Acentech

Project No. 617187
Report No. 423

CLEVELAND NATIONAL FOREST ELECTRIC SAFETY AND RELIABILITY PROJECT TECHNICAL NOISE STUDY REPORT

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April 2012

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List of Abbreviated Terms

BLM	Bureau of Land Management
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CNEL	Community Noise Equivalent Level
dB	Decibels
CNF	Cleveland National Forest (U.S. Forest Service)
dBA	A-weighted noise level
C	Distribution Line
FHWA	Federal Highway Administration
Hz	Hertz
kV	kilovolt
L_{dn}	Day-Night Average Sound Level
L_{eq}	Equivalent Sound Level
$L_{eq(h)}$	Equivalent Sound Level over one hour
$L_{eq(8)}$	Equivalent Sound Level over eight hours
L_{max}	Maximum Sound Level
L_{xx}	Percentile-Exceeded Sound Level xx% of period
NEPA	National Environmental Policy Act
NSLU	Noise sensitive land use
RMS	Root mean square
SPL	Sound pressure level
TL	Transmission Line
VdB	Vibrational Velocity Level

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EXECUTIVE SUMMARY

This noise and vibration study report presents the results of noise impact analysis of the Cleveland National Forest Electric Safety and Reliability Project (Project) located in the eastern part of San Diego County, California, in and around the Cleveland National Forest.

The Project includes approximately 105 miles of transmission lines. These lines include:

1. Transmission Line (TL) 625
    - Three segments:
        - Loveland Substation to Barrett Tap
        - Barrett Tap to Descanso Substation
        - Barrett Tap to Barrett Substation
    - Wood to steel conversion in place
    - Loveland Substation to Barrett Tap converted to a double circuit
2. TL626
    - Santa Ysabel Substation to Descanso Substation
    - Wood to steel conversion in place
3. TL629
    - Four segments:
        - Descanso Substation to Glencliff Substation
        - Glencliff Substation to Cameron Tap
        - Cameron Tap to Cameron Substation
        - Cameron Tap to Crestwood Substation
    - Wood to steel conversion in place
    - Cameron Tap to Crestwood Substation converted to a double circuit
4. TL682
    - Rincon Substation to Warners Substation
    - Wood to steel conversion in place
5. TL6923
    - Barrett Substation to Cameron Substation
    - Wood to steel conversion in place

The Project includes approximately 44 miles of distribution lines.

6. Distribution Line or Circuit (C) 78
    - Partially relocate circuit along Viejas Grade Road
    - Wood to steel conversion
7. C79
    - Underground line from Highway 79 to Cuyamaca Peak along Lookout Road
8. C157
    - Wood to steel conversion in place
9. C440
    - Wood to steel conversion in place
    - Underground a portion of the line in Highway S1
10. C442
    - Wood to steel conversion in place
11. C449
    - Wood to steel conversion in place
    - Underground a portion of the line along Buckman Springs Road and Morena Stokes Valley Road
    - Partially relocate circuit with transmission

The purpose of this study is to assess the Project's potential noise and vibration impacts upon adjacent residences during construction and operation, and to provide feasible mitigation measures to reduce the significance of these impacts.

The following sections provide a summary of our conclusions and recommendations.

Construction Noise Impacts and Mitigation Measures

This study concludes that the Project construction will have short term significant noise impacts upon residences that are adjacent to the pole replacement locations.

Operational Noise Impacts and Mitigation Measures

This study concludes that the Project's operational noise impacts are less than significant.

1. INTRODUCTION

Noise is typically defined as unwanted sound. The main characteristics of sound are intensity, frequency and duration. The decibel (dB) is the typical measurement of sound intensity. A sound level of 0 dB approximates the threshold of hearing for people. Sound levels of typical community noise sources and community noise environment are illustrated in Attachment A. However, the average person can perceive a change of +/- 3 dB. A change of +/-5 dB is readily perceptible and a change of +10 dB is perceived as twice as loud. Noise can have both human health and quality of life effects. At 130 to 140 dB, sound becomes extremely painful to the average person. Data shows that long exposure to noise levels exceeding 85 dB can result in hearing loss and other health-related problems (OSHA, 2006). The community noise environment is normally unacceptable for residential sites that are exposed to noise where the day-night average sound level (DNL) exceeds 75 decibels (HUD, 1991). From a quality of life standpoint, noise can interfere with speech, disturb sleep and cause annoyance.

Results of studies on the relationship between noise exposure and percentage of community highly annoyed by noise demonstrate that approximately four percent (4%) of a community is highly annoyed by community noise levels equivalent to 55 dB CNEL, and about fourteen percent (14%) of a community can be highly annoyed by community noise levels equivalent to 65 dB CNEL. Additionally, an increase in the ambient or periodic noise level can cause quality of life impacts even when the absolute noise level does not exceed 55-65 dB CNEL. Changes of 10 dB or more often generate widespread complaints.

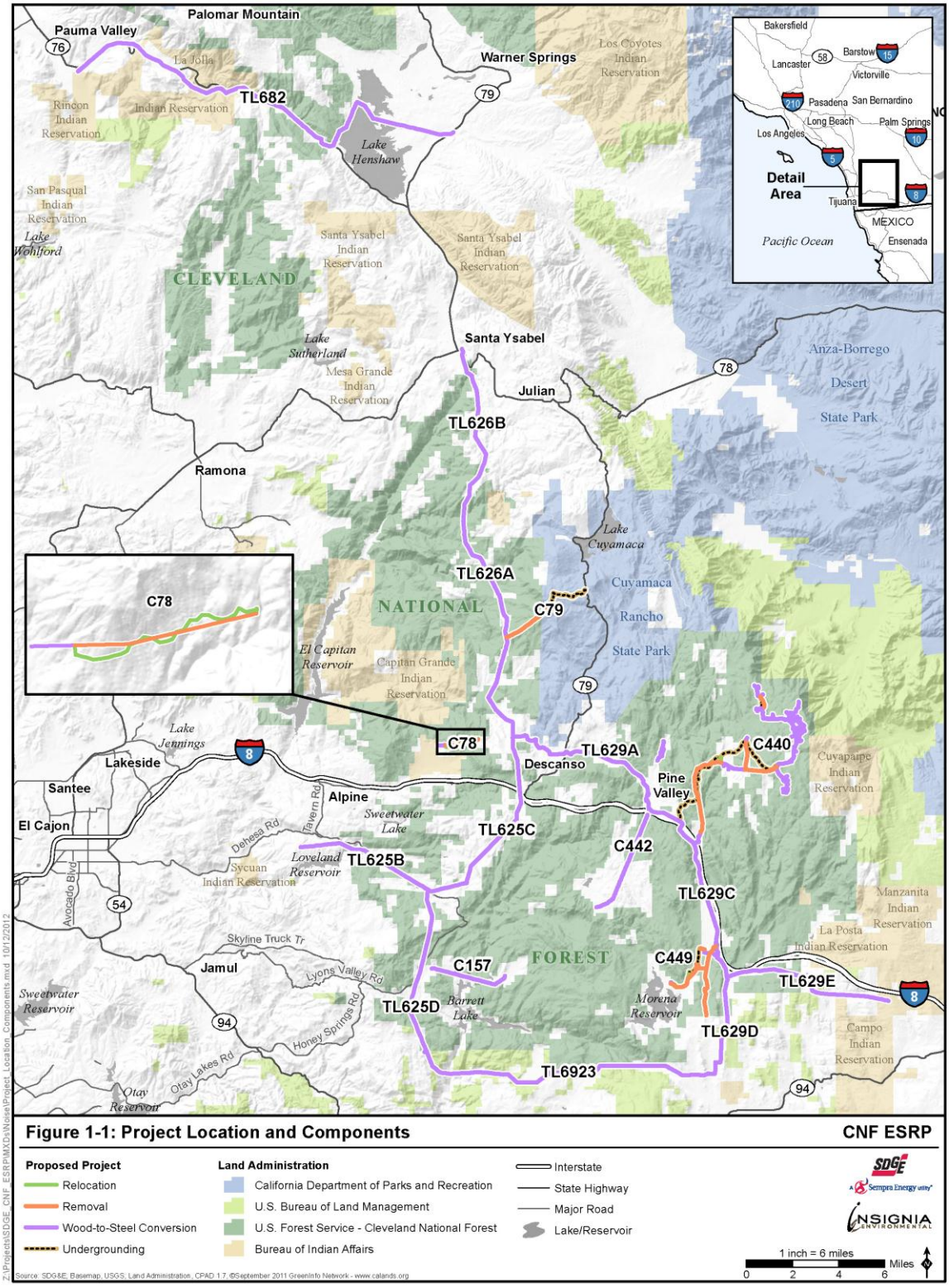
Frequency of sound is measured in Hertz (Hz) or cycles per second. The generally accepted range of human hearing ranges from approximately a low of 20 Hz to a high of 20,000 Hz. Some frequencies are more noticeable and annoying than others.

When compared to most other environmental issues, noise level standards are comprehensive in existing Federal, State, and local regulations. These standards are generally the result of socioeconomic studies that balance quality of life issues with reasonable development needs. A glossary of acoustical terms used in this report is presented in Appendix "A" and discusses the fundamentals of acoustics.

1.1 Project Description

Acentech Inc. has completed an environmental noise and vibration study for San Diego Gas and Electric Company's (SDG&E) Electric Safety and Reliability Project (Proposed Project), in the eastern part of San Diego County, California, in and around the Cleveland Nationals Forest. The Project includes approximately 105 miles of transmission lines and 45 miles of distribution lines. The locations of these lines are depicted in Figure 1: Location Map. Each of these lines was evaluated using applicable noise and vibration standards.

Figure 1: Location Map



1.1.1 Transmission Lines

These lines include:

TL625 – Three segments, approximately 22.5 miles in length :
- B Loveland Substation east to Barrett Tap
- C Barrett Tap east to Descanso Substation
- D Barrett Tap south to Barrett Substation
- Wood to steel conversion in place
- Loveland Substation to Barrett Tap converted to a double circuit

TL626 –approximately 18.8 miles in length from Santa Ysabel Substation south to Descanso Substation
- Wood to steel conversion in place

TL629 – Four segments, approximately 29.8 miles in length:
- A Descanso Substation east to Glencliff Substation
- C Glencliff Substation southeast to Cameron Tap
- D Cameron Tap south to Cameron Substation
- E Cameron Tap east to Crestwood Substation
- Wood to steel conversion in place
- Cameron Tap to Crestwood Substation converted to a double circuit

TL682 – approximately 20.2 miles in length from Rincon Substation east to Warners Substation
- Wood to steel conversion in place

TL6923 – approximately 13.4 miles in length from Barrett Substation east to Cameron Substation
- Wood to steel conversion in place

1.1.2 Distribution Lines

These lines include:

C78 – approximately 1.8 miles in length; runs from east of Viejas Reservation east along Viejas Grade Road to Via Arturo Road.
- Partially relocate circuit along Viejas Grade Road
- Wood to steel conversion

C79 – approximately 2.2 miles in length from Boulder Creek Road east to the Cuyamaca Peak communication site.
- Underground line from Highway 79 to Cuyamaca Peak along Lookout Road

C157 – approximately 3.5 miles in length; runs from Skye Valley Road, near Lyons Valley Road, east to Skye Valley Ranch.
- Wood to steel conversion in place

C440 – approximately 23.9 miles in length; runs from Glencliff Substation northeast to Mount Laguna along Sunrise Highway.
- Wood to steel conversion in place
- Underground a portion of the line in Highway S1

C442 – – approximately 6.3 miles in length; runs south from Pine Valley Road to Los Pinos Peak Forest Station and along Pine Creek Road south toward the community of Pine Valley.

Wood to steel conversion in place

C449 – approximately 6.7 miles in length; runs from Old Highway 80 south along Buckman Springs Road to Oak Drive and southwest along Morena Stokes Valley Road to Camp Morena.

Wood to steel conversion in place
Underground a portion of the line along Buckman Springs Road and Morena Stokes Valley Road
Partially relocate circuit with transmission

1.1.3 Construction Activities

Appendix C lists equipment typically utilized in the proposed construction activities.

1.1.3.1 Access Road Construction

SDG&E maintains existing access roads to allow operation and maintenance of the existing electric facilities. Whenever possible, construction will utilize existing access roads. The first step in modifying the overhead power lines will be to evaluate existing access roads, then repair those roads where necessary.

1.1.3.2 Wood to Steel Conversion in Place

As part of the Project, SDG&E will remove existing 20- to 90-foot-tall wood poles and replace them with steel poles at an approximately one-to-one ratio. The entire existing wooden pole will be removed unless protection of an environmental resource requires the pole to be cut off at the surface and the base left in place. The resulting holes will be backfilled, with native material where possible. The old wooden distribution poles will be removed from the site by a helicopter, crane or other lift, placed on flatbed trucks, disposed of at an approved facility.

Approximately 1,384 replacement poles will support transmission lines with an average span length of approximately 400 feet. Similarly, approximately 721 replacement poles will support distribution lines with an average span length of approximately 230 feet.

Prior to stringing the new overhead power lines with replacement conductors, temporary guard structures, typically consisting of vertical wood poles with cross arms, will be installed at road crossings and crossings of energized electric and communication lines to prevent the conductors from sagging onto roadways or other lines during conductor installation. In some cases, bucket trucks may also be used in place of these guard structures.

For transmission lines, SDG&E will configure each steel pole to carry the following:

Up to six 69 kV 636 kcmil[1] (0.977-inch diameter) aluminum-clad steel-supported (ACSS) aluminum conductors.

Two to seven 12 kV 636 kcmil (0.997-inch diameter) aluminum-clad steel-reinforced (ACSR) aluminum conductors, 12 kV 336.4 kcmil (0.721-inch diameter) ACSR aluminum conductors, 12 kV number 2 5/2 (0.330-inch diameter) Alumoweld aluminum conductors (AWAC), or 12 kV number 2 3/4 (0.386-inch diameter) AWAC.

One to two levels of communication circuits.

SDG&E will install three 69 kV conductors on one or both sides of the steel poles and arrange the conductors in a vertical configuration with a minimum separation of 4.5 feet. Where distribution underbuild is required, SDG&E will install two 12 kV conductors on each side of the transmission line steel poles and arrange the conductors in a horizontal configuration with a minimum separation of four feet. SDG&E will install the lowest 69 kV conductor at least 30 feet above the ground (25 feet above the ground where there is pedestrian access only) and the lowest 12 kV conductor at least 25 feet above the ground (17 feet above the ground where there is pedestrian access only). For single-circuit tangent poles, the conductors will be attached using three post insulators installed on each pole. For double-circuit tangent poles, the conductors will be attached using six post insulators installed on each pole. For single-circuit angle poles, the conductors will be attached using six suspension and three post insulators installed on each pole. For double-circuit angle poles, the conductors will be attached using 12 suspension insulators installed on each pole.

For distribution lines, SDG&E will configure each steel pole to carry two to four 12 kV 636 kcmil (0.997-inch diameter) ACSR aluminum conductors, 12 kV 336.4 kcmil (0.721-inch diameter) ACSR aluminum conductors, 12 kV number 2 5/2 (0.330-inch diameter) AWAC, or 12 kV number 2 3/4 (0.386-inch diameter) AWAC. SDG&E will install one to two conductors on each side of the steel poles and arrange the conductors in a horizontal configuration. SDG&E will install the new conductors with a minimum horizontal separation of approximately four feet. SDG&E will install the lowest conductor at least 25 feet above the ground (17 feet above the ground where there is pedestrian access only). SDG&E will attach the conductors to the distribution poles using one polymer insulator per conductor installed on each steel pole.

1.1.3.3 Existing Pole Removal

Wood pole removals will typically require a 20-foot-diameter area around the pole. Pole-removal activities will utilize bucket trucks to remove cross arms and the conductor, or in locations where there is no truck access, helicopters will be utilized to remove poles. Poles will be completely removed where possible. The holes will be backfilled with soil or materials similar to the surrounding area, and the site will be restored. If complete removal is not practical (e.g., if the pole cannot be pulled from the ground), it will be sectioned and cut at the base or six to 12 inches below the surface and covered with native material. If necessary to avoid impacts to sensitive resources or private property, poles may be cut off above ground level. All anchors and stub poles will also

[1] A circular mil is a unit equal to the area of a circle with a diameter of one mil (0.001 inch); used chiefly in specifying cross-sectional areas of round conductors. A kcmil is 1,000 circular mils.

be removed where possible. Old poles, associated hardware, and any other debris generated from Proposed Project activities will be removed from the Proposed Project site and placed on flatbed trucks for recycling or disposal at an approved facility, such as the MECO yard in Pine Valley.

1.1.3.4 Steel Pole Installation

SDG&E will notify the Underground Service Alert a minimum of 48 hours in advance of excavating or conducting other ground-disturbing activities in order to identify buried utilities. Exploratory excavations (potholing) will also be conducted to verify the locations of existing facilities in the field, if necessary.

1.1.3.4.1 Direct-Bury Steel Poles

Installation of 1,648 of direct-bury steel poles will begin with the excavation of holes approximately 20 to 48 inches in diameter and approximately seven to 12 feet deep, depending on the height of the pole. Pole holes will be excavated using a small truck-mounted or track-mounted drill rig if the site is land-accessible, or by hanging drilling equipment if accessible only by helicopter. Rock splitting/blasting may be required if crews encounter rock while digging. Pole hole drilling will excavate between approximately 0.7 to 2.2 cubic yards (CY) of soil per pole. New poles will be delivered to the site by a flatbed truck or by helicopter and placed in holes using a machine digger and/or hand digger. The annular space between poles and hole walls will then be backfilled with concrete, with an additional foot of crushed rock placed beneath the bearing plat if needed due to drainage and soil conditions. Should access or site conditions prohibit the use of a concrete backfill, pole holes may be backfilled and compacted with the previously excavated soil. Any remaining excavated material will be placed around the holes or spread onto access roads and adjacent areas.

1.1.3.4.2 Self-Supported Steel Poles

The installation of 457 self-supported steel poles required to resist terminal loads will be installed on micro-pile foundations. Micro-pile foundation installation will begin with the excavation of holes approximately eight inches in diameter by approximately 10 to 40 feet deep (requiring the removal of approximately 0.1 to 0.5 CY of soil), depending on the properties of the soil or rock underlying the surface. A steel rod will be inserted into the hole, centered, and the remaining space filled with a mixture of water, cement, and sand. The steel rod will protrude above grade and will connect to the structure or a small concrete cap supporting the structure above grade. Holes for micro-pile foundations will be drilled using a small drill rig operated from the top of an elevated platform, measuring approximately eight feet by eight feet on four to six legs and approximately six feet above grade. Depending on requirements for foundation strength, four to 12 micro-pile foundations will be arranged in a circular pattern to take the place of a concrete foundation. New poles will be delivered to the site by a flatbed truck and assembled on site using a truck-mounted crane, or sections will be flown in by helicopter. If there is no truck access to the job site, poles will be assembled at a staging area and flown in and installed by helicopter. Any remaining excavated material will be placed around the holes or spread onto access roads and adjacent areas.

1.1.3.5 Conductor Installation

Prior to stringing the new conductor, temporary guard structures typically consisting of vertical wood poles with cross arms will be installed at road crossings and crossings of energized electric and communication lines, preventing the conductors from sagging onto roadways or other lines during conductor installation. In some cases, bucket trucks may also be used as guard structures. As an alternative to using temporary guard structures, SDG&E may use flaggers to halt traffic for brief periods while overhead conductors are installed at road crossings.

Conductor stringing will begin with the installation of insulators and stringing sheaves during steel pole installation. Sheaves are rollers that temporarily attach to the lower end of the insulators to allow the conductor to be pulled along the line. A rope will then be pulled through the rollers from structure to structure. The rope may be pulled through the rollers using a helicopter in instances where terrain is difficult or when the use of a bucket truck or aerial man-lift is not feasible. Once the rope is in place, it will be attached to a steel cable and pulled back through the sheaves, and into place using conventional tractor-trailer pulling equipment located within one of the designated stringing sites. The conductor will be pulled through each structure under a controlled tension to keep the conductor elevated and away from obstacles, thereby minimizing third-party damage to the line and protecting the public.

After the conductor is pulled into place, the sag between the structures will be adjusted to a pre-calculated level. The conductor will then be attached to the end of each insulator, the sheaves will be removed, and the vibration dampers and other hardware accessories will be installed. The lowest transmission conductor will be installed with a minimum ground clearance of approximately 30 feet (25 feet where there is pedestrian access only). The lowest distribution conductor will be installed with a minimum ground clearance of 25 feet (17 feet where there is pedestrian access only). SDG&E will accomplish the removal of existing conductors in a method similar to the reverse of the conductor installation process. The old conductors will be wound onto wooden spools, placed on flatbed trucks, and recycled at an approved facility.

1.1.3.6 Underground Duct Package and Cable Installation

Trenches will be excavated using a backhoe, saw cutter, and other trenching equipment as warranted by site conditions. The depth of the trench will be determined by localized topography and potential conflicts, but is anticipated to be approximately five feet deep, with a width of approximately 2.5 feet. Dewatering of the trenches is not anticipated, but may be required based on weather conditions during construction. The trench alignment will proceed to the riser pole and support the transition from the underground to overhead conductors. Nine riser poles will be installed with the same equipment previously described for installation of the steel poles.

The underground distribution lines will be installed in a duct bank composed of two 4- to 5-inch-diameter PVC conduits encased in concrete or placed in sand or native fill. In order to facilitate the pulling and splicing of the cables, underground concrete splice vaults measuring approximately eight feet long, five feet wide, and seven feet deep will be installed in line with the underground duct banks every approximately 500 to 800

feet. These vaults will also provide access to the underground cables for maintenance, inspection, and repair during operation.

During trenching activities, the trench will be widened at the underground vault locations to allow for approximately two feet of additional clearance. The pre-formed, steel-reinforced precast concrete splice vaults will be delivered to the associated work areas on flatbed trucks and lowered into place using small, truck-mounted cranes. The splice vaults will then be connected to the underground duct banks before being covered with at least three feet of compacted fill. SDG&E does not anticipate that engineered backfill will be required. The remainder of the excavated material will be spread across the ROW or access roads, if possible, or disposed of at an approved facility, such as the MECO yard in Pine Valley.

After trenching activities for the underground duct banks have been completed, the PVC cable conduits will be installed (separated by spacers), and concrete will be poured around the conduits to form the duct banks. Approximately 13.3 miles of undergrounding for lines C79, C440, and C449 will result. Upon completion of the duct bank, the cables will be installed in the duct banks. Each cable segment will be pulled into the duct bank and terminated at the riser pole where the line converts to an overhead configuration. To pull the cable through the ducts, a cable reel will be placed at one end of the section and a pulling rig at the other end. A larger rope will then be pulled into the duct using a fish line and attached to the cable puller, which pulls the cable through the duct. Lubricant will be applied to the cable as it enters the duct to decrease friction during pulling. After installation of the conductor, the ground surface will be restored to near pre-construction conditions and repaved or reseeded as appropriate.

1.1.3.7 Cleanup and Post-Construction Restoration

All areas that are temporarily disturbed around each structure, areas used for conductor pulling, and all staging areas will be restored to pre-construction conditions, to the extent practicable, following installation of the replacement poles and reconductoring of the lines. This will include removal of all construction materials and debris, returning areas to their original contours, and reseeding, as needed.

1.1.4 Construction Equipment

Appendix C summarizes equipment used to maintain existing access roads and construct new roads and turnarounds. Appendix C also provides the equipment that will be used to construct each Proposed Project components, along with its approximate duration of use. SDG&E expects pick-up trucks and worker vehicles to travel daily to and from each Proposed Project component work site. Delivery trucks will likely travel to and from the staging areas. Approximately one water truck, completing an average of two trips per day, may be required to deliver water to each active construction segment of the Proposed Project site for dust control, compaction, and fire protection. All vehicles and equipment will be used in accordance with the U.S. Forest Service' SDG&E Operation and Maintenance Project Fire Plan (August 2011).

1.1.5 Construction Schedule for Transmission Lines

SDG&E anticipates that construction of the entire Proposed Project will take approximately four years from initial site development through final energization. Table 1: Proposed Construction Schedule summarizes the length of time anticipated to construct each Proposed Project component.

Construction activities will generally be limited to no more than 12 hours per 24-hour period, six days per week, as needed. On occasion, construction activities may be required at night or on weekends to minimize impacts to schedules and to facilitate cutover work, and as required by other property owners or agencies, such as the CAISO, which may require outages of certain portions of the electric system. If construction occurs outside of the hours allowed by San Diego County, SDG&E will follow its established protocols and will provide advance notice by mail to all property owners within 300 feet of planned construction activities. The announcement will state the construction start date, anticipated completion date, and hours of construction.

Table 1: Proposed Construction Schedule for Transmission Lines

Project Component	Activity	Approximate Duration (days)	Anticipated Start Date
TL625B	Grade pads and access roads	50	September 2013
	Install foundations	70	September 2013
	Install poles	70	October 2013
	Reconductor	60	December 2013
	Restore ROW	20	March 2014
TL625C	Grade pads and access roads	50	October 2016
	Install foundations	90	November 2016
	Install poles	120	December 2016
	Reconductor	120	January 2017
	Restore ROW	50	June 2017
TL625D	Grade pads and access roads	40	December 2014
	Install foundations	40	December 2014
	Install poles	40	January 2015
	Reconductor	60	February 2015
	Restore ROW	30	April 2015
TL626A	Grade pads and access roads	40	October 2015
	Install foundations	80	November 2015
	Install poles	80	December 2015
	Reconductor	100	January 2016
	Restore ROW	40	May 2016
TL626B	Grade pads and access roads	40	July 2014
	Install foundations	70	August 2014

Project Component	Activity	Approximate Duration (days)	Anticipated Start Date
	Install poles	70	September 2014
	Reconductor	80	October 2014
	Restore ROW	30	January 2015
TL629A	Grade pads and access roads	40	December 2014
	Install foundations	100	December 2014
	Install poles	100	January 2015
	Reconductor	120	February 2015
	Restore ROW	40	July 2015
TL629C	Grade pads and access roads	20	April 2016
	Install foundations	50	April 2016
	Install poles	50	May 2016
	Reconductor	70	May 2016
	Restore ROW	20	August 2016
TL629D	Grade pads and access roads	20	August 2016
	Install foundations	40	August 2016
	Install poles	40	September 2016
	Reconductor	50	September 2016
	Restore ROW	20	November 2016
TL629E	Obtain ROW	120	April 2013
	Grade pads and access roads	60	September 2013
	Install foundations	70	January 2014
	Install poles	70	March 2014
	Reconductor	60	April 2014
	Restore ROW	20	July 2014
TL682	Grade pads and access roads	80	August 2013
	Install foundations	160	September 2013
	Install poles	160	September 2013
	Reconductor	140	October 2013
	Restore ROW	40	April 2014
TL6923	Grade pads and access roads	40	July 2015
	Install foundations	70	August 2015
	Install poles	80	September 2015
	Reconductor	100	October 2015
	Restore ROW	40	February 2016

1.1.6 Construction Schedule for Distribution Lines

SDG&E anticipates that construction of the entire Proposed Project will take approximately four years from initial site development through final energization. Table 2 summarizes the length of time anticipated to construct each Proposed Project component.

Construction activities will generally be limited to no more than 12 hours per 24-hour period, six days per week, as needed. On occasion, construction activities may be required at night or on weekends to minimize impacts to schedules and to facilitate cutover work, and as required by other property owners or agencies, such as the CAISO, which may require outages of certain portions of the electric system. If construction occurs outside of the hours allowed by San Diego County, SDG&E will follow its established protocols and will provide advance notice by mail to all property owners within 300 feet of planned construction activities. The announcement will state the construction start date, anticipated completion date, and hours of construction.

1.1.7 Operation and Maintenance

The operation and maintenance of the system will not change. These activities include:

Right of-Way Repair – SDG&E performs ROW repairs as necessary, usually following seasonal rains, and requires the use of a four-wheel-drive pick-up truck, a motor grader, a backhoe, and/or a cat-loader. The cat-loader has steel tracks, while the remaining equipment has rubber tires.

Pole Brushing – SDG&E typically clears a 10-foot-diameter area around the pole base. Vegetation is removed using mechanical equipment consisting of chain saws, weed trimmers, rakes, shovels, and brush hooks. Three-person crews typically conduct this work.

Application of Herbicides – Application of herbicides may follow the mechanical clearing of vegetation to prevent vegetation from recurring.

