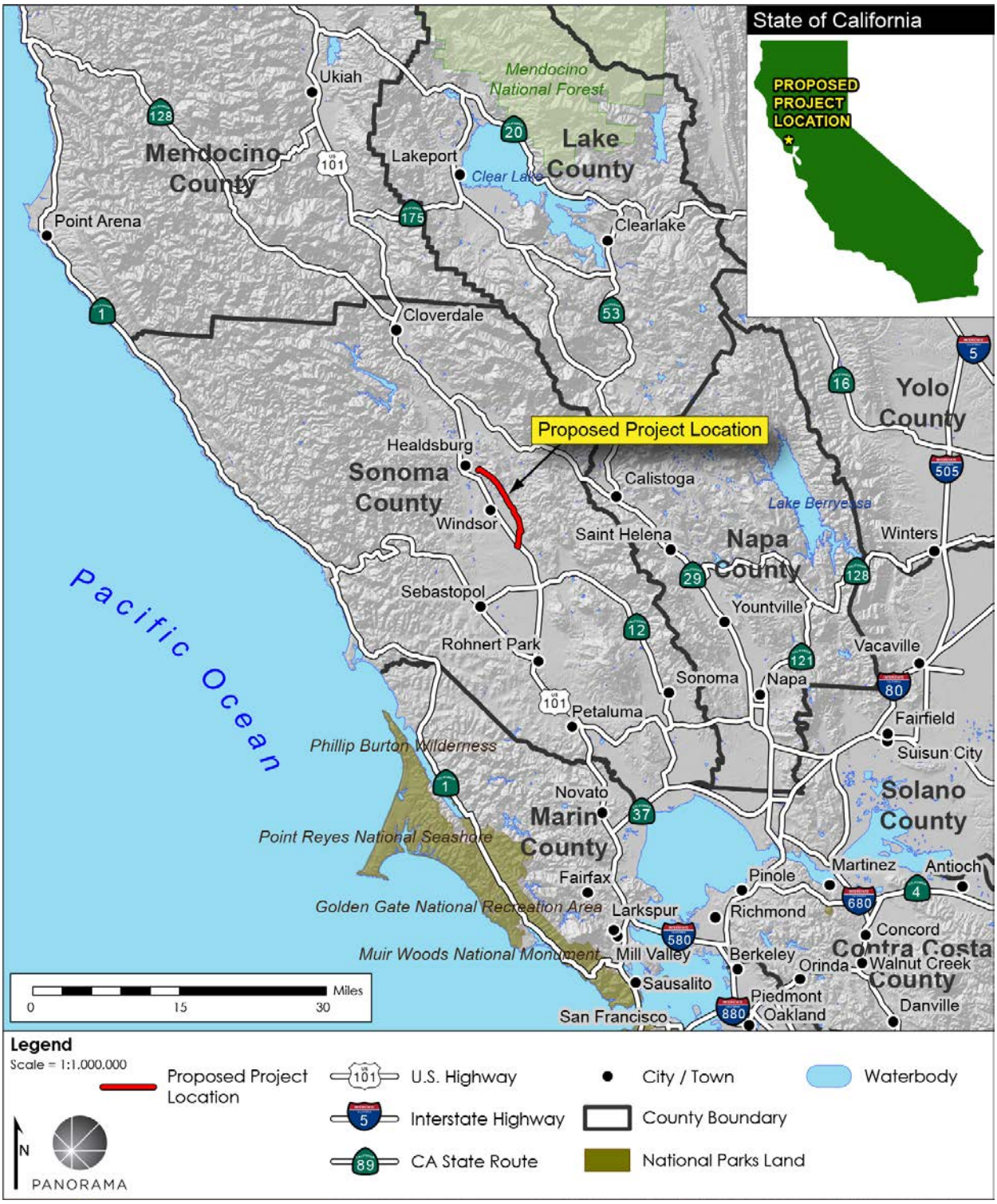
1.2 PROJECT DESCRIPTION

The proposed project is primarily located in unincorporated Sonoma County, California, and passes through a small portion of the Town of Windsor. **Figure 1-1** shows the regional project location. The project alignment originates at the Fulton Substation in Fulton and travels north through residential neighborhoods in Larkfield-Wikiup, regional parks, rural residential, vineyards, rangeland, woodland, and other open space. The project alignment terminates at the Fitch Mountain #1 Tap, located south of Bailhache Avenue and the Russian River. Project activities would also occur at Fitch Mountain Substation, located east of the City of Healdsburg, between the Russian River and Bailhache Avenue.

PG&E is proposing to reinforce the electric transmission and distribution system in Sonoma County by replacing existing conductor ("reconductoring") on two power lines. PG&E proposes to replace the conductor on a 9.8-mile-long section of the Fulton-Hopland 60-kilovolt (kV) Power Line (Fulton-Hopland line) between Fulton Substation and Fitch Mountain Substation. The proposed project would also include replacing poles along 8 miles of the Fulton-Hopland line, replacing conductor on 1.4 miles of the Geysers #12-Fulton 230-kV Transmission Line (Geysers #12 line), and making modifications to Fitch Mountain Substation.

The proposed project would be comprised of two segments: the Southern Segment and the Northern Segment. The Southern Segment would extend from Fulton Substation to Shiloh Ranch Regional Park, and the Northern Segment would extend between Shiloh Ranch Regional Park and the Fitch Mountain #1 Tap 60-kV Power Line (Fitch Mountain #1 Tap).

Figure 1-1 Regional Project Location



Sources: (ESRI 2016), (USGS 2012), (PG&E 2016)

2 ENVIRONMENTAL SETTING

2.1 EXISTING LAND USES AND NOISE SOURCES

2.1.1 Southern Segment

Land uses surrounding the Fulton Substation and along the project alignment in the Southern Segment include agricultural and residential. Northeast of Highway 101, the Southern Segment passes through the residential neighborhood of Larkfield-Wikiup, which includes Maddux Ranch Regional Park, two schools, and low- and medium-density residential development. As the alignment leaves the residential neighborhoods, it crosses Faught Road and continues northward, where land uses transition to rural residential and agriculture.

The noise environment along the Southern Segment is typical of a residential setting. Existing noise sources include motor vehicle traffic, construction activities, dogs barking, children playing, and other miscellaneous noises coming from residences, schools, and parks.

2.1.2 Northern Segment

Land uses along the Northern Segment include open space, agriculture, rural residential, and regional parks. The Northern Segment passes through Shiloh Ranch Regional Park, Foothill Regional Park, vineyards, rangeland, woodland, and agricultural preserves.

The noise environment along the Northern Segment is typical of a rural setting. Existing noise sources include intermittent vehicle traffic, wildlife, and regional park activities.

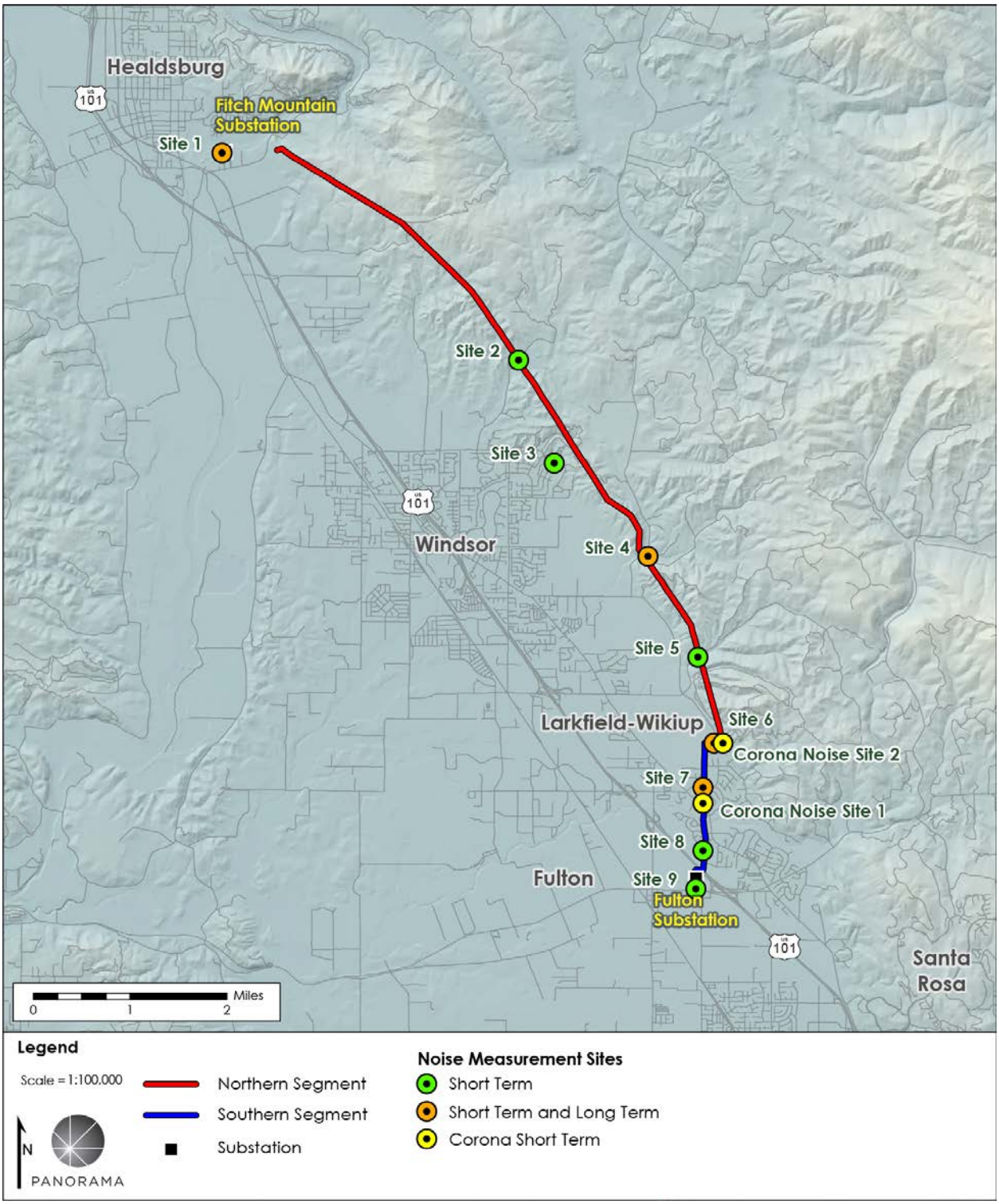
2.1.3 Fitch Mountain Substation

Fitch Mountain Substation and surrounding parcels are located on land designated as rural residential. Noise near Fitch Mountain Substation is dominated by noise from the existing substation and noise from an adjacent gravel quarry.

