Broadband Analysis and Planning

Broadband Consortium of the Pacific Coast

Final Report

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1. Regional Summary

1.1. Primary broadband infrastructure

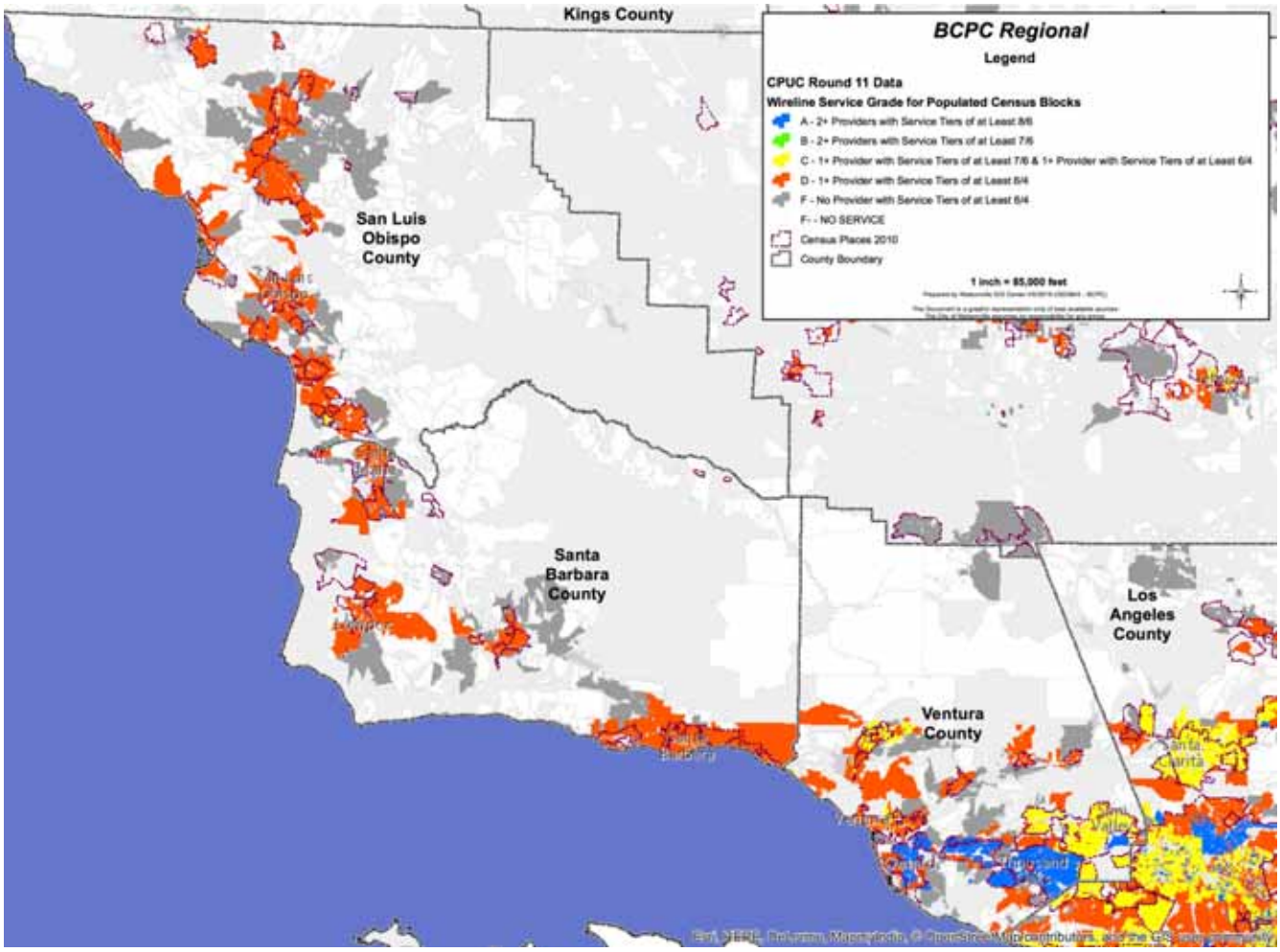


Figure 1.1 – BCPC regional broadband infrastructure grades, by census block. See Appendix B for tabular grades by community.

Broadband infrastructure in the three counties included in the Broadband Consortium of the Pacific Coast – San Luis Obispo, Santa Barbara and Ventura – varies widely in quality. As a general rule, broadband infrastructure is poorest in the northern end of the region, and improves as it moves south.

Table 1.1 - Broadband infrastructure grades

County	Grade	GPA
San Luis Obispo	D-	0.8
Santa Barbara	D-	0.8
Ventura	C	2.1
BCPC region	D+	1.4

Two telephone companies and four cable companies provide broadband service and are responsible for the primary broadband infrastructure in the region. All six file regular availability, technology and service level reports with the Federal Communications Commission. That data is provided to the California Public Utilities Commission, which further refines it. The analysis in this report is based on the data sets

published by the CPUC and supplemented with standard census data, unless otherwise indicated.

Verizon and AT&T are the incumbent telephone companies – AT&T in most of San Luis Obispo and a portion of Ventura County, and Verizon to some extent in all three counties. AT&T relies solely on copper-based wireline infrastructure and provides service in most of San Luis Obispo County. This service does not meet the California Public Utilities Commission's minimum standard of 6 Mbps download and 1.5 Mbps upload speeds. Of the more than 4,000 census blocks where AT&T reports providing broadband service in San Luis Obispo County, only one is served with the minimum upload speed.

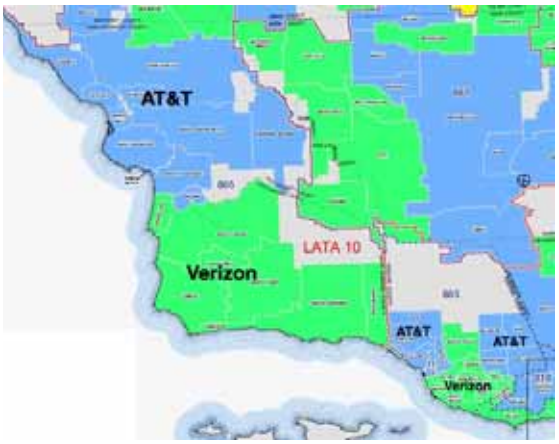


Figure 1.2 – Telephone company service areas. See Appendix A for additional detail.

However, AT&T's infrastructure in Ventura County supports service that meets the CPUC standard in about half the census blocks it serves, and even meets the FCC's minimum of 25 Mbps download and 3 Mbps upload in a relative handful of locations.

Table 1.2 - Broadband download speeds

Cable download speeds - claimed throughout service area	
Charter Communications	100 Mbps
Comcast	150 Mbps
Cox Communications	150 Mbps
Time Warner Cable	300 Mbps

AT&T	**768 Kbps**	**1.5 Mbps**	**3 Mbps**	**6 Mbps**	**12 Mbps**	**18 Mbps**	**24 Mbps**	**45 Mbps**
San Luis Obispo	361	1,074	800	377	1,215	394		
Ventura County	85	634	242	93	1171	1084	113	156

Verizon	**1 Mbps**	**1.5 Mbps**	**3 Mbps**	**5 Mbps**	**7 Mbps**	**10 Mbps**	**15 Mbps**	**100 Mbps**
San Luis Obispo		8	5	4	8	3	39	18
Santa Barbara	57	357	450	331	1,156	594	1,992	67
Ventura County	106	427	458	278	751	251	780	3131

Verizon's infrastructure is split between legacy copper-based and modern fiber-to-the-home systems. Where fiber infrastructure is present, Verizon's service is excellent, supporting symmetrical 100 Mbps download and upload speeds. On the other hand, its legacy copper systems have generally not been upgraded or well maintained: none meet the CPUC's minimum standard. Verizon is the only telephone company in Santa Barbara County and serves small portions of San Luis Obispo County. With the

exception of a few new developments in the Santa Maria Valley, where fiber was installed at the time of construction, Verizon's service in Santa Barbara and San Luis Obispo is provided via substandard copper-based systems. In Ventura County, however, Verizon has upgraded its infrastructure to full fiber to the premise capabilities in about 70% of the census blocks it serves. The balance of its Ventura County territory is served by substandard copper systems.

Table 1.3 - Broadband upload speeds

Cable upload speeds - claimed throughout service area						
Charter Communications	5 Mbps					
Comcast	20 Mbps					
Cox Communications	20 Mbps					
Time Warner Cable	20 Mbps					
AT&T	**384 Kbps**	**512 Kbps**	**768 Kbps**	**1.5 Mbps**	**3 Mbps**	**6 Mbps**
San Luis Obispo	1,435	800	1,985	1		
Ventura	719	242	800	1,548	113	156
Verizon	**384 Kbps**	**768 Kbps**	**1 Mbps**	**100 Mbps**		
San Luis Obispo	8	17	42	18		
Santa Barbara	414	1,937	2,586	67		
Ventura	533	1,487	1,031	3,131		

It should be noted that as of 1 April 2016, all of Verizon's wireline systems in California, including those in the three county region, are owned by Frontier Communications. It is a smaller telephone company with a more rural customer base, but it has purchased and absorbed other Verizon systems, including some in urban areas in the eastern U.S. This report was prepared with data submitted by Verizon, however, and the underlying infrastructure will not change significantly in the immediate future. Over time, Frontier can be expected to make wireline infrastructure upgrades – the company has a much better recent track record in this regard than Verizon – but at the present the change in ownership happened too recently to have an effect on the findings of this report. Consequently, for the sake of clarity Verizon is identified as the incumbent company throughout.

Likewise, Charter Communications is attempting to purchase systems belonging to Time Warner Communications (and Bright House Networks). This transaction has not been approved by regulators and this report treats the two companies as being completely separate.

All four of the cable companies in the region – Charter Communications, Comcast, Cox Communications and Time Warner Cable – report that their systems are 100% compliant with the DOCSIS 3.0 standard, the highest version of the standard in general use in California. Consistent with common practice in the industry, all four companies report uniformly high levels of broadband service

throughout their territories, ranging from 100 Mbps to 300 Mbps download and 5 Mbps to 20 Mbps upload speeds. These service levels meet the minimum standards set by both the CPUC and the FCC.

However, these reports should be viewed with caution because the promised speeds are contingent on ideal conditions, such as low usage, relatively few homes sharing resources, no maintenance issues and adequate connectivity to major Internet exchanges. These ideal conditions are not always present, and are becoming problematic as Internet traffic grows and more subscribers are acquired. Consequently, the service reports provided by the cable companies should not be treated with the same level of credibility as those provided by the telephone companies, which to some extent do reflect different conditions on the ground.

Figure 1.3 – Claimed cable franchise areas; not all companies have built infrastructure. See Appendix A for additional detail.

1.2. Regional broadband availability

Overall broadband availability in the region varies from 95% of homes in San Luis Obispo County to nearly 100% in Ventura County. Broadband coverage claimed by telephone companies ranges from 90% in San Luis Obispo County to 91% in Santa Barbara County to 95% in Ventura County, while cable company claims range from 90% to 95% to 99% respectively. Although there are places where cable companies offer broadband service and telephone companies do not, the reported gap is much larger than would be expected under normal conditions, and is an illustration of the differing standards the two industries use when reporting broadband availability and service levels to state and federal regulators.

Table 1.4 - Basic broadband availability - Percentage where at least 1 provider is present

	Census blocks	Housing units	Population	Area (sq mi)
San Luis Obispo County	53%	95%	93%	14%
Santa Barbara County	85%	98%	98%	68%
Ventura County	95%	99.95%	99.96%	88%

Table 1.5 - Broadband availability claimed by primary wireline providers

	AT&T	Verizon	Charter	Comcast	Cox	Time Warner	Telco	Cable
San Luis Obispo County	88%	1%	90%				90%	90%
Santa Barbara County		91%	1%	42%	52%		91%	95%
Ventura County	42%	53%	7%		0%	92%	95%	99%

The average home in California is served by two broadband companies: a telephone company with infrastructure that is capable of supporting service that at least meets the CPUC's standard and a cable company with infrastructure that supports service that meets the FCC's higher standard and is comparable to that reported by most of the cable companies found in the three county region. Overall, the primary broadband infrastructure present in the region is below average and receives a grade of "D +". The regional average, however, masks a significant difference between Santa Barbara and San Luis Obispo Counties, where primary broadband infrastructure earns a "D-" grade (both with averages of 0.8), and Ventura County, where primary infrastructure is at a strong "C" level with a 2.1 average.

1.3. Commercial and industrial broadband infrastructure

Secondary infrastructure is better. The region is well served by major regional, national and international fiber routes, with several transpacific cables landing in San Luis Obispo County and multiple fiber routes running generally north and south along the U.S. 101 corridor. These major trunk routes are supplemented by regional submarine cable connections and extensive metropolitan fiber systems that provide wholesale, industrial-grade connectivity to the region.

Table 1.6 - Top commercial/industrial broadband infrastructure cities

		Star Rating
#1	San Luis Obispo	2.0
#2	Camarillo	1.5
#3	Thousand Oaks	1.5

All three counties and a majority of the cities in the region provided map files with the location of commercial and industrial areas. As described below, the availability of commercial and industrial-grade broadband infrastructure – primary service as well as various levels of fiber-based connectivity – was compared to the mapping data and Star Ratings for these zones were calculated at the census block level. Regionally, most commercial and industrial census blocks rated 1 Star or less, however there were ample instances of 2 Star, 3 Star and even some 4 Star Ratings. The highest aggregate rating for a city was found in San Luis Obispo, which rated 2 Stars overall. Otherwise, aggregate ratings in incorporated cities in Santa Barbara and San Luis Obispo counties were at a half-Star or less. Ventura County cities rated higher, up to one and a half Stars. Unincorporated communities were also evaluated, with a wide range of results as detailed below.

1.4. Wireless broadband service

Four mobile broadband companies – AT&T, Sprint, T-Mobile and Verizon – serve the region, with service generally following the wireline pattern of improving as users move from north to south. Mobile service from all companies in San Luis Obispo and Santa Barbara counties generally fails to meet the CPUC's minimum standard, although there are pockets of exceptions. The same is true of Sprint in Ventura County, while the other three companies manage to meet the CPUC's benchmark in a significant amount of territory.

Fixed wireless Internet service is available in the region, but not consistently or, generally, at high service levels. Two companies, Surfnet Communications and Outback Internet, file service reports with the FCC and claim coverage areas in San Luis Obispo County, particularly in the northern half. No companies report service in Santa Barbara County. In the past, two have reported serving Ventura

County – Frazier Mountain in the northeast corner and Skyriver in the Ventura/Oxnard area – but no longer do so.

1.5. Next steps and recommendations

Generally, there are three steps for local organisations and individuals to consider in order to improve broadband infrastructure in the region:

1. Perform a gap analysis to determine whether service/franchise territories assigned to cable and telephone companies are fully served by broadband-capable infrastructure.
2. Recruit companies interested in pursuing fundable infrastructure projects in under and unserved areas. As described below, there are several areas in San Luis Obispo County and possibly some in Santa Barbara County where financially feasible projects could be developed, and funded via the California Advanced Services Fund and other, rurally focused programs. Do not limit recruitment to local companies: new market entrants may be better positioned to design, finance and operate projects, and will provide a useful competitive incentive for incumbents, no matter how big or small, to upgrade and expand.
3. Complete the analyses of commercial and industrial areas and identify those that are a high priority for development, with the goal of improving the quality, quantity and diversity of available broadband infrastructure and resources. The immediate objective should be to identify lead agencies – local government or private organisations – interested in pursuing infrastructure upgrade initiatives, particularly for open access facilities that are available on a competitive basis.
4. Leverage customer-focused projects – primary rural service and urban commercial/industrial upgrades alike – to develop accessible long distance fiber connections to major Internet exchanges in the region and to the north and south, in Silicon Valley and Los Angeles. These kinds of "middle mile" initiatives provide necessary resources (and competitive incentives) for local providers to expand and new companies to enter the market.
5. Conduct planning and implementation on a regional, three-county basis, and coordinate with neighboring regions. Although each county has its own individual characteristics and needs, telecommunications policy, planning and project development and implementation should be done on as large a scale as possible. Connectivity between counties and other regions is a major factor in broadband infrastructure development, often outweighing local considerations. The incumbent telephone and cable companies serving the region do their planning on a national basis, and are far less concerned about local issues.

The BCPC can serve as a central coordinating body for local initiatives and a point of contact for interested parties, such as new service providers, and establish working relationships with other regional consortia. The consortium can also support project development and implementation by offering expertise, research and analysis, and access to outside funding sources to local agencies, organisations and companies.

1.6. Note on organisation

This report is written with the assumption that most readers will be interested in a particular county, rather than the region as a whole. The individual county sections are intended to be self contained, except where specifically noted. As a consequence, the reader interested in a complete regional picture will be subjected to significant repetition from one county section to the next. Please accept our apologies in advance.

2. San Luis Obispo County

2.1. Summary

Primary broadband infrastructure in San Luis Obispo County is substandard. The two incumbent telephone companies that serve the county are AT&T and Verizon. With very few exceptions, neither company maintains its infrastructure in a condition that can support the California Public Utilities Commission's minimum acceptable service level of 6 Mbps download and 1.5 Mbps upload speeds, let alone the Federal Communication Commission's standard of 25 Mbps download and 3 Mbps upload speeds. Charter Communications is the only cable company offering broadband service in the county, and according to its own reports, its infrastructure does meet the CPUC and FCC standards.

Table 2.1 - Broadband infrastructure grades

County	Grade	GPA
San Luis Obispo	D-	0.8

Table 2.2 - Top commercial/industrial broadband infrastructure city

		Star Rating	
#1	San Luis Obispo	★★	2.0

Together, the two telephone companies and Charter offer service to 95% of the homes in the county, leaving 5% with no access to a wireline Internet service provider. Charter serves 90% of the homes, leaving 5% with access to only substandard service from a telephone company.

The average home in California is served by two broadband companies: a telephone company with infrastructure that is capable of supporting service that at least meets the CPUC's standard and a cable company with infrastructure that supports service comparable to that reported by most of the cable companies found in the three county region. Overall, the broadband infrastructure present in San Luis Obispo County is well below average and, as detailed below, receives a substandard grade of "D-".

Table 2.3 - San Luis Obispo County basic broadband availability

Percentage where at least 1 provider is present

Census blocks	Housing units	Population	Area (sq mi)
53%	95%	93%	14%

Broadband availability claimed by primary wireline providers

AT&T	Verizon	Charter	Telco	Cable
88%	1%	90%	90%	90%

Secondary broadband infrastructure, however, is better. Five companies provide specialised wireline service to businesses in the county, and major regional, national and international fiber cable routes pass through it. Commercial and industrial-grade broadband infrastructure was evaluated in the cities that provided zoning data for this analysis, as well as in unincorporated areas, using county-provided data. Based on the data available, most of the commercial and industrial zones in the areas evaluated

lack access to even average consumer-grade broadband infrastructure. However there are exceptions, notably the City of San Luis Obispo which received the highest aggregate rating of any city in the three county region – 2 Stars – as described below.

Four mobile broadband companies – AT&T, Sprint, T-Mobile and Verizon – serve San Luis Obispo County but, with the exception of a few scattered areas, do not support service that meets the CPUC's minimum standard. Two fixed wireless companies report providing service in the county. Surfnet Communications reports the most widespread coverage, albeit at service levels below the CPUC's minimum. Outback Internet is present in the northern half of the county and does report providing service that meets that standard, however this claim is unverified.

2.2. Service providers

Telephone companies

Two telephone companies, AT&T and Verizon, offer broadband service in San Luis Obispo County. The dominant carrier is AT&T, which serves all but the northeast and southwest corners of the county, which are Verizon territory.

AT&T offers DSL-based broadband service to most homes in its telephone service area, although there are wide variations, ranging from 15% broadband coverage in Creston to 100% in Cambria and Los Berros. Incorporated cities in AT&T's service area have broadband coverage of 96% or better, except for Pismo Beach, where the figure is 84%.

Based on the service levels reported by AT&T – upload speeds between 384 Kbps and 768 Kbps and download speeds centering on 1.5 Mbps and 12 Mbps, with no service reported above 18 Mbps – it appears that little or no work has been put into upgrading copper lines in San Luis Obispo County, and the supporting electronics have only been partially upgraded. More than half of AT&T's broadband service area has a maximum download speed of 3 Mbps or lower, indicating that the supporting infrastructure is based on legacy DSL technology.

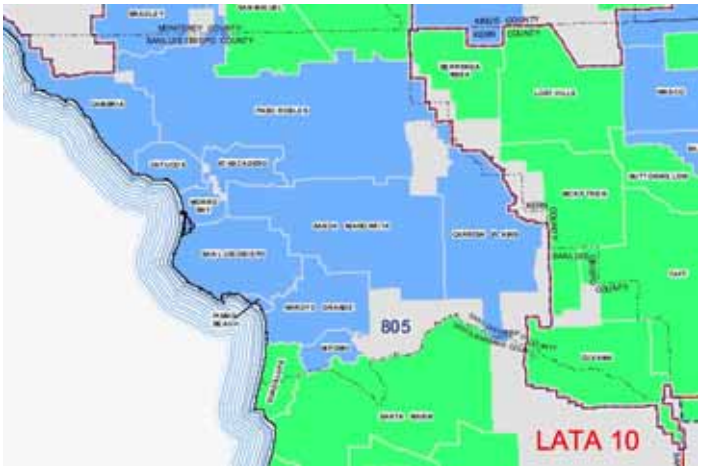


Figure 2.1 – AT&T's service area is blue, Verizon's is green.

The fact that the maximum speeds in the balance of its broadband service are 18 Mbps download and 768 Kbps upload indicates that AT&T is principally, if not exclusively, using an interim technology – ADSL2 – to boost speeds on its legacy copper telephone network, rather than reconfigure the network and upgrade it with more fiber optic-based capacity so that it can support VDSL-based service, which is the company's top of the line offering elsewhere.

Table 2.4 - San Luis Obispo County broadband speeds

Cable download speeds - claimed throughout service area

Charter Communications	100 Mbps

Telco download speeds by census block

	768 Kbps	1 Mbps	1.5 Mbps	3 Mbps	5 to 7 Mbps	10 Mbps	12 Mbps	15 Mbps	18 Mbps	24 Mbps	45 Mbps	100 Mbps
AT&T	361	1,074	800	377					1,215			
Verizon		8	5		4	8	3	39				18

Cable upload speeds - claimed throughout service area

Charter Communications	5 Mbps

Telco upload speeds by census block

	384 Kbps	512 Kbps	768 Kbps	1 Mbps	1.5 Mbps	3 Mbps	6 Mbps	100 Mbps
AT&T	1,435	800	1,985		1			
Verizon	8		17	42				67

Verizon offers no broadband service in its service territory in northeastern San Luis Obispo County. Most of this area is farm and ranch land, except for the community of San Miguel. Its territory in the southwestern corner is an extension of its Santa Barbara County service area, with similar infrastructure and service levels. It includes the Blacklake, Callender, Woodlands communities, and a portion of Nipomo. As with AT&T, upload and download speeds indicate that the infrastructure is a mix of legacy DSL and minimally upgraded ADSL technology, except for Woodlands, where it offers fiber to the home service.

Cable companies

Charter Communications is the only cable company either with a video franchise area or offering broadband service in San Luis Obispo County. It covers most of the incorporated cities and census designated places (CDPs) in the county, including San Miguel, which lacks telephone company-provided broadband service. Charter offers broadband service to 91% of the homes in San Miguel and Los Berros and covers between 97% and 100% of the remaining cities and CDPs with broadband service, except for Creston, Edna, Oak Shores ,San Simeon, Shandon and Whitley Gardens, where it offers no service at all.

In the remainder of the county – the rural areas outside of recognised communities – Charter offers broadband service to about 41% of homes. The gaps in Charter's broadband coverage might be due to either incomplete buildout – i.e., it provides no service at all – or a failure to upgrade analog-only systems to digital capabilities. It has not been determined whether Charter has any analog-only systems

in its San Luis Obispo County territory, but it is worth noting that it does maintain such systems in Monterey County, to the north.

Charter reports that is using DOCSIS 3.0 technology exclusively, and, consistent with common practice in the cable industry, claims to deliver up to 100 Mbps download and 5 Mbps upload speeds everywhere in its broadband service area. The key phrase is "up to". It is a term of art in the broadband industry that means, in effect, that the technology that's been deployed in an area is theoretically capable of supporting the indicated service level, but consumers should not expect to experience that maximum service level consistently, if at all. Anecdotal evidence indicates that the total capacity of Charter's broadband systems in San Luis Obispo County is restricted, due to the relatively large number of homes that share resources such as Internet bandwidth and indirect access to high capacity fiber connections. Its reported service speeds are the slowest of any cable company in the region, and are below average for the California cable industry overall.

Mobile broadband service

All four of the major mobile broadband carriers – AT&T, Sprint, T-Mobile and Verizon – report offering service in portions of San Luis Obispo County. According to testing conducted by the California Public Utilities Commission, Sprint's service is generally limited to low speed connections – between 768 Kbps and 1.5 Mbps – in scattered locations along the U.S. 101 corridor. T-Mobile's and Verizon's service is similarly slow but is available more widely along the U.S. 101 corridor, with some pockets of service in the 3 Mbps range. AT&T has the best service according to the CPUC, with download speeds of 3 Mbps or better in most of its service area, which covers most of the western two-thirds of the county. More information is available from the maps in Appendix A.

Other retail Internet service providers

Two other fixed wireless companies report offering service in the northern area of San Luis Obispo County, Surfnet Communications and Outback Internet. Both use unlicensed radio frequencies, which are subject to inference and may be preempted by other users. Any and all users have the same legal right to transmit on unlicensed frequencies, and must accept whatever interference or degradation results.

Surfnet reports offering service at 4 Mbps download and upload speed, which does not meet the CPUC's 6 Mbps download standard. Outback claims to provide service at 15 Mbps download and 5 Mbps upload speeds. Although it is theoretically possible to deliver these service levels via unlicensed fixed wireless technology, neither company publishes sufficient information to evaluate the veracity of claims made.

Examination of the mapping data provided by the two companies to the California Public Utilities Commission indicates that these reports are based on unsophisticated modelling of relatively few access points and cannot be taken at face value. Consistent with common practice in the fixed wireless industry, prospective customers are advised to contact the companies to confirm availability and actual service levels.

2.3. Report card

Using a grading method developed by the East Bay and Central Coast broadband consortia, and adopted by broadband consortia in other regions, by the California Emerging Technology Fund and by many local agencies, the primary wireline infrastructure in San Luis Obispo County was assessed on a five point A to F scale. A full table of grades and grade point averages for cities and census designated places, as well as a full explanation of the methodology used, may be found in Appendix B.

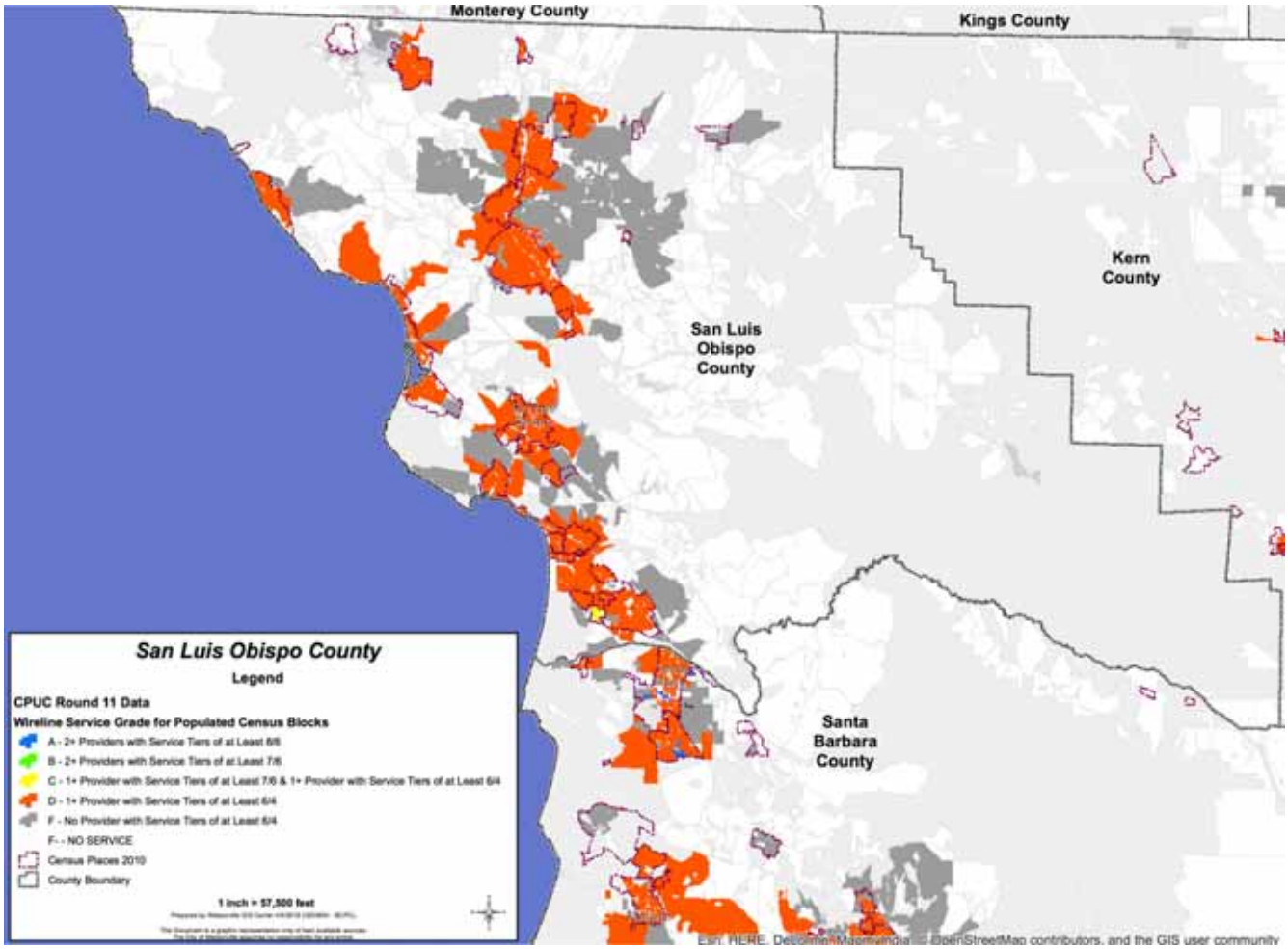


Figure 2.2 – San Luis Obispo County broadband infrastructure grades, by census block. Red = D, Grey = F, White = F-. See Appendix B for tabular grades by community.

Overall, San Luis Obispo County received a "D-" grade, which indicates that the broadband infrastructure that is present falls below the average for California and often fails to meet even the CPUC's basic minimum standard of 6 Mbps download and 1.5 Mbps upload speeds. The average Californian household – i.e., a "C" – has access to broadband infrastructure that supports at least one provider offering a minimum of 10 Mbps download and 6 Mbps upload speeds and at least one other provider offering the CPUC's minimum service level. Census blocks that have no wireline service that

meets the CPUC's minimum rate an "F", and blocks that meet that minimum but fall below the California average are given a "D". Census blocks in a given area – city, county, CDP – are averaged for a composite grade.

As a practical matter, census blocks where Charter offers service receive a "D", and blocks where it doesn't receive an "F", because neither AT&T or Verizon's infrastructure in San Luis Obispo County is capable of supporting service that meets the CPUC's minimum standard. The exception is the Woodland community, where Verizon offers fiber to the home service.

2.4. Commercial and industrial availability

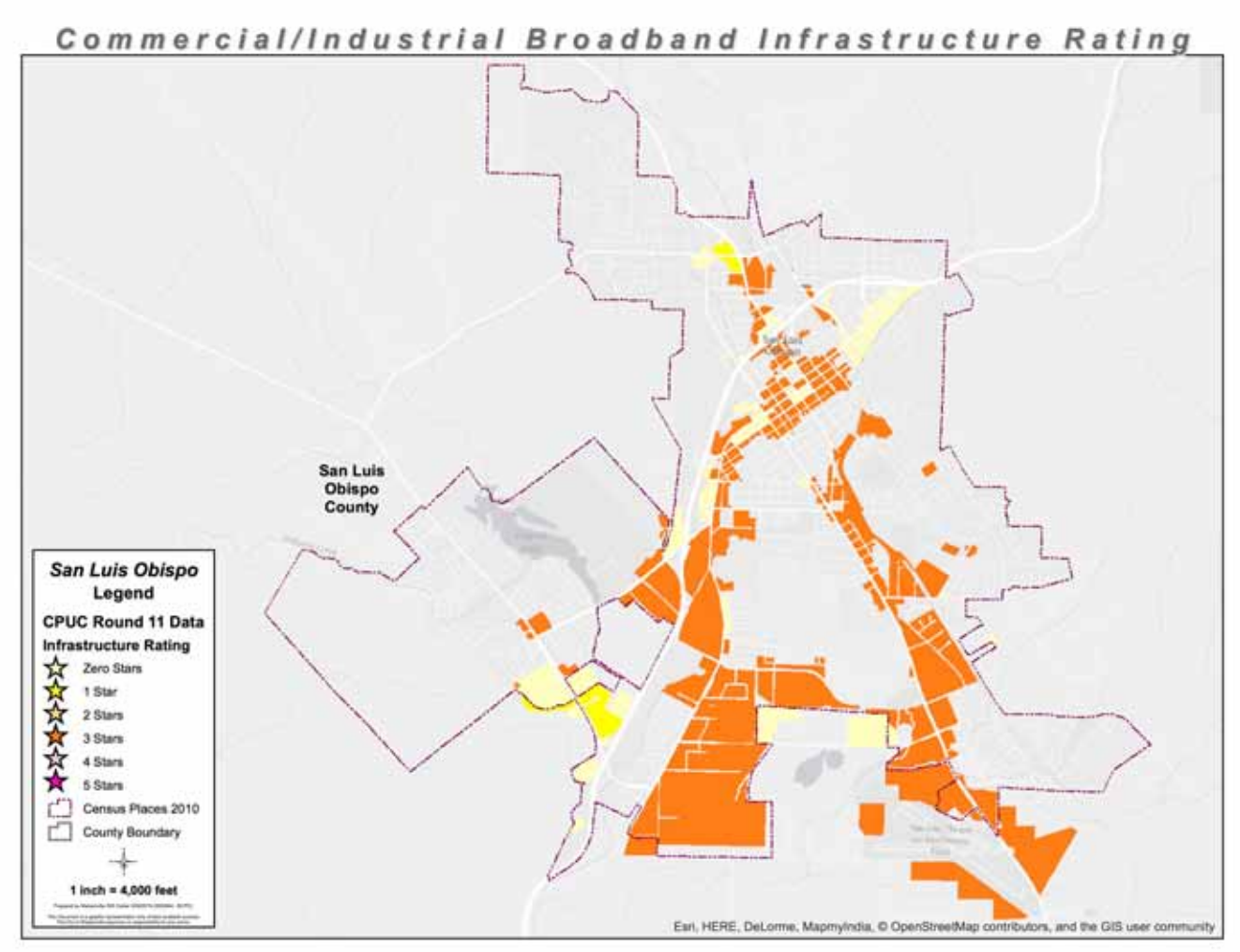


Figure 2.3 – Commercial/industrial broadband infrastructure Star Ratings for commercial and industrial zones in the City of San Luis Obispo.

Businesses have a much wider range of broadband needs than residences. Some small businesses are able to get by with slow, consumer-grade connections, while others need direct, high capacity connections to central Internet facilities. In order to assess the level of broadband infrastructure that is

available to businesses, or prospective businesses, in the region, a five-star rating system was developed. The rating is a combination of primary wireline infrastructure grade and an assessment of fiber optic facilities, both the fiber itself and the service level supported by its network connections and attached electronics.

Copper-based service offered by specialised, business-focused companies was also evaluated. No advanced copper-based technology has been deployed in San Luis Obispo County, so it didn't factor into the overall rating.

One resource that does have a significant impact in San Luis Obispo County, and the City of San Luis Obispo in particular, is the excellent long distance fiber connections that are available. Several major north-south fiber routes pass through the city, generally along the U.S. 101 corridor, and connect to major Internet exchanges in Los Angeles and Silicon Valley. In addition, several transpacific cables land near San Luis Obispo, and a submarine cable provides an alternate fiber path to southern California. Maps of these routes are in Appendix A. These routes, while not specifically factored into the analysis, do provide essential connectivity that significantly improve the resources available to the companies that were evaluated, and in that way improve local commercial and industrial broadband availability ratings.

Of the five business-focused, secondary providers in San Luis Obispo County, two – Level 3 and TW Telecom – offer fiber to the premise service, primarily in the City of San Luis Obispo, and regularly report this information to the California Public Utilities Commission via a standard format.

A third company, Digital West, is much smaller and focuses on providing fiber services in the City of San Luis Obispo and surrounding communities. Digital West does not provide broadband availability reports to the CPUC. However, the company provided information regarding its fiber network for the purposes of this analysis. This data was compared to standard census block boundaries, and any census block within 50 meters of Digital West's network was deemed served by it. This method does not take into account the cost of building connections from the network to business premises – Digital West did not provide information regarding network access points – and might overstate the company's coverage. It should be noted that the cost of building short lateral connections – 100 meters or less – can be in the $10,000 to $20,000 range, and considerably higher for longer distances. On the other hand, the cost of connecting via existing conduit or accessible pole routes can be $1,000 or less. Standard industry practice, followed by incumbent telephone and cable companies as well as independent ISPs, is to charge the business that first requests service for the entire cost of any new construction required, although there are many exceptions.

In addition, Verizon has deployed primary fiber to the premise infrastructure in the Woodlands community, which is available for use by businesses.

Four cities – Arroyo Grande, Atascadero, Paso Robles and San Luis Obispo – provided zoning data for the analysis, as did San Luis Obispo County for unincorporated areas. Census block ratings ranged from No Stars, which indicates that there is no fiber to the premise infrastructure available and the primary copper infrastructure cannot support average service levels for residential and small business customers, to 3 Stars, which indicates that average commercial grade service is available from primary

providers and/or significant fiber-based infrastructure is present. No adjustments were made to account for uncertainty regarding the accessibility of Digital West's network.

On an aggregate basis, the City of San Luis Obispo's industrial and commercial areas received 2 Stars, which is the result of averaging many 3-Star and No-Star/1-Star areas. It is the highest rating of any community in either San Luis Obispo or Santa Barbara counties and is equaled only by one small unincorporated area in Ventura County.

All other cities and census designated places in San Luis Obispo County were rated as No Stars on an aggregate basis, although limited 1-Star infrastructure can be found in Arroyo Grande, Atascadero and Paso Robles, and a few scattered locations in unincorporated areas.

A full explanation of the method used to calculate Star Ratings for commercial and industrial areas is in Appendix C, and maps of the results are in Appendix A.

3. Santa Barbara County

3.1. Summary

Primary broadband infrastructure in Santa Barbara County is substandard. The incumbent telephone companies that serves the county, Verizon, does not maintain its infrastructure in a condition that can support the California Public Utilities Commission's minimum acceptable service level of 6 Mbps download and 1.5 Mbps upload speeds, let alone the Federal Communication Commission's standard of 25 Mbps download and 3 Mbps upload speeds.

Table 3.1 - Broadband infrastructure grades

County	Grade	GPA
Santa Barbara	D-	0.8

Three cable companies are present in Santa Barbara County. Charter serves a small area in and around Guadalupe, otherwise the northern half of San Barbara County is Comcast territory. The southern, inhabited strip of the county along U.S. 101 is served by Cox Communications. According to reports filed by the three companies, their infrastructure meets the CPUC and FCC standards.

Together, the two telephone companies and three cable companies offer service to 98% of the homes in the county, leaving 2% with no access to a wireline Internet service provider. Cable companies serve 95% of the homes, leaving 3% with access to only substandard service from a telephone company.

The average home in California is served by two broadband companies: a telephone company with infrastructure that is capable of supporting service that at least meets the CPUC's standard and a cable company with infrastructure that supports service comparable to that reported by most of the cable companies found in the three county region. Overall, the broadband infrastructure present in Santa Barbara County is well below average and, as detailed below, receives a substandard grade of "D-".

Table 3.2 - Santa Barbara County basic broadband availability

Percentage where at least 1 provider is present

Census blocks	Housing units	Population	Area (sq mi)
85%	98%	98%	68%

Broadband availability claimed by primary wireline providers

Verizon	Charter	Comcast	Cox	Telco	Cable
91%	1%	42%	52%	91%	95%

Secondary broadband infrastructure, however, is better. Three companies provide specialised wireline service to businesses in the county, and major regional and national fiber cable routes pass through it. Commercial and industrial-grade broadband infrastructure was evaluated in the cities and unincorporated areas that provided zoning data for this analysis. Based on the data available, most of the commercial and industrial zones in the areas evaluated lack access to even average consumer-grade

broadband infrastructure. However there are exception within cities, notably Santa Maria but also Carpenteria and Lompoc, where specific locations within commercial and/or industrial zones were rated highly.

Four mobile broadband companies – AT&T, Sprint, T-Mobile and Verizon – serve Santa Barbara County but, with a few exceptions, notably AT&T in the Lompoc area, do not support service that meets the CPUC's minimum standard. No fixed wireless companies report providing service in the county.

3.2. Service providers

Telephone companies

Verizon is the only incumbent telephone company providing broadband or voice service in Santa Barbara County. Most of its service is provided via its legacy copper telephone network, which doesn't support service that meets the California Public Utilities Commission's minimum service standard of 6 Mbps download and 1.5 Mbps upload speeds.

Table 3.3 - Santa Barbara County broadband speeds

Cable download speeds - claimed throughout service area	
Charter Communications	100 Mbps
Comcast	150 Mbps
Cox Communications	150 Mbps

Telco download speeds by census block

	1 Mbps	1.5 Mbps	3 Mbps	5 Mbps	7 Mbps	10 Mbps	15 Mbps	100 Mbps
Verizon	57	357	450	331	1,156	594	1,992	67

Cable upload speeds - claimed throughout service area	
Charter Communications	5 Mbps
Comcast	20 Mbps
Cox Communications	20 Mbps

Telco upload speeds by census block

	384 Kbps	768 Kbps	1 Mbps	100 Mbps
Verizon	414	1,937	2,586	67

The company reports two ranges of service speeds for its legacy copper network. The higher range indicates that less than half (47%) of its network has received the minimal upgrades necessary to provide service using ADSL2 technology, which allows it to offer download speeds between 10 Mbps and 15 Mbps, with upload speeds of 1 Mbps.

ADSL2 is an interim technology that allows legacy DSL service based on first generation ADSL or similar technology to be improved without extensive wireline network upgrades. The alternative would be to replace the copper network with fiber to the premise facilities, as Verizon has done in Ventura County, or do the necessary wireline and electronics upgrades – usually involving a combination of copper and fiber – to support modern VDSL technology, as AT&T appears to have done in a few places in Ventura County.

The balance of Verizon's copper network is either fitted out with older, 1990s vintage DSL equipment or doesn't support broadband service at all. The areas that Verizon reports as having the lower of its two speed ranges – 1 to 7 Mbps download and 384 to 768 Kbps download speeds – represent 44% of its reported broadband service area.

The remaining 9% of Santa Barbara County's population is virtually all served by Verizon's legacy telephone network but the company has not upgraded its infrastructure – outside lines and inside electronics – to be able to support broadband service of any kind.

There are a handful of areas where Verizon delivers service via direct fiber-to-the-premise infrastructure. It reports offering symmetrical FTTP service at 100 Mbps download and upload speeds in several dozen locations in Santa Maria, a dozen in Orcutt and one in Guadalupe. The extent of these locations is undefined – the data is only reported at the census block level – but these are apparently newer residential developments where FTTP infrastructure was installed at the time of construction. To its credit, Verizon appears to have provisioned these scattered locations with its FiOS-brand service, which supports the high speeds reported.

Cable companies

There are two primary cable companies in Santa Barbara County, Comcast and Cox Communications. A third, Charter Communications, provides service to Guadalupe, as an extension of its San Luis Obispo franchise area. Charter reports that it offers service to all homes in Guadalupe at the 100 Mbps download and 5 Mbps upload level. More information regarding its system is in the San Luis Obispo County section above. The eastern third of Santa Barbara, which is predominantly national forest land, is not claimed as a franchise area by any cable company.

Comcast serves the northern half of Santa Barbara County, from just south of Solvang to the San Luis Obispo County line, with the exception of the Guadalupe area. Where it provides broadband service, it reports uniformly offering service at 150 Mbps download and 20 Mbps upload speeds, using DOCSIS 3.0 technology. Comcast's claimed broadband coverage varies from 100% of homes in Mission Hills and Vandenberg Village, to 86% in Los Olivos. It reports reaching 15% of homes in the Vandenberg Air Force Base census area, but that number shouldn't necessarily be regarded as problematic because of the unique nature of military housing.

In incorporated cities, Comcast's availability reports show broadband service to 90% of homes in Buellton, 92% in Lompoc, 97% in Solvang and 98% in Santa Maria. The gaps in Comcast's service area are likely due to incomplete build outs. As far as is known, the company does not have any systems in the region that are not fully digital. However, Comcast does have a practice of not fully building out its cable systems to marginal areas, or to commercial and industrial zones.

Figure 3.1 – Claimed cable franchise areas in Santa Barbara County. Blue is Comcast, Pink is Cox. The green in the northwest corner is Charter. See Appendix A for additional detail.

Cox's Santa Barbara County service area extends along the southern coast, from Gaviota to the Ventura County line. The company claims to provide broadband service to 100% of the homes in the incorporated cities of Carpenteria, Goleta and Santa Barbara, and the Isla Vista, Mission Canyon, Montecito, Summerland and Toro Canyon census designated places. Since these are all relatively compact, affluent communities, these claims are likely to prove to be largely true where residential areas are concerned. Further ground verification should be conducted before accepting these claims as completely true regarding industrial and commercial areas, however.

Like Comcast, Cox uniformly claims to provide service throughout its coverage area at 150 Mbps download and 20 Mbps upload speeds, using DOCSIS 3.0 technology. However, both Comcast's and Cox's service claims are based on "up to" caveats.

"Up to" is a term of art in the broadband industry that means, in effect, that the technology that's been deployed in an area is theoretically capable of supporting the indicated service level, but consumers should not expect to experience that maximum service level consistently, if at all.

The term is commonly used by all types of broadband service providers, but it should be particularly considered when evaluating cable company claims. Unlike telephone companies, which typically go to some trouble to report where their service varies from their standards, cable companies simply make blanket claims of maximum service levels. Factors such as variations in housing density and aggregate system bandwidth, for example, will result in consumers experiencing service levels below the claimed maximums. It should not be assumed that the uniform claims of universal, maximum service level availability are true.

Mobile broadband service

All four of the major mobile broadband carriers – AT&T, Sprint, T-Mobile and Verizon – report offering service in portions of Santa Barbara County. According to testing conducted by the California Public Utilities Commission, Sprint's service is generally limited to low speed connections – between 768 Kbps and 1.5 Mbps – in scattered locations along the U.S. 101 corridor, with some pockets of

service in the 3 Mbps range. T-Mobile's service is similarly slow but is available less widely along the U.S. 101 corridor.

AT&T has the most extensive coverage, generally with download speeds in the 3 Mbps range and with few dead spots along the U.S. 101 corridor. It provides higher speed service in the 6 Mbps range in Lompoc and Santa Maria. Verizon has generally uniform 3 Mbps availability in northern and western Santa Barbara County, but provides only slower speed service – in the 768 Kbps to 1.5 Mbps range – along the stretch of U.S. 101 between Goleta and the Ventura County line. More information is available in Appendix A.

