PREFERRED SCENARIO FOR UNSERVED HOUSEHOLDS IN THE CONNECTED CAPITAL AREA BROADBAND CONSORTIUM REGION

Prepared by Valley Vision, in partnership with the California Emerging Technology Fund.

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CCABC

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- Central Coast Broadband Consortium (CCBC)
- Sacramento Metropolitan Chamber of Commerce

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ABOUT THE AUTHORS

Valley Vision is a civic leadership organization dedicated to improving the livability of the Sacramento region. Through research and action, Valley Vision collaborates on solutions that improve people's lives. It has been in the center of strategic efforts to improve broadband access and digital inclusion efforts in the Sacramento Region. https://www.valleyvision.org/.

The California Emerging Technology fund (CETF) provides leadership statewide to close the "Digital Divide" by accelerating the deployment and adoption of broadband to unserved and underserved communities and populations. https://www.cetfund.org/.

The Connected Capital Area Broadband Consortium (CCABC) is managed by Valley Vision and funded by the California Public Utilities Commission (CPUC) under the California Advanced Services Fund (CASF), Rural and Urban Regional Broadband Consortia. For more information visit: https://www.cpuc.ca.gov/General.aspx?id=848.

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INTRODUCTION

In the digital age, fast and reliable internet is indispensable to equity and economic development. Without it, community members are barred from full access to basic services, job opportunities, and other tools and paths for improving quality of life.

Valley Vision , in partnership with the California Emerging Technology Fund (CETF), is at the center of strategic efforts to improve broadband access in California's Capital Region, paving the way for future-ready infrastructure and regional prosperity. In 2020, this was embodied in its work contributing to state broadband policy, its continued role as manager of the Connected Capital Area Broadband Consortium ("the Consortium"), and its management of the Sacramento Coalition for Digital Inclusion, among others. Broadband infrastructure and adoption is also identified as a high priority in the region's Prosperity Strategy[1], which Valley Vision co-authored and released together with its civic leadership partners.

WHAT IS A PREFERRED SCENARIO?

In 2017, CETF sponsored AB 1665[2] , the "Internet For All Now Act," which established the statutory goal of achieving **98% broadband availability in households in each consortium region of California**. AB 1665 assigned to the California Public Utilities Commission (CPUC) the responsibility of achieving this goal, and directed them to optimize opportunities to leverage federal funding and other resources. During the rulemaking process for the implementation of AB 1665, CETF recommended that the CPUC work with the Regional Consortia to engage Internet Service Providers and local governments in developing a "Preferred Scenario" to reach the 98% goal.

1 The Prosperity Strategy is the region's Comprehensive Economic Development Strategy (CEDS), the economic roadmap that ensures a strong, inclusive, and equitable economy by bringing together public, private, and civic stakeholders to establish regional goals, objectives, and a plan of action (https://www.valleyvision.org/projects/capital-region-prosperity-strategy/).

2 Valley Vision is a civic leadership organization dedicated to improving the livability of the Sacramento region. Through research and action, Valley Vision collaborates on solutions that improve people's lives. It has been in the center of strategic efforts to improve broadband access and digital inclusion efforts in the Sacramento Region. https://www.valleyvision.org/.

Under a grant from CETF, Valley Vision (manager of the Consortium), has developed this Preferred Scenario report that identifies gaps in broadband deployment and access throughout the Capital Region, the available local assets, and partnerships with agencies and organizations that can help to cost-effectively address these gaps.

A Preferred Scenario not only identifies and maps priority unserved communities (at the California standard of 6Mbps downstream and 1Mbps upstream) to be reached with high-speed broadband infrastructure to achieve the 98% deployment goal, but also:

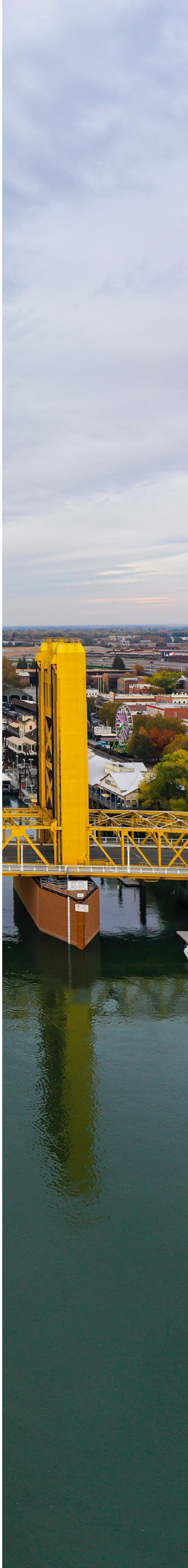
1. Inventories public assets that local governments are willing to contribute to the Preferred Scenario;
2. Identifies known middle-mile backhaul[3] facilities;
3. Delineates the new last-mile and middle-mile infrastructure that must be constructed to achieve the 98% deployment and connect priority unserved communities;
4. Determines and documents the willingness of existing Internet Service Providers to participate in the Preferred Scenario, including a willingness to leverage existing resources; and,
5. Estimates the amount of California Advanced Services funds[4] (CASF) required to achieve the Preferred Scenario.