2.2 AMBIENT NOISE MEASUREMENTS

To characterize the existing ambient noise environment, noise measurements and observations were performed near the project alignment at the locations shown in **Figure 2-1.**

Figure 2-1 Noise Measurement Locations



Sources: (ESRI 2016), (PG&E 2016)

On Monday, May 23, 2016, RCH Staff conducted short-term (10 to 20 minutes) noise measurements at eight different locations and programmed long-term noise meters at four different locations to measure noise for 48 hours beginning at 12 a.m. Tuesday morning, May 24, 2016. RCH staff used Metrosonics db308 sound level meters equipped with a windscreen, which were calibrated before and after the noise measurement. The temperature ranged from 67 to 74 degrees Fahrenheit under sunny and generally calm wind conditions, with a humidity ranging from 41 to 56 percent.

On Thursday, May 26, 2016, RCH Staff conducted short-term (10 to 20 minutes) noise measurements at five different locations and collected the long-term noise meter measurements at the four locations mentioned above. The temperature ranged from 68 to 77 degrees Fahrenheit under sunny and generally steady wind conditions, with a humidity ranging from 44 to 56 percent.

Noise measurement locations and observations are summarized in **Table 2-1** and detailed in data sheets included in Attachment A. Measured existing outdoor ambient noise levels are displayed in **Table 2-2** and detailed in Attachment A.

Table 2-1 Noise Measurement Locations

Site ID	Location	Approximate Distance from Alignment	Land Use	Dominant Noise Source
1	Adjacent to Fitch Mountain Substation on Bumpy Road	2,250 feet from Shiloh-Fitch Segment	Residential	Substation noise
2	Brooks Road	85 feet	Residential/ Recreation	Wildlife, airplanes, and cars on Brooks Road
3	Foothill Regional Park	1,350 feet	Recreation	Wildlife, airplanes, people using trails
4	Leslie Road	Underneath	Residential	Cars on Chalk Hill Road and Leslie Road
5	Shiloh Ridge Road near alignment	35 feet	Residential	Cars on Shiloh Ridge Road and tractor in field across road
6	Shiloh Ridge Regional Park trail near bend in Faught Road	15 feet	Residential/Recreation	Cars on Faught Road, distant construction, insects, birds
7	East side of Faught Road north of Faught Court	Underneath	Residential	Traffic on Faught Road, residential noise
8	Park Across from Mark West Elementary School	Underneath	Residential/Recreation	Traffic on Lavell Road, construction at school, children at School
9	Fulton Substation	30 feet	Residential	Traffic on River Road

Table 2-2 Outdoor Ambient Noise Levels

Site ID	Time Period	CNEL	L_{eq} [a]	L_{max}	L2 [b]	L50 [c]
Site 1 LT [d]	Tuesday May 24, 2016, 0:00 to Wednesday May 25, 2016, 23:59	62, 63	54-62, 55-61	55-78, 55-79	54-67, 55-67	54-59, 54-58
Site 1 ST	Monday May 23, 2016 14:48 to 14:58	NA	57, 57	63, 59	61,58	56, 56
	Thursday May 26, 2016 16:51 to 17:01	NA	57, 57	58, 57	57, 58	57, 57
Site 2 ST	Thursday May 26, 2016 16:10 to 16:30	NA	47, 45, 46, 53	59, 57, 57, 71	55, 51, 51, 63	43, 43, 43, 43
Site 3 ST	Monday May 23, 2016 13:54 – 14:14	NA	45, 46, 46, 47	57, 56, 58, 60	50, 52, 51, 56	43, 44, 43, 43
Site 4 LT [d]	Tuesday May 24, 2016, 0:00 to Wednesday May 25, 2016, 23:59	53, 60	43-53, 43-72	45-84, 43-89	43-58, 43-82	43, 43-57
Site 4 ST	Monday May 23, 2016 13:22 to 13:32	NA	47, 58	63, 79	53, 67	43, 43
	Thursday May 26, 2016 15:43 to 15:53	NA	44, 44	51, 58	47, 49	43, 43
Site 5 ST	Monday May 23, 2016 12:34 to 12:54	NA	46, 46, 47, 47	57, 59, 58, 59	52, 55, 55, 54	43, 43, 43, 43
Site 6 LT [d]	Tuesday May 24, 2016, 0:00 to Wednesday May 25, 2016, 23:59	51, 51	43-50, 42-48	44-71, 42-71	42-58, 42-56	42-45, 42-54
Site 6 ST	Monday May 23, 2016 12:09 to 12:19	NA	45, 47	51, 54	50, 52	43, 45
	Thursday May 26, 2016 15:16 to 15:26	NA	46, 48	58, 64	51, 55	43, 45
Site 7 LT [d]	Tuesday May 24, 2016, 0:00 to Wednesday May 25, 2016, 23:59	64, 60	44-76, 44-65	57-91, 53-96	43-84, 43-74	43-63, 43-56
Site 7 ST	Monday May 23, 2016 11:31 to 11:41	NA	54, 54	69, 69	63, 64	46, 45
	Thursday May 26, 2016 14:45 to 14:55	NA	59, 59	69, 70	64, 66	56, 55
Site 8 ST	Monday May 23, 2016 10:57 to 11:07	NA	57,54	64, 62	62, 60	55, 53
	Thursday May 26, 2016 14:23 to 14:33	NA	57, 59	66, 67	63, 65	55, 57
Site 9 ST	Monday May 23, 2016 15:18 to 15:38	NA	63, 63, 63, 63	72, 70, 76, 70	66, 67, 69, 68	62, 62, 61, 62

Notes:

[a] Short-term L_{eq} measurements are 20-minute intervals. Long-term L_{eq} measurements are the range of 1-hour intervals for each 24-hour period.

[b] The L2 is the value exceeded 2% of the time or 72 seconds in any hour.

[c] The L50 is the value exceeded 50% of the time or 30 minutes in any hour; the median noise level.

[d] The range of L_{eq}, L_{max}, L2, and L50 values for a 24-hour period are listed for long-term measurements. Long-term measurements were continuous 48-hour measurements.

Source: RCH Group 2016

2.3 AUDIBLE CORONA NOISE MEASUREMENTS

On May 26, 2016, RCH staff attempted to measure corona noise levels from the existing transmission line at two different sites. Corona Site 1, as shown in **Figure 2-1**, is under the existing transmission in an empty grassy area northwest of ASAP at The Cove (an after school arts program for kids). Corona Site 2 is under the existing transmission line that runs above Shiloh Park Trail near Site 7. RCH staff used a Larson Davis SoundTrack LxT sound level meter equipped with a windscreen, calibrated before the noise measurements. At Corona Site 1, the temperature was 68 degrees Fahrenheit and sunny, with steady wind conditions and a humidity of 56 percent. At Corona Site 2, the temperature was 68 degrees Fahrenheit and sunny, with calm wind conditions and a humidity of 56 percent.

A short-term 10-minute noise measurement was recorded at Corona Site 1 from 18:46 to 18:56. The L_{eq} was 57.3 dB, the L_{min} was 44.8 dB, and the L_{max} was 67.9 dB. Corona noise levels could not be measured as RCH staff was unable to hear audible corona noise from the existing transmission line. The outdoor ambient noise at Corona Site 1 was too loud at the time of the measurement due to traffic noise on Faught Road and Old Redwood Highway. Therefore, RCH staff moved to a more remote location (Corona Site 2) to attempt to measure corona noise levels from the existing line.

A short-term 10-minute noise measurement was recorded at Corona Site 2 from 19:04 to 19:14. The L_{eq} was 41.4 dB, the L_{min} was 36.5 dB, and the L_{max} was 54.7 dB. Corona noise levels could not be measured as RCH staff was unable to hear audible corona noise from the existing transmission line. At the L_{min} of 36.5 dB, RCH staff was unable to hear any audible corona noise, and could only hear background noise from insects and birds, therefore under the aforementioned conditions, corona noise levels from the existing transmission line are less than 36.5 dB.

3 NOISE AND VIBRATION ANALYISIS

3.1 CONSTRUCTION

3.1.1 Noise

Methodology

Construction noise is considered temporary and short-term in duration. Construction noise at its source varies depending on construction activity, duration, and type and usage of equipment involved. Noise impacts from construction are dependent on the construction noise levels generated, the timing and duration of the construction activities, proximity to sensitive receptors, and impact thresholds, including noise regulations and standards. Construction equipment can be stationary or mobile. Stationary equipment operates in one location for various periods of time with fixed-power operation, such as pumps, generators, and compressors, or a variable noise operation, such as rock drills or augers. Mobile equipment, such as bulldozers, graders, and loaders, move around construction areas.

Proposed Equipment and Hourly Usage

Project construction is broken into different phases, each with specific construction activities and equipment. Maximum noise levels (L_{max}) are instantaneous measurements that vary by equipment. Average noise levels (L_{eq}) are also used to quantify construction noise. L_{eq} levels for individual equipment are often lower than L_{max} noise levels because L_{eq} considers the mobility and usage factor (the percentage of time during a construction noise operation that a piece of equipment is operating at full power) for each piece of equipment.

Cumulative Noise Levels

Cumulative noise levels were determined using the Federal Highway Administration's (FHWA) Roadway Construction Noise Model (RCNM), which is the national model for prediction of construction noise based on noise calculations and extensive construction noise data. Cumulative noise levels are estimated using the L_{eq} for the two loudest pieces of equipment that would be used during a given activity.

