

Wireless Facility Technical Review

**Verizon Application for Wireless Site (No. 276849)
1867 Mora Avenue, San Ynez, CA 93460**

4/28/2015

Preiser Consulting
23836 La Posta Court, Corona, CA 92883
·Tel 951.489.1793 · Fax 951.638.4150

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Introduction

Preiser Consulting has been engaged by the County of Santa Barbara to conduct a peer review, consistent with recognized industry standard practices, of an application by Verizon Wireless to construct a new wireless site near 1867 Mora Avenue, San Ynez, CA.

Site Description and Surrounding Environment

The site is located in a rural area with the nearest residence located approximately 288' to the south; a barn is located approximately 190' to the northeast. See Figure 1, below, for an aerial view of the general vicinity.

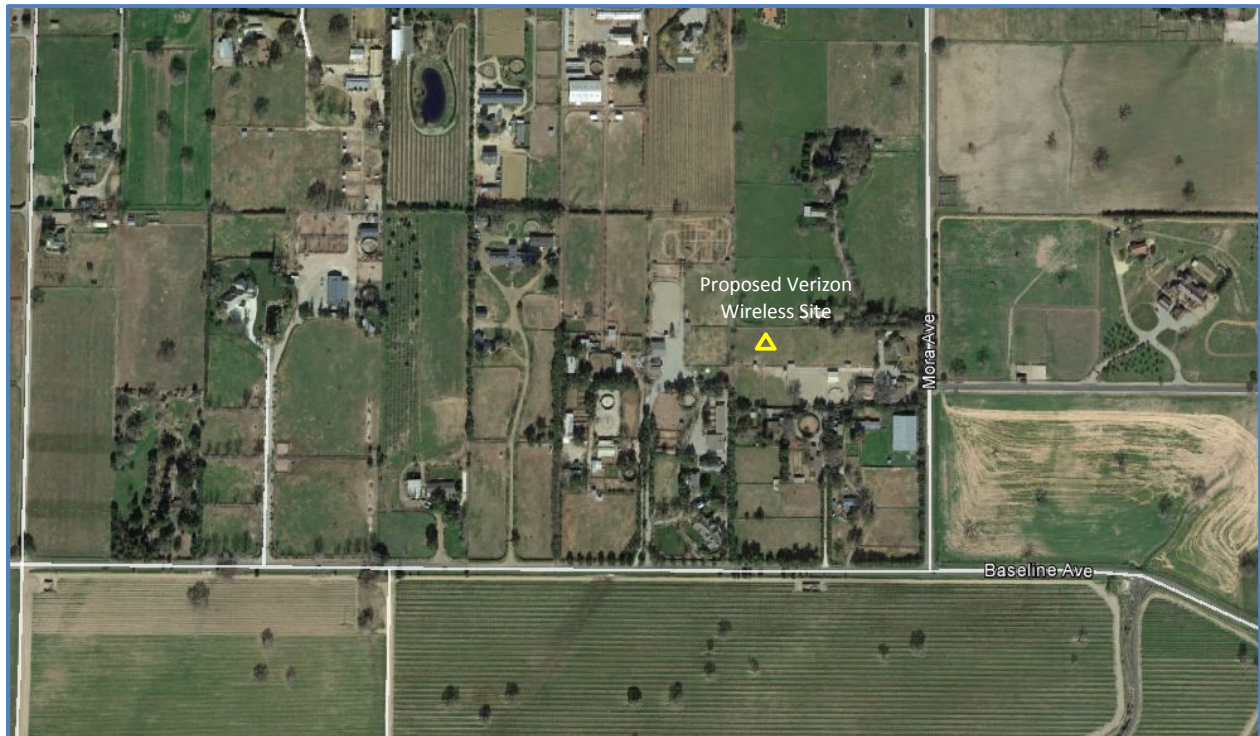


Figure 1 - Aerial View of the Vicinity

The proposed wireless facility would be located within a 1,125 sq-ft fenced service area and would consist of a 50-ft tall faux broadleaf tree as the antenna mounting structure, a 194 sq-ft

prefabricated shelter to house supporting equipment, and a diesel generator to provide emergency power.