Other retail Internet service providers

No wireless Internet service providers, or other independent consumer-grade ISPs have filed reports with either the CPUC or the Federal Communications Commission indicating that they provide service

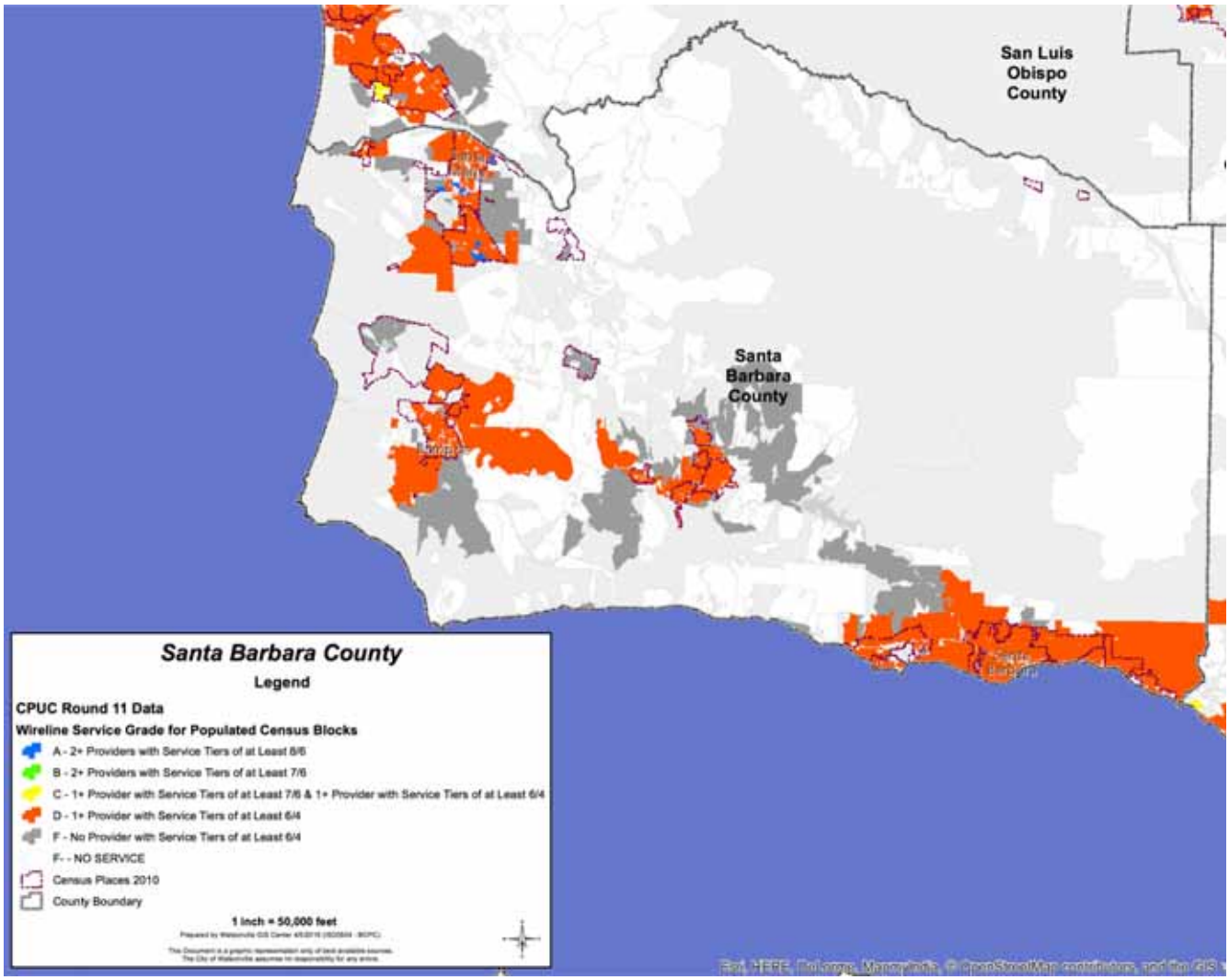


Figure 3.2 – Santa Barbara County broadband infrastructure grades, by census block. Red = D, Grey = F, White = F-. See Appendix B for tabular grades by community.

in Santa Barbara County. The City of Lompoc operates a low cost, municipal wireless Internet service utility that is available in most of the city.

3.3. Report card

Using a grading method developed by the East Bay and Central Coast broadband consortia, and adopted by broadband consortia in other regions, by the California Emerging Technology Fund and by many local agencies, the primary wireline infrastructure in Santa Barbara County was assessed on a five point A to F scale. A full table of grades and grade point averages for cities and census designated places, as well as a full explanation of the methodology used, may be found in Appendix B.

Overall, Santa Barbara County received a "D-" grade, which indicates that its primary broadband infrastructure falls below the average for California and sometimes fails to meet even the CPUC's basic minimum standard of 6 Mbps download and 1.5 Mbps upload speeds. The average Californian household – i.e., a "C" – has access to broadband infrastructure that supports at least one provider offering a minimum of 10 Mbps download and 6 Mbps upload speeds and at least one other provider offering the CPUC's minimum service level. Census blocks that have no wireline service that meets the CPUC's minimum rate an "F", and blocks that meet that minimum but fall below the California average are given a "D". Census blocks in a given area – city, county, CDP – are averaged for a composite grade.

As a practical matter, census blocks where cable modem service is available receive a "D" and blocks where it isn't receive an "F", because Verizon's infrastructure in Santa Barbara County is not capable of supporting service that meets the CPUC's minimum standard. The exceptions are census blocks in Santa Maria and Orcutt, where Verizon offers fiber to the home service. These census blocks received an "A" grade.

3.4. Commercial and industrial availability

Businesses have a much wider range of broadband needs than residences. Some small businesses are able to get by with slow, consumer-grade connections, while others need direct, high capacity connections to central Internet facilities. In order to assess the level of broadband infrastructure that is available to businesses, or prospective businesses, in the region, a five-star rating system was developed. The rating is a combination of primary wireline infrastructure grade and an assessment of fiber optic facilities, both the fiber itself and the service level supported by its network connections and attached electronics.

Copper-based service offered by specialised, business-focused companies was also evaluated. No advanced copper-based technology has been deployed in Santa Barbara County, so it didn't factor into the overall rating.

One factor that does have an impact in Santa Barbara County is the excellent long distance fiber connections that are available. Several major north-south fiber routes pass through the city, generally along the U.S. 101 corridor, and connect to major Internet exchanges in Los Angeles and Silicon

Valley. In addition, the City of Santa Barbara and the surrounding area has an excellent metropolitan fiber network. Maps of these routes are in Appendix A.

Of the three business-focused, secondary providers in Santa Barbara County, two – Level 3 and TW Telecom – offer fiber to the premise service, primarily in the City of Santa Barbara and Goleta, and regularly report this information to the California Public Utilities Commission via a standard format. Verizon has deployed primary fiber to the premise infrastructure in Santa Maria, Guadalupe and Orcutt.

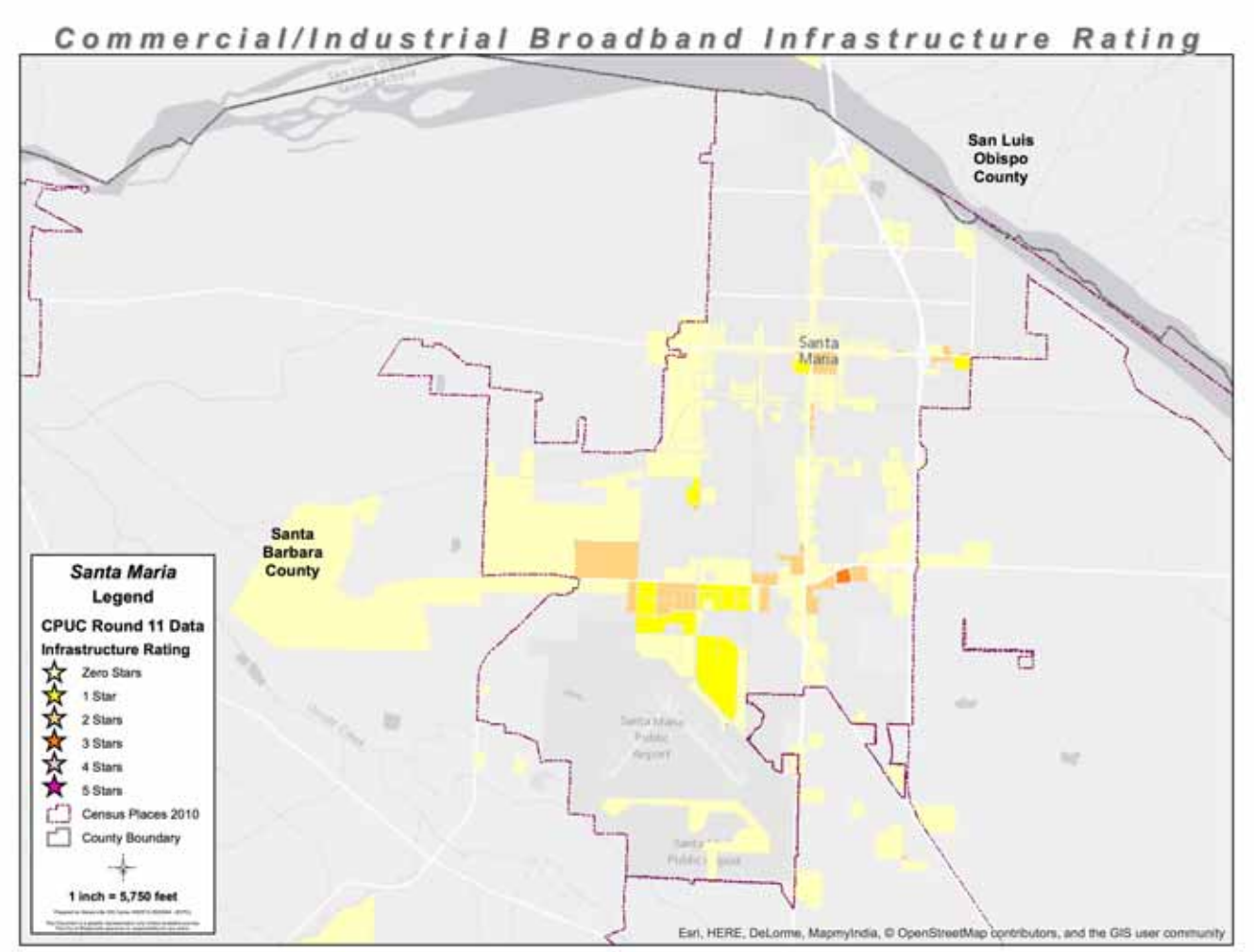


Figure 3.3 – Commercial/industrial broadband infrastructure Star Ratings for commercial and industrial zones in the City of Santa Maria.

Three cities – Carpenteria, Lompoc and Santa Maria – provided zoning data for the analysis, as did Santa Barbara County for unincorporated areas. Census block ratings ranged from No Stars, which indicates that there is no fiber to the premise infrastructure available and the primary copper infrastructure cannot support average service levels for residential and small business customers, to 3 Stars, which indicates that average commercial grade service is available from primary providers and/or significant fiber-based infrastructure is present.

Aggregate ratings were all No Stars, but the low average disguises several areas of excellence, including 3-Star locations in Carpenteria, Lompoc and Santa Maria, and a significant number of locations in Santa Maria that rated 1 Star or 2 Stars.

A full explanation of the method used to calculate Star Ratings for commercial and industrial areas is in Appendix C, and maps of the results are in Appendix A.

4. Ventura County

4.1. Summary

Primary broadband infrastructure in Ventura County is generally at or above the statewide average. Verizon has deployed high speed fiber to the premise infrastructure to approximately 70% of its service area, and AT&T has upgraded about half of its territory to the point that it at least meets the CPUC's minimum standard of 6 Mbps download and 1.5 Mbps upload speeds.

Where Verizon offers fiber-based service, it well exceeds the FCC's standard of 25 Mbps download and 3 Mbps upload speeds. AT&T's improvements to its copper-based network has brought about a tenth of its territory up to the FCC's standard as well. However, none of Verizon's copper-based infrastructure meets the CPUC's minimum standard.

Table 4.1 - Broadband infrastructure grades

County	Grade	GPA
Ventura	C	2.1

Table 4.2 - Top commercial/industrial broadband infrastructure cities

		Star Rating
#1	Camarillo	1.5
#2	Thousand Oaks	1.5
#3	Port Hueneme	1.0

Time Warner is the largest cable company in Ventura. Its recent infrastructure upgrades significantly improved the speeds it reports providing throughout its service area, and significantly exceeds the FCC's standard. Charter Communications is the next largest, and its reported service level generally meets the FCC's benchmark.

Together, these primary providers claim to offer broadband service to all but a tiny faction (5/100ths of one percent) of the homes in Ventura County. The telephone companies claim to deliver broadband to 95% of the homes, while cable companies claim 99% availability. As explained below, it's likely that the cable companies' actual coverage is closer to that of the telephone companies, but even so, the overwhelming majority of Ventura County residents have access to at least one and usually two primary broadband service providers.

The average home in California is served by two broadband companies: a telephone company with infrastructure that is capable of supporting service that at least meets the CPUC's standard and a cable company with infrastructure that supports service comparable to that reported by most of the cable companies found in the three county region. Overall, the broadband infrastructure present in Ventura receives a "C" grade, as described in Appendix B.

Secondary broadband infrastructure also rates highly. Three companies provide specialised wireline service to businesses in the county, and major regional and national fiber cable routes pass through it. Commercial and industrial-grade broadband infrastructure was evaluated for cities and unincorporated areas of Ventura County, thanks to the county's practice of maintaining a central database of zoning information. On the whole, aggregate ratings for commercial and industrial broadband infrastructure were higher in Ventura County than the other two counties in the region, due to the extensive fiber optic infrastructure installed by Verizon and specialised fiber companies, and the generally good

condition of copper-based primary infrastructure. All the cities in Ventura County show a healthy mix of different levels of commercial and industrial broadband infrastructure, and most rate between one half and one and a half Stars.

Table 4.3 - Ventura County basic broadband availability

Percentage where at least 1 provider is present			
Census blocks	**Housing units**	**Population**	**Area (sq mi)**
95%	99.95%	99.96%	88%

Broadband availability claimed by primary wireline providers						
AT&T	**Verizon**	**Charter**	**Cox**	**Time Warner**	**Telco**	**Cable**
42%	53%	7%	0%	92%	95%	99%

Four mobile broadband companies – AT&T, Sprint, T-Mobile and Verizon – serve Ventura County with many areas meeting the CPUC's minimum standard. No fixed wireless companies currently report providing service in the county, but in the past two have – Frazier Mountain in the northeastern corner of Ventura County and Skyriver in the Ventura/Oxnard area. Both companies appear to still be in business.

4.2. Service providers

Telephone companies

Ventura County telephone service is split between AT&T and Verizon. AT&T serves the western and eastern thirds of the county, including the City of Ventura, Ojai, Fillmore, Moorpark and Simi Valley. Verizon occupies the central third of the county, including the cities of Oxnard, Camarillo, Santa Paula and Thousand Oaks.

Figure 4.1 – AT&T's service area is blue, Verizon's is green.

It appears that AT&T is using three types of DSL technology to provide service in Ventura County: legacy DSL, interim ADSL2 and modern VDSL technology. Since AT&T does not report the type of DSL it provisions, inferences have to be made on the basis of service speeds. There are overlaps in speed ranges – for example, excellent legacy DSL can provide service that's similar to that of low quality ADSL2 – so there's some guess work involved in determining which technology is used where.

That said, it appears that AT&T is using ADSL2 technology, which requires relatively few upgrades to its wireline network, in most of Fillmore, with a few pockets of legacy-grade service.

Moorpark, Ojai, Simi Valley and the City of Ventura have reported speeds that indicate that all three types of technology are present, with mid level ADSL2 technology predominating. The City of Ventura, however, has a significant number of areas, representing 51% of census blocks, where only low quality legacy infrastructure, offering 768 Kbps to 3 Mbps download and 384 Kbps to 512 Kbps upload speeds are available.

Table 4.4 - Ventura County broadband speeds

Cable download speeds - claimed throughout service area

Charter Communications	100 Mbps
Cox Communications	150 Mbps
Time Warner Cable	300 Mbps

Telco download speeds by census block

	768 Kbps	1 Mbps	1.5 Mbps	3 Mbps	5 to 7 Mbps	10 Mbps	12 Mbps	15 Mbps	18 Mbps	24 Mbps	45 Mbps	100 Mbps
AT&T	85		634	242	93		1,171		1,084	113	156	
Verizon		106	427	458	1,029	251		780				3,131

Cable upload speeds - claimed throughout service area

Charter Communications	5 Mbps
Cox Communications	20 Mbps
Time Warner Cable	20 Mbps

Telco upload speeds by census block

	384 Kbps	512 Kbps	768 Kbps	1 Mbps	1.5 Mbps	3 Mbps	6 Mbps	100 Mbps
AT&T	719	242	800		1,548	113	156	
Verizon	533		1,487	1,031				3,131

Ojai and Moorpark appear to have the highest proportion of census blocks where AT&T has upgraded its wireline network and associated electronics to support its top of the line VDSL-based service – 18% and 12% respectively. On the other hand, Moorpark has the lowest overall telephone company broadband service level of any incorporated city in Ventura County, with only 90% of homes able to buy DSL service from AT&T. Ojai has 98%, City of Ventura has 97%, Simi Valley have 95% and Fillmore 93% broadband coverage from AT&T.

It should be noted that areas with newer residential developments tend to have better service, because the networks are newer and likelier to conform to current standards. That tendency likely also explains the 13 census blocks in the City of Ventura and the 2 blocks in Simi Valley where AT&T reports

offering service via fiber to the premise infrastructure. Recently built developments are increasingly likely to have fiber infrastructure throughout. However, unlike Verizon, AT&T has not developed the necessary infrastructure and business processes to support residential fiber systems, so advertised download speeds are in the 18 Mbps to 24 Mbps range and upload speeds vary from 1.5 Mbps to 3 Mbps, consistent with ADSL2 or VDSL-based service.

In unincorporated areas, the Oak Park and Santa Susana census designated places appear to have upgraded VDSL-based service in 22% and 35% of census blocks, respectively. For the most part, however, slow legacy DSL infrastructure is the most common type of AT&T infrastructure outside of the immediate vicinity of incorporated cities.

Overall, Verizon offers broadband service to 99% of homes in its territory in Camarillo, 95% in Oxnard, 94% in Port Hueneme and 94% in Santa Paula. In Thousand Oaks, it offers broadband service to 94% of homes, however AT&T covers an additional 5%, for a total of 99% coverage. Additional information about broadband coverage, including in unincorporated areas, is in Appendix E.

Verizon has invested heavily in fiber to the premise upgrades in Ventura County. It also provides service via legacy DSL and interim ADSL technology, and some of these technologies overlap. It offers both fiber and DSL-based service of some kind to approximately 40% of the homes in census blocks where it advertises broadband availability in Ventura County. The remaining 60% of homes are split evenly between fiber-only and DSL-only service.

In other words, as many as 70% of the homes within Ventura County where Verizon offers broadband service (i.e., not including homes where only telephone service is available) have access to fiber-to-the-premise service offered under the FiOS brand. The number is approximate because reports are only granular down to the census block level, and it is possible that homes in a census block might be split between fiber and DSL service, rather than served by both.

Where Verizon reports having fiber to the home service, it uniformly claims to provide symmetrical 100 Mbps download and upload speeds. Fiber technology is able to support this performance level, but the consistency of customer experiences with FiOS service will depend on both network configuration and the amount of wholesale bandwidth Verizon provides to the network.

Overall, 45% of Verizon's copper-based DSL systems appear to be using interim ADSL2 and 55% legacy DSL technology. It does not deploy VDSL technology to any meaningful degree, because it has chosen instead to upgrade with fiber to the home infrastructure.

Cable companies

Four cable companies are present to one degree or another in Ventura County. Time Warner is the dominant cable company by far, though. Charter Communications is limited to about two-thirds of the City of Ventura, with Time Warner accounting for the balance of the city.

Cox Communications has a tiny service area on the border with Santa Barbara County, which is an insignificant extension of its system there. See the Santa Barbara County section above for more

information. Bright House Networks has, at times, claimed northwestern Ventura County as part of its video franchise area, but it has never built any systems there, video or broadband. Time Warner serves the southern half of Ventura County, except for the small Charter and Cox areas in the southwest.

Charter reports offering 100 Mbps download and 5 Mbps upload speeds in its portion of the City of Ventura and surrounding unincorporated areas. Since it is a relatively isolated system, its characteristics are presumed to be similar to Charter's San Luis Obispo County systems. More information may be found in the San Luis Obispo County section above.

In the most recent round of CPUC-published data, Time Warner reported a significant upgrade to its service levels in Ventura County. Previously, it reported offering download speeds at 50 Mbps or better, but below 100 Mbps. Its reported upload speed range was between 3 Mbps and 6 Mbps. In this latest version, however, it claims to offer 300 Mbps download speeds and 20 Mbps upload speeds uniformly throughout its Ventura County service area.

Figure 4.2 – Claimed cable franchise areas in Ventura County. Yellow is Time Warner, Green is Charter, Pink is Cox, Brown is Bright House. See Appendix A for additional detail.

Since the two sets of reports were filed only six months apart (as of 30 June 2014 and 31 December 2014), the change is almost certainly not due to construction work performed in that period. Such an upgrade would require more time. The change is likely due to a combination of factors, partly related to upgrades to the existing infrastructure, partly to improvements in core Internet connectivity and partly to marketing decisions.

As a consequence, Time Warner's claim of universal availability of 300 Mbps download speeds should be treated with some degree of skepticism. On the one hand, given the competition it faces from Verizon's FiOS product, which offers comparable or better video, broadband and telephone service, it's very likely Time Warner has made significant physical improvements to its Ventura County infrastructure. On the other hand, given the common cable industry practice of making uniform, marketing-driven service level claims, regardless of facts on the ground, it would be prudent to treat these reported improvements as a work in progress.

Similarly, Time Warner claims to provide broadband service – at its uniform reported speeds – to nearly every census block in its service area, which is all of the developed area of southern Ventura County, except for the small Charter and Cox franchises in the southwest. The City of Ventura aside, Time Warner claims 100% broadband availability in every incorporated city in Ventura County and all census designated places, except for Lake Sherwood and Santa Rosa Valley, where it reports 9% and 97% availability, respectively.

As with its service level claims, Time Warner's service availability claims should be viewed with skepticism. Experience has shown that such broad reaching marketing claims turn out to be less than truthful when consumers who live in marginal areas or businesses in purely commercial or industrial districts attempt to purchase service. Nevertheless, it is likely that Time Warner has built out extensively in its Ventura County territory and unserved homes and businesses account for a relatively tiny percentage of the total.

Mobile broadband service

All four of the major mobile broadband carriers – AT&T, Sprint, T-Mobile and Verizon – report offering service in portions of Ventura County. According to testing conducted by the California Public Utilities Commission, mobile broadband service in Ventura County is significantly faster and more widely available than in Santa Barbara or San Luis Obispo counties, although each carrier has weak spots.

AT&T's service is available throughout the southern half of Ventura County, except for the southeast corner. Download speeds are generally in the 3 Mbps range or lower, except in parts of Ventura, Oxnard and Santa Paula, where expected speeds are in the 6 Mbps range. T-Mobile's coverage is similar, with its fastest service (also in the 6 Mbps range) in the Moorpark/Thousand Oaks area.

Sprint provides limited mobile broadband service in Ventura County. It has pockets of service with generally 3 Mbps download speeds or slower, with a small area in Oxnard where 6 Mbps might be available. It serves the city of Ventura, Oxnard and Thousands Oaks, and is largely unavailable elsewhere.

Verizon appears to have the best mobile broadband coverage in Ventura County, judging from the CPUC's data. A few dead spots in hilly areas aside, it covers all of southern Ventura County, including parklands, and much of the northern half. It supports 6 Mbps download speeds along a wide swath that follows State Route 126 and includes the City of Ventura, Oxnard, Santa Paula and Fillmore. In the balance of its southern Ventura County service area, Verizon generally provides speeds in the 3 Mbps range.

More information is available in Appendix A.

Other retail Internet service providers

No wireless Internet service providers are currently reporting service levels to either the CPUC or the FCC. In the previous round of reporting, however, two companies filed service reports and both still appear to be operating. Frazier Mountain Internet Service provides consumer grade service in the northeastern corner of Ventura County, offering download speeds well under the CPUC's minimum standard of 6 Mbps. Skyriver is a business-focused ISP, with an operational area that includes the City of Ventura, Oxnard, Santa Paula and Thousand Oaks. It has reported download speeds that meet the CPUC's 6 Mbps standard and, as business oriented ISPs usually do, advertises that it can provide custom services that reach much higher speeds. Such claims are likely true in theory – if a customer is

willing to pay the price, pretty much anything is possible – but are usually highly dependent on location, network congestion (including radio spectrum limitations) and other factors.

4.3. Report card

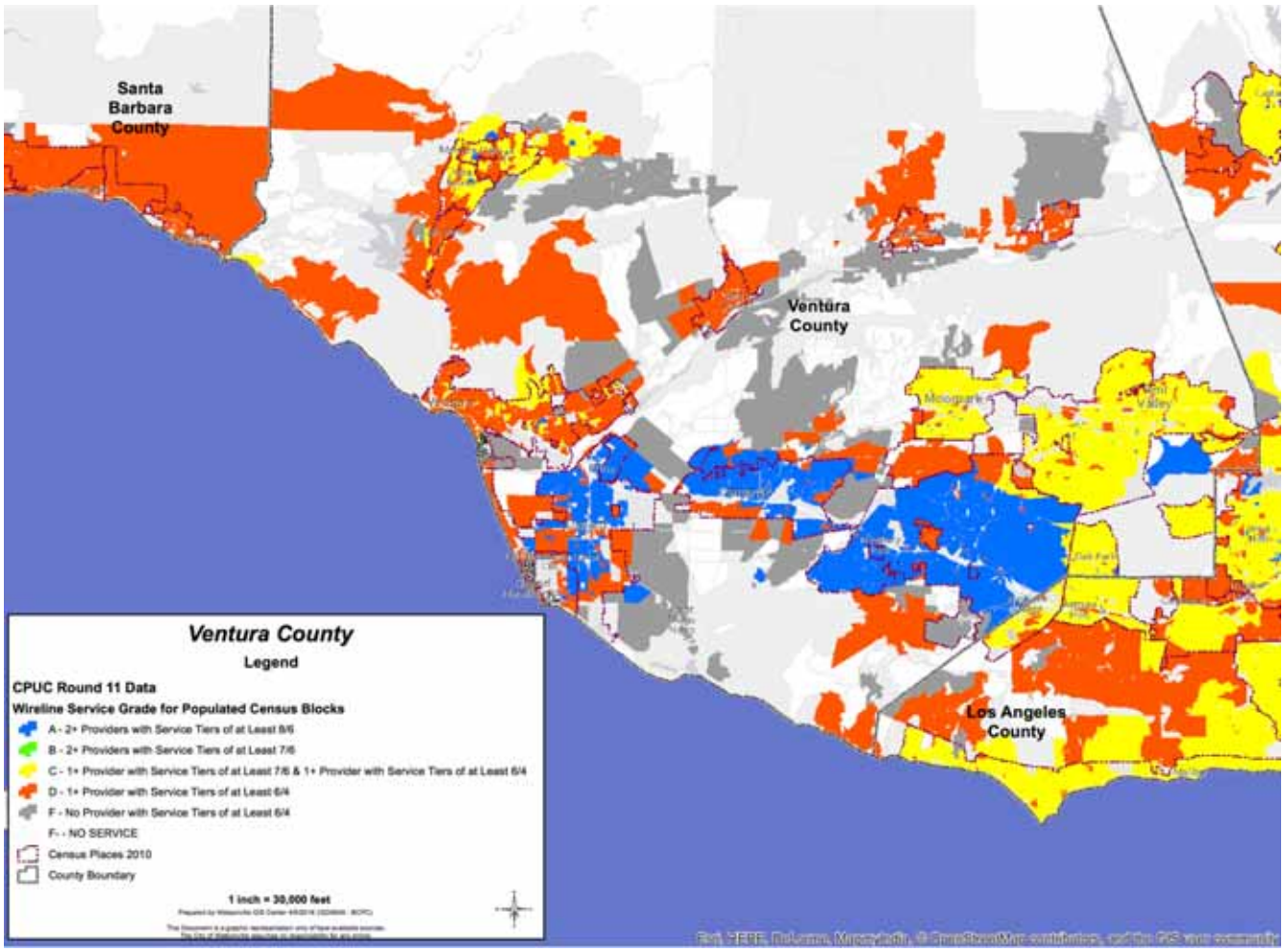


Figure 4.3 – Ventura County broadband infrastructure grades, by census block. Red = D, Grey = F, White = F-. See Appendix B for tabular grades by community.

Using a grading method developed by the East Bay and Central Coast broadband consortia, and adopted by broadband consortia in other regions, by the California Emerging Technology Fund and by many local agencies, the primary wireline infrastructure in Ventura County was assessed on a five point A to F scale. A full table of grades and grade point averages for cities and census designated places, as well as a full explanation of the methodology used, may be found in Appendix B.

Overall, Ventura County received a "C" grade with a 2.1 average, which indicates that its primary broadband infrastructure is generally consistent with California's average broadband infrastructure and is occasionally superior. The average Californian household – i.e., a "C" – has access to broadband infrastructure that supports at least one provider offering a minimum of 10 Mbps download and 6 Mbps

upload speeds and at least one other provider offering the CPUC's minimum service level. Census blocks in a given area – city, county, CDP – are averaged for a composite grade.

As a general rule, census blocks where Verizon offers its high speed, fiber-based FiOS-brand service received an "A" grade, since high speed cable modem service was also usually available. Areas where Verizon only offers copper-based DSL service received a "D", if cable modem service was available, or an "F", where it wasn't. Verizon's copper network in Ventura County is not capable of supporting CPUC-minimum service levels. In AT&T's service territories, there was a roughly 50/50 split between "C" and "D" grades – cable modem service is widely available and about half of AT&T's infrastructure can support the CPUC's minimum level of service. Relatively few census blocks in Ventura County received an "F" grade.

4.4. Commercial and industrial availability

Businesses have a much wider range of broadband needs than residences. Some small businesses are able to get by with slow, consumer-grade connections, while others need direct, high capacity connections to central Internet facilities. In order to assess the level of broadband infrastructure that is available to businesses, or prospective businesses, in the region, a five-star rating system was developed. The rating is a combination of primary wireline infrastructure grade and an assessment of fiber optic facilities, both the fiber itself and the service level supported by its network connections and attached electronics.

Copper-based service offered by specialised, business-focused companies was also evaluated. No advanced copper-based technology has been deployed in Ventura County, so it didn't factor into the overall rating.

One factor that does have an impact in Ventura County is the excellent long distance fiber connections that are available. Several major north-south fiber routes pass through the city, generally along the U.S. 101 corridor, and connect to major Internet exchanges in Los Angeles and Silicon Valley. In addition, metropolitan fiber networks that connect to the Los Angeles area provide additional, competitive connectivity. Maps of these routes are in Appendix A.

All three of the business-focused, secondary providers in Ventura County – CyberNet, Level 3 and TW Telecom – offer fiber to the premise service, in a number of scattered locations through the county, and regularly report this information to the California Public Utilities Commission via a standard format. Verizon has deployed primary fiber to premise infrastructure extensively throughout its Ventura County service area, and AT&T has installed similar facilities in a relative handful of census blocks, primarily in the City of Ventura.

The County of Ventura maintains a central zoning database and provided zoning data for all cities as well as unincorporated areas. Census block ratings ranged from No Stars, which indicates that there is no fiber to the premise infrastructure available and the primary copper infrastructure cannot support average service levels for residential and small business customers, to 4 Stars, which indicates that average commercial grade service is available from primary providers and significant fiber-based infrastructure that serves high and mid-level needs is present.

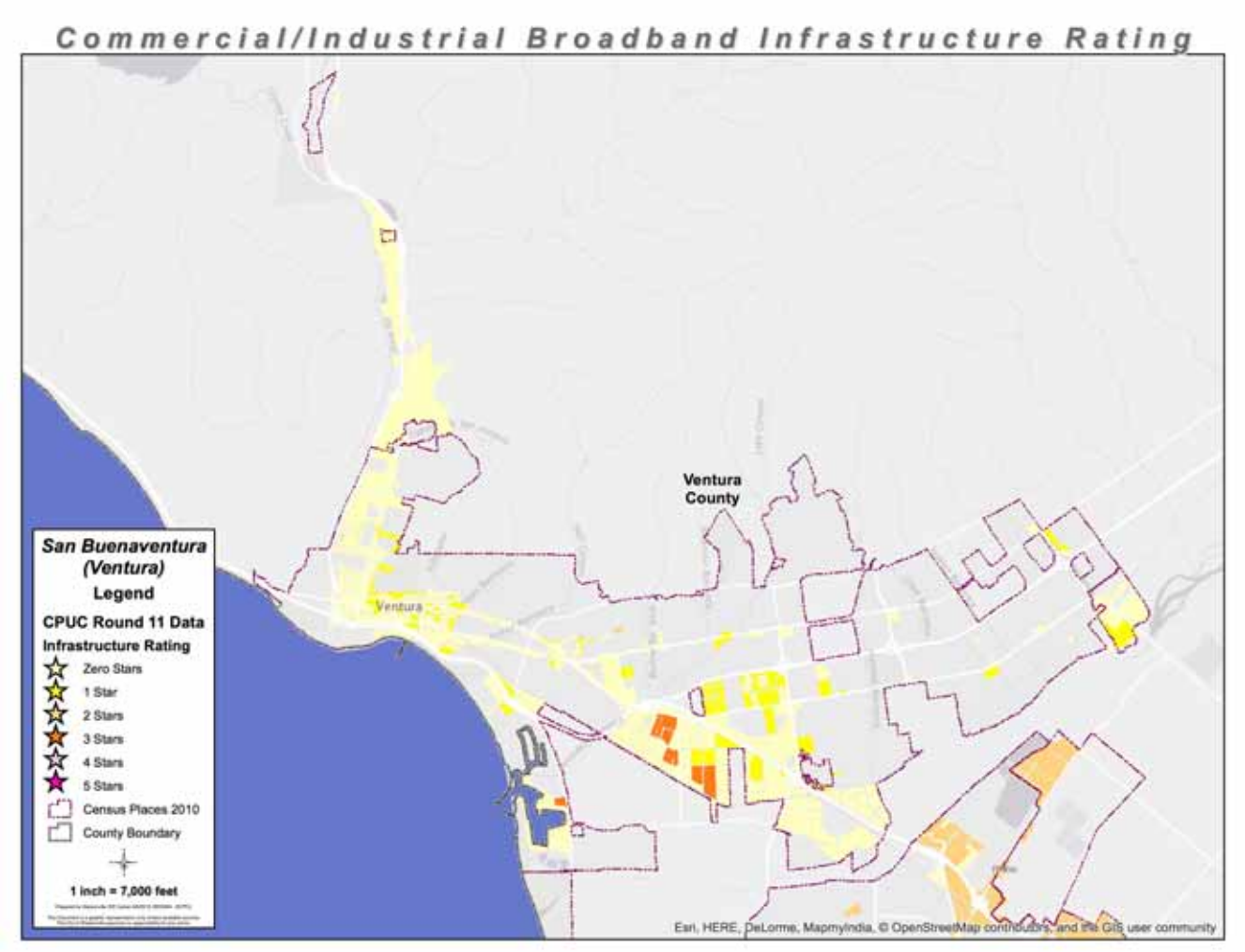


Figure 4.4 – Commercial/industrial broadband infrastructure Star Ratings for commercial and industrial zones in the City of Ventura.

Aggregate ratings for cities ranged from No Stars in the City of Ventura to half Stars in Moorpark, Ojai and Simi Valley, to one Star in Oxnard and Port Hueneme, to one and a half Stars in Camarillo and Thousand Oaks. Higher aggregate ratings correlate to the widespread presence of Verizon's FiOS fiber to the premise infrastructure. Areas served by AT&T did not tend to do as well.

There were several focused areas of excellence, including 3-Star and 4-Star locations in Camarillo, Moorpark, Oxnard, City of Ventura, Simi Valley and Thousand Oaks. The Casa Conejo community was rated 2-Star, in aggregate.

A full explanation of the method used to calculate Star Ratings for commercial and industrial areas is in Appendix C, and maps of the results are in Appendix A.

5. Funding analysis

There are four primary sources of grant funding for commercial broadband infrastructure in the four counties, one from the State of California and three from the federal government.

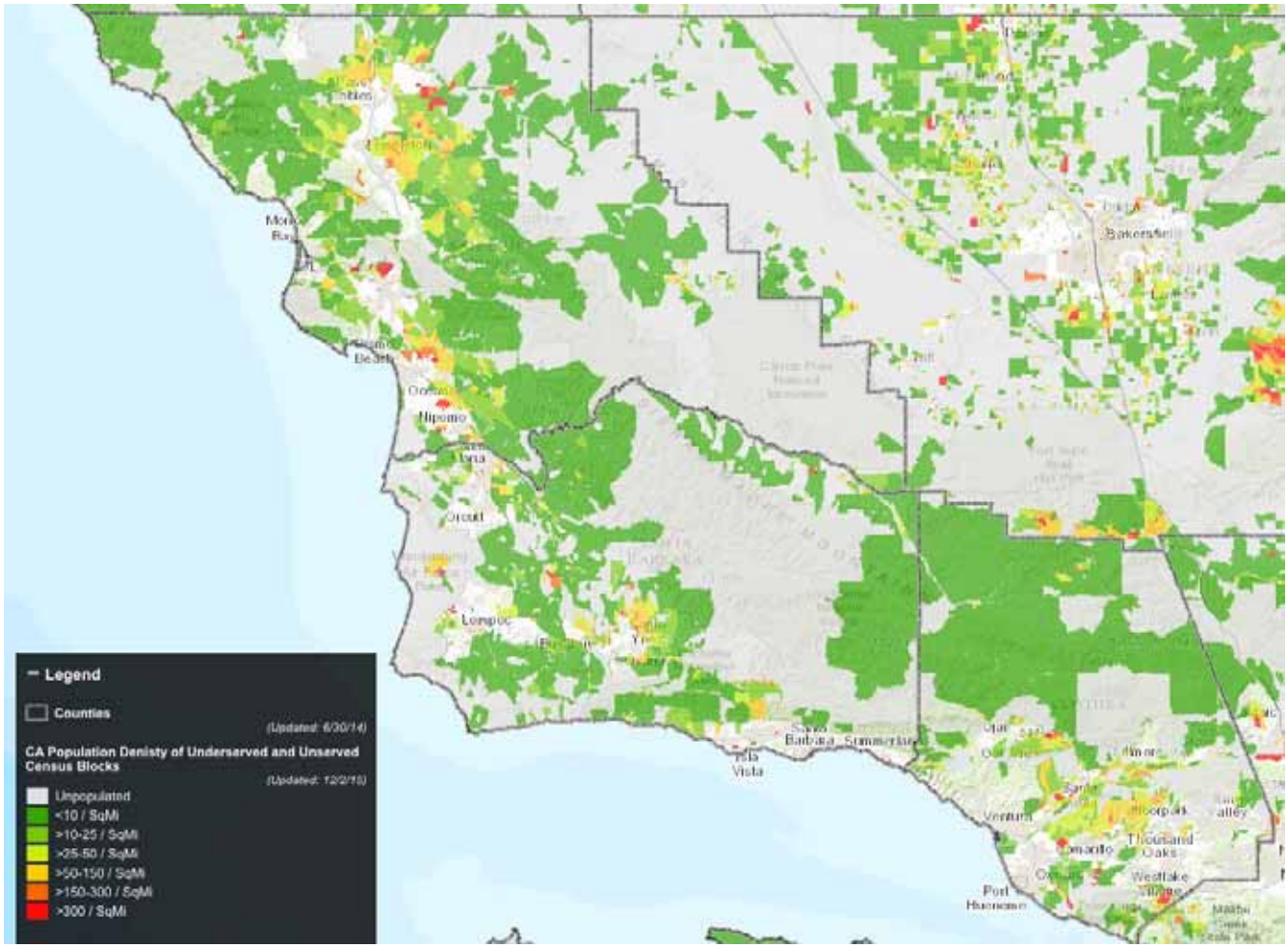


Figure 5.1 – "Heat map" of areas eligible for broadband construction subsidies from the California Advanced Services Fund. Colors indicate populated areas that are eligible; red indicates densely populated area, green indicates lightly populated areas.

5.1. California Advanced Services Fund

The State of California has established the California Advanced Services Fund (CASF) to build broadband infrastructure in areas where service that meets the CPUC's minimum standard of 6 Mbps download and 1.5 Mbps upload speeds is not available. Typically, CASF will subsidise 60% of construction costs in areas where substandard service is available and 70% in areas where broadband service is not available at all. An additional 20% of constructions costs, up to a total of $500,000, can be covered via loans from CASF.

An analysis of broadband availability reports submitted by service providers to the CPUC and census data indicates that relatively few homes in the region are in areas that are eligible for CASF funding, based on an analysis of wireline service availability. However, when deciding whether or not to approve CASF grants, the CPUC also takes mobile and fixed wireless service availability into account. As mentioned above, most of the mobile broadband service that's available in the three counties does not meet the CPUC's minimum standard, and is not likely to be an obstacle. Fixed wireless Internet service is spotty, but there are locations – particularly in areas not well served by wireline providers – where challenges from fixed wireless operators might be problematic.

Table 5.1: Eligibility for California Advanced Services Fund Subsidies

	Population	Housing units	Anchor institutions	Eligible population	Eligible housing units
San Luis Obispo	32,002	11,220	25	12%	10%
Santa Barbara	21,810	8,166	35	5%	5%
Ventura	16,251	5,652	42	2%	2%

San Luis Obispo County has the greatest number of eligible homes, with 10% of the county's homes located in areas that are likely to be eligible for CASF broadband construction subsidies. As figure 5.1 illustrates, there are several areas within San Luis Obispo County where high population densities (by rural standards) and CASF-eligibility coincide. These areas are illustrated in Appendix A and assessed in greater detail in Appendix D. CASF-eligible areas in Santa Barbara and Ventura counties are also evaluated, however the opportunities there are more limited. CASF funding should be considered anytime broadband development needs are evaluated, but the eligible areas in Santa Barbara County and, particularly, Ventura County are considerably less likely to present opportunities based on those criteria alone.

5.2. Connect America Fund

Table 5.2: Unserved premises eligible for CAF-2 funding

	AT&T	Verizon	Total	Approximate percentage of county homes eligible for CAF-2 funding
San Luis Obispo County	5,440	653	6,093	6%
Santa Barbara County		1,249	1,249	1%
Ventura County	933	609	1,542	1%
	6,373	2,511	8,884	2%

The Federal Communications Commission gives operating subsidies to telephone companies that provide broadband service in rural and/or remote areas, as a part of its universal service mandate. In the current round – Phase 2 – of the Connect America Fund (CAF) program, the FCC offered large telephone companies a right of first refusal to accept these funds or not, on a state by state basis. AT&T

and Verizon have accepted CAF subsidies in California, including San Luis Obispo, Santa Barbara and Ventura counties. CAF phase 2 subsidies granted in the region total $39 million.

Because the CAF program gives incumbent telephone companies a right of first refusal on funds, no other ISPs or small telephone companies are eligible for support in the three counties. In exchange for the money, AT&T and Verizon have promised to upgrade all eligible premises to a minimum of 10 Mbps download and 1 Mbps upload speeds. This service level does not meet the CPUC's 1.5 Mbps upload standard, so in theory these areas remain eligible for CASF subsidies, however applications targeting them will be problematic due to concerns about competition and conflicts with federal grant programs. A list of eligible census blocks has been provided in a separate file.

Table 5.3: CAF-2 funding granted

	AT&T	Verizon	Total
San Luis Obispo County	$17,305,894	$1,845,146	$19,151,040
Santa Barbara County		$9,806,777	$9,806,777
Ventura County	$5,155,477	$4,990,576	$10,146,053
	$22,461,371	$16,642,499	$39,103,870

The FCC closed its application window in 2014 for its rural broadband experiments program, also funded through CAF. Initially, three projects in California – two in Monterey County and one in the San Joaquin Valley – were provisionally funded, but all three failed to meet program requirements and were dropped from consideration. In at least two cases, the applicants were unable to obtain the particular kind of technical and financial expertise required by the FCC and other federal agencies.

5.3. Rural Utilities Service

The U.S. Department of Agriculture runs several broadband-related grant and loan programs via the Rural Utilities Service (RUS). These programs include Community Connect Grants, loans and loan guarantees and a series of gigabit community pilot projects. The loan programs are available on a year-round basis, while application windows are periodically announced for the grant programs. None are currently open.

In the past, service providers in California have had difficulty qualifying for and/or winning RUS funding. The programs have been designed with midwestern and southern business models and demographics in mind, which are markedly different from conditions in California.

5.4. Economic Development Administration

Jurisdictions that are eligible for grants from the federal Economic Development Administration (EDA) may apply for grants, typically 50% of construction costs, to build certain types of broadband infrastructure. The first such grant was received by the City of San Leandro to build underground telecommunications conduit, which it then made available to a private telecommunications company.

Planning grants are also available. The EDA has recently put a higher priority on broadband infrastructure, and is accepting proposals for such grants within its regular application cycle.

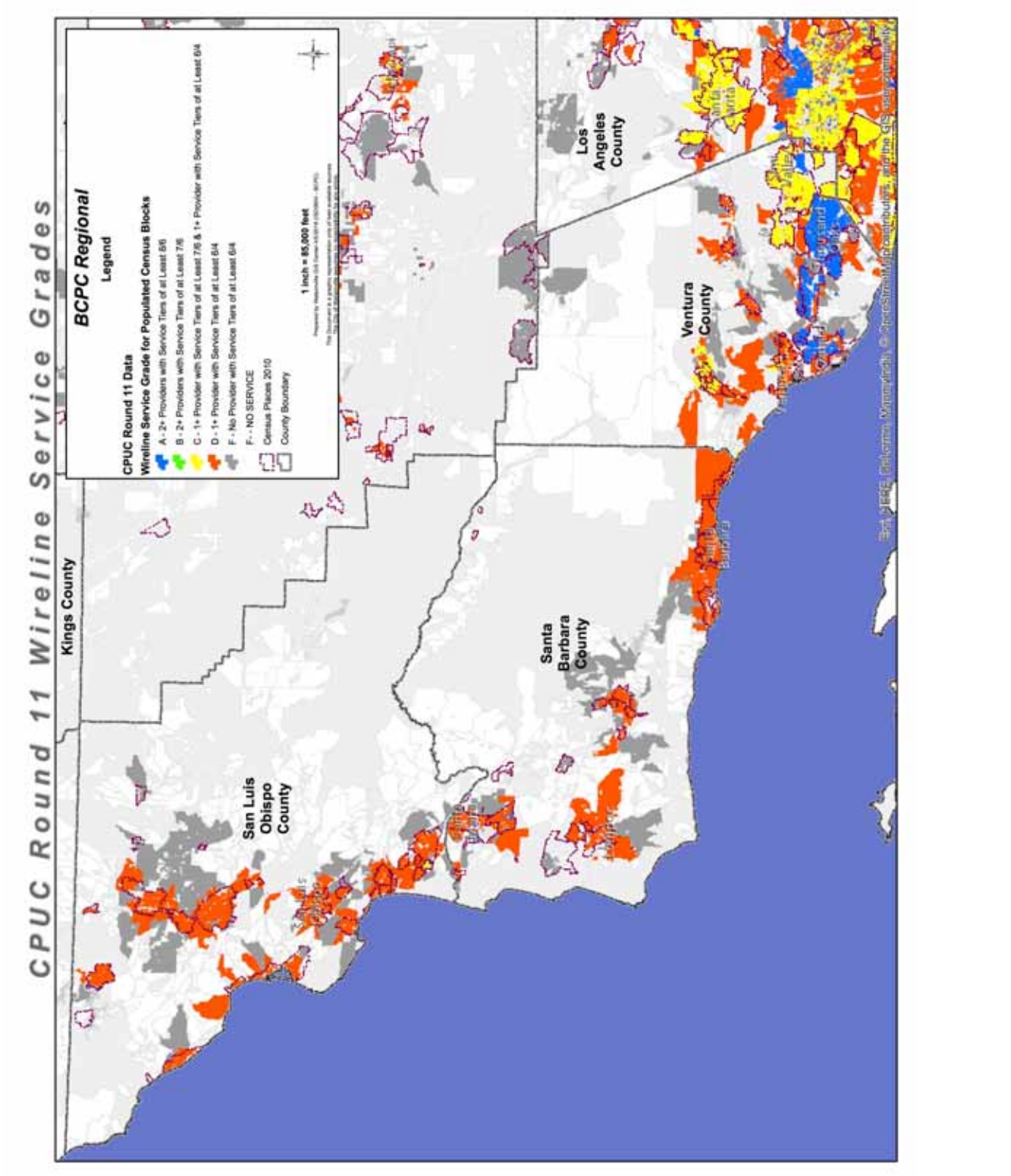
5.5. Other funding sources

Both the State of California and the federal government operate programs that provide funding to various types of agencies – for example police and fire departments, sheriffs' offices, hospitals, health care providers and schools – for the purpose of purchasing broadband and other telecommunications services and facilities. Typically, this money is not directly available for construction of commercially available broadband infrastructure but can used to support business plans on an ongoing basis.