Equipment repair or replacement – SDG&E may need to add, repair, or replace this type of equipment in order to maintain uniform, adequate, safe, and reliable service. SDG&E may remove and replace an existing structure with a larger/stronger structure at the same location or a nearby location due to damage or changes in conductor size. Equipment repair or replacement generally requires a crew to gain access to the location of the equipment to be repaired or replaced. This is typically a four-man crew with two to three trucks, a boom or line truck, an aerial lift truck, and an assist truck. If no vehicle access exists, the crew and material are flown in by helicopter.

Insulator Washing – SDG&E typically inspects insulators on an annual basis to determine if washing is required. A two-person crew driving a washer truck will be required for this 30-minute operation.

Tree Trimming – SDG&E conducts tree-trimming activities with a two-person crew, a one-person aerial lift truck, and a chipper trailer. SDG&E can complete typical tree-trimming activities in one day.

Visual Inspection – SDG&E uses helicopters in the visual inspection of overhead facilities. SDG&E inspects each electric transmission line several times a year via helicopter.

Corona Noise – Modern transmission lines are designed, constructed, and maintained so that during dry conditions they operate below the corona-inception voltage and generate a minimum of corona-related noise. The corona hum from a 500 kV line typically will produce noise levels up to 36 dBA when measured at the edge of the transmission line right of way (ROW) during dry conditions.[2] Corona levels (and audible noise levels) are highest during heavy rain, when the conductors are wet, but the noise generated by the rain will likely be greater than the noise generated by corona; thus, the increased corona-related noise will not be noticeable. In foul weather conditions, water droplets and fog can produce corona discharges from high voltage lines that are typically 5 dBA higher than fair weather conditions, but can be 20 dBA higher than usual.

Table 2: Proposed Construction Schedule for Distribution Lines

Project Component	Activity	Approximate Duration (days)	Anticipated Start Date
C78	Set up/material	5	August 2013
	Remove poles	5	September 2013
	Dig pole/anchor holes	15	August 2013
	Install poles	10	September 2013
	Reconductor	5	September 2013
	Restore ROW	10	November 2013
C79	Install Poles	5	November 2013
	Remove Poles	10	April 2014
	Restore ROW	15	February 2014
	Set up/material	20	November 2013
	Trench/Concrete Products	60	December 2013
	Cables/connections	15	March 2014
	Restore ROW	30	May 2014
C157	Set up/material	10	May 2014
	Dig pole/anchor holes	25	June 2014
	Install poles	15	June 2014
	Reconductor	10	July 2014
	Remove poles	10	July 2014
	Restore ROW	15	August 2014

[2] Average noise measurements made during "fair" conditions in 2004 under cleaned spans of a 500 kV line of the SnoKing Project of the Bonneville Power Administration. http://www.transmission.bpa.gov/planproj/Transmission_Projects/snoking/default.cfm

C440	Set up/material	90	August 2013
	Dig pole/anchor holes	180	October 2013
	Install poles	180	October 2013
	Reconductor	240	February 2014
	Remove poles	60	February 2015
	Restore ROW	90	July 2015
	Trench/Concrete Products	240	October 2013
	Cables/connection	60	September 2014
C442	Set up/material	15	September 2014
	Dig pole/anchor holes	60	September 2014
	Install poles	30	November 2014
	Reconductor	20	December 2014
	Remove poles	20	January 2015
	Restore ROW	20	February 2015
C449	Set up/material	20	March 2015
	Dig pole/anchor holes	60	April 2015
	Install poles	30	June 2015
	Reconductor	20	July 2015
	Remove poles	20	August 2015
	Trench/Concrete Products	45	July 2015
	Cables/connections	10	July 2015
	Restore ROW	20	August 2015

1.2 Environmental Settings & Existing Conditions

1.2.1 Settings & Locations

The Proposed Project encompasses a wide range of physical conditions within eastern San Diego County. Each TL and C follow different alignments that pass through or adjacent to parts of the Cleveland National Forest, State parks, Indian Reservations, Bureau of Land Management lands, State Lands, and private property. Some alignments are adjacent to roads and highways and some travel across open land, some developed and some undeveloped.

1.2.2 Existing Noise Conditions Along Transmission Lines

The sound levels in most communities fluctuate, depending on the activity of nearby and distant noise sources, time of the day, or season of the year. Within an hour, the sound level can fluctuate between the lowest level (Lmin) and the highest level (Lmax).

Ambient sound measurements were taken at 21 locations to characterize the existing environment between June 8 and June 10th and between August 31st and September 9th, 2001. List of measurement equipment may be found in Section 1.3.1. These sound measurements included:

L_{eq} is an average of the time-varying sound energy for a specified time period. The L_{eq} was measured for each hour of measurement.

$L_{(10)}$ is the level that is exceeded 10 percent of the time period.

$L_{(90)}$ is the level that is exceeded 90 percent of the time and is often utilized as a descriptor of the background noise.

The ambient sound levels will be between the L90 and the L10 values 80 percent of the time.

The weather conditions during that time period are presented in Appendix C. Table 3: Sound Measurement Survey Results presents the average daytime level for the 12-hour period of 7:00 a.m. to 07:00 p.m., L_{eq}(day), and the CNEL measured at each location.

Table 3: Sound Measurement Survey Results Along Transmission Lines

SDG&E ID	Measurement Location	L_{eq}(day)	CNEL
TL625	Loc. A: 19605 Japatul Road. Ranch approximately 1,025 feet south of Japatul Road; less than 11 dwelling units per acre.	41	44
TL625	Loc. B: Near Carveacre Road, approximately 2,775 feet south of Japatul Road and 7,170 feet west of Lyons Valley Road. CNF.	44	45
TL625	Loc. E: 22779 Japatul Valley Road. Residential acreage/horse ranch; less than 11 dwelling units per acre, 775 ft east of Japatul Rd	42	56
TL626	Loc. M: Inaja Memorial Park. Park, approximately 180 feet south of Old Julian Road (CA 78/79). Adjacent to CNF.	52	64
TL626	Loc. N: Pole Z371508 on Burrel Way/Descanso Trail, Descanso. Less than 11 dwelling units per acre	42	53
TL626	Loc. U: Approximately 200 feet west of Boulder Creek Road and 440 feet NW of Sherilton Ranch Road Intersection. CNF.	37	44
TL 629	Loc. C: Boulder Oaks Campground. CNF.	44	52
TL629	Loc. J: Meadow Lane / Tanglewood Drive, Descanso. Less than 11 dwelling units per acre.	53	53

SDG&E ID	Measurement Location	L_{eq}(day)	CNEL
TL629	Loc K: 27408 Old Highway 80, Guatay. Less than 11 dwelling units per acre.	48	53
TL629	Loc L: Pole Z41006, near Cameron Truck Trail, Campo. Less than 11 dwelling units per acre.	45	51
TL682	Loc S: San Luis Rey Picnic Area, 70 feet south of CA 76. CNF	48	67
TL682	Loc T: La Jolla Indian Reservation; approximately 1,150 feet south of Poomacha Road/CA76 Intersection; less than 11 dwelling units per acre.	41	48
TL6923	Loc. F: 1875 Lake Morena Drive, Campo; less than 11 dwelling units per acre.	55	52
TL6923	Loc F: 1704 Lake Morena Drive, Campo, approximately 500 feet north of Campo Elementary School and 240 feet west of Beckman Springs Road; less than 11 dwelling units per acre.	47	52

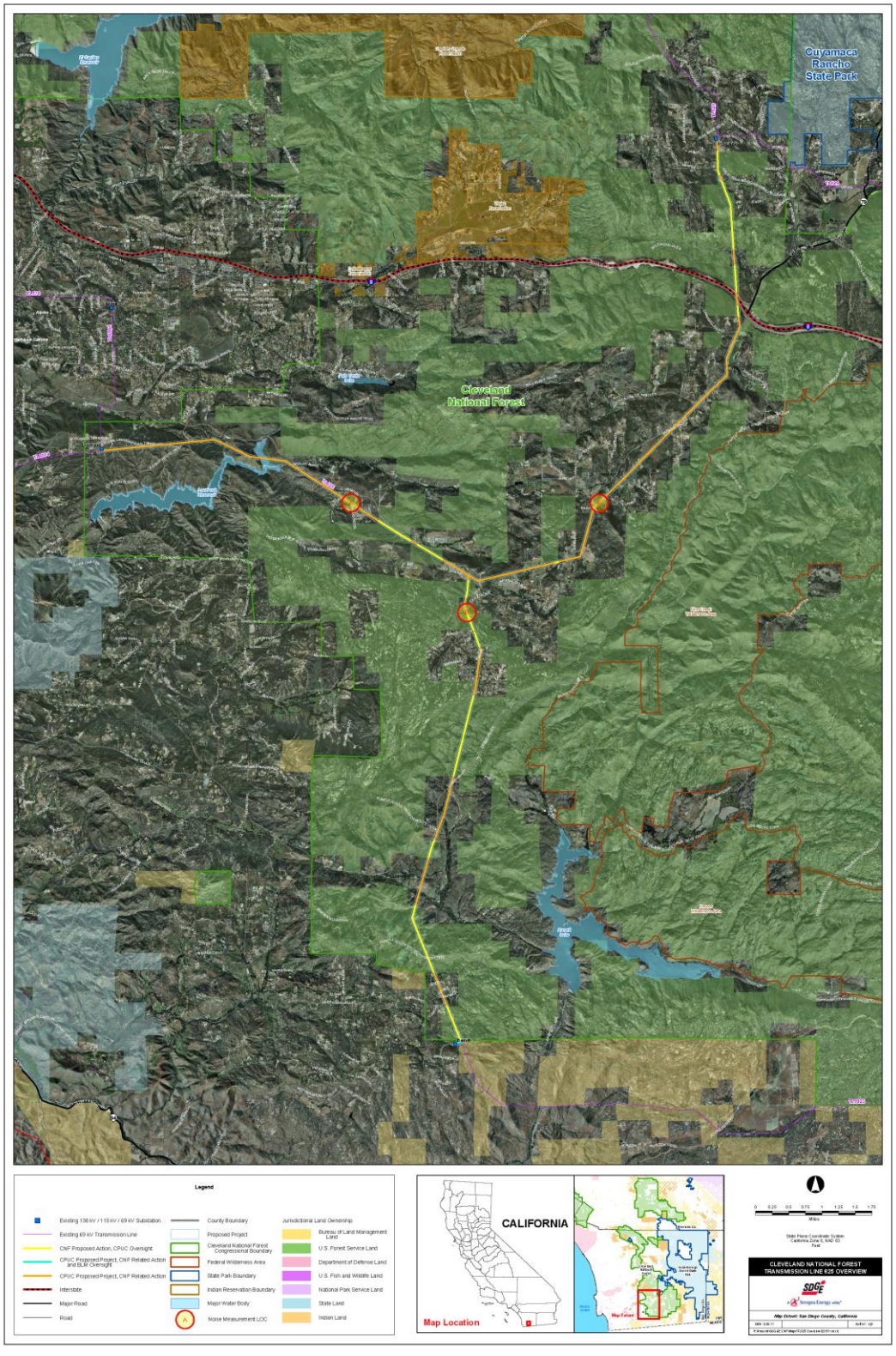
Note: All measurements are reported in dBA. Leq(day) is from 7 a.m. to 7 p.m.

1.2.2.1 TL625

As shown in Figure 2: TL625 Overview, TL625 has three segments covering approximately 22.5 miles of improvements. The northern segment begins at Descanso Substation (southern terminus of TL626 and western terminus of TL629) and passes through residential areas and across developed lands and through or adjacent to U.S. Forest Service-administered lands to I-8. South of I-8 it follows Japatul Valley Road that passes through residential and ranch acreages (less than 11 dwellings per acre) before heading cross county east to near Carveacre Road where it spits into a western segment and a southern segment.

The western segment follows mostly on the south side of Old Japatul Road and Dehesa Road, terminating at Loveland Substation. Land uses include ranches (less than 11 dwellings per acre) and U.S. Forest Service.

Figure 2: TL625 Overview

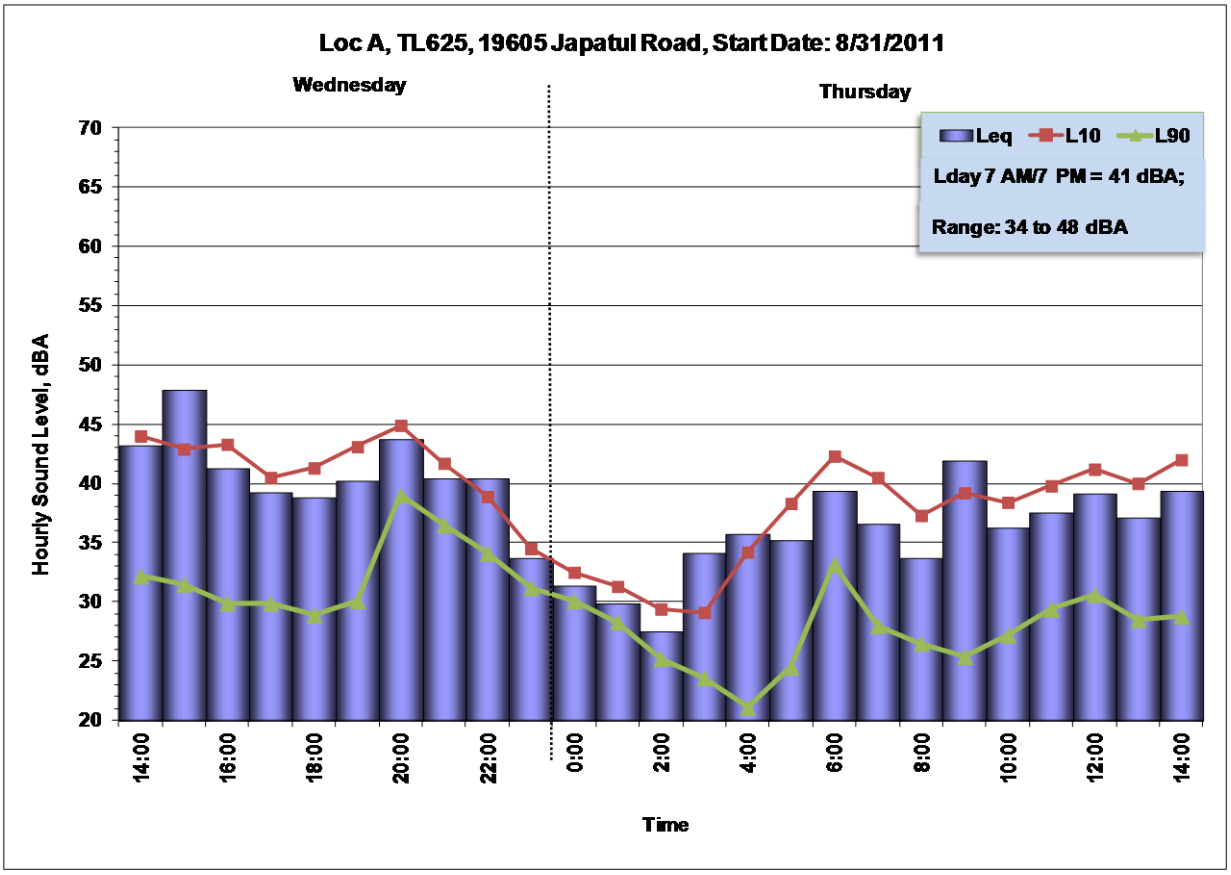


The southern segment heads south to Barrett Substation, passing through U.S. Forests Service lands and residential and ranch lands with less than 11 dwellings per acre.

Noise measurements were made at three locations along TL625: Locations A, B, and E.

Figure 3: TL625 – Location A Noise Measurement Results presents the sound levels measured at Loc. A: 19605 Japatul Road over a 25-hour period between 31 August and 1 September 2011. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 41 dBA and the CNEL was 44 dBA.

Figure 3: TL625 – Location A Noise Measurement Results



Sources of ambient noise included traffic on Japatul Road located approximately 1,025 feet north of the measurement location, local ranch activity, aircraft, and natural sounds. The measurement site was adjacent to SDG&E Tower as shown in the pictures in Figure 4: TL625 – Location A Noise Measurement Pictures and the map in Figure 2: TL625 Overview.

Figure 4: TL625 – Location A Noise Measurement Pictures

Looking East

Looking West

Looking South

Figure 5: TL625 – Location B Noise Measurement Results presents the sound levels measured at Loc. B: Near Carveacre Road over a 25-hour period between June 8 and June 9, 2011. The location was approximately 2,375 feet southwest of Japatul Road/Carveacre Road intersection and 7,170 feet west of Lyons Valley Road on U.S. Forest Service-administered land. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 44 dBA and the CNEL was 45 dBA.

Sources of ambient noise included traffic on Carveacre Road and Japatul Road located approximately 1,025 feet north of the measurement location, aircraft, and natural sounds. The measurement site was adjacent to SDG&E Tower as shown in the pictures in Figure 6: TL625 – Location B Noise Measurement Pictures and the map in Figure 2: TL625 Overview.

Figure 5: TL625 – Location B Noise Measurement Results

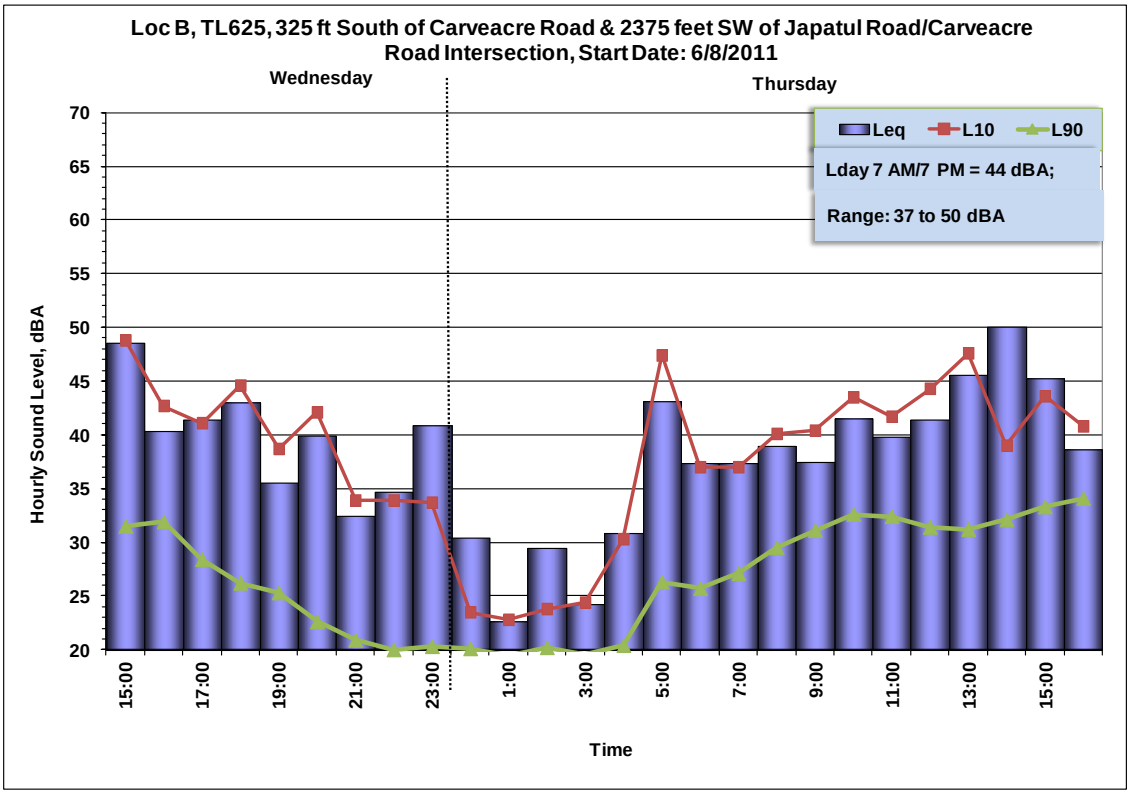
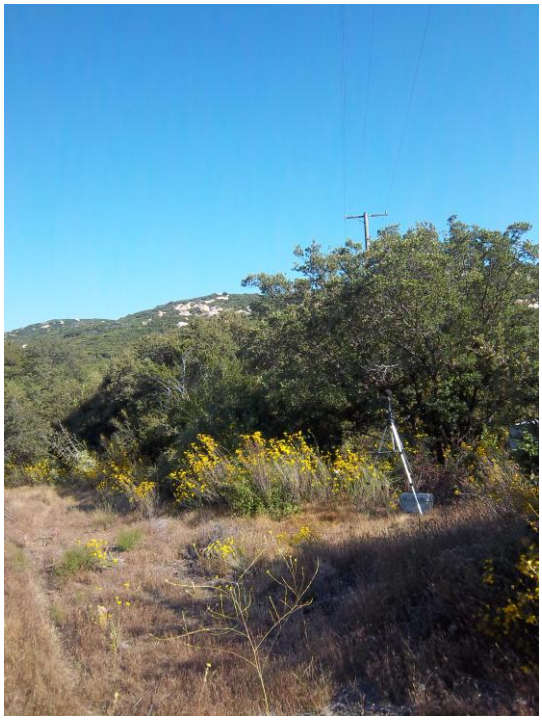


Figure 6: TL625 – Location B Noise Measurement Pictures

Looking North towards Carveacre Road



Looking South

Figure 7: TL625 – Location E Noise Measurement Results presents the sound levels measured at Loc. E: 22779 Japatul Valley Road, over four 24-hour periods between September 2 and September 6, 2011. The location was approximately 875 feet east of Japatul Valley Road where TL625 crosses Illahe Drive. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 42 dBA and the CNEL was 56 dBA.

Sources of ambient noise included traffic on Japatul Valley Road located approximately 1,025 feet north of the measurement location, aircraft, and natural sounds (nighttime cicadas). The measurement site was adjacent to SDG&E TL625 pole as shown in the pictures in Figure 8: TL625 – Location E Noise Measurement Pictures and the map in Figure 2: TL625 Overview.

Figure 7: TL625 – Location E Noise Measurement Results

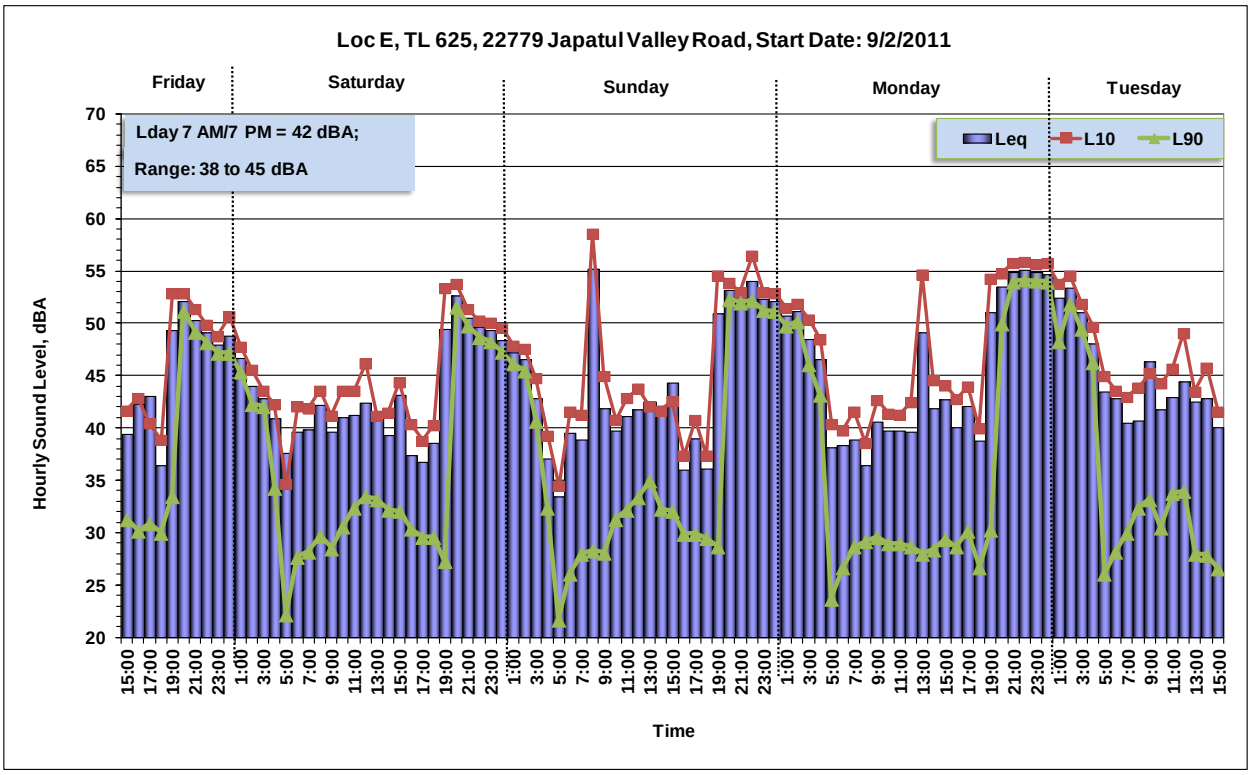


Figure 8: TL625 – Location E Noise Measurement Pictures

Looking NE

Looking NNW

1.2.2.2 TL626

As shown in Figure 9: TL626 Overview, TL626 has approximately 18.8 miles of improvements between Descanso Substation and Santa Ysabel Substation to the north. TL626 passes through residential areas in the Descanso area and through and adjacent to U.S. Forest Service-administered lands and ranch land (less than 11 dwellings per acre).

Noise measurements were made at three locations along TL626: Locations M, N, and U. Figure 10: TL626 – Location M Noise Measurement Results presents the sound level measurement results at Loc. M: Inaja Memorial Park, over a 25-hour period between August 31 and September 1, 2011. The location was approximately 180 feet south of Old Julian Road (CA78/79). The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 52 dBA and the CNEL was 64 dBA.

Sources of ambient noise included traffic on Old Julian Road (CA78/79) located approximately 180 feet north of the measurement location, aircraft, and natural sounds (nighttime cicadas). The measurement site was approximately 1,100 feet east of TL626 as shown in the map in Figure 9: TL626 Overview. Pictures of the measurement location are shown in Figure 11: TL626 – Location M Noise Measurement Pictures.

