Verizon Wireless Cell Site Necessity Case – East Santa Ynez Valley

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Introduction:
There are two main drivers that prompt the creation of a cell site project, coverage and/or capacity. Most sites provide a mixture of both, but increasingly some sites are pure capacity.

Coverage is the need for expanded service often requested by our customers or emergency services personnel. While this initially meant providing coverage in vehicles, as usage patterns have shifted this now means improving coverage inside of buildings and in residential areas.

Capacity is the need for more bandwidth of service. In the simplest form this means a cell site can handle a limited number of voice calls, data mega bites, or total number of active users. When any one of these limits are met the user experience within the coverage area of that cell quickly starts to degrade during the busier hours of use.

Coverage is best shown in coverage maps. We use tools that take into account terrain, vegetation, building types, and cell site specifics to show predictions of the existing coverage and what we expect to see with a given cell site. The prediction models make some assumptions such as that the antennas are above the nearby ground clutter (Buildings and vegetation). Once the antennas fall below the ground clutter the models become inaccurate and cannot tell that specific trees or buildings are blocking the RF signal. Due to this, modeling of tower height requirements is frequently not accurate and misleading.

Capacity is best shown in graphs of usage growth and projected exhaustion. We utilize sophisticated programs to model current usage growth and project it into the future to determine when additional capacity will be required. The algorithms that predict capacity growth output numbers that are not easily explained. Since it takes 2-3 years on average to complete a cell site project, we have to be looking about 3 years into the future to meet future customer demand.

While data capacity may not seem urgent, beginning in 2014 voice traffic will begin to migrate from the older 3G voice technology to 4G VoLTE (Voice over IP). This will add additional load to the 4G data network. Since voice is delay sensitive, exhaustion of the data network can cause degradation of voice calls including 911 calls.

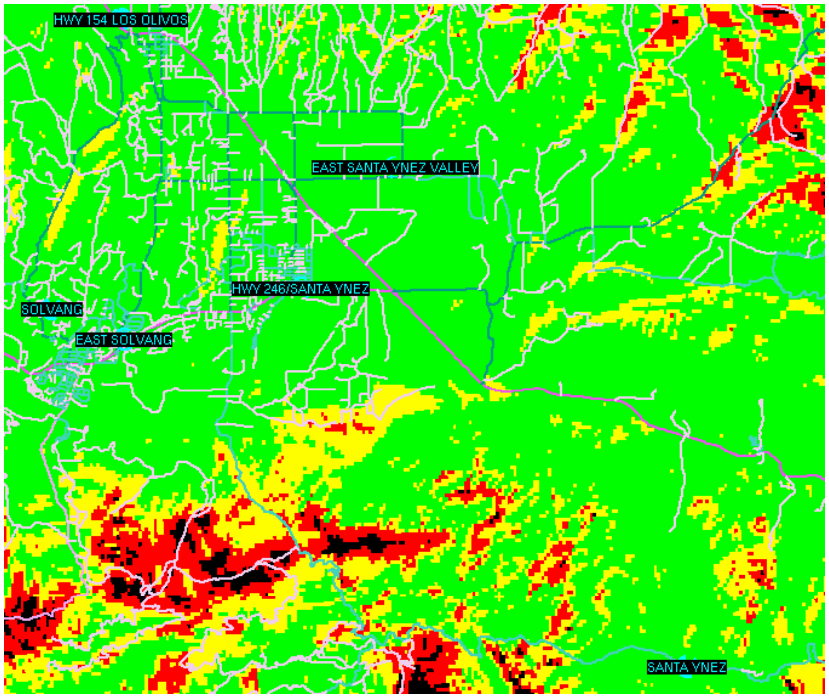
“Why do you need a site here???”

A good capacity cell will be close to the user population and have the traffic evenly spread around the site. When we cannot get a location that accomplishes being close to the customers and central to the usage, we end up having to build additional cells to meet the demands for service. Capacity sites are generally lower in height than a coverage site with a full cell needing to be above the ground clutter (buildings, trees, & etc.) and a small cell being one that is at or below the ground clutter.