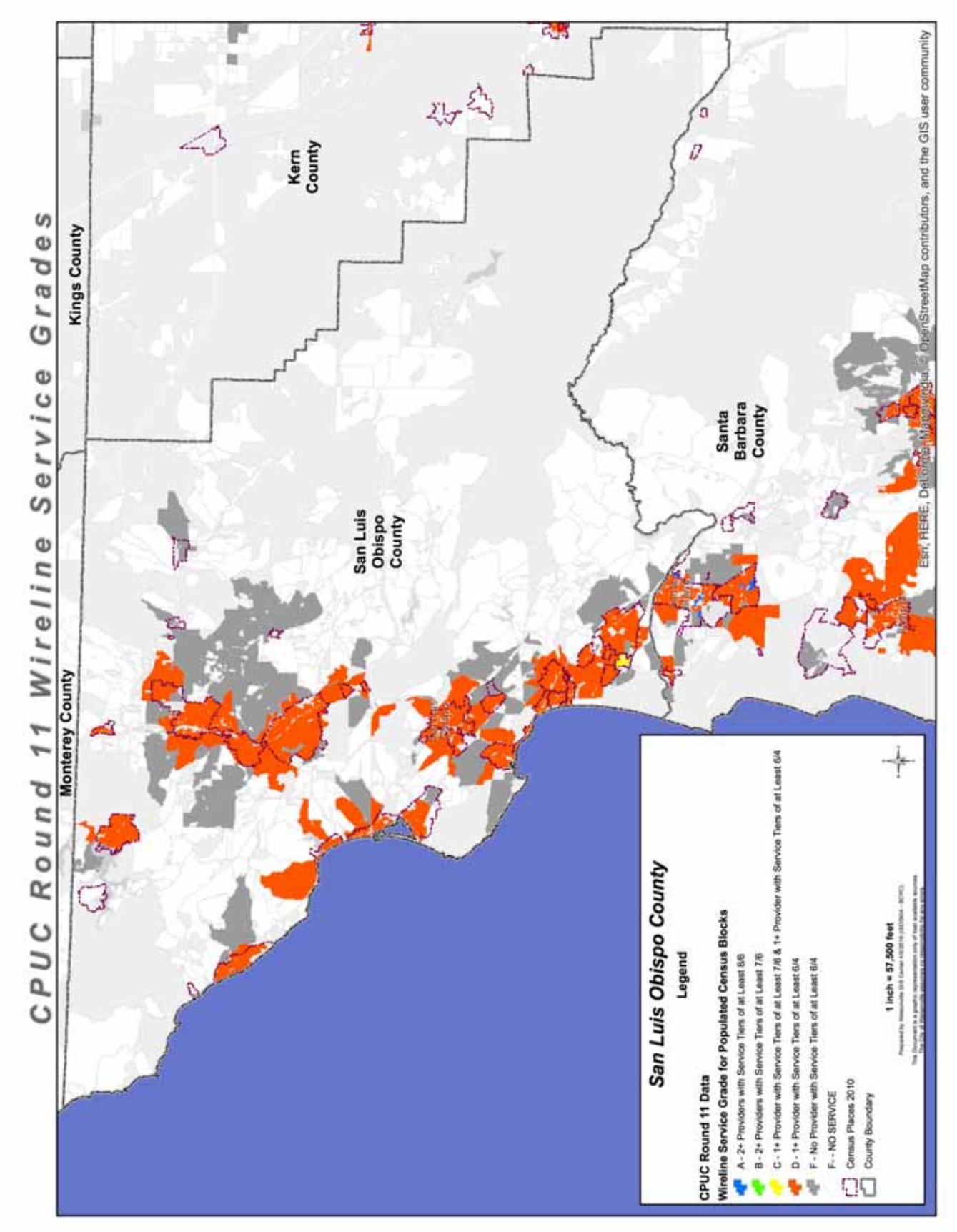
Appendix A - Maps

1. Infrastructure grades

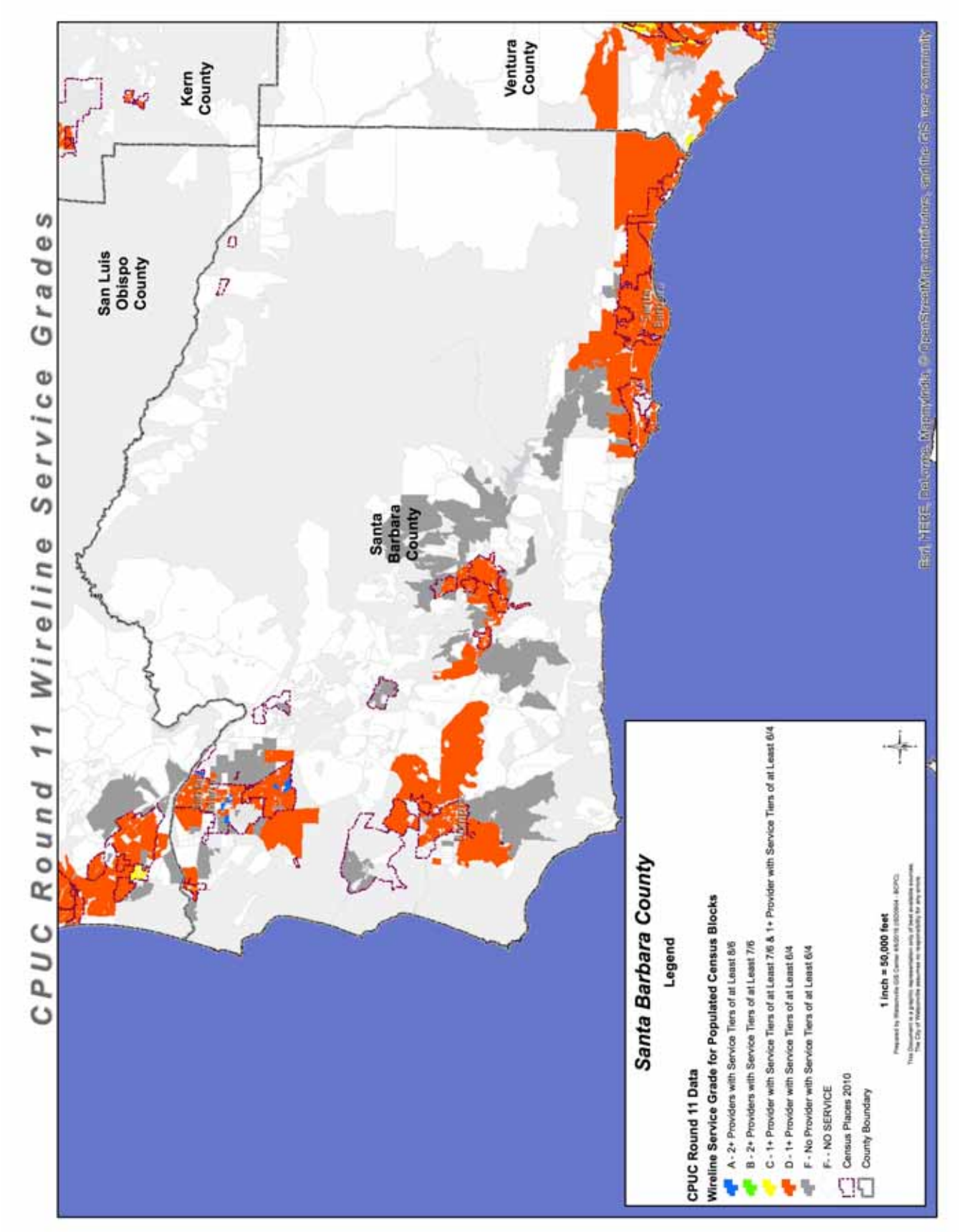
BCPC Region



San Luis Obispo County



Santa Barbara County



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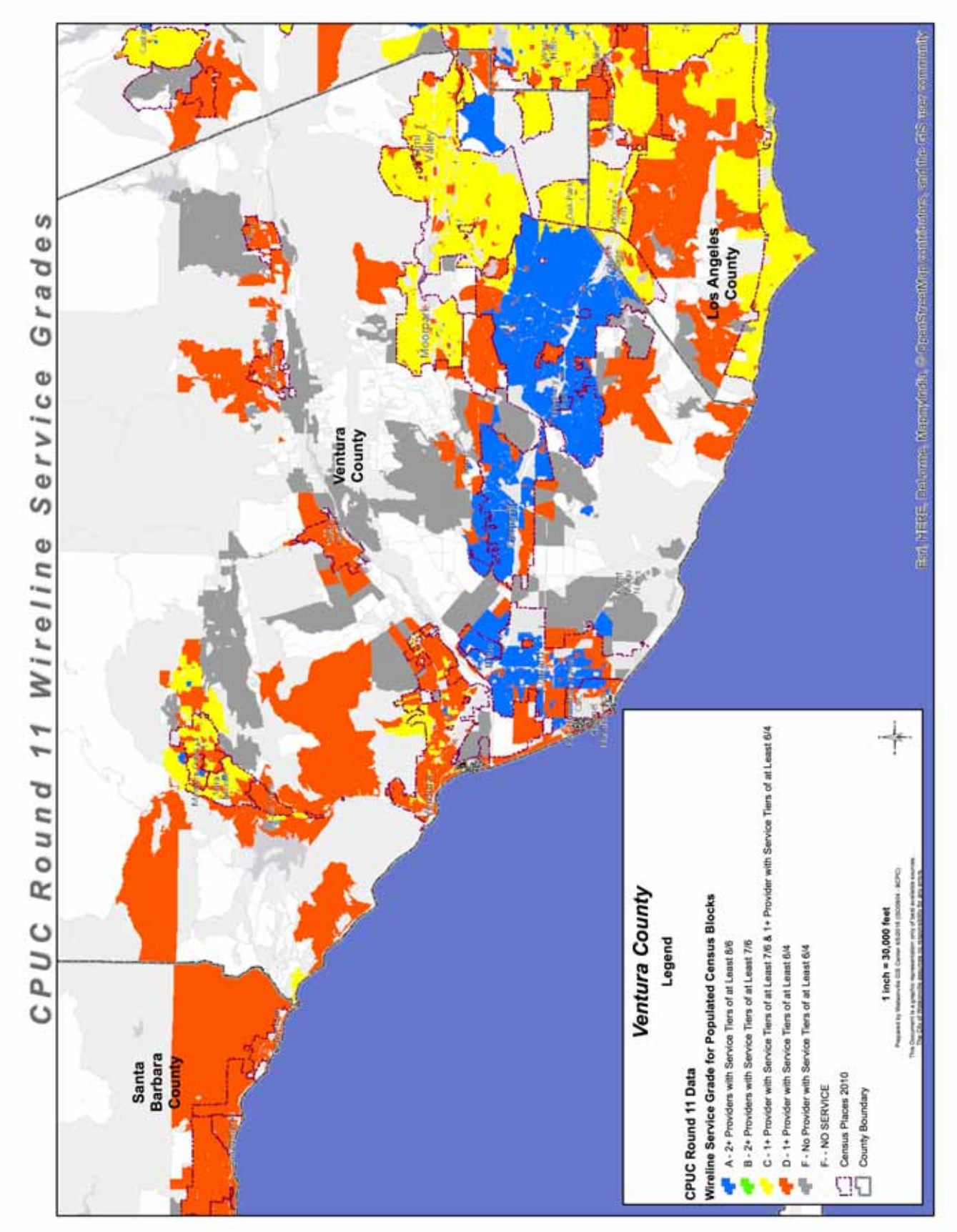
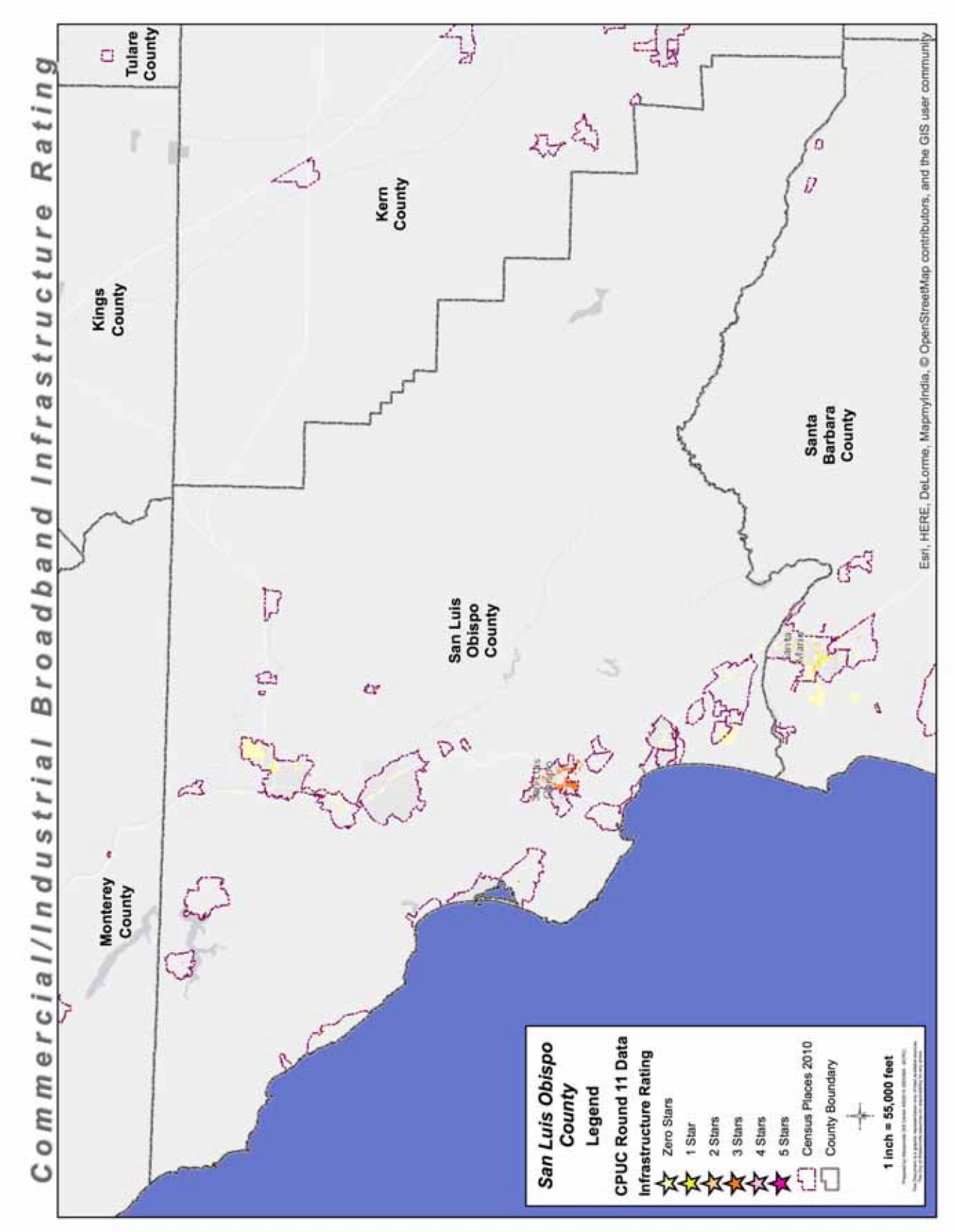
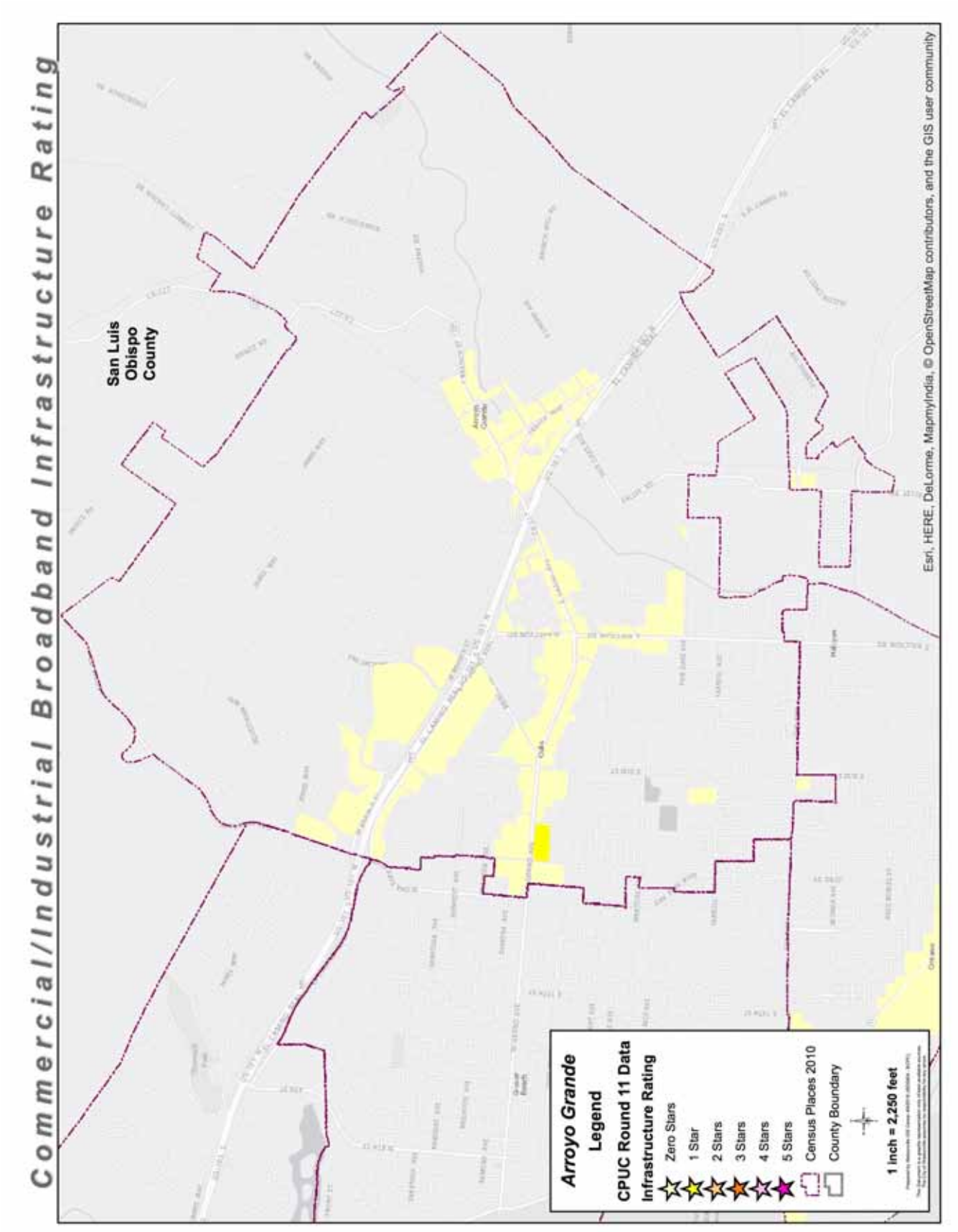


2. Commercial/industrial broadband infrastructure ratings

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San Luis Obispo County
Arroyo Grande
Legend
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Zero Stars
1 Star
2 Stars
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4 Stars
5 Stars
Census Places 2010
County Boundary
1 inch = 2,250 feet
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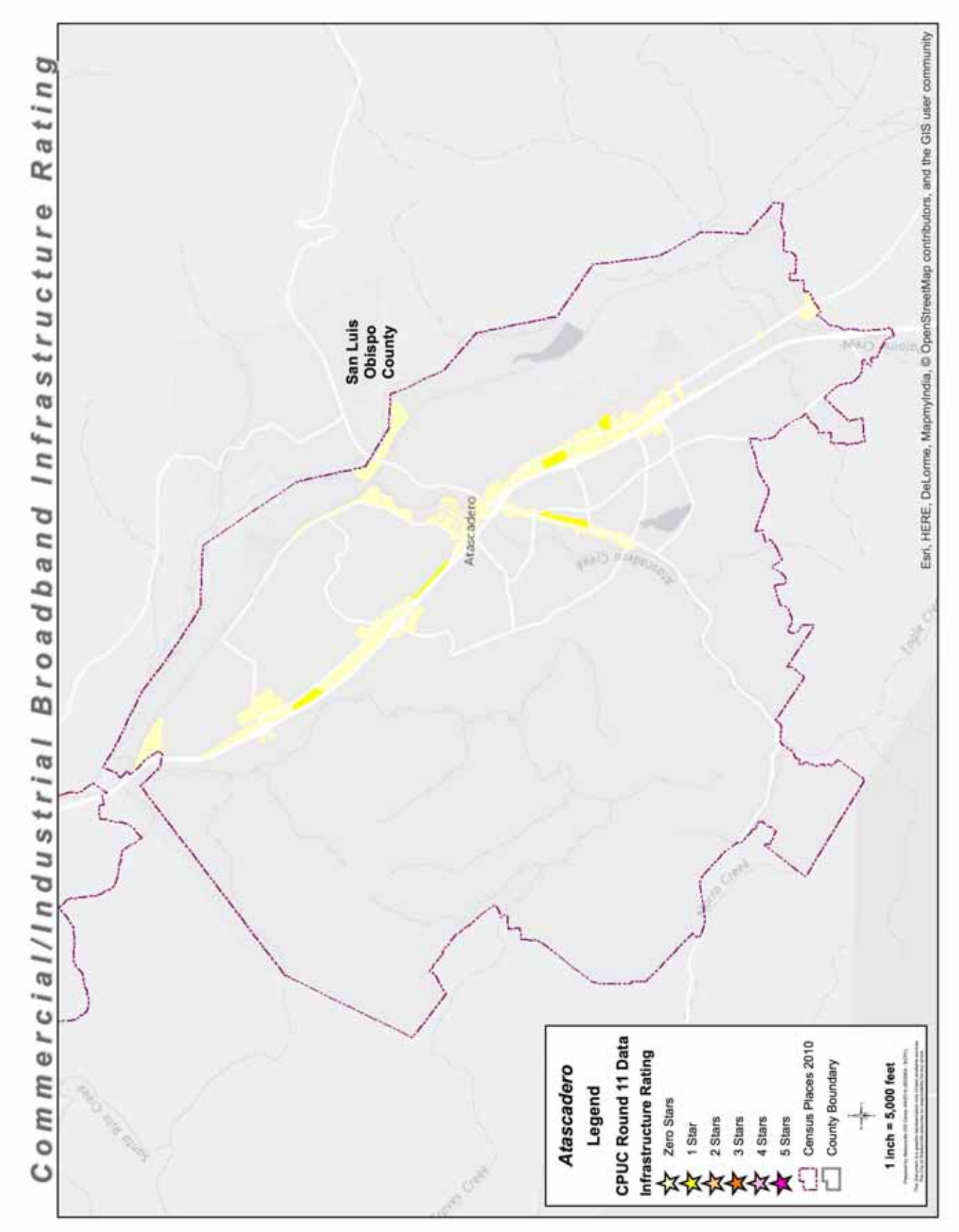
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San Luis Obispo County
Atascadero
Atascadero
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1 Star
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3 Stars
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Census Places 2010
County Boundary
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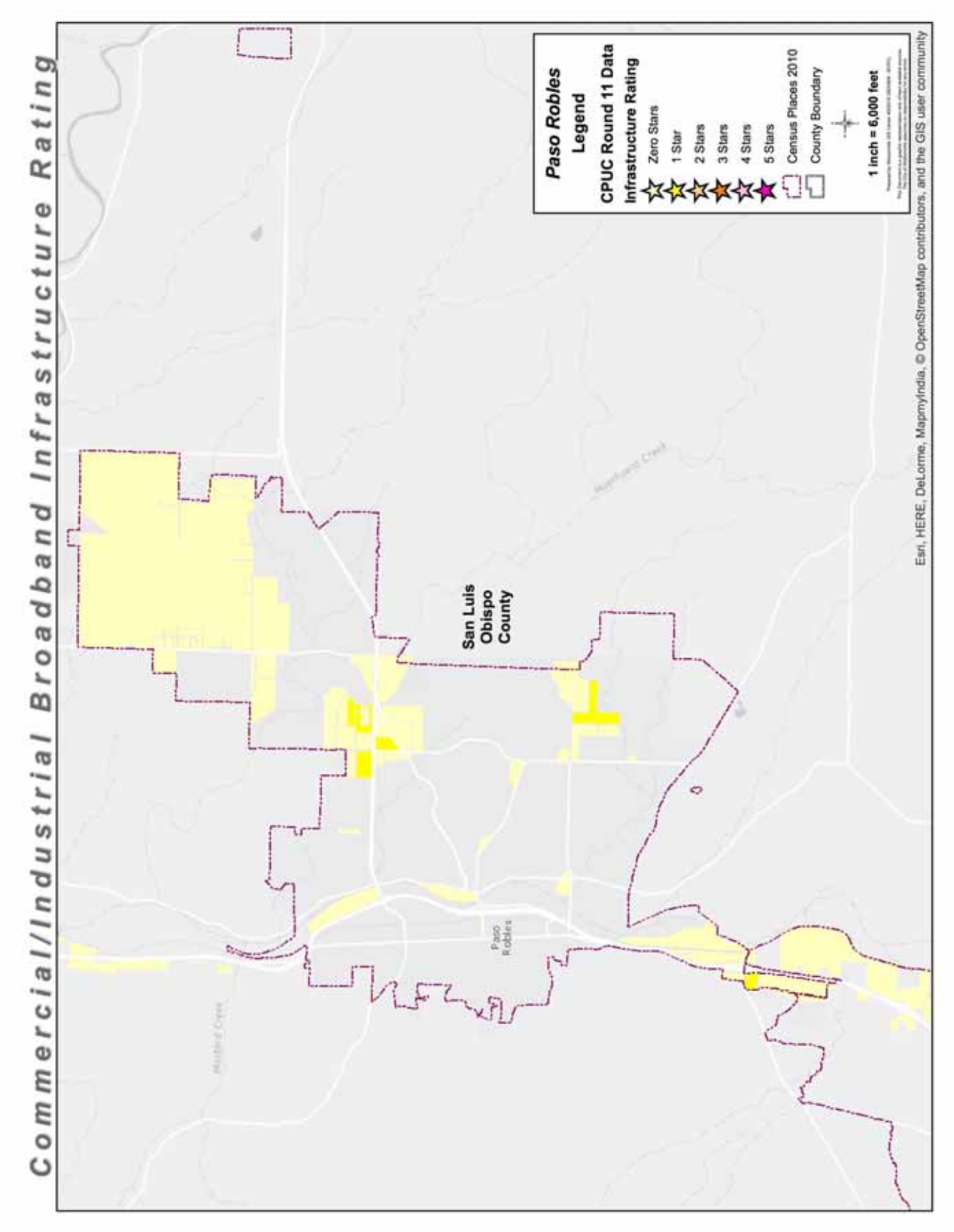
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community