Figure 9: TL626 Overview

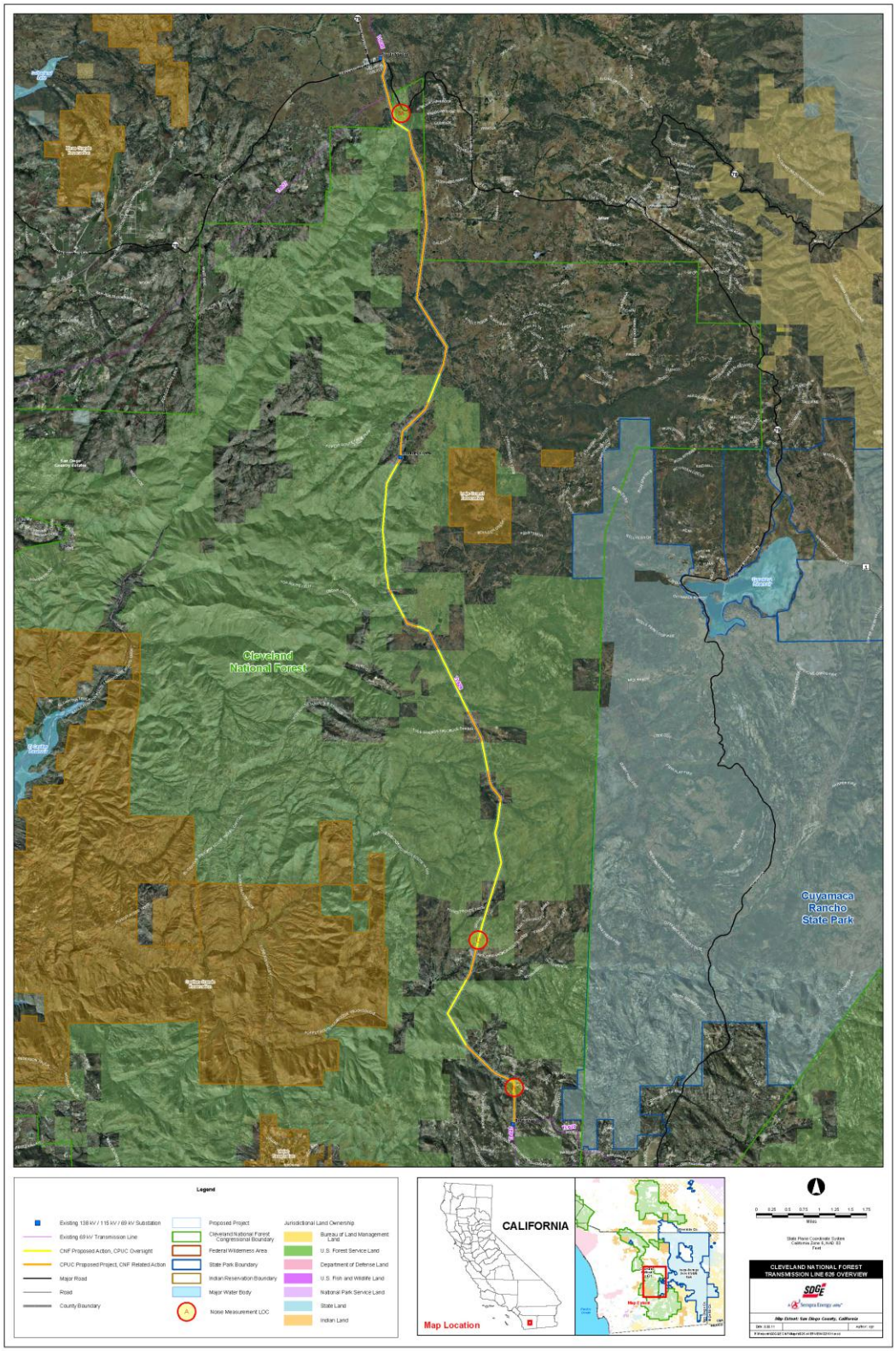


Figure 10: TL626 – Location M Noise Measurement Results

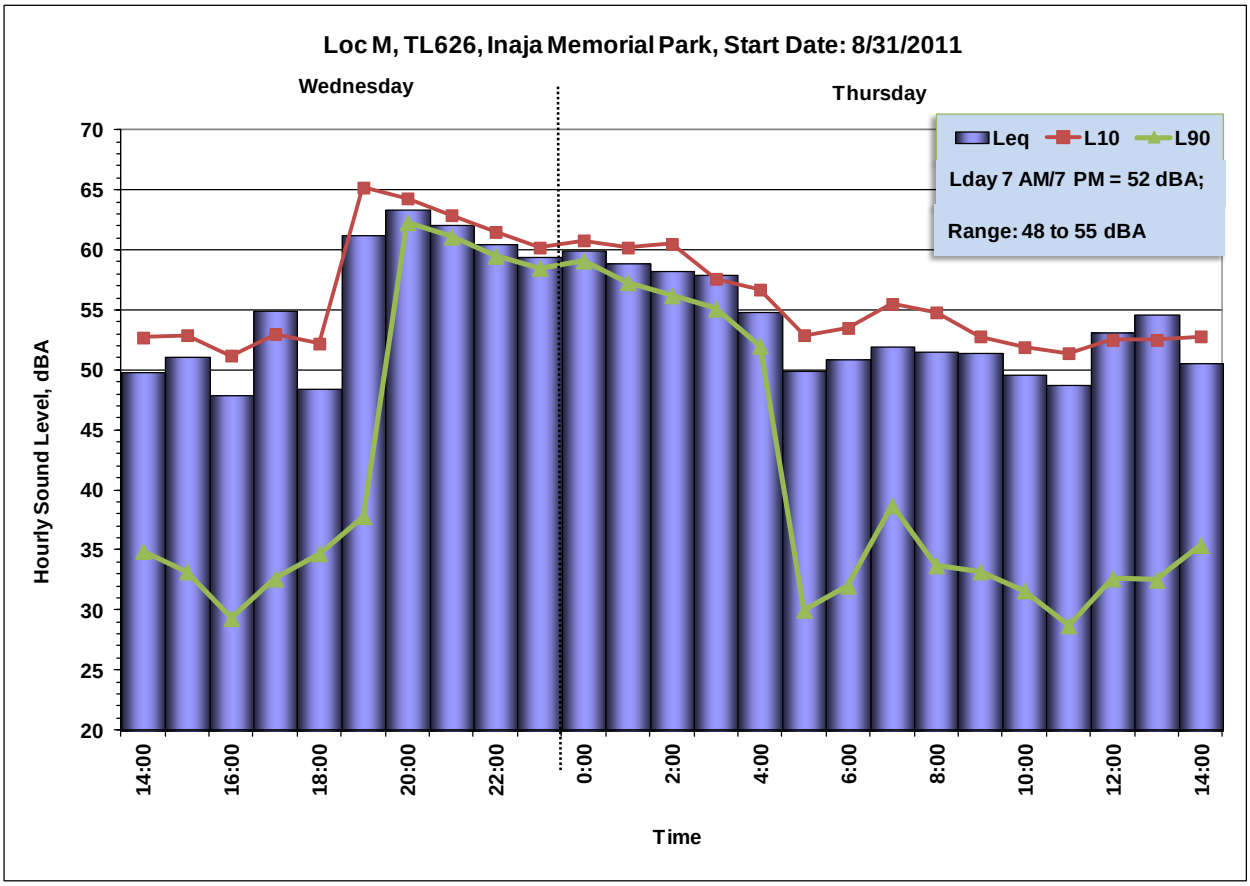
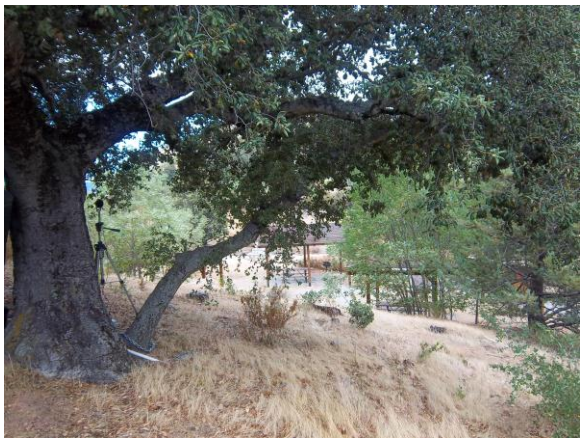


Figure 11: TL626 – Location M Noise Measurement Pictures



Looking North

Looking South

Figure 12: TL626 – Location N Noise Measurement Results presents the sound level measurement results at Loc. N: Burrel Way, south of Decanso Trail intersection, Descanso, over a 25-hour period between September 1 and September 2, 2011. The location was approximately 625 feet north of Boulder Creek Road. The data includes

the hourly Leq, L10 and L90 values. The average daytime Leq was 42 dBA and the CNEL was 53 dBA.

Figure 12: TL626 – Location N Noise Measurement Results

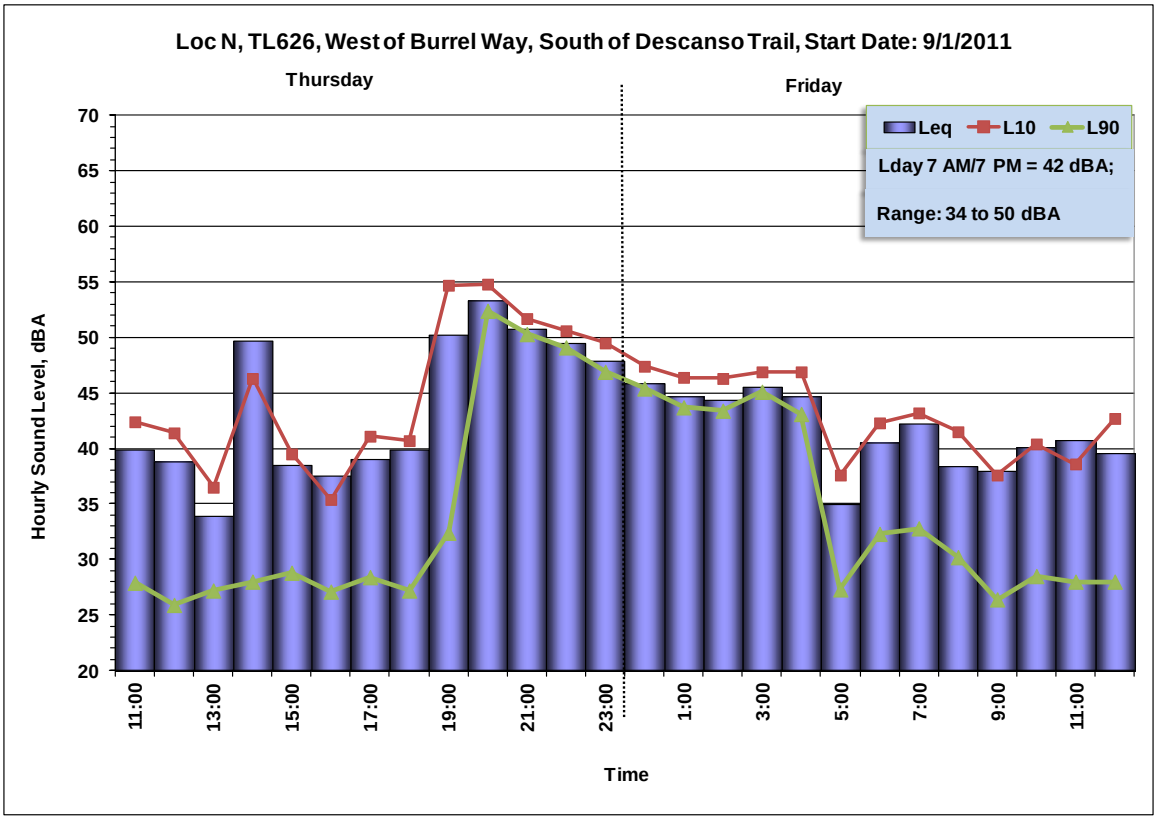


Figure 13: TL626 – Location N Noise Measurement Pictures

Looking South

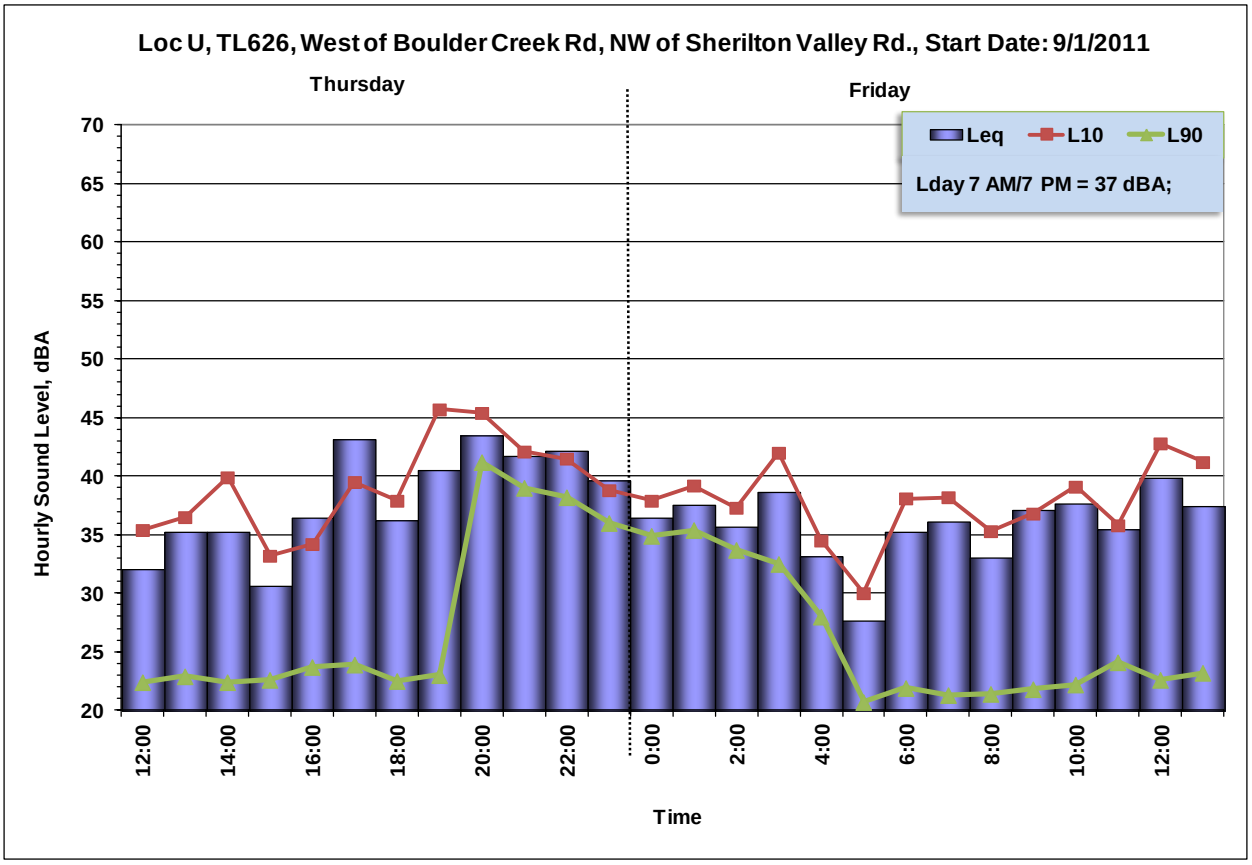
Looking West

Sources of ambient noise included local traffic, aircraft, and natural sounds (nighttime cicadas). The measurement site was at Pole Z371508 of TL626 as shown in the Figure 9: TL626 Overview. Pictures of the measurement location are shown in Figure 13: TL626 – Location N Noise Measurement Pictures.

Figure 14: TL626 – Location U Noise Measurement Results presents the sound level measurement results at Loc. U: West of Boulder Creek Road, NW of Sherilton Valley Road intersection, CNF, over a 25-hour period between September 1and September 2, 2011. The location was approximately 200 feet west of Boulder Creek Road and 440 feet NW of Sherilton Ranch Road Intersection. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 37 dBA and the CNEL was 44 dBA.

Sources of ambient noise included local traffic, aircraft, and natural sounds (nighttime cicadas). The measurement site was near Pole Z371553 of TL626 as shown in the map in Figure 9: TL626 Overview. No pictures of the measurement location were taken.

Figure 14: TL626 – Location U Noise Measurement Results



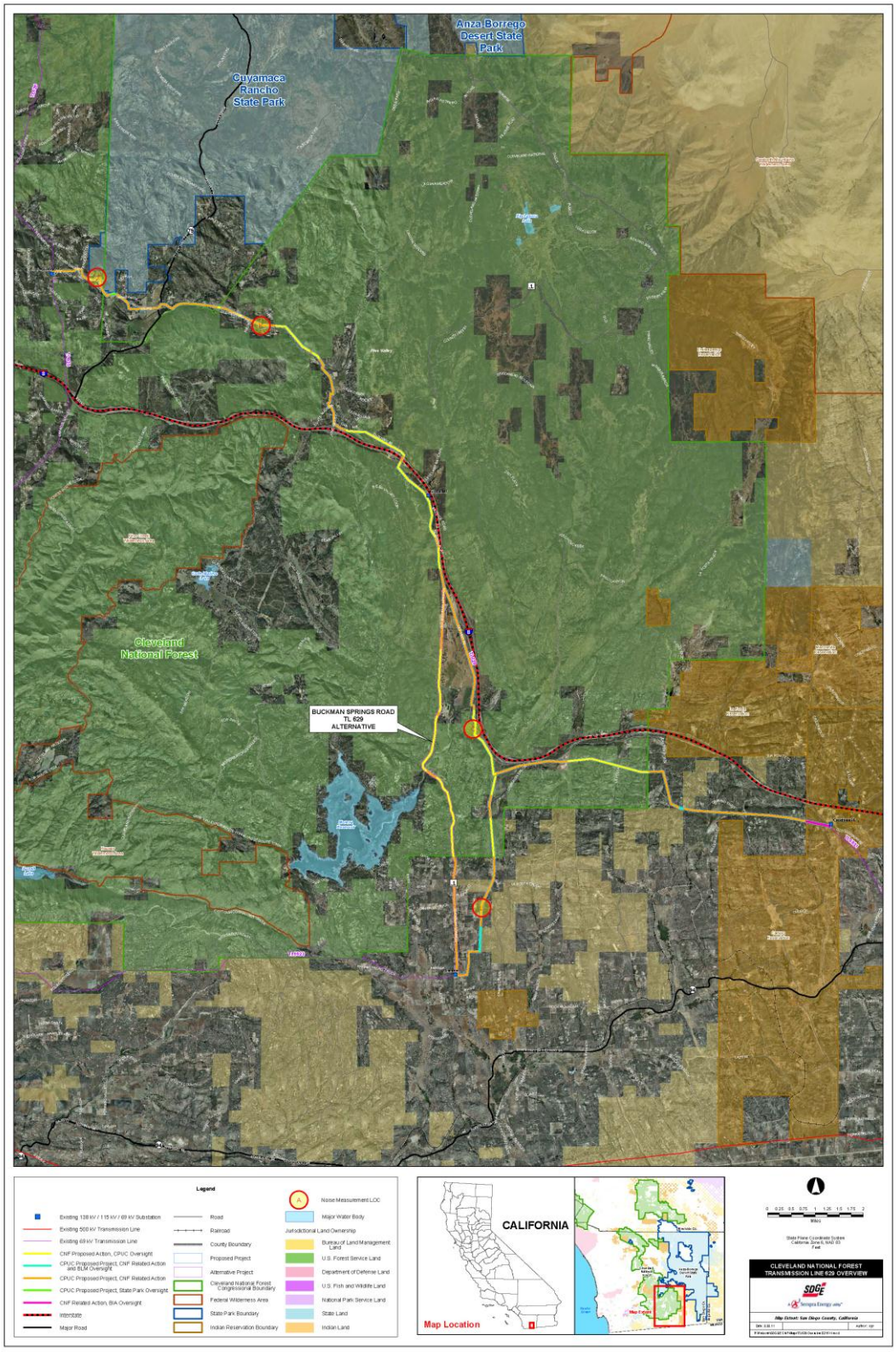
1.2.2.3 TL629

As shown in Figure 15: TL629 Overview, TL629 connects Descanso Substation to Glencliff Substation (approximately 11.2 miles), Glencliff Substation to Cameron Tap (approximately 6.2 miles), Cameron Tap south to Cameron Substation (approximately 6.2 miles) Cameron Tap east to Crestwood Substation (approximately 7.6 miles). TL629 passes through residential areas in Descanso, Guatay, Pine Valley, and along Buckman Springs Road north of Cameron Substation. TL629 parallels Old Highway 80 east of Descanso to Glencliff Substation passing adjacent to or within U.S. Forest Service-administered lands.

Noise measurements were made at four locations along TL629: Locations C, J, K and L.

Figure 16: TL629 – Location C Noise Measurement Results presents the sound level measurement results at Loc. C: Bolder Oaks Campground, over a 25-hour period between August 31 and September 1, 2011. The location was approximately 1065 feet south of the Campground entrance and 450 feet SW of Old Highway 80. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 44 dBA and the CNEL was 52 dBA.

Figure 15: TL629 Overview



Sources of ambient noise included traffic on I-8 located approximately 1000 feet east of the measurement location, aircraft, and natural sounds. The measurement site is shown in the map in Figure 15: TL629 Overview. Pictures of the measurement location are shown in Figure 17: TL629 – Location C Noise Measurement Pictures.

Figure 16: TL629 – Location C Noise Measurement Results

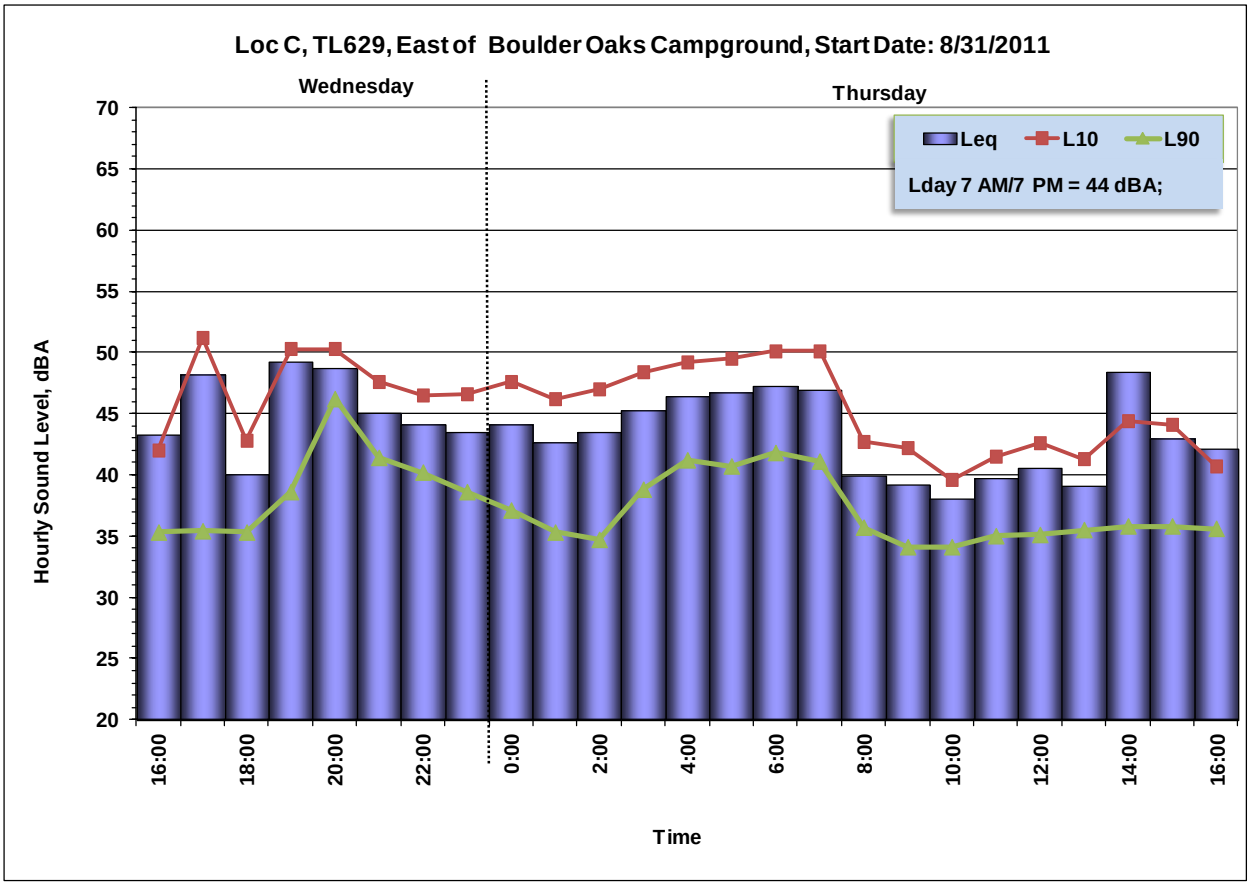


Figure 18: TL629 – Location J Noise Measurement Results presents the sound level measurement results at Loc. J: intersection of Meadow Lane / Tanglewood Drive, Descanso, over a 25-hour period between June 9 and June 10, 2011. Location J was approximately 55 feet north of Tanglewood Drive. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 53 dBA and the CNEL was 53 dBA.

Sources of ambient noise included local traffic, aircraft, and natural sounds. The measurement site is shown in the map in Figure 15: TL629 Overview. Pictures of the measurement location are shown in Figure 19: TL629 – Location J Noise Measurement Pictures.

Figure 17: TL629 – Location C Noise Measurement Pictures

Looking SSE

Looking WNW

Figure 18: TL629 – Location J Noise Measurement Results

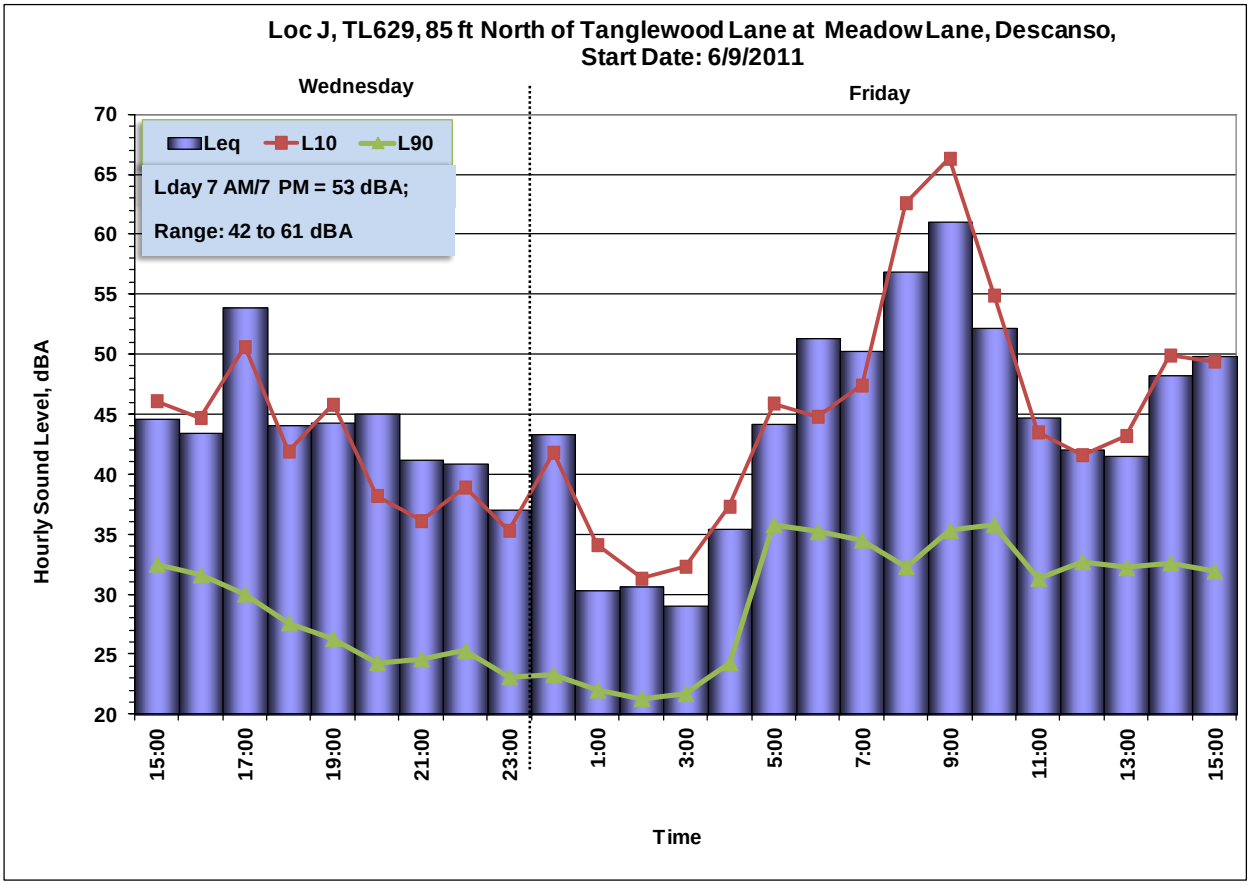
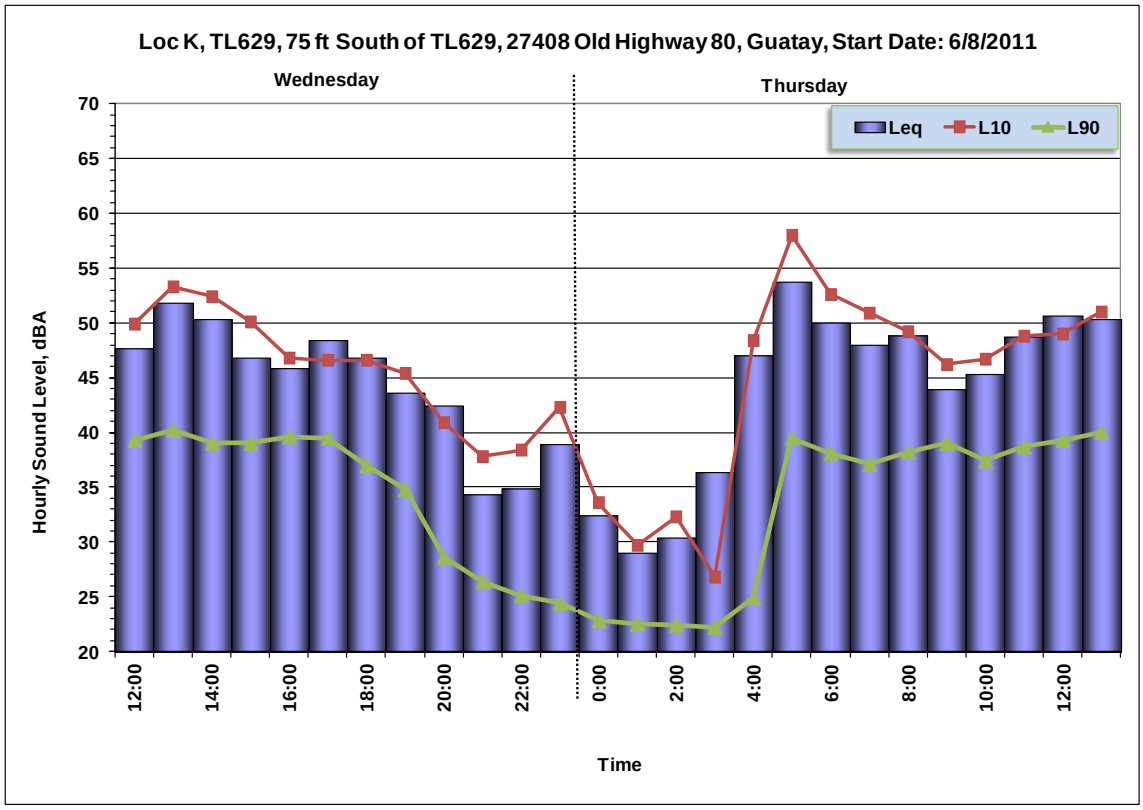


Figure 19: TL629 – Location J Noise Measurement Pictures

Looking North **Looking West**

Figure 20: TL629 – Location K Noise Measurement Results presents the sound level measurement results at Loc. K: 27408 Old Highway 80, Guatay, over a 25-hour period between June 8 and June 9, 2011. Location K was approximately 55 feet north of Tanglewood Drive. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 48 dBA and the CNEL was 53 dBA.