3 "A general term for the segment of a network between the core and the edge. An example: the connection from a community network hub in a small town to a carrier hotel where it connects to the Internet backbone." https://nextcenturycities.org/glossary/

4 The CASF provides grants to Internet Service Providers to bridge the "digital divide" in unserved and underserved areas in the state. https://www.cpuc.ca.gov/General.aspx?id=6442457932.

ABOUT THE CONSORTIUM AND THE REGION

The Consortium serves a four-county region: Sacramento, Sutter, Yolo, and Yuba Counties [5] (shown in Figure 1). The area encompasses urban, suburban, and rural areas. It is inclusive of agricultural, natural, and other sparsely populated areas. It also includes many governmental and quasi-governmental entities, including four counties, 15 incorporated cities, more than two dozen school districts, multiple water and utilities districts, and numerous other special districts. The population is likewise very diverse, with a broad spectrum of income levels, cultural groups, languages spoken, education levels, and other demographic and socioeconomic factors. The diversity of both the geography and population present challenges for broadband infrastructure development. A driving value for the Consortium is equity. It wants all residents, businesses, and other interests to access high speed, reliable, and affordable broadband internet.



5 The Counties of Placer and El Dorado are served by the Gold Country Broadband Consortium, and Valley Vision collaborates with them on overall planning and policy.