Commercial/Industrial Broadband Infrastructure Rating
Paso Robles
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1 inch = 6,000 feet
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Paso Robles
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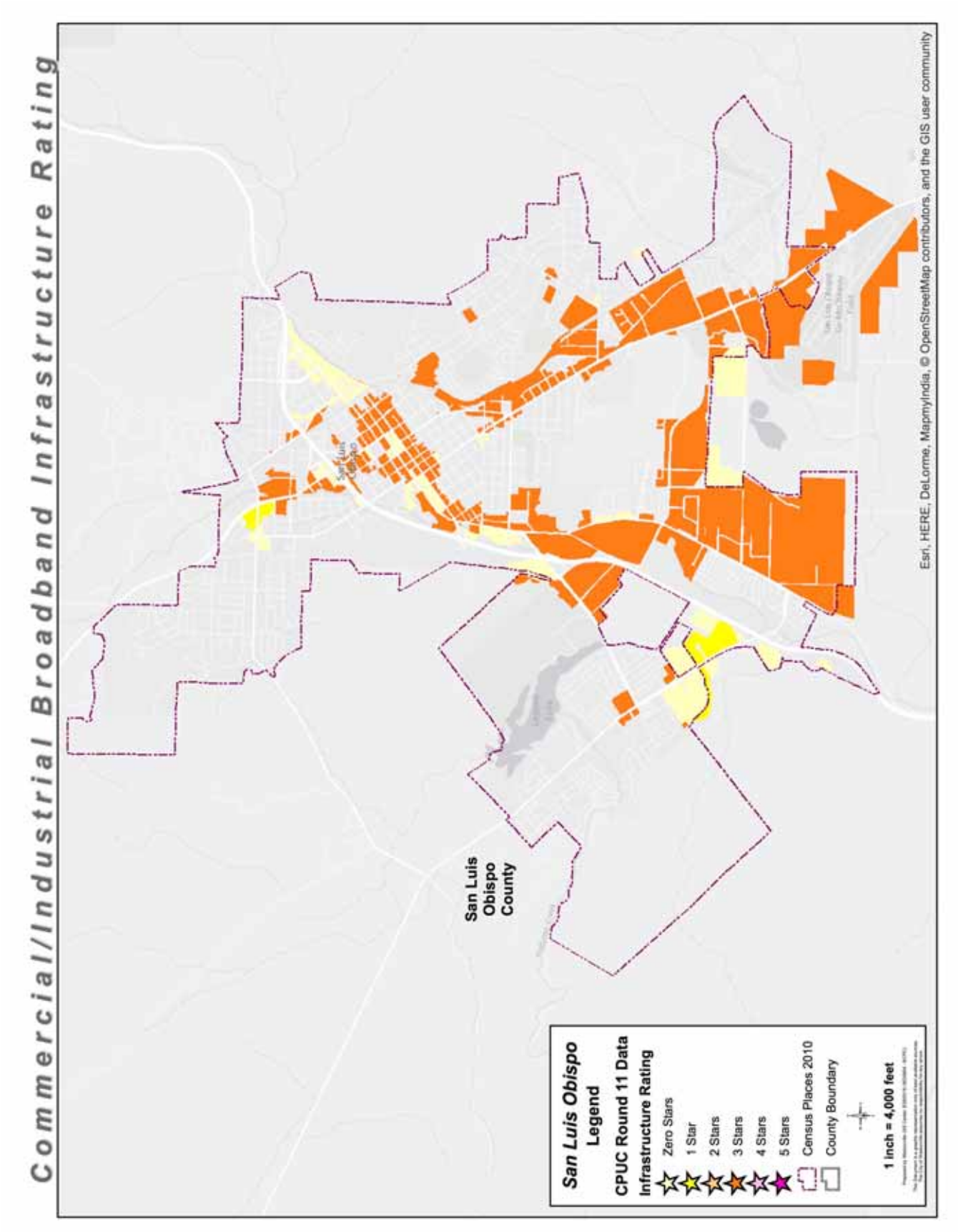
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1 inch = 4,000 feet
San Luis Obispo County
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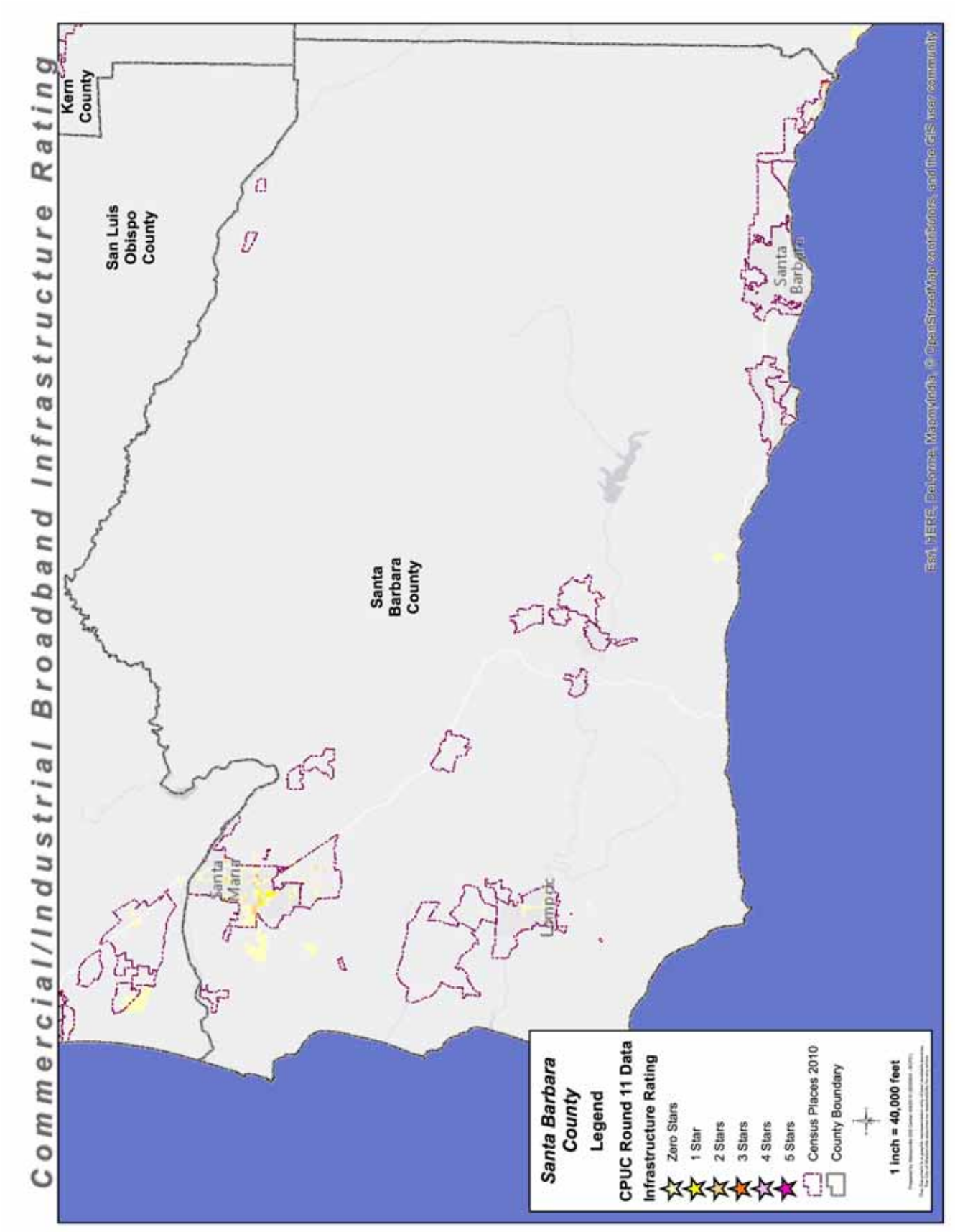
Commercial/Industrial Broadband Infrastructure Rating
Kern County
San Luis Obispo County
Santa Barbara County
Santa Barbara
Santa Maria
Lompoc
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Santa Barbara County
Legend
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Census Places 2010
County Boundary
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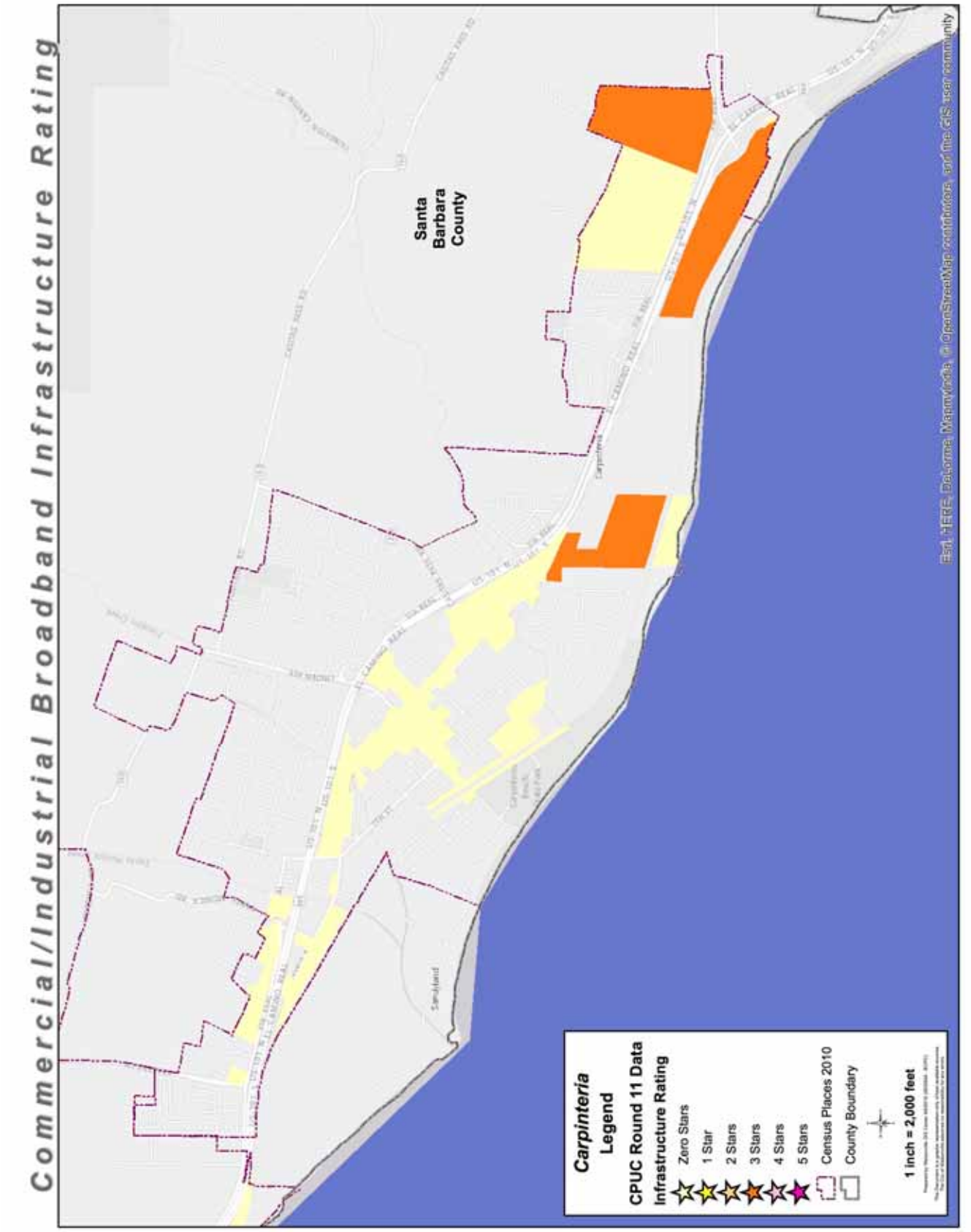
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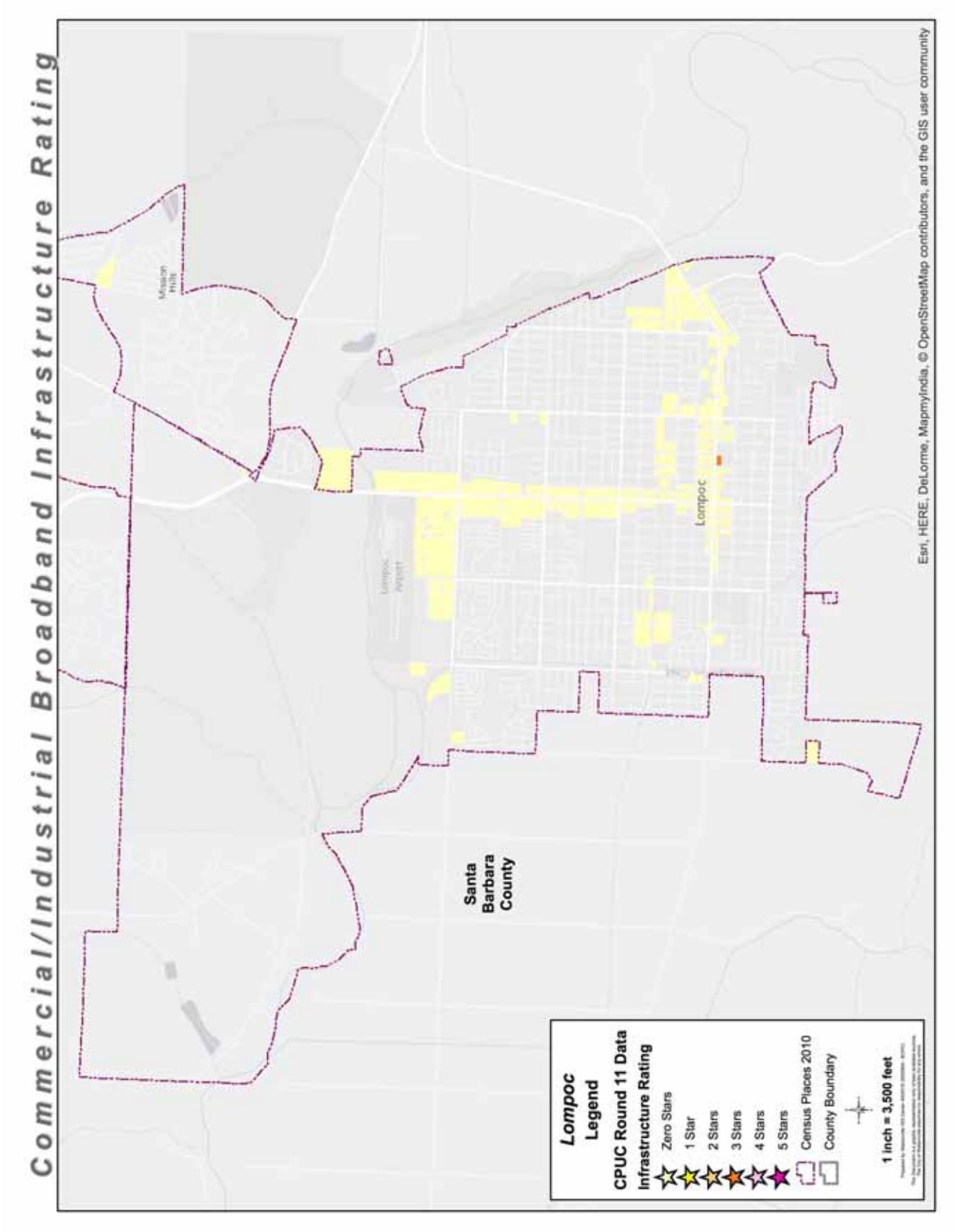
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Lompoc
Mission Hills
Lompoc Airport
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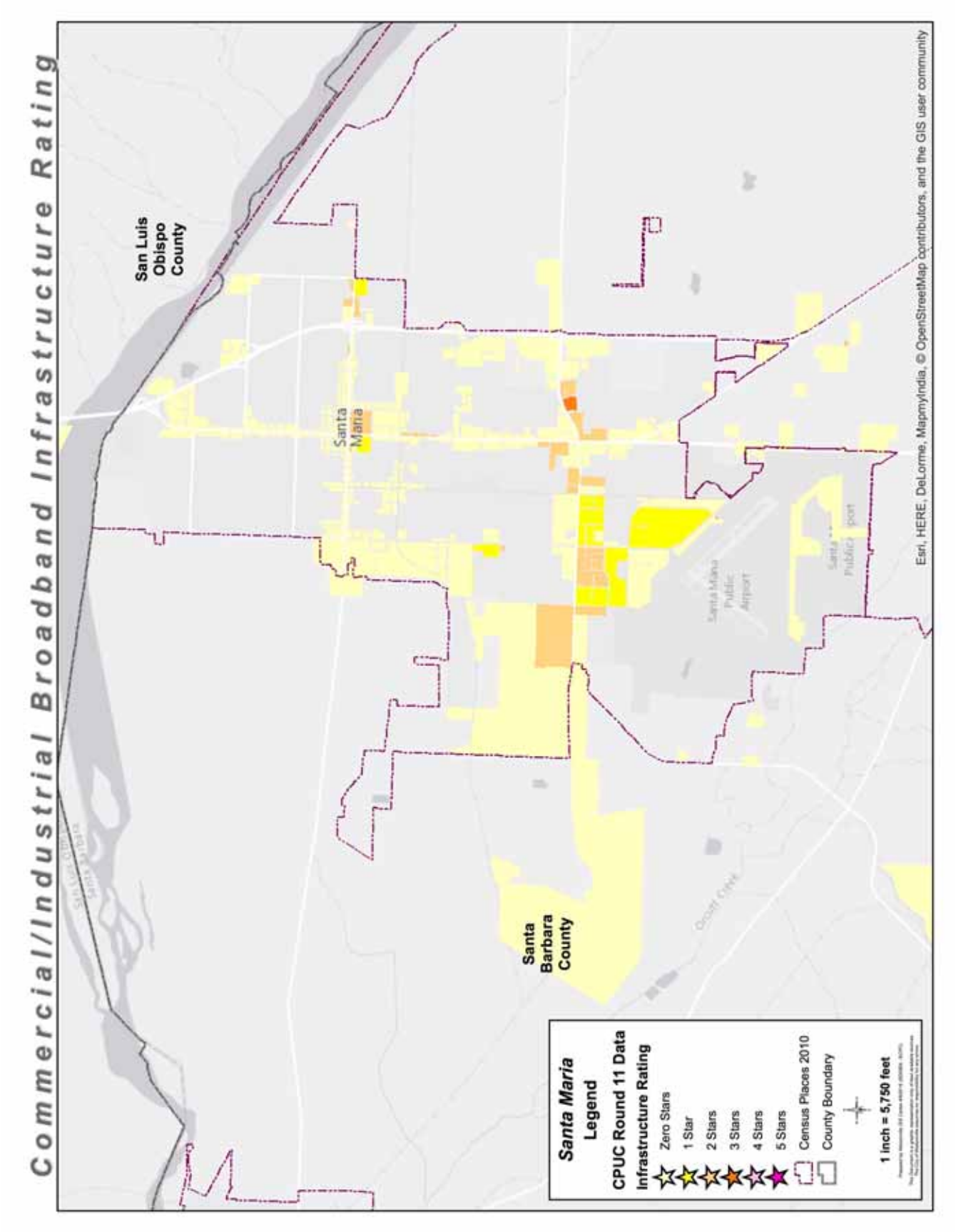
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Santa Barbara County
Santa Maria Public Airport
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Santa Maria
Legend
CPUC Round 11 Data
Infrastructure Rating
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Census Places 2010
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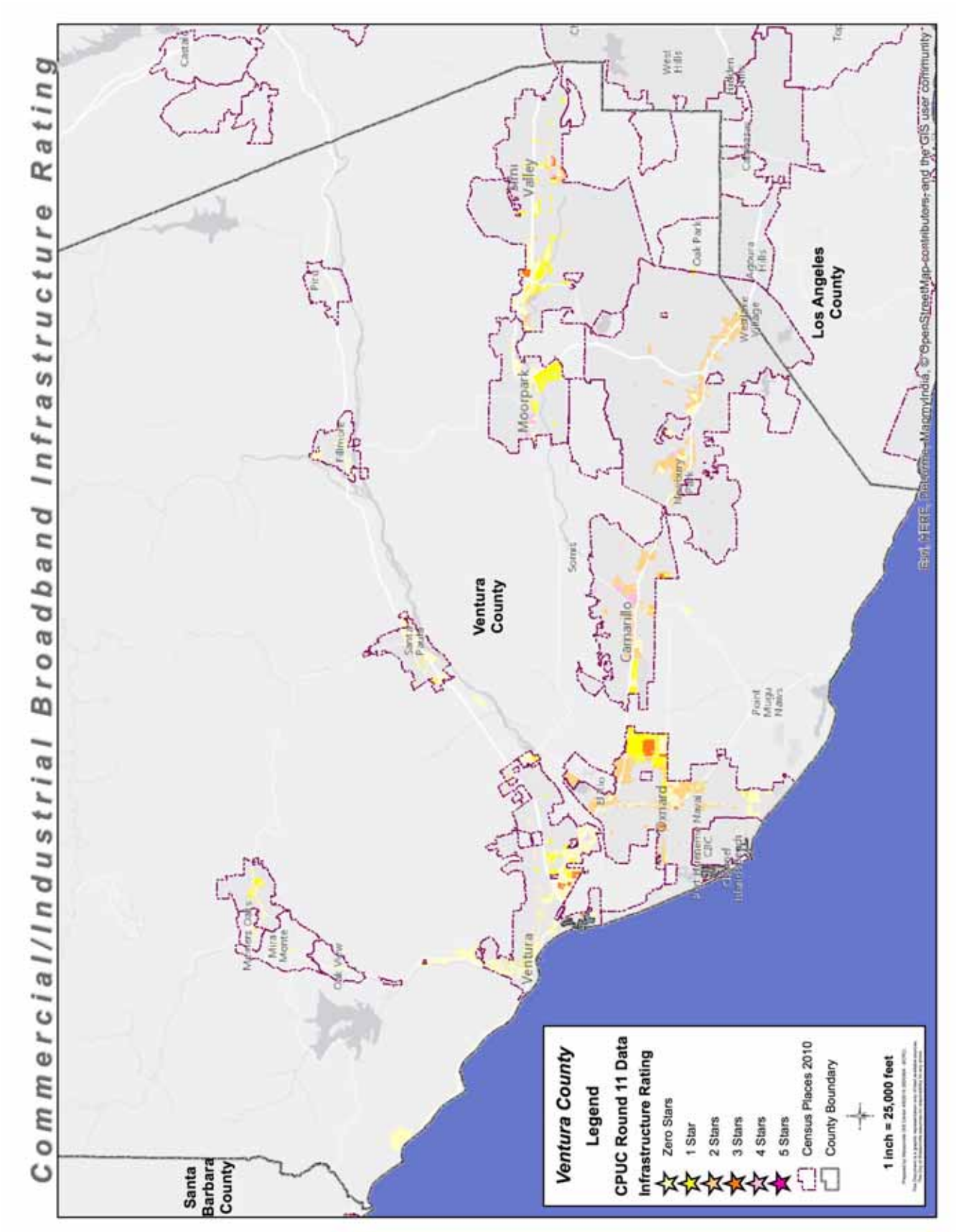
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County Boundary
1 inch = 25,000 feet
Santa Barbara County
Los Angeles County
Ventura County
Moorpark
Simi Valley
Camarillo
Oxnard
Ventura
Port Hueneme Naval CBC
Point Mugu Naws
Santa Paul
Fillmore
Piru
Mira Monte
Meiners Oaks
Oak View
Somis
Calabasas
Agoura Hills
Oak Park
Westlake Village
West Hills
Topanga
Malibu
Castaic
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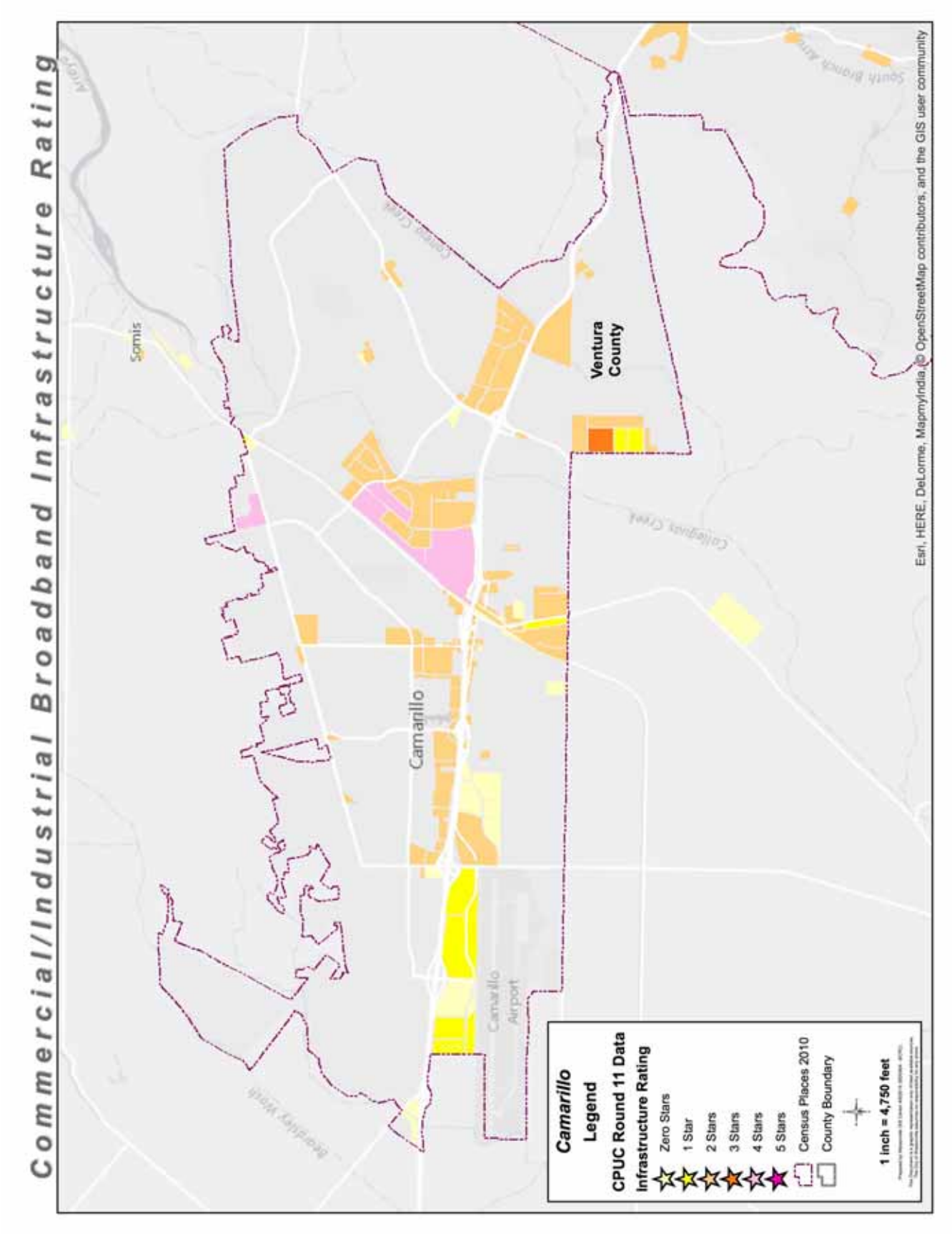
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Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Camarillo
Legend
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Census Places 2010
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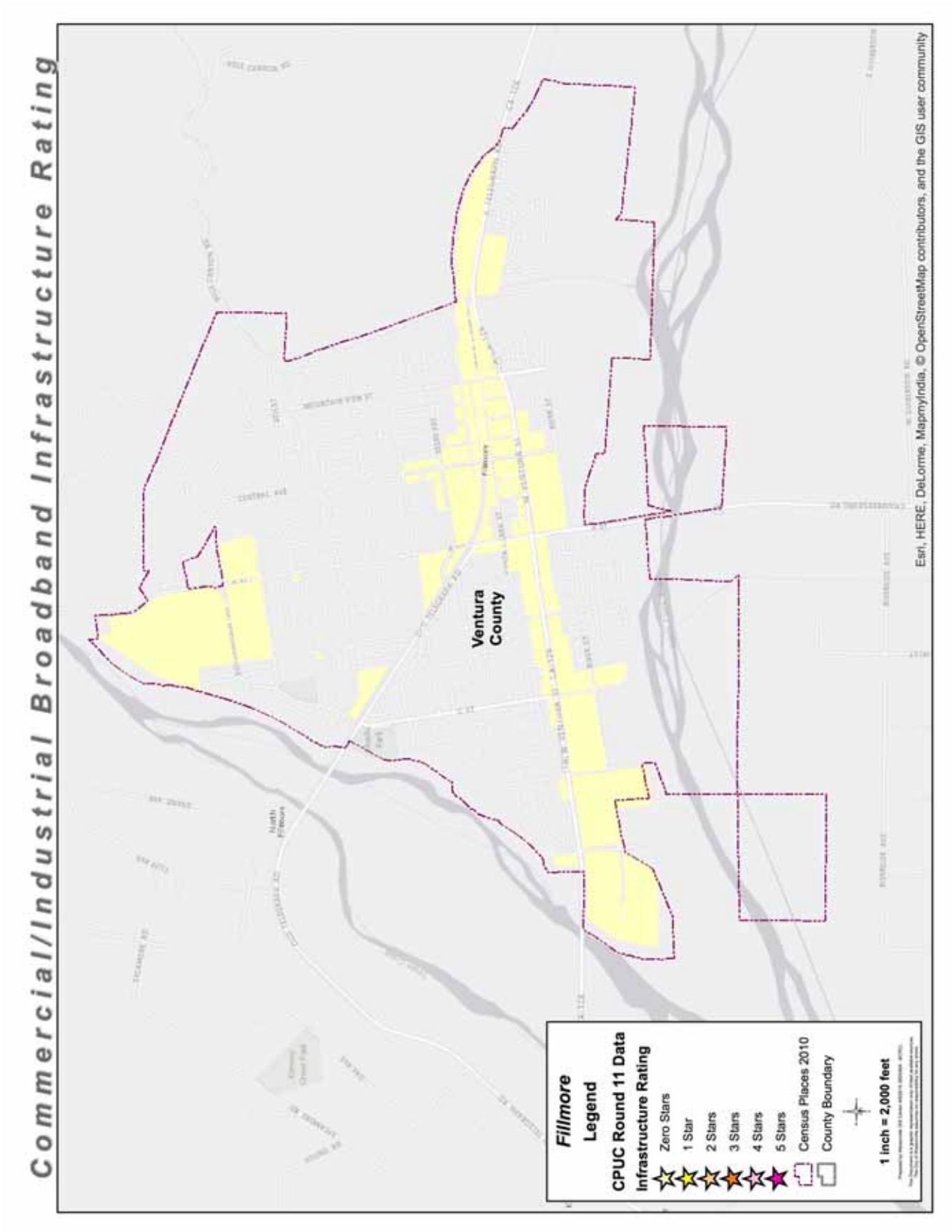
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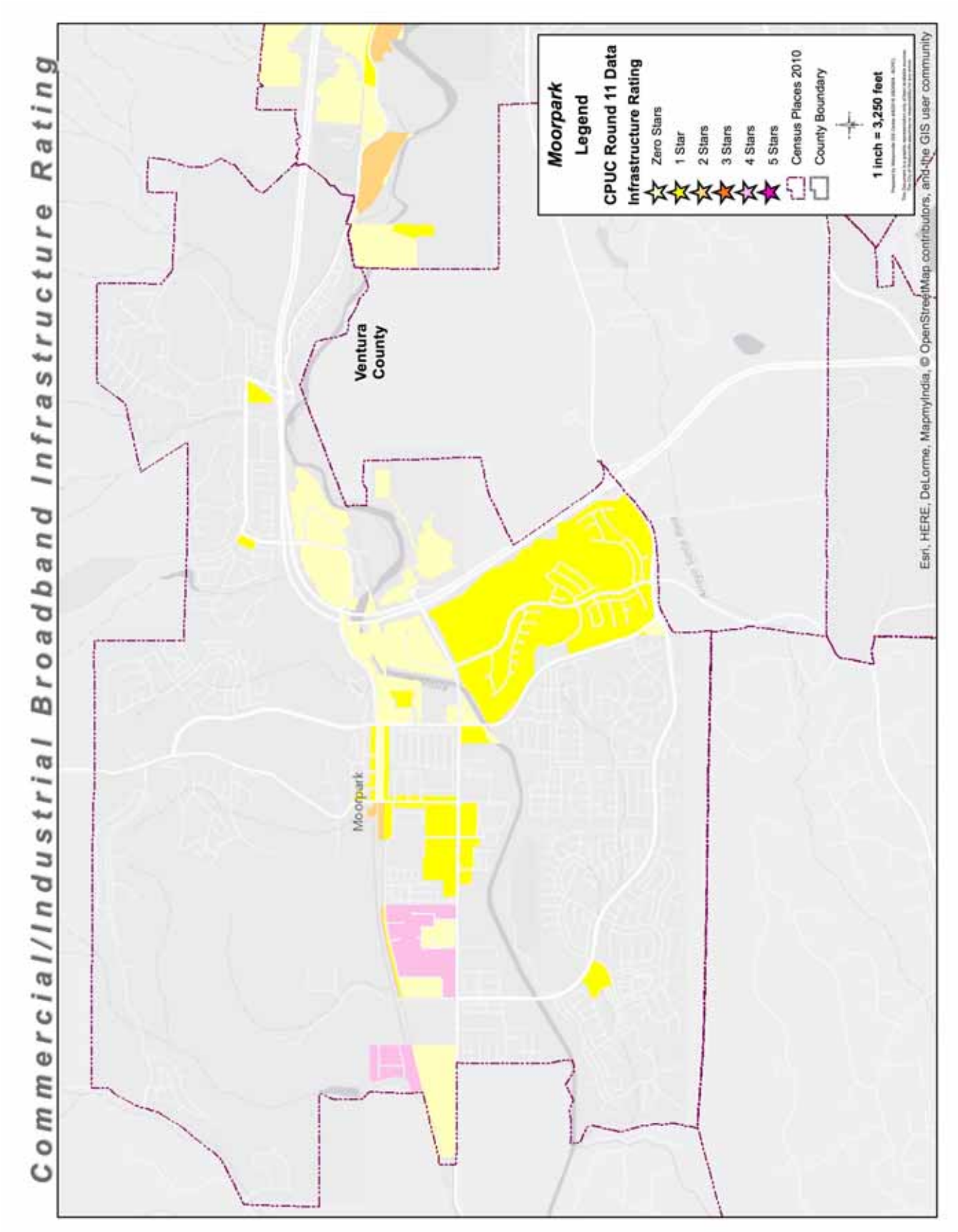
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Ventura County
Moorpark
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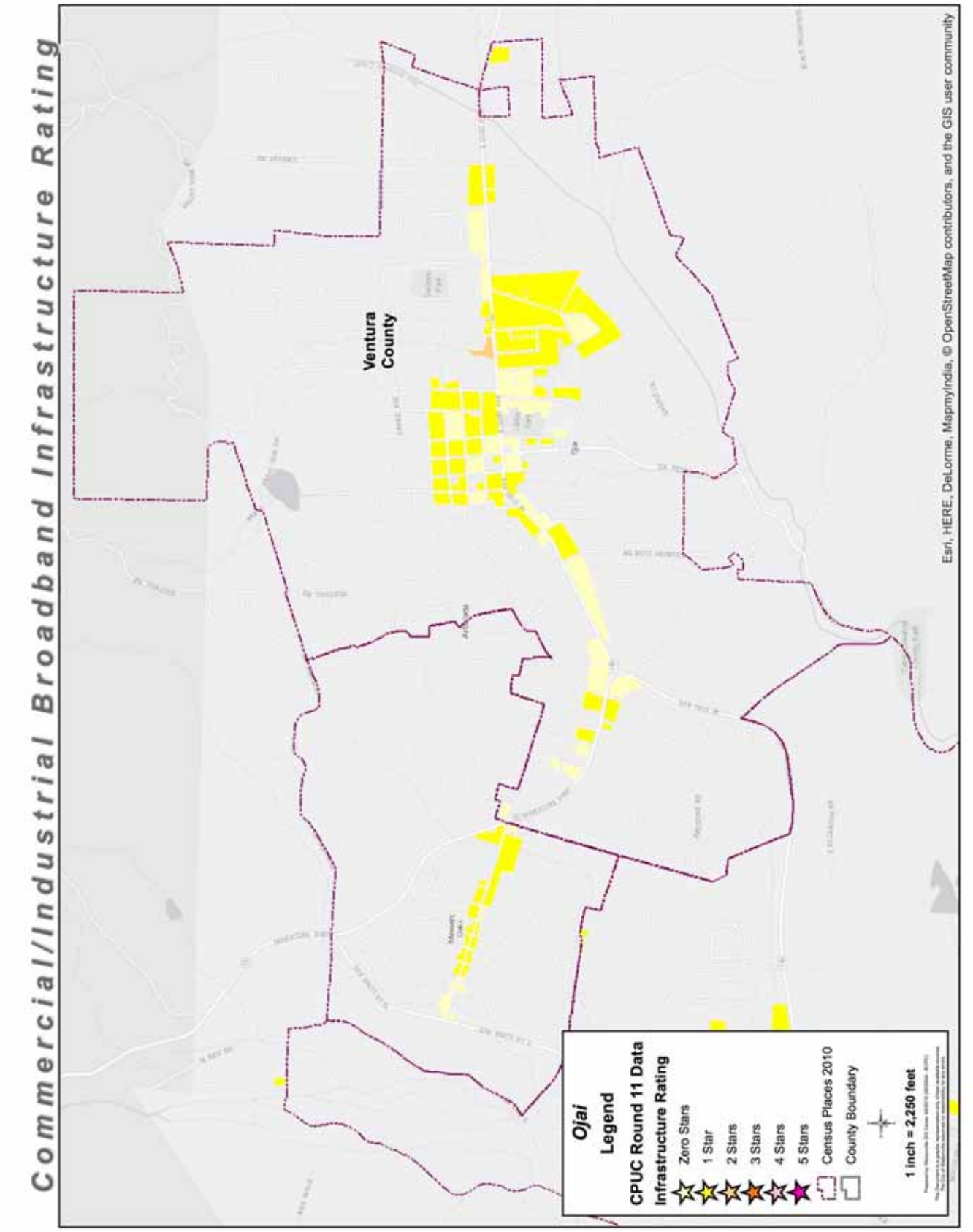
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Ventura County
Ojai
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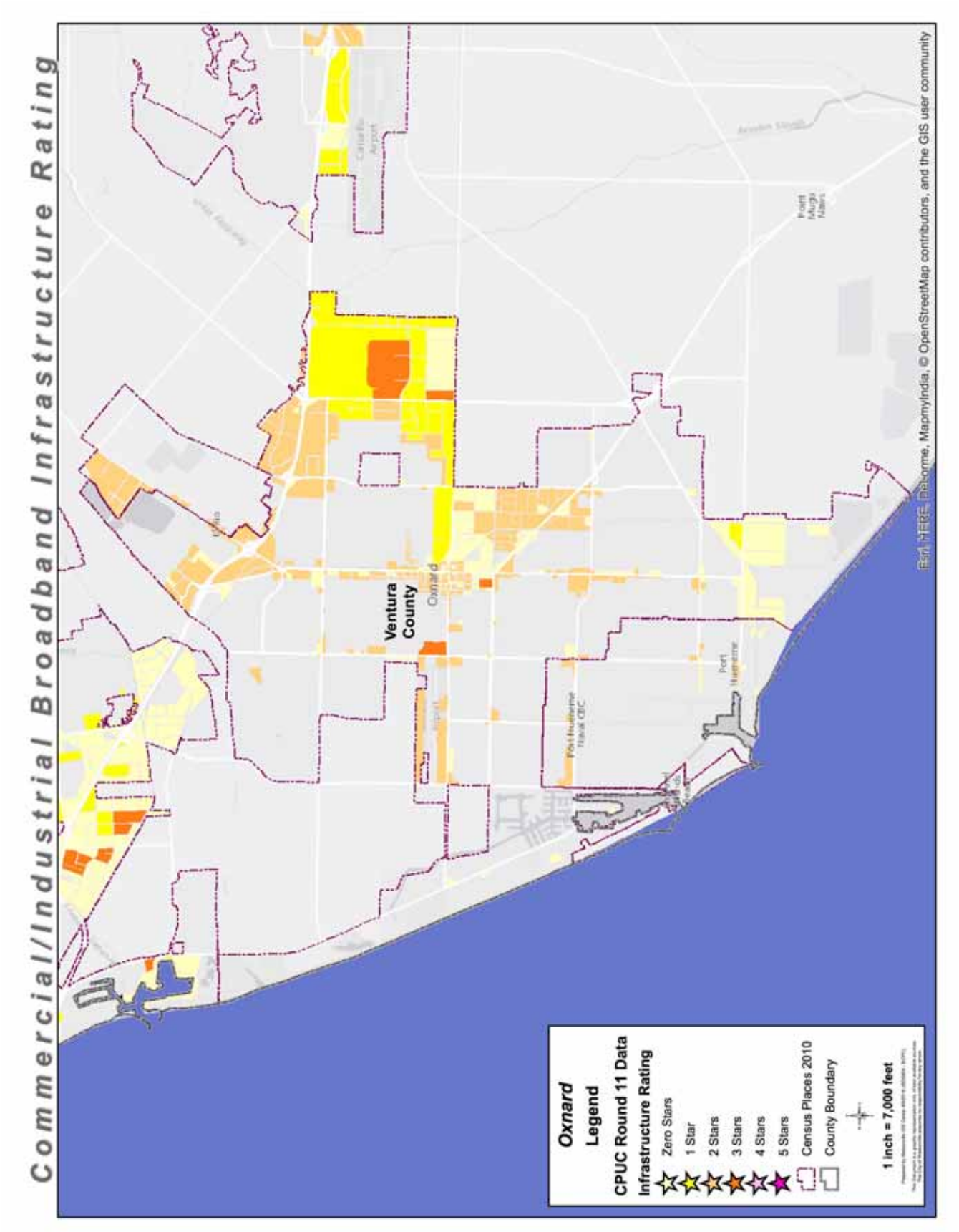
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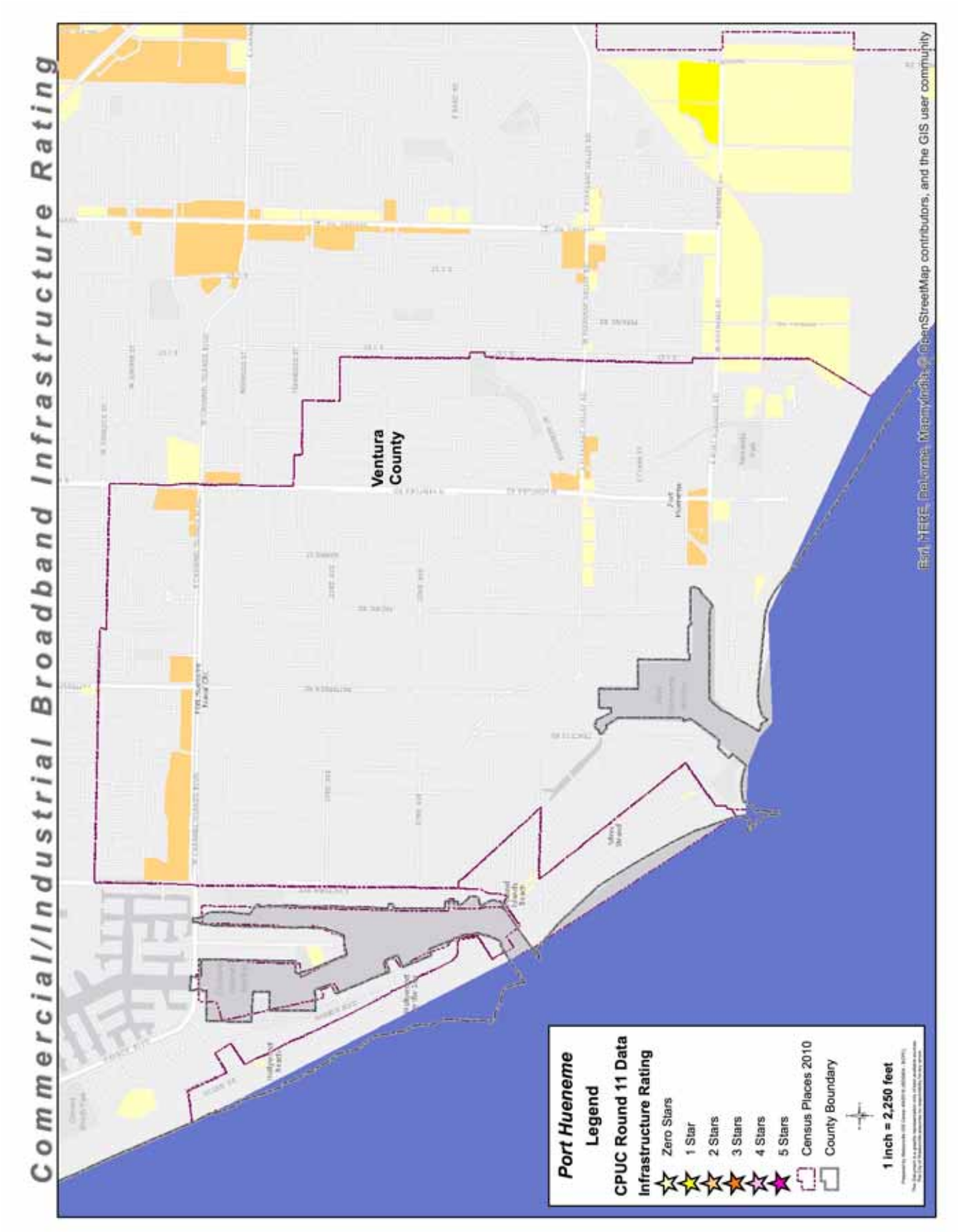
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Ventura County
Port Hueneme
Legend
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County Boundary
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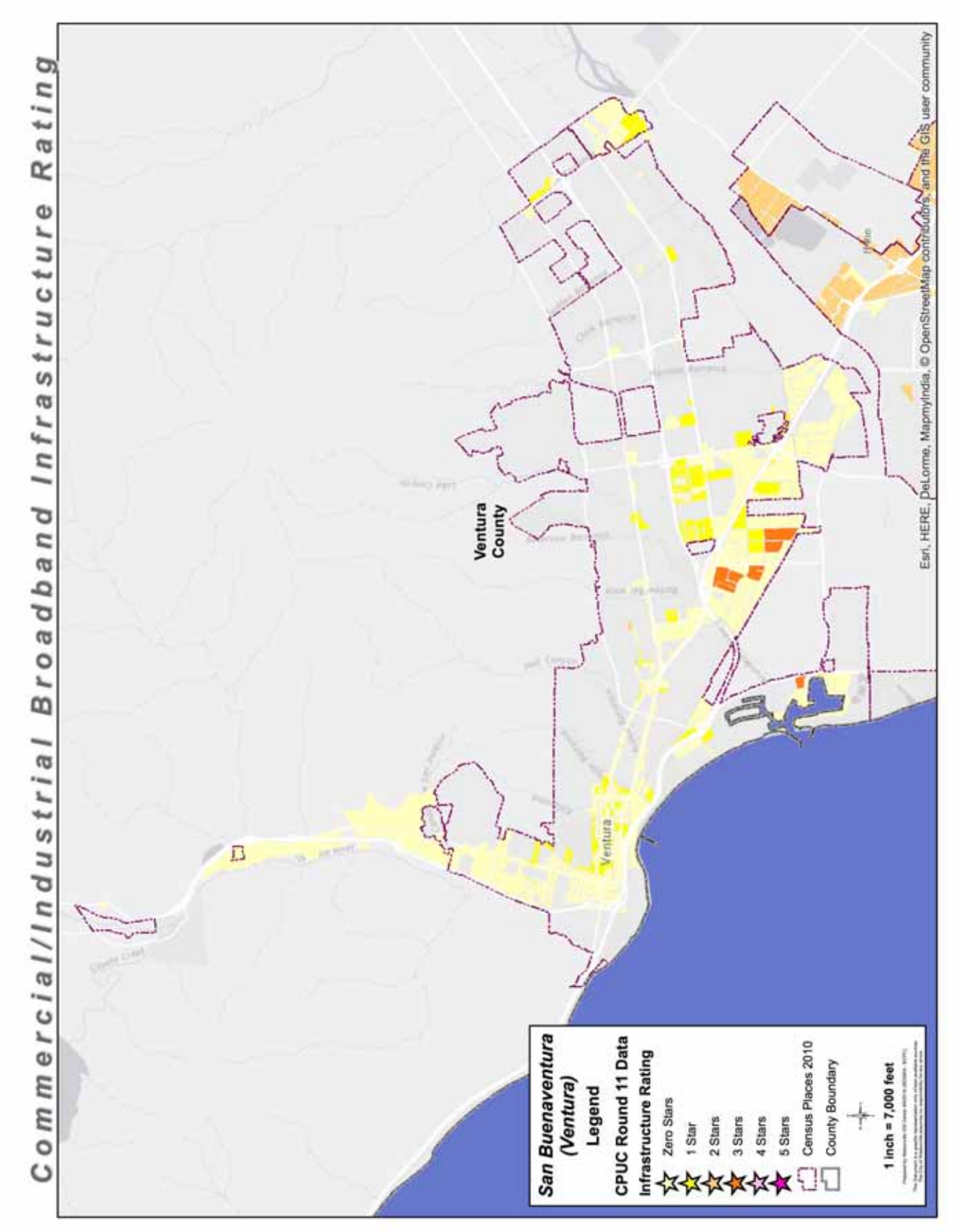
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Ventura County
Ventura
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San Buenaventura (Ventura)
Legend
CPUC Round 11 Data
Infrastructure Rating
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Census Places 2010
County Boundary
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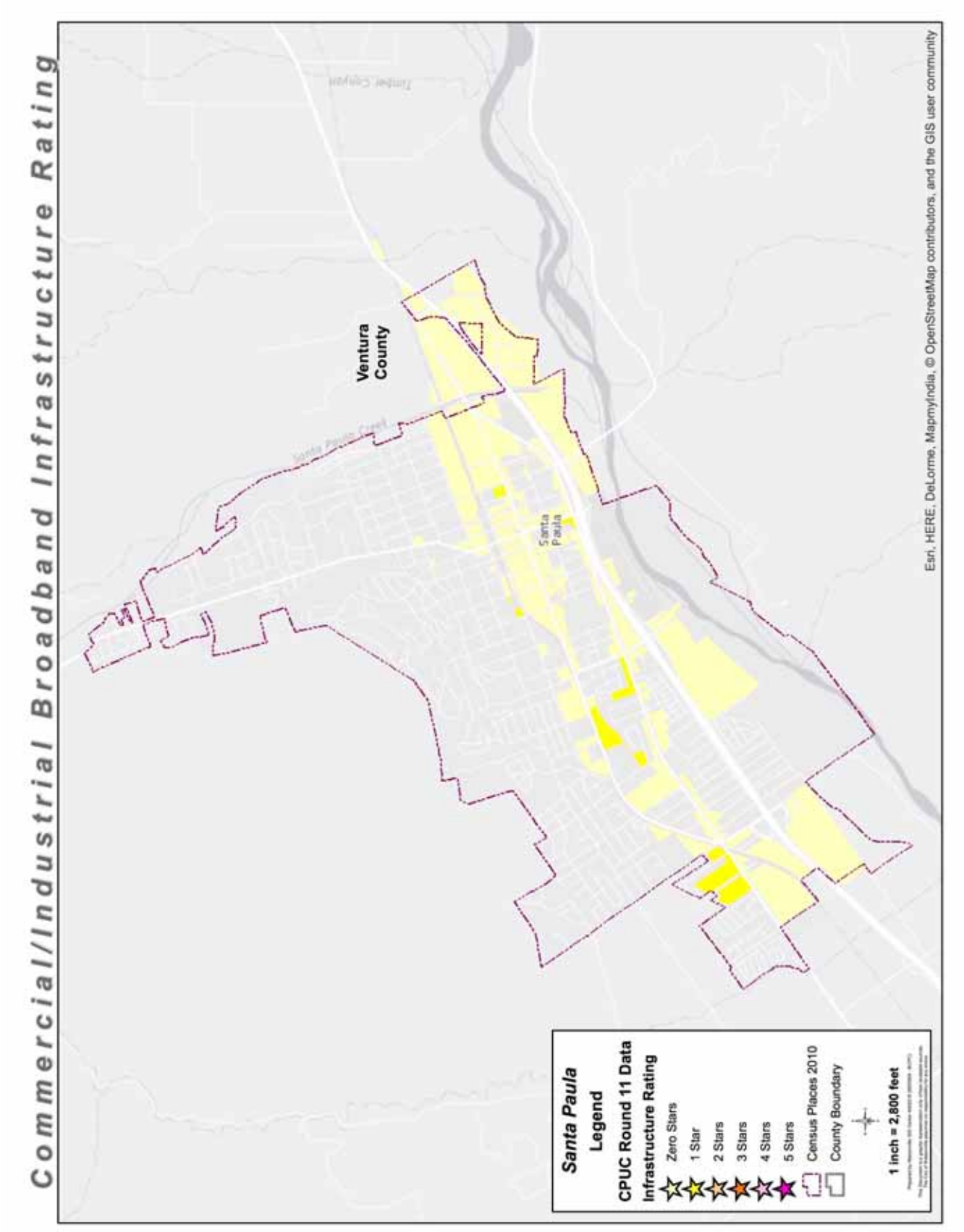
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Santa Paula
Santa Paula
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County Boundary
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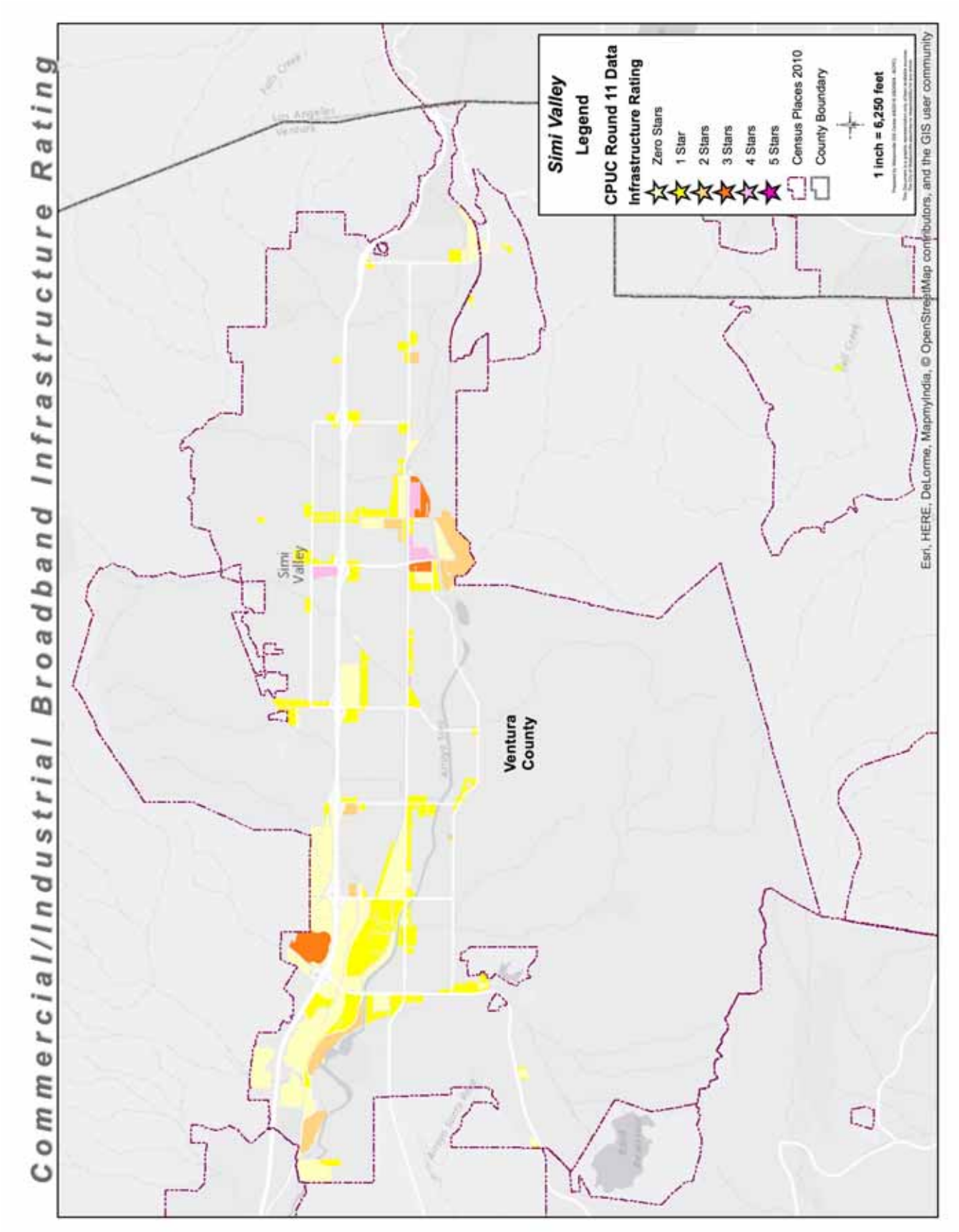
Commercial/Industrial Broadband Infrastructure Rating
Simi Valley
Legend
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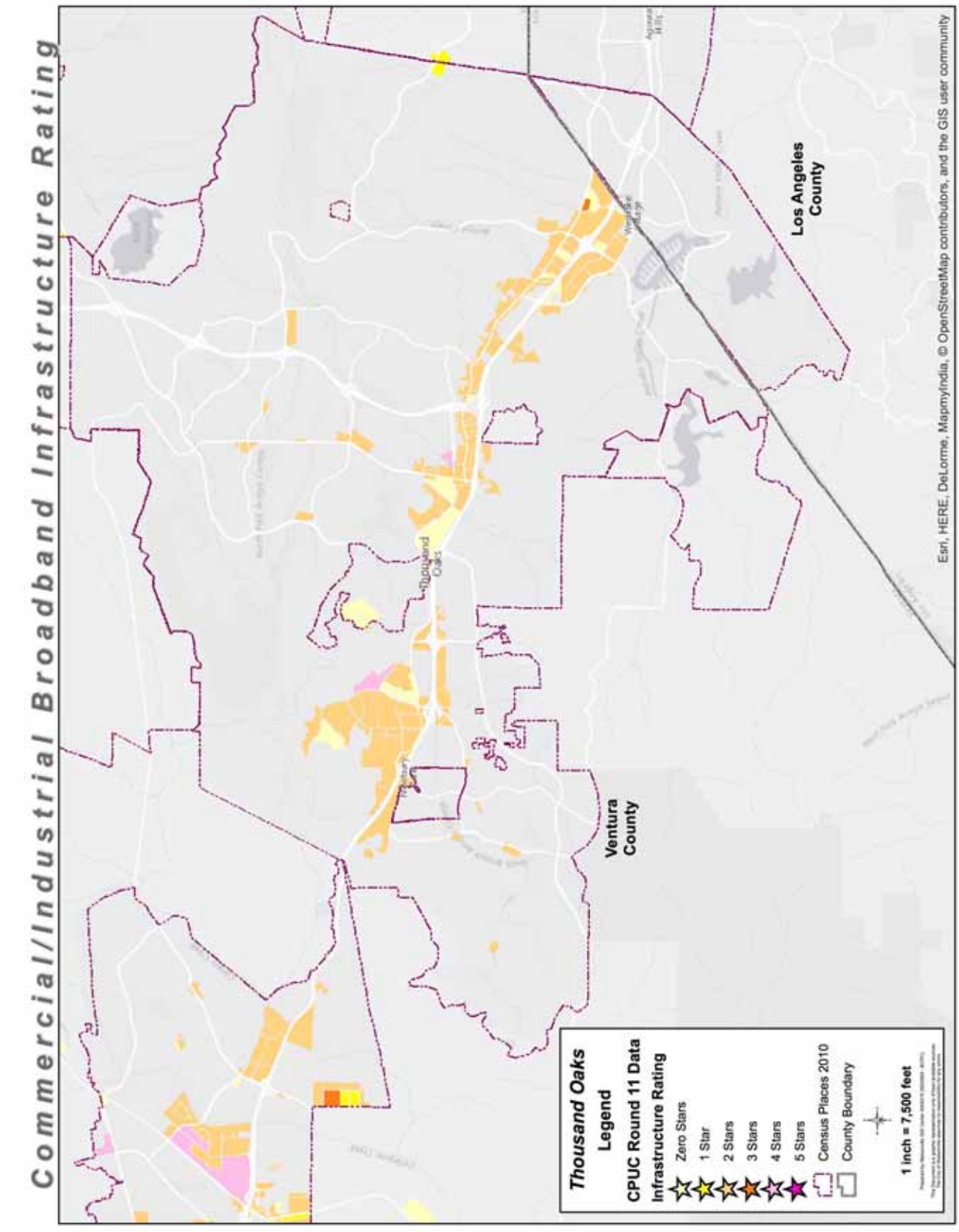
County Boundary
1 inch = 6,250 feet
Simi Valley
Ventura County
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community


Commercial/Industrial Broadband Infrastructure Rating
Thousand Oaks
Legend
CPUC Round 11 Data
Infrastructure Rating
Zero Stars
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Census Places 2010
County Boundary
1 inch = 7,500 feet
Ventura County
Los Angeles County
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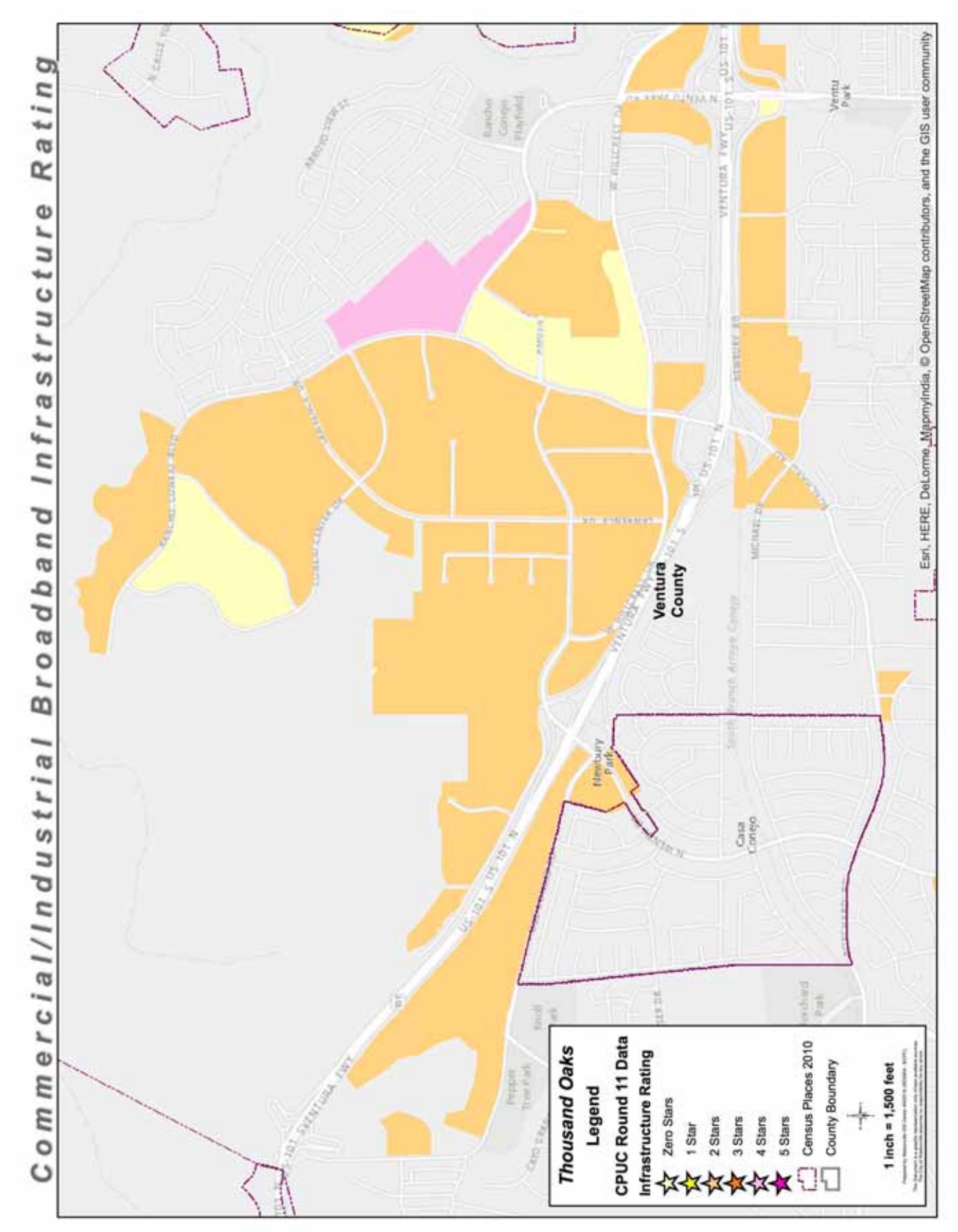
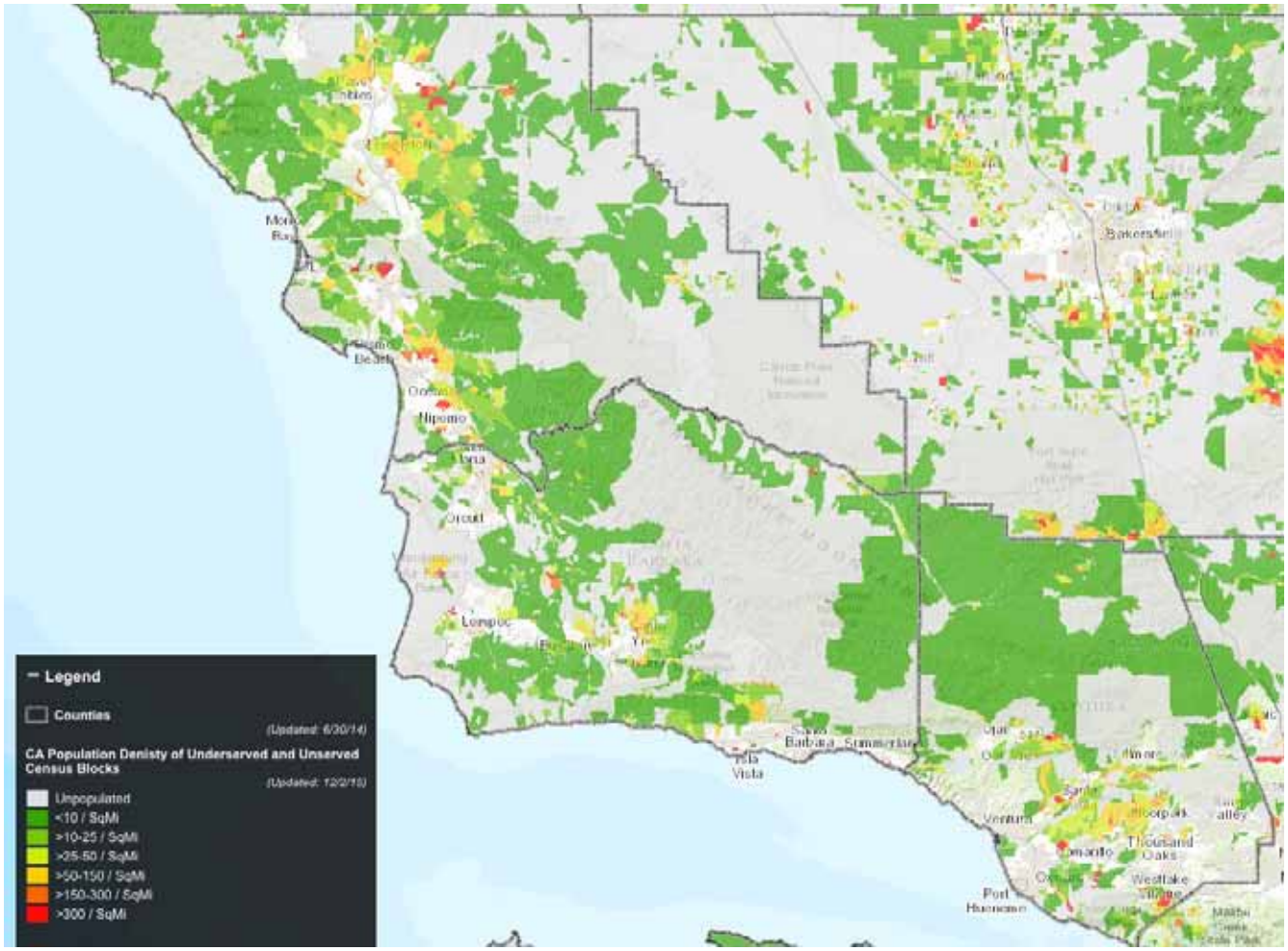