Background

Verizon Wireless is licensed by the Federal Communications Commission (FCC) to provide wireless services in portions of the 700 MHz, 870 MHz, 1950 MHz, and 1700/2100 MHz frequency bands. Verizon Wireless and other carriers commonly deploy multiple technologies in their wireless infrastructure to provide voice and data services in various licensed frequency bands. At the proposed site, Verizon Wireless is planning to operate in three of these bands (700 MHz, 1950 MHz, and 1700/2100 MHz) with 4th Generation (4G) LTE services. LTE is an abbreviation for Long-Term Evolution, otherwise known as 4G LTE. It is a standard for wireless communications capable of providing high-speed data services, as well as voice communications.

Methodology

In conducting a peer review, relevant site application documents are reviewed and analyzed against applicable FCC regulations, wireless industry standards and best practices. In this case, the application package was reviewed, including the project drawings, dated March 6, 2015, the site alternative analysis, and the site justification statement. Also, the RF study by Sitesafe, Inc., dated June 19, 2014, was reviewed relating to the RF safety aspects to determine compliance with Federal Communications Commission guidelines.

Proposed Site Antenna Configuration

The project plans indicate that Verizon Wireless is planning to provide service from this site using a total of six (6) Andrew Model ANDREW HBXX-6517DS and (3) ANDREW Model LNX-6514DS panel antennas mounted on the antenna supporting structure at an effective height of 42' above ground level. The antennas would be arranged into three sectors (90, 210 and 330 degrees), each with three antennas.

The table below contains details of the proposed antenna configurations, including sector azimuth, band of operation, antenna model, antenna center line, effective radiated power and antenna down-tilt¹.

Antenna Configuration Details						
Sector	Ant ID	Height	Antenna Model	Band/Service	Effective Radiated Power (ERP)	Antenna Down-tilt
90°	A-1	42'	ANDREW HBXX-6517DS-VTM	1950MHz/LTE	4,512 w	0°
90°	A-2	42'	ANDREW HBXX-6517DS-VTM	2100MHz/LTE	4,947 w	0°
90°	A-3	42'	ANDREW LNX-6514DS-A1M	700 MHz/LTE	2,536 w	0°
210°	A-4	42'	ANDREW HBXX-6517DS-VTM	1950MHz/LTE	4,512 w	0°
210°	A-5	42'	ANDREW HBXX-6517DS-VTM	2100MHz/LTE	4,947 w	0°
210°	A-6	42'	ANDREW LNX-6514DS-A1M	700 MHz/LTE	2,536 w	0°
330°	A-7	42'	ANDREW HBXX-6517DS-VTM	1950MHz/LTE	4,512 w	0°
330°	A-8	42'	ANDREW HBXX-6517DS-VTM	2100MHz/LTE	4,947 w	0°
330°	A-9	42'	ANDREW LNX-6514DS-A1M	700 MHz/LTE	2,536 w	0°

The project drawings also depict a microwave dish antenna as a future addition to the site, but no details were provided as to band of operation, power output, antenna height or azimuth.²

Justification for Site

The statement from a Verizon Wireless engineer, dated March 10, 2015, indicated the objective of this proposed site is to improve 4G data capacity in the East Santa Ynez Valley by offloading traffic from the existing Santa Ynez Peak Site located on a mountain top at an elevation of 4298' approximately 9 miles southeast. This is consistent with industry trends to increase capacity, especially for high-speed data services, by either replacing, or augmenting, high elevation sites with multiple low level sites, which not only increases capacity, but also improves both in-building and in-vehicle signal levels.

¹ Upon initial review, it was found that antenna down-tilt data was not addressed in the project drawings or the Sitesafe report. This data was subsequently requested by Preiser Consulting and provided by Sitesafe via email.

² It is assumed that, in the event of a need to add a microwave antenna for backhaul of site traffic, or any other antenna additions or modifications, Verizon Wireless would be required to submit an updated RF safety report.

Upon request by Preiser Consulting, Verizon submitted additional technical data justifying the need for the new site. It contained, among other data, a graph depicting the Forward Data Volume (FDV) from the Santa Ynez Peak site for the period of April 2014 to April 2015. Examination of the graph shows significant overload which could result in service degradation and dropped calls. This would be reduced by activation of the proposed site in the East Santa Ynez Valley.