Figure 20: TL629 – Location K Noise Measurement Results



Sources of ambient noise included local traffic on Old Highway 80 approximately 325 feet south, barnyard animals within 50 feet north, gardening activities, and natural sounds. The measurement site is shown in the map in Figure 15: TL629 Overview. Pictures of the measurement location are shown in Figure 21: TL629 – Location K Noise Measurement Pictures.

Figure 21: TL629 – Location K Noise Measurement Pictures

Looking North

Looking NW

Looking East

Figure 22: TL629 – Location L Noise Measurement Results presents the sound level measurement results at Loc. L: TL629 Pole Z41000, over a 25-hour period between June

8 and June 9, 2011. Location K was 230 feet south of Cameron Truck Trail and 2,950 feet east of Beckman Springs Road. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 45 dBA and the CNEL was 51 dBA.

Sources of ambient noise included local traffic on local roads, ranching activities, and natural sounds. The measurement site is shown in the map in Figure 15: TL629 Overview. Pictures of the measurement location are shown in Figure 23: TL629 – Location L Noise Measurement Pictures.

Figure 22: TL629 – Location L Noise Measurement Results

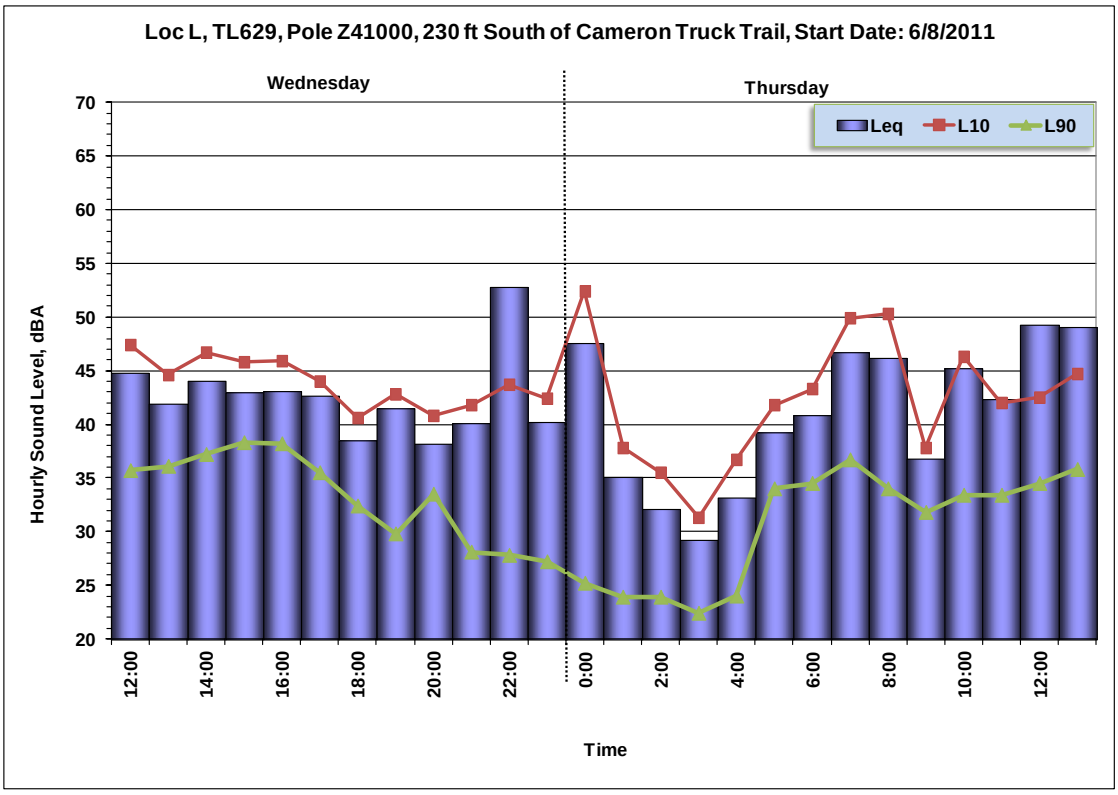


Figure 23: TL629 – Location L Noise Measurement Pictures

Looking South

Looking North

Looking West

1.2.2.4 TL682

As shown in Figure 25: TL682 Overview, TL682 connects Rincon Substation to Warner Substation (approximately 20.2 miles). TL682 closely parallels CA76 east of Rincon Substation to west of Lake Henshaw where it travels north around Lake Henshaw to then east to Warner Substation located on the south side of CA79 approximately 750 feet west of the intersection with County Route S2. The line travels through farm lands near Rincon, the ranch and residential areas on La Jolla Indian Reservation, U.S. Forest Service-administered lands and grazing land.

Noise measurements were made at two locations along TL682: Locations S and T.

Figure 24: TL682 – Location S Noise Measurement Results presents the sound level measurement results at Loc. S: San Luis Rey Picnic Area, over a 25-hour period between September 6 and September 7, 2011. Location S was 70 feet south of CA76. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 48 dBA and the CNEL was 67 dBA.

Sources of ambient noise included local traffic on CA76, aircraft, and natural sounds (such as cicada during nighttime periods). The measurement site is shown in the map in Figure 25: TL682 Overview. Pictures of the measurement location are shown in Figure 26: TL682 – Location S Noise Measurement Pictures.

Figure 24: TL682 – Location S Noise Measurement Results

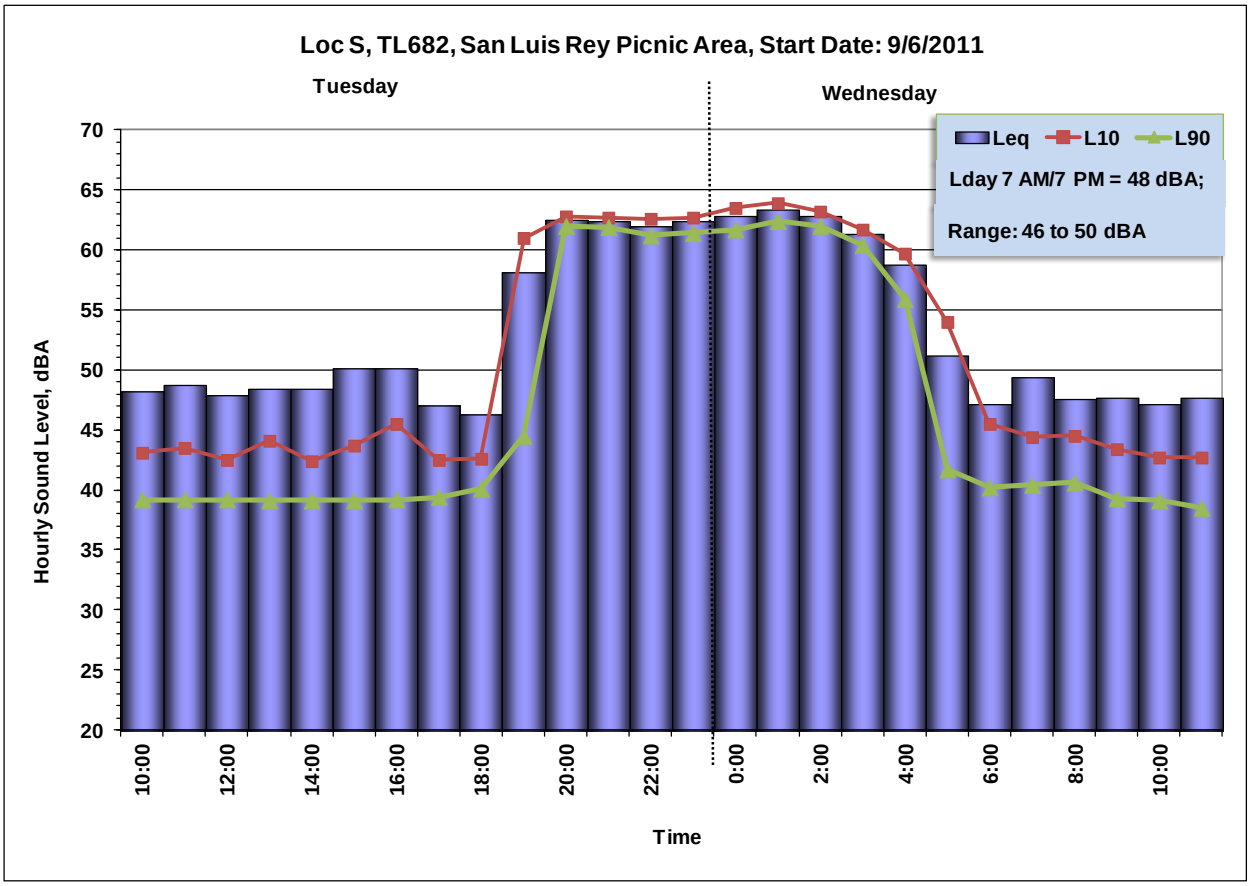


Figure 25: TL682 Overview

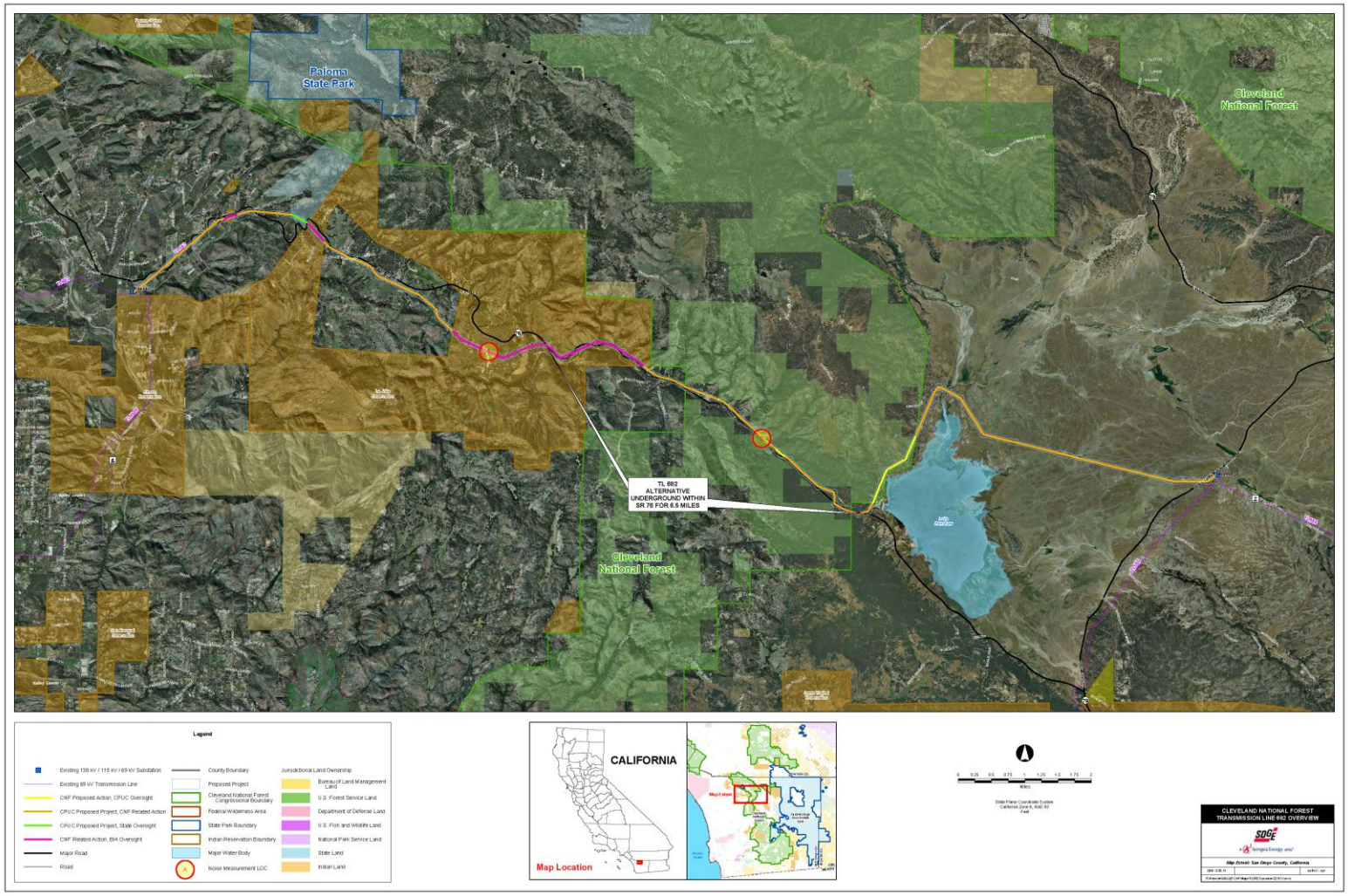


Figure 26: TL682 – Location S Noise Measurement Pictures

Looking North (monitor is not visible)

Looking East (microphone at center of picture)

Figure 27: TL682 – Location T Noise Measurement Results presents the sound level measurement results at Loc. T: La Jolla Indian Reservation, over a 25-hour period between September 6 and September 7, 2011. Location T was near TL682 pole Z118075 located approximately 1,150 feet south of CA76 / Poomacha Road intersection. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 41 dBA and the CNEL was 48 dBA.

Sources of ambient noise included traffic on CA76, residential activities, and natural sounds. The measurement site is shown in the map in Figure 25: TL682 Overview. Pictures of the measurement location are shown in Figure 28: TL682 – Location T Noise Measurement Pictures.

Figure 27: TL682 – Location T Noise Measurement Results

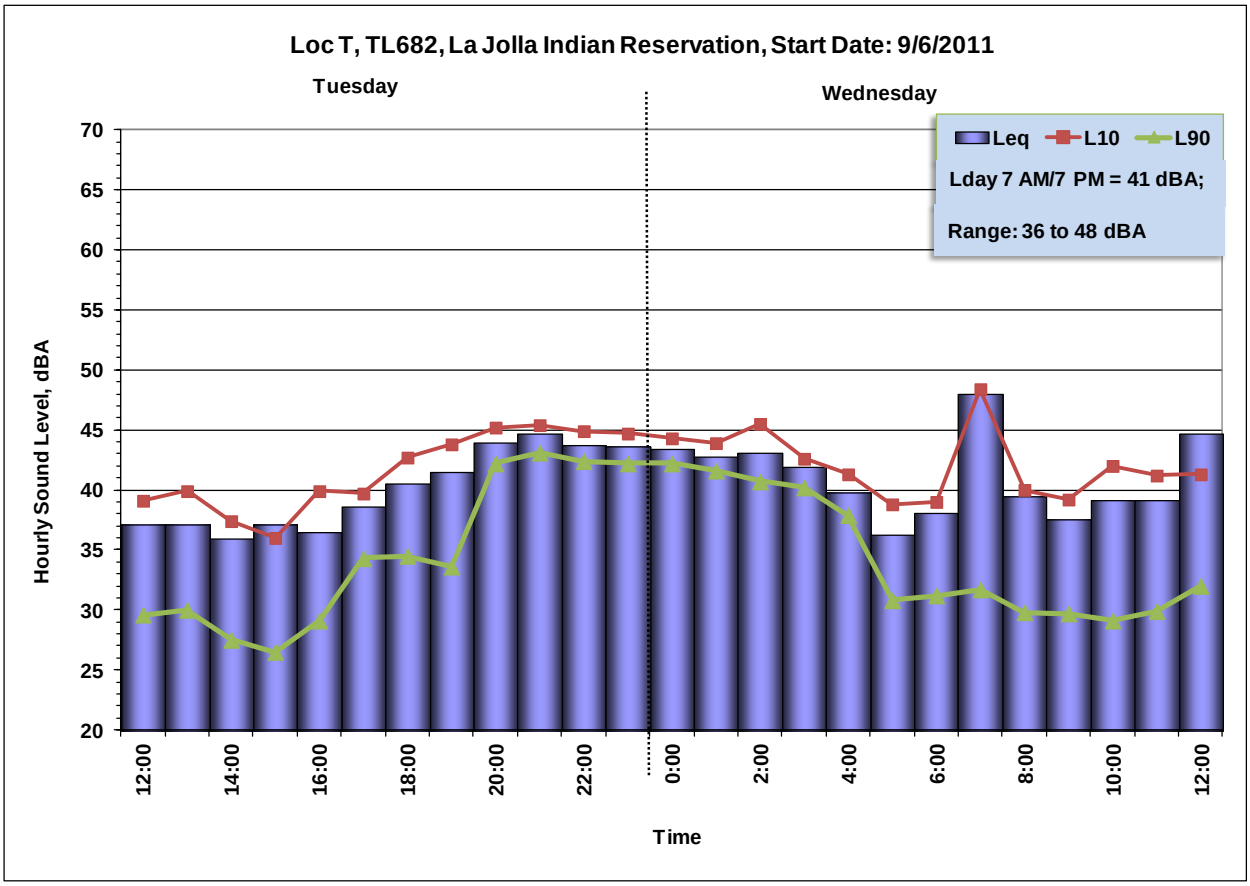


Figure 28: TL682 – Location T Noise Measurement Pictures

Looking East

Looking South

1.2.2.5 TL6923

As shown in Figure 30: TL6923 Overview, TL6923 connects Barnett Substation to Cameron Substation (approximately 13.4 miles). TL682 travels across agricultural, CNF and BLM lands.

Noise measurements were made at two locations along TL6923: Locations F and F', see Figure 30: TL6923 Overview.

Figure 29: TL6923 – Location F Noise Measurement Results presents the sound level measurement results at Loc. F: 1875 Lake Morena Drive, over a 25-hour period between June 9 and June 10, 2011. Location F was approximately 580 feet east of Lake Morena Drive and near TL6923 alignment. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 55 dBA and the CNEL was 52 dBA.

Sources of ambient noise included local traffic on Lake Morena Drive, aircraft (helicopter activity was observed 4,000 to 5,000 feet west of the site), and natural sounds. Pictures of the measurement location are shown in Figure 31: TL6923 – Location F Noise Measurement Pictures.

Figure 29: TL6923 – Location F Noise Measurement Results

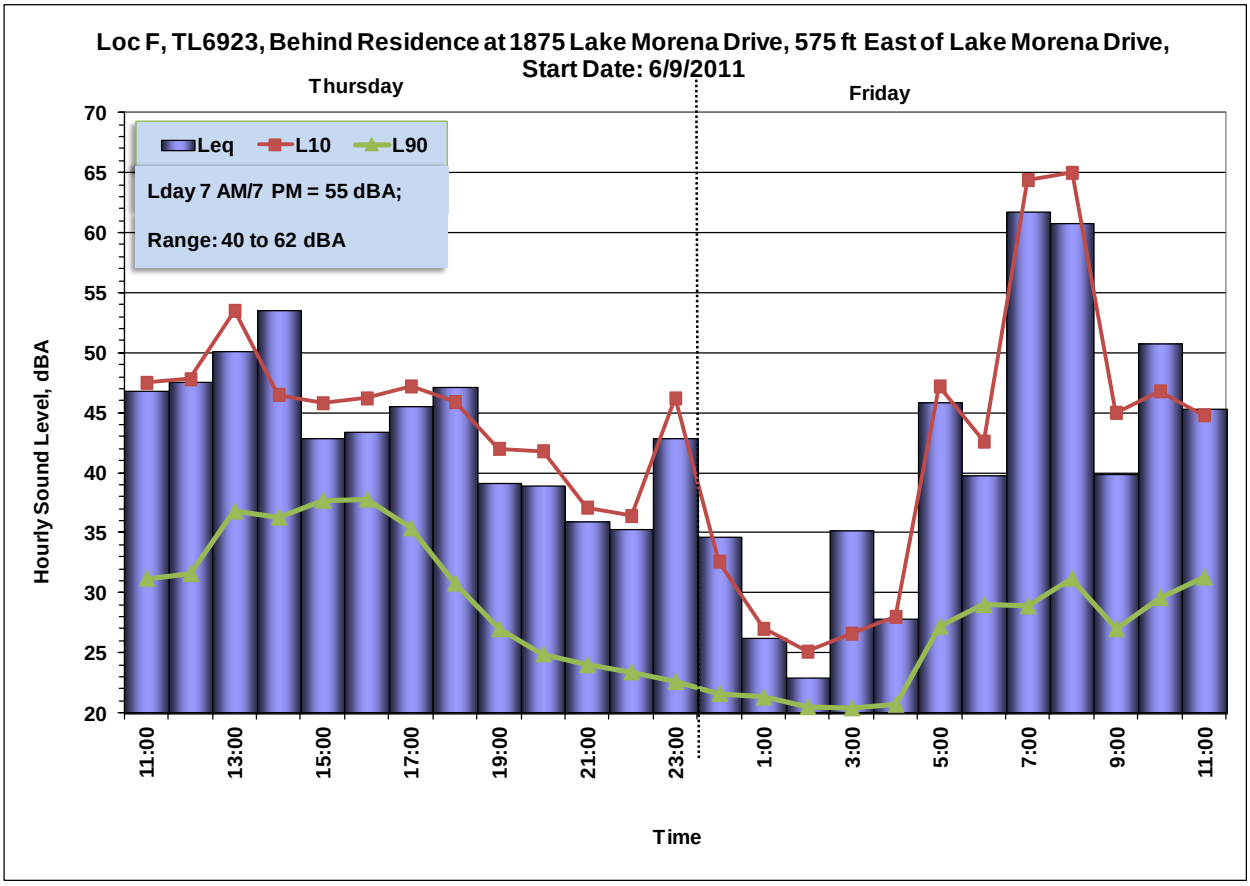


Figure 30: TL6923 Overview

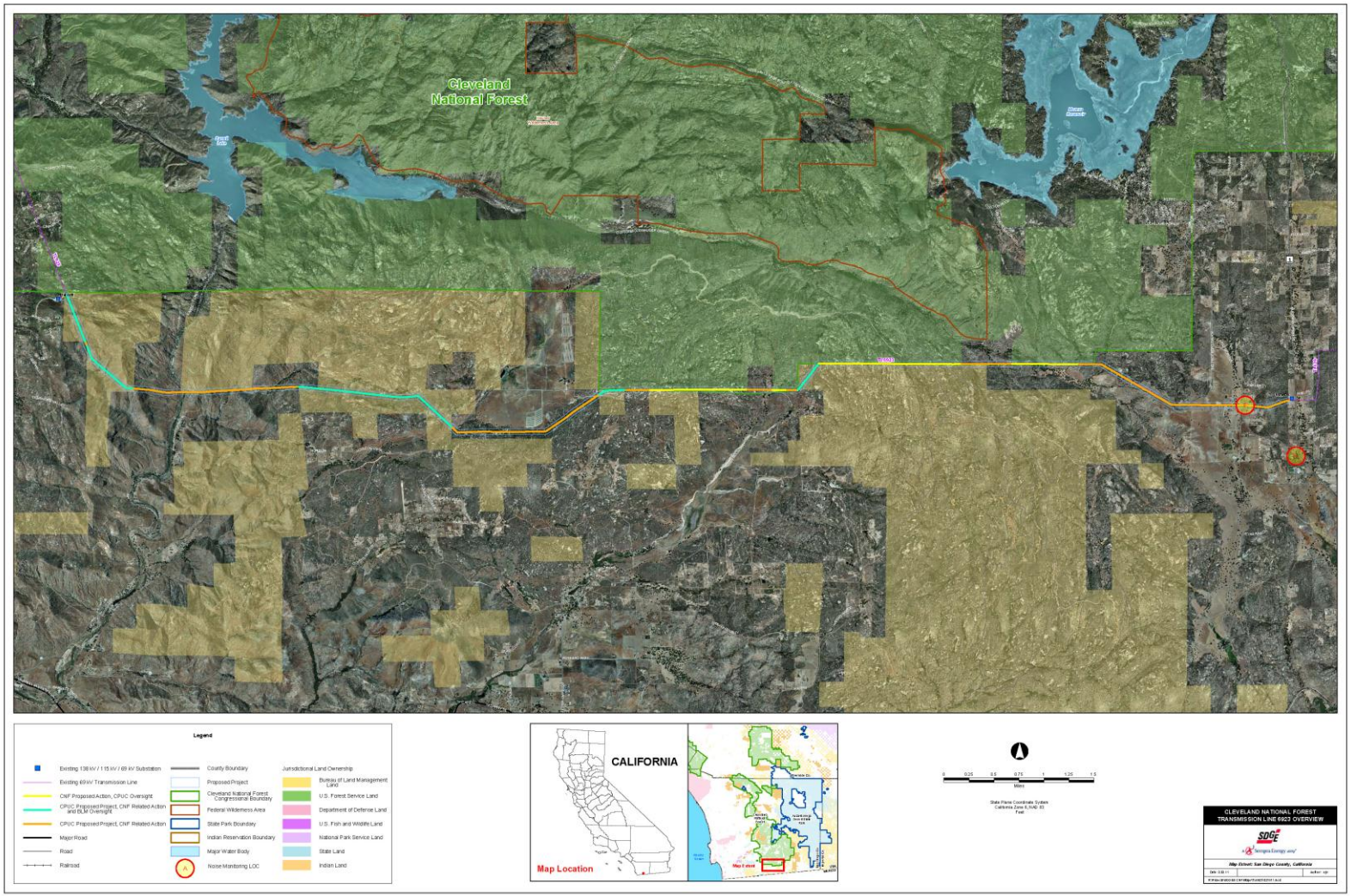


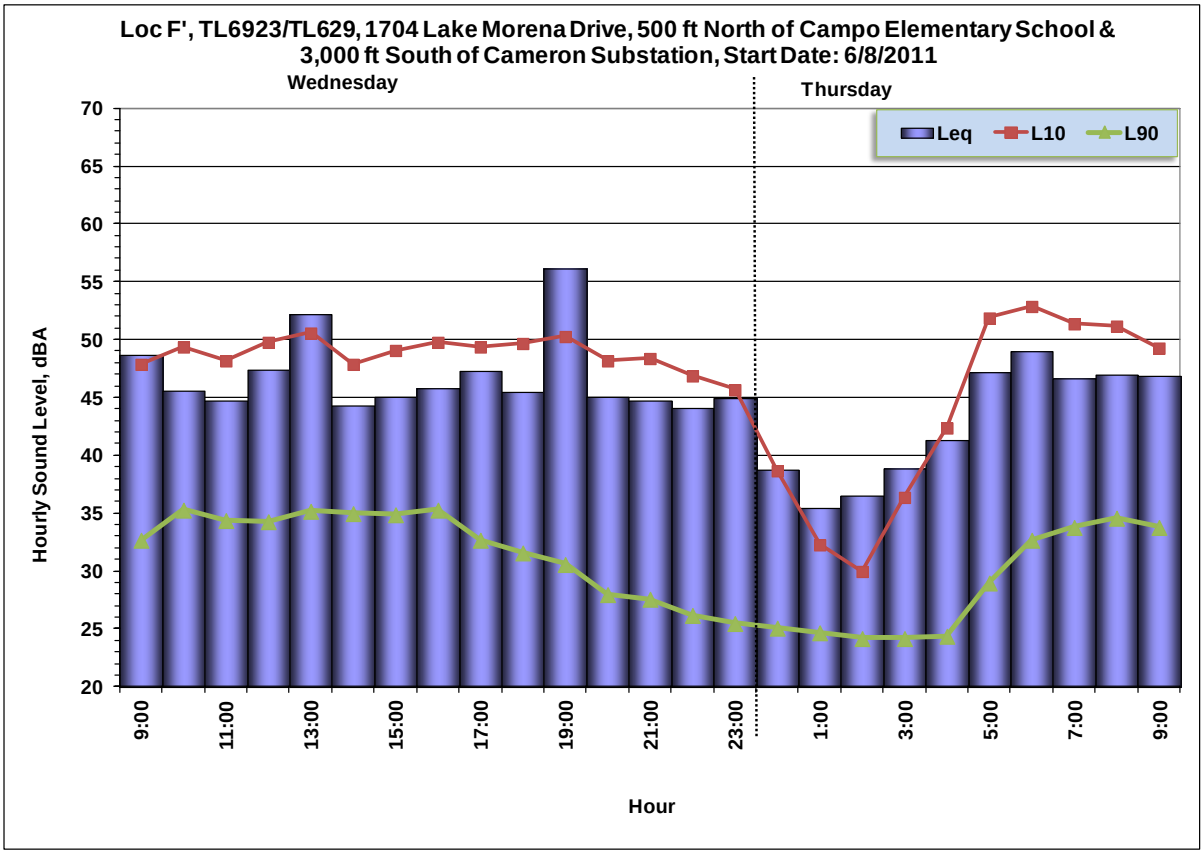
Figure 31: TL6923 – Location F Noise Measurement Pictures

Looking West

Looking South

Figure 32: TL6923 – Location F' Noise Measurement Results presents the sound level measurement results at Loc. F': 1704 Lake Morena Drive, over a 25-hour period between June 8 and June 9, 2011. Location F' was approximately 250 feet west of Beckman Springs Road, 375 feet south of Lake Morena Drive, 500 feet north of Campo Elementary School, and 3,000 feet south of Cameron Substation. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 47 dBA and the CNEL was 52 dBA.