Commercial/Industrial Broadband Infrastructure Rating
Thousand Oaks
Legend
CPUC Round 11 Data
Infrastructure Rating
Zero Stars
1 Star
2 Stars
3 Stars
4 Stars
5 Stars
Census Places 2010
County Boundary
1 inch = 1,500 feet
Ventura County
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

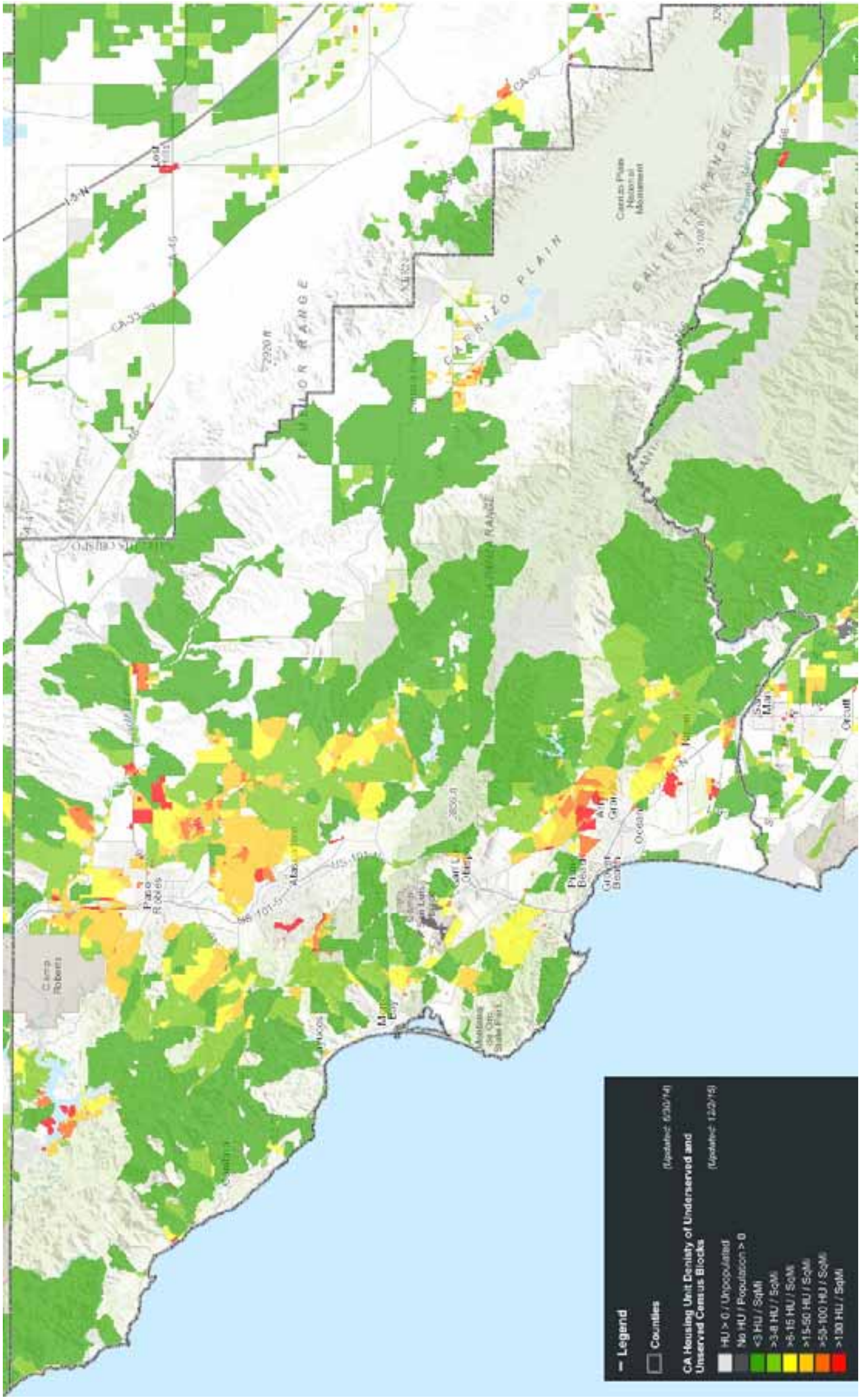
3. CASF eligible areas by market density



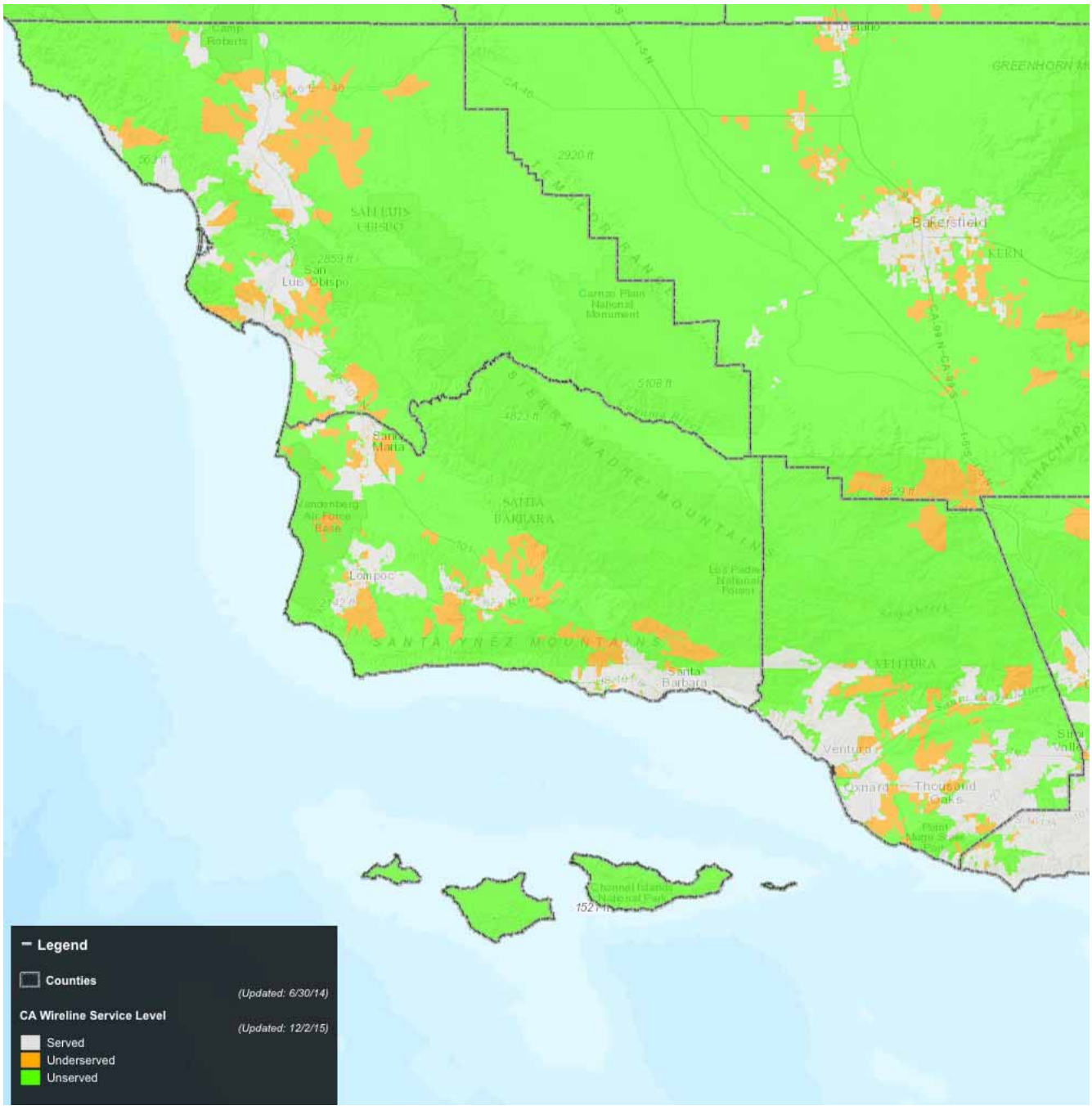
A detail map of San Luis Obispo County is below. An interactive map showing detailed CASF eligibility by population density, down to the census block or, in some cases, parcel levels is available at:

http://map.centralcoastbroadbandconsortium.org

Click on the "Advanced" tab for additional information.


Legend
Counties
(Updated: 6/30/14)
CA Housing Unit Denisty of Underserved and Unserved Census Blocks
(Updated: 12/2/15)
HU > 0 / Unpopulated
No HU / Population > 0
<3 HU / SqMi
>3-8 HU / SqMi
>8-15 HU / SqMi
>15-50 HU / SqMi
>50-100 HU / SqMi
>100 HU / SqMi
Paso Robles
Camp Roberts
Carrizo Plain National Monument
CARRIZO PLAIN
CALIENTE RANGE

4. CASF eligible areas by unserved, underserved and served status

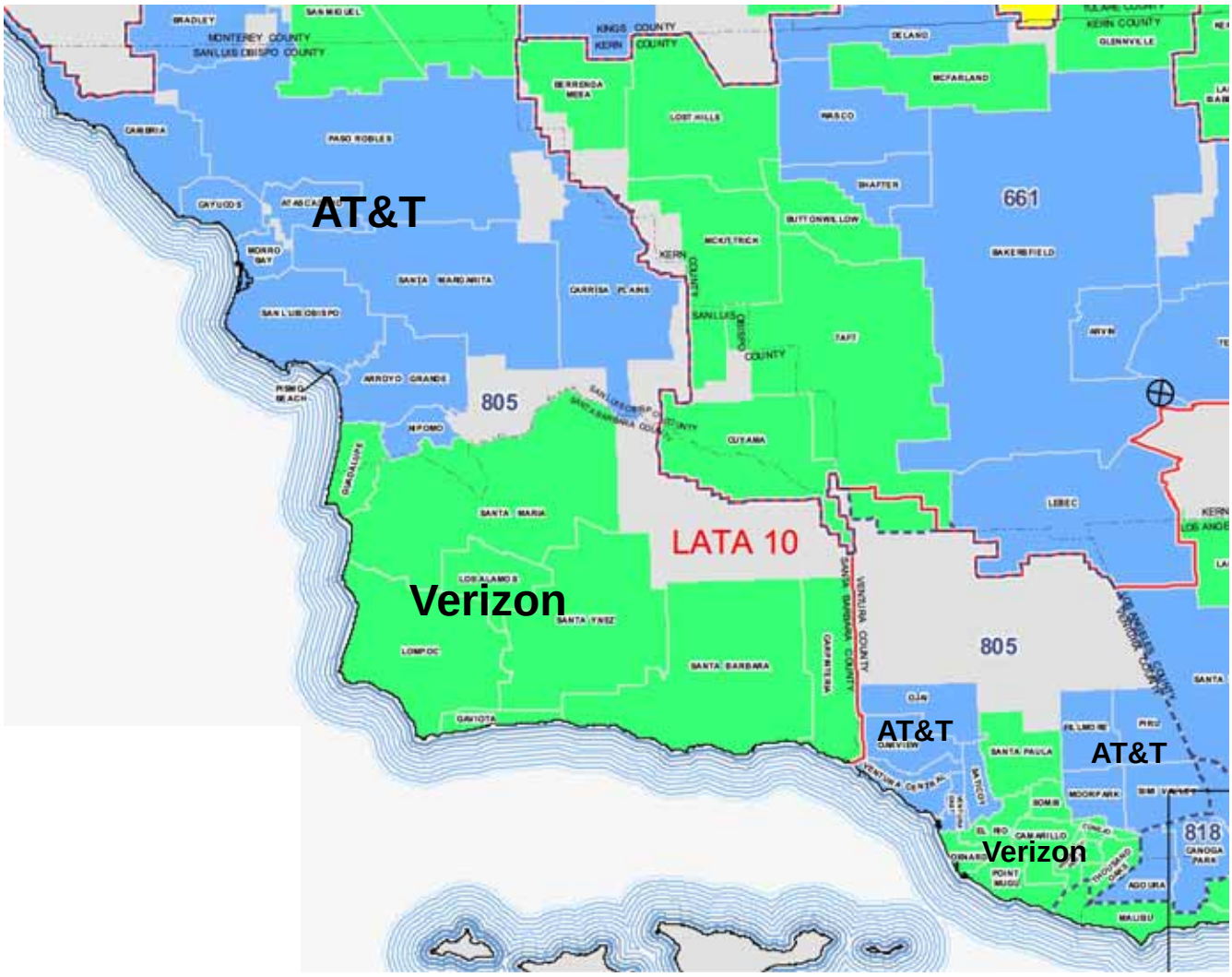


An interactive map showing "under served" or "unserved" status down to the census block or, in some cases, parcel levels is available at:

http://map.centralcoastbroadbandconsortium.org

Click on the "Advanced" tab for additional information.

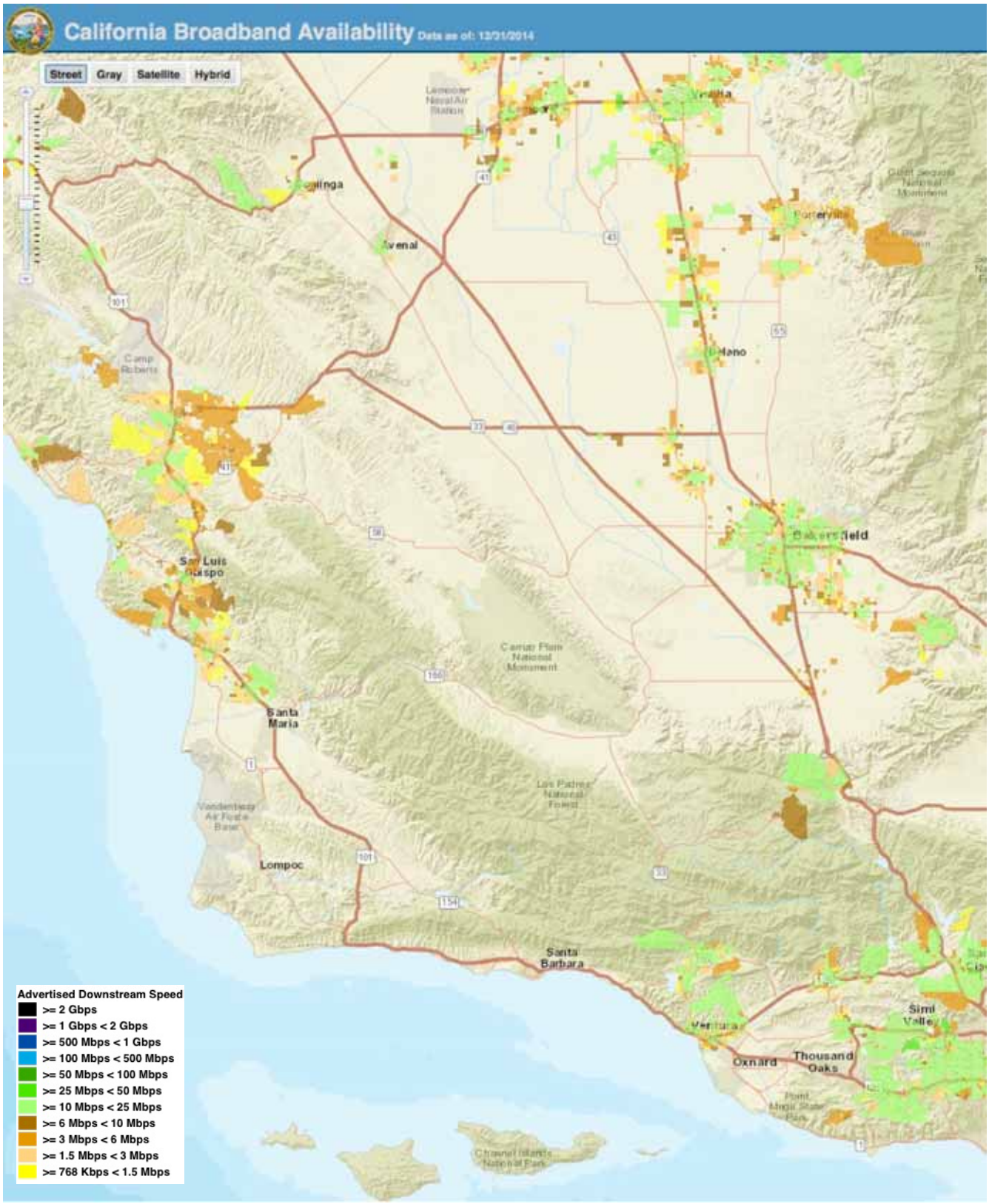
5. Telephone company service areas (CPUC-assigned)



