HELIX
Environmental Planning

Verizon Wireless Telecommunications Facility "Hopper"

Noise Impact Analysis

January 21, 2015

Project Proponent:
Core Development Services
2749 Saturn Street
Brea, California 92821

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PLANNING

Prepared for:
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Noise Impact Analysis

Verizon Wireless Telecommunications Facility

"Hopper"
23586 Calabasas Road
Calabasas, CA 91302

Prepared for:

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Irvine, CA 92618

Preparer:

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EXECUTIVE SUMMARY

This noise impact analysis is submitted to satisfy the following City of Calabasas (City) noise requirements for the proposed Verizon Wireless "Hopper" Telecommunications site (hereafter referred to as the "Project" or the "proposed Project"):

(1) Assess noise impacts from on-site Project-related noise sources;

(2) Determine whether mitigation is necessary and feasible to reduce interior noise impacts to below 60 dBA (A-weighted decibels), in compliance with the City's nighttime commercial property-line noise limit.

The Project site is located at 23586 Calabasas Road in the City of Calabasas (City), California (Assessor's Parcel Number [APN] 2068-004-062). The site is in a room on the roof of the on-site commercial office building.

The proposed Project entails the modification of a Verizon communications substation, which includes the removal of 20 existing panel antennas and their replacement with 16 new panels mounted behind fiber-reinforced plastic (FRP) visual screening; as well as the installation of 4 fiber demarcation boxes and 8 Remote Radio Unit (RRU) units.

The site already has electronics equipment cabinets mounted within a second-floor room inside the on-site commercial building. These cabinets create only very low (unmeasurable) levels of noise through the door of the room. The primary existing noise is from the two rooftop mounted air-conditioning (AC) condensers; refer to the detailed site plan shown in Figure 3 and, for additional Project details, see Appendix A.

While not typical property lines, the interior open air portion of the commercial building will be analyzed to determine whether noise levels might interfere with the building's occupants' normal usage. Noise impact information for the property lines to the north, east, south, and west locations closest to the installation also will be provided.

Ground topography on the site is nearly level with no significant topological shielding near the planned site.

The Project site is in a fully developed neighborhood commercial/shopping center with associated surface parking. The Project site is zoned Commercial Old Town (CT).

Located approximately 430 feet north of the project site (shopping center) property line is Highway 101 (Ventura Freeway), which includes six lanes in the site vicinity. Adjacent land uses include the following: (1) The northern property line is adjacent to Calabasas Road; (2) across Calabasas Road to the north is a horse stable and an empty parcel (outside City limits); (3) to the east is another office building also zoned CT; (4) to the south is a smaller commercial site zoned Commercial Office (CO); and (5) to the west are additional commercial office buildings in a CT zone. For a City of Calabasas zoning map, see Appendix B.

The primary source of ambient noise was from traffic on the nearby streets, including Highway 101 and Calabasas Road.

The surrounding area is almost completely developed. No substantial changes to the area's noise levels from transportation or other stationary sources are expected in the foreseeable future.

The new Power/Fiber demarcation boxes, RRU's and antenna are all passive units and have either no noise source level or so low that they cannot be measured in a normal outdoor environment. Project-related noise sources are the existing AC condensers shown in Table 5 below.

As shown in Table 6, the estimated equipment noise levels at all of the commercial locations (R1-R5) range between 10.4 dBA and 50.4 dBA, which is within the City's nighttime noise limit at the site boundary (60 dBA L_{EQ} for commercial) established by the City noise ordinance shown in Table 1. Standard solid roof/wall construction would provide a minimum reduction of 20 dBA from the calculated rooftop noise level of 57.2 dBA (5 feet from the condenser units) to the interior office uses. The resulting interior noise level of 37.2 dBA would be within acceptable limits for commercial office uses. Therefore, potential impacts associated with the proposed equipment noise would be considered less than significant.

The Project's noise impacts would be in compliance with the City of Calabasas' property-line noise limit. No mitigation or project design features would be required.