Figure 32: TL6923 – Location F' Noise Measurement Results



Sources of ambient noise included local traffic on Lake Morena Drive and Beckman Springs Road, aircraft, and natural sounds. Pictures of the measurement location are shown in Figure 33: TL6923– Location F' Noise Measurement Pictures

Figure 33: TL6923– Location F' Noise Measurement Pictures

Looking West

Looking South

Looking SSE

Looking North

1.2.3 Existing Noise Conditions Along Distribution Lines

Ambient sound measurements were taken at 7 locations along the distribution lines (circuits) to characterize the existing environment between June 8 and June 9th and between September 2nd and September 8th, 2001. List of measurement equipment may be found in Section 1.3.1. These sound measurements included:

L_{eq} is an average of the time-varying sound energy for a specified time period. The L_{eq} was measured for each hour of measurement.

$L_{(10)}$ is the level that is exceeded 10 percent of the time period.

$L_{(90)}$ is the level that is exceeded 90 percent of the time and is often utilized as a descriptor of the background noise.

The ambient sound levels will be between the L90 and the L10 values 80 percent of the time.

The weather conditions during that time period are presented in Appendix C. Table 4 presents the average daytime level for the 12-hour period of 7:00 a.m. to 7:00 p.m., L_{eq}(day), and the CNEL measured at each location.

Table 4: Sound Measurement Survey Results Along Distribution Lines

SDG&E ID	Measurement Location	L_{eq}(day)	CNEL
C78	No Access Provided by the Viejas Tribal Council	–	–
C79	Loc P: Lookout Road, approximately 330 ft west of CA79 adjacent to Paso Picacho Campgrounds, Cuyamaca State Park.	44	66
C157	Loc. D: Skye Valley Rd, North of Barrett Lake, approximately 2.3 miles east of Lyons Valley Road, 920 feet south of C157 and adjacent to Pine Creek Wilderness.	40	46
C440	Loc H: Approximately 320 feet ENE of Morris Ranch Road and 2,980 feet south of San Diego County Road S1 (Sunrise Highway); CNF	45	58
C440	Loc. I: Laguna Campground near Laguna Meadows Road, Laguna Recreation Area; 885 feet SW of San Diego County Road S1 (Sunrise Highway); CNF.	44	42
C442	Loc. O: Approximately 840 feet south of I-8, CNF	35	58
C442	Loc R: Approximately 160 ft east of Pine Creek Road and 7400 feet from Pine Creek and Old Highway 80 intersection; CNF	40	54
C449	Loc G: Approximately 425 feet East of Morena Conservation Camp at Pole 42779; CNF	42	47

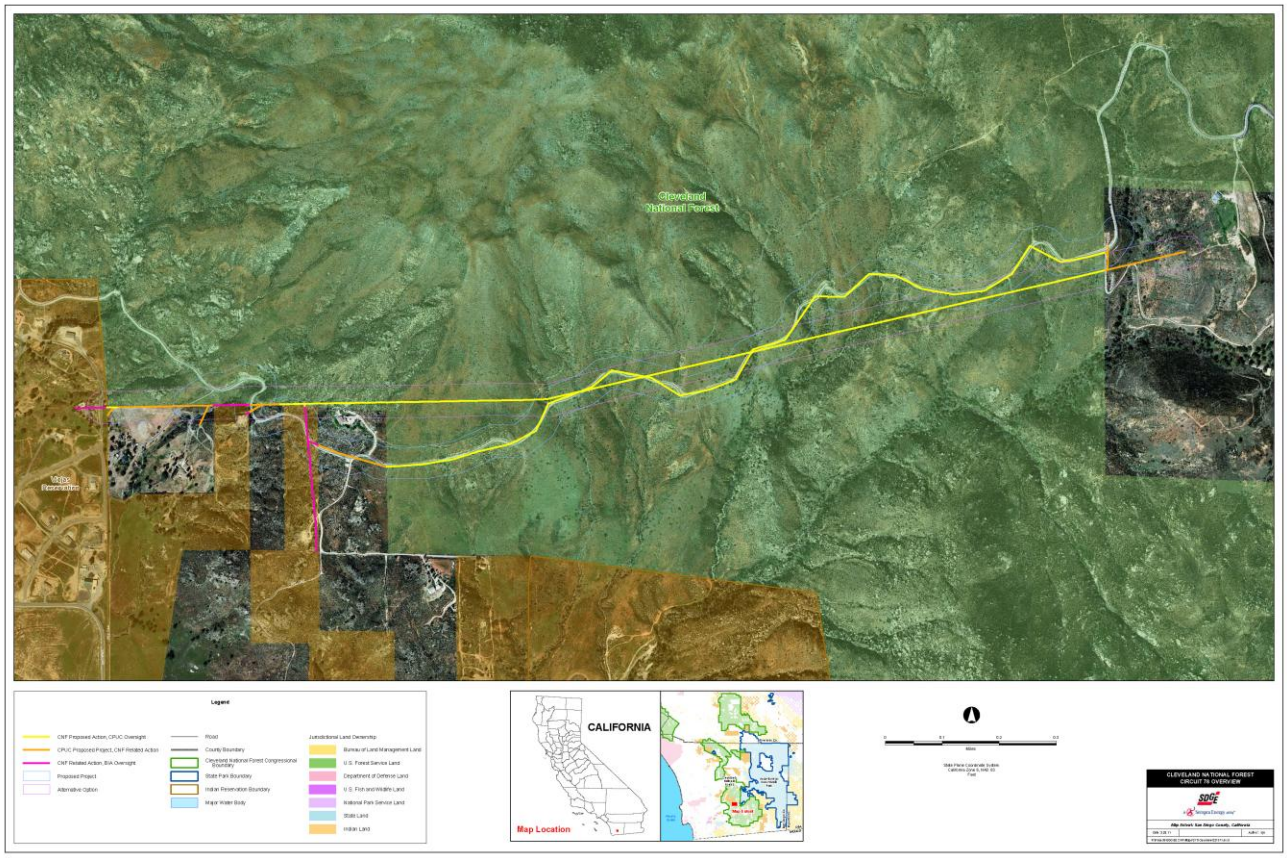
Note: All measurements are reported in dBA. Leq(day) is from 7 a.m. to 7 p.m.

1.2.3.1 C78

As shown in Figure 34, C78 runs east from the Viejas Indian Reservation approximately 1.8 miles. C78 travels mostly across U.S. Forest Service-administered lands.

Access to the line was not provided by The Viejas Tribal Council and no noise measurements were made for this distribution line.

Figure 34: C78 Overview



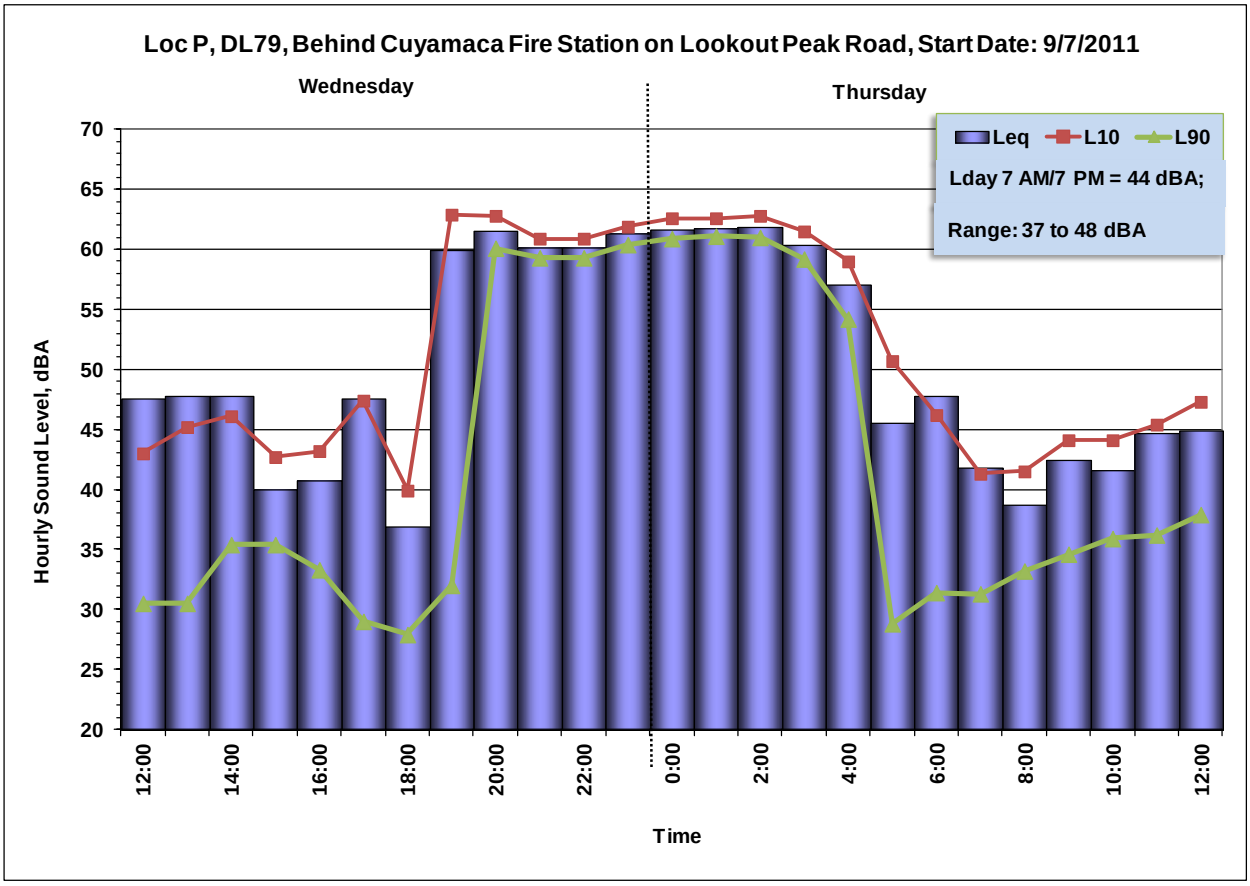
1.2.3.2 C79

As shown in Figure 36: C79 Overview, C79 connects lines along CA79 to Cuyamaca Peak (approximately 2.2 miles in length). C79 travels across Cuyamaca State Park lands.

Noise measurements were made at one location along C79: Location P.

Figure 35: C79 – Location P Noise Measurement Results presents the sound level measurement results at Loc. P: along Lookout Road, over a 25-hour period between September 7 and September 8, 2011. Location P was on the north side of Lookout Road, approximately 330 feet west of CA79 and adjacent to Paso Picacho Campgrounds, Cuyamaca State Park. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 44 dBA and the CNEL was 66 dBA.

Figure 35: C79 – Location P Noise Measurement Results



Sources of ambient noise included local traffic on CA79, activity associated with the campgrounds and the nearby Cuyamaca Fire Station, aircraft, and natural sounds (nighttime cicada). The measurement site is shown in the map in

Pictures of the measurement location are shown in Figure 37: C79 – Location P Noise Measurement Pictures.

Figure 36: C79 Overview

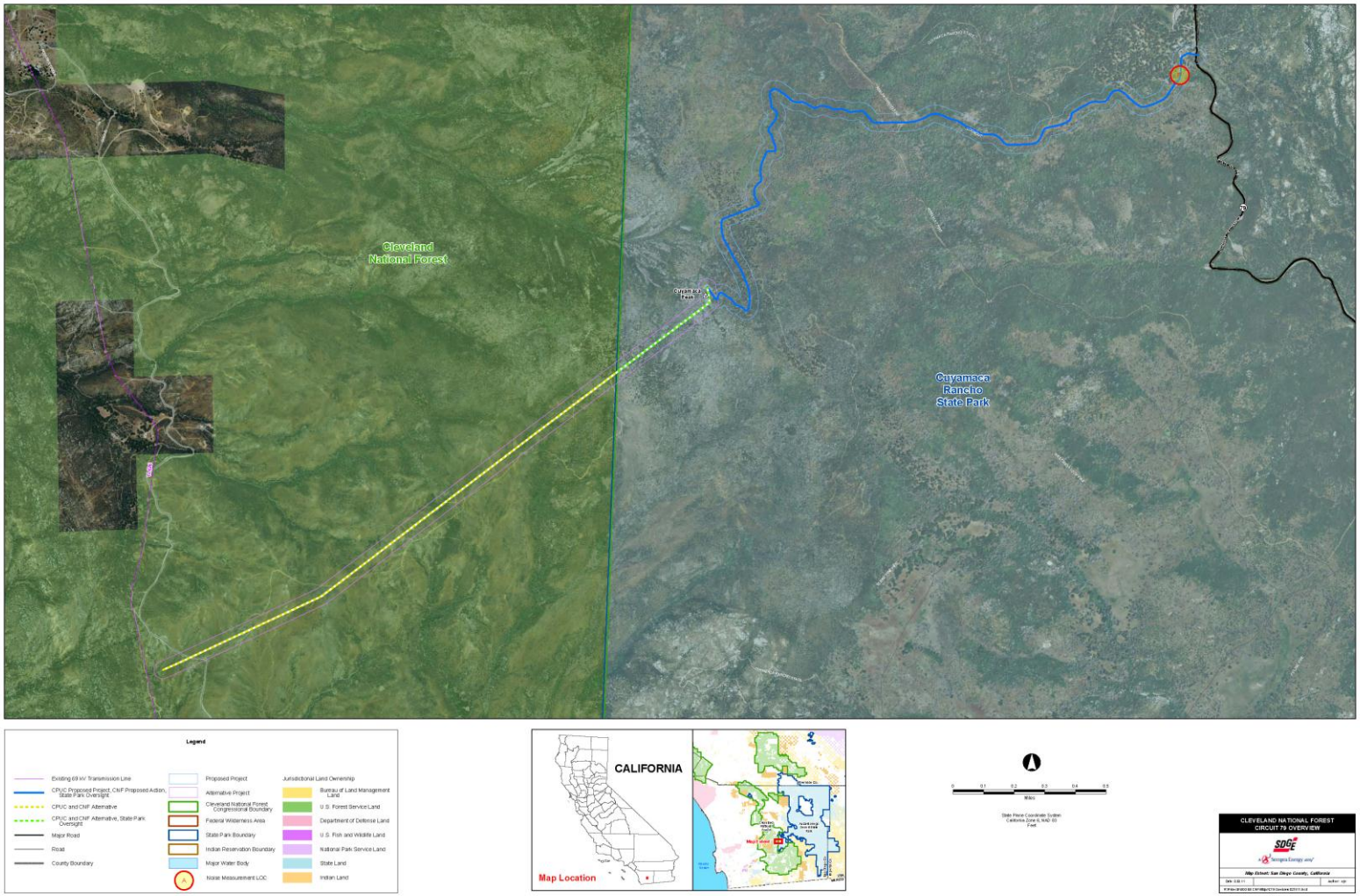


Figure 37: C79 – Location P Noise Measurement Pictures

Looking North

Looking NE towards Cuyamaca Fire Station

Looking SW

1.2.3.3 C157

As shown in Figure 38: C157 Overview, C157 involve improvements are over approximately 3.5 miles. C157 crosses private (undeveloped) and U.S. Forest Service-administered lands.

Noise measurements were made at one location along C157: Location D.

Figure 39: C157 – Location D Noise Measurement Results presents the sound level measurement results at Loc. D: along Sky Valley Road, over a 25-hour period between June 8 and June 9, 2011. Location D was on the northern side of Sky Valley Road, approximately 925 feet south of where C157 crosses over Barrett Lake The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 40 dBA and the CNEL was 46 dBA.

Sources of ambient noise at this remote location included aircraft and natural sounds. The measurement site is shown in the map in Picture of the measurement location is shown in Figure 40: C157 – Location D Noise Measurement Picture.

Figure 38: C157 Overview

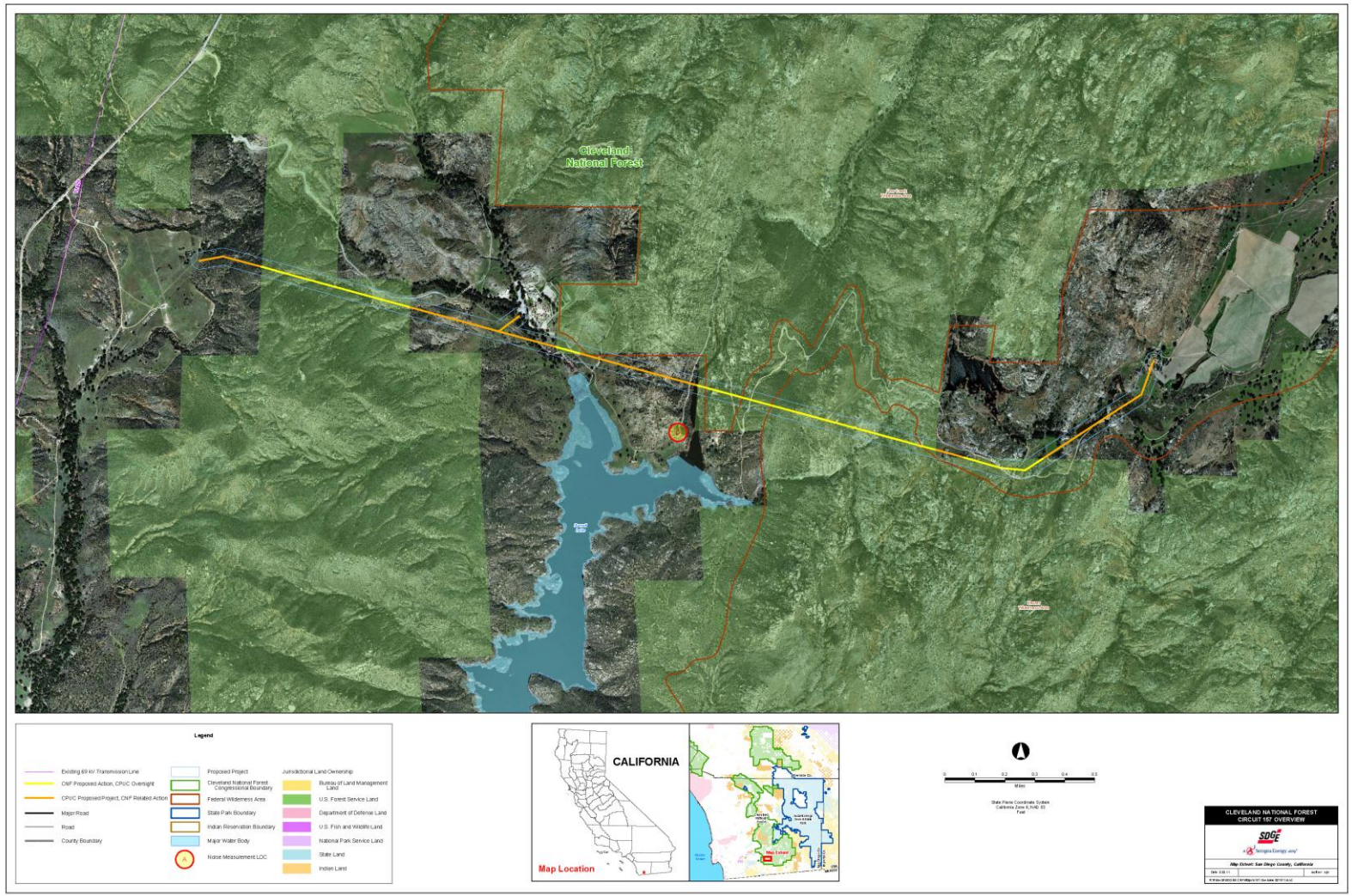


Figure 39: C157 – Location D Noise Measurement Results

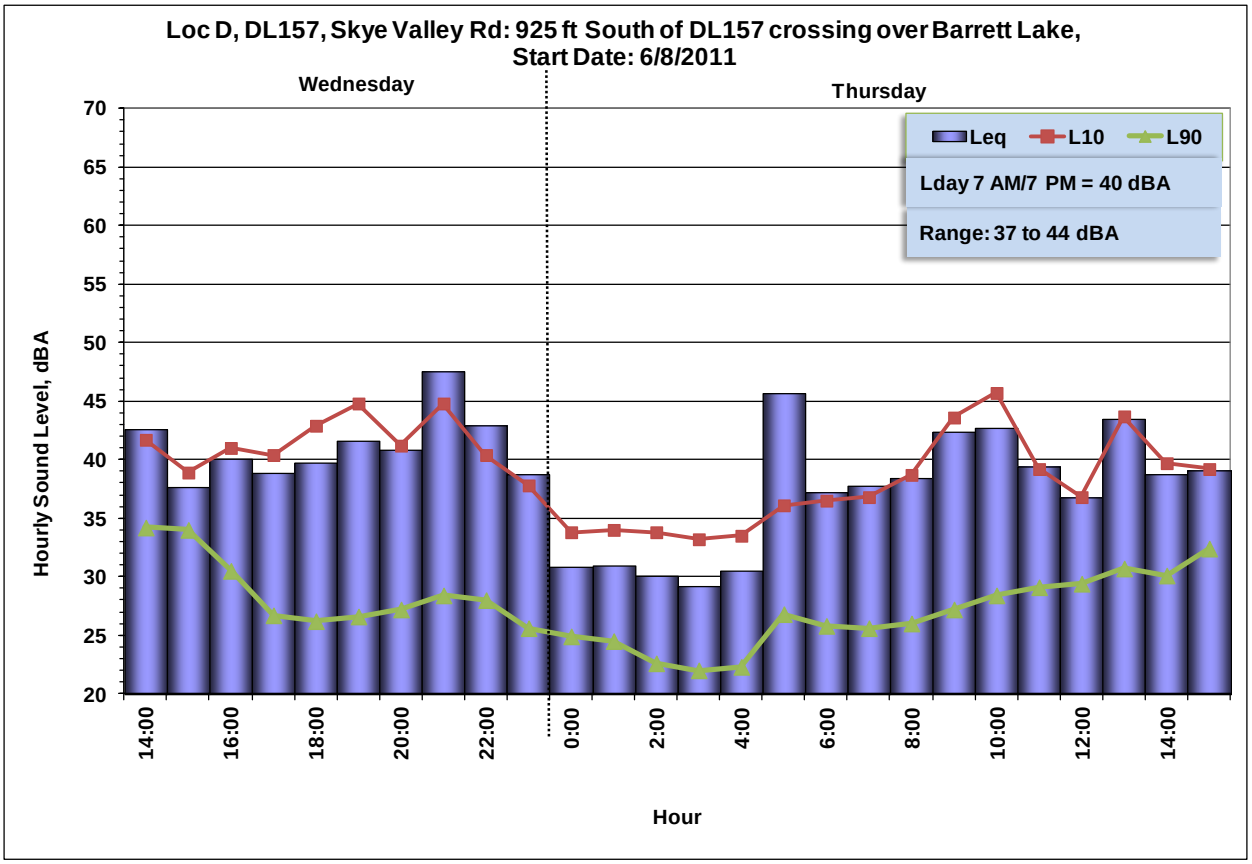


Figure 40: C157 – Location D Noise Measurement Picture

Looking NW

1.2.3.4 C440

As shown Figure 42: C440 Overview, C440 involves approximately 16.9 miles of improvements within the Laguna Mountains. C440 crosses private (undeveloped) and

U.S. Forest Service-administered lands in the Laguna Mountains and the Laguna Recreation Area.

Noise measurements were made at two locations along C440: Location H and I.

Figure 41: C440 – Location H Noise Measurement Results presents the sound level measurement results at Loc. H: east of Morris Ranch Road, over a 4-day period between September 2 and September 6, 2011. Location H was approximately 320 feet east of Morris Ranch Road and 2,980 feet south of San Diego County Road S1 (Sunrise Highway). The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 45 dBA and the CNEL was 58 dBA.

Sources of ambient noise at this remote location included aircraft and natural sounds (wind in the trees and nighttime cicada). The measurement site is shown in the map in Figure 42: C440 Overview. Pictures of the measurement location are shown in Figure 43: C440 – Location H Noise Measurement Pictures.

Figure 41: C440 – Location H Noise Measurement Results

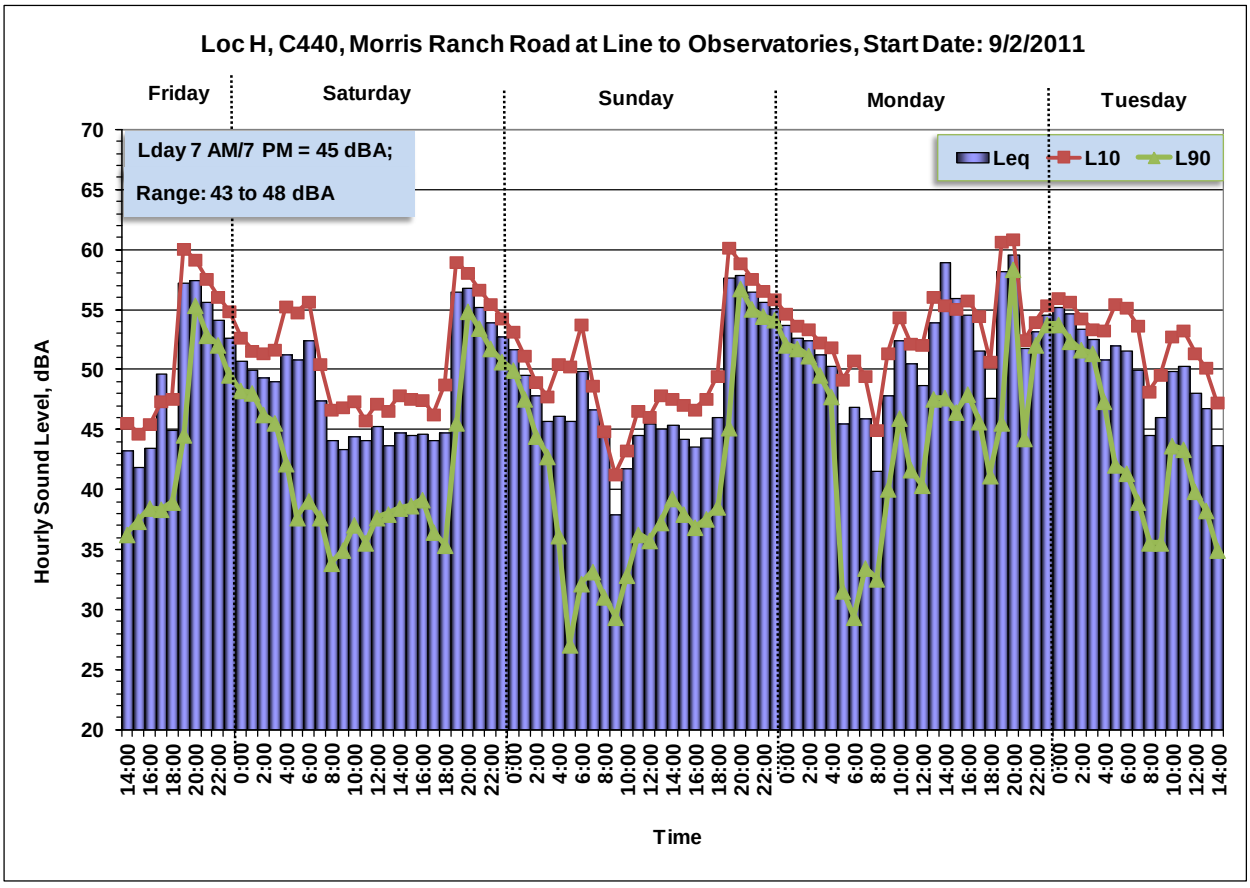


Figure 42: C440 Overview

Figure 43: C440 – Location H Noise Measurement Pictures

Looking ENE toward observatory

Looking WSW toward Morris Ranch Road

Figure 44: C440 – Location I Noise Measurement Results presents the sound level measurement results at Loc. I: entrance to Laguna Campground south of Laguna Meadows Road, Laguna Recreation Area; approximately 885 feet SW of San Diego County Road S1 (Sunrise Highway); over a 25-hour period between June 8 and June 9, 2011. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 44 dBA and the CNEL was 42 dBA.