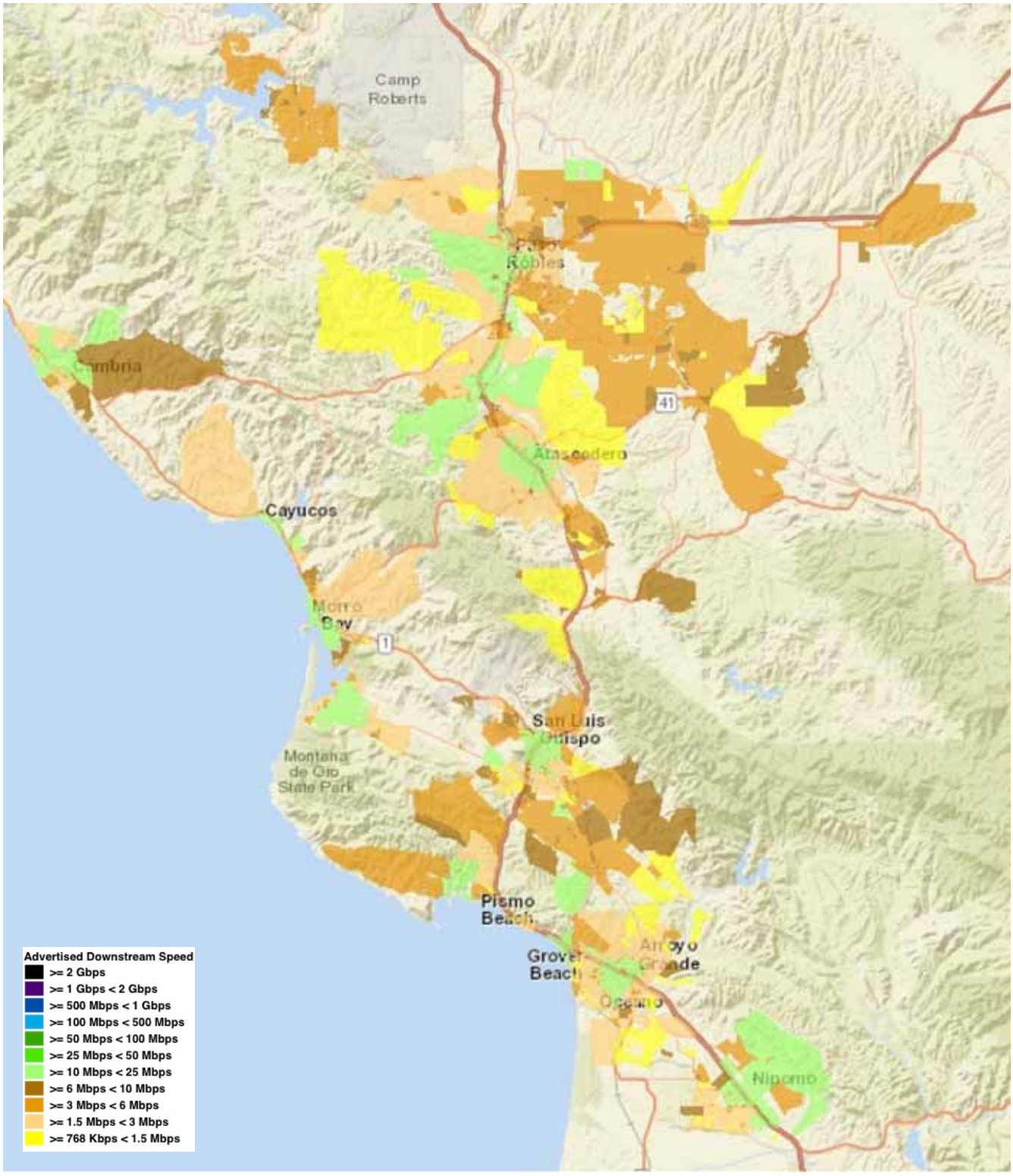
6. Cable franchise areas claimed

7. AT&T DSL service

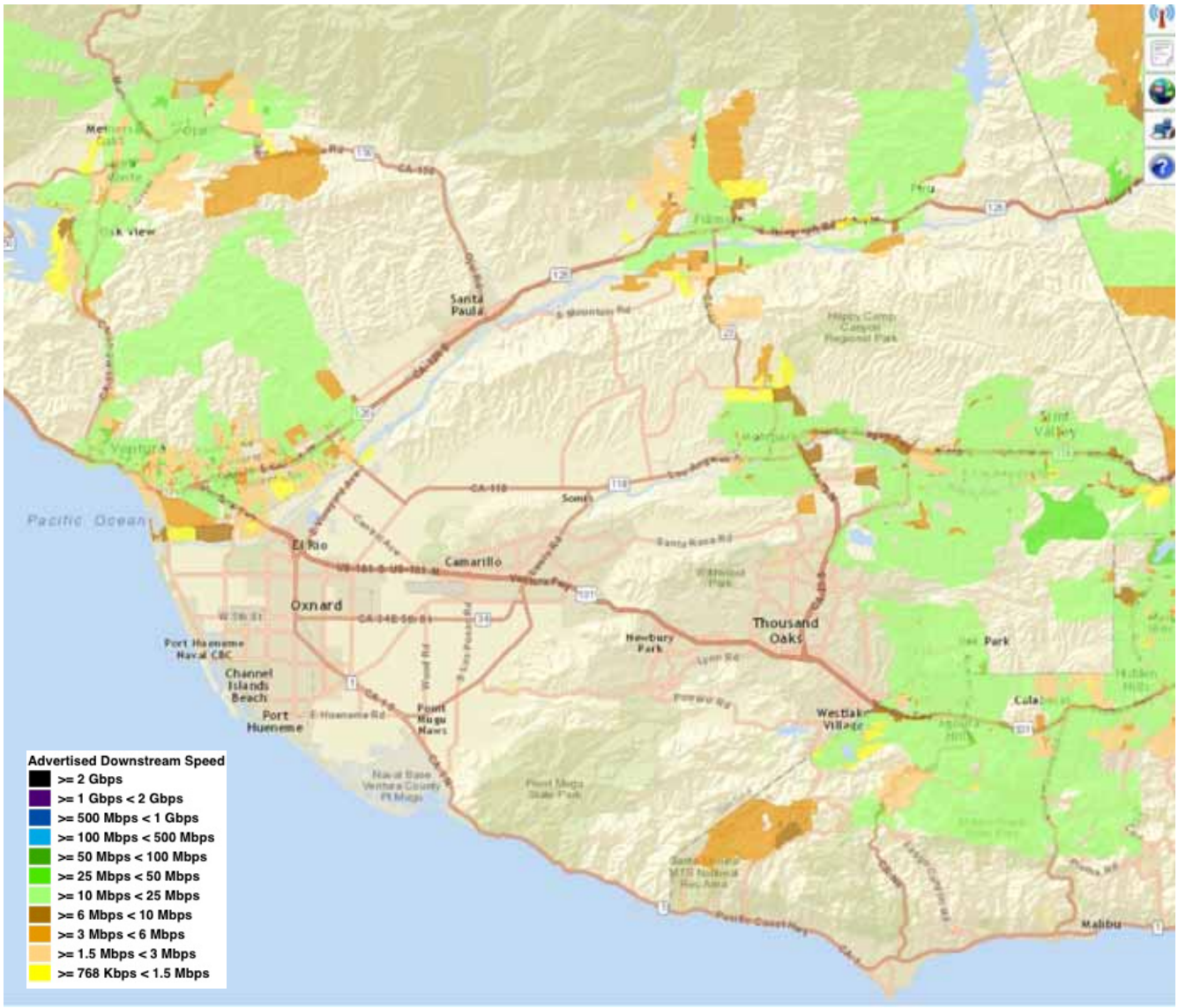
BCPC Region



San Luis Obispo County

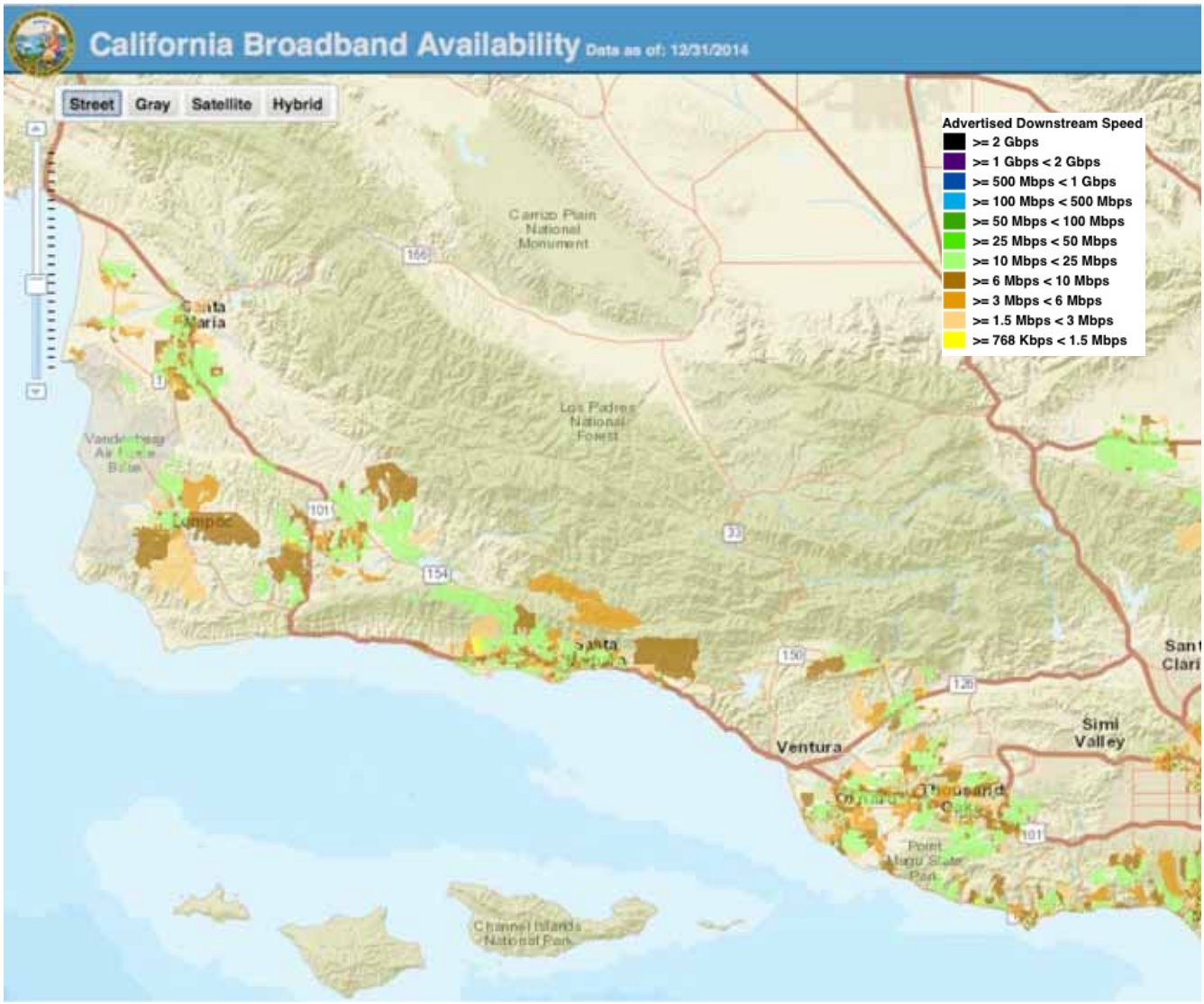


Ventura County

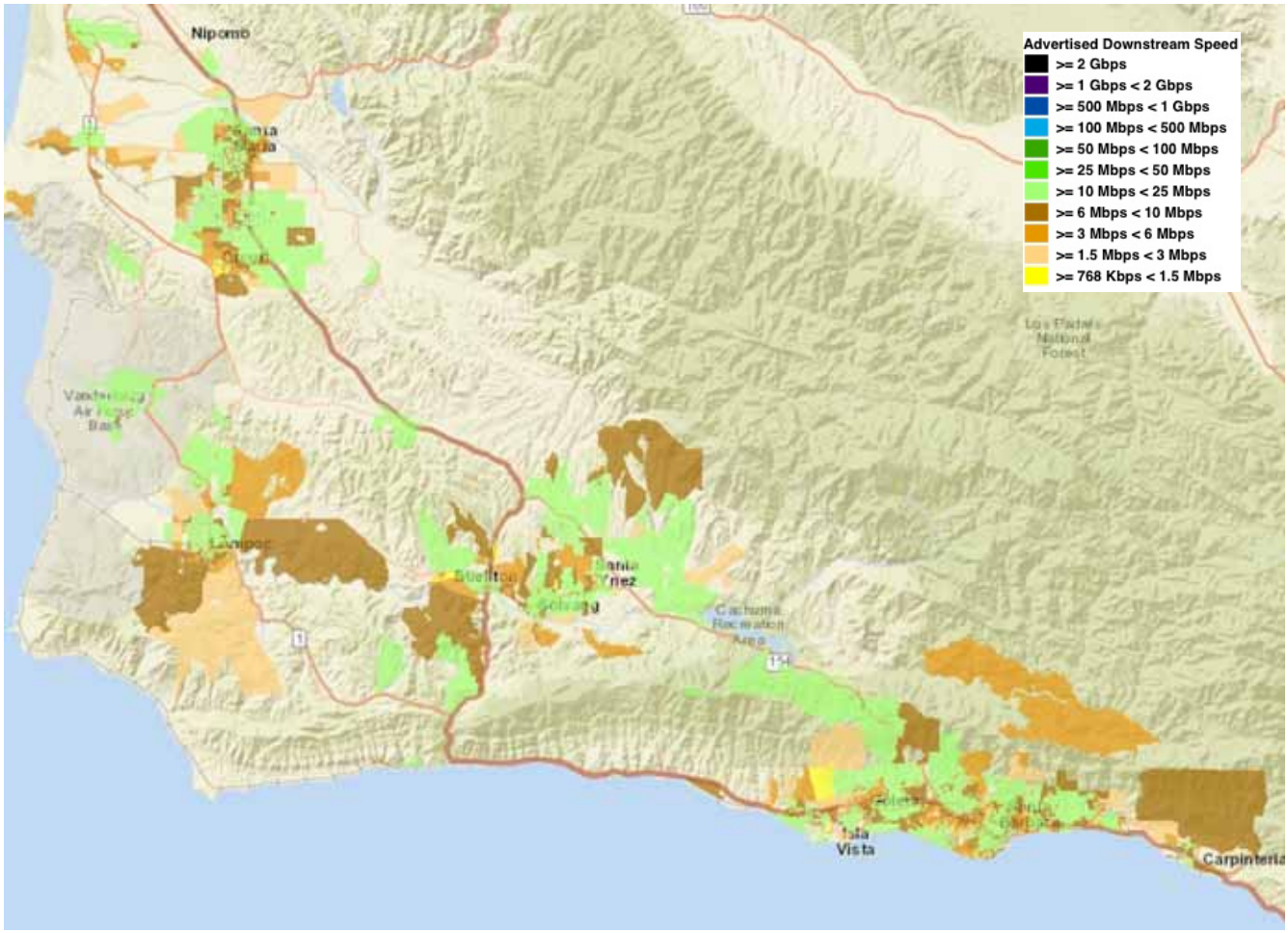


8. Verizon DSL service

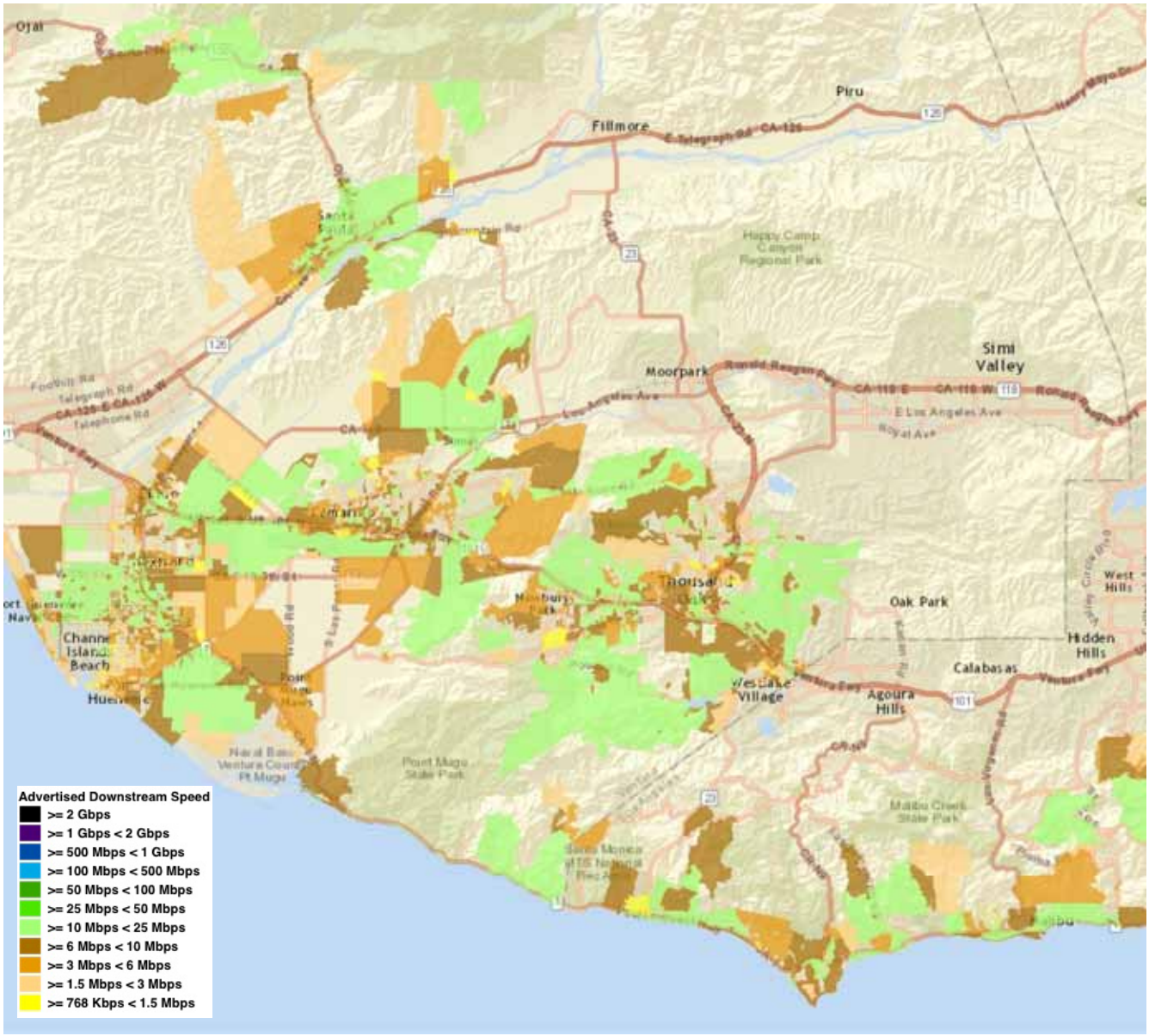
BCPC Region



Santa Barbara County

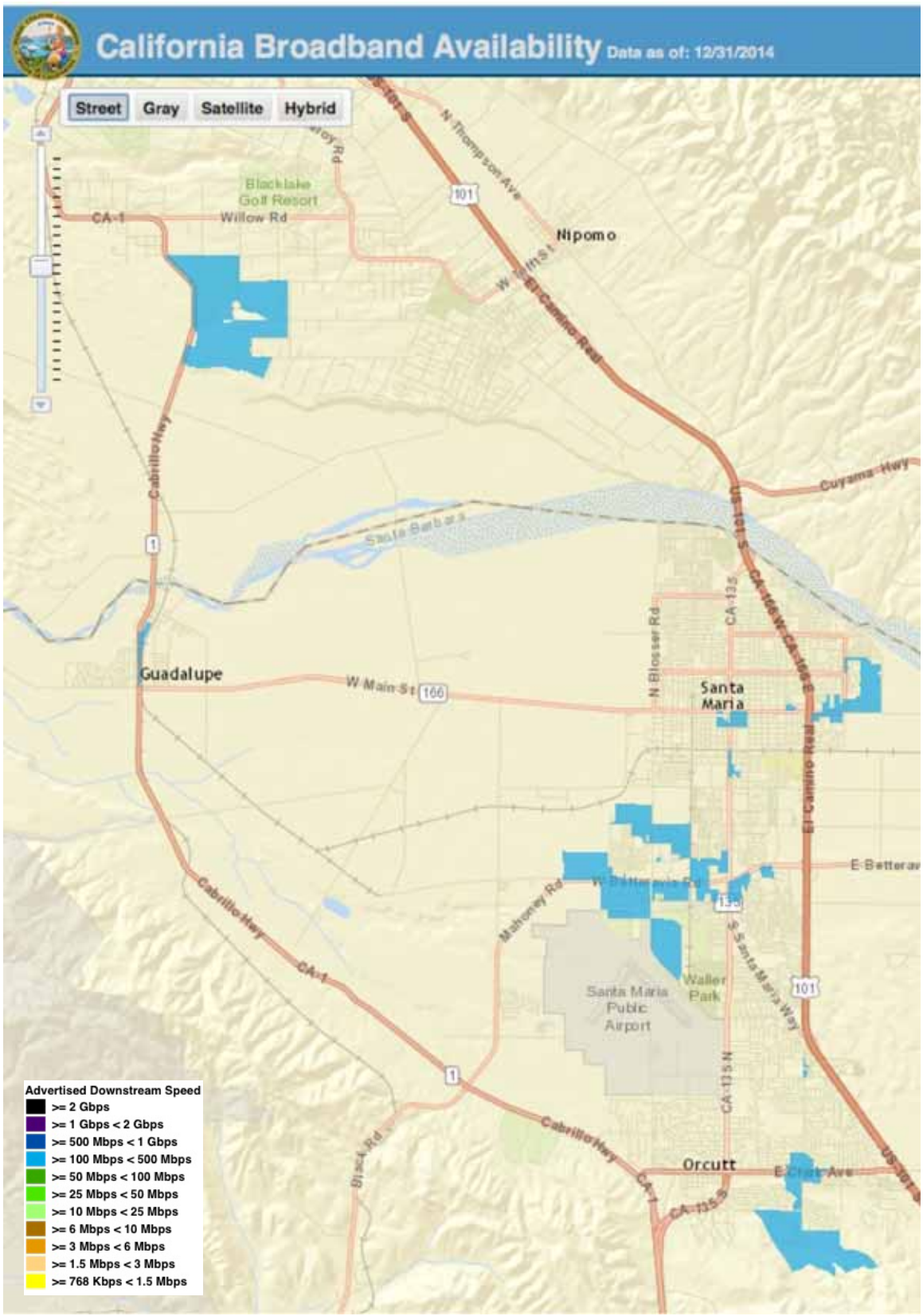


Ventura County



9. Verizon FiOS service

San Luis Obispo and Santa Barbara Counties

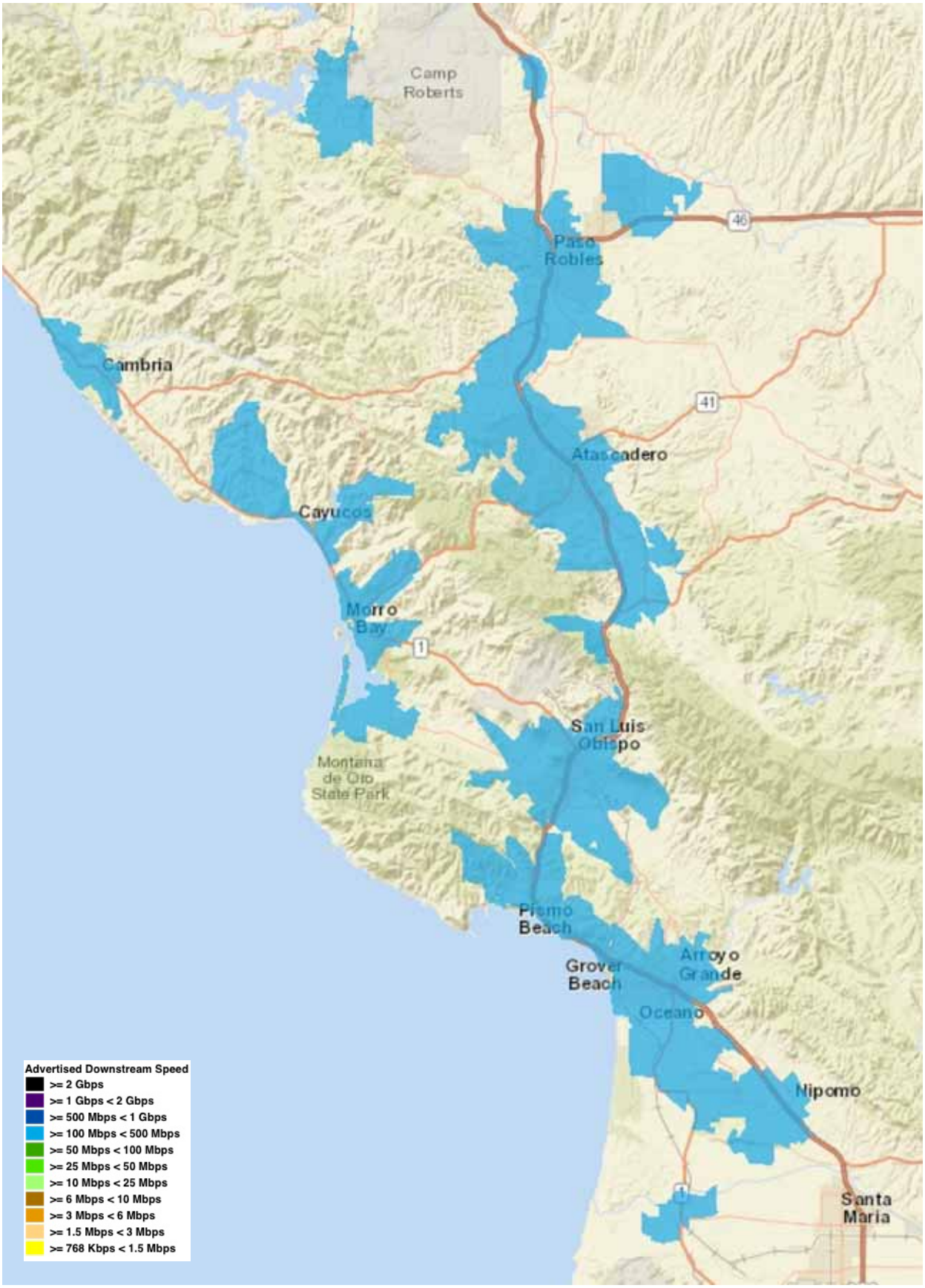


Ventura County

10. Charter Communications cable modem service

BCPC Region

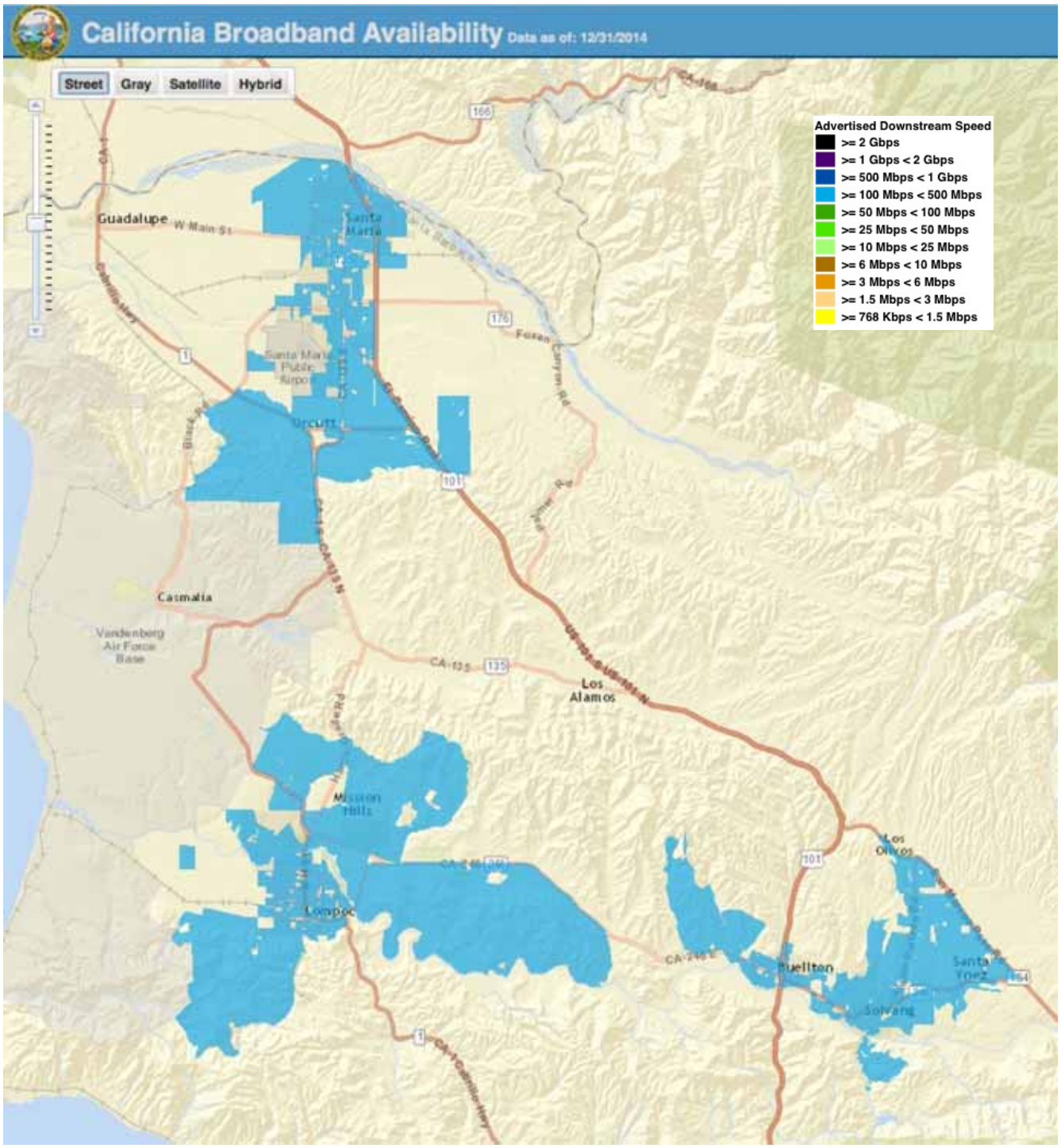
San Luis Obispo County



Ventura County

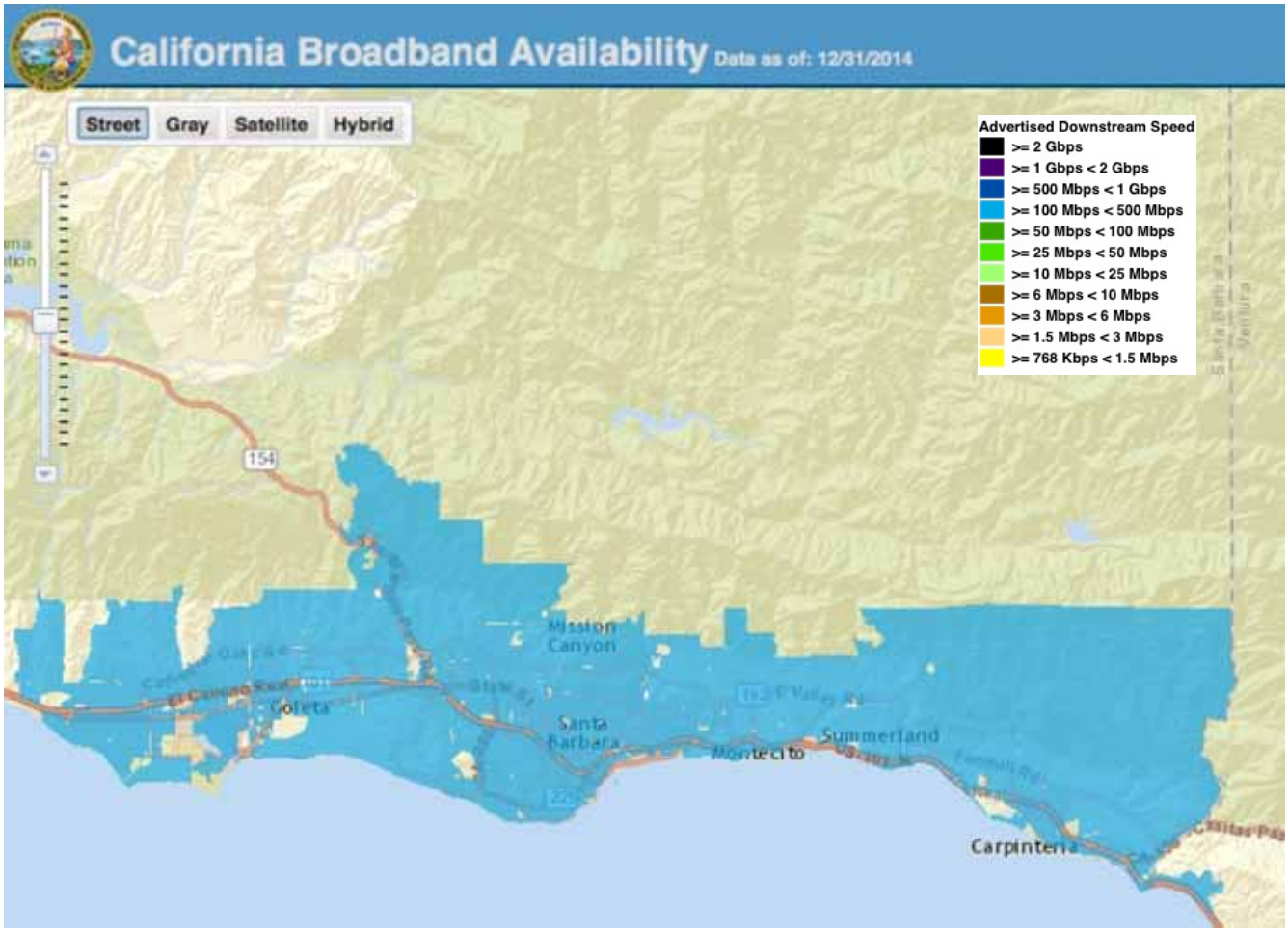
11. Comcast cable modem service

Santa Barbara County



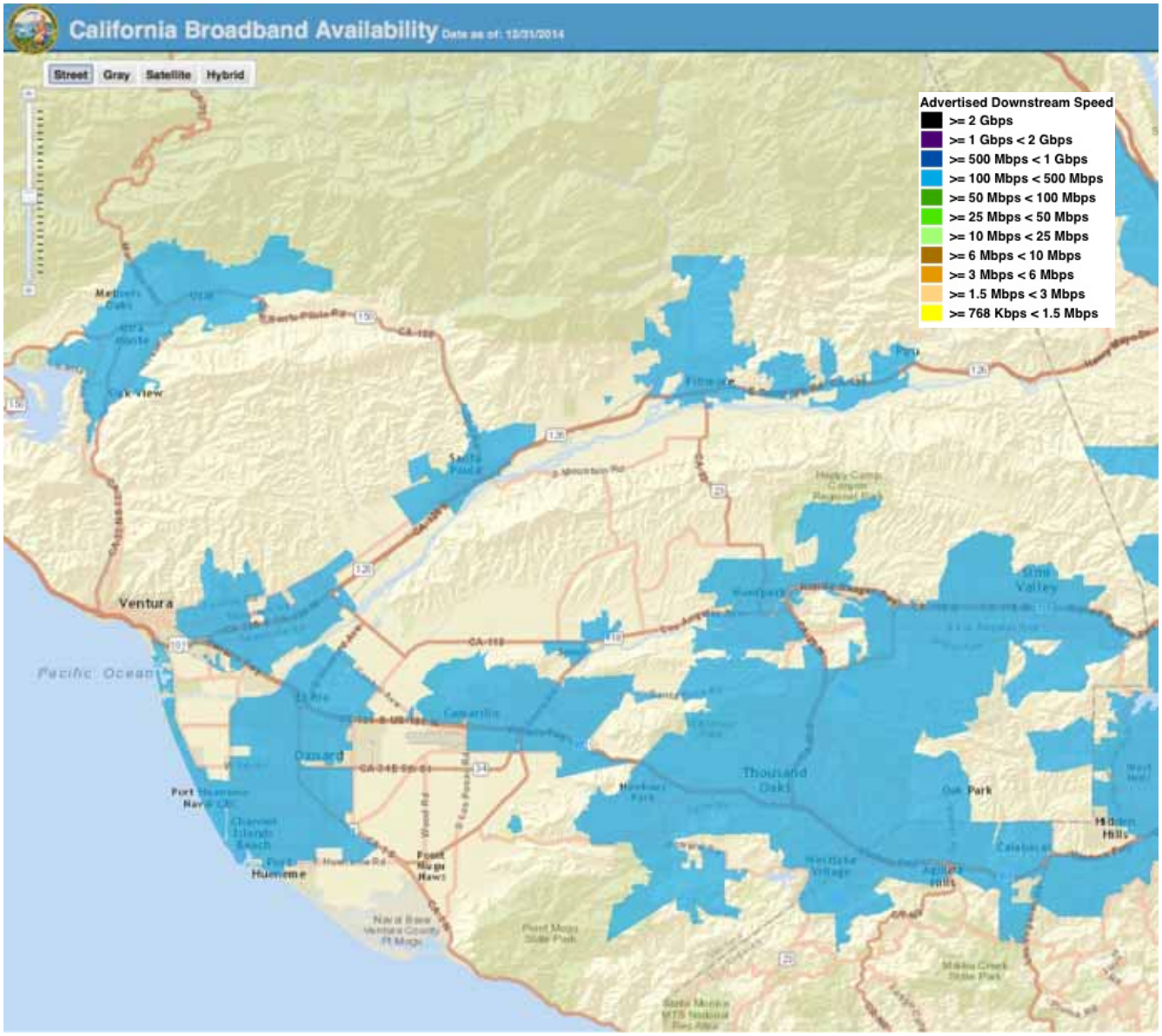
12. Cox Communications cable modem service

Santa Barbara County



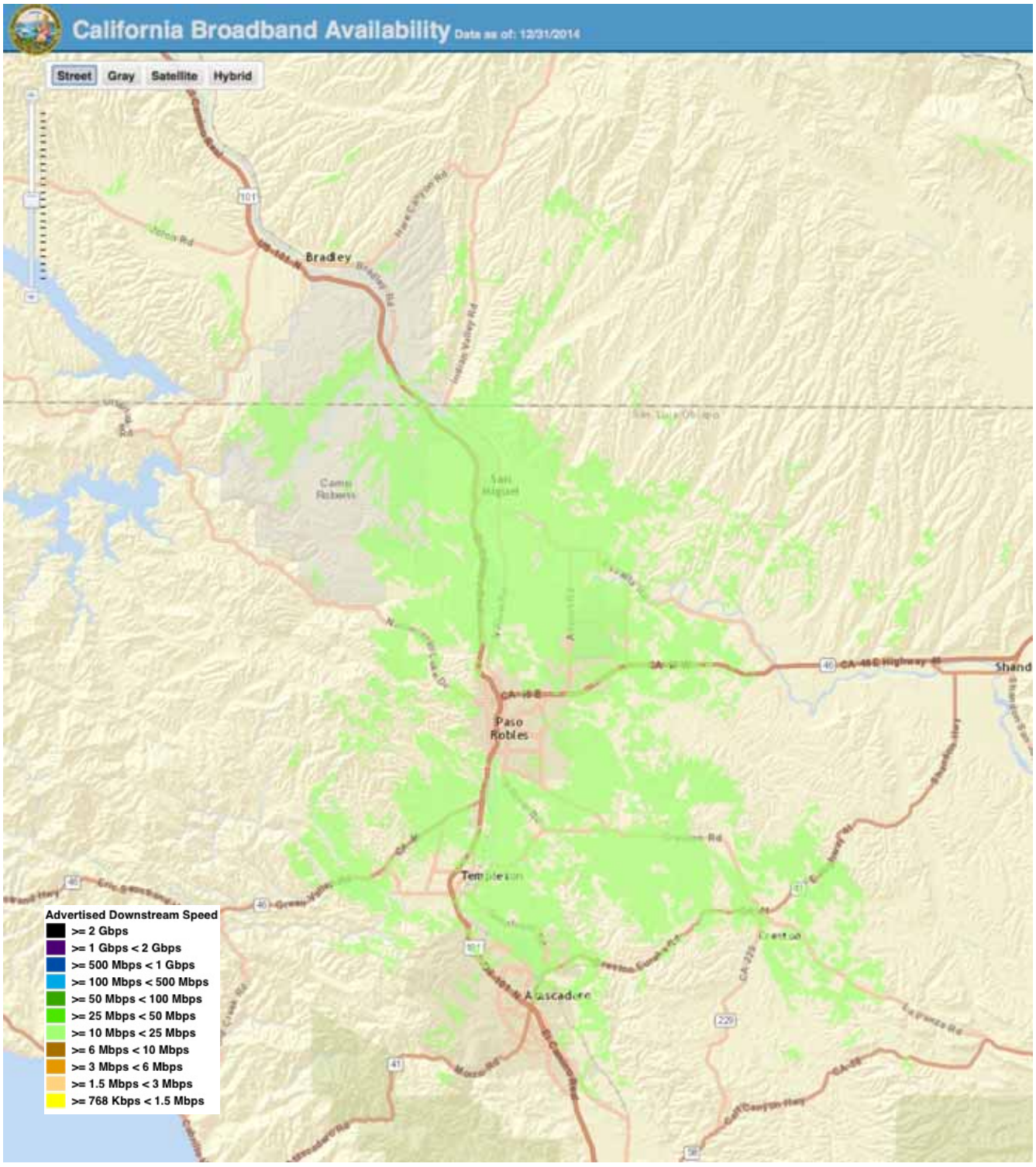
13. Time Warner cable modem service

Ventura County



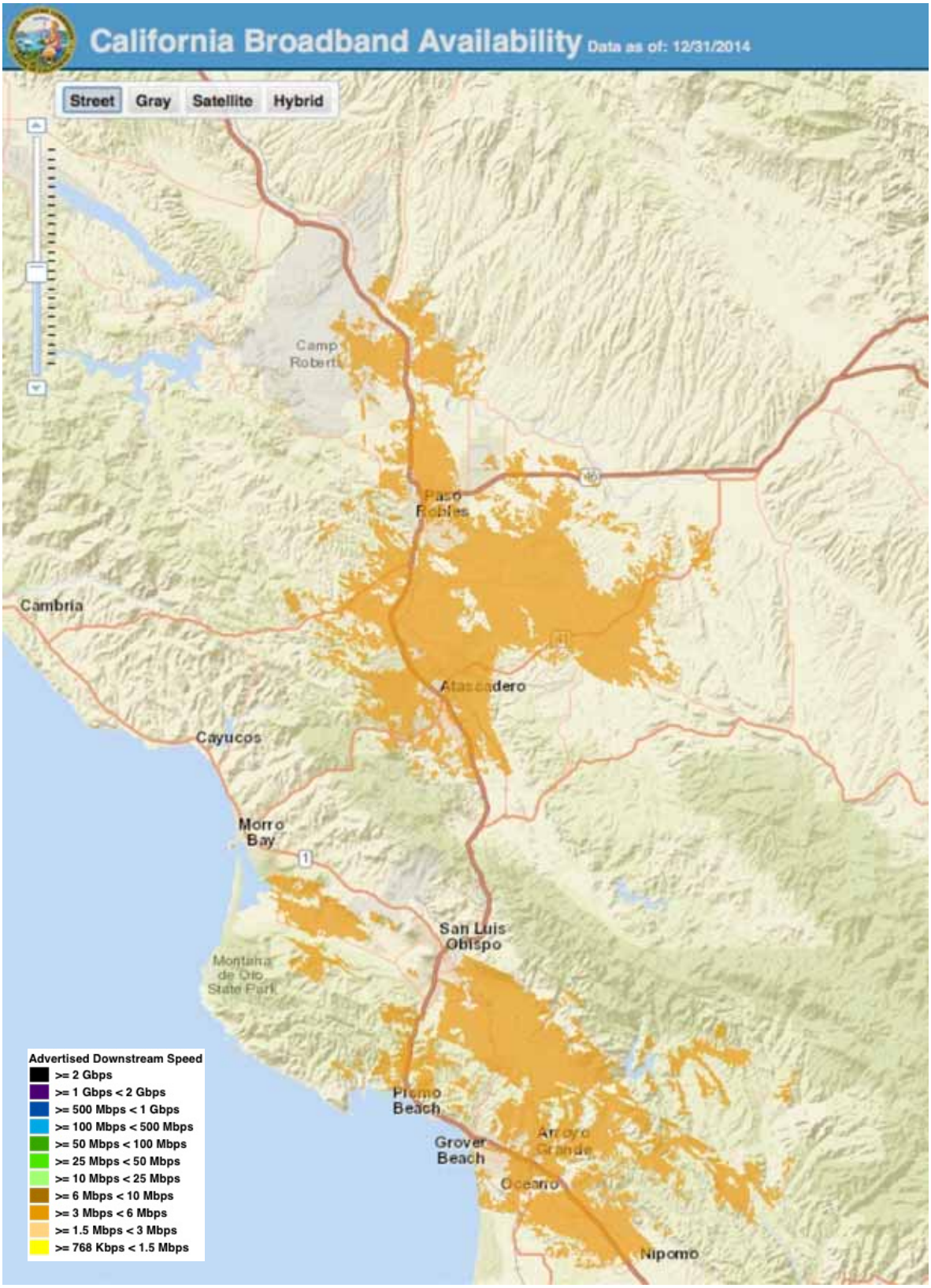
14. Outback Internet fixed wireless service (unlicensed)

San Luis Obispo County

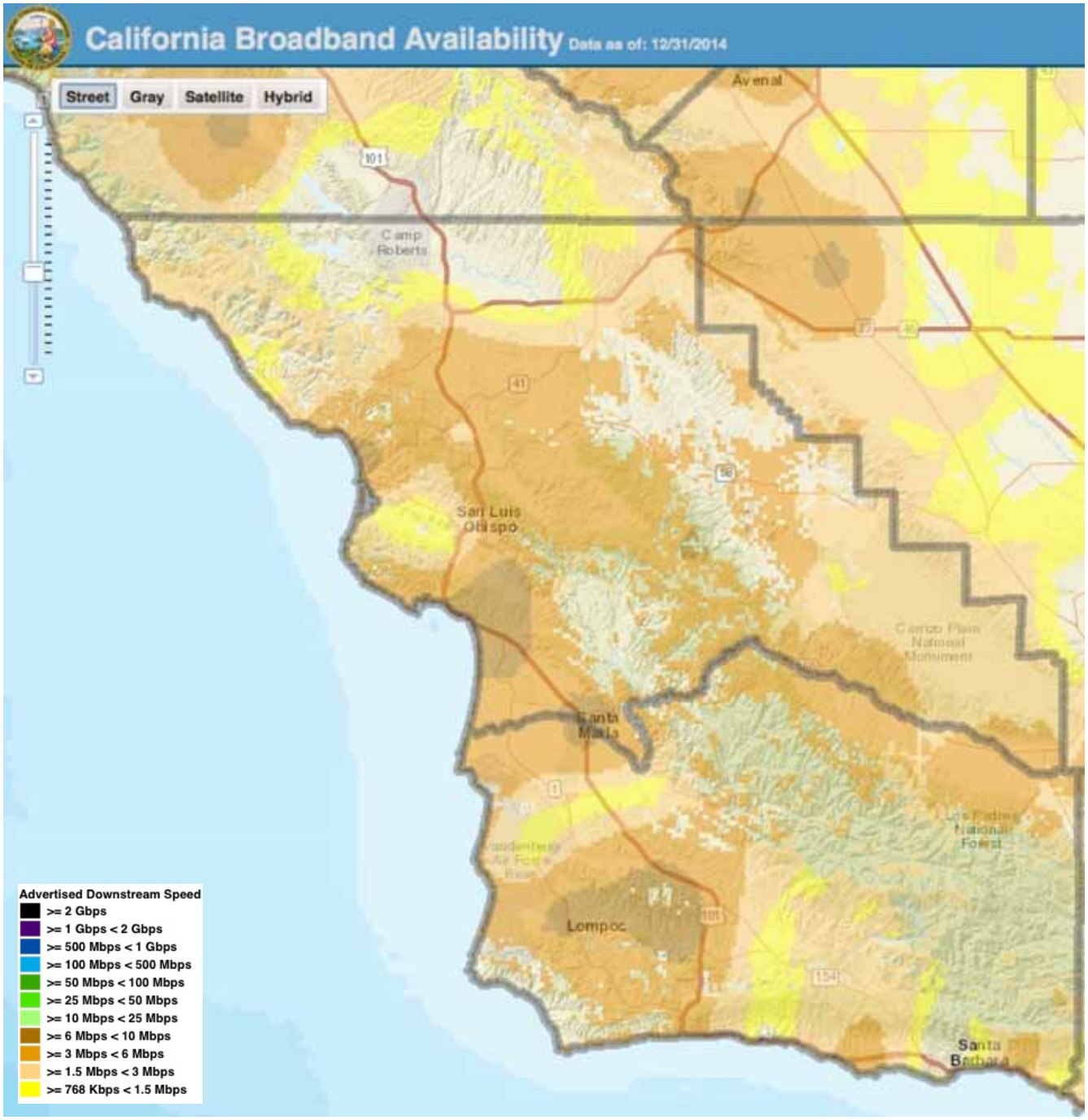


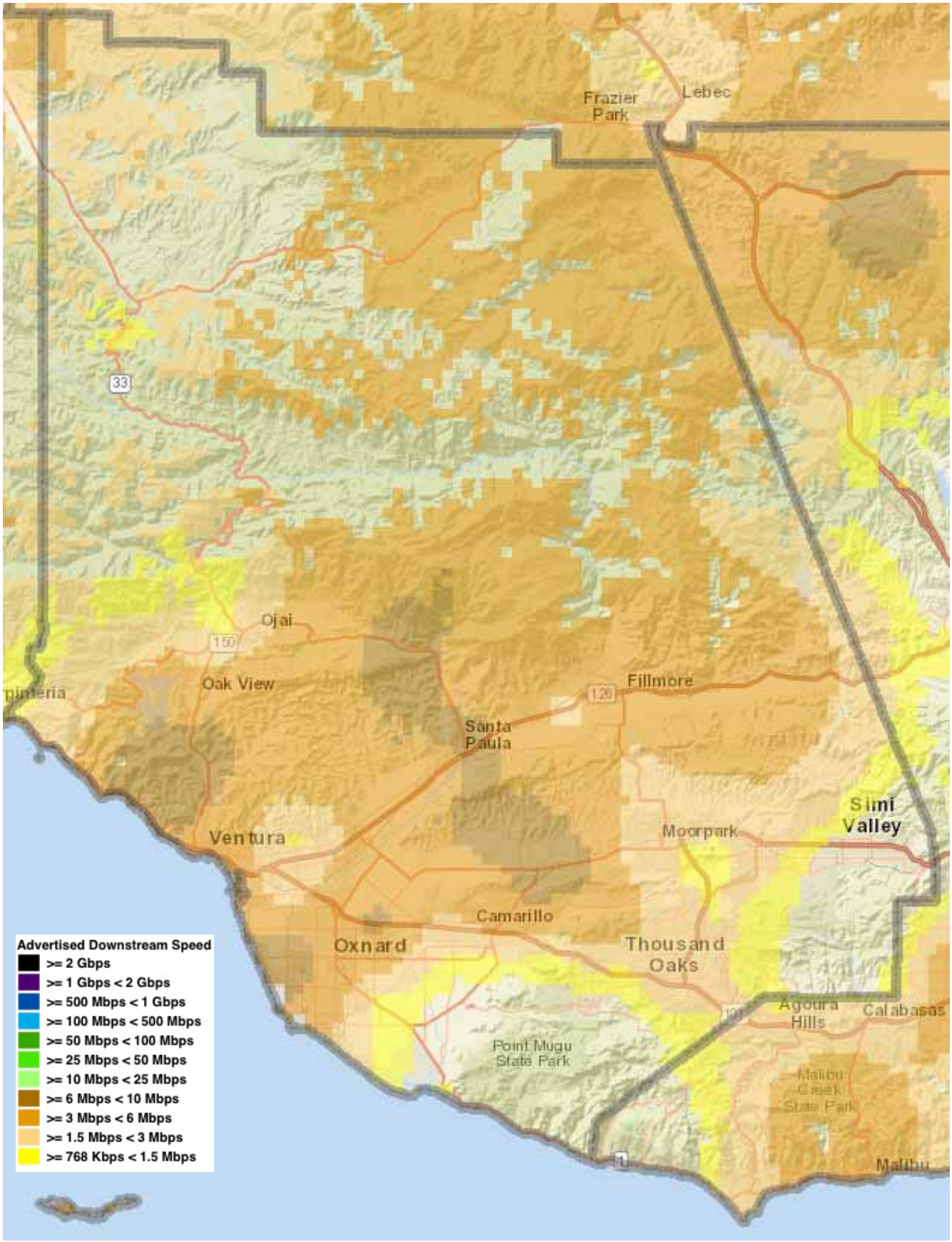
15. Surfnet fixed wireless service (unlicensed)

San Luis Obispo County

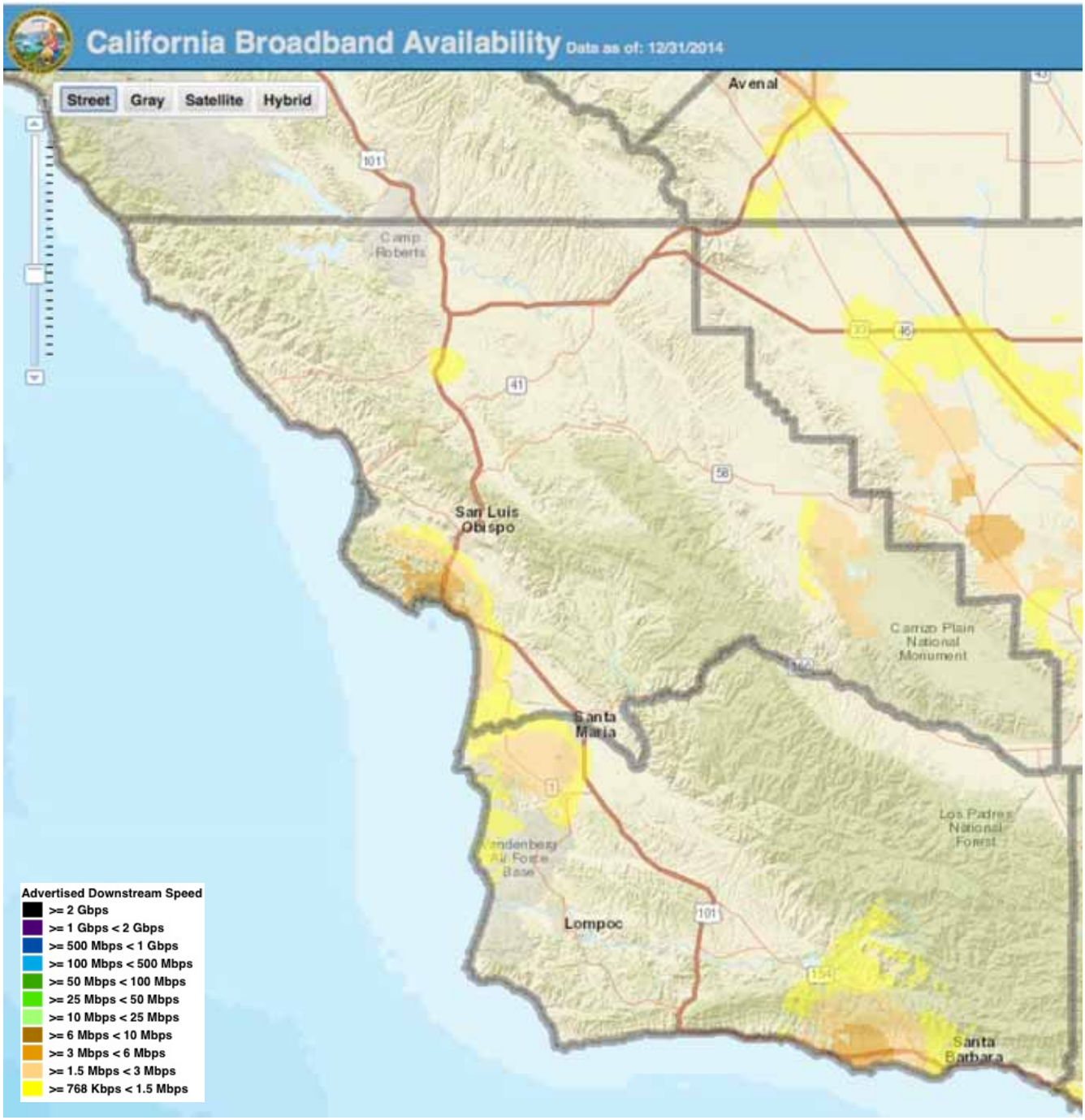


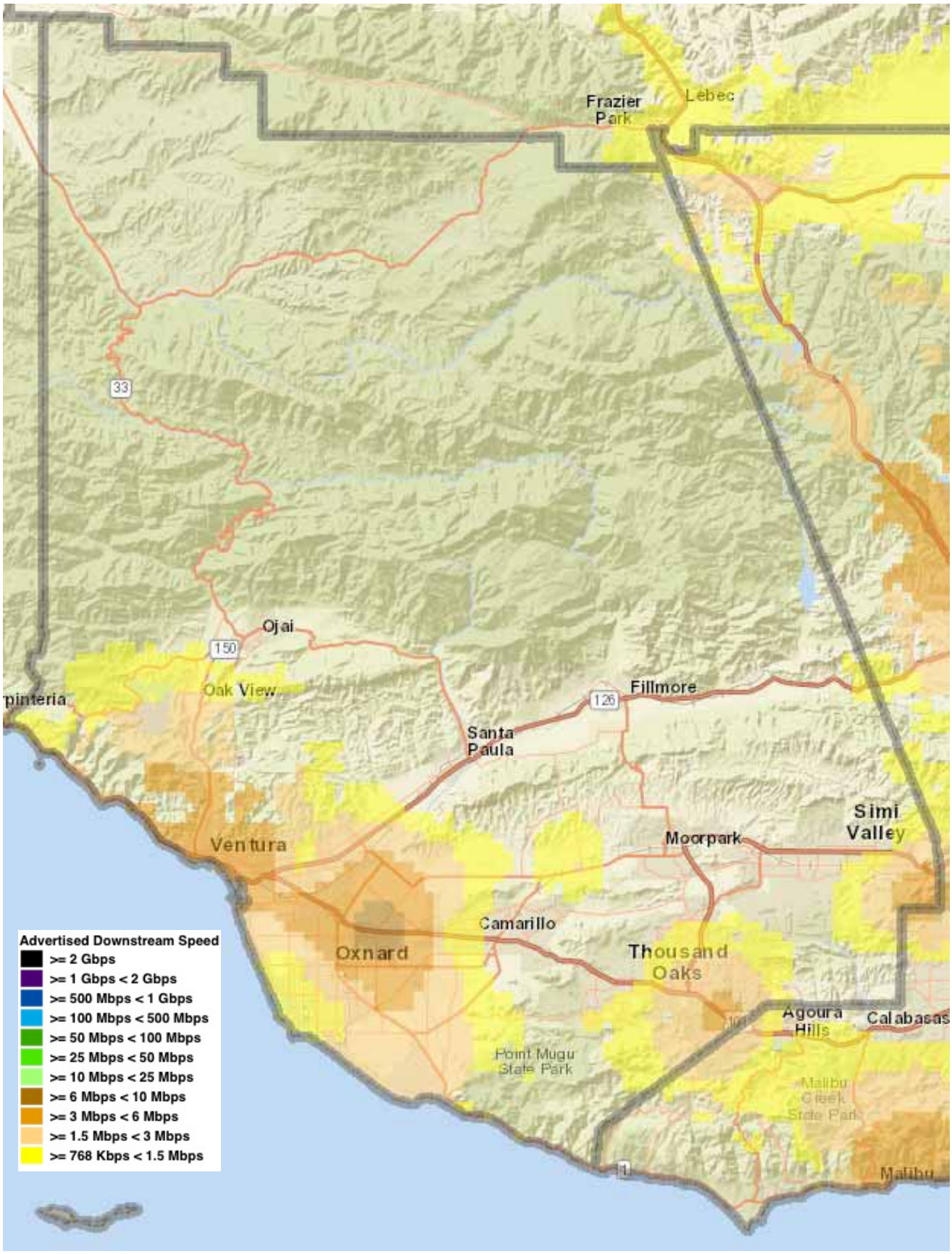
16. AT&T mobile broadband service




Frazier Park
Lebec
33
Ojai
150
Oak View
Fillmore
126
Santa Paula
Ventura
Moorpark
Simi Valley
Camarillo
Oxnard
Thousand Oaks
Agoura Hills
Calabasas
Point Mugu State Park
Malibu Creek State Park
Malibu
Advertised Downstream Speed
>= 2 Gbps
>= 1 Gbps < 2 Gbps
>= 500 Mbps < 1 Gbps
>= 100 Mbps < 500 Mbps
>= 50 Mbps < 100 Mbps
>= 25 Mbps < 50 Mbps
>= 10 Mbps < 25 Mbps
>= 6 Mbps < 10 Mbps
>= 3 Mbps < 6 Mbps
>= 1.5 Mbps < 3 Mbps
>= 768 Kbps < 1.5 Mbps

17. Sprint mobile broadband service

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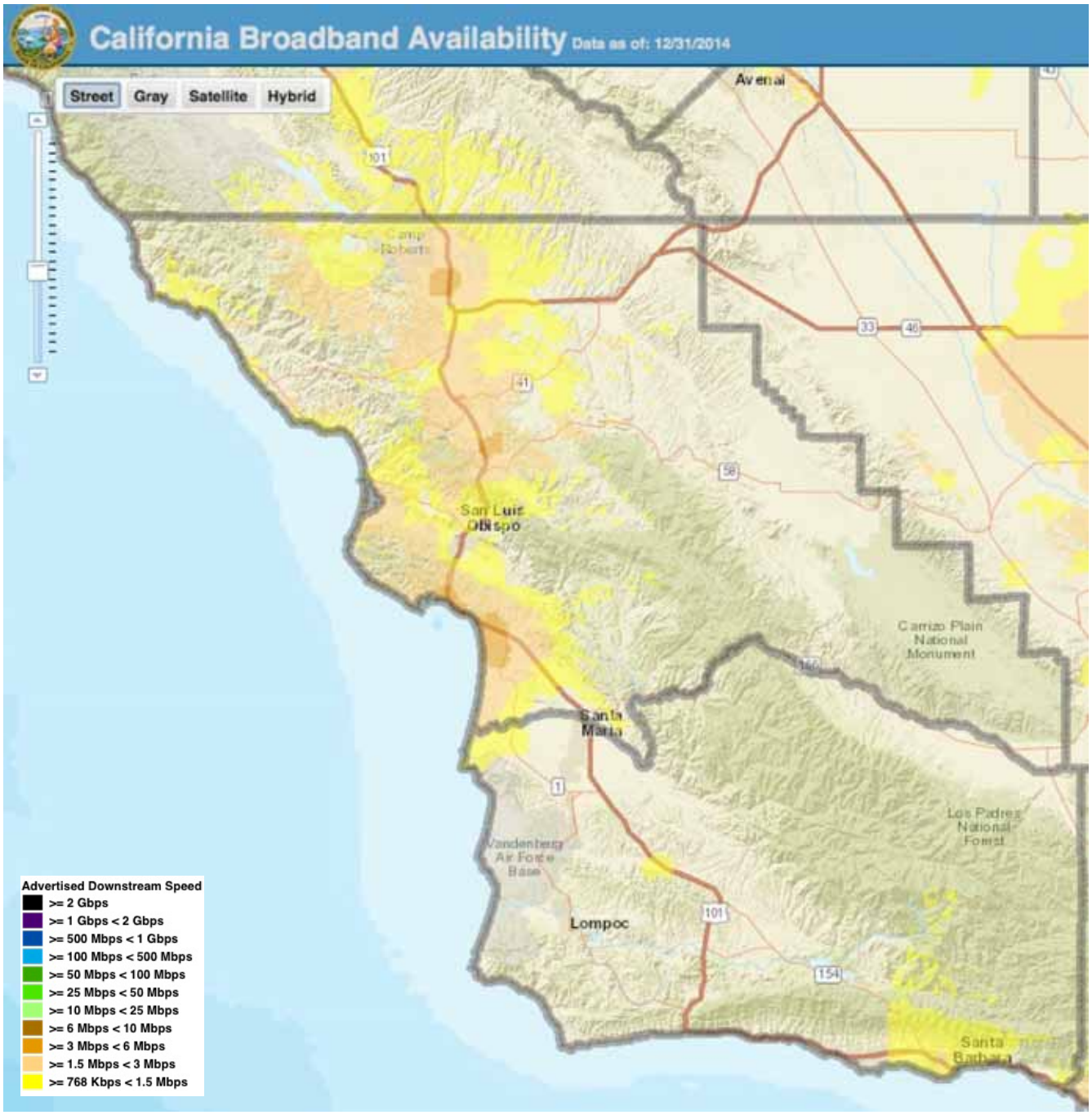
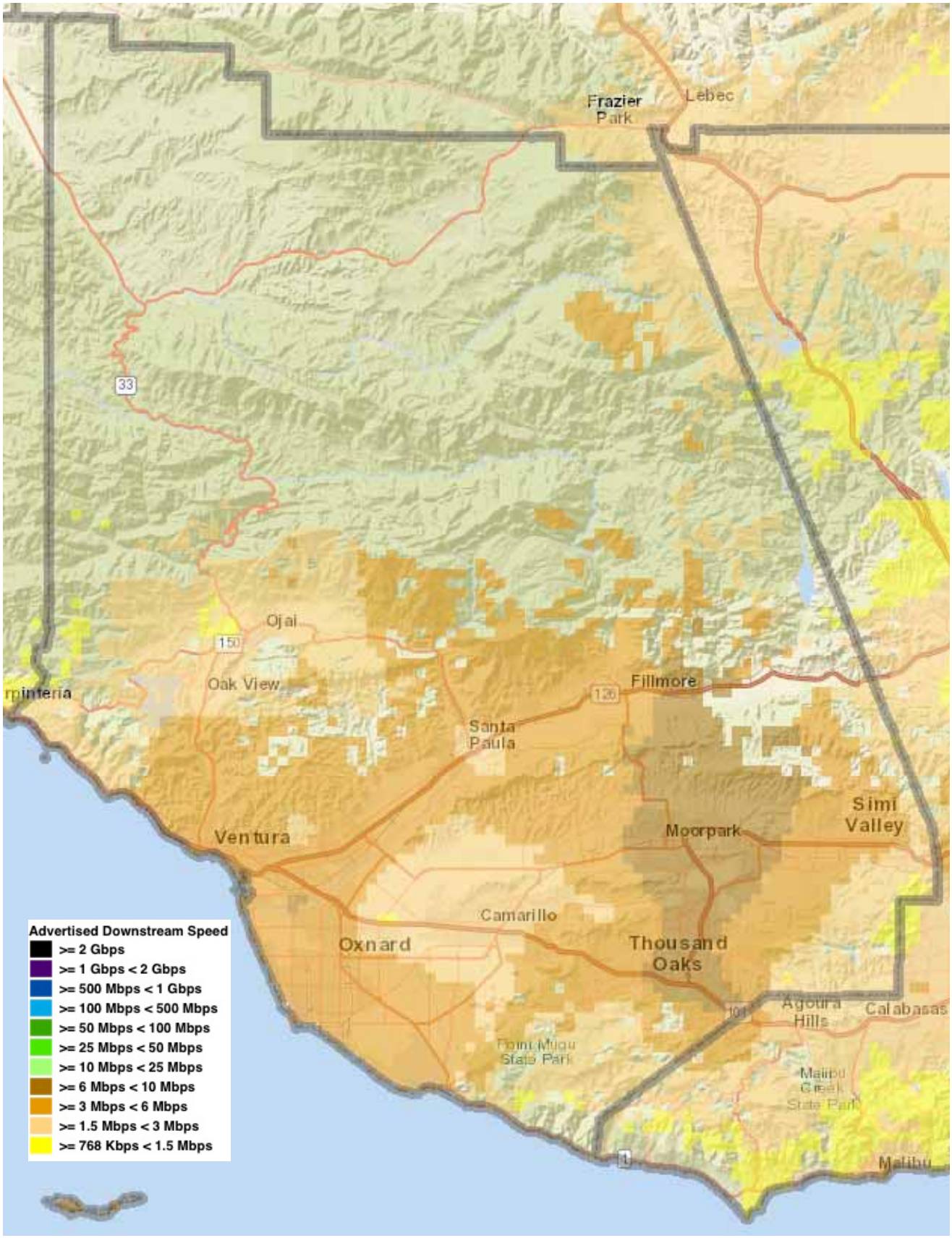
Santa Paula
Ventura
Moorpark
Simi Valley
Camarillo
Oxnard
Thousand Oaks
Agoura Hills
Calabasas
Point Mugu State Park
Malibu Creek State Park
1
Malibu
Advertised Downstream Speed
>= 2 Gbps
>= 1 Gbps < 2 Gbps
>= 500 Mbps < 1 Gbps
>= 100 Mbps < 500 Mbps
>= 50 Mbps < 100 Mbps
>= 25 Mbps < 50 Mbps
>= 10 Mbps < 25 Mbps
>= 6 Mbps < 10 Mbps
>= 3 Mbps < 6 Mbps
>= 1.5 Mbps < 3 Mbps
>= 768 Kbps < 1.5 Mbps

18. T-Mobile mobile broadband service

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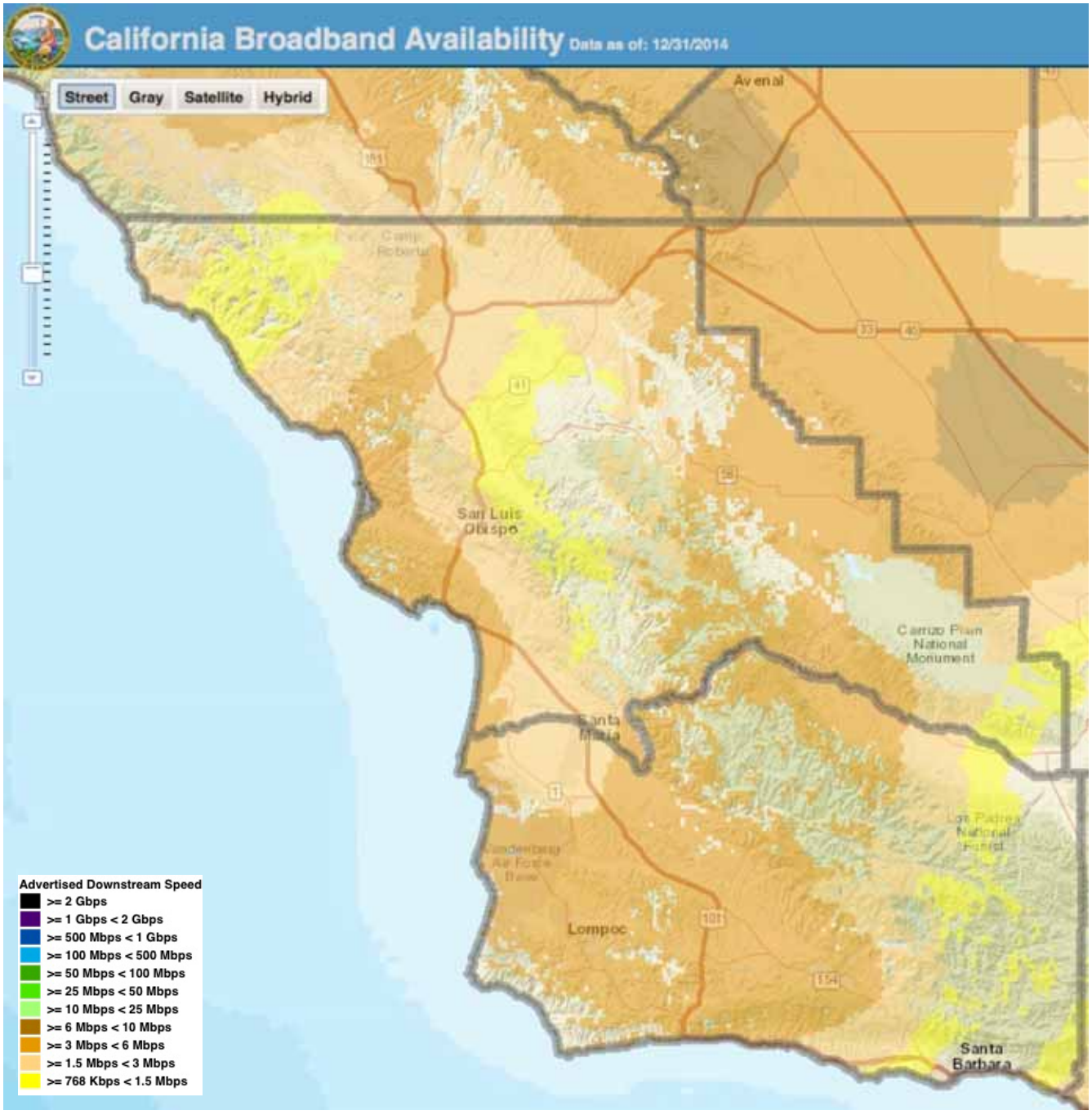
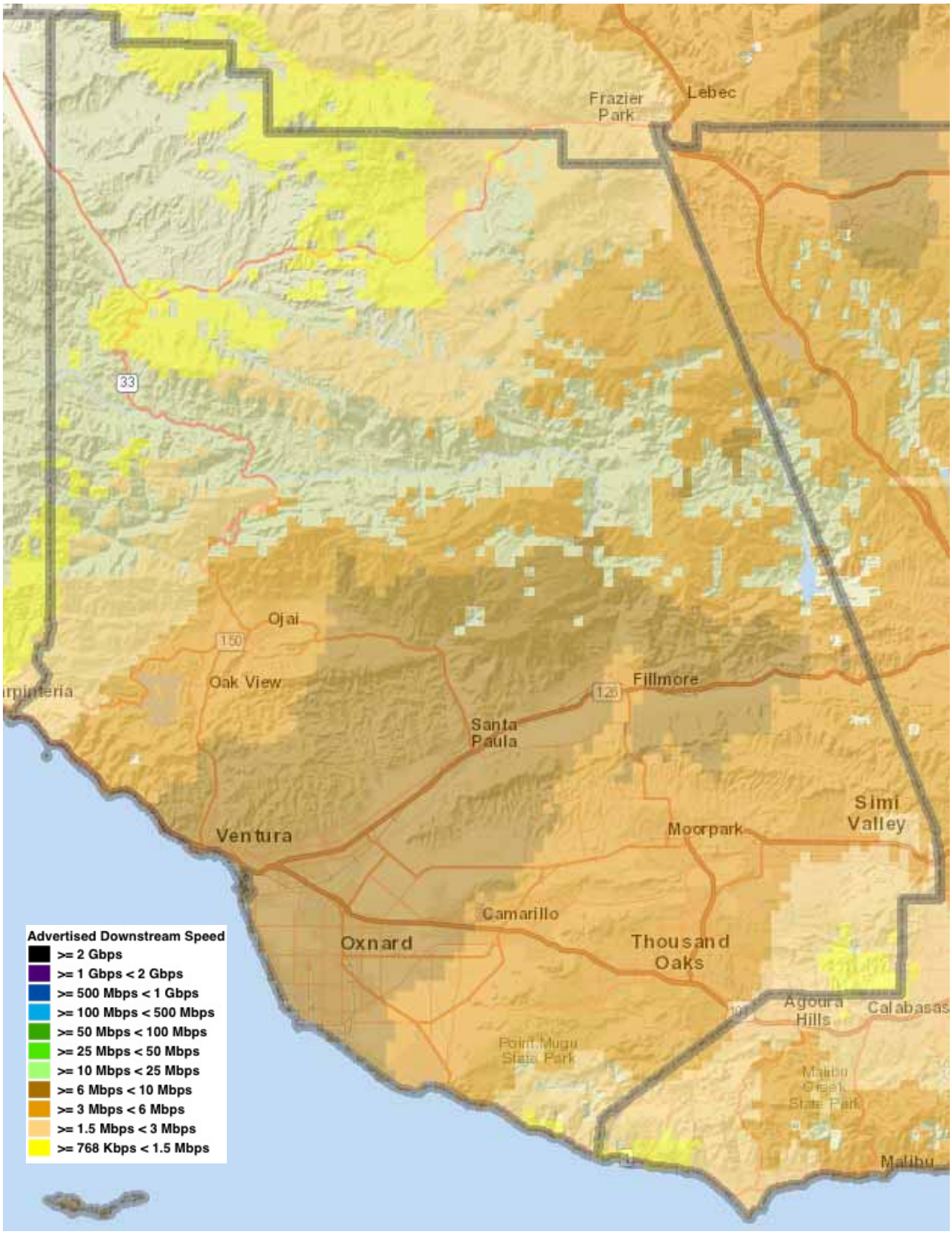
Santa Paula
Ventura
Moorpark
Simi Valley
Camarillo
Oxnard
Thousand Oaks
101
Agoura Hills
Calabasas
Point Mugu State Park
Malibu Creek State Park
1
Malibu
Advertised Downstream Speed
>= 2 Gbps
>= 1 Gbps < 2 Gbps
>= 500 Mbps < 1 Gbps
>= 100 Mbps < 500 Mbps
>= 50 Mbps < 100 Mbps
>= 25 Mbps < 50 Mbps
>= 10 Mbps < 25 Mbps
>= 6 Mbps < 10 Mbps
>= 3 Mbps < 6 Mbps
>= 1.5 Mbps < 3 Mbps
>= 768 Kbps < 1.5 Mbps