Preiser Consulting also reviewed the RF coverage maps provided which depict the modeled coverage, both existing and proposed. The maps indicate a small improvement in coverage, in particular to areas southwest of the proposed site. However, as indicated by the applicant, the primary justification for the site is the need for additional system capacity, not RF coverage.

Alternatives Considered

Verizon Wireless submitted an Alternative Site Analysis based on a stated need for a site within a certain geographic area. Once wireless carriers determine the need for a site in a specific area, the RF engineer identifies a circle or other shape drawn on a map that indicates where a site should be located to meet the engineering requirements. The size of this search ring varies depending upon the topography and demographics factors. In this case, the Verizon Wireless engineer identified an area approximately 1.5 miles in diameter. According to Verizon Wireless, the following six alternative sites within the search ring were considered.

1. Lewis Family trust (APN: 141-150-005)
2. ETAM INC (APN:141-010-007)
3. Peabody (APN: 141-070-022)
4. Allen M Segal Family Trust (APN: 141-070-017)
5. Grossman (APN: 141-070-012)
6. Santa Ynez Rancho Estates (Water Tower) (APN: 141-070-005)

The Verizon analysis indicates that Alternative Sites 1, 2, 5 and 6 were not pursued further because the landlords were not responsive, or due to failure to reach an agreement.

Alternative Sites 3 and 4 were rejected by the Verizon Wireless engineer *“because the site does not meet the capacity objectives desired in order to address the overload issue in the*

surrounding area". The alternative analysis does not provide supportive documentation as to why Alternative Sites 3 and 4 were rejected.

Findings Relating to Radio Frequency Emissions Safety

Preiser Consulting has reviewed the Sitesafe, Inc. report, dated June 19, 2014, for consistency with Federal Communications Commission's guidelines for radio frequency emissions exposure as detailed in their Office of Engineering & Technology Bulletin No. 65, "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields," August 1997 ("OET Bulletin 65"). Based on the OET Bulletin 65, the Maximum Permissible Exposure ("MPE") for the general population/uncontrolled exposure is 0.47 milli-Watt per square centimeter (mW/cm²) in the 700 MHz band (LTE), 0.58 mW/cm² in the Cellular spectrum, and 1 mW/cm² in the PCS and AWS spectrum. Permissible levels for exposure under occupational conditions, such as may be encountered by maintenance personnel, are five times higher.

Based on independent modeling of potential RF emission levels consistent with FCC guidelines, Preiser Consulting has determined that the maximum exposure anywhere at ground level would not exceed 0.6% of the applicable public exposure limit, while the maximum calculated exposure at the second floor level of any nearby building (assuming future construction of 2-story residences within 275' of the site) would not exceed 1.35% of the applicable public exposure limit. These results are based on several conservative assumptions; actual levels are expected to be lower.

Exposure levels may exceed the maximum permissible levels for personnel working on site at elevated positions directly in front of the antennas. It is the responsibility of the site operator to ensure maintenance personnel undergo RF safety training and to institute operating procedures to control RF exposure when site maintenance is performed. Warning signage is recommended at the site access gate, the base of the antenna structure and near the antennas.

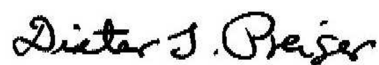
Preiser Consulting concurs with the Sitesafe conclusion that the wireless facility as proposed will comply with FCC prevailing guidelines for levels of permissible radio frequency exposure.

Summary and Conclusions

Preiser Consulting is of the opinion that:

- The proposed design is considered reasonable and consistent with industry best practices to provide mobile services, in particular 4th generation high-speed data services, in similar areas.
- As justification for the new site, the applicant provided additional supporting data showing overload at the Santa Ynez Peak site. Implementation of the proposed new site would reduce the degree of system overload.
- The proposed installation will meet Federal Communications Commission guidelines pertaining to radio frequency emissions exposure to the general public.
- The Alternative Analysis submitted did not adequately address why Alternative Sites 3 and 4, were rejected. If it is determined that these alternative sites may be less intrusive or otherwise preferred from a planning standpoint, the County may consider requesting that the applicant either provide additional supporting data or further pursue these alternatives.

Date: April 28, 2015



Dieter J. Preiser, PMP