Noise Attenuation

Noise levels from construction activities would attenuate with distance at a rate of approximately 6 dB per doubling of distance over acoustically hard sites, such as streets and parking lots. Noise levels from construction activities would attenuate with distance at a rate of 7.5 dB per doubling of distance over acoustically soft sites, such as soft dirt and grass. Natural terrain features such as hills and manmade features, such as buildings and walls, can significantly alter noise levels (Caltrans 2013). These factors generally limit the distance

construction noise travels. Noise attenuation rates for this project have been conservatively estimated using a 6 dB decrease per each doubling of distance.

Ground-Based Activities

Table 3-1 lists the maximum noise levels for ground-based equipment identified by PG&E.

Table 3-1 Maximum Noise Levels from Proposed Ground-Based Equipment

Equipment	L_{max} at 50 Feet	1-Hour L_{eq} at 50 Feet	Usage Factor
ASV mower or similar equipment on rubber tracks [a]	82 dB	78 dB	40%
Back hoe	78 dB	74 dB	40%
Bobcat	78 dB	74 dB	40%
Boom truck	83 dB	79 dB	40%
Bucket truck	74 dB	70 dB	40%
Concrete truck	79 dB	75 dB	40%
Chipper truck with chipper [b]	81 dB	74 dB	20%
Compressor	78 dB	74 dB	40%
Crane	81 dB	73 dB	16%
Crawler mounted with auger	84 dB	77 dB	20%
D4/D6 dozer	82 dB	78 dB	40%
Drill rig	79 dB	72 dB	20%
Dump truck	76 dB	73 dB	40%
Excavator	81 dB	77 dB	40%
Forklift	80 dB	76 dB	40%
Generator	81 dB	78 dB	50%
Jackhammer	89 dB	82 dB	20%
Light tower	70 dB	70 dB	100%
Line truck with auger attachment	84 dB	77 dB	20%
Line truck with tensioner or puller attachment [d]	74 dB	70 dB	75%
Line truck with trailer [d]	74 dB	70 dB	40%
Line truck with worker lift attachment [d]	74 dB	70 dB	40%
Man lift	75 dB	68 dB	20%
Motor grader	85 dB	81 dB	40%
Paver	77 dB	74 dB	50%

Equipment	L_{max} at 50 Feet	1-Hour L_{eq} at 50 Feet	Usage Factor
Pickup truck/crew-cab truck/ F550 truck	75 dB	71 dB	40%
Rigging truck [d]	74 dB	70 dB	40%
Semi-truck with trailer [c]	76 dB	73 dB	40%
Shiflet truck [d]	74 dB	70 dB	40%
Skip loader	80 dB	75 dB	40%
Skid steer	78 dB	74 dB	40%
UTV mounted with hydraulic jack	82 dB	78 dB	40%
UTV with excavator [a]	82 dB	78 dB	40%
UTV with worker-lift attachment [a]	82 dB	78 dB	40%
Water truck [c]	76 dB	73 dB	40%

Notes:

[a] Noise level based on EPA requirements for off-highway vehicles greater than 170 cc built 1986 or newer

[b] Tetra Tech 2011

[c] Based on dump truck

[d] Based on flat-bed truck

Source: (U.S. DOT 2008) (unless noted otherwise)

Table 3-2 provides the maximum noise level for the loudest piece of construction equipment, and the calculated cumulative noise level (L_{eq}) of the two loudest pieces of construction equipment that would be used during ground-based construction activities (i.e., no helicopters). The table identifies which construction activities would be conducted in the Northern Segment and in the Southern Segment. The L_{max} and L_{eq} are provided at a reference distance of 50 feet.

Table 3-2 Cumulative Noise Levels from Ground-Based Construction Activities

Construction Activity	Southern Segment	Northern Segment	Equipment (Two Loudest "*")	Loudest Scenario Assumptions	Cumulative Noise Levels at 50 Feet (dB)	
					L_{max} [a]	L_{eq} [b]
Survey	●	●	1 Pickup truck*	--	75	71
Vegetation Clearing	●	●	1-2 Pickup trucks*	Up to 3 pieces of equipment could operate at the same time in close proximity.	81	76
			1-2 Bucket trucks			
			1-2 Chipper trucks with chippers*			
Grading and Blading	●	●	1 ASV mower or similar equipment on rubber tracks*	Up to 3 pieces of equipment could operate at the same time in close proximity. The mower and dozer would not operate at the same time.	82	80
			1 D4 dozer*			
			1 Pickup truck			
			1 Semi-truck with trailer to haul grader			
			1 Water truck			
Drainage Crossing Establishment	N/A	●	1 Crawler backhoe*	Both pieces of equipment could be used at the same time in close proximity.	78	76
			1 Pickup truck*			
LDSP Hole Auguring	●	●	1 UTV with excavator*	Up to 2 pieces of equipment could operate at the same time in close proximity.	84	81
			1 Pickup truck			
			1 Line truck with auger attachment*			
LDSP Installation [c]	●	●	1 Shiflet truck	Up to 3 pieces of equipment could operate at the same time in close proximity.	89	85
			1 Crew-cab truck			
			1 UTV with worker-lift attachment			
			1 Line truck with trailer			
			1 UTV mounted with hydraulic jack*			

Construction Activity	Southern Segment	Northern Segment	Equipment (Two Loudest "*")	Loudest Scenario Assumptions	Cumulative Noise Levels at 50 Feet (dB)	
					L_{max} [a]	L_{eq} [b]
			1 Back hoe			
			1 Jackhammer*			
			1 Compressor			
TSP Hole Auguring	N/A	●	1 Crawler mounted auger*	Both pieces of equipment could be used at the same time in close proximity.	84	79
			1 Dump truck*			
TSP Installation	N/A	●	1 Shiflet truck	Up to 3 pieces of equipment could operate at the same time in close proximity.	83	81
			1 Crane			
			1 Boom truck*			
			1 Rigging truck (2-ton)			
			1 Crew-cab truck			
			1 Pickup truck			
			1 Concrete truck*			
Guard Structure Installation at US 101 Crossing	●	N/A	1 Light tower	Up to 4 pieces of equipment could operate at the same time in close proximity.	75	77 dB
			1 Bucket truck*			
			2 Pickup trucks			
			1 Crew cab*			
Reconductoring (Poles and Mid-Span Locations)	●	●	3 100-ton cranes (or alternatively a boom truck, bucket truck, or line truck with a worker lift attachment)*	Up to 2 pieces of equipment could operate at the same time in close proximity. Either a crane, boom truck, bucket truck, or worker lift attached to a line truck would operate with a single pickup truck.	83	79
			3 Pickup trucks*			

Construction Activity	Southern Segment	Northern Segment	Equipment (Two Loudest "*")	Loudest Scenario Assumptions	Cumulative Noise Levels at 50 Feet (dB)	
					L_{max} [a]	L_{eq} [b]
Reconductoring (Pull-and-Tension Sites)	●	●	1 Line truck with a wire reel attachment or trailer 3 Pickup trucks* 1 Line truck with a puller attachment* 1 Line truck with a tensioner attachment*	Wire reel would not have a motor, and the line truck would be turned off during reconductoring. Up to 3 trucks would operate intermittently at the same time in close proximity to a line truck with either a puller or tensioner attachment.	75	77
Miscellaneous Transport	●	●	1 Boom truck* 1 F550 truck*	Both pieces of equipment could be used at the same time in close proximity.	83 dB	80 dB
Material and Equipment Staging	●	●	1 100-ton crane* 1 F550 truck 1 Pickup truck 1 Crew-cab truck 1 Boom truck* 1 Line truck with auger attachment	Up to 4 pieces of equipment could operate at the same time in close proximity.	84 dB	82 dB
Cleanup and Restoration	●	●	1 Motor grader* 1 D6 dozer* 1 Semi-truck with trailer 1 Pickup truck	Up to 3 pieces of equipment could operate at the same time in close proximity. The motor grader and dozer would not operate at the same time.	85 dB	82 dB
Substation Equipment	N/A	N/A	1 Bobcat 1 Excavator*	Up to 4 pieces of equipment could operate at the same time in close	83 dB	83 dB

Construction Activity	Southern Segment	Northern Segment	Equipment (Two Loudest "*")	Loudest Scenario Assumptions	Cumulative Noise Levels at 50 Feet (dB)	
					L_{max} [a]	L_{eq} [b]
Modifications (includes cleanup and restoration)			1 Fork lift	proximity. The crane, boom truck would not operate at the same time.		
			1 Crane			
			1 Boom truck*			
			1 Man lift			
Substation Road Paving	N/A	N/A	3 Crew-cab trucks	Up to 3 pieces of equipment could operate at the same time in close proximity.	79	78
			1 Skid steer*			
			1 Skip loader*			

Notes:

[a] The L_{max} refers to the loudest piece of equipment for each activity.

[b] The L_{eq} time period is one hour. The L_{eq} estimates are obtained by combining noise levels from all pieces of construction equipment operating during a given activity.

[c] This activity includes both pole delivery and old pole removal.

Source: (PG&E 2016), (U.S. DOT 2008)

Helicopter Activities

PG&E proposes to use two light- or medium-lift helicopters (MD 500 model) and one heavy-lift helicopter (Blackhawk or other similar heavy lift helicopter) to transport construction workers, material, and equipment between staging areas and pole locations. Light- and medium-lift helicopters would be used to transport workers and materials weighing up to approximately 5,000 pounds (e.g., wood or steel poles, conductor support arms, insulators, tools, and portable equipment). Heavy lift helicopters would be used to transport poles or other equipment exceeding the capacity of the light- and medium-lift helicopters. PG&E has identified staging areas near the alignment that may be used as helicopter landing zones. In addition, PG&E has stated that helicopters may touch down to pick up or drop off workers or equipment at any point along the alignment where field conditions permit a safe landing. **Table 3-3** provides the maximum amount of time a helicopter would spend at a single pole, landing zone, or flight path. Light- or medium-lift helicopters would operate at a single pole location for a few days at a time and up to approximately 5 days in total. Heavy-lift helicopters would operate for a maximum of two days at a single pole location.