1.0 INTRODUCTION

This noise impact analysis is submitted to satisfy the following City of Calabasas (City) noise requirements for the proposed Verizon Wireless "Hopper" Telecommunications site (hereafter referred to as the "Project" or the "proposed Project"):

(1) Assess noise impacts from on-site Project-related noise sources;

(2) Determine whether mitigation is necessary and feasible to reduce interior noise impacts to below 60 dBA (A-weighted decibels), in compliance with the City's nighttime commercial property-line noise limit.

1.1 PROJECT LOCATION

The Project site is located at 23586 Calabasas Road in the City of Calabasas (City), California (Assessor's Parcel Number [APN] 2068-004-062), in a room on the rooftop of the commercial office building on the property. Refer to Figures 1 and 2 for a regional location map and aerial photograph of the Project site, respectively.

1.2 PROJECT DESCRIPTION

The proposed Project entails the modification of a Verizon communications substation, which includes removing 20 panel antennas and replacing them with 16 new panels mounted behind fiber-reinforced plastic (FRP) visual screening, as well as the installation of 4 fiber demarcation boxes and 8 Remote Radio Unit (RRU) units.

The site already has electronics equipment cabinets mounted within a second-floor room inside the on-site commercial building. These cabinets create only very low (unmeasurable) levels of noise through the door of the room. The primary existing noise is from the two rooftop mounted air-conditioning (AC) condensers; refer to the detailed site plan shown in Figure 3 and, for additional Project details, see Appendix A.

1.3 ANALYZED RECEPTORS

While not typical property lines, the interior open air portion of the commercial building will be analyzed to determine whether noise levels might interfere with the building's occupants' normal usage. Noise impact information for the property lines to the north, east, south, and west locations closest to the installation also will be provided.

1.4 NOISE METRICS

All noise-level and sound-level values presented herein are expressed in terms of decibels (dB), with A-weighting, abbreviated "dBA," to approximate the hearing sensitivity of humans. Time-averaged noise levels of one hour are expressed by the symbol "L_{EQ}" unless a different period is specified. Some of the data also may be presented as octave-band-filtered and/or A-octave-band-filtered data, which are a series of sound spectra centered on each stated frequency, with half of the

bandwidth above, and half of the bandwidth below, the stated frequency. These data are typically used for machinery noise analysis and barrier-effectiveness calculations.