Sources of ambient noise at this remote location included local traffic, aircraft and natural sounds. The measurement site is shown in the map in Figure 42: C440 Overview. Pictures of the measurement location are shown in Figure 43: C440 – Location H Noise Measurement Pictures.

Figure 44: C440 – Location I Noise Measurement Results

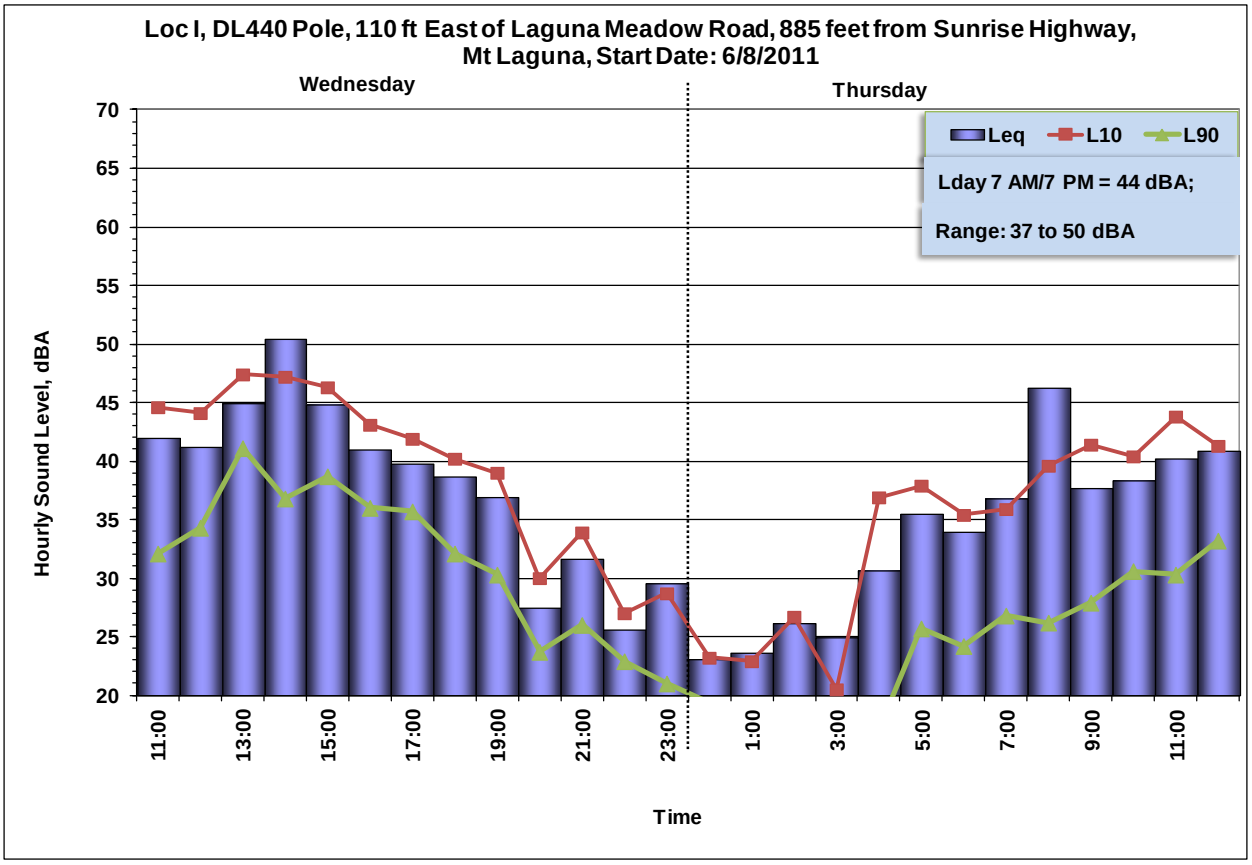


Figure 45: C440 – Location I Noise Measurement Pictures

Looking SE

Looking North toward Laguna Meadows Road

1.2.3.5 C442

As shown in Figure 47: C442 Overview, C442 involve improvements over approximately 6.3 miles south of I-8 and 1.5 miles north of I-8. C442 crosses private (undeveloped) and U.S. Forest Service-administered lands in the Laguna Mountains.

Noise measurements were made at two locations along C442: Location O and R.

Figure 46: C442 – Location O Noise Measurement Results presents the sound level measurement results at Loc. O; approximately 880 feet south of eastbound I-8, within the CNF, over a 4-day period between September 2 and September 6, 2011. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 35 dBA and the CNEL was 58 dBA.

Sources of ambient noise at this remote location included aircraft and natural sounds (wind in the trees and nighttime cicada). The measurement site is shown in the map in Figure 47: C442 Overview. Pictures of the measurement location are shown in Figure 48: C442 – Location O Noise Measurement Pictures.

Figure 46: C442 – Location O Noise Measurement Results

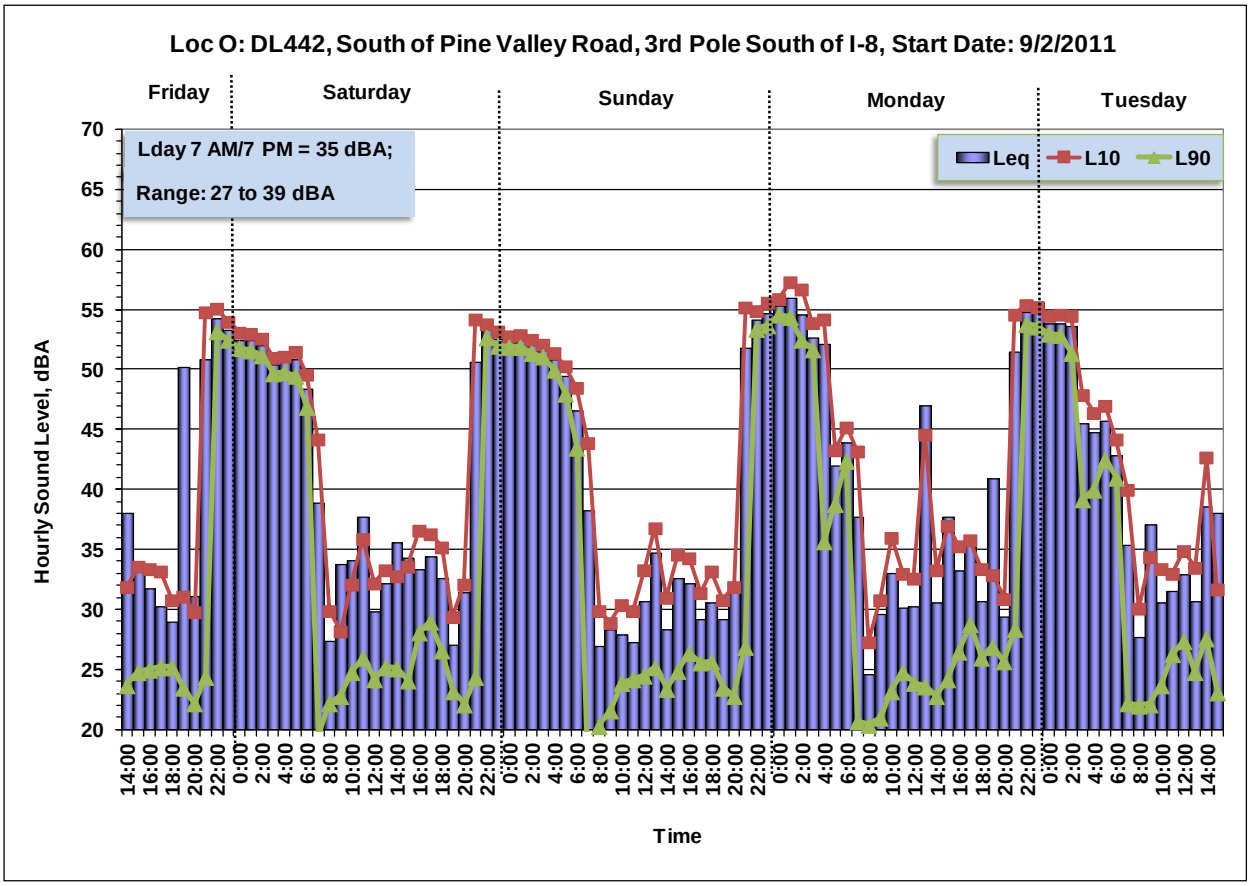


Figure 47: C442 Overview

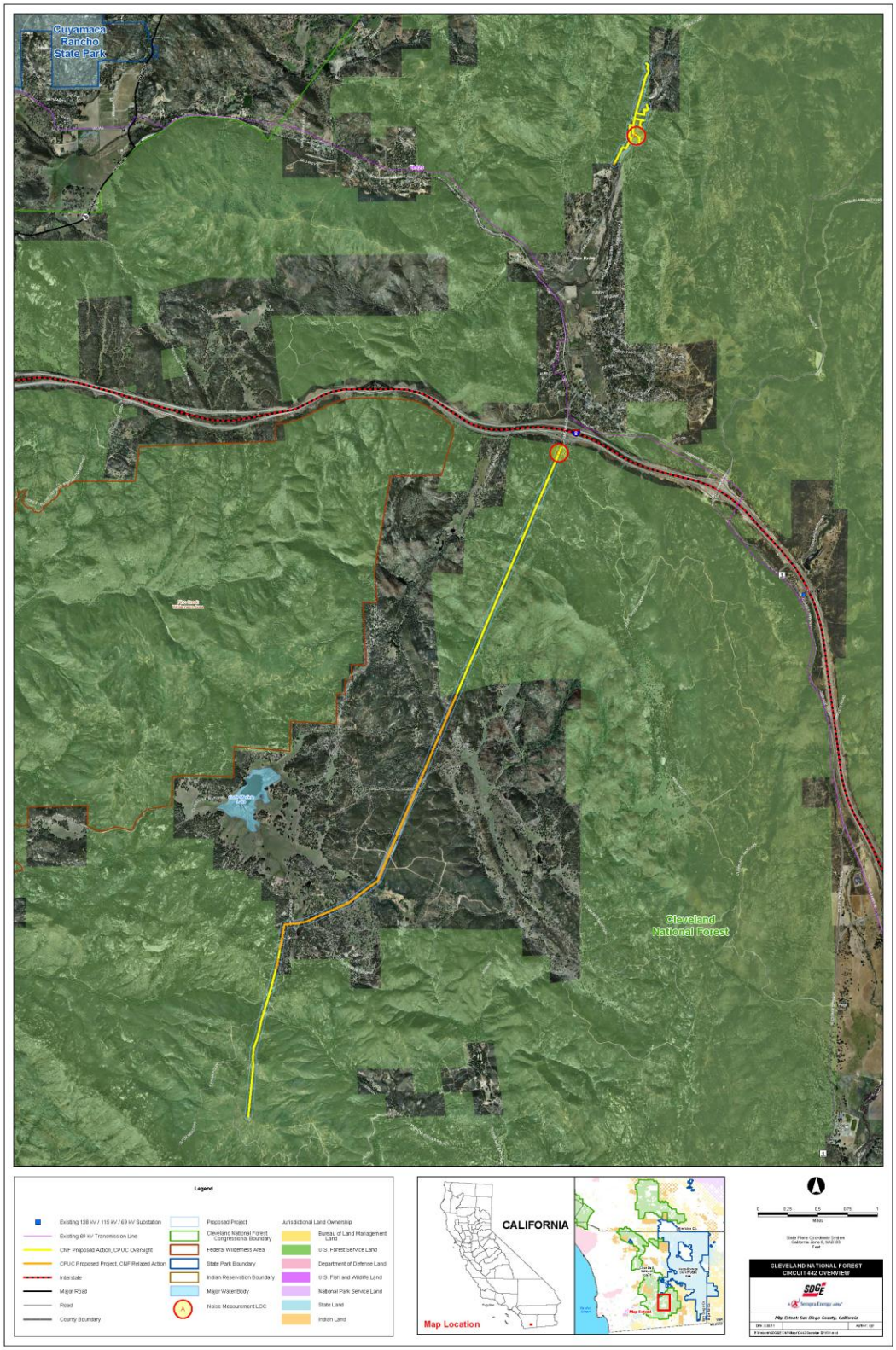


Figure 48: C442 – Location O Noise Measurement Pictures

Looking North towards I-8

Looking South

Figure 49: C442 – Location R Noise Measurement Results presents the sound level measurement results at Loc. R; approximately 2.7 miles north of I-8 and 115 feet east of Pine Creek Road, within the CNF, over a 25-hour period between September 7 and September 8, 2011. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 40 dBA and the CNEL was 54 dBA.

Sources of ambient noise at this remote location included local traffic and natural sounds (wind in the trees and nighttime cicada). The measurement site is shown in the map in Figure 47: C442 Overview. Pictures of the measurement location are shown in Figure 50.

Figure 49: C442 – Location R Noise Measurement Results

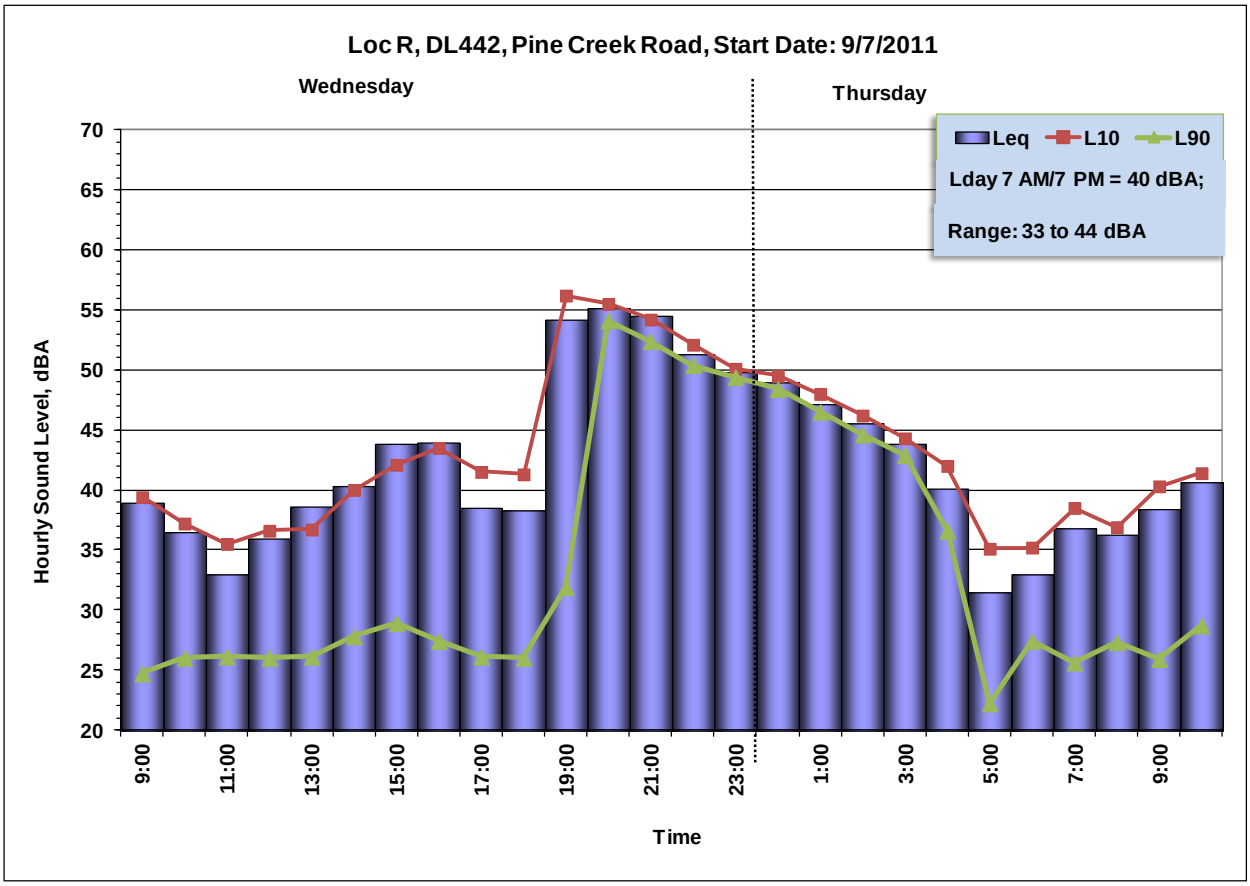


Figure 50: C442 – Location R Noise Measurement Pictures

Looking North towards Pine Creek Bridge

Looking West

Looking ESE

1.2.3.6 C449

As shown in Figure 53: C449 Overview, C449 involve improvements over approximately 6.7 miles, mostly through U.S. Forest Service-administered lands and Lake Morena County Park. The north-south section of C449 parallels Beckman Road in U.S. Forest Service-administered lands. An east-west section transverses U.S. Forest Service-administered lands and Lake Morena County Park to Morena Conservation Camp.

Noise measurements were made at one location along C449: Location G.

Figure 51: C449 – Location G Noise Measurement Results presents the sound level measurement results at Loc. G; approximately 425 feet east of Morena Conservation Camp and 575 feet north of Morena Stokes Valley Road, within the CNF, over a 25-hour period between June 8 and June 9, 2011. The data includes the hourly Leq, L10 and L90 values. The average daytime Leq was 42 dBA and the CNEL was 47 dBA.

Sources of ambient noise at this remote location included aircraft, local traffic on Morena Stokes Valley Road, activities within the Morena Conservation Camp, and natural sounds. The measurement site is shown in the map in Figure 53: C449 Overview. A picture of the measurement location is shown in Figure 52: C449 – Location G Noise Measurement Picture.

Figure 51: C449 – Location G Noise Measurement Results

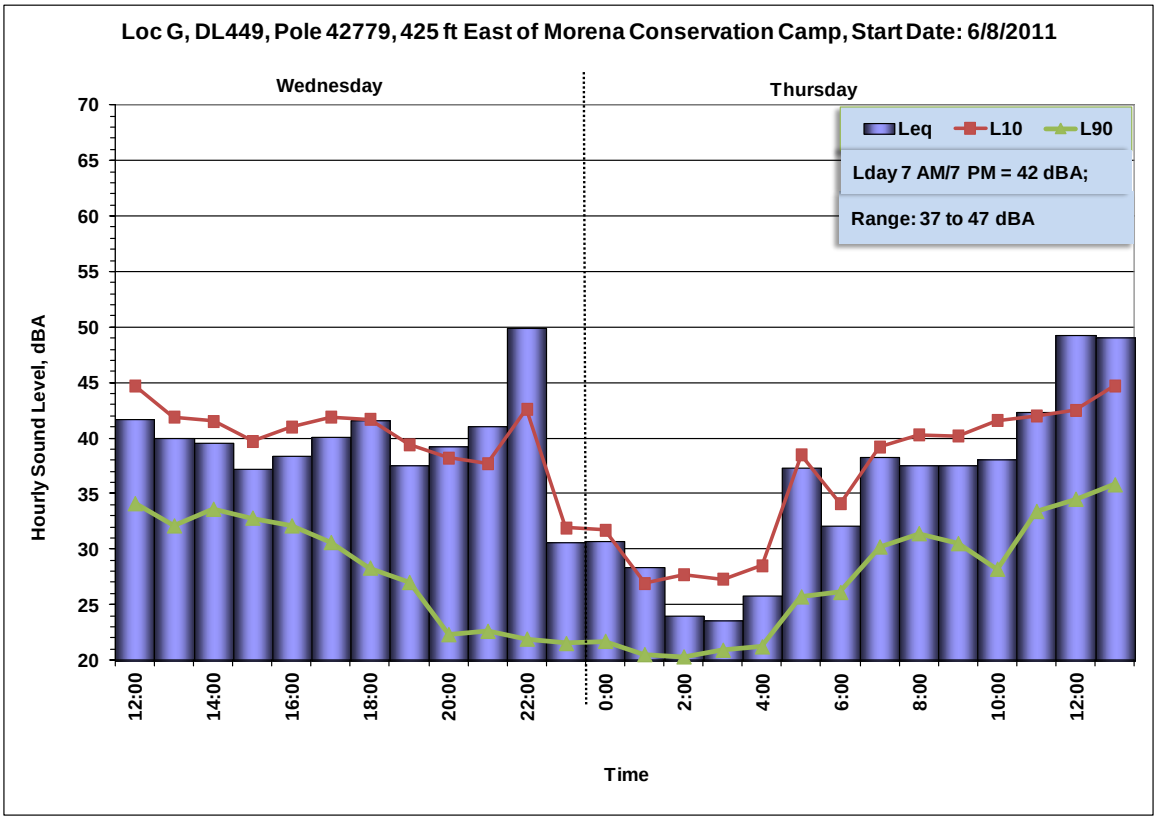


Figure 52: C449 – Location G Noise Measurement Picture

Looking West

Figure 53: C449 Overview

1.3 Methodology and Equipment

1.3.1 Noise Measuring Methodology and Procedure

The following Precision Environmental Noise Monitors (Type 1) were used to monitor the baseline noise conditions:

Larson Davis Model 870, Serial Number 120
Larson Davis Model 870, Serial Number 1525
Larson Davis Model 870, Serial Number 124
Larson Davis Model 820, Serial Number 1680
Larson Davis Model 820, Serial Number 891
Larson Davis Model 820, Serial Number 1006
Rion Model NL 31, Serial Number 0323
Rion Model NL 31, Serial Number 0333

All monitoring systems had been laboratory calibrated within the last year in accordance with industry standards.

The monitors were set up at each site to monitor the noise for a 25-hour period. The monitors were set to use the A-weighting and "slow" response. Each monitor was field calibrated before and after the monitoring period. The microphone was positioned 5 feet above grade and a wind screen was placed over the microphone for protection to reduce wind noise. Monitors were set to record the 1-hour Leq.[3]

Measurement locations were selected to be representative of existing conditions along each power line.

1.3.2 Noise Modeling

Construction equipment noise emissions and load factors were based upon materials in the *FHWA Roadway Construction Noise Model User's Guide*. Equipment inventory, average hours per day and percent of construction time operating were based upon data provided by SDG&E. The total 8-hour noise emission at 50 feet was calculated for each phase of construction.

For pole installation a -6 dB per doubling relationship was used to calculate the distance to the 75 dBA 8-hour average level.

For underground installation, a 300-foot long construction spread was assumed (based upon SDG&E estimate that 300 feet per day can be installed). The total acoustic emission was calculated (dB per foot) and a -3 dB per doubling of distance was used to calculate the distance from construction activities along a 300-foot long construction spread to the 75 dBA 8-hour average level.

[3] Leq is the energy average sound level used by agencies such as the City and County of San Diego to quantify the ambient noise level and to set noise limits.

2. NOISE SENSITVE LAND USES

2.1 Guidelines for the Determination of Significance

2.1.1 Federal

There are no federal noise standards that directly regulate environmental noise related to the construction or operation of a project of this type. However, the EPA has established guidelines for noise levels below which there is no reason to suspect that the general population will be at risk from any of the identified effects of noise. These levels are not standards, criteria, regulations, or goals, but are defined to protect public health and welfare with an adequate margin of safety, and to provide guidelines for implementing noise standards locally. As a guideline, the EPA identified an Ldn value of 55 dBA as the threshold of activity interference outside farm residences.

In addition, the federal government has passed various laws to regulate and limit noise levels in the United States (U.S.), a discussion of which follows.

Noise Pollution and Abatement Act of 1970

The Noise Pollution and Abatement Act of 1970 established the Office of Noise Abatement and Control within the U.S. Environmental Protection Agency (EPA), and requires investigations of noise issues and consultation with the EPA.

Noise Control Act of 1972

The Noise Control Act of 1972 was the first comprehensive statement of national noise policy. It declared "it is the policy of the U.S. to promote an environment for all Americans free from noise that jeopardizes their health or welfare."

Occupational Health and Safety Act (OSHA) of 1970

The OSHA regulates worker noise exposure to 90 A-weighted decibels[4] (dBA) over an 8-hour work shift. Areas where exposure exceeds 85 dBA must be designated and labeled as high-noise-level areas where hearing protection is required.

Federal Aviation Administration (FAA)

The FAA establishes 65 decibels (dB) Community Noise Level Equivalent[5] (CNEL) as the noise standard associated with aircraft noise measured at exterior locations in noise sensitive land uses such as a residence.

[4] The human ear is not uniformly sensitive to all sound frequencies; therefore, the A-weighting scale has been devised to correspond with the human ear's sensitivity. The A-weighting scale uses the specific weighting of sound pressure levels from about 31.5 hertz (Hz) to 16 kilohertz (kHz) for determining the human response to sound.

[5] CNEL measurements are weighted averages of sound levels gathered over a 24-hour period, essentially measuring ambient noise. Measurements taken during day, evening and nighttime periods are weighted separately, recognizing that humans are most sensitive to noise in late night hours and are more sensitive during evening hours than in daytime hours.

2.1.2 State of California

There are also no regulations at the state level that would apply to noise from commercial wind turbine generator operation. However, there are state guidelines and standards on noise.

California Noise Control Act

The California Noise Control Act states that excessive noise is a serious hazard to the public health and welfare and that exposure to certain levels of noise can result in physiological, psychological, and economic damage. It also finds that there is a continuous and increasing bombardment of noise in the urban, suburban, and rural areas. The California Noise Control Act declares that the State of California has a responsibility to protect the health and welfare of its citizens by the control, prevention, and abatement of noise. It is the policy of the state to provide an environment for all Californians free from noise that jeopardizes their health or welfare.

California Natural Resources Agency

The California Natural Resources Agency has adopted the California Environmental Quality Act (CEQA), California's broadest environmental law. CEQA applies to all discretionary projects proposed to be conducted or approved by a California public agency, including private projects requiring discretionary government approval. It has developed guidelines for determining whether a project may have a significant effect on the environment. For noise Table 5: CEQA Checklist presents the serious of questions regarding the effect of noise and vibration. CEQA helps to guide the CPUC during issuance of permits and approval of projects.

California has adopted CEQA to assess the potential for significant noise impacts as a result of projects. CEQA requires that the following questions be asked:

• Would the project result in exposure of persons to or generation of noise levels in excess of standards established in the local General Plan or Noise Ordinance or applicable standards of other agencies?

• Would the project result in a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?

For purposes of the second question, CEQA does not define what noise level increase would be considered "substantial." However, in CEQA noise analysis, it is common to define a noise impact as significant if the pre-existing noise environment is greater than Ldn = 55 dBA and if a project would increase noise levels by more than 3 dB at noise-sensitive receptors.