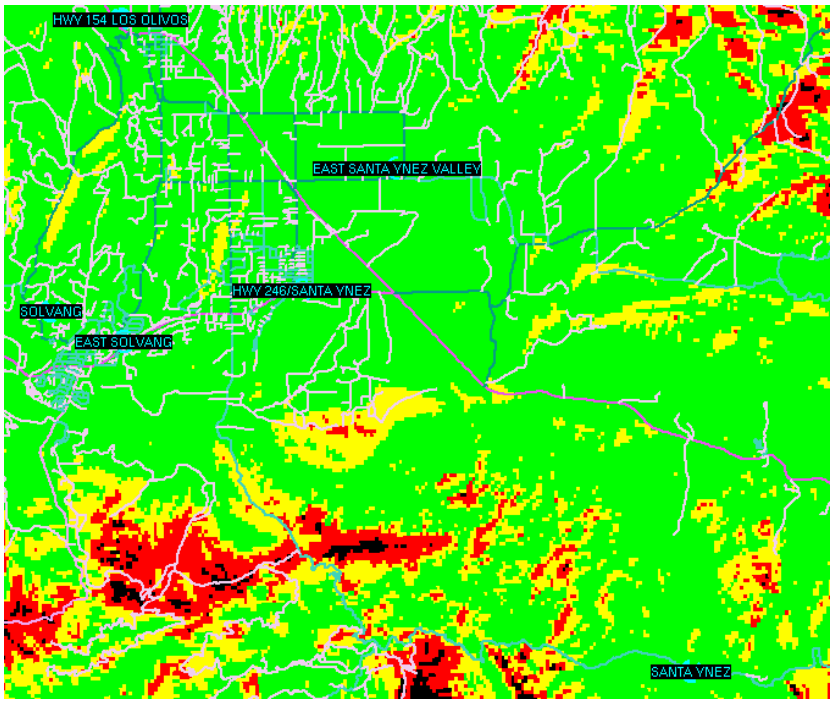
Where our customers use their wireless devices continues to evolve. While we once needed to cover highways and business districts, we are seeing increasing issues with high growth in residential areas. Current statistics show that about 1 of 3 American households no longer have a landline phone. To serve this need we have to increase the cells we have in or very near residential areas.

Need Case for: East Santa Ynez Valley

Existing Coverage



Proposed Coverage



The proposed East Santa Ynez Valley site is a capacity site which will add needed capacity to support the residential areas of the eastern Santa Ynez Valley. The primary objective of this site is to support the rapid growth in residential 4G data use we are seeing in this community.

Green=Good In-Building, Yellow= Good In-Vehicle, Red=Good on-Street.

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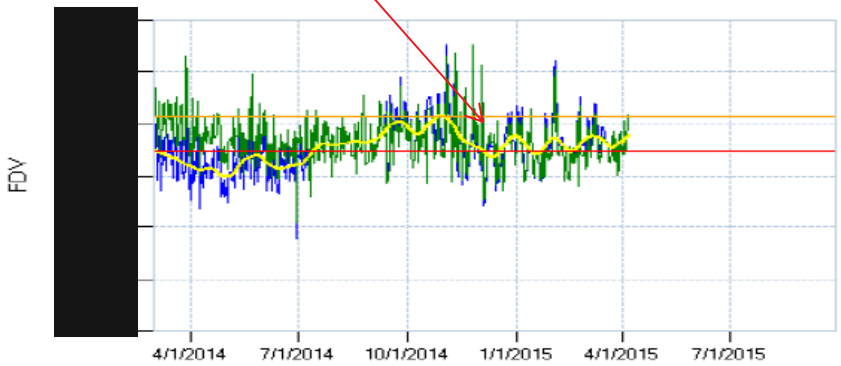
The green line
shows FDV (Forward Data Volume).
Red line is the threshold
where significant service
degradation is seen.
The yellow line is the trend.



Summary: The existing Santa Ynez site cannot support the volume of data traffic in the large area of Santa Ynez Valley it covers. This is a mountain top "voice coverage" site we attempted to use to provide data services however the site quickly exhausted.

Detail below.

The graph above shows FDV (Forward Data Volume). FDV is the total MB of data flowing through the cell it can rise just above the red line then reaches a limit and data delivery is delayed. With voice traffic transitioning from the old 3G technology to the new 4G technology we will see further increases in 4G traffic. Since the 4G network will be carrying 911 calls and is used extensively in support of police and fire emergency response it is critical that we do not allow service quality to degrade. We have already been called before the Santa Barbara emergency dispatch to explain how we plan to address the failure of data service in areas of Santa Barbara County. The Santa Ynez Valley was one of their key complaints as they are already having issues due to the capacity limitations in this area.