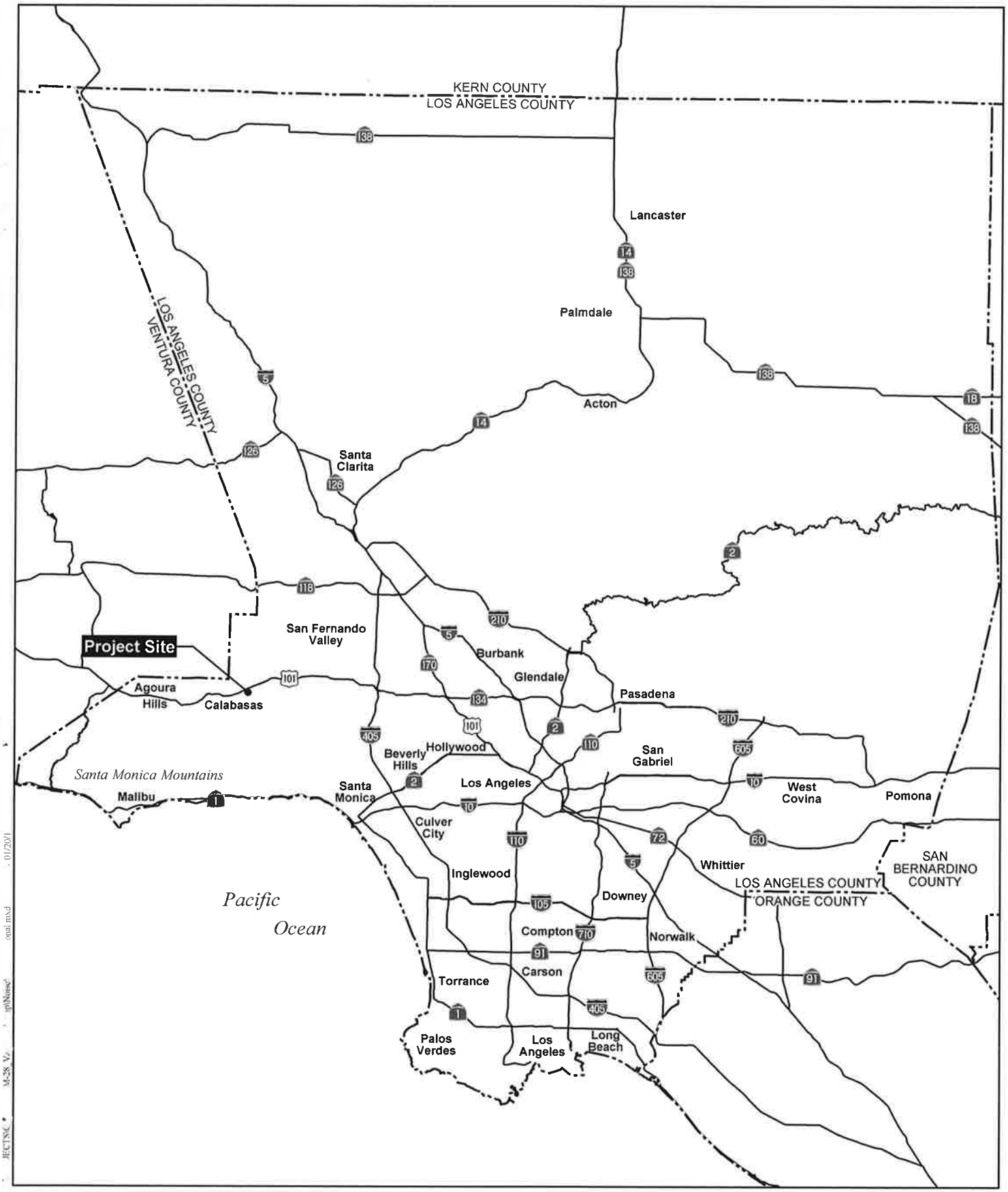
The Community Noise Equivalent Level (CNEL) represents a 24-hour average, where noise levels during the evening hours of 7:00 p.m. to 10:00 p.m. have an added 5 dB weighting, and sound levels during the nighttime hours of 10:00 p.m. to 7:00 a.m. have an added 10 dB weighting. This is similar to the Day-Night sound level (L_{DN}), which is a 24-hour average with an added 10 dB weighting on the same nighttime hours, but no added weighting on the evening hours. Sound levels expressed in CNEL are always based on dBA. These metrics are used to express noise levels for both measurement and municipal regulations, as well as for land use guidelines and enforcement of noise ordinances.

Noise emission data are often provided based on the industry standard format of sound power (noted by S_{WL}), which is the total acoustic power radiated from a given sound source as related to a reference power level. Sound power differs from sound pressure (if notation is needed, the abbreviation is S_{PL}), which measures the fluctuations in air pressure caused by the presence of sound waves and is generally the format that describes noise levels as heard by the receiver. Sound pressure is the actual noise experienced by a human or registered by a sound level instrument. When sound pressure is used to describe a noise source, it must specify the distance from the noise source to provide complete information. Sound power is a specialized analytical method to provide information without the distance requirement, but it may be used to calculate the sound pressure at any desired distance.

1.5 CITY OF CALABASAS MUNICIPAL CODE

The City Municipal Code, 17.20.160 Noise, provides the following restrictions pertaining to the generation of noise in the community:

D. Exterior Noise Level Standards. No person shall cause or allow exterior noise levels to exceed the levels set forth in Table 3-1 (included as Table 1 in this report) on any property owned, leased, occupied, or otherwise controlled by such person.