California Public Utilities Commission

The California Public Utilities Commission has adopted this "Information and Criteria List" in order to determine whether applications for projects are complete. This list specifies the information required from any applicant for a project subject to CEQA. Submission of this information is necessary before an application can be determined to be complete. Long term noise estimates for operational noise (e.g., corona discharge noise, and station sources such as substations, etc.) are to be provided.

Table 5: CEQA Checklist for Noise and Vibration

Would the project result in:	Potentially Significant Impact	Less-Than-Significant Impact with Mitigation Measures	Less-Than-Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	❒	❒	❒	❒
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	❒	❒	❒	❒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	❒	❒	❒	❒
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	❒	❒	❒	❒
e) If located within an airport land use plan or within two miles of a public airport or public use airport for which such a plan has not been adopted, would the project result in exposure of persons residing or working in the project area to excessive noise levels?	❒	❒	❒	❒
f) If located within the vicinity of a private airstrip, would the project result in exposure of persons residing or working in the project area to excessive noise levels?	❒	❒	❒	❒

Caltrans Transportation- and Construction-Induced Vibration Guidance

Human reaction to groundborne vibration is virtually always characterized in terms of the root-mean-square (RMS) vibration velocity. The RMS is considered the best available measure of potential human annoyance from ground-borne vibration and measurements are usually reported in terms of the maximum RMS vibration velocity level for analysis of human perception and impact. The vibration perception threshold for humans is 0.004 in/sec RMS. When the daytime groundborne vibration levels exceed 0.0055 in/sec RMS in residences, groundborne noise can be considered annoying or unacceptable to some people.

Damage to structures is normally characterized by peak particle velocity (PPV), which is 1.4 times to over 8 times the RMS value. Construction equipment will typically produce PPV of 4 times the RMS value. Although damage is related to the integrity and type of structure, 0.1 in/sec PPV (0.025 in/sec RMS) and below has virtually no risk of "architectural" damage to normal buildings.6

Transportation- and Construction-Induced Vibration Guidance Manual (Caltrans, 2004) provides practical guidance to California Department of Transportation (Caltrans) engineers, planners, and consultants who must address vibration issues associated with the construction, operation, and maintenance of Caltrans projects. Table 6: Vibration Damage Threshold Guidance lists the maximum levels of vibration allowed by Caltrans.

Table 6: Vibration Damage Threshold Guidance

Structure Type/Condition	Maximum PPV[7] (inches per second)	
	Transient Sources	Continuous/Frequent Intermittent Sources
Human Annoyance	0.05	0.022
Extremely fragile historic buildings, ruins, and ancient monuments	0.12	0.08
Fragile buildings	0.2	0.1
Historic and some old buildings	0.5	0.25
Older residential structures	0.5	0.3
New residential structures	1.0	0.5
Modern industrial/commercial buildings	2.0	0.5

Source: Caltrans, 2004; Hendricks, 2002.

6 Rudy Hendriks, "Transportation Related Earthborne Vibrations (Caltrans Experiences)," Technical Advisory, Vibration, TAV-02-01-R9601, Department of Transportation, Division of Environmental Analysis, Office of Noise, Air Quality, and Hazardous Waste Management, Sacramento, CA, 2002.

7 Transient sources create a single isolated vibration event, such as blasting or drop balls. Continuous/frequent intermittent sources include impact pile drivers, pogo-stick compactors, crack-and-seat equipment, vibratory pile drivers, and vibratory compaction equipment.

2.1.3 Local

Each local government outlines requirements for noise abatement and control in their general plans and municipal codes. The general plans typically set overall goals and objectives, while the municipal codes set specific sound limits. No municipal noise codes occur for the study area other than those of the County of San Diego.

San Diego County Guidelines for Determining Significance for Noise

The San Diego County Guidelines for Determining Significance for noise is used by county staff for review of discretionary projects and environmental documents, pursuant to CEQA. Project implementation that is anticipated to result in the exposure of any on- or off-site, existing or reasonably foreseeable future noise-sensitive land use to exterior or interior noise (including noise generated from a project together with noise from roads, railroads, airports, heliports, and all other noise sources) that is either in excess of 60 dB (CNEL) or an increase of 10 dB (CNEL) over pre-existing noise is considered significant.

County of San Diego Noise Ordinance

The County of San Diego Noise Ordinance establishes prohibitions for disturbing, excessive, or offensive noise and contains provisions, such as sound level limits, for the purpose of securing and promoting public health, comfort, safety, peace, and quiet. Limits, as specified by zoning, are provided in Table 7: San Diego County Sound Level Limits. In the case that two adjacent properties each have different zone classifications, the sound level limit at the location on the boundary between the two properties is the arithmetic mean of the respective limits for the two zones, except for extractive industries. It is unlawful for any person to cause or allow the creation of any noise that exceeds the applicable limits of the Noise Ordinance at any point on or beyond the boundaries of the property on which the sound is produced. Furthermore, the Noise Ordinance allows the county to grant variances from the noise limitations for temporary on-site noise sources, subject to terms and conditions intended to achieve compliance. The San Diego County Department of Planning and Land Use recommends the use of these limits to establish thresholds of significance for noise. Fixed-location public utility distribution or transmission facilities located on or adjacent to a property line is subject to this noise level limit, measured at or beyond six feet from the boundary of the easement upon which the equipment is located.

The Noise Ordinance establishes additional noise limitations for the operation of construction equipment. It is unlawful for any person to operate construction equipment at any construction site on Monday through Saturday, except between the hours of 7 a.m. and 7 p.m., and on Sunday; days appointed by the President, Governor, or the Board of Supervisors for a public fast; Thanksgiving; or holidays. Construction noise cannot exceed an average of 75 dB during the allowed construction period when measured at or within the property lines of any property developed for residential purposes, unless a variance is granted.

Table 7: San Diego County Sound Level Limits

Zone Categories	Period	Applicable Limit 1-Hour Average Sound Level (dBA)
RS, RD, RR, RMH, A70, A72, S80, S81, S87, S88, S90, S92, RV, and RU. Use Regulations with a density of less than 11 dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45
RRO, RC, RM, C30, S86, RV, RU, and V5. Use Regulations with a density of 11 or more dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50
S94, V4, and all other commercial zones	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55
V1, V2 V1 V2 V3	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m. 10 p.m. to 7 a.m. 7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55 55 50 70 60
M50, M52, M54	Anytime	70
S82, M58, and all other industrial zones	Anytime	75

Source: San Diego County, 1982

In addition, except for emergency work or work on a public road project, impulsive noise cannot exceed the maximum sound level shown in Table 8, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the hour.

Table 8: MAXIMUM SOUND LEVEL (IMPULSIVE) MEASURED AT OCCUPIED PROPERTY IN DECIBELS (dBA)

OCCUPIED PROPERTY USE	DECIBELS (dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

San Diego County General Plan, Noise Element

The San Diego County General Plan establishes limitations on sound levels to be received by NSLUs. New development[8] may cause an existing NSLU to be affected by noise or it may create or locate a NSLU in such a place that it is affected by noise.

The Noise Element states that an acoustical study is required if it appears that a NSLU will be subject to noise levels of CNEL equal to 60 dBA or greater. If that study confirms that greater than 60 dBA CNEL will be experienced, modifications that reduce the exterior noise level to less than 60 dBA CNEL and the interior noise levels to below 45 dBA CNEL must be made to the development. If these modifications are not made, the development will not be approved unless a finding is made that specific social or economic considerations warrant project approval. However, if the noise level is expected to exceed 75 dBA CNEL even with such modifications, the development will not be approved, irrespective of such social or economic considerations.

The Noise Element includes special provisions for county road construction projects and interior noise levels in rooms that are usually occupied for only a part of the day (e.g., schools, libraries, etc.).

San Diego County Department of Planning and Land Use Noise and Vibration Guidelines

The Department of Planning and Land Use has issued guidelines for determining significance for noise and vibration based largely on federal transit guidelines. Vibration is considered significant if Project implementation will expose the uses listed in Table 9.

Table 9: Guidelines for Determining the Significance of Ground-borne Vibration and Noise Impacts

Land Use Category	Ground-Borne Vibration Impact Levels (inches/sec rms)		Ground-Borne Noise Impact Levels (dB re 20 micro Pascals)	
	Frequent Events[1]	Infrequent Events[2]	Frequent Events[1]	Infrequent Events[2]
Category 1: Buildings where low ambient vibration is essential for interior operations (research & manufacturing facilities with special vibration constraints)	0.0018 [3]	0.0018	Not applicable[4]	Not applicable[4]
Category 2: Residences and buildings where people normally sleep (hotels, hospitals, residences, & other sleeping facilities)[5]	0.0040	0.010	35 dBA	43 dBA
Category 3: Institutional land uses with	0.0056	0.014	40 dBA	48 dBA

[8] Development is defined as any physical development including, but not limited to, residences, commercial or industrial facilities, roads, civic buildings, hospitals, schools, and airports.

primarily daytime use (schools, churches, libraries, other institutions, & quiet offices)[5]				

Source: U.S Department of Transportation, Federal Transit Administration, "Transit Noise and Vibration Impact Assessment," May 2006.

Notes to Table:

1. "Frequent Events" is defined as more than 70 vibration events per day. Most rapid transit projects fall into this category.
2. "Infrequent Events" is defined as fewer than 70 vibration events per day. This category includes most commuter rail systems.
3. This criterion limit is based on levels that are acceptable for most moderately sensitive equipment such as optical microscopes. Vibration sensitive manufacturing or research will require detailed evaluation to define acceptable vibration levels. Ensuring lower vibration levels in a building often requires special design of the HVAC systems and stiffened floors.
4. Vibration-sensitive equipment is not sensitive to ground-borne noise.
5. For Categories 2 and 3 with occupied facilities, isolated events such as blasting are significant when the peak particle velocity (PPV) exceeds one inch per second. Continuous or frequent intermittent vibration sources such as impact pile drivers are significant when their PPV exceeds 0.1 inch per second. More specific criteria for structures and potential annoyance were developed by Caltrans (2004) and will be used to evaluate these continuous or transient sources in San Diego County.

An affirmative response to or confirmation of any one of the following Guidelines will generally be considered a significant impact related to noise as a result of Project implementation, in the absence of scientific evidence to the contrary.

Project implementation will result in the exposure of any existing or reasonably foreseeable future NSLU to exterior or interior noise (including noise generated from the Project, together with noise from roads [existing and planned Circulation Element roadways], railroads, airports, heliports and all other noise sources) in excess of any of the following:

A. Exterior Locations:

i. 60 dB (CNEL); or

ii. An increase of 10 dB (CNEL) over pre-existing noise.

In the case of single-family residential detached NSLUs, exterior noise shall be measured at an outdoor living area which adjoins and is on the same lot as the dwelling, and which contains at least the following minimum area:

(1) Net lot area up to 4,000 square feet: 400 square feet

(2) Net lot area 4,000 sq. ft. to 10 acres: 10% of net lot area

(3) Net lot area over 10 acres: 1 acre

For all other projects, exterior noise shall be measured at all exterior areas provided for group or private usable open space.

B. Interior Locations:

45 dB (CNEL) except for the following cases:

> Rooms which are usually occupied only a part of the day (schools, libraries, or similar facilities), the interior one-hour average sound level due to noise outside should not exceed 50 decibels (A).
>
> Corridors, hallways, stairwells, closets, bathrooms, or any room with a volume less than 490 cubic feet.

Project construction equipment in excess of the following:

> An average of 75 dB between the hours of 7 a.m. and 7 p.m. from Monday through Saturday.
>
> Operating on Sunday; days appointed by the President, Governor, or the Board of Supervisors for a public fast; Thanksgiving; or holidays.

Impulsive sounds of 82 dBA at the property line or other occupied areas of residential, village zoning or civic use land uses for more than 25 minutes in an hour.

Impulsive sounds of 85 dBA at the property line or other occupied areas of agricultural, commercial or industrial land uses for more than 25 minutes in an hour.

2.2 Potential Impacts

Typical noise-related adverse effects associated with new development projects generally fall into the following categories: noise from the operation of the development, and the exposure of NSLUs to existing and future noise from all sources.

Noise could increase due to additional transmission or distribution lines (corona noise) and additional helicopter flyovers during periodic inspections and outdoor human activity in defined limited areas for inspection and maintenance. A doubling of these activities would increase existing noise levels by less than 3 dBA. However, no additional helicopter inspections are anticipated and existing corona noise is not expected to double.

Exposure of NSLUs to existing and future noise from all sources is another potential adverse effect. The CNEL measured at all but three locations was less than 60 dB CNEL. Three locations were over CNEL because of nighttime insect noise. The existing noise levels are mainly related to local and distant traffic, human, agricultural and ranching activities and from natural sounds such as birds, insects (cicadas), and wind noise. The Project is not expected to increase the noise exposure of NSLUs.

Where NSLU's adjoin the transmission lines, noise caused by construction activities may exceed County limits and impacts considered significant. Exposure of selected species to noise caused by construction activities is also another typical adverse effect. Such an effect is addressed by the County's Biological Significance Guidelines 4.1.G and 4.1.J. The acoustical assessment of this issue is documented in the Project's biological resource studies.

3. PROJECT-GENERATED AIRBORNE NOISE

3.1 Guidelines for the Determination of Significance

In accordance with the County of San Diego Guidelines for Determining Significance – Noise, for non-construction noise" it shall be unlawful for any person to cause or allow the creation of any noise to the extent that the one-hour average sound level, at any point on or beyond the boundaries of the property exceeds the applicable limits in" Table 10.

Table 10: San Diego County Code Section 36.404, SOUND LEVEL LIMITS IN DECIBELS (dBA)

ZONE	TIME	ONE-HOUR AVERAGE SOUND LEVEL LIMITS (dBA)
(1) R-S, R-D, R-R, R-MH, A-70, A-72, S-80, S-81, S-87, S-90, S-92 and R-V and R-U with a density of less than 11 dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	50 45
(2) R-RO, R-C, R-M, S-86, V5 and R-V and R-U with a density of 11 or more dwelling units per acre.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	55 50
(3) S-94, V4 and all other commercial zones.	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	60 55
(4) V1, V2 V1, V2 V1 V2	7 a.m. to 7 p.m. 7 p.m. to 10 p.m. 10 p.m. to 7 a.m. 10 p.m. to 7 a.m.	60 55 55 50
V3	7 a.m. to 10 p.m. 10 p.m. to 7 a.m.	70 65
(5) M-50, M-52 and M-54	Anytime	70
(6) S-82, M-56 and M-58	Anytime	75
(7) S88 (see subsection (c) below)		

(a) If the measured ambient level exceeds the applicable limit noted above, the allowable one hour average sound level shall be the ambient noise level, plus three

decibels. The ambient noise level shall be measured when the alleged noise violation source is not operating.

(b) The sound level limit at a location on a boundary between two zones is the arithmetic mean of the respective limits for the two zones; provided however, that the one-hour average sound level limit applicable to extractive industries, including but not limited to borrow pits and mines, shall be 75 decibels at the property line regardless of the zone which the extractive industry is actually located.

(c) S88 zones are Specific Planning Areas which allow for different uses. The sound level limits in table above that apply in an S88 zone depend on the use being made of the property. The limits in Zone (1) apply to property with a residential, agricultural or civic use. The limits in zone (3) apply to property with a commercial use. The limits in zone (5) apply to property with an industrial use that would only be allowed in an M50, M52 or M54 zone. The limits in zone (6) apply to all property with an extractive use or a use that would only be allowed in an M56 or M58 zone.

(d) A fixed-location public utility distribution or transmission facility located on or adjacent to a property line shall be subject to the sound level limits of this section, measured at or beyond six feet from the boundary of the easement upon which the facility is located.

For construction activities "Except for emergency work, it shall be unlawful for any person to operate construction equipment or cause construction equipment to be operated, that exceeds an average sound level of 75 decibels for an eight-hour period, between 7 a.m. and 7 p.m., when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is being received. "In addition to the general limitations on sound levels in on construction equipment, the following additional sound level limitations shall apply:

Except for emergency work or work on a public road project, no person shall produce or cause to be produced an impulsive noise that exceeds the maximum sound level shown in Table 11, when measured at the boundary line of the property where the noise source is located or on any occupied property where the noise is received, for 25 percent of the minutes in the measurement period.

Table 11: San Diego County Code Section 36.410, Maximum Sound Level (Impulsive) Measured At Occupied

OCCUPIED PROPERTY USE	(dBA)
Residential, village zoning or civic use	82
Agricultural, commercial or industrial use	85

The minimum measurement period for any measurements conducted under this section shall be one hour. During the measurement period a measurement shall be conducted every minute from a fixed location on an occupied property. The measurements shall measure the maximum sound level during each minute of the measurement period.

Vibration levels that exceed 0.01 in/sec at residences would be considered significant.

3.2 Potential Operational Noise Impacts

The objectives of the Project are to continue to provide safe and reliable electrical service by making operational and physical improvements to increase fire safety and reliability. As such, the operation of the proposed project will not change. No additional noise impacts from maintenance and operation of the facilities are anticipated.

3.3 Potential Construction Noise Impacts

Construction noise is a temporary phenomenon. Construction noise levels will vary from hour-to-hour and day-to-day, depending on the equipment in use and the operations being performed. Construction activities will require the temporary use of various noise-generating construction equipment that will increase the ambient noise levels in the Project area on an intermittent basis. Table 1: Proposed Construction Schedule presents the anticipated construction schedule. The equipment noise emissions are tabulated in Appendix C. Table 12: Construction Noise provides an estimate of the distance from the activities to where the impact threshold would be exceeded. Not all activities will occur at every site, e.g., either there is a "Truck set" or a "Helo set", not both. Likewise the site will either install a micropile foundation or be direct bury, not both.

Table 12: Construction Noise

Activity	Distance to Leq(8) =75 dBA, feet
Improve Access Roads	<25
Construct 1 Micropile Foundation (Helo set)	590
Install 1 Micropile Pole (Helo set)	400
Construct 1 Micropile Foundation (Truck set)	180
Install 1 Micropile Pole (Truck set)	80
Construct 1 Direct-Bury Pole (Truck set)	190
Construct 1 Direct-Bury Pole (Helo set)	330
String Conductor 1 phase	100
Restore ROW	150
Pole Removal Ground Access	<25
Pole Removal No Ground Access	280
Underground Conductor	150

Note: Helo Set - using a helicopter for locations that are not accessible by ground (Truck set).

3.3.1 Transmission Line Construction Noise Impacts

The activities associated with the wood pole to steel pole conversion will involve road improvements to access the pole locations, removing the wooden poles, Installing the steel poles, stringing new conductors and site cleanup. As presented in Appendix C each of these activities will take from a few hours to a day at each pole site. There are

approximately 1,384 poles that will be replaced with a span between poles of approximately 400 feet. In most cases where there are nearby noise sensitive receivers, the construction will be from the ground and areas of impact will be up to 190 ft from the pole. Therefore all residences within this distance of a replacement pole location will exceed the County's significance guideline would be impacted for the 1 to 2 days of construction activity at that site.

3.3.2 Distribution Line Construction Noise Impacts

The activities associated with the wood pole to steel pole conversion may include road improvements to access the pole locations, removing the wooden poles, installing the steel poles, stringing new conductors and site cleanup. As presented in Appendix C each of these activities will take from a few hours to a day at each pole site. There are approximately 721 poles that will be replaced with a span between poles of approximately 230 feet. In most cases where there are nearby noise sensitive receivers, the construction will be from the ground and areas of impact will be up to 190 ft from the pole. Therefore all residences within this distance of a replacement pole location will exceed the County's significance guideline would be impacted for the 1 to 2 days of construction activity at that site.

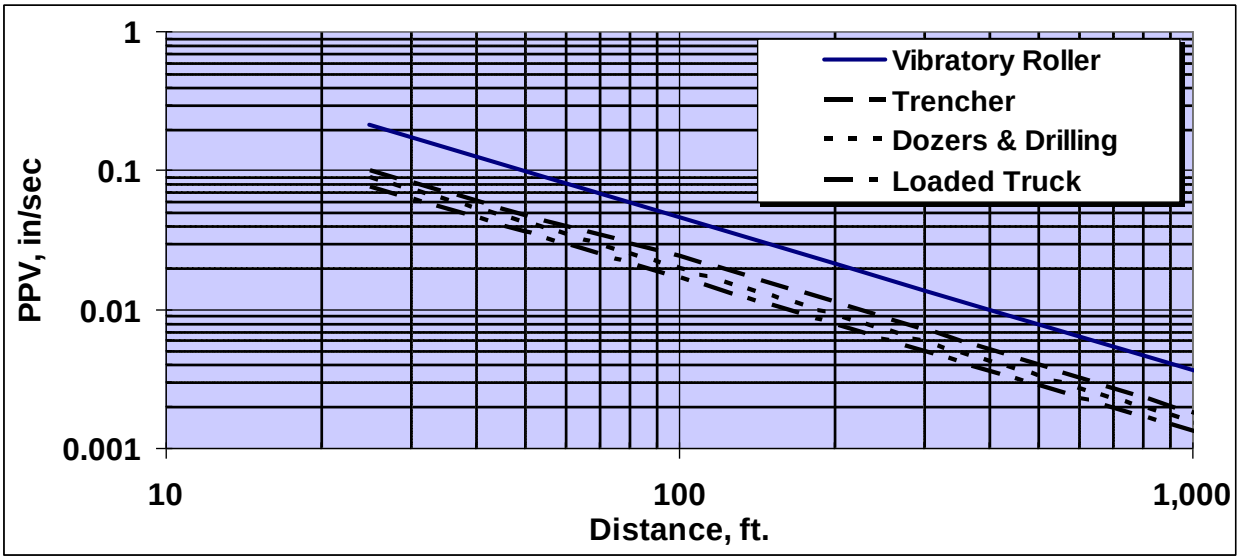
4. Construction Ground-borne Vibration Impacts

Vibration amplitude decreases with distance from the source, as presented Figure 54: Construction Vibration Amplitudes. Damage potential can be estimated by comparing the vibration damage potential threshold criteria provided previously in Table 6: Vibration Damage Threshold Guidance. Vibration levels beyond 25 feet from construction activities are below the damage threshold for older and newer residential buildings.

Table 9: Guidelines for Determining the Significance of Ground-borne Vibration and Noise Impacts describe the threshold of annoyance from vibration in terms of maximum rms amplitude. The ratio of peak particle velocity (PPV) to maximum root mean squared (rms) amplitude is defined as the crest factor for the signal. For ground-borne vibration from construction equipment, the crest factor is usually less than 4. For a crest factor of 4, an rms value of 0.01 inches per second would correspond to a PPV of 0.04 inches second. Residences within approximately 60 feet of most construction activities would exceed the annoyance threshold for infrequent events.

There are residential structures within 60 feet of construction activities and vibration impacts are anticipated to existing residences.

Figure 54: Construction Vibration Amplitudes



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5. Applicant-Proposed Measures

- Applicant-proposed measure (APM)-NOI-01: SDG&E will provide notice of the construction plans to all property owners within 300 feet of the Project by mail at least 1 week prior to the start of construction activities. The announcement will state the construction start date, anticipated completion date, and hours of operation, and well as provide a telephone contact number for receiving questions or complaints during construction.
- APM-NOI-02: Equipment will be positioned to maximize the distance to residences and maintain safe and effective operation.
- APM-NOI-03: All internal combustion-engine driven equipment will be equipped with exhaust mufflers that are in good condition and meet or exceed the manufacturer's specifications. All equipment will be maintained and tuned according to manufacturer recommendations.
- APM-NOI-04: When backup alarms have more than one loudness setting, they will be set to the lowest loudness setting that meets OSHA safety requirements.
- APM-NOI-05: When located within 50 feet of residences, a temporary noise barrier with and effective height of approximately 3 feet will be placed between residences and stationary pieces of noise generating equipment during use. The effective height is the height of the barrier above line-of-sight between noise source and noise sensitive receiver.
- APM-NOI-06: Helicopters will be required to maintain a height of at least 500 feet when passing above residential areas except when at temporary construction areas or actively assisting with the stringing of conductor. All helicopters will be required to maintain a lateral distance of at least 500 feet from all schools.
- APM-NOI-07: Residents who experience construction noise levels that exceed the applicable noise thresholds will be temporarily relocated, on an as-needed basis, for the duration of the activities that will impact them.
- APM-NOI-08: SDG&E will utilize ground access where ever possible to minimize helicopter usage near residences.
- APM-NOI-09: SDG&E will relocate poles within 25 feet of residential structures wherever possible to minimize the potential for structural damage.

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6. CONCLUSIONS

Acentech Inc. has completed an acoustical analysis for the Project. The impact assessment in this report has been made in relation to the County of San Diego Guidelines for Determining Significance for Noise and CEQA Guidelines.

The results of our analysis indicate that operational noise impacts and vibration impacts would be significant for residences near the construction activities. However, implementation of APM-NOI-01 through APM-NOI-09 would reduce these impacts to less than significant.

During operation, the noise levels due to occasional maintenance would be similar to those for the existing power lines. Therefore, no additional noise impacts from maintenance and operation of the facilities are anticipated.

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APPENDIX A

GLOSSARY OF ACOUSTICAL TERMS

Ambient Noise Level - The ambient noise level is the level of noise that is all-encompassing within a given environment, usually being a composite of sounds from many and varied sources near to and far from the receiver.

A-Weighted Sound Pressure Level (dBA) - Sound level which is frequency weighted according to a prescribed frequency response established by the American National Standards Institute (ANSI S1.4-1971) that accounts for the response of the human ear. The A-scale sound level measures approximately the relative "noisiness" or "annoyance" of many common sounds.

Ambient Noise Level - That sound level that exists at any instant regardless of source.

Crest Factor The ratio of PPV (peak particle velocity) to maximum RMS (root-mean-square) amplitude is defined as the ***crest factor*** for the signal. The crest factor is always greater than 1.4, although a *crest factor* of 8 or more is not unusual for impulsive signals. For groundborne vibration from construction equipment other than pile drivers or other impulsive equipment, the *crest factor* is usually 4 to 5.

Community Noise Equivalent Level (CNEL) - The *community noise equivalent level* is defined for a 24 hour calendar day. The sound exposure during the evening (1900 to 2200 hours) is adjusted upward by 5 decibels and the nighttime (2200 to 0700 hours) sound exposure is adjusted upward by 10 decibels.

Day-night Sound Level (L_{dn}) The day-night sound level is defined as the equivalent A-weighted sound level during a 24-hour time period. A 10 decibel penalty is applied to the equivalent sound level during nighttime hours (2200 to 0700 hours).

Daytime Sound Level (L(day)) - The level of a constant sound which has the same sound energy as does a time-varying sound during the daytime hours defined as from 0700 to 2200 hours.

Decibel (dB) - A unit of measurement on a logarithmic scale which describes the magnitude of a particular quantity of sound pressure or power with respect to a standard reference value.

Equivalent Sound Level (L_{eq}) - The equivalent sound level, L_{eq}, is the level of a constant sound which, in the given situation and time period, has the same sound energy as does a time-varying sound. Technically, equivalent sound level is the level of the time-weighted, mean, square, A-weighted sound pressure. The time interval over which the measurement is taken should always be specified.

Frequency - The time rate (number of times per second) that the wave of sound repeats itself, or that a vibrating object repeats itself--now expressed in Hertz (Hz), formerly in cycles per second (cps).

Maximum Sound Level (L_{max}) – The maximum sound level occurring over a time period or from a sound source.

Noise - Any sound that is undesirable because it interferes with speech and hearing, or is intense enough to damage hearing, or is otherwise annoying (unwanted sound).

Octave and 1/3 Octave Bands - One octave is an interval between to sound frequencies that have a ratio of two. For example, the frequency range of 200 Hz to 400 Hz is one octave, as is the frequency range of 2000 Hz to 4000 Hz. An octave band may be subdivided into smaller proportional bands, e.g. 1/3 octave bands, where each octave is divided into three 1/3 octave bands.

Peak Particle Velocity (PPV) – The peak particle velocity in in/sec of a vibrational wave.

root-mean-square (RMS) – This denotes square root of the sum of the square of a set of values. This allows the total energy of a wave form that oscillates about zero to be summed.

Sound Power Level (PWL) - Sound Power Level is a measure in decibels of the acoustic power of a sound source. Technically the PWL of a sound, in decibels, is 10 times the logarithm to the base ten of the ratio of the power of this sound source measured in watts to the reference power $\{10 \log_{10} (W/W_{ref})\}$. The standard reference power, W_{ref}, for acoustics in air is 1 picowatt.