To aid in resolving this, we propose to add a 3 sector cell site as proposed in Santa Ynez Valley to remove this area from the existing high site and improve data service in this portion of the community.

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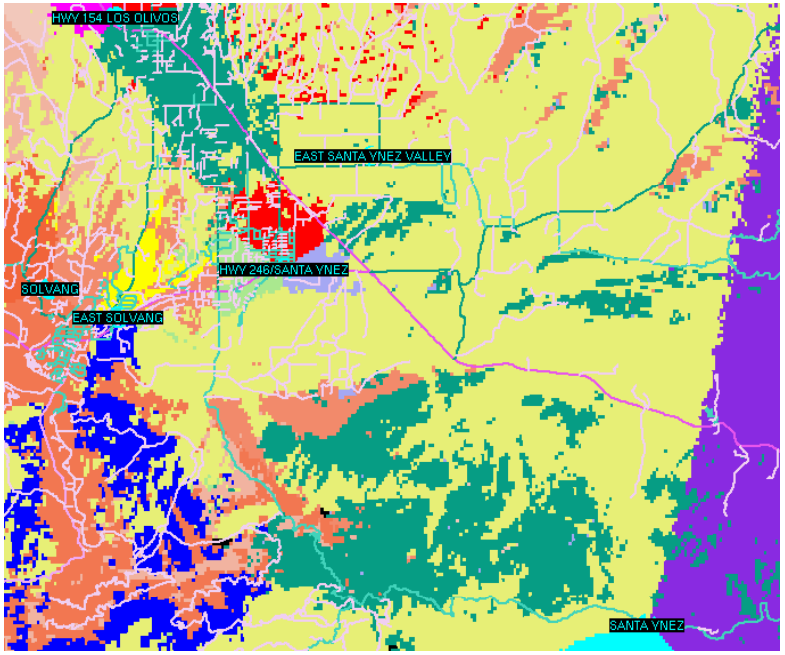
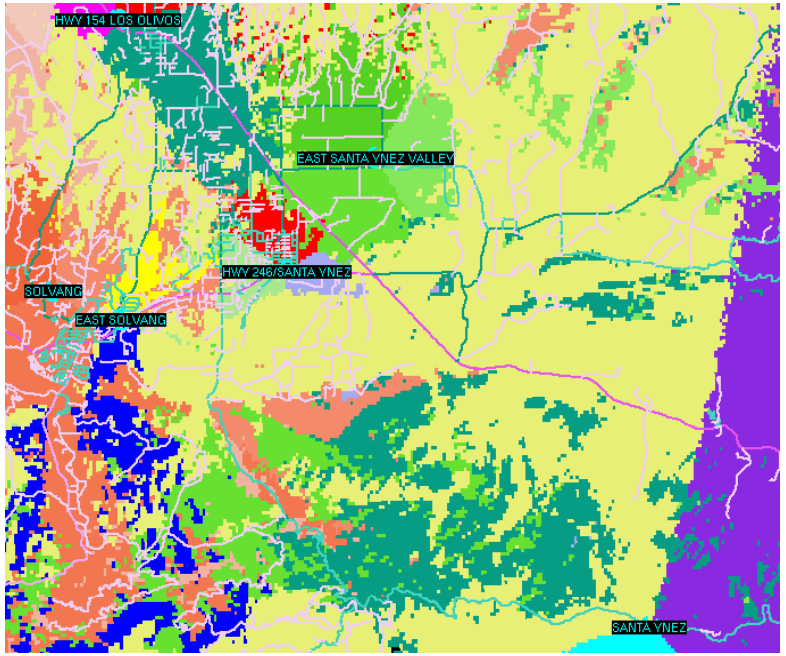
Best Server without East Santa Ynez Valley



Best Server with East Santa Ynez Valley



The plots above show the best server or sectors that cover this area. The light yellow area is covered by the mountain top Santa Ynez site. This 4200' elevation site is in complete overload. This project will improve service by offloading residential traffic onto a new cell which will improve data service for the users within this new sites footprint.