Regional Location

VERIZON WIRELESS HOPPER NOISE IMPACT ANALYSIS

HELIX Environmental Planning

0 10 Miles

Figure 1

I:\PROJECTS\C\CCM\CCM-28_VzHopper\Map\Noise\Fig2_Aerial.mxd CCM-28 01/20/15 -EV

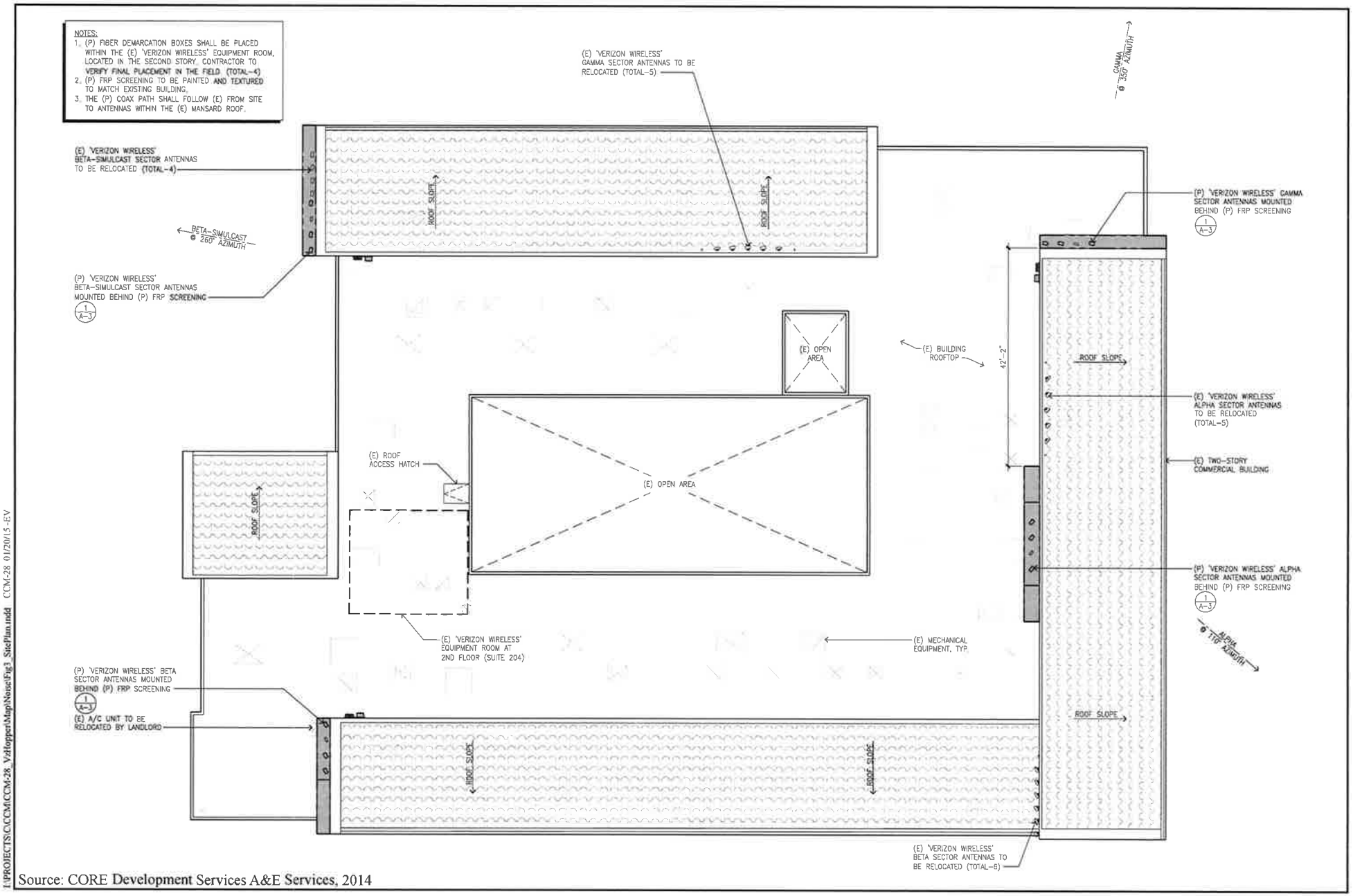
Aerial Photograph

VERIZON WIRELESS HOPPER NOISE IMPACT ANALYSIS

HELIX Environmental Planning

N 0 300 Feet

Figure 2



Source: CORE Development Services A&E Services, 2014

Detail Site Plan

VERIZON WIRELESS HOPPER NOISE IMPACT ANALYSIS

Figure 3

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Table 1* EXTERIOR NOISE LEVEL STANDARDS		
Zone	**Time Interval**	**Hourly Equivalent Sound Level (L_{EQ}, dBA)**
Residential Zones	Monday—Friday	
RS, RM, RMH, RR, RC, HM, OS	10 p.m. to 7 a.m.	50 dBA
RS, RM, RMH	7 a.m. to 10 p.m.	65 dBA
RR, RC, HM, OS	7 a.m. to 10 p.m.	60 dBA
Residential Zones	Saturday and Sunday	
RS, RM, RMH, RR, RC, HM, OS	10 p.m. to 8 a.m.	50 dBA
	8 a.m. to 10 p.m.	60 dBA
Commercial and Special Purpose Zones	All Days of Week	
PD, CL, CR, CO, CMU, CB, CT, PF,REC	10 p.m. to 7 a.m.	60 dBA
PD, CL, CR, CO, CMU, CB, CT, PF	7 a.m. to 10 p.m.	65 dBA
REC with active recreation areas	7 a.m. to 10 p.m.	70 dBA

* Table 3-1 in City Municipal Code

E. Interior Noise Level Standards for Residential Uses. No person shall operate or cause to operate any source of sound within any residential dwelling unit or allow the creation of noise on property owned, leased, occupied or otherwise controlled by such person which causes the noise level, when measured inside a neighboring dwelling unit, to exceed the levels set forth in Table 3-2 (included as Table 2 in this report).

Table 2* INTERIOR NOISE LEVEL STANDARDS		
	Daytime (7 a.m. to 10 p.m.)	**Nighttime (10 p.m. to 7 a.m.)**
Hourly Equivalent Sound Level (L_{EQ}, dBA)	45	40
Maximum level, dBA	60	55

*Table 3-2 in City Municipal Code

2.0 ENVIRONMENTAL SETTING