Table 3-3 Maximum Daily Helicopter Operation – Single Location (Pull Span 1)

Helicopter Lift/Size	Measurement Period	Pole		Landing Zone		Flight Path [a]	
		Minutes	Hours	Minutes	Hours	Minutes	Hours
Light/Medium	Entire Day	5.25	0.1	132	2.2	76	1.3
	Single Hour	5.25	--	30	--	15	--
Heavy	Entire Day	5 (LDSPs); 7 (TSPs) [b]	0.1	108	1.8	47	0.8
	Single Hour	4 (LDSPs); 6 (TSPs) [b]	--	30	--	15	--

Notes:

[a] Values for flight path represent the period traveling through a single 800-foot portion of the total flight path.

[b] If necessary, concrete for the TSP foundation at Pole 92 could be delivered using a heavy-lift helicopter. If this occurred, heavy-lift helicopter operation at Pole 92 would be as much as 25 minutes in a day and 15 minutes in a single hour. Pole 92 is approximately 800 feet from the closest landing zone and approximately 900 feet from the closest residence.

Source: (PG&E 2016)

The main cause of noise from a helicopter is the rotors, especially when a helicopter hovers for a prolonged period over a single location. Helicopters at close proximity dominate the noise environment, and noise from other equipment would indistinguishable. Helicopter noise increases with airspeed and in high-rate climbs and sharp turns. A doubling of height or distance of the helicopter from the receptor would reduce the noise level by approximately 6 or 7 dB. If the height or distance was increased by a factor of three, the noise level would be reduced by approximately 10 dB (Helicopter Association International 2007). **Table 3-4** provides the maximum noise level for the helicopters that are anticipated to be used during construction.

Table 3-4 Maximum Helicopter Noise Levels

Helicopter Type	Example Models	L_{max} (50 feet)	L_{max} (100 feet)
Light/Medium-Lift Helicopter	MD 500	90 dB	84 dB
Heavy-Lift Helicopter	Blackhawk	108 dB	102 dB

Source: (TRC 2015)

3.1.2 Vibration

Vibrational impacts were assessed using the FTA's Transit Noise and Vibration Impact Assessment guidance manual (May 2006). FTA thresholds used for determining potential vibrational impacts on structures are found in **Table 3-5**. Nuisance or annoyance can occur at 0.1 in/sec PPV.

Table 3-5 Vibration Thresholds for Minor Cosmetic or Structural Damage

Category	Continuous Source PPV (inches/second)
Extremely Fragile Historic Buildings, Ruins, Ancient Monuments [a]	0.08
Fragile Buildings [a]	0.10
Historic and Some Old Buildings [b]	0.25
Older Residential Structures [c]	0.30
New Residential Structures	0.50
Modern Industrial/Commercial Buildings	0.50

Notes:

[a] There are no extremely fragile historic buildings, ruins, ancient monuments, or fragile buildings within the vicinity of the proposed project; therefore, this category is not relevant to the proposed project.

[b] Few, if any, structures that are susceptible to minor cosmetic damage from vibration at levels lower than 0.3 in/sec PPV are anticipated.

[c] This threshold was chosen as the CEQA significance threshold for the proposed project because it would be sufficient to protect most structures along the project alignment.

Source: (FTA 2006)

Vibration levels of construction equipment for the project would be consistent with a large bulldozer or drill rig. The nearest receptor may be as close as 20 feet from drilling activities at the Fitch Mountain Substation. Maximum vibration levels for the project would be approximately 0.114 PPV in/sec, which is below the thresholds for potential structure damage. The project could result in nuisance or annoyance from where vibration would exceed 0.1 in/sec PPV.

3.2 OPERATION AND MAINTENANCE

3.2.1 Noise

Modern transmission lines are designed, constructed, and maintained so that they operate below the corona-inception voltage and generate a minimum of corona-related noise during dry conditions. Operation of transmission lines of 230-kV and greater may produce corona noise when wet. Corona noise from the existing 230-kV transmission line was not audible during the May 2016 community noise survey. Humidity levels during the May 2016 survey were 56 percent. The project would reconductor the 230-kV line with a larger conductor than is currently in place. The larger conductor reduces the gradient of voltage on the line and allows less energy to escape. Corona noise is anticipated to reduce on the 230-kV transmission line as a result of the project.

Audible noise from substations is generated predominantly by equipment such as transformers, reactors and other wire-wound equipment. Substation modifications that occur as part of the project would not add additional noise-generating components. It is expected that operational noises from the substation would not change noise levels in the vicinity as a result of the project.

Maintenance activities for the alignment and substation are expected to be similar in scope and frequency to existing maintenance activities. The project is not anticipated to create any new noise impacts after the completion of construction.

3.2.2 Vibration

Maintenance activities for the project lines and substation are expected to be similar in scope and frequency to existing maintenance activities. The project is not anticipated to create any new groundborne vibration impacts after the completion of construction.

4 RECOMMENDATIONS

Construction noise and vibration may be perceived by nearby noise-sensitive receptors as a nuisance and/or cause annoyance. The following measures are recommended to reduce noise levels to the extent possible, and to reduce the potential for significant annoyance:

- **Notification.** Notify residents within 500 feet of project work areas in advance of construction activities, and provide information on methods for reducing indoor noise (i.e., closing doors and windows facing the alignment).
- **Mufflers and Maintenance.** Ensure equipment and vehicles are properly equipped with feasible noise control devices (i.e., mufflers) and maintained in good working order.
- **Stationary Equipment.** Position stationary construction equipment (i.e., compressors and generators) as far away from nearby residences as feasible. Ensure stationary equipment is equipped with engine-housing enclosures or shielded by portable barriers.
- **Noise Complaints.** Designate a "construction noise coordinator" who would be responsible for responding to any local complaints about construction noise.
- **Schools.** Notify and coordinate construction activities with schools that may be affected by construction noise.
- **Places of Worship.** Notify and coordinate construction activities with places of worship (churches, synagogues, temples, etc.) that may be affected by construction noise.
- **Helicopters.** Restrict excessive helicopter operation near noise-sensitive receptors. Plan helicopter flight paths between construction work areas and helicopter landing zones to avoid sensitive receptors and follow paths with high existing ambient noise levels, such as highways. Restrict helicopter use where adequate ground access is available. Position helicopter landing zones a minimum of 500 feet from receptors, and restrict touch down within 500 feet of receptors.

5 REFERENCES

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Fulton-Fitch Mountain Reconductoring Project

Noise Attachment A

Noise Measurements Data Sheets

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/23/16	Record: 1 of _____

Location	Weather Data	
Monitoring ID: 1	Wind: Steady / Gusty / (Calm)	Precipitation: (No) / Yes Type:
Location Description: (cross streets/address) Fitch Mountain Substation	Average Wind Speed: 0	
Topography and Terrain: Flat, forested	Temperature: 73° F	Humidity: 46 %
GPS Coordinates: 38°36'22.7"N 122°51'11.2" W	Other Weather Notes: Overcast	
Waypoint (6) **Sound Level Meter**	**Field Calibration**	
Model #: dB 308	Model #: 01-304	
Serial #: 2671	Serial #: 8893	
Weighting: (A) / C / Flat	Calibration Level (dBA): 102.0	
Response: (Slow) / Fast / Impl	Pre-Test: 102.0 dBA	
Windscreen: (Yes) / No (explain)	Post-Test: 102.0 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
1	14:48	14:53	56.9		63.4	61	56	57 dB airplane – 63dB
2	14:53	14:58	56.7		59	58	56	background NOISE level from substation is 56dB birds < 56dB 59 dB plane

Site Diagram

Noise Sources:
Substation humming, planes

Additional Notes:

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/26/2016	Record: 2 of ____

Location	**Weather Data**	
Monitoring ID: (1)	Wind: Steady / Gusty / (Calm)	Precipitation: (No) / Yes
Location Description: (cross streets/address) Fitch Mountain Substation	Average Wind Speed: 2mph	Type:
Topography and Terrain: flat, wooded	Temperature: 74°F	Humidity: 52%
GPS Coordinates:	Other Weather Notes: Sunny	
Sound Level Meter	**Field Calibration**	
Model #: dB 308	Model #: CI-304	
Serial #: 2671	Serial #: 8093	
Weighting: (A) / C / Flat	Calibration Level (dBA): 102.0	
Response: (Slow) / Fast / Impl	Pre-Test: 102.0 dBA	
Windscreen: (Yes) / No (explain)	Post-Test: 102.0 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
3	16:51	16:56	57.1		57.6	57	57	57 dB substation noise
4	16:56	17:01	57.4		57.4	58	57	HWY 101 is audible, but less than 57 dB
								60 dB crows

Site Diagram	Noise Sources:
	Substation noise

Additional Notes:

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/26/2016	Record: 3 of ____

Location	**Weather Data**	
Monitoring ID: 3	Wind: Steady / (Gusty) / Calm	Precipitation: (No) / Yes Type:
Location Description: (cross streets/address) 50' from alignment	Average Wind Speed: 5 11 mph	
Topography and Terrain: wooded, hilly	Temperature: 77°F	Humidity: 44%
GPS Coordinates: 38°34'32.3"N 122°47'46.2"W pt 16	Other Weather Notes: Sunny	
Sound Level Meter	**Field Calibration**	
Model #: dB 308	Model #: CL-304	
Serial #: 2671	Serial #: 8093	
Weighting: (A) / C / Flat	Calibration Level (dBA): 102.0	
Response: (Slow) / Fast / Impl	Pre-Test: 102.0 dBA	
Windscreen: (Yes) / No (explain)	Post-Test: 102.0 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
1	16:10	16:15	47.4	~~54.1~~	59.4	55	43	plane @ 49 dB
2	16:15	16:20	44.9		57.1	51	43	wind gust @ 51 dB
3	16:20	16:25	45.8		57.3	51	43	wind gust @ 55 dB
4	16:25	16:30	53.4		71.0	63	43	background @ 43 dB
								Truck @ 59 dB
								wind gust @ 56 dB
								loud bird @ 51 dB
								car @ 57 dB
								deer @ 45 dB
								haul truck @ 71 dB

Site Diagram

Noise Sources:

Additional Notes:

- Intermittent gusts of wind @ 50-56 dB
- Birds chirping at background noise level of 43 dB