19. Verizon mobile broadband service




Frazier Park
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Santa Paula
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Camarillo
Oxnard
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Agoura Hills
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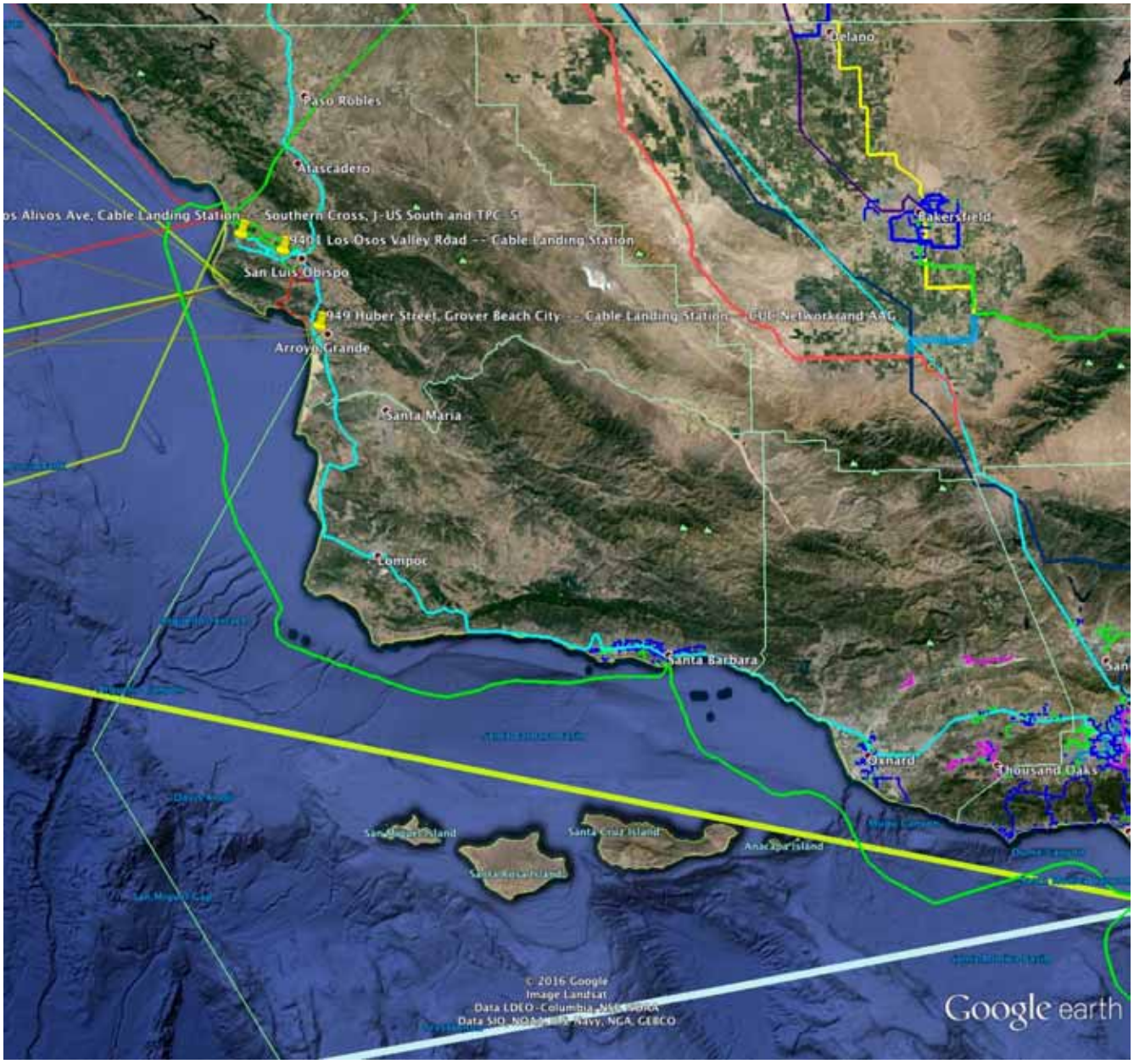
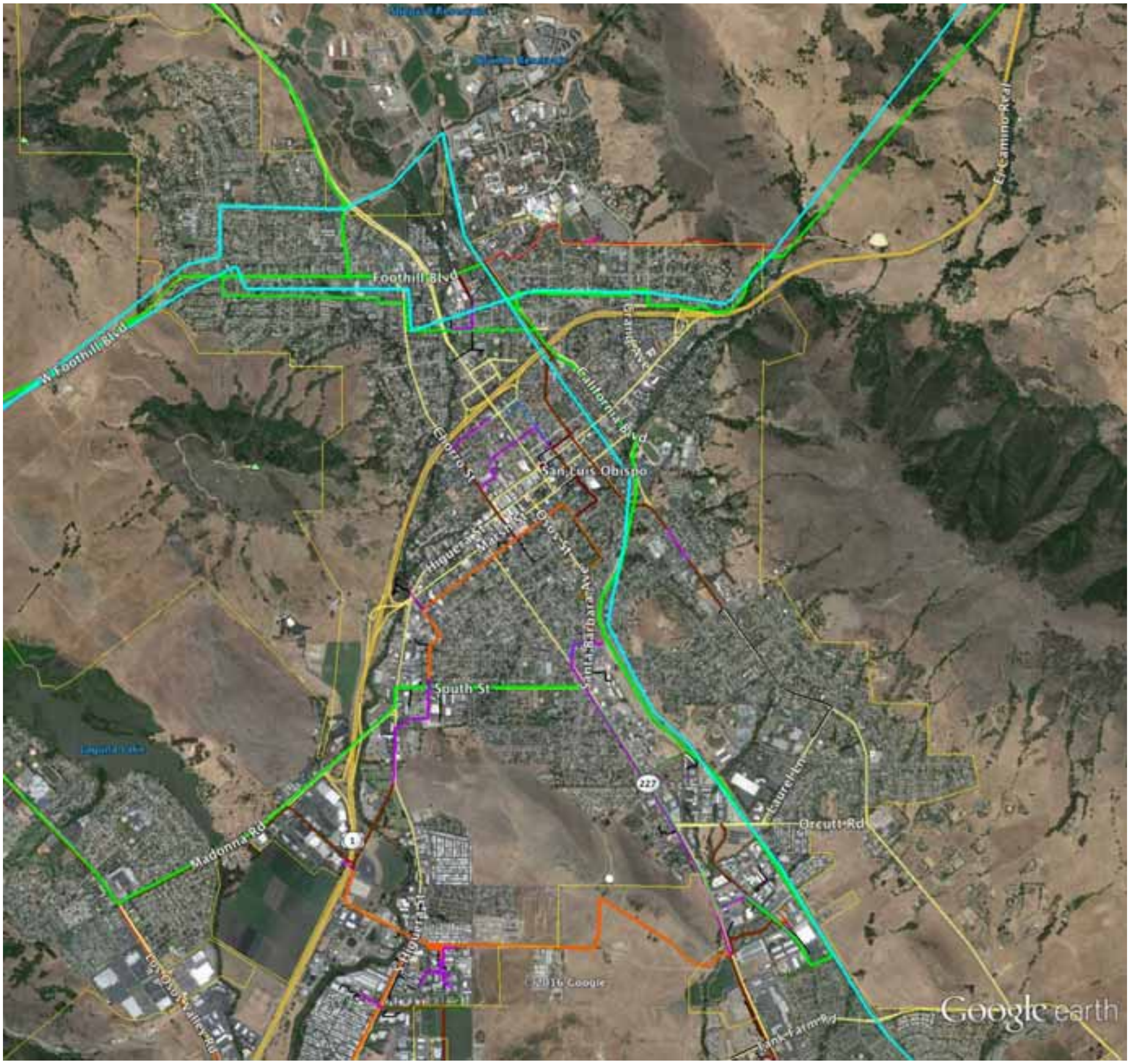
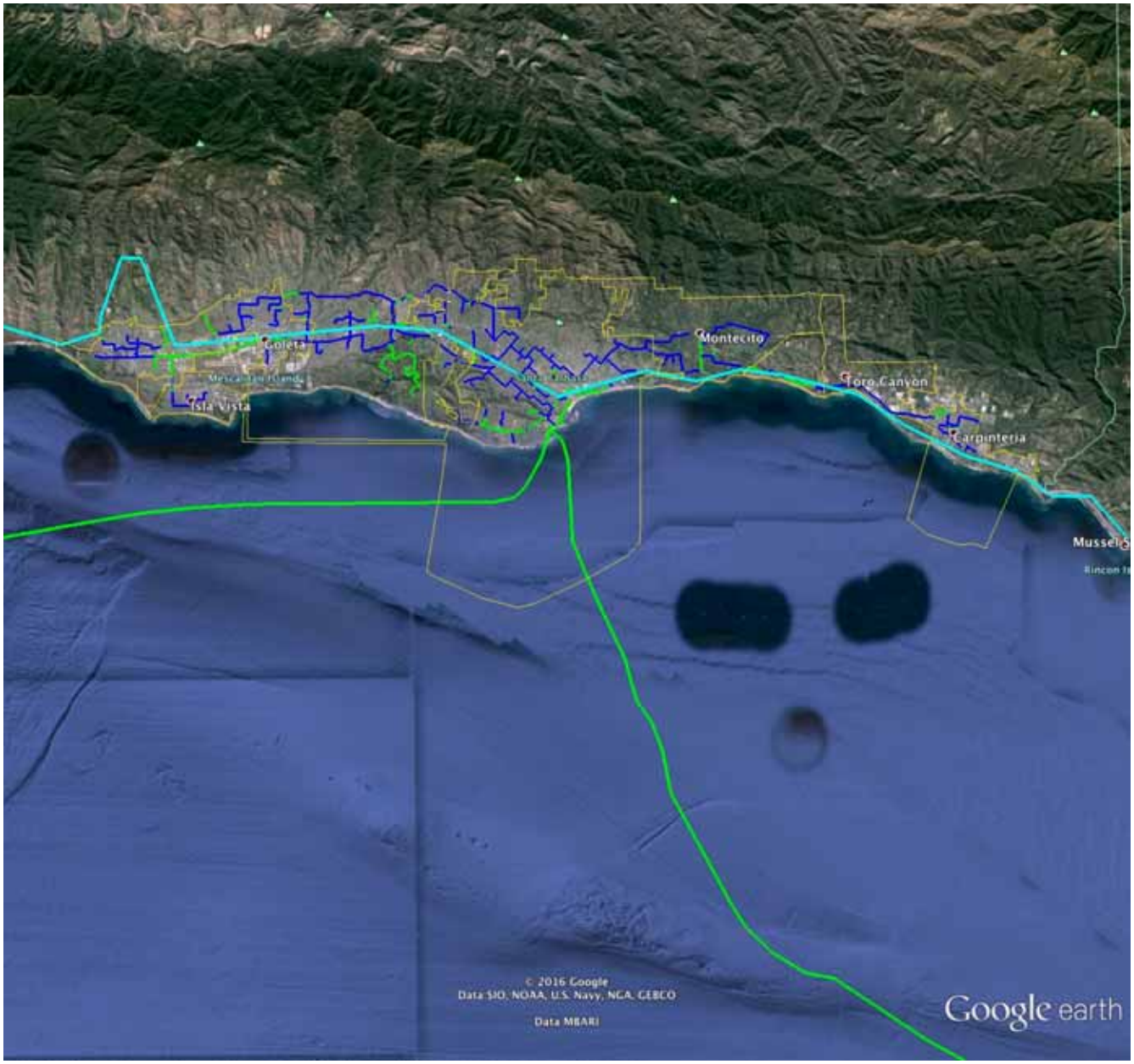
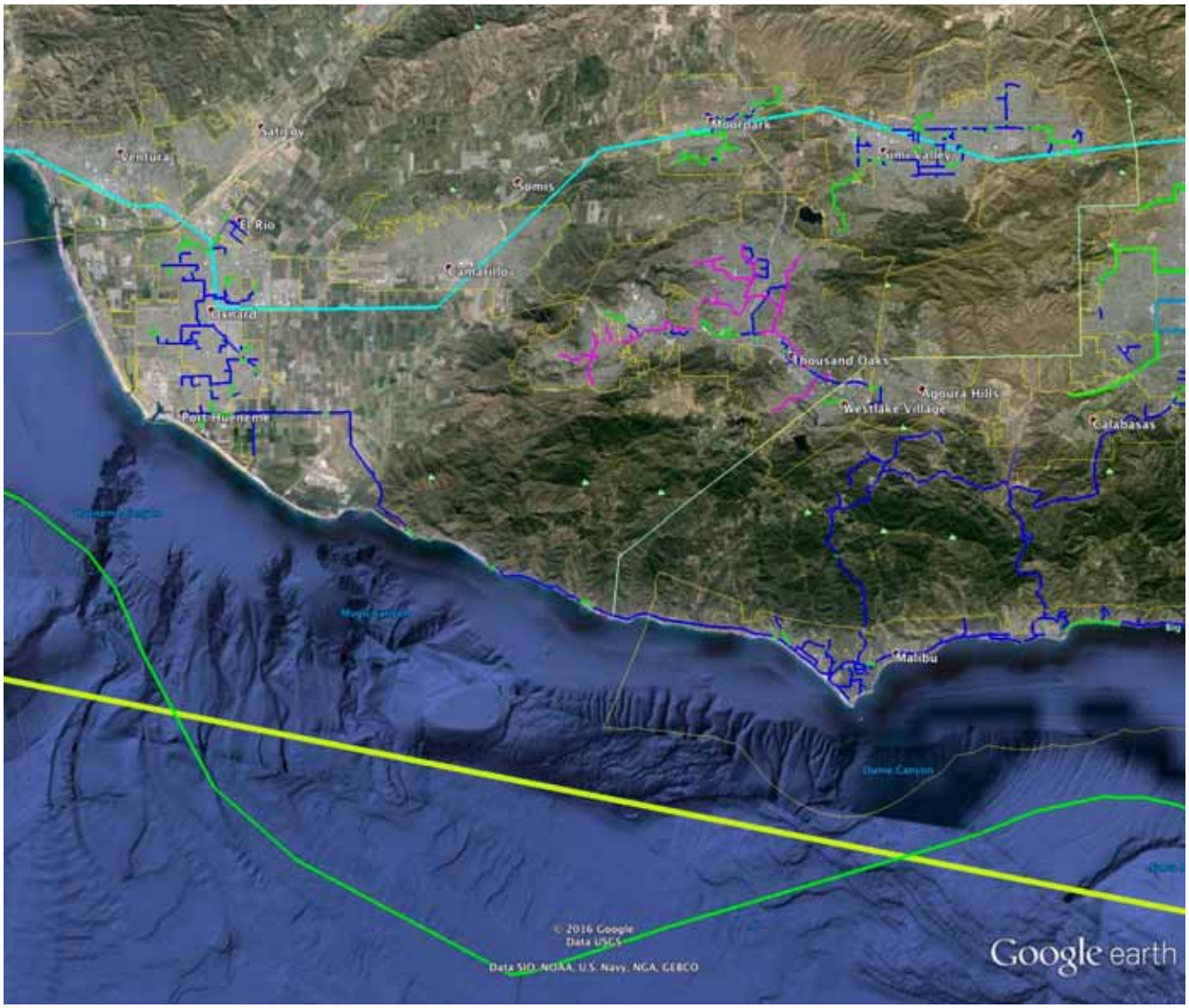
>= 25 Mbps < 50 Mbps
>= 10 Mbps < 25 Mbps
>= 6 Mbps < 10 Mbps
>= 3 Mbps < 6 Mbps
>= 1.5 Mbps < 3 Mbps
>= 768 Kbps < 1.5 Mbps

20. Regional fiber routes




Foothill Blvd
W Foothill Blvd
California Blvd
Grand Ave
Chorro St
San Luis Obispo
Higuera St
Marsh St
Osos St
Santa Barbara Ave
South St
Laguna Lake
Madonna Rd
Orcutt Rd
Laurel Ln
S Higuera St
Los Osos Valley Rd
Tank Farm Rd
El Camino Real
© 2016 Google
Google earth


Goleta
Isla Vista
Montecito
Toro Canyon
Carpinteria
© 2016 Google
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Data MBARI
Google earth


Ventura
Saticoy
Somis
El Rio
Camarillo
Oxnard
Port Hueneme
Thousand Oaks
Agoura Hills
Westlake Village
Calabasas
Malibu
Dume Canyon
© 2016 Google
Data USGS
Data SIO, NOAA, U.S. Navy, NGA, GEBCO
Google earth

Appendix B - Infrastructure grades

Community grades

County	Grade	GPA	2015 Change
San Luis Obispo	D-	0.8	
Santa Barbara	D-	0.8	-0.1
Ventura	C	2.1	+0.5
BCPC region	D+	1.4	+0.2

San Luis Obispo County	Grade	GPA	2015 Change
Arroyo Grande city	D	1.0	
Atascadero city	D	1.0	
Avilla Beach CDP	D-	0.9	
Blacklake CDP	D	1.0	
Callender CDP	D	1.0	
Cambria CDP	D	1.0	
Cayucos CDP	D	1.0	
Creston CDP	F	0.0	
Edna CDP	F	0.0	
El Paso de Robles (Paso Robles) city	D	1.0	
Garden Farms CDP	D	1.0	
Grover Beach city	D	1.0	
Lake Nacimiento CDP	D-	0.9	
Los Berros CDP	D-	0.9	
Los Osos CDP	D	1.0	
Los Ranchos CDP	D-	0.9	
Morro Bay city	D	1.0	
Nipomo CDP	D-	0.9	
Oak Shores CDP	F	0.0	
Oceano CDP	D	1.0	
Pismo Beach city	D	1.0	
San Luis Obispo city	D	1.0	
San Miguel CDP	D-	0.9	
San Simeon CDP	F	0.0	

Santa Margarita CDP	D	1.0
Shandon CDP	F	0.0
Templeton CDP	D	1.0
Whitley Gardens CDP	F	0.0
Woodlands CDP	C	2.0
Rest of San Luis Obispo County	F	0.2
San Luis Obispo County (overall)	**D-**	**0.8**

Santa Barbara County	**Grade**	**GPA**	**2015 Change**
Ballard CDP	D-	0.9	
Buellton city	D-	0.7	-0.1
Carpinteria city	D-	0.9	-0.1
Casmalia CDP	F-	0.0	
Cuyama CDP	F-	0.0	
Garey CDP	F-	0.0	
Goleta city	D-	0.9	-0.1
Guadalupe city	D	1.0	
Isla Vista CDP	D-	0.9	-0.1
Lompoc city	D-	0.9	
Los Alamos CDP	F-	0.0	
Los Olivos CDP	D-	0.7	
Mission Canyon CDP	D-	0.9	-0.1
Mission Hills CDP	D	1.0	
Montecito CDP	D	1.0	
New Cuyama CDP	F-	0.0	
Orcutt CDP	D	1.0	
Santa Barbara city	D	1.0	
Santa Maria city	D	1.0	
Santa Ynez CDP	D-	0.9	
Sisquoc CDP	F-	0.0	
Solvang city	D-	0.9	
Summerland CDP	D-	0.7	-0.3
Toro Canyon CDP	D	1.0	
Vandenberg AFB CDP	F-	0.0	

Vandenberg Village CDP	D	1.0	
Rest of Santa Barbara County	F+	0.4	-0.1
Santa Barbara County (overall)	**D-**	**0.8**	-0.1

Ventura County	**Grade**	**GPA**	**2015 Change**
Bell Canyon CDP	C-	1.7	+0.7
Camarillo city	B+	3.6	+0.9
Casa Conejo CDP	A	4.0	+1.0
Channel Islands Beach CDP	D	1.0	+0.0
El Rio CDP	B+	3.6	+0.9
Fillmore city	D	1.0	
Lake Sherwood CDP	F-	0.0	-0.1
Meiners Oaks CDP	D+	1.6	+0.5
Mira Monte CDP	D+	1.4	+0.3
Moorpark city	C-	1.9	+0.8
Oak Park CDP	C	2.1	+1.0
Oak View CDP	D	1.1	+0.1
Ojai city	C-	1.7	+0.6
Oxnard city	B-	2.8	+0.6
Piru CDP	D-	0.9	
Port Hueneme city	C-	1.9	+0.3
San Buenaventura (Ventura) city	D	1.2	+0.2
Santa Paula city	D	1.0	
Santa Rosa Valley CDP	D-	0.7	
Santa Susana CDP	C	2.2	+0.9
Saticoy CDP	D-	0.9	
Simi Valley city	C-	1.9	+0.8
Thousand Oaks city	B+	3.6	+0.9
Rest of Ventura County	D-	0.8	+0.1
Ventura County (overall)	**C**	**2.1**	**+0.5**

Grades cross tab by community

San Luis Obispo County	A	B	C	D	F	F-
Arroyo Grande city				247		2
Atascadero city				394	10	42
Avilla Beach CDP				63		9
Blacklake CDP				34		
Callender CDP				21	1	1
Cambria CDP				281		14
Cayucos CDP				124	3	27
Creston CDP					1	10
Edna CDP					4	1
El Paso de Robles (Paso Robles) city				747	27	64
Garden Farms CDP				8		
Grover Beach city				280	1	11
Lake Nacimiento CDP				59	1	20
Los Berros CDP				21		1
Los Osos CDP				361	10	33
Los Ranchos CDP				33	2	4
Morro Bay city				425	3	33
Nipomo CDP				272	9	27
Oak Shores CDP						33
Oceano CDP			1	209		
Pismo Beach city				336	2	20
San Luis Obispo city				679		8
San Miguel CDP				46		10
San Simeon CDP					7	8
Santa Margarita CDP				66		
Shandon CDP					24	12
Templeton CDP				146	5	10
Whitley Gardens CDP					9	11
Woodlands CDP			18	4		1
Rest of San Luis Obispo County				499	302	5,141
San Luis Obispo County			**19**	**5,355**	**421**	**5,553**

Santa Barbara County	A	B	C	D	F	F-
Ballard CDP				6	1	4
Buellton city				62	15	50
Carpinteria city				134	4	71
Casmalia CDP						7
Cuyama CDP						6
Garey CDP						10
Goleta city				275	21	162
Guadalupe city			1	71		6
Isla Vista CDP				68	2	20
Lompoc city				751	59	138
Los Alamos CDP					43	11
Los Olivos CDP				33	13	7
Mission Canyon CDP				34		6
Mission Hills CDP				31	2	3
Montecito CDP				167	4	18
New Cuyama CDP						20
Orcutt CDP	11			348	13	101
Santa Barbara city				989	38	158
Santa Maria city	39			1,099	102	290
Santa Ynez CDP				70	7	13
Sisquoc CDP					1	16
Solvang city				96	9	17
Summerland CDP				34	12	24
Toro Canyon CDP				28		17
Vandenberg AFB CDP					42	223
Vandenberg Village CDP				78	4	21
Rest of Santa Barbara County				463	191	3,366
Santa Barbara County	**50**		**1**	**4,837**	**583**	**4,785**

Ventura County	A	C	D	F	F-
Bell Canyon CDP		14	4		3
Camarillo city	590		326	16	44
Casa Conejo CDP	35		12		
Channel Islands Beach CDP			52		2
El Rio CDP	49		7		1
Fillmore city			239	1	6
Lake Sherwood CDP				19	13
Meiners Oaks CDP	3	25	51		
Mira Monte CDP	6	30	121		
Moorpark city	18	192	188	6	62
Oak Park CDP	13	94	13		
Oak View CDP	1		68		
Ojai city	17	57	99		1
Oxnard city	1,331		1,074	28	69
Piru CDP			47	4	28
Port Hueneme city	69		316	2	13
San Buenaventura (Ventura) city	15	192	1,192	49	130
Santa Paula city			382	5	16
Santa Rosa Valley CDP			54		28
Santa Susana CDP	5	23	7		
Saticoy CDP			23	3	
Simi Valley city	33	892	366	8	82
Thousand Oaks city	882	33	630	1	32
Rest of Ventura County	129	64	719	320	3,013
Ventura County	**3,196**	**1,616**	**5,990**	**462**	**3,543**

Methodology

In a study conducted for the East Bay Broadband Consortium (EBBC) in 2013[1], in cooperation with the Central Coast Broadband Consortium, core broadband infrastructure was evaluated in Alameda, Contra Costa and Solano Counties using data submitted to the California Public Utilities Commission by Internet service providers. A comparative report card was developed, with the average grade – "C" – set at the most prevalent infrastructure, and corresponding service levels, in the state: a combination of relatively high speed cable modem and mid-range telephone company DSL facilities.

[1] *East Bay Broadband Report Card*, Tellus Venture Associates, 28 January 2014.

This methodology was subsequently used by the Central Coast Broadband Consortium to evaluate California broadband infrastructure and service on a statewide basis, on behalf of the California Emerging Technology Fund.

The primary data for assessing the quantity and quality of broadband infrastructure in the East Bay region (Alameda, Contra Costa and Solano counties) comes from the California Public Utilities Commission, which collects service level reports from providers throughout the state. This data can be broken down to the census block level, and shows what level of service Internet companies claim to provide, but not necessarily what they deliver. The accuracy of this data and the definition of service levels varies from company to company, although it is generally consistent within any given company. In other words, if Company Z exaggerates the speeds and availability of home Internet service, it tends to do so to more or less the same extent everywhere. By using a comparative system for ranking, rather than using the absolute values provided, the variation in the accuracy of the data can be smoothed out and an apples-to-apples comparison can be achieved.

The data collected by CPUC was divided into three categories: core wireline service, commercial broadband service providers and mobile carriers.

Consumer-grade service throughout California was assessed, and used as one of the two primary grading benchmarks, the other being the CPUC's standard for minimum acceptable service of 6 Mbps download/1.5 Mbps upload speed. Upload speed was given equal weight to download speed, even though it's generally less critical for consumers, because upload speed gives a good indication of the capacity of the underlying infrastructure. When a service provider skimps on upload speeds, as frequently happens, it is usually because its cables and other core equipment have a limited capacity.

Grades were then assigned as follows:

A - Two competing providers, both advertising maximum download speeds of at least 25 Mbps and maximum uploads speeds of 6 Mbps, or 3 or more competing providers offering that standard of service in combination.

B - Competing providers, both advertising maximum download speeds of at least 10 Mbps and maximum uploads speeds of 6 Mbps.

C - Competing providers, one advertising max down/up speeds of at least 10/6 Mbps and the remainder meeting CPUC's minimum 6 down/1.5 up standard.

D - At least one provider advertising speeds that meet the CPUC's minimum standards of 6 Mbps down and 1.5 Mbps up.

F - At least one provider offers service, but no service is available that meets the CPUC's minimum standard of 6 Mbps down and 1.5 Mbps up (meets CPUC's definition of underserved).

F- - No broadband service available (meets CPUC's definition of unserved).

A "C" grade indicates that the consumer grade broadband services, and consequently the underlying core infrastructure, in a given area meets the statewide average. A "D" grade means it meets the minimum passing service standard set by the CPUC. "F" grades indicate full or partial failure, which also means the area is eligible for infrastructure construction subsidies from the Commission. "A" and "B" grades show that service in an area is superior to the California average.

The first step in grading was to give a letter grade to each census block in the three counties. Then, the grade points were tallied, weighted by population and averaged for the census blocks within cities, counties and unincorporated areas, to produce a numerical grade on a four point scale, which was rounded to the nearest tenth.

The numerical grade point average for an area was then converted to a letter grade on the following scale:

A	4.0
A-	3.7-3.9
B+	3.3-3.6
B	3.0-3.2
B-	2.7-2.9
C+	2.3-2.6
C	2.0-2.2
C-	1.7-1.9
D+	1.3-1.6
D	1.0-1.2
D-	0.7-0.9
F+	0.3-0.6
F	0.0-0.2
F-	No service available

In the initial analysis done for BCPC, the formula used to calculate grades did not initially account for Verizon's FiOS infrastructure in Ventura and (to a much lesser extent) Santa Barbara County because of the way in which Verizon reported its coverage data. The anomaly was immediately obvious when the results were checked, and a provisional correction was applied to the grades for the affected census blocks. When the final analysis was done, using updated data, the anomaly disappeared. The grades used in this report are based on the final analysis and contain no provisional corrections.

Appendix C - Commercial/industrial infrastructure ratings

Community ratings

San Luis Obispo County	Stars
Arroyo Grande city	0.0
Atascadero city	0.0
Avilla Beach CDP	0.0
Callender CDP	0.0
Cambria CDP	0.0
Cayucos CDP	0.0
Creston CDP	0.0
El Paso de Robles (Paso Robles) city	0.0
Lake Nacimiento CDP	0.0
Los Osos CDP	0.0
Nipomo CDP	0.0
Oceano CDP	0.0
San Luis Obispo city	2.0
San Miguel CDP	0.0
San Simeon CDP	0.0
Santa Margarita CDP	0.0
Shandon CDP	0.0
Templeton CDP	0.0
Woodlands CDP	0.0
Rest of San Luis Obispo County	0.5

Santa Barbara County	Stars
Carpinteria city	0.0
Casmalia CDP	0.0
Cuyama CDP	0.0
Isla Vista CDP	0.0
Lompoc city	0.0
Los Alamos CDP	0.0
Los Olivos CDP	0.0
Mission Hills CDP	0.0
Montecito CDP	0.0
New Cuyama CDP	0.0
Orcutt CDP	0.0
Santa Maria city	0.0
Santa Ynez CDP	0.0
Summerland CDP	0.0
Toro Canyon CDP	0.0
Vandenberg Village CDP	0.0
Rest of Santa Barbara County	0.0

Ventura County	Stars
Camarillo city	1.5
Channel Islands Beach CDP	0.0
El Rio CDP	2.0
Fillmore city	0.0
Mira Monte CDP	0.5
Moorpark city	0.5
Oak View CDP	0.0
Ojai city	0.5
Oxnard city	1.0
Piru CDP	0.0
Port Hueneme city	1.0
San Buenaventura (Ventura) city	0.0
Santa Paula city	0.0
Santa Susana CDP	0.5
Saticoy CDP	0.0
Simi Valley city	0.5
Thousand Oaks city	1.5
Rest of Ventura County	0.0

Ratings cross tab by community

San Luis Obispo County	No Stars	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Arroyo Grande city	33					
Atascadero city	39	2				
Avilla Beach CDP	5					
Blacklake CDP						
Callender CDP	5					
Cambria CDP	14					
Cayucos CDP	7					
Creston CDP	3					
Edna CDP						
El Paso de Robles (Paso Robles) city	44	4				
Garden Farms CDP						
Grover Beach city						
Lake Nacimiento CDP	4					
Los Berros CDP						
Los Osos CDP	27			1		
Los Ranchos CDP						
Morro Bay city						
Nipomo CDP	28					
Oak Shores CDP						
Oceano CDP	32					
Pismo Beach city						
San Luis Obispo city	41	3		105		
San Miguel CDP	9					
San Simeon CDP	3					
Santa Margarita CDP	6					
Shandon CDP	12					
Templeton CDP	17	1				
Whitley Gardens CDP						
Woodlands CDP	2					
Rest of San Luis Obispo County	20			2		
San Luis Obispo County	**351**	**10**		**108**		

Santa Barbara County	No Stars	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Ballard CDP						
Buellton city						
Carpinteria city	41			1		
Casmalia CDP	1					
Cuyama CDP	3					
Garey CDP						
Goleta city						
Guadalupe city						
Isla Vista CDP	3					
Lompoc city	83			1		
Los Alamos CDP	15					
Los Olivos CDP	12					
Mission Canyon CDP						
Mission Hills CDP	2					
Montecito CDP	3					
New Cuyama CDP	2					
Orcutt CDP	43		3			
Santa Barbara city						
Santa Maria city	181	8	15	1		
Santa Ynez CDP	9					
Sisquoc CDP						
Solvang city						
Summerland CDP	10					
Toro Canyon CDP	1					
Vandenberg AFB CDP						
Vandenberg Village CDP	5					
Rest of Santa Barbara County	65					
Santa Barbara County	**480**	**8**	**18**	**3**		

Ventura County	No Stars	1 Star	2 Stars	3 Stars	4 Stars	5 Stars
Bell Canyon CDP						
Camarillo city	10	11	47	1	3	
Casa Conejo CDP						
Channel Islands Beach CDP	1					
El Rio CDP			7			
Fillmore city	42					
Lake Sherwood CDP						
Meiners Oaks CDP						
Mira Monte CDP	1	1				
Moorpark city	15	16				
Oak Park CDP						
Oak View CDP	4					
Ojai city	8	16				
Oxnard city	131	21	171	4		
Piru CDP	4					
Port Hueneme city	4		6			
San Buenaventura (Ventura) city	235	54		6		
Santa Paula city	45	1				
Santa Rosa Valley CDP						
Santa Susana CDP	1	1				
Saticoy CDP	10	1				
Simi Valley city	44	33	3	4	2	
Thousand Oaks city	38	1	76	1	2	
Rest of Ventura County	50		1			
Ventura County	**643**	**156**	**311**	**16**	**7**	

Methodology

The purpose of the commercial/industrial broadband infrastructure rating system is to assess the availability of business-focused facilities and service within commercially and industrially zoned areas of cities and counties. The infrastructure grading system (see above) assesses primary broadband infrastructure, which is owned by incumbent telephone and cable companies, and supports retail voice, television and/or broadband service for both residential and business customers. However, when deciding whether to locate or remain in an area, businesses often assess the availability of commercial and industrial grade broadband facilities, in addition to the consumer grade services provided by primary carriers.

Commercial and industrial grade service may be provided both by primary carriers and by independent telecommunications companies. This type of service is broken down into four categories:

Commercial grade commodity Internet service delivered via primary infrastructure (i.e., telephone or cable systems) offered on standard terms and resembling, to one degree or another, the retail service offered to residences. Sometimes referred to as "business class" packages, these services are typically more expensive than residential service and may meet higher quality of service standards, but generally deliver similar upload and download speeds.

Enhanced commercial grade broadband service delivered via fiber to the premise or, less commonly, advanced copper-based technologies. This service might be offered on a commodity basis, with fixed terms and rates, or on an individually negotiated and provisioned basis. For the purposes of this analysis, this type of service is referred to as "megabit-class fiber" service and defined as any fiber-based (or advanced copper-based) service that supports a minimum *upload* speed of 10 Mbps. This service may included standard Internet access at the minimum speed or better, or simply be a "lit" service (i.e.,i.e., Layer 2) that provides a high bandwidth connection between two points without necessarily connecting to the Internet.

Industrial grade broadband service delivered via fiber to the premise technology. Referred to as "gigabit class" service for the purpose of this analysis, this category of service is similar to megabit class fiber service, but provides symmetrical connections at a minimum speed of 1 Gbps.

Dark fiber. This type of service involves only the rental of fiber optic strands between two points. The customer takes responsibility for providing the electronics (i.e., "lighting" it) and any other connectivity or provisioning that might be required, for example Internet bandwidth. The primary difference between dark fiber service and the three types of "lit" services is that customers pay a flat rate for the lease of the fiber and then determine how much bandwidth is used, based on equipment and related services that they purchase separately. A pair of dark fiber strands can typically support bi-directional speeds well above the 10 Terabit per second range, if desired.

The system for rating the infrastructure available in a given location is as follows:

Zero stars: no fiber-to-the-premise infrastructure is present and the primary infrastructure grade is "F" or "D", indicating that there is either no business class service available at all or there is only one primary carrier offering service of any kind.

1 Star: either business class service is available from a primary carrier and a second primary carrier offers service that meets CPUC minimum standards (i.e., a primary infrastructure grade of at least "C"), or megabit class service is available and the primary infrastructure grade is "D".

2 Stars: either the primary infrastructure grade is at least a "C" and megabit class service is available, or the primary infrastructure grade is at least a "D" and gigabit class service is available.

3 Stars: either the primary infrastructure grade is at least a "C" and gigabit class service is available, or the primary infrastructure grade is at least a "D" and both megabit and gigabit class service is available.

4 Stars: the primary infrastructure grade is at least a "C" and both megabit and gigabit class service is available.

5 Stars: meets the criteria for 4 Stars and open access dark fiber is available on standardised and published terms.

This rating system is based on the principle that the greater the range and variety of competitive services that are available in a given location, the greater its attractiveness to a greater range of businesses, and therefore the greater its value as commercial real estate.

For the purposes of this analysis, a location is defined as a census block or partial census block that is contained within an area zoned for commercial or industrial use. Census blocks are used to define boundaries because broadband availability data is reported on a census block level. Although not all parcels within a census block necessarily have access to all of the services as reported, the basic infrastructure to provide such service is present.

A Star rating is given to each location (i.e., full or partial census block in a commercial or industrial zone) and represented on a map. Aggregate community ratings are calculated by averaging the Star Ratings for census blocks that have a centroid within a commercial and/or industrial zone in cities and census designated places, and rounding to the nearest half Star.

Because census block and zone boundaries do not coincide, many census blocks are incidentally touched by a commercial and/or industrial zone. Using only those census blocks with a centroid inside of commercial and/or industrial zone reduces the noise level of the data and provides a clearer analysis of the available broadband infrastructure within those zones. For visual representation purposes, any portion of a census block that falls outside of a commercial and/or industrial zone is "clipped" out of the picture, producing a complete picture.

It should be noted that this report is the first to include commercial/industrial broadband infrastructure ratings and as time goes on, the techniques used will be refined and some of the above methodology might change. Also, since primary broadband infrastructure grades and other metrics also change, due to improvement or degradation of infrastructure, some of the data upon which these ratings are based may change as well. It would be prudent to regard the above Star Ratings as the result from a "Beta" version of the rating system.

Appendix D - Broadband development priority & feasibility

Tables

San Luis Obispo County

Priority	Rank	Feasibility	Rank
San Simeon CDP	1	Shandon CDP	1
Shandon CDP	2	Oak Shores CDP	2
Rest of San Luis Obispo County	3	Whitley Gardens CDP	3
Oak Shores CDP	4	San Simeon CDP	4
Whitley Gardens CDP	5	Nipomo CDP	5
San Miguel CDP	6	Edna CDP	6
Grover Beach city	7	Creston CDP	7
Los Berros CDP	7	Rest of San Luis Obispo County	8
Nipomo CDP	9	Atascadero city	9
Atascadero city	10	San Miguel CDP	10
Edna CDP	11	Grover Beach city	11
Creston CDP	12	Avilla Beach CDP	12
Los Osos CDP	13	Los Osos CDP	13
El Paso de Robles (Paso Robles) city	14	Los Ranchos CDP	13
Cayucos CDP	15	Templeton CDP	15
Templeton CDP	15	Los Berros CDP	16
Morro Bay city	17	El Paso de Robles (Paso Robles) city	17
Blacklake CDP	18	Cayucos CDP	18
Garden Farms CDP	18	Lake Nacimiento CDP	19
Lake Nacimiento CDP	18	Cambria CDP	20
Oceano CDP	18	San Luis Obispo city	21
Pismo Beach city	18	Callender CDP	22
Santa Margarita CDP	18	Woodlands CDP	22
Los Ranchos CDP	24	Morro Bay city	24
Avilla Beach CDP	25	Pismo Beach city	24
Cambria CDP	26	Arroyo Grande city	26
Arroyo Grande city	27	Blacklake CDP	27
San Luis Obispo city	28	Garden Farms CDP	27
Callender CDP	29	Oceano CDP	27
Woodlands CDP	29	Santa Margarita CDP	27

Santa Barbara County

Priority	Rank
Vandenberg AFB CDP	1
Rest of SB County	1
New Cuyama CDP	3
Lompoc city	4
Isla Vista CDP	5
Santa Maria city	6
Los Alamos CDP	7
Sisquoc CDP	8
Casmalia CDP	9
Cuyama CDP	9
Orcutt CDP	11
Buellton city	12
Garey CDP	13
Solvang city	14
Los Olivos CDP	15
Mission Canyon CDP	16
Montecito CDP	16
Summerland CDP	16
Santa Barbara city	19
Carpinteria city	20
Guadalupe city	21
Santa Ynez CDP	22
Vandenberg Village CDP	22
Ballard CDP	24
Goleta city	25
Mission Hills CDP	26
Toro Canyon CDP	27

Feasibility	Rank
Los Alamos CDP	1
Lompoc city	2
Rest of SB County	3
New Cuyama CDP	4
Sisquoc CDP	5
Vandenberg AFB CDP	5
Orcutt CDP	7
Buellton city	8
Santa Maria city	9
Los Olivos CDP	10
Solvang city	11
Casmalia CDP	12
Santa Ynez CDP	12
Cuyama CDP	14
Garey CDP	15
Ballard CDP	16
Goleta city	17
Toro Canyon CDP	18
Mission Hills CDP	19
Vandenberg Village CDP	20
Isla Vista CDP	21
Guadalupe city	22
Carpinteria city	23
Santa Barbara city	24
Mission Canyon CDP	25
Montecito CDP	25
Summerland CDP	25

Ventura County

Priority	Rank	Feasibility	Rank
Rest of Ventura County	1	Lake Sherwood CDP	1
San Buenaventura (Ventura) city	2	Santa Rosa Valley CDP	2
Oxnard city	3	Rest of Ventura County	3
Piru CDP	4	San Buenaventura (Ventura) city	4
Lake Sherwood CDP	5	Oxnard city	5
Camarillo city	6	Bell Canyon CDP	6
Santa Rosa Valley CDP	7	Camarillo city	7
Santa Paula city	8	Piru CDP	7
Casa Conejo CDP	9	Simi Valley city	7
Meiners Oaks CDP	9	Saticoy CDP	10
Mira Monte CDP	9	Santa Paula city	11
Oak Park CDP	9	Thousand Oaks city	12
Oak View CDP	9	Moorpark city	13
Santa Susana CDP	9	Ojai city	14
Simi Valley city	15	Fillmore city	15
Port Hueneme city	16	Channel Islands Beach CDP	16
Saticoy CDP	17	El Rio CDP	17
El Rio CDP	18	Port Hueneme city	18
Bell Canyon CDP	19	Casa Conejo CDP	19
Channel Islands Beach CDP	20	Meiners Oaks CDP	19
Thousand Oaks city	20	Mira Monte CDP	19
Fillmore city	22	Oak Park CDP	19
Ojai city	23	Oak View CDP	19
Moorpark city	24	Santa Susana CDP	19

Methodology

The California Advanced Services Fund (CASF) offers subsidies of up to 70% of construction costs for broadband projects in areas that are deemed under served (i.e.,i.e., lacking service that meets a minimum standard of 6 Mbps down and 1.5 Mbps up) or unserved (i.e., effectively no service available other than dial-up, older technology that does not exceed dial up speeds or satellite).

Census and regional GIS data was used to identify census blocks that are included within the boundaries of incorporated cities and census designated places. Please note, however, this analysis is an ordinal ranking exercise. It was assumed that even though there are adjacent census blocks outside of these boundaries that might or might not be eligible for CASF funding, any inaccuracy would be roughly evenly distributed and not affect relative rankings.

When projects are actually developed, all relevant census blocks in an area will likely be included in project proposals, whether strictly within the boundaries of a city/CDP or not. Consequently, the census

block lists we will provide for inclusion in commission resolutions will include census blocks outside of city/CDP boundaries, as well as within. Not all census blocks may be funded, but service providers will be interested in building business plans that include all potential customers in a project area.

This analysis has two objectives: deliver the greatest amount of good for the greatest number of people and, necessarily, identify opportunities for broadband infrastructure projects that have the greatest likelihood of success. Three primary criteria were used to sort and rank census blocks:

1. CASF eligibility.
2. Social and economic impact on a community.
3. Feasibility of building a financially viable broadband infrastructure project.

CASF eligibility was determined using CPUC broadband availability data for consumer wireline carriers. If a census block did not have at least one consumer wireline carrier reporting service of at least 6 Mbps down and 1.5 Mbps up, it was deemed eligible.

Mobile service was not taken into account because CPUC field tests and other experience with mobile speed testing and qualification of areas for CASF funding shows that carrier advertising claims are not a good basis for assessing actual service availability. In most cases, mobile carriers fail to meet advertised or even CPUC-minimum performance levels, as the CPUC's broadband availability map demonstrates.

As a rule, fixed wireless service providers either do not meet CPUC minimum standards or file coverage and speed data that can be most kindly described as aspirational. Commercial wireline service providers do not serve residences in the normal course of business. Consequently, neither fixed wireless or commercially-focused wireline service from secondary providers were factored into the analysis.

Some census blocks were deemed ineligible and excluded from the analysis because their under and unserved status results from institutional factors: college campuses, state prisons and military areas.

CASF eligibility was treated as a yes/no criterion. No extra weight was given to unserved census blocks because 1. state law and CASF rules automatically give greater priority to unserved census blocks and 2. rational project design entails starting with denser, usually underserved, areas and moving out to sparser, generally unserved areas. The more underserved, as opposed to unserved, census blocks in an area, the more likely a project is to be reckoned financially feasible and actually built. If the goal is reaching unserved census blocks, then the journey must start in served and underserved areas.

Social and economic impact was measured by the number of people and community anchor institutions in an eligible census block, the proportion of the community that would be reached by CASF-funded projects, and median household income. The lower the average household income in an area, the higher the ranking.

Financial feasibility is measured by the same factors. Although business case analyses are usually done on the basis of households, population numbers serve for the purposes of ordinal ranking. Community anchor institutions are also potentially large customers. Likewise, the greater the percentage of a

community that is fundable, the better the business case. Population density was added as a rough comparison of construction costs – the denser the population, the lower the cost per subscriber, all other factors being equal. For the purpose of determining financial feasibility, the higher the household income in an area, the higher the ranking.