Ground topography on the site is nearly level with no significant topological shielding near the planned site.

2.1 SITE LAND USE

The Project site is in a fully developed neighborhood commercial/shopping center with associated surface parking. The area planned for the new and modified equipment is on the rooftop of an existing commercial office building. The Project site is zoned Commercial Old Town (CT).

2.2 ADJACENT LAND USES

Located approximately 430 feet north of the project site property line is Highway 101 (Ventura Freeway), which includes six lanes in the site vicinity. Adjacent land uses include the following: (1) the northern property line is adjacent to Calabasas Road; (2) across Calabasas Road to the east is a horse stable and an empty parcel (outside City limits); (3) to the east is another office building also zoned CT; (4) to the south is a smaller commercial site zoned Commercial Office (CO); and (5) to the west are additional commercial office buildings in a CT zone. For a City of Calabasas zoning map, see Appendix B.

2.3 EXISTING NOISE LEVELS

An on-site inspection was conducted at 12:15 p.m. on Friday, December 19, 2014. A 15-minute ambient noise measurement was made near the outside AC condensers on the project site, which is the rooftop of the commercial building. The measured noise level was 64.8 dBA L_{EQ}. During the ambient noise measurement, there was no measurable breeze, the humidity was moderate, and the temperature was in the upper-60s (degrees Fahrenheit). The primary source of ambient noise was from traffic on the nearby streets, including Highway 101 and Calabasas Road.

2.4 FUTURE NOISE ENVIRONMENT SOURCES

The surrounding area is almost completely developed. No substantial changes to the area's noise levels from transportation or other stationary sources are expected in the foreseeable future.