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/23/14	Record: 4 of ____

Location	Weather Data	
Monitoring ID: 4	Wind: (Steady) / Gusty / Calm	Precipitation: (No) / Yes Type:
Location Description: (cross streets/address) Foothills Park	Average Wind Speed: 3 mph	
Topography and Terrain: Hilly, grassy woodland	Temperature: 74°F	Humidity: 49%
GPS Coordinates: 38° 33' 37.0" N 122° 47' 21.3" W	Other Weather Notes: Partly Cloudy	
Waypoint 5 **Sound Level Meter**	**Field Calibration**	
Model #: dB 308	Model #: CI-304	
Serial #: 2671	Serial #: 8095	
Weighting: (A) / C / Flat	Calibration Level (dBA):	
Response: (Slow) / Fast / Impl	Pre-Test: 102.0 dBA	
Windscreen: (Yes) / No (explain)	Post-Test: 102.0 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
	13:~~59~~	13:59	44.8		57.6	50	43	45 dB - birds calling binaural meter @ 13:57 - 56 dB
	13:59	~~14~~14:04	46.4		55.8	52	44	
	14:04	14:09	45.5		57.9	51	43	distant traffic c 43dB
	14:09	14:14	46.8		59.7	56	43	47 dB - 48dB gust of wind
								47 dB - 49 dB airplane
								49 dB-red-winged blackbird
								56 dB airplane over ridge
								50 dB joggers talking 50' away
								53 dB wind

Site Diagram

Noise Sources:

Frogs, birds, airplanes, people using park, wind walking/jogging

Additional Notes:

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/23/2016	Record: 5 of ____

Location	**Weather Data**	
Monitoring ID: ~~1~~ 5	Wind: Steady / Gusty / (Calm)	Precipitation: (No) / Yes Type:
Location Description: (cross streets/address) Leslie Road near chalk hill Rd	Average Wind Speed: 0mph	
Topography and Terrain: wooded / hilly w/ Leslie Rd	Temperature: 74°F	Humidity: 44%
GPS Coordinates: 38°32'47.2" N 122°46'16.2" W	Other Weather Notes: Sunny w/ scattered clouds	

~~Winsor 5~~ **Sound Level Meter**	**Field Calibration**
Model #: dB 308	Model #: CI-304
Serial #: ~~2~~ #2671	Serial #: 8093
Weighting (A) / C / Flat	Calibration Level (dBA):
Response: (Slow) / Fast / Impl	Pre-Test: 102.0 dBA
Windscreen: (Yes) / No (explain)	Post-Test: 102.0 dBA

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
1	13:22	13:27	46.6		63.0	53	43	45dB car on Chalk Hill Rd
2	13:27	13:32	58.2		79.1	67	43	distant construction <43dB
								Birds <43dB
								52dB car on bridge on Leslie Rd
								62 dB SUV passing on Leslie Rd
								60 dB SUV on Leslie
								62 dB SUV " "
								Birds <43dB
								78 dB loud pickup

Site Diagram	Noise Sources:
	Cars on Chalk Hill Road and Leslie Road, birds, distant construction

Additional Notes:

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/26/2016	Record: 6 of ____

Location	**Weather Data**	
Monitoring ID: Site 5	Wind: Steady / Gusty / Calm	Precipitation: No / Yes Type:
Location Description: (cross streets/address) Leslie Road	Average Wind Speed: 10mph S	
Topography and Terrain: Wooded, Hilly	Temperature: 77°F	Humidity: 45%
GPS Coordinates: 38°32'47.1"N 122°46'16.2"W	Other Weather Notes: Sunny, warm	
waypoint 15 **Sound Level Meter**	**Field Calibration**	
Model #: dB 308	Model #: CL - 304	
Serial #: 2671	Serial #: 8093	
Weighting: A / C / Flat	Calibration Level (dBA): 102.0	
Response: Slow / Fast / Impl	Pre-Test: 102.0 dBA	
Windscreen: Yes / No (explain)	Post-Test: 102.0 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
3	15:43	15:48	43.6		51.3	47	43	49 dB car on Chalk Hill Rd
4	15:48	15:53	44.4		58.2	49	43	45dB - clanging on nearby property
								birds c 43 dB
								44dB car on Chalk Hill Rd
								49 dB large truck
								53 dB truck horn
								Construction noise c 43 dB

Site Diagram

Noise Sources:
traffic on Chalk Hill Road

Additional Notes:

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 05/23/2016	Record: 7 of ____

Location	Weather Data	
Monitoring ID: 6	Wind: Steady / Gusty / Calm	Precipitation: No / Yes Type:
Location Description: (cross streets/address) Shiloh Ridge Road	Average Wind Speed: 4 mph	
Topography and Terrain: Hilly/grassy w/ Shiloh Ridge Road	Temperature: 71°F	Humidity: 49%
GPS Coordinates: 38°31'53.0" N 122°45'41.3" W	Other Weather Notes: Sunny w/ scattered clouds	
waypt # 4 **Sound Level Meter**	**Field Calibration**	
Model #: dB 308	Model #: CI-304	
Serial #: 26071	Serial #: 8093	
Weighting: A / C / Flat	Calibration Level (dBA):	
Response: Slow / Fast / Impl	Pre-Test: 102.0 dBA	
Windscreen: Yes / No (explain)	Post-Test: 102.0 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
1	12:34	12:39	45.8		57.2	52	43	50 dB passing car
2	12:39	12:44	46.2		59.0	55	43	gust of wind is 49 dB
3	12:44	12:49	46.9		57.8	55	43	tractor is 45dB
4	12:49	12:54	46.8		59.2	54	43	airplane - 47 dB
								47 dB car tractor stops @ 12:4 pm
								Birds < 43 ~~tractor stops @ 12:4~~ 1 pm
								semi truck = 60 dB
								53 dB gust of wind
								58dB power in wind

Site Diagram

Noise Sources:
tractor in field to be used for landing zone
cars passing on Shiloh Ridge Rd
wind, birds

Additional Notes:

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/23/2016	Record: 8 of ____

Location	**Weather Data**	
Monitoring ID: 7	Wind: (Steady) / Gusty / Calm	Precipitation: (No) / Yes Type:
Location Description: (cross streets/address) bend in faught Rd near Shiloh trail	Average Wind Speed: 3mph	
Topography and Terrain: hilly / wooded	Temperature: 70°F	Humidity: 54%
GPS Coordinates: 38°31'06.7" N 122°45'25.5" W	Other Weather Notes: Sunny w/ Scattered clouds	
Waypt (3) **Sound Level Meter**	**Field Calibration**	
Model #: dB308	Model #: CI-304	
Serial #: 2161	Serial #: 8093	
Weighting: (A) / C / Flat	Calibration Level (dBA):	
Response: (Slow) / Fast / Impl	Pre-Test: 102.0 dBA	
Windscreen: (Yes) / No (explain)	Post-Test: 102.0 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
								-48dB
1	12:09	12:14	44.7		51.4	50	43	46dB ~~car~~ on bus on faught road
2	12:14	12:19	47.4		53.8	52	45	43.1 - distant heavy machinery / construction
								- children @ nearby school are audible but < 43dB
								birds < 43 dB
								52 qB passing van
								50dB airplane

Site Diagram

Noise Sources:
- Cars on faught road
- distant construction
- insects, birds

Additional Notes:

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/26/2016	Record: 9 of ____

Location	**Weather Data**	
Monitoring ID: 7	Wind: (Steady) / Gusty / Calm	Precipitation: (No) / Yes Type:
Location Description: (cross streets/address) Bend in Faught Rd Near Shiloh trail underneath alignment	Average Wind Speed: 12mph	
Topography and Terrain: hilly, wooded	Temperature: 75°F	Humidity: 47%
GPS Coordinates:	Other Weather Notes: Sunny, warm	

Sound Level Meter	**Field Calibration**
Model #: dB 308	Model #: CI-304
Serial #: 2671	Serial #: 8093
Weighting: (A) / C / Flat	Calibration Level (dBA): 102.0
Response: (Slow) / Fast / Impl	Pre-Test: 102.0 dBA
Windscreen: (Yes) / No (explain)	Post-Test: 102.0 dBA

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
3	15:16	15:21	45.7		58.1	51	43	47 dB cars on faught rd.
4	15:21	15:26	48.2		63.5	55	45	<43 dB when no traffic
								kids @ distant school
								<43dB
								58 dB dog barking @
								nearby home
								48-49dB passing cars
								on Faught Road
								44 dB - car engine starting

Site Diagram	Noise Sources:
	Cars on Faught Rd

Additional Notes:

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/23/2016	Record: 10 of _____

Location	**Weather Data**	
Monitoring ID: 8	Wind: Steady / Gusty / (Calm) [circled]	Precipitation: (No) [circled] / Yes Type:
Location Description: (cross streets/address) Faught road near faught Ct. underneath line	Average Wind Speed: 3mph	
Topography and Terrain: flat - mostly pavement w/some landscaping	Temperature: 68°F	Humidity: 55%
GPS Coordinates: 38°30'42.7" N 122°45'37.0" W	Other Weather Notes: partly cloudy	

Waypoint 2 **Sound Level Meter**	**Field Calibration**
Model #: ~~36 ... 308~~ dB 308	Model #: CL-304
Serial #: 2671	Serial #: 8093
Weighting: (A) [circled] / C / Flat	Calibration Level (dBA):
Response: (Slow) [circled] / Fast / Impl	Pre-Test: 102.0 dBA
Windscreen: (Yes) [circled] / No (explain)	Post-Test: 102.0 dBA

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
1	11:31	11:36	53.7		68.9	63	46	46dB saw noise @ apartments
2	11:36	11:41	54.1		68.5	64	45	across street
								67dB fast car
								46dB - birds in trees
								61dB - car slowing to turn
								60dB box truck
								46dB woman pushing stroller/bike
								across street on sidewalk
								43dB when no cars
								48dB hammering across street

Site Diagram

Noise Sources:

Mostly traffic on faught Rd.
Some home tools, birds

Additional Notes:

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/26/2016	Record: 11 of ____

Location	Weather Data	
Monitoring ID: 8	Wind: (Steady) / Gusty / Calm SSW 13 mph	Precipitation: (No) / Yes Type:
Location Description: (cross streets/address) Faught Road near Faught Ct.	Average Wind Speed:	
Topography and Terrain: underneath line flat, pavement + landscaping	Temperature: 75°F	Humidity: 47%
GPS Coordinates: 38°30'42.71"N 122°45'37.0"W	Other Weather Notes: Sunny, warm sunny	
Sound Level Meter	**Field Calibration**	
Model #: dB 308	Model #: CI-304	
Serial #: 2671	Serial #: 8093	
Weighting: (A) / C / Flat	Calibration Level (dBA): 102.0	
Response: (Slow) / Fast / Impl	Pre-Test: 102.0 dBA	
Windscreen: (Yes) / No (explain)	Post-Test: 102.0 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
3	14:45	14:50	58.5		68.0	64	56	• car @ 62 dB
4	14:50	14:55	59.3		69.9	66	55	• jeep @ 66 dB
								• background @ 49 dB with no traffic
								• steady flow of traffic
								• people yelling @ 66 dB
								• suv @ 69 dB
								• car alarm @ 52 dB

Site Diagram

Noise Sources:

Additional Notes:
- Noise predominantly vehicle traffic
- can't hear highway

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/23	Record: 12 of ____

Location	Weather Data	
Monitoring ID: 9	Wind: Steady / Gusty (Calm)	Precipitation (No) / Yes Type:
Location Description: (cross streets/address) Across from Mark West Elementary	Average Wind Speed: 0 mph	
Topography and Terrain: Flat and grassy	Temperature: 67°F	Humidity: 55%
GPS Coordinates: 30° 30' 05.7" N 122° 45' 36.7" W	Other Weather Notes:	
waypoint 1 **Sound Level Meter**	**Field Calibration**	
Model #: ~~2671~~ dB 308	Model #: 01-304	
Serial #: 2671	Serial #: 8093	
Weighting: (A) / C / Flat	Calibration Level (dBA):	
Response: (Slow) / Fast / Impl	Pre-Test: 102.0 dBA	
Windscreen: (Yes) / No (explain)	Post-Test: 102.0 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
1	10:57	11:02	56.8		64.0	62	55	58 dB construction equipment
2	11:02	11:07	54.1		62.1	60	53	64dB motorcycle, 62 dB loading soil into truck
								54dB someone yelling @ school
								55 dB backup beeps - 60 dB
								61 dB passing car
								61 dB SUV passing

Site Diagram

Noise Sources:
construction @ school
minimal traffic on street
children @ school do not register over construction noise
traffic on HWY 101 barely audible

Additional Notes: 63 dB overhead plane

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/26/2016	Record: 13 of ____

Location	Weather Data	
Monitoring ID: 9	Wind: (Steady) / Gusty / Calm	Precipitation: (No) / Yes
Location Description: (cross streets/address) Mark West Elementary	12 Average Wind Speed: 8 mph SSW	Type:
Topography and Terrain: 36' from any Rd of flat, grass and pavement	Temperature: 75°F	Humidity: 47%
GPS Coordinates: 30°30' 08.7"N 122°45' 36.7"W Waypt 1	Other Weather Notes: Sunny	
Sound Level Meter	**Field Calibration**	
Model #: dB 308	Model #: CI-304	
Serial #: 2671	Serial #: 8093	
Weighting: (A) / C / Flat	Calibration Level (dBA): 102.0	
Response: (Slow) / Fast / Impl	Pre-Test: 102.0 dBA	
Windscreen: (Yes) / No (explain)	Post-Test: 102.0 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{02}	L_{50}	Notes/Events
3	14:23	14:28	57.0		65.9	63	55	54 dB background traffic
4	14:28	14:33	58.8		67.4	65	57	noise from 101
								61 dB passing SUV
								55 horn honking
								57 dB construction equip across street
								60 dB - van
								66 dB pickup
								65 dB SUV
								58 dB backhoe/loader

Site Diagram

Noise Sources:
- HWY 101
- intermittent construction
- cars picking up kids

Additional Notes: kids @ school are audible, but not louder than traffic or other sources

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/23/2016	Record: 14 of ____

Location	Weather Data	
Monitoring ID: 10	Wind: Steady / Gusty / (Calm)	Precipitation: (No) / Yes Type:
Location Description: (cross streets/address) Fulton Substation	Average Wind Speed: 3mph	
Topography and Terrain: Flat, paved	Temperature: 71°F	Humidity: 41%
GPS Coordinates: 38°29' 48.2" N 122°45' 41.3" W	Other Weather Notes: Scattered Clouds	
Waypoint (7)		

Sound Level Meter	Field Calibration
Model #: dB 308	Model #: cl-304
Serial #: 2671	Serial #: 8093
Weighting: (A) / C / Flat	Calibration Level (dBA):
Response: (Slow) / Fast / Impl	Pre-Test: 1020 dBA
Windscreen: (Yes) / No (explain)	Post-Test: 1020 dBA

ID	Start Time	Stop Time	Leq	Lmin	Lmax	L02	L50	Notes/Events
1	15:18	15:23	62.5		71.9	66	62	53dB substation noise
2	15:23	15:28	63.0		69.5	67	62	when no cars
3	15:28	15:33	63.3		75.8	69	61	64 dB car on River Road
4	15:33	15:38	62.8		70.1	68	62	62dB nearby bird
								67-64dB plane
								67dB motorcycle on River Rd
								slammed trunk @ 15:29 or 28
								62 dB truck pulling out of park n ride

Site Diagram	Noise Sources:
	Traffic on River Road
	substation humming

Additional Notes:

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 5/26/2016	Record: 15 of ____

Location	**Weather Data**	
Monitoring ID: Corona Noise Measurement	Wind: Steady / Gusty / Calm	Precipitation: No / Yes Type:
Location Description: (cross streets/address) Faught Road, Old Redwood Hwy	Average Wind Speed: 12mph	
Topography and Terrain: directly under line flat, grassy	Temperature: 68°F	Humidity: ~~100%~~ 56%
GPS Coordinates: 38°30'34.0"N 122°45'37.0"W	Other Weather Notes: Sunny	

Sound Level Meter	**Field Calibration**
Model #: LxT2	Model #: CAL200
Serial #: 0004337	Serial #: 9233
Weighting: A / C / Flat	Calibration Level (dBA): 114
Response: Slow / Fast / Impl	Pre-Test: 114.00 dBA
Windscreen: Yes / No (explain)	Post-Test: 114.06 dBA

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Notes/Events
1	6:46pm	6:56pm							58dB car on Redwood Hwy
									60 dB truck w/trailer
									45 is lowest level measured - covered noise not audible
									60 dB pickup
									54 dB kids yelling
									67dB loud trucks

Site Diagram	Noise Sources:
	Traffic Noise

Additional Notes: Corona Noise is not audible

Field Noise Measurement Data Form

Project Name: Fulton to Fitch	Date: 4/26/2016	Record: 16 of ____

Location	**Weather Data**	
Monitoring ID: Corona Noise 2	Wind: Steady / Gusty / Calm	Precipitation: No / Yes Type:
Location Description: (cross streets/address) Bend in Faught Rd - Shiloh Park Trail	Average Wind Speed: 0 mph	
Topography and Terrain: Directly under line Wooded, Hilly	Temperature: 68°F	Humidity: ~~100%~~ 56%
GPS Coordinates: 38°31'06.6"N 122°45'26.2"W	Other Weather Notes: Sunny	
waypoint 18 **Sound Level Meter**	**Field Calibration**	
Model #: LxT 2	Model #: CAL 200	
Serial #: 0004337	Serial #: 9233	
Weighting: A / C / Flat	Calibration Level (dBA): 114	
Response: Slow / Fast / Impl	Pre-Test: 114.0 dBA	
Windscreen: Yes / No (explain)	Post-Test: 114.06 dBA	

ID	Start Time	Stop Time	L_{eq}	L_{min}	L_{max}	L_{10}	L_{50}	L_{90}	Notes/Events
1	19:04	19:14							low = ~~38~~ 37
									46 dB car on Rd
									39 dB - ambient when
									no cars passing
									40 dB - distant traffic
									43 dB - distant airplane

Site Diagram

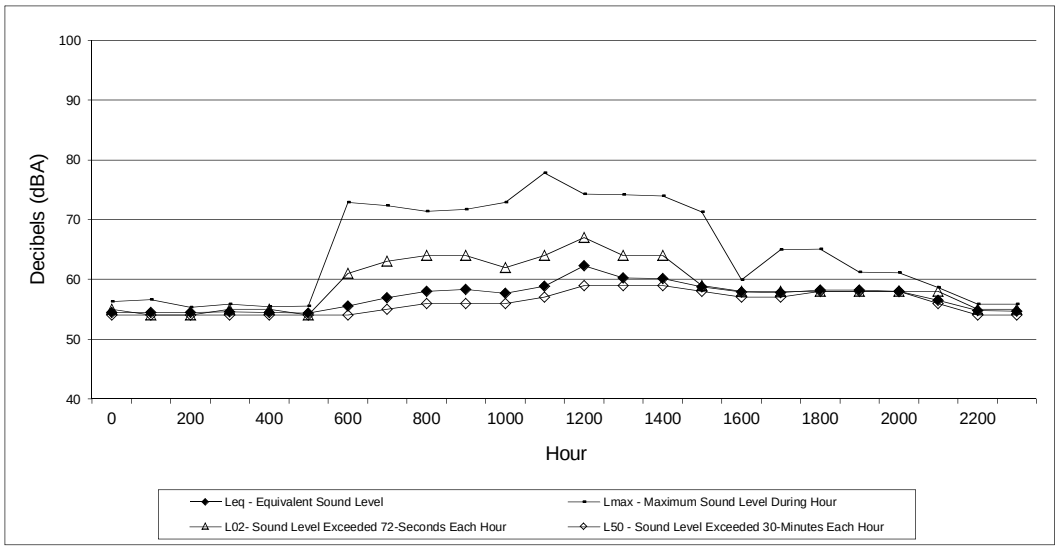
Noise Sources:
Distant traffic airplane noise - wildlife

Additional Notes: Lowest level measured when no traffic was 37 dB - only insect noise, corona noise still not audible < 37