Appendix E - Other data

1. Basic broadband availability

San Luis Obispo County	Percentage where at least 1 provider is present			
	Census blocks	Housing units	Population	Area (sq mi)
Arroyo Grande city	99%	100%	100%	100%
Atascadero city	91%	100%	100%	98%
Avilla Beach CDP	88%	99%	99%	98%
Blacklake CDP	100%	100%	100%	100%
Callender CDP	96%	100%	100%	100%
Cambria CDP	95%	100%	100%	82%
Cayucos CDP	84%	100%	100%	75%
Creston CDP	9%	15%	15%	15%
Edna CDP	80%	99%	99%	99%
El Paso de Robles (Paso Robles) city	92%	100%	100%	89%
Garden Farms CDP	100%	100%	100%	100%
Grover Beach city	96%	98%	99%	94%
Lake Nacimiento CDP	78%	100%	100%	97%
Los Berros CDP	100%	100%	100%	100%
Los Osos CDP	92%	100%	100%	78%
Los Ranchos CDP	90%	99%	99%	92%
Morro Bay city	92%	100%	100%	45%
Nipomo CDP	94%	99%	99%	95%
Oak Shores CDP	0%	0%	0%	0%
Oceano CDP	100%	100%	100%	100%
Pismo Beach city	93%	100%	100%	31%
San Luis Obispo city	99%	100%	100%	95%
San Miguel CDP	82%	91%	91%	74%
San Simeon CDP	47%	98%	97%	21%
Santa Margarita CDP	100%	100%	100%	100%
Shandon CDP	67%	90%	91%	63%
Templeton CDP	94%	100%	100%	99%
Whitley Gardens CDP	55%	94%	93%	68%
Woodlands CDP	96%	100%	100%	100%
Rest of San Luis Obispo County	17%	66%	62%	11%
San Luis Obispo County	53%	95%	93%	14%

Santa Barbara County	Percentage where at least 1 provider is present			
	Census blocks	Housing units	Population	Area (sq mi)
Ballard CDP	64%	99%	100%	100%
Buellton city	61%	92%	95%	92%
Carpinteria city	96%	100%	100%	28%
Casmalia CDP	0%	0%	0%	0%
Cuyama CDP	0%	0%	0%	0%
Garey CDP	0%	0%	0%	0%
Goleta city	98%	100%	100%	100%
Guadalupe city	92%	100%	100%	89%
Isla Vista CDP	94%	100%	94%	91%
Lompoc city	86%	94%	92%	79%
Los Alamos CDP	80%	98%	97%	82%
Los Olivos CDP	87%	99%	99%	96%
Mission Canyon CDP	100%	100%	100%	100%
Mission Hills CDP	94%	100%	100%	100%
Montecito CDP	100%	100%	100%	100%
New Cuyama CDP	0%	0%	0%	0%
Orcutt CDP	80%	96%	98%	97%
Santa Barbara city	97%	100%	100%	47%
Santa Maria city	84%	99%	99%	85%
Santa Ynez CDP	86%	99%	100%	97%
Sisquoc CDP	6%	4%	3%	29%
Solvang city	86%	99%	99%	92%
Summerland CDP	100%	100%	100%	100%
Toro Canyon CDP	98%	100%	100%	100%
Vandenberg AFB CDP	16%	89%	81%	34%
Vandenberg Village CDP	86%	100%	100%	100%
Rest of Santa Barbara County	22%	88%	90%	11%
Santa Barbara County	85%	98%	98%	68%

Ventura County	Percentage where at least 1 provider is present			
	Census blocks	Housing units	Population	Area (sq mi)
Bell Canyon CDP	86%	100%	100%	95%
Camarillo city	95%	100%	100%	97%
Casa Conejo CDP	100%	100%	100%	100%
Channel Islands Beach CDP	96%	100%	100%	98%
El Rio CDP	98%	100%	100%	100%
Fillmore city	98%	100%	100%	92%
Lake Sherwood CDP	63%	100%	100%	93%
Meiners Oaks CDP	100%	100%	100%	100%
Mira Monte CDP	100%	100%	100%	100%
Moorpark city	88%	100%	100%	97%
Oak Park CDP	100%	100%	100%	100%
Oak View CDP	100%	100%	100%	100%
Ojai city	99%	100%	100%	100%
Oxnard city	97%	100%	100%	68%
Piru CDP	65%	99%	100%	86%
Port Hueneme city	96%	100%	100%	94%
San Buenaventura (Ventura) city	91%	100%	100%	66%
Santa Paula city	96%	100%	100%	91%
Santa Rosa Valley CDP	67%	97%	96%	75%
Santa Susana CDP	100%	100%	100%	100%
Saticoy CDP	100%	100%	100%	100%
Simi Valley city	95%	100%	100%	97%
Thousand Oaks city	98%	100%	100%	98%
Rest of Ventura County	33%	87%	86%	19%
Ventura County	95%	99.95%	99.96%	88%

2. Broadband availability claimed by primary wireline providers

San Luis Obispo County	Percentage of homes claimed by:				
	AT&T	Charter	Verizon	Telco	Cable
Arroyo Grande city	99%	100%	0%	99%	100%
Atascadero city	96%	99%	0%	96%	99%
Avilla Beach CDP	97%	99%	0%	97%	99%
Blacklake CDP	31%	100%	69%	100%	100%
Callender CDP	0%	100%	100%	100%	100%
Cambria CDP	100%	100%	0%	100%	100%
Cayucos CDP	97%	100%	0%	97%	100%
Creston CDP	15%	0%	0%	15%	0%
Edna CDP	99%	0%	0%	99%	0%
Paso Robles city	99%	100%	0%	99%	100%
Garden Farms CDP	99%	100%	0%	99%	100%
Grover Beach city	98%	98%	0%	98%	98%
Lake Nacimiento CDP	79%	100%	0%	79%	100%
Los Berros CDP	100%	91%	0%	100%	91%
Los Osos CDP	96%	99%	0%	96%	99%
Los Ranchos CDP	99%	99%	0%	99%	99%
Morro Bay city	96%	100%	0%	96%	100%
Nipomo CDP	98%	97%	3%	101%	97%
Oak Shores CDP	0%	0%	0%	0%	0%
Oceano CDP	90%	100%	0%	90%	100%
Pismo Beach city	84%	100%	0%	84%	100%
San Luis Obispo city	97%	100%	0%	97%	100%
San Miguel CDP	0%	91%	0%	0%	91%
San Simeon CDP	98%	0%	0%	98%	0%
Santa Margarita CDP	84%	100%	0%	84%	100%
Shandon CDP	90%	0%	0%	90%	0%
Templeton CDP	96%	100%	0%	96%	100%
Whitley Gardens CDP	94%	0%	0%	94%	0%
Woodlands CDP	0%	100%	100%	100%	100%
Rest of SLO County	56%	41%	1%	57%	41%
San Luis Obispo County	88%	90%	1%	90%	90%

Santa Barbara County	**Percentage of homes claimed by:**					
	Charter	**Comcast**	**Cox**	**Verizon**	**Telco**	**Cable**
Ballard CDP	0%	98%	0%	96%	96%	98%
Buellton city	0%	90%	0%	92%	92%	90%
Carpinteria city	0%	0%	100%	71%	71%	100%
Casmalia CDP	0%	0%	0%	0%	0%	0%
Cuyama CDP	0%	0%	0%	0%	0%	0%
Garey CDP	0%	0%	0%	0%	0%	0%
Goleta city	0%	0%	100%	92%	92%	100%
Guadalupe city	100%	0%	0%	99%	99%	100%
Isla Vista CDP	0%	0%	100%	45%	45%	100%
Lompoc city	0%	92%	0%	92%	92%	92%
Los Alamos CDP	0%	0%	0%	98%	98%	0%
Los Olivos CDP	0%	86%	0%	99%	99%	86%
Mission Canyon CDP	0%	0%	100%	93%	93%	100%
Mission Hills CDP	0%	100%	0%	100%	100%	100%
Montecito CDP	0%	0%	100%	98%	98%	100%
New Cuyama CDP	0%	0%	0%	0%	0%	0%
Orcutt CDP	0%	95%	0%	95%	95%	95%
Santa Barbara city	0%	0%	100%	99%	99%	100%
Santa Maria city	0%	98%	0%	98%	98%	98%
Santa Ynez CDP	0%	97%	0%	98%	98%	97%
Sisquoc CDP	0%	0%	0%	4%	4%	0%
Solvang city	0%	97%	0%	99%	99%	97%
Summerland CDP	0%	0%	100%	90%	90%	100%
Toro Canyon CDP	0%	0%	100%	20%	20%	100%
Vandenberg AFB CDP	0%	15%	0%	89%	89%	15%
Vandenberg Village CDP	0%	100%	0%	100%	100%	100%
Rest of Santa Barbara County	0%	9%	70%	81%	81%	79%
Santa Barbara County	1%	42%	52%	91%	91%	95%

Ventura County	Percentage of homes claimed by:						
	AT&T	Charter	Cox	Time Warner	Verizon	Telco	Cable
Bell Canyon CDP	99%	0%	0%	100%	0%	99%	100%
Camarillo city	0%	0%	0%	100%	99%	99%	100%
Casa Conejo CDP	0%	0%	0%	100%	100%	100%	100%
Channel Islands Beach CDP	0%	0%	0%	100%	89%	89%	100%
El Rio CDP	0%	0%	0%	100%	92%	92%	100%
Fillmore city	93%	0%	0%	100%	0%	93%	100%
Lake Sherwood CDP	0%	0%	0%	9%	100%	100%	9%
Meiners Oaks CDP	95%	0%	0%	100%	0%	95%	100%
Mira Monte CDP	90%	0%	0%	100%	0%	90%	100%
Moorpark city	90%	0%	0%	100%	0%	90%	100%
Oak Park CDP	100%	0%	0%	100%	0%	100%	100%
Oak View CDP	100%	0%	0%	100%	0%	100%	123%
Ojai city	98%	0%	0%	100%	0%	98%	100%
Oxnard city	0%	0%	0%	99%	95%	95%	99%
Piru CDP	99%	0%	0%	98%	0%	99%	98%
Port Hueneme city	0%	0%	0%	100%	94%	94%	100%
San Buenaventura (Ventura) city	97%	38%	0%	66%	0%	97%	105%
Santa Paula city	0%	0%	0%	100%	94%	94%	100%
Santa Rosa Valley CDP	0%	0%	0%	97%	93%	93%	97%
Santa Susana CDP	99%	0%	0%	100%	0%	99%	100%
Saticoy CDP	100%	0%	0%	100%	0%	100%	100%
Simi Valley city	95%	0%	0%	100%	0%	95%	100%
Thousand Oaks city	5%	0%	0%	100%	94%	99%	100%
Rest of Ventura County	28%	14%	0%	56%	48%	76%	71%
Ventura County	42%	7%	0%	92%	53%	95%	99%

Ventura County Verizon DSL/FiOS tabs

	DSL HUs	FiOS HUs	DSL/ FiOS HUs
Camarillo city	9%	43%	48%
Casa Conejo CDP	0%	57%	43%
Channel Islands Beach CDP	100%	0%	0%
El Rio CDP	2%	28%	71%
Lake Sherwood CDP	100%	0%	0%
Oxnard city	42%	22%	36%
Port Hueneme city	69%	7%	24%
Santa Paula city	100%	0%	0%
Santa Rosa Valley CDP	100%	0%	0%
Thousand Oaks city	4%	42%	53%
Unincorporated/unattached	53%	21%	25%
Verizon Ventura County	31%	30%	40%

	DSL HUs	FiOS HUs	DSL/ FiOS HUs	Total
Camarillo city	2,251	11,026	12,168	25,445
Casa Conejo CDP	0	575	435	1,010
Channel Islands Beach CDP	1,661	0	0	1,661
El Rio CDP	25	434	1,105	1,564
Lake Sherwood CDP	593	0	0	593
Oxnard city	20,924	11,256	18,167	50,347
Port Hueneme city	5,255	519	1,850	7,624
Santa Paula city	8,238	0	0	8,238
Santa Rosa Valley CDP	1,083	0	0	1,083
Thousand Oaks city	1,947	18,885	23,668	44,500
Unincorporated/unattached	3,955	1,566	1,886	7,407
Verizon Ventura County	45,932	44,261	59,279	149,472

3. Broadband report card cross tab by community

San Luis Obispo County	A	B	C	D	F	F-
Arroyo Grande city				247		2
Atascadero city				394	10	42
Avilla Beach CDP				63		9
Blacklake CDP				34		
Callender CDP				21	1	1
Cambria CDP				281		14
Cayucos CDP				124	3	27
Creston CDP					1	10
Edna CDP					4	1
El Paso de Robles (Paso Robles) city				747	27	64
Garden Farms CDP				8		
Grover Beach city				280	1	11
Lake Nacimiento CDP				59	1	20
Los Berros CDP				21		1
Los Osos CDP				361	10	33
Los Ranchos CDP				33	2	4
Morro Bay city				425	3	33
Nipomo CDP				272	9	27
Oak Shores CDP						33
Oceano CDP			1	209		
Pismo Beach city				336	2	20
San Luis Obispo city				679		8
San Miguel CDP				46		10
San Simeon CDP					7	8
Santa Margarita CDP				66		
Shandon CDP					24	12
Templeton CDP				146	5	10
Whitley Gardens CDP					9	11
Woodlands CDP			18	4		1
Rest of San Luis Obispo County				499	302	5,141
San Luis Obispo County			**19**	**5,355**	**421**	**5,553**

Santa Barbara County	A	B	C	D	F	F-
Ballard CDP				6	1	4
Buellton city				62	15	50
Carpinteria city				134	4	71
Casmalia CDP						7
Cuyama CDP						6
Garey CDP						10
Goleta city				275	21	162
Guadalupe city			1	71		6
Isla Vista CDP				68	2	20
Lompoc city				751	59	138
Los Alamos CDP					43	11
Los Olivos CDP				33	13	7
Mission Canyon CDP				34		6
Mission Hills CDP				31	2	3
Montecito CDP				167	4	18
New Cuyama CDP						20
Orcutt CDP	11			348	13	101
Santa Barbara city				989	38	158
Santa Maria city	39			1,099	102	290
Santa Ynez CDP				70	7	13
Sisquoc CDP					1	16
Solvang city				96	9	17
Summerland CDP				34	12	24
Toro Canyon CDP				28		17
Vandenberg AFB CDP					42	223
Vandenberg Village CDP				78	4	21
Rest of Santa Barbara County				463	191	3,366
Santa Barbara County	**50**		**1**	**4,837**	**583**	**4,785**

Ventura County	A	C	D	F	F-
Bell Canyon CDP		14	4		3
Camarillo city	590		326	16	44
Casa Conejo CDP	35		12		
Channel Islands Beach CDP			52		2
El Rio CDP	49		7		1
Fillmore city			239	1	6
Lake Sherwood CDP				19	13
Meiners Oaks CDP	3	25	51		
Mira Monte CDP	6	30	121		
Moorpark city	18	192	188	6	62
Oak Park CDP	13	94	13		
Oak View CDP	1		68		
Ojai city	17	57	99		1
Oxnard city	1,331		1,074	28	69
Piru CDP			47	4	28
Port Hueneme city	69		316	2	13
San Buenaventura (Ventura) city	15	192	1,192	49	130
Santa Paula city			382	5	16
Santa Rosa Valley CDP			54		28
Santa Susana CDP	5	23	7		
Saticoy CDP			23	3	
Simi Valley city	33	892	366	8	82
Thousand Oaks city	882	33	630	1	32
Rest of Ventura County	129	64	719	320	3,013
Ventura County	**3,196**	**1,616**	**5,990**	**462**	**3,543**

4. Primary broadband providers - upload and download speeds

Broadband upload speeds

Cable upload speeds - claimed throughout service area

Charter Communications	5 Mbps
Comcast	20 Mbps
Cox Communications	20 Mbps
Time Warner Cable	20 Mbps

AT&T upload speeds by census block - San Luis Obispo County

	384 Kbps	512 Kbps	768 Kbps	1.5 Mbps
Arroyo Grande city	68	27	110	
Atascadero city	144	32	135	
Avilla Beach CDP	13	2	21	
Cambria CDP	97	66	97	
Cayucos CDP	12	10	83	
Creston CDP			1	
Edna CDP		2	2	
Paso Robles	65	174	386	
Garden Farms CDP		5		
Grover Beach city	216	24	14	
Lake Nacimiento CDP		19	7	
Los Berros CDP	2			
Los Osos CDP	48	37	181	
Los Ranchos CDP		21	10	
Morro Bay city	59	54	226	
Nipomo CDP	86	25	94	
Oceano CDP	118	8	6	
Pismo Beach city	87	10	68	
San Luis Obispo city	140	103	320	1
San Simeon CDP	6		1	
Santa Margarita CDP		19	27	
Shandon CDP		10	14	
Templeton CDP	38	13	78	
Whitley Gardens CDP	8		1	
Rest of SLO County	228	139	103	
SLO County total	**1,435**	**800**	**1,985**	**1**

Verizon upload speeds by census block - San Luis Obispo County

	384 Kbps	768 Kbps	1 Mbps	100 Mbps
Blacklake CDP		1	12	
Callender CDP		4	16	
Nipomo CDP	2	4	2	
Woodlands CDP		1	1	18
Rest of SLO County	6	7	11	
SLO County total	**8**	**17**	**42**	**18**

Verizon upload speeds by census block - Santa Barbara County

	384 Kbps	768 Kbps	1 Mbps	100 Mbps
Ballard CDP		6		
Buellton city	5	12	58	
Carpinteria city	11	30	28	
Goleta city	36	120	93	
Guadalupe city	2	8	54	1
Isla Vista CDP	8	2	10	
Lompoc city	29	257	464	
Los Alamos CDP			43	
Los Olivos CDP	1	2	43	
Mission Canyon CDP	4	22	2	
Mission Hills CDP		25	7	
Montecito CDP	26	63	71	
Orcutt CDP	35	166	137	12
Santa Barbara city	108	416	457	
Santa Maria city	45	525	584	54
Santa Ynez CDP	8	22	44	
Sisquoc CDP			1	
Solvang city	3	15	84	
Summerland CDP	9	12	21	
Toro Canyon CDP	3			
Vandenberg AFB CDP	3	5	34	
Vandenberg Village CDP	4	12	61	
Rest of Santa Barbara County	74	217	290	
Santa Barbara County total	**414**	**1,937**	**2,586**	**67**

AT&T upload speeds by census block - Ventura County

	384 Kbps	512 Kbps	768 Kbps	1.5 Mbps	3 Mbps	6 Mbps
Bell Canyon CDP		3		14		
Fillmore city	3	1	178			
Meiners Oaks CDP	18		6	21	4	3
Mira Monte CDP	28	14	11	30		6
Moorpark city	15	9	19	185	10	20
Oak Park CDP		3	1	83	11	13
Oak View CDP	2	1	45			1
Ojai city	2	5	55	49	8	17
Piru CDP	3		36			
Ventura	488	116	326	189	26	50
Santa Susana CDP			3	17	6	5
Saticoy CDP	19	6				
Simi Valley city	31	31	46	851	44	34
Thousand Oaks city		1		34	2	1
Rest of Ventura County	110	52	74	75	2	6
Ventura County total	**719**	**242**	**800**	**1,548**	**113**	**156**

Verizon upload speeds by census block - Ventura County

	384 Kbps	768 Kbps	1 Mbps	100 Mbps
Camarillo city	39	148	78	603
Casa Conejo CDP	3	9		35
Channel Islands Beach CDP	20	20	1	
El Rio CDP	9	15	4	49
Lake Sherwood CDP		7	12	
Oxnard city	229	783	438	1,355
Port Hueneme city	55	53	52	69
Santa Paula city	18	92	199	
Santa Rosa Valley CDP	3	7	20	
Thousand Oaks city	69	183	118	882
Rest of Ventura County	88	170	109	
Ventura County total	**533**	**1,487**	**1,031**	**3,131**

Broadband download speeds

Cable download speeds - claimed throughout service area

Charter Communications	100 Mbps
Comcast	150 Mbps
Cox Communications	150 Mbps
Time Warner Cable	300 Mbps

AT&T download speeds by census block - San Luis Obispo County

	768 Kbps	1.5 Mbps	3 Mbps	6 Mbps	12 Mbps	18 Mbps
Arroyo Grande city	2	66	27	10	89	11
Atascadero city	24	120	32	25	96	14
Avilla Beach CDP	3	10	2	1	7	13
Cambria CDP	3	94	66	23	68	6
Cayucos CDP		12	10	4	69	10
Creston CDP				1		
Edna CDP			2	2		
Paso Robles	2	63	174	72	186	128
Garden Farms CDP			5			
Grover Beach city	42	174	24	2	12	
Lake Nacimiento CDP			19	7		
Los Berros CDP	1	1				
Los Osos CDP	4	44	37	9	158	14
Los Ranchos CDP			21	10		
Morro Bay city	2	57	54	27	123	76
Nipomo CDP	20	66	25	10	61	23
Oceano CDP	29	89	8	2	4	
Pismo Beach city	6	81	10	2	32	34
San Luis Obispo city	49	91	103	52	239	30
San Simeon CDP	6					1
Santa Margarita CDP			19	27		
Shandon CDP			10	13	1	
Templeton CDP	4	34	13	8	44	26
Whitley Gardens CDP	8			1		
Rest of SLO County	156	72	139	69	26	8
SLO County total	**361**	**1,074**	**800**	**377**	**1,215**	**394**

Verizon download speeds by census block - San Luis Obispo County

	1.5 Mbps	3 Mbps	5 Mbps	7 Mbps	10 Mbps	15 Mbps	100 Mbps
Blacklake CDP				1		12	
Callender CDP			3	1	2	14	
Nipomo CDP	2	3		1	1	1	
Woodlands CDP		1				1	18
Rest of San Luis Obispo Coun	6	1	1	5		11	
San Luis Obispo County tota	8	5	4	8	3	39	18

Verizon download speeds by census block - Santa Barbara County

	1 Mbps	1.5 Mbps	3 Mbps	5 Mbps	7 Mbps	10 Mbps	15 Mbps	100 Mbps
Ballard CDP			5	1				
Buellton city		5		3	9	8	50	
Carpinteria city		11	3		27	8	20	
Goleta city	3	33	39	12	69	22	71	
Guadalupe city		2		1	7	7	47	1
Isla Vista CDP	2	6	1		1	1	9	
Lompoc city	1	28	29	44	184	142	322	
Los Alamos CDP							43	
Los Olivos CDP		1		1	1	1	42	
Mission Canyon CDP	2	2	13	2	7	1	1	
Mission Hills CDP			10	13	2	1	6	
Montecito CDP	1	25	10	14	39	16	55	
Orcutt CDP	11	24	61	41	64	32	105	12
Santa Barbara city	12	96	111	76	229	110	347	
Santa Maria city	9	36	89	81	355	157	427	54
Santa Ynez CDP	2	6	11	3	8	5	39	
Sisquoc CDP							1	
Solvang city		3	2	1	12	11	73	
Summerland CDP	1	8	7	1	4		21	
Toro Canyon CDP		3						
Vandenberg AFB CDP		3			5	6	28	
Vandenberg Village CDP		4	2	3	7	1	60	
Rest of Santa Barbara County	13	61	57	34	126	65	225	
Santa Barbara County total	**57**	**357**	**450**	**331**	**1,156**	**594**	**1,992**	**67**

AT&T download speeds by census block - Ventura County

	768 Kbps	1.5 Mbps	3 Mbps	6 Mbps	12 Mbps	18 Mbps	24 Mbps	45 Mbps
Bell Canyon CDP			3		10	4		
Fillmore city		3	1	2	124	52		
Meiners Oaks CDP		18		2	9	16	4	3
Mira Monte CDP	2	26	14	9	14	18		6
Moorpark city	2	13	9	5	80	119	10	20
Oak Park CDP			3	1	28	55	11	13
Oak View CDP		2	1		36	9		1
Ojai city		2	5	2	60	42	8	17
Piru CDP	2	1		2	10	24		
Ventura	37	451	116	18	372	125	26	50
Santa Susana CDP				3	5	12	6	5
Saticoy CDP		19	6					
Simi Valley city	4	27	31	24	331	542	44	34
Thousand Oaks city			1		14	20	2	1
Rest of Ventura County	38	72	52	25	78	46	2	6
Ventura County total	**85**	**634**	**242**	**93**	**1171**	**1084**	**113**	**156**

Verizon download speeds by census block - Ventura County

	1 Mbps	1.5 Mbps	3 Mbps	5 Mbps	7 Mbps	10 Mbps	15 Mbps	100 Mbps
Camarillo city	8	31	41	23	84	18	60	603
Casa Conejo CDP		3	1	1	7			35
Channel Islands Beach CDP	3	17	14	5	1	1		
El Rio CDP		9	3		12	1	3	49
Lake Sherwood CDP			1	1	5	1	11	
Oxnard city	34	195	237	175	371	100	338	1355
Port Hueneme city	25	30	28	8	17	26	26	69
Santa Paula city		18	13	25	54	36	163	
Santa Rosa Valley CDP		3	2	2	3	6	14	
Thousand Oaks city	14	55	48	12	123	37	81	882
Rest of Ventura County	22	66	70	26	74	25	84	138
Ventura County total	**106**	**427**	**458**	**278**	**751**	**251**	**780**	**3131**

5. California Advanced Services Fund (CASF) eligibility

San Luis Obispo County

Community	Population	Housing units	Anchor institutions	CASF Eligible population	CASF Eligible housing units
Arroyo Grande city	0	0		0%	0%
Atascadero city	246	108	1	1%	1%
Avilla Beach CDP	14	10		1%	1%
Blacklake CDP	0	0		0%	0%
Callender CDP	0	0		0%	0%
Cambria CDP	3	5		0%	0%
Cayucos CDP	10	7		0%	0%
Creston CDP	94	39	1	100%	100%
Edna CDP	193	71		100%	100%
El Paso de Robles (Paso Robles) city	34	25		0%	0%
Garden Farms CDP	0	0		0%	0%
Grover Beach city	105	92		1%	2%
Lake Nacimiento CDP	8	4		0%	0%
Los Berros CDP	47	20		7%	9%
Los Osos CDP	173	64		1%	1%
Los Ranchos CDP	15	7		1%	1%
Morro Bay city	5	1		0%	0%
Nipomo CDP	377	136		2%	2%
Oak Shores CDP	337	634		100%	100%
Oceano CDP	0	0		0%	0%
Pismo Beach city	2	3		0%	0%
San Luis Obispo city	4	2		0%	0%
San Miguel CDP	207	75		9%	9%
San Simeon CDP	462	301		100%	100%
Santa Margarita CDP	0	0		0%	0%
Shandon CDP	1,295	412	5	100%	100%
Templeton CDP	35	11	1	0%	0%
Whitley Gardens CDP	285	123		100%	100%
Woodlands CDP	0	0		0%	0%
Rest of SLO County	28,051	9,070	17	58%	59%
San Luis Obispo County	32,002	11,220	25	12%	10%

Santa Barbara County

Community	Population	Housing units	Anchor institutions	CASF Eligible population	CASF Eligible housing units
Ballard CDP	7	4	0	1.5%	2%
Buellton city	272	184	0	5.6%	10%
Carpinteria city	0	0	0	0.0%	0%
Casmalia CDP	138	61	0	100.0%	100%
Cuyama CDP	57	30	2	100.0%	100%
Garey CDP	68	29	0	100.0%	100%
Goleta city	7	2	0	0.0%	0%
Guadalupe city	0	0	0	0.0%	0%
Isla Vista CDP	1,455	1	0	6.3%	0%
Lompoc city	4,032	1,101	2	9.5%	8%
Los Alamos CDP	1,890	681	1	100.0%	100%
Los Olivos CDP	162	72	0	14.3%	14%
Mission Canyon CDP	0	0	0	0.0%	0%
Mission Hills CDP	0	0	0	0.0%	0%
Montecito CDP	0	0	0	0.0%	0%
New Cuyama CDP	517	215	2	100.0%	100%
Orcutt CDP	676	503	1	2.3%	5%
Santa Barbara city	0	0	0	0.0%	0%
Santa Maria city	1,580	567	13	1.6%	2%
Santa Ynez CDP	61	61	0	1.4%	3%
Sisquoc CDP	183	73	3	100.0%	100%
Solvang city	179	64	1	3.4%	3%
Summerland CDP	0	0	0	0.0%	0%
Toro Canyon CDP	0	0	0	0.0%	0%
Vandenberg AFB CDP	2,839	880	3	85.1%	85%
Vandenberg Village CDP	0	0	1	0.0%	0%
Rest of Santa Barbara County	7,687	3,638	6	17.1%	21%
Santa Barbara County	21,810	8,166	35	5.1%	5%

Ventura County

Community	Population	Housing units	Anchor institutions	CASF Eligible population	CASF Eligible housing units
Bell Canyon CDP	7	3	0	0.3%	0%
Camarillo city	93	7	6	0.1%	0%
Casa Conejo CDP	0	0	0	0.0%	0%
Channel Islands Beach CDP	0	0	0	0.0%	0%
El Rio CDP	0	0	0	0.0%	0%
Fillmore city	0	0	0	0.0%	0%
Lake Sherwood CDP	1,425	542	0	93.3%	91%
Meiners Oaks CDP	0	0	0	0.0%	0%
Mira Monte CDP	0	0	0	0.0%	0%
Moorpark city	0	0	1	0.0%	0%
Oak Park CDP	0	0	0	0.0%	0%
Oak View CDP	0	0	0	0.0%	0%
Ojai city	0	0	0	0.0%	0%
Oxnard city	1,200	387	0	0.6%	1%
Piru CDP	26	9	1	1.3%	2%
Port Hueneme city	0	0	0	0.0%	0%
San Buenaventura (Ventura) city	503	370	16	0.5%	1%
Santa Paula city	22	4	0	0.1%	0%
Santa Rosa Valley CDP	122	39	0	3.7%	3%
Santa Susana CDP	0	0	0	0.0%	0%
Saticoy CDP	2	1	0	0.2%	0%
Simi Valley city	17	8	2	0.0%	0%
Thousand Oaks city	7	2	0	0.0%	0%
Rest of Ventura County	12,827	4,280	16	30.5%	28%
Ventura County	16,251	5,652	42	2.0%	2%

6. Secondary service providers

San Luis Obispo County secondary provider census blocks/technology

	DSL	Other copper	Fiber
Arroyo Grande city	50	22	
Atascadero city	64	28	1
Avilla Beach CDP		4	
Callender CDP		4	
Cambria CDP		7	
Cayucos CDP		2	
Creston CDP		2	
El Paso de Robles (Paso Robles) city	70	52	1
Grover Beach city	30	21	1
Lake Nacimiento CDP		1	
Los Osos CDP	3	10	1
Los Ranchos CDP		1	
Morro Bay city		21	
Nipomo CDP		13	
Oak Shores CDP	4	4	
Oceano CDP	2	6	
Pismo Beach city	1	11	
San Luis Obispo city	141	93	20
San Miguel CDP		3	
Santa Margarita CDP		4	
Shandon CDP		2	
Templeton CDP	9	16	
Woodlands CDP		1	
Rest of SLO County	1	61	5
San Luis Obispo County	375	389	29

Santa Barbara County secondary provider census blocks/technology

	DSL	Other copper	Fiber
Ballard CDP		1	
Buellton city		5	
Carpinteria city		13	2
Casmalia CDP			1
Goleta city		42	21
Guadalupe city		10	1
Isla Vista CDP		2	1
Lompoc city	30	19	3
Los Olivos CDP		3	
Mission Canyon CDP		2	
Montecito CDP		8	
New Cuyama CDP		1	
Orcutt CDP	1	15	
Santa Barbara city		131	39
Santa Maria city	136	91	2
Santa Ynez CDP		1	
Solvang city	1	11	
Summerland CDP		2	
Vandenberg AFB CDP		1	2
Vandenberg Village CDP		2	
Rest of Santa Barbara County	1	54	3
Santa Barbara County	169	414	75

Ventura County secondary provider census blocks/technology

	DSL	Other copper	Fiber
Camarillo city		3	5
El Rio CDP			1
Fillmore city		2	1
Moorpark city			2
Oxnard city		15	5
San Buenaventura (Ventura) city		17	6
Santa Paula city		2	
Simi Valley city		4	9

Thousand Oaks city		12	5	
Rest of Ventura County		3	2	
Ventura County	0	88	82	

San Luis Obispo County secondary provider census blocks

	Level 3	Norcast	Sonic.net	TW Telecom
Arroyo Grande city		55		17
Atascadero city	1	72		20
Avilla Beach CDP		3		1
Callender CDP		3		1
Cambria CDP		1		6
Cayucos CDP		1		1
Creston CDP				2
El Paso de Robles (Paso Robles) city	1	79		43
Grover Beach city	1	40		11
Lake Nacimiento CDP		1		
Los Osos CDP	1	6		7
Los Ranchos CDP		1		
Morro Bay city		10		11
Nipomo CDP		6		7
Oak Shores CDP		8		
Oceano CDP			3	5
Pismo Beach city		6		6
San Luis Obispo city	7	166		81
San Miguel CDP				3
Santa Margarita CDP		1		3
Shandon CDP				2
Templeton CDP		18		7
Woodlands CDP				1
Rest of SLO County	2	26		39
San Luis Obispo County	13	503	3	274

Santa Barbara County secondary provider census blocks

	Level 3	Norcast	TW Telecom
Ballard CDP			1
Buellton city		1	4
Carpinteria city	2		13
Casmalia CDP	1		
Goleta city	6	2	55
Guadalupe city	1	3	7
Isla Vista CDP			3
Lompoc city	2	32	18
Los Olivos CDP	1		2
Mission Canyon CDP			2
Montecito CDP	1		7
New Cuyama CDP			1
Orcutt CDP		9	7
Santa Barbara city	9	1	160
Santa Maria city	2	159	68
Santa Ynez CDP			1
Solvang city	1	4	7
Summerland CDP			2
Vandenberg AFB CDP	1		2
Vandenberg Village CDP			2
Rest of Santa Barbara County	3	6	49
Santa Barbara County	30	217	411

Ventura County secondary provider census blocks

	CyberNet	Level 3	TW Telecom
Camarillo city		4	4
El Rio CDP	1		
Fillmore city		2	1
Moorpark city		2	
Oxnard city		8	12
San Buenaventura (Ventura) city	1	4	18
Santa Paula city			2
Simi Valley city	2	9	2

Thousand Oaks city	1	5	11
Rest of Ventura County		2	3
Ventura County	5	36	53

Appendix F - Glossary

ADSL	Asymmetric Digital Subscriber Line: DSL service with a larger portion of the capacity devoted to downstream communications, less to upstream. Typically thought of as a residential service. ADSL2 is the second generation of ADSL technology and provides higher service levels.
ATM	Asynchronous Transfer Mode: A data service offering by ASI, that can be used for interconnection of customer's LAN. ATM provides service from 1 Mbps to 145 Mbps utilizing Cell Relay Packets.
Backhaul	Connecting Internet access to a location over long or short distances. Traditionally, wired networks have been necessary for backhaul, but with 802.16, also known as WiMAX, backhaul via wireless will become even more common than it is with WiFi.
Bandwidth	The amount of data transmitted in a given amount of time; usually measured in bits per second, kilobits per second, and megabits per second.
Bit	A single unit of data, either a one or a zero. In the world of broadband, bits are used to refer to the amount of transmitted data. A kilobit (Kb) is approximately 1,000 bits. A megabit (Mb) is approximately 1,000,000 bits.
Broadband	"Broadband" refers generally to any telecommunications service capable of supporting digital data transmission at high speeds. These services can include and/or support Internet, television, telephone, private data networks and various specialized uses. Broadband service can be delivered in a variety of ways, including telephone lines (e.g. DSL), coaxial cable (e.g. cable modem), fiber optic cable (e.g. Lit San Leandro), wireless cellular/mobile service (e.g. cell phones, tablets, wireless modems), WiFi, point-to-point and point-to-multipoint wireless service (e.g. TelePacific, Etheric) and hybrid networks (XO Communications). Although different organizations use different criteria, the California Public Utilities Commission considers 6 Mbps download and 1.5 Mbps upload speed to be a standard for adequate broadband service availability. Unless otherwise stated, this report uses the CPUC definition.
Byte	The amount of memory space needed to store one character, which is normally 8 bits.
Cable modem	A device that hooks to your cable TV line to allow your computer to receive data at about 1.5 Mbps. The theoretical maximum for downstream transactions is 27 Mbps and 2.5 Mbps upstream, but the connection is usually much slower because the provider may be hooked to the Internet via a T-1 line.
CDMA	The type of digital cellular phone network used throughout most of the United States, but rare elsewhere in the world. CDMA stands for Code Division Multiple Access, and CDMA2000 1x is the third-generation, or 3G, extension to which CDMA cellular operators are upgrading their networks. It is a digital cellular technology that uses spread-spectrum techniques. Unlike competing

	systems, such as GSM, that use TDMA, CDMA does not assign a specific frequency to each user. Instead, every channel uses the full available spectrum. Individual conversations are encoded with a pseudo-random digital sequence. CDMA consistently provides better capacity for voice and data communications than other commercial mobile technologies, allowing more subscribers to connect at any given time, and it is the common platform on which 3G technologies are built.
Cell	The geographic area covered by a cellular telephone transmitter. A connected group of cells form a cell system, which is what you gain access to when you sign up for cellular telephone service.
Cellular	A mobile communications system that uses a combination of radio transmission and conventional telephone switching to permit telephone communications to and from mobile users within a specified area.
CLEC	Competitive Local Exchange Carrier: Wireline service provider that is authorized under state and Federal rules to compete with ILECs to provide local telephone service. CLECs provide telephone services in one of three ways or a combination thereof: a) by building or rebuilding telecommunications facilities of their own, b) by leasing capacity from another local telephone company (typically an ILEC) and reselling it, and c) by leasing discreet parts of the ILEC network referred to as UNEs.
Coaxial cable	A type of cable that can carry large amounts of bandwidth over long distances. Cable TV and cable modem service both utilize this technology.
Commercial grade	Broadband service similar to residential service in that the provider takes effectively all responsibility for installing, maintaining and supporting the service. Speeds are similar (6 to 100 Mbps), but service levels, reliability, consistency and pricing are higher.
Copper	Most telephone and cable lines are built using copper wires, which is a telecommunications technology that has been in use since the 19th century. the term is to distinguish lower capacity copper wires (and cables) from higher capacity fiber optic strands (and cables) that are made from glass or plastic.
CPCN	Certificate of Public Convenience and Necessity: Authorization given by the CPUC to telecommunications carriers in order to provide service in the state of California.
Dark fiber	Fiber optic cables are comprised of many, very thin fiber optic strands made of glass. A laser is used to send a beam of light through a fiber optic strand, and this beam carries data from one end to the other. If no electronic equipment (i.e. the laser) is connected to a strand, it is literally dark, and cannot carry data. Dark fiber is sought after and used by telecommunications carriers and large companies that prefer to install and operate their own electronic equipment at either end.

Dial-Up	A technology that provides customers with access to the Internet over an existing telephone line.
DS3	A dedicated phone connection supporting data rates of about 43Mbps (megabits per second). Also called a T-3, the line actually consists of 672 individual channels, each of which supports 64Kbps. DS3 lines are used mainly by Internet Service Providers (ISPs) connecting to the Internet backbone. Large businesses also use DS3 lines when they have large sites to interconnect.
DSL	A common form of broadband Internet connection. DSL stands for Digital Subscriber Line.
E-Rate	A Federal program that provides subsidy for voice and data lines to qualified schools, hospitals, CBOs, and other qualified institutions. The subsidy is based on a percentage designated by the FCC. CTF benefits are calculated net of the E-rate subsidy.
E911	Enhanced 911, an emergency service that automatically sends phone number and location information to the operator. E911 comes in handy, say, when you need to get emergency help and are unable to speak or don't know your location.
Ethernet	The most common networking standard in the world, formally known as IEEE 802.3.
Fixed wireless	Broadband systems based on fixed wireless technology provide Internet service using outdoor antennas installed on homes and businesses. It is most commonly found in rural areas, but it is also sometimes used by businesses to compensate for poor wireline service in urban areas. Fixed wireless systems can provide services between two specific locations – i.e. point to point – or from a central access point to many locations in the surrounding areas – i.e. point to multipoint.
FTTN	Fiber To The Neighborhood: A hybrid network architecture involving optical fiber from the carrier network, terminating in a neighborhood cabinet with converts the signal from optical to electrical.
FTTP	Fiber To The Premise (Or FTTB
Gigahertz	A measure of electromagnetic wave frequency equal to one thousand million (1,000,000,000) hertz, often abbreviated as GHz and used to specify the radio frequency used by wireless devices. 802.11a networks operate at 5 GHz. 802.11b and g networks use 2.4 GHz, which is susceptible to interference from nearby cordless phones and microwave ovens that use the same frequency.
GPON	Gigabyte-Capable Passive Optical Network: GPON uses a different, faster approach (up to 2.5 Gbit/s in current products) than BPON.
GSM	Global System for Mobile Communications: This is the current radio/telephone standard in Europe and many other countries except Japan and the United States.

Hub	A common connection point for devices, such as computers and printers, in a network.
ILEC	Incumbent Local Exchange Carrier. An ILEC is a telephone company that was providing local service when the Telecommunications Act of 1996 was enacted. Compare with CLEC, a company that competes with the already established local telephone business.
Industrial grade	Broadband service where the customer plays a much greater role in provisioning and supporting the service, including buying different elements from different vendors and managing installation and support. Speeds would be higher – perhaps as high as a Gigabit per second or more – and quality of service levels could be as high as Tier 1. Comcast's Business Class service or AT&T's business DSL service are examples of commercial grade service. A DS-3 or dark fiber strands are examples of industrial grade service.
I-Net	Institutional Network. Provides a high-speed connection between government, educational and community entities. It is often negotiated with a cable franchise, in exchange for using right- of-way in a jurisdiction.
ISP	Internet Service Provider: A company providing Internet access to consumers and businesses, acting as a bridge between customer (end-user) and infrastructure owners for dial-up, cable modem and DSL services.
LAN	Local Area Network: A geographically localized network consisting of both hardware and software. The network can link workstations within a building or multiple computers with a single wireless Internet connection.
Last mile	Infrastructure (e.g. fiber optic lines, distribution boxes, equipment vaults, poles, conduit) that provides broadband service to end users or end- user devices (including households, and businesses).
Lit fiber	Fiber optic cables are comprised of many, very thin fiber optic strands made of glass. A laser is used to send a beam of light through a fiber optic strand, and this beam carries data from one end to the other. When this kind of electronic equipment (i.e. the laser) is installed and operating, then the fiber strand is literally "lit" and ready to transmit data, either for the company that operates it or for third-party customers.
Local Loop	A generic term for the connection between the customer's premises (home, office, etc.) and the provider's serving central office. Historically, this has been a wire connection; however, wireless options are increasingly available for local loop capacity.
MAN	Metropolitan Area Network: A high-speed date intra-city network that links multiple locations with a campus, city or LATA. A MAN typically extends as far as 50 kilometers.
Managed services	The type of service provided by dominant incumbent providers, such as AT&T and Comcast. Rather than providing a simple connection between points – via lit or dark fiber – these companies provide full Internet bandwidth services, at a

	speed and quality of service level they specify, and sometimes with quantity limits, i.e. data caps. It is analogous to water service: these companies sell "water" and don't rent out access to their "pipes".
Mbps	Megabits per second: 1,000,000 bits per second. A measure of how fast data can be transmitted.
Middle mile	Broadband infrastructure that does not predominantly provide broadband service to end users or to end-user devices, and may include interoffice transport, backhaul, Internet connectivity, or special access. Middle mile facilities are the link between last mile facilities and major interconnection points, such as those that form the core of the Internet.
Modem	Short for modulator/demodulator. A modem modulates outgoing digital data into analog signals so they can be sent over copper phone lines, and demodulates incoming analog signals into digital.
Overbuilders	Building excess capacity. In this context, it involves investment in additional infrastructure project to provide competition.
PON	Passive Optical Network: A Passive Optical Network consists of an optical line terminator located at the Central Office and a set of associated optical network terminals located at the customer's premise. Between them lies the optical distribution network comprised of fibers and passive splitters or couplers. In a PON network, a single piece of fiber can be run from the serving exchange out to a subdivision or office park, and then individual fiber strands to each building or serving equipment can be split from the main fiber using passive splitters / couplers. This allows for an expensive piece of fiber cable from the exchange to the customer to be shared amongst many customers thereby dramatically lowering the overall costs of deployment for fiber to the business (FTTB) or fiber to the home (FTTH) applications.
Rights-of-Way	Legal rights of passage over land owned by another. Carriers and service providers must obtain rights-of-way to dig trenches or plant poles for cable systems, and to place wireless antennae.
Router	An intelligent network device that goes one step beyond bridging by converting address-based protocols that describe how packets move from one place to another. In practice, this generally comes down to translating between IP addresses and MAC addresses for data flowing between your local network and the Internet. Many people use the term interchangeably with "gateway." You must enter the IP address of your router when configuring network settings manually.
Subscribership	Subscribership is how many customers have subscribed for a particular telecommunications service.
Switched Network	A domestic telecommunications network usually accessed by telephones, key telephone systems, private branch exchange trunks, and data arrangements.

T-1	The T-1 standard was introduced in 1961 in order to support a bi-directional speed of 1.5 Mbps at a high quality-of-service level, using the copper wires of the time. Because it is a dedicated and managed circuit, its performance is usually substantially better than shared services such as DSL or cable modem, even in cases where the claimed top speed of those shared services is many times higher. A T-1 circuit is generally considered to be the lowest level of service that can be described as industrial or carrier grade.
Telco	An abbreviation for Telephone Company.
Telecommunications	Refers to all types of data transmission, from voice to video.
Throughput	The amount of data that can be transmitted in a given amount of time. Throughput is commonly measured in bits per second. (Although throughput is not really a measurement of speed, most people, including us, use the word "speed" when talking about a high-throughput network.)
Universal Service	The idea of providing every home in the United States with basic telephone service.
VDSL	Very-high-bit-rate digital subscriber line (VDSL or VHDSL)[1] is a digital subscriber line (DSL) technology providing data transmission faster than asymmetric digital subscriber line (ADSL) over a single flat untwisted or twisted pair of copper wires (up to 52 Mbit/s downstream and 16 Mbit/s upstream),[2] and on coaxial cable (up to 85 Mbit/s down- and upstream)[3] using the frequency band from 25 kHz to 12 MHz.[4] These rates mean that VDSL is capable of supporting applications such as high-definition television, as well as telephone services (voice over IP) and general Internet access, over a single connection. VDSL is deployed over existing wiring used for analog telephone service and lower-speed DSL connections. This standard was approved by ITU in November 2001.
Videoconferencing	Conducting a conference between two or more participants at different sites by using computer networks to transmit audio and video data.
VLAN	Virtual Local Area Network. A network of computers that behave as if they are connected to the same wire even though they may actually be physically located on different segments of a LAN.
VoIP	Voice Over Internet Protocol: A new technology that employs a data network (such as a broadband connection) to transmit voice conversations.
VPN	A method of creating an encrypted tunnel through which all traffic passes, preventing anyone from snooping through transmitted and received data. VPN stands for virtual private network.
WAN	Wide Area Network, A collection of local area networks connected by a variety of physical means. The Internet is the largest and most well-known wide area network. Wide area network is generally abbreviated to WAN.

WiFi	Short for wireless fidelity and is meant to be used generically when referring of any type of 802.11 network, whether 802.11b, 802.11a, dual-band, etc. The term is promulgated by the WiFi Alliance. Any products tested and approved as "WiFi Certified" (a registered trademark) by the WiFi Alliance are certified as interoperable with each other, even if they are from different manufacturers. A user with a "WiFi Certified" product can use any brand of access point with any other brand of client hardware that also is certified. Typically, however, any WiFi product using the same radio frequency (for example, 2.4 GHz for 802.11b or 11g, 5 GHz for 802.11a) will work with any other, even if not "WiFi Certified." Formerly, the term "WiFi" was used only in place of the 2.4 GHz 802.11b standard, in the same way that "Ethernet" is used in place of IEEE 802.3. The Alliance expanded the generic use of the term in an attempt to stop confusion about wireless LAN interoperability.
WiMAX	Another name for the 802.16 wireless networking specification used for long-haul and backhaul connections.
Wireless ISP	A company that provides wireless Internet access. The term is often abbreviated to WISP.
WLAN	Wireless Local Access Network, a LAN that can be connected to via a wireless connection.

Sources: Tellus Venture Associates, California Public Utilities Commission, Neratech, Wikipedia.