3.0 STUDY METHODS, EQUIPMENT, AND PROCEDURES

3.1 EQUIPMENT AND PROCEDURES

On-site noise levels were recorded using a sound level meter conforming to the American National Standards Institute (ANSI) specifications for sound level meters, ANSI SI.4-1983 (R2001). The meter was field-calibrated immediately prior to the noise measurement to ensure accuracy, with all instruments maintained with National Bureau of Standards traceable calibration, per the manufacturers' standards.

3.2 NOISE MODELING SOFTWARE

Modeling of the non-traffic outdoor noise environment was accomplished using Computer-Aided Noise Abatement (CADNA) Version 4.4. This model predicts noise impacts in a wide variety of conditions. CADNA assists in the calculation, presentation, assessment, and mitigation of noise exposure. It allows for consideration of effects from a variety of variables, including noise source, intervening structures, and topography, in estimating sound levels at a particular location.

3.3 SUMMARY OF SITE-SPECIFIC FEATURES USED IN CADNA NOISE MODEL

Existing and proposed features at the Project site that were included in the CADNA noise prediction model are listed in Table 3. These are considered to be the only on-site permanent features that would affect the noise propagation of the existing and proposed noise sources to the adjacent property lines.

Table 3
SUMMARY OF SITE FEATURES INCLUDED IN THE CADNA EXTERIOR MODEL

Description	Elevation or Height
Site Topography	Elevation varies from approximately 945 feet to 951 feet **(above sea level)**
Building Height	Varies from 34 to 44 feet
Equipment (AC) Mount Area Height	34 feet (Building Rooftop)

3.4 PROPERTY LINE DISTANCES

For verification of noise impacts, Table 4 includes a partial list of equipment-to-property-line distances at the planning receiver locations. These locations are shown on Figure 4, *Noise Contours and Receivers*. The figure also displays the predicted site noise contours that show estimated noise levels associated with the equipment noise.

Table 4 PARTIAL LIST OF EQUIPMENT-TO-PROPERTY-LINE DISTANCES		
Receiver	**Property-line Location**	**Distance (Feet)[1]**
R1	North Property Line	150
R2	East Property Line	159
R3	South Property Line	65
R4	West Property Line	116
R5	2nd Floor Building Open Area	25

[1] The distance provided is from the center of the AC pad area to the select location line.

4.0 OPERATIONAL NOISE IMPACTS

4.1 SIGNIFICANCE THRESHOLDS

As described in Sections 2.1 and 2.2, the proposed Project site and adjacent properties are all zoned commercial; therefore, the operational noise level limit is 60 dBA from 10 p.m. to 7 a.m.

4.2 PROJECT-RELATED NOISE SOURCES

The new Power/Fiber demarcation boxes, RRU's and antenna are all passive units and have either no noise source level or are so low that they cannot be measured in a normal outdoor environment. Project-related noise sources are the existing AC condensers shown in Table 5 below.

Table 5 CARRIER 38CKC060 CONDENSER									
Octave Band Center Frequency (Hz)	**63 Hz**	**125 Hz**	**250 Hz**	**500 Hz**	**1 KHz**	**2 KHz**	**4 KHz**	**8 KHz**	**dBA L_{EQ}**
Calculated S_{WL}	55.5	57.5	69.5	75	76	70.5	69.0	63.0	63.0

SWL = Sound Power Level

4.3 CALCULATED NOISE IMPACTS

Table 6 provides the calculated noise levels at the five receiver locations for the operational equipment noise associated with the proposed project (AC). The receiver locations are also shown on Figure 4. Figure 4 also depicts the predicted site noise contours that show estimated noise levels associated with the equipment noise.