Fulton-Fitch Mountain Reconductoring Project

Noise Attachment B

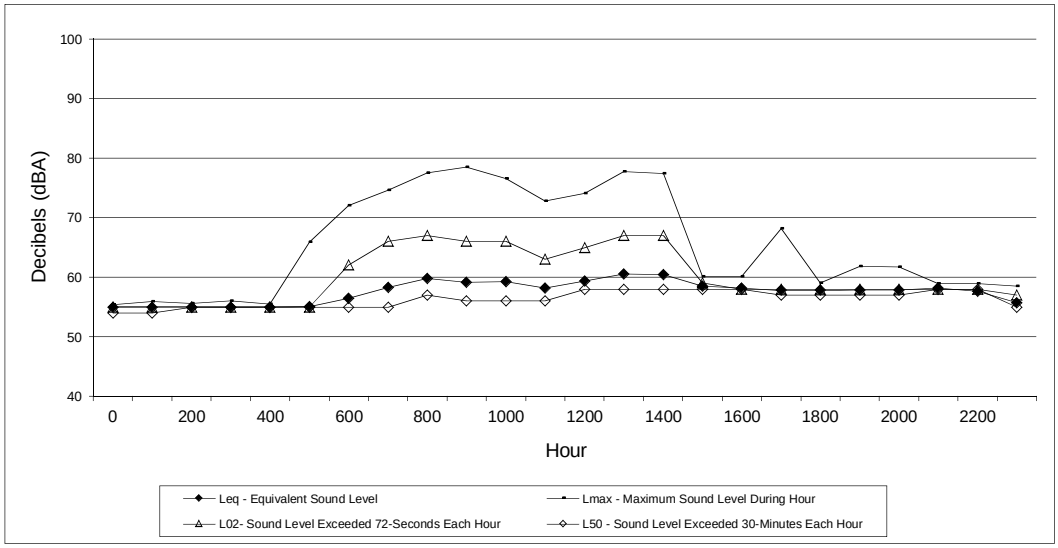
Long-Term Noise Monitoring Plots and Data



Site 1. Fitch Mountain Substation
Tuesday May 24, 2016

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L02- Sound Level Exceeded 72-Seconds Each Hour	L50 - Sound Level Exceeded 30-Minutes Each Hour
0	55	56	55	54
100	55	57	54	54
200	55	55	54	54
300	55	56	55	54
400	55	55	55	54
500	54	56	54	54
600	56	73	61	54
700	57	72	63	55
800	58	71	64	56
900	58	72	64	56
1000	58	73	62	56
1100	59	78	64	57
1200	62	74	67	59
1300	60	74	64	59
1400	60	74	64	59
1500	59	71	59	58
1600	58	60	58	57
1700	58	65	58	57
1800	58	65	58	58
1900	58	61	58	58
2000	58	61	58	58
2100	57	59	58	56
2200	55	56	55	54
2300	55	56	55	54

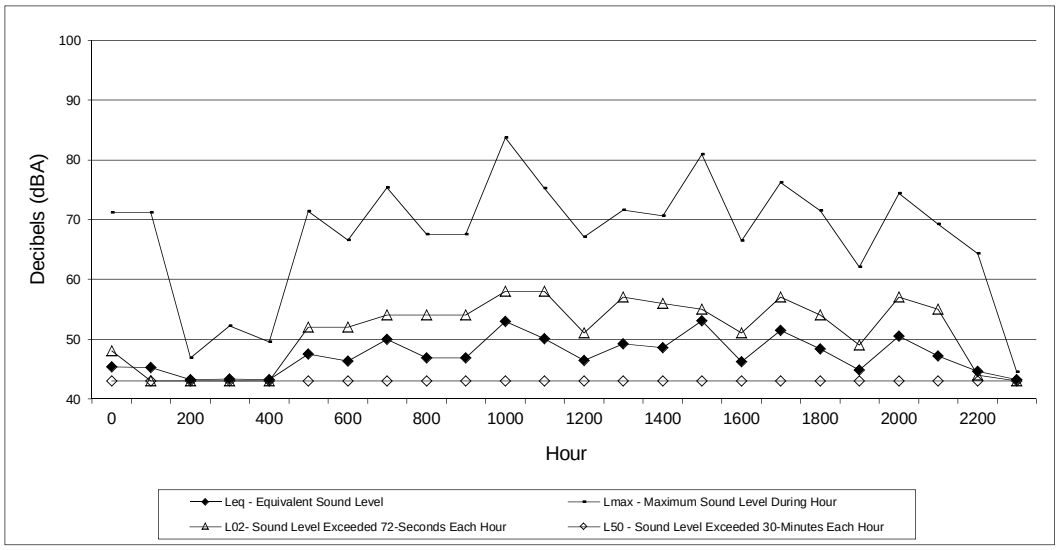
CNEL 62



Site 1. Fitch Mountain Substation
Wednesday May 25, 2016

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L02- Sound Level Exceeded 72-Seconds Each Hour	L50 - Sound Level Exceeded 30-Minutes Each Hour
0	55	55	55	54
100	55	56	55	54
200	55	56	55	55
300	55	56	55	55
400	55	56	55	55
500	55	66	55	55
600	57	72	62	55
700	58	75	66	55
800	60	78	67	57
900	59	79	66	56
1000	59	77	66	56
1100	58	73	63	56
1200	59	74	65	58
1300	61	78	67	58
1400	60	77	67	58
1500	59	60	59	58
1600	58	60	58	58
1700	58	68	58	57
1800	58	59	58	57
1900	58	62	58	57
2000	58	62	58	57
2100	58	59	58	58
2200	58	59	58	58
2300	56	59	57	55

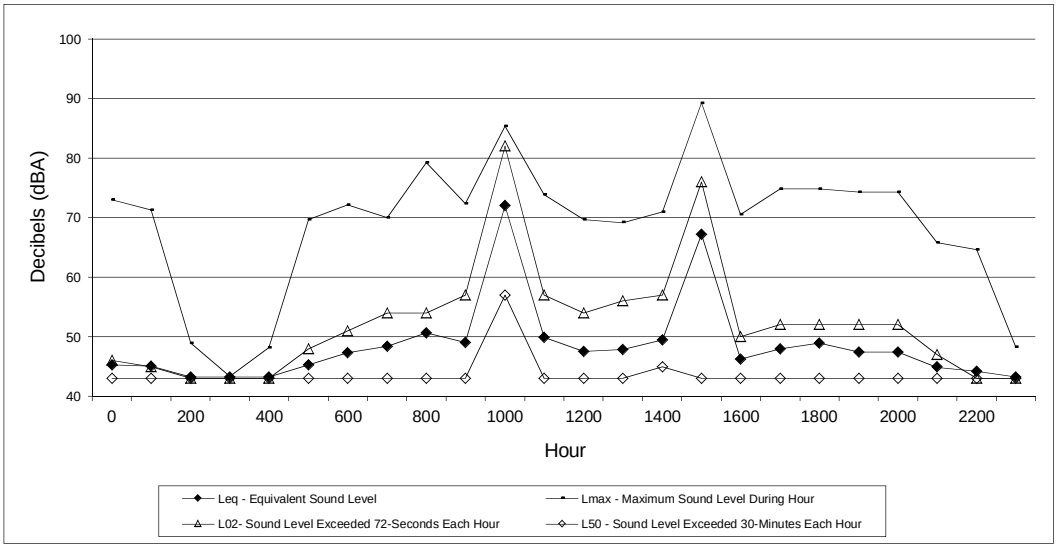
CNEL: 63



Site 4. Leslie Road near Chalk Hill Road
Tuesday May 24, 2016

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L02- Sound Level Exceeded 72-Seconds Each Hour	L50 - Sound Level Exceeded 30-Minutes Each Hour
0	45	71	48	43
100	45	71	43	43
200	43	47	43	43
300	43	52	43	43
400	43	50	43	43
500	48	71	52	43
600	46	67	52	43
700	50	75	54	43
800	47	68	54	43
900	47	68	54	43
1000	53	84	58	43
1100	50	75	58	43
1200	46	67	51	43
1300	49	72	57	43
1400	49	71	56	43
1500	53	81	55	43
1600	46	67	51	43
1700	52	76	57	43
1800	48	72	54	43
1900	45	62	49	43
2000	51	74	57	43
2100	47	69	55	43
2200	45	64	44	43
2300	43	45	43	43

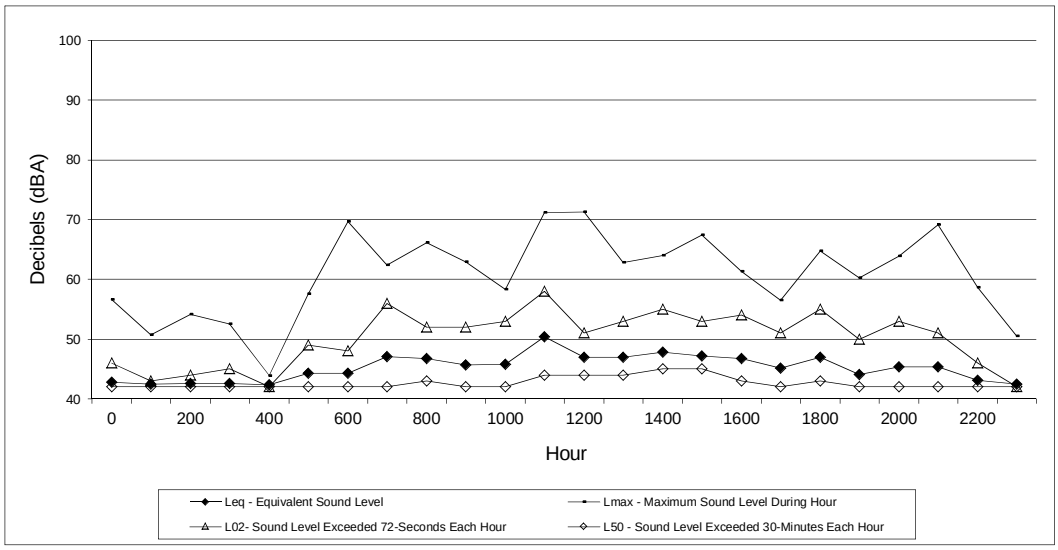
CNEL 53



Site 4. Leslie Road near Chalk Hill Road
Wednesday May 25, 2016

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L02- Sound Level Exceeded 72-Seconds Each Hour	L50 - Sound Level Exceeded 30-Minutes Each Hour
0	45	73	46	43
100	45	71	45	43
200	43	49	43	43
300	43	43	43	43
400	43	48	43	43
500	45	70	48	43
600	47	72	51	43
700	48	70	54	43
800	51	79	54	43
900	49	72	57	43
1000	72	85	82	57
1100	50	74	57	43
1200	48	70	54	43
1300	48	69	56	43
1400	50	71	57	45
1500	67	89	76	43
1600	46	71	50	43
1700	48	75	52	43
1800	49	75	52	43
1900	47	74	52	43
2000	47	74	52	43
2100	45	66	47	43
2200	44	65	43	43
2300	43	48	43	43