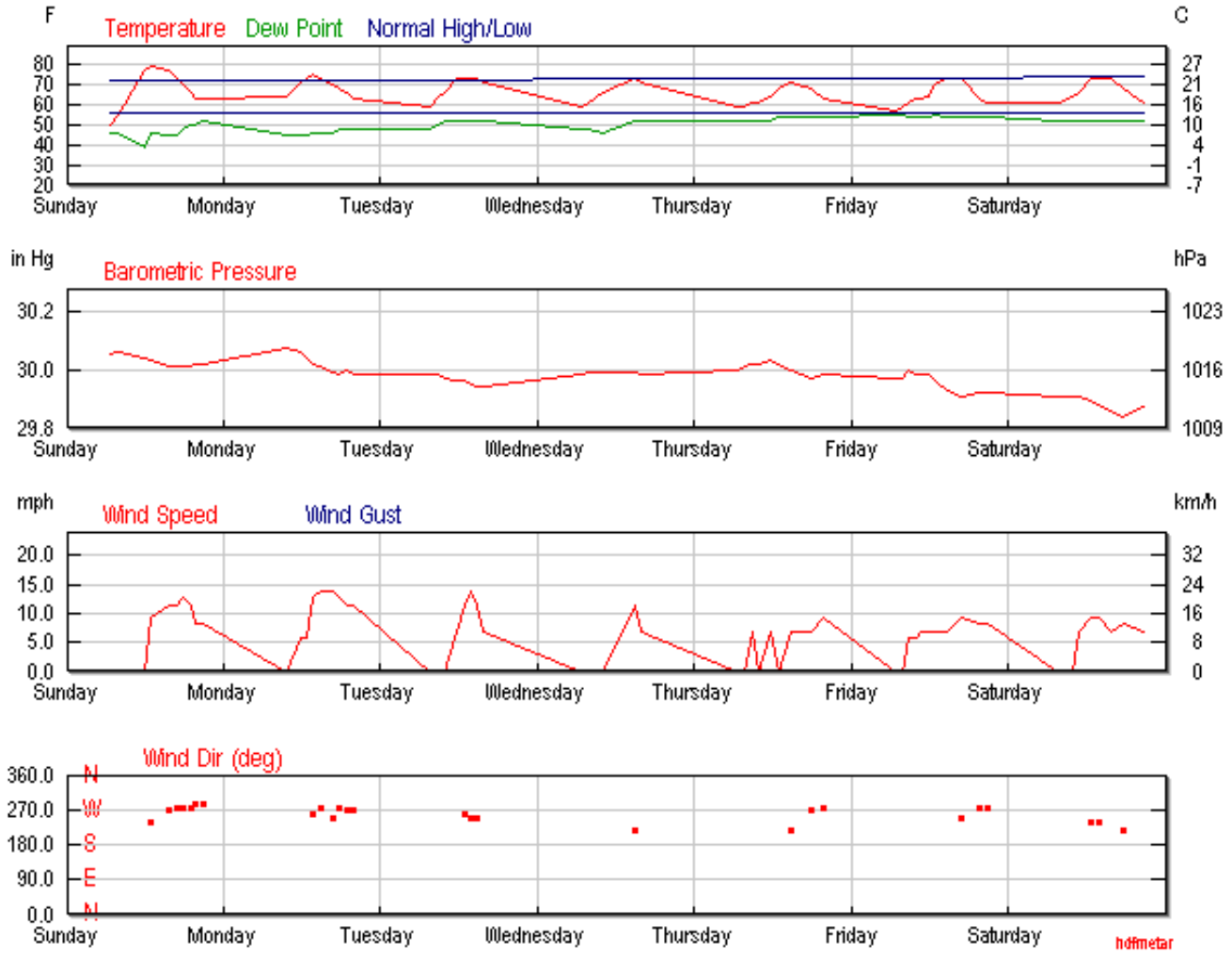
Sound Pressure Level (SPL) - Sound Pressure Level is a measure in decibels of the magnitude of the sound. Technically the SPL of a sound, in decibels, is 20 times the logarithm to the base ten of the ratio of the pressure of this sound to the reference pressure $\{20 \log_{10} (p/p_{ref})\}$. The common reference pressure, p_{ref}, for acoustics in air is 20 micropascals.

Velocity Level - Also referred to as the "vibration velocity level." Vibration velocity is the rate of change of displacement of a vibration. The velocity level is 20 times the logarithm to the base 10 of the ratio of the root-mean-square (RMS) value of the velocity to the reference velocity, 10^{-6} in/sec.

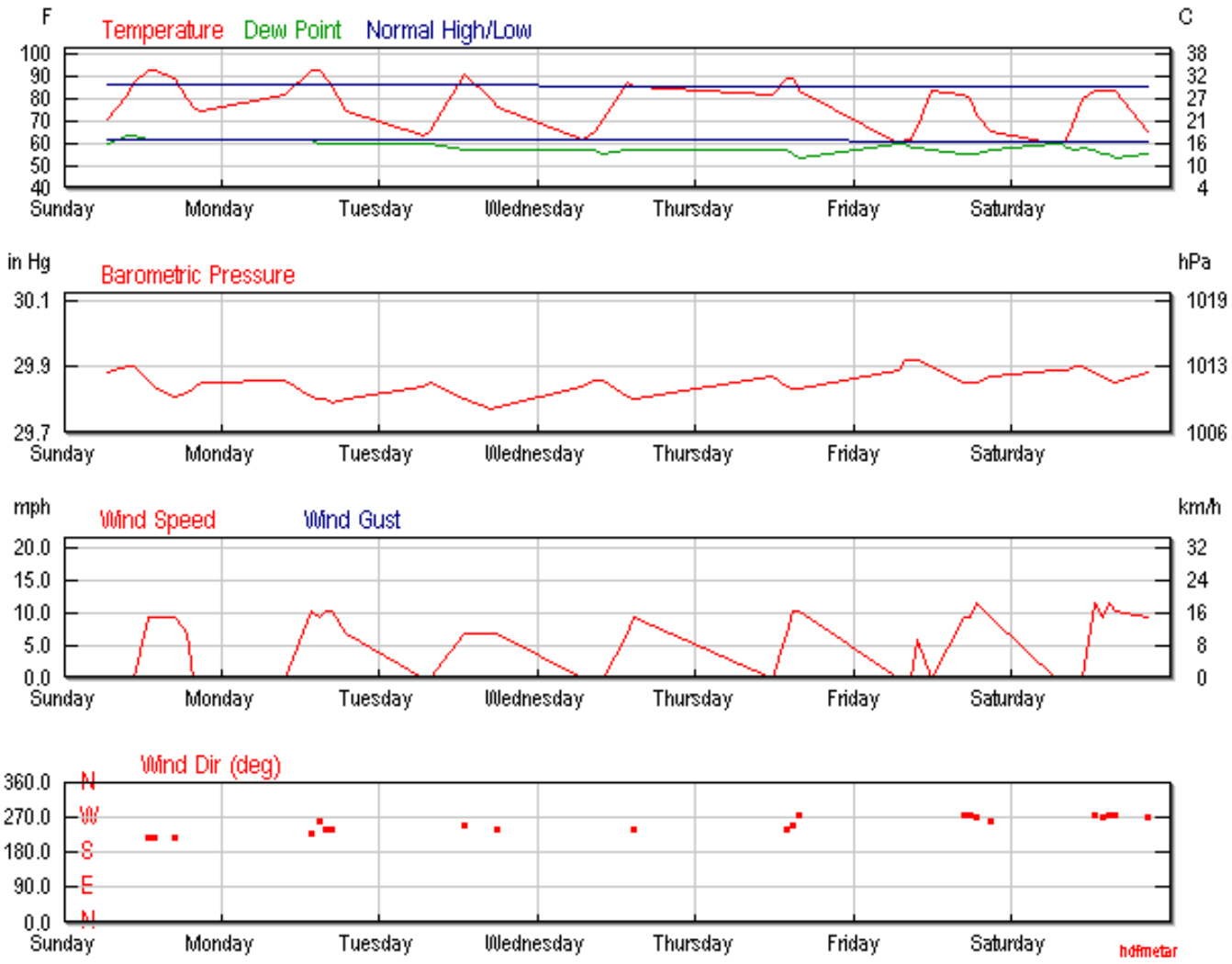
Appendix B
Local Weather Data During Field Noise Measurements

History for Santee, CA

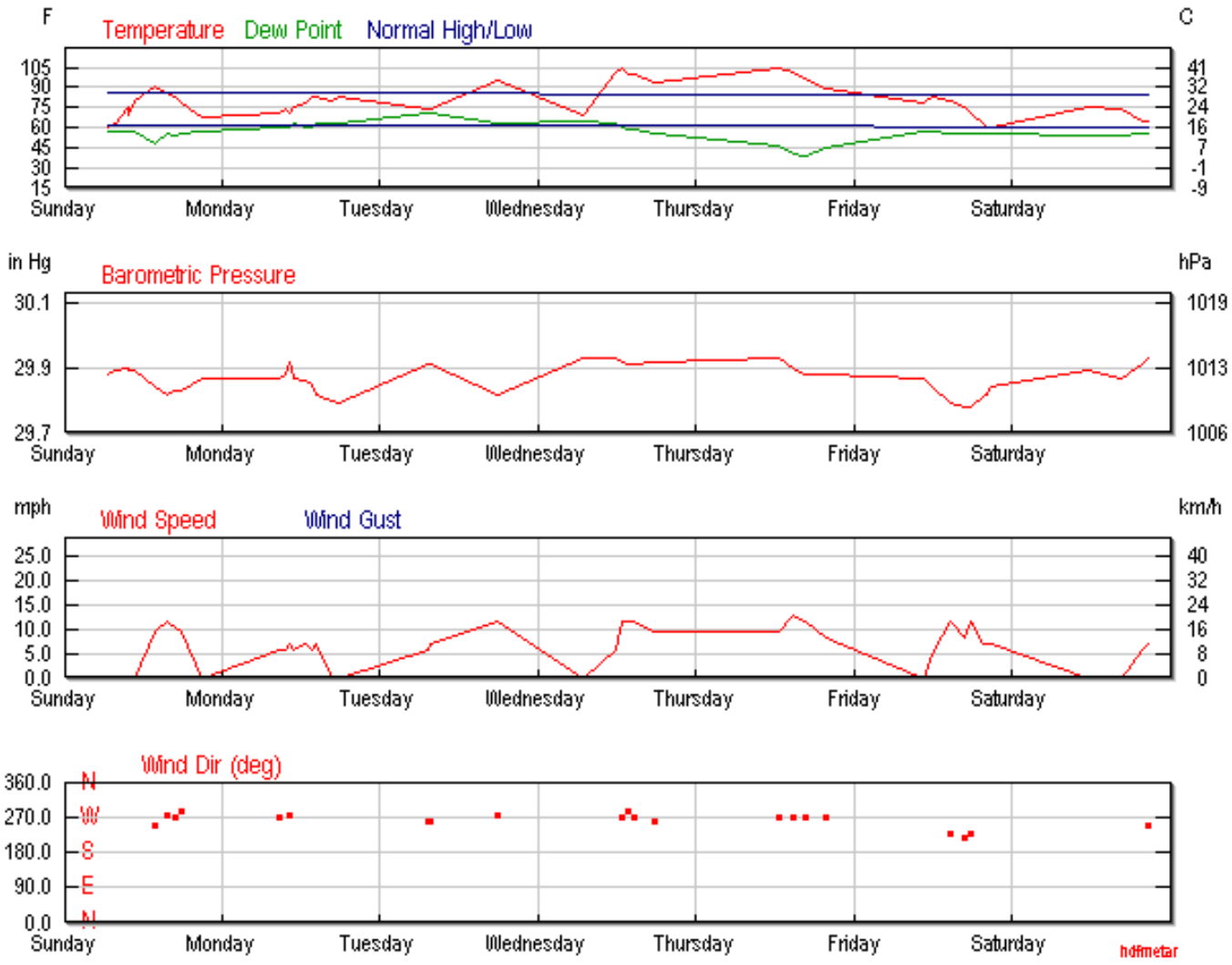
Week of June 5, 2011 through June 11, 2011 http://www.wunderground.com/history/airport/KSEE/2011/6/8/WeeklyHistory.html



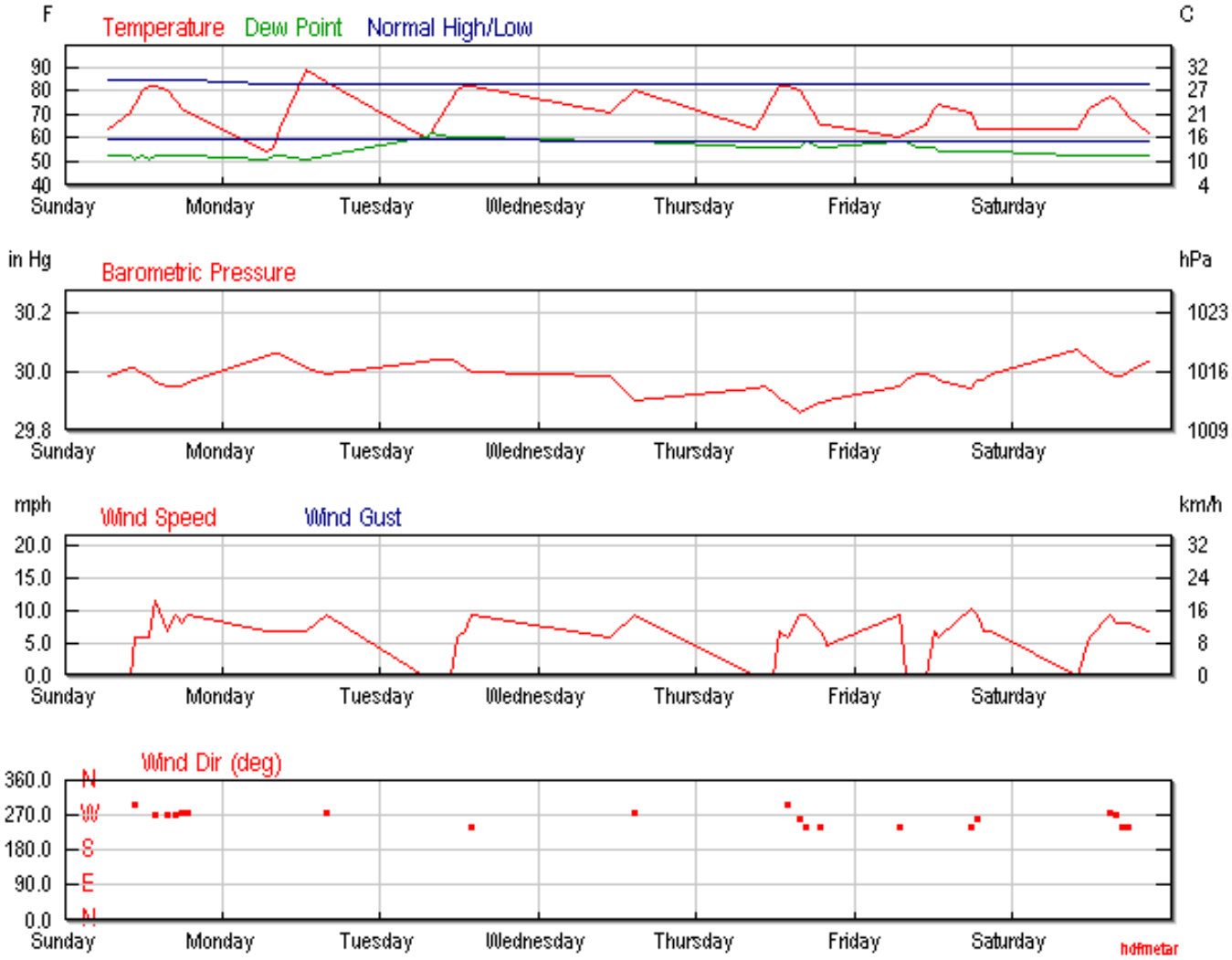
Week of August 28, 2011 through September 3, 2011



Week of September 4, 2011 through September 10, 2011



Week of September 11, 2011 through September 17, 2011



Daily Observations

2011	Temp(°F).			Dew Point(°F)			Humidity (%)			Sea Level Press. (in)			Visibility(mi)			Wind (mph)		Precip. (in)
June	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	low	high	avg	sum
5	78	64	50	52	47	39	87	52	26	30.06	30.03	30.01	12	12	12	13	5	0.00
6	75	70	62	48	46	45	59	44	36	30.07	30.02	29.98	12	12	12	14	7	0.00
7	73	66	59	52	51	48	67	53	47	29.98	29.96	29.94	-	-	-	14	4	0.00
8	73	66	59	52	50	46	67	55	47	30.00	29.99	29.98	15	13	7	12	3	0.00
9	71	65	59	54	53	52	77	67	53	30.03	30.01	29.97	12	8	7	9	3	0.00
10	73	65	57	55	54	54	94	71	50	30.00	29.96	29.91	15	8	3	9	4	0.00
11	73	66	60	52	52	52	72	58	47	29.91	29.88	29.84	20	12	5	9	4	0.00
August																		
28	93	82	71	64	63	61	69	51	36	29.9	29.85	29.81	15	13	12	9	3	0.00
29	93	88	75	63	61	61	61	44	34	29.86	29.81	29.79	20	20	20	10	6	0.00
30	91	78	64	61	59	57	88	59	31	29.85	29.81	29.77	3	3	2	7	3	0.00
31	87	74	62	57	57	55	82	60	35	29.86	29.84	29.8	10	7	4	9	2	0.00
Sept.																		
1	89	86	82	57	56	54	42	35	31	29.87	29.84	29.83	20	18	15	10	5	0.00
2	84	72	60	61	58	55	100	67	39	29.92	29.89	29.85	15	7	2	12	3	0.00
3	84	72	60	61	58	54	100	63	35	29.9	29.88	29.85	20	12	2	12	3	0.00
4	91	76	60	57	56	48	88	54	23	29.9	29.86	29.82	20	18	12	12	3	0.00
5	82	76	71	63	62	61	69	58	48	29.92	29.85	29.79	15	15	15	7	5	Rain
6	95	73	73	72	69	63	94	74	34	29.91	29.88	29.82				12	7	0.00
7	104	86	69	64	60	55	83	35	24	29.93	29.92	29.91	20	20	20	12	6	0.00
8	104	100	89	46	43	39	21	15	12	29.93	29.9	29.88				13	10	0.00
9	82	71	60	57	56	55	82	60	42	29.87	29.82	29.78	15	10	5	12	5	0.00
10	75	70	64	55	55	54	73	61	47	29.93	29.9	29.87	15	10	7	7	2	0.00
11	82	73	64	54	53	52	68	46	35	30.01	29.97	29.95	20	16	2	12	4	0.00
12	89	72	55	54	53	52	88	61	27	30.06	30.03	29.99	20	20	20	9	7	0.00

Appendix C:
Construction & Operation Equipment Summary

Construction Equipment Summary

Activity	Equipment	Use	Aproximate Quantity	Avg. Duration of Use (hours/day)	Percent of Construction Time -- Operating	**Acoustic Use Factor**	**Lmax @ 50 ft**	**Average Leq**
Improve Access Roads 1 mile	Bulldozer	Grade access roads	1	10	100%	40	82	78
	Road Grader	Grade access roads	1	10	100%	40	84	80
	Loader	Load haul trucks, transport materials	1	2	100%	40	79	69
	Dump Truck	Transporting Soil and Fill On and Off Site	1	2	100%	40	84	74
	1-ton Pickup Truck	Transport personnel	1	1	100%	40	75	62
	Water Truck	Suppress dust	2	8	100%	40	76	75
	Mower		1	3	100%	20	85	74
	Backup Alarm		8	5	100%	5	83	77
						Total	Leq@50 FT	**85**
Construct 1 Micropile Foundation (Helo set)	Portable water tank	dust control	1	4	100%			
	Drilling Rig	drill foundation holes	1	8	100%	20	79	72
	1-ton Pickup Truck	transport personnel	1	1	100%	40	75	62
	Compressor	operate tools	1	8	100%	40	78	74
	pneumatic tools		2	8	100%	50	85	85
	Helicopter	deliver materials set plate	1	2	100%	100	102	96
	Backup Alarm		2	4.5	100%	5	83	73
						Total	Leq@50 FT	**96**
Install 1 Micropile Pole (Helo set)	helo	deliver equipment, set pole base and top sections	1	1	100%	100	102	93
	1 ton pick up	transport crews	1	1	100%	40	75	62
	flat bed truck	transport equipment to **helo landing zone**	1	1	100%			
	compressor	operate tools	1	1	100%	40	78	65
	chain saw		1	0.25	100%	20	84	62
	pneumatic tools		2	1	100%	50	85	76
	Backup alarm		2	1	100%	5	83	64
						Total	Leq@50 FT	**93**

Activity	Equipment	Use	Aproximate Quantity	Avg. Duration of Use (hours/day)	Percent of Construction Time -- Operating	**Acoustic Use Factor**	**Lmax @ 50 ft**	**Average Leq**
Construct 1 Micropile Foundation (Truck set)	Water Truck	dust/fire control	1	2	100%	40	76	66
	Fork Lift	moving eqipment on the ROW	1	6	50%	40	79	71
	Drilling Rig	drill foundation holes	1	8	100%	20	79	72
	Boom truck	Set plate	1	4	100%	16	81	70
	Flatbed truck	deliver materials	1	1	100%	40	74	61
	1-ton Pickup Truck	transport personnel	1	1	100%	40	75	62
	Compressor	operate tools	1	8	100%	40	78	74
	pneumatic tools		2	8	100%	50	85	85
	Backup alarm		6	4	100%	5	83	74
						Total	Leq@50 FT	**86**
Install 1 Micropile Pole (Truck set)	boom truck	set base and top section	1	3	100%	16	81	69
	bucket truck	frame structures/ spread existing phases	1	3	100%	16	81	69
	water truck	dust control	1	2	100%	40	76	66
	1 ton pick up	transport personell	1	1	100%	40	75	62
	flat bed truck	transport equipment	1	1	100%	40	74	61
	chain saw		1	0.25	100%	20	84	62
	pneumatic tools		2	1	100%	50	85	76
	Backup alarm		5	2	100%	5	83	71
						Total	Leq@50 FT	**79**
Construct 1 Direct-Bury Pole (Truck set)	Drilling Rig	drill anchor holes	1	8	100%	20	79	72
	Loader	load spoil, wastes	1	4	100%	40	79	75
	Water Truck	dust/fire control	1	1	100%	40	76	63
	Concrete Truck	deliver slurry	1	2	100%	40	79	69
	Bucket Truck	to set top section	1	2	100%	16	81	67
	Flatbed truck	to delver pole sections	1	1	100%	40	74	61
	1-ton Pickup Truck	transport personell	1	1	100%	40	75	62
	Boom Truck	set base and top section	1	2	100%	16	81	67
	Air Compressor	operate tools	1	8	100%	40	78	74
	chain saw		1	0.25	100%	20	84	62
	pneumatic tools		2	8	100%	50	85	85
	Backup alarm		8	3	100%	5	83	74
						Total	Leq@50 FT	**86**

Activity	Equipment	Use	Aproximate Quantity	Avg. Duration of Use (hours/day)	Percent of Construction Time -- Operating	Acoustic Use Factor	Lmax @ 50 ft	Average Leq
Construct 1 Direct-Bury Pole (Helo set)	Compressor	Hand Dig Hole	1	8	100%	40	78	74
	Concrete	Concrete Backfill	1	2	100%	40	79	69
	Helicopter	Deliver equipment, bottom section, top section	1	0.5	100%	100	102	90
	1-ton Pickup Truck	transport personnel	1	1	100%	40	75	62
	chain saw		1	0.25	100%	20	84	62
	pneumatic tools		2	8	100%	50	85	85
	Backup alarm		3	1	100%	5	83	66
							Total Leq@50 FT	**91**
String Conductor 1 phase	Puller and Tensioner	pull new conductor into place and secure at correct tension	1	3	100%	40	88	80
	Reel Trailer	feed new conductor to the pulling rig	1	3	100%			
	Bucket Truck	install conductor, act as guard structure	1	3	100%	16	81	69
	1-ton Pickup Truck	transport personnel	2	1	100%	40	75	65
	Water Truck	dust/fire control	2	3	100%	40	76	71
	Backup alarm		5	2	100%	5	83	72
							Total Leq@50 FT	**81**
Restore ROW	Grader	recontour work area	1	10	100%	40	85	81
	Haul Truck	remove waste	1	10	45%	40	76	69
	Mini Ex	for water bars	1	10	45%	40	81	74
	Bob Cat	for water bars	1	10	45%	40	79	72
	Hydroseed truck	Replant vegitation	1	10	100%	50	80	77
	1-ton Pickup Truck	transport personnel	1	1	100%	40	75	62
	Water Truck	dust/fire control	1	10	100%	40	76	72
	Backup alarm		7	9	76%	5	83	77
							Total Leq@50 FT	**85**
Pole Removal Ground Access	Boom Truck/ w Hydraulic Pole Puller		1	1	100%	16	81	64
	Backup alarm		1	1	100%	5	83	61
							Total Leq@50 FT	**66**

Activity	Equipment	Use	Aproximate Quantity	Avg. Duration of Use (hours/day)	Percent of Construction Time -- Operating	**Acoustic Use Factor**	**Lmax @ 50 ft**	**Average Leq**
Pole Removal	Hydraulic Pole Puller		1	2	100%	16	81	67
	Helicopter		1	0.5	100%	100	102	90
						Total	Leq@50 FT	**90**
Underground	Saw Cut	cut pavement and road materials	1	8	80%	20	90	82
	Backhoe	excavate	2	8	80%	40	79	77
3.0 miles total	Bobcat	moving dirt & steel plates	1	2	100%	40	79	69
UG	Dump Truck	hauling dirt & asphalt	3	8	70%	40	76	75
	Water Truck	dust control, fire patrol	1	8	50%	50	76	70
equipment use	Concrete Truck	slurry hauling	5	2	100%	20	79	73
per 300 feet	Foreman Truck	transport personnel	3	1	20%	40	76	61
	Crew truck	transport personnel	2	1	10%	40	76	56
	Air compresser	jackhammering, blowing rope in conduits	1	8	10%	40	78	64
	Pavement Roller	asphalt	1	8	50%	20	80	70
	Vibrating plate	asphalt	1	2	50%	20	83	67
	bitumen (emulsion) sp	final street repair	1	1	100%	40	84	71
	4' grinder	final street repair	1	3	100%	50	85	78
	spreader box lg	final street repair	1	2	100%	40	84	74
	arrowboard	traffic control	2	8	100%	100	73	76
	Jack Hammer		1	8	10%	20	89	72
	blowing rope in conduits		1	8	10%	20	96	79
	Backup alarm		17	4	68%	5	83	78
						Total	Leq@50 FT	**88**

Operation

Activity	Equipment	Quantity	Avg. Duration of Use (hours/day)	Acoustic Use	Lmax @ 50 ft	Average Leq
Right of-Way Repair	four-wheel-drive pick-up truck	1	1	40	75	71
	backhoe	1	8	40	78	74
	Grader	1	8	40	84	80
	Backup alarm	3	6	5	83	75
				Total	Leq@50 FT	**82**
Pole Brushing	chain saw	1	1	20	84	77
	four-wheel-drive pick-up truck	1	1	40	75	71
				Total	Leq@50 FT	**78**
Equipment repair or replacement	Drilling Rig	1	8	20	79	72
	Loader	1	4	40	79	75
	Water Truck	1	1	40	76	72
	Concrete Truck	1	2	40	79	75
	Bucket Truck	1	2	16	81	73
	Flatbed truck	1	1	40	74	70
	1-ton Pickup Truck	1	1	40	75	71
	Boom Truck	1	2	16	81	73
	Air Compressor	1	8	40	78	74
	chain saw	1	0.25	20	84	71
	pneumatic tools	2	8	50	85	85
	Backup alarm	8	3	5	83	79
				Total	Leq@50 FT	**88**
Insulator Washing	washer truck	1	0.5	50	79	73
	Backup alarm	1	1	5	83	67
				Total	Leq@50 FT	**74**
Tree Trimming	aerial lift truck	1	8	20	75	68
	chipper trailer	1	8	20	79	72
	Backup alarm	1	8	5	83	70
				Total	Leq@50 FT	**74**
Visual Inspection	Helicopter	1		100	102	66
				Total	Leq@50 FT	**66**