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Noise Contours and Receivers

VERIZON WIRELESS HOPPER NOISE IMPACT ANALYSIS

HELIX Environmental Planning

N 0 100 Feet

Figure 4

As shown in Table 6, the estimated equipment noise levels at all of the commercial locations (R1-R5) range between 10.4 dBA and 50.4 dBA, which is within the City's nighttime noise limit at the site boundary (60 dBA L_{EQ} for commercial) established by the City noise ordinance shown in Table 1. Standard solid roof/wall construction would provide a minimum reduction of 20 dBA from the calculated rooftop noise level of 57.2 dBA (5 feet from the condenser units) to the interior office uses. The resulting interior noise level of 37.2 dBA (57.2 dBA minus 20 dBA) would be within the acceptable identified limits for commercial office uses. Therefore, potential impacts associated with the proposed equipment noise would be considered less than significant.

Table 6
CALCULATED NOISE IMPACTS AT POTENTIAL EXTERIOR RECEPTOR LOCATIONS WITH ALL SITE EQUIPMENT OPERATING

Receiver	Location	Proposed Equipment Noise dBA L_{EQ}
R1	North Property Line	13.5
R2	East Property Line	10.4
R3	South Property Line	18.1
R4	West Property Line	18.1
R5	2nd Floor Building Open Area	50.4

4.4 REQUIRED PROJECT FEATURES

No Project Design features are required.

5.0 MITIGATION

The proposed Project would be in compliance with the City of Calabasas noise level limits. No mitigation is required.

6.0 CONCLUSIONS

The Project's noise impacts would be in compliance with the City of Calabasas' property-line noise limit. No mitigation would be required.

This analysis is based upon a current worst-case scenario of anticipated, typical equipment for this type of wireless facility. Substitution of equipment with higher noise emission levels may alter the conclusions of this study.

These conclusions and recommendations are based on the most up-to-date, Project-related information available. However, noise characteristics of mechanical equipment may vary for specific installations. Verification of compliance with City noise regulations can be provided, if desired, by conducting a noise survey consisting of sound level measurements at or close to the nearest receiver locations in each direction, after the Project is built and in operation. This is best accomplished in the late night or very early morning hours while the equipment is in full operation and other ambient noise sources are minimized. If any additional sound attenuation is found to be necessary, it can be specified at that time.

7.0 QUALIFICATIONS

Mr. Terry is a senior acoustical consultant for HELIX Environmental Planning, Inc. with nearly 30 years of experience in engineering and mechanical systems. His specialized experience in acoustical and mechanical engineering includes evaluating noise from various sources including engines, compressors, generators, chillers, pump stations, turbines, presses, manufacturing equipment, and air handling systems, as well as providing recommendations (including design elements) for noise control solutions to achieve satisfactory noise levels. Mr. Terry has analyzed several power plant or public utility projects involving evaluation and control of noise from mechanical equipment. Mr. Terry's responsibilities include research, computer modeling, analysis, and noise monitoring. Other projects have focused on noise control within industrial, commercial, or residential projects, and have ranged from equipment noise reduction to building modification or design enhancement.

Mr. Terry oversees report preparation, noise control design, testing of prototype solutions, project management, and client support. He has served as an Industry Expert in General Acoustics, Nuisance Noise and Vibration Control, and Building Construction Practices at numerous public hearings and workshops, including Planning Commissions, City Councils, and Boards of Supervisors. He has provided court testimony and depositions on many cases in litigation involving noise and vibration issues. Clients have included engineers and architects for various utilities, manufacturers, and water and sewer districts, including Pacific Bell, San Diego Gas & Electric, PG&E Dispersed Generating Systems, Callaway Golf, Verizon, Cingular, Nextel, SBC, AT&T, Sprint, several water districts, and a number of large law firms.

Affiliations

Acoustical Society of America
Institute for Noise Control Engineering
California Association of Environmental Professionals
San Diego Forensic Consultants Association

Education

B.S., Mechanical Engineering, San Diego State University

8.0 CERTIFICATION

This report is based on the related project information received and measured noise levels, and represents a true and factual analysis of the acoustical impact issues associated with the proposed Verizon Wireless "Hopper" telecommunications facility to be located at 23586 Calabasas Road, Calabasas, CA. This report was prepared by Charles Terry.

Charles Terry

January 21, 2015
Date

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