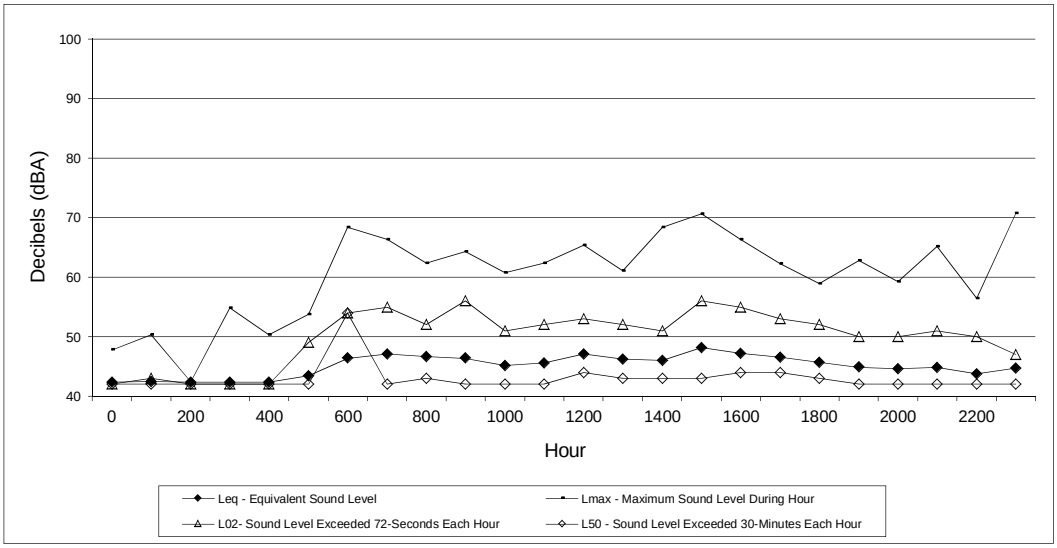
CNEL: 60



Site 6. Bend in Faught Road near Shiloh Trail
Tuesday May 24, 2016

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L02- Sound Level Exceeded 72-Seconds Each Hour	L50 - Sound Level Exceeded 30-Minutes Each Hour
0	43	57	46	42
100	43	51	43	42
200	43	54	44	42
300	43	53	45	42
400	42	44	42	42
500	44	58	49	42
600	44	70	48	42
700	47	62	56	42
800	47	66	52	43
900	46	63	52	42
1000	46	58	53	42
1100	50	71	58	44
1200	47	71	51	44
1300	47	63	53	44
1400	48	64	55	45
1500	47	67	53	45
1600	47	61	54	43
1700	45	57	51	42
1800	47	65	55	43
1900	44	60	50	42
2000	45	64	53	42
2100	45	69	51	42
2200	43	59	46	42
2300	43	51	42	42

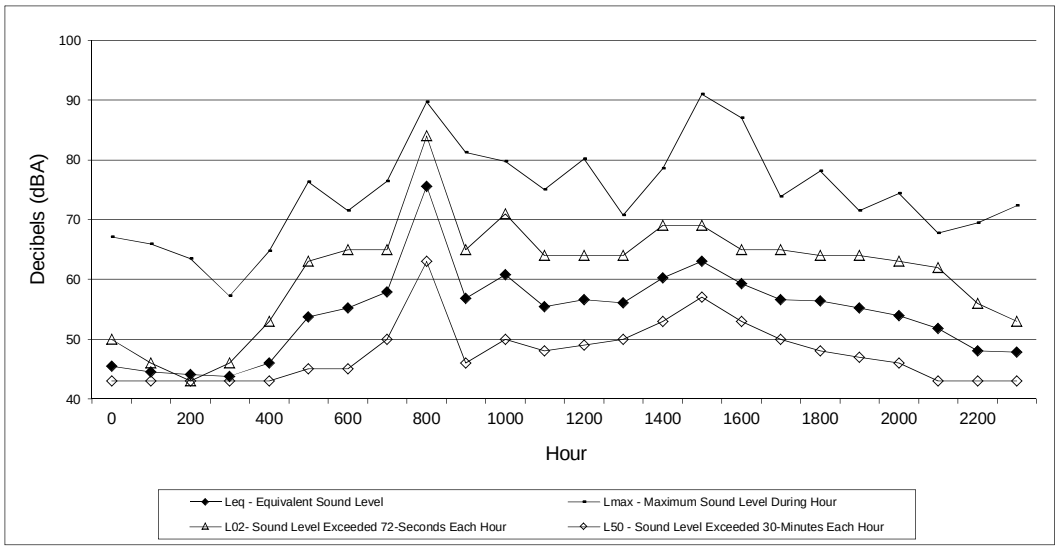
CNEL 51



Site 6. Bend in Faught Road near Shiloh Trail
Wednesday May 25, 2016

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L02- Sound Level Exceeded 72-Seconds Each Hour	L50 - Sound Level Exceeded 30-Minutes Each Hour
0	42	48	42	42
100	43	50	43	42
200	42	42	42	42
300	42	55	42	42
400	42	50	42	42
500	43	54	49	42
600	46	68	54	54
700	47	66	55	42
800	47	62	52	43
900	46	64	56	42
1000	45	61	51	42
1100	46	62	52	42
1200	47	65	53	44
1300	46	61	52	43
1400	46	68	51	43
1500	48	71	56	43
1600	47	66	55	44
1700	47	62	53	44
1800	46	59	52	43
1900	45	63	50	42
2000	45	59	50	42
2100	45	65	51	42
2200	44	57	50	42
2300	45	71	47	42

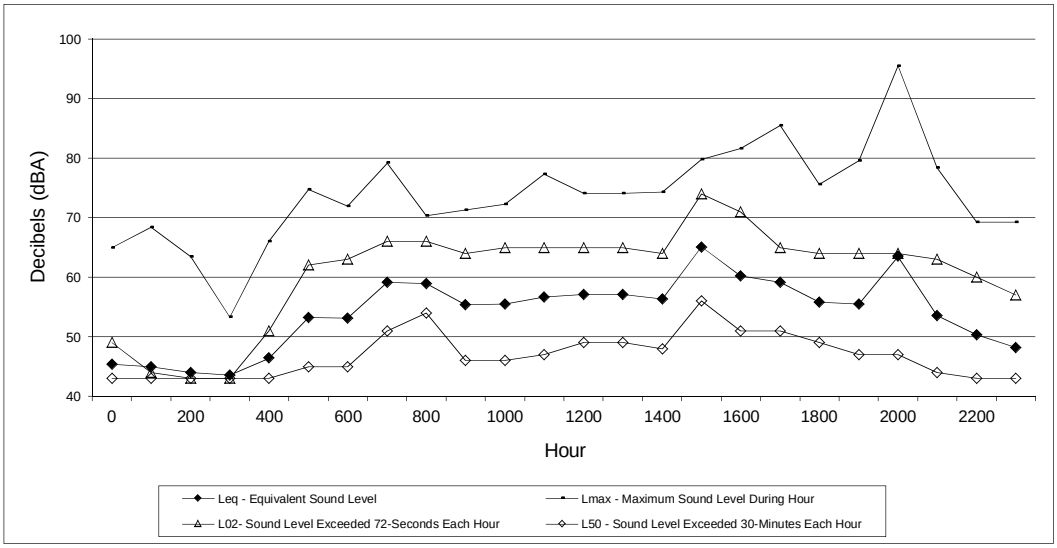
CNEL: 51



Site 7. Faught Road near Faught Court
Tuesday May 24, 2016

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L02- Sound Level Exceeded 72-Seconds Each Hour	L50 - Sound Level Exceeded 30-Minutes Each Hour
0	46	67	50	43
100	45	66	46	43
200	44	64	43	43
300	44	57	46	43
400	46	65	53	43
500	54	76	63	45
600	55	72	65	45
700	58	76	65	50
800	76	90	84	63
900	57	81	65	46
1000	61	80	71	50
1100	55	75	64	48
1200	57	80	64	49
1300	56	71	64	50
1400	60	79	69	53
1500	63	91	69	57
1600	59	87	65	53
1700	57	74	65	50
1800	56	78	64	48
1900	55	72	64	47
2000	54	74	63	46
2100	52	68	62	43
2200	48	70	56	43
2300	48	72	53	43

CNEL 64



Site 7. Faught Road near Faught Court
Wednesday May 25, 2016

Hour	Leq - Equivalent Sound Level	Lmax - Maximum Sound Level During Hour	L02- Sound Level Exceeded 72-Seconds Each Hour	L50 - Sound Level Exceeded 30-Minutes Each Hour
0	45	65	49	43
100	45	68	44	43
200	44	63	43	43
300	44	53	43	43
400	46	66	51	43
500	53	75	62	45
600	53	72	63	45
700	59	79	66	51
800	59	70	66	54
900	55	71	64	46
1000	56	72	65	46
1100	57	77	65	47
1200	57	74	65	49
1300	57	74	65	49
1400	56	74	64	48
1500	65	80	74	56
1600	60	82	71	51
1700	59	86	65	51
1800	56	76	64	49
1900	56	80	64	47
2000	64	96	64	47
2100	54	78	63	44
2200	50	69	60	43
2300	48	69	57	43

CNEL: 60