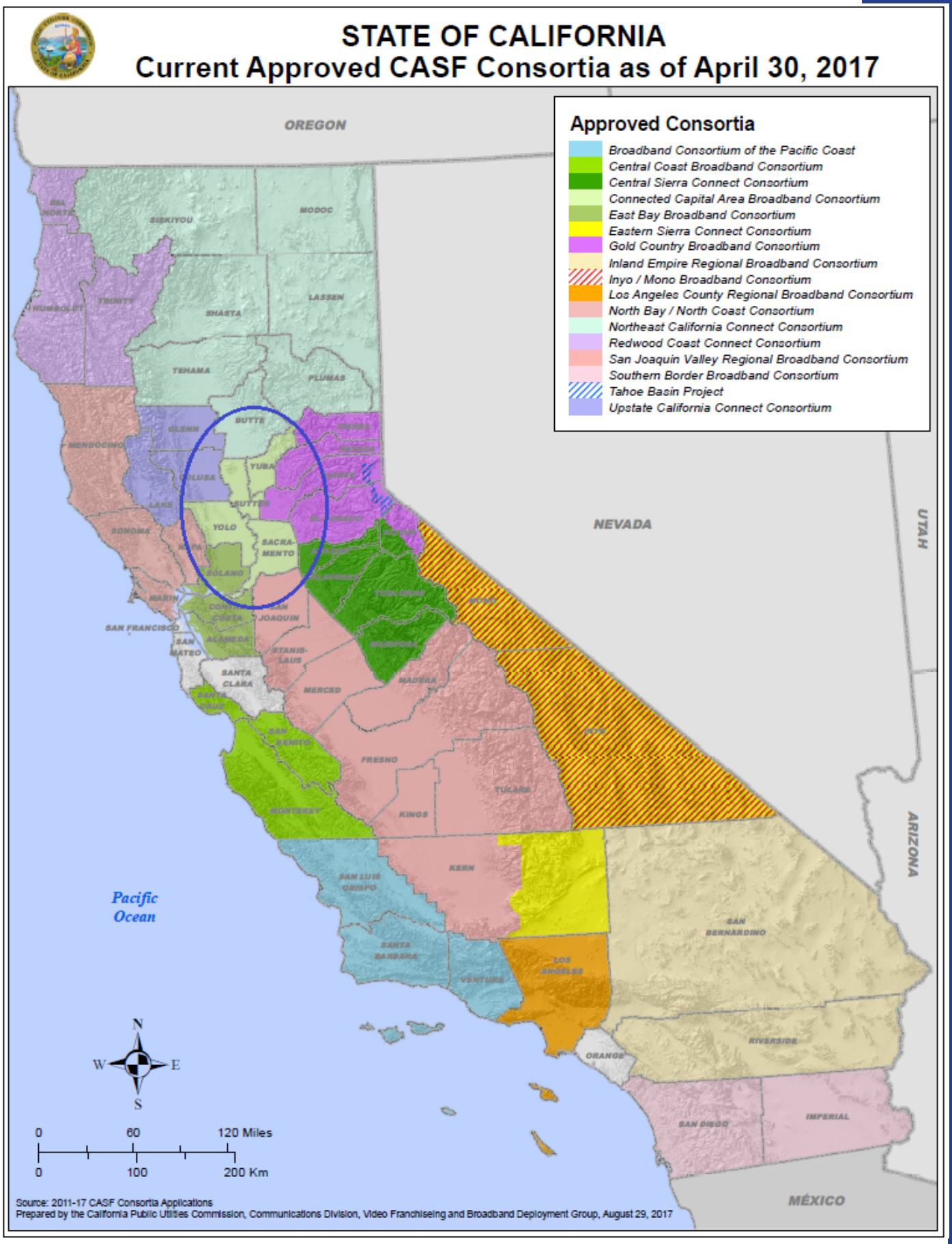


Figure 1. Location of the Connected Capital Area Broadband Consortium in California. From CPUC website: https://www.cpuc.ca.gov/General.aspx?id=870.

UNSERVED HOUSEHOLDS IN THE CONSORTIUM REGION

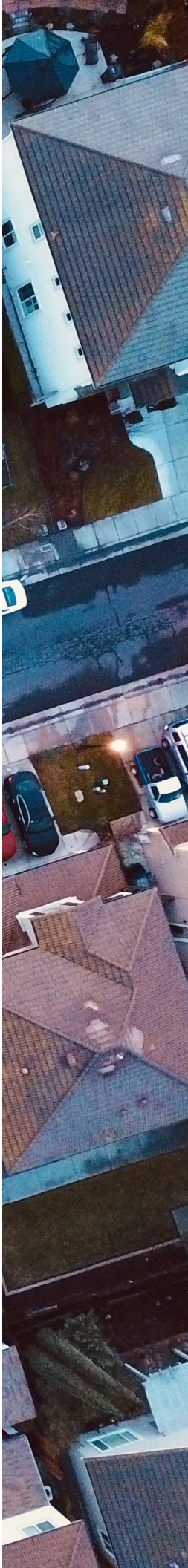
What is the definition of a "served" area?

The current definition of a "served" area — based on the Internet for All Now Act of 2017[6] — is an area that has available broadband service speeds of at least 6 Mbps downstream and 1 Mbps upstream ("6Mbps/1Mbps").

How many households in our region are still considered "unserved"?

Table 1 shows the broadband service availability at the 6Mbps/1Mbps standard in each of the counties of the Consortium region: Sacramento, Sutter, Yolo and Yuba. Service availability is estimated using census block-level broadband availability data from the CPUC. The data is collected on an annual basis from a majority of the last-mile broadband service providers in the state, and it can be used to estimate the number of served and unserved households. Served areas (at 6/1Mbps) include fixed broadband service provided by either wireline (i.e., xDSL, cable modem, and fiber optics) or fixed wireless service (i.e., licensed, lightly and unlicensed spectrum), or both. The Consortium is served at 97.4% of households, and service by county ranges from 94.7% in Yuba to 97.7% in Sacramento. The 0.6% needed to reach 98% access in the region consists of 3,752 households; 1,431 households correspond to Sacramento; 1,165 to Yolo; 843 to Yuba; and 314 to Sutter.

Table 2 shows the broadband service availability at different broadband speed standards including: 1) 6/1 Mbps (CA standard), 2) 25/3 Mbps (FCC standard), 3) 100/20[7] Mbps (Governor's Executive Order[8] and the California Broadband For All Action Plan[9]), and 4) 1000/500 Mbps (FCC definition of gigabit service).



6 Assembly Bill -1665 (October 2017). Telecommunications: California Advanced Services Fund. (https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201720180AB1665).

7 The executive order and action plan establish a goal of 100 Mbps downstream with no specific upstream speed. This analysis uses a 20 Mbps upstream speed.

8 Governor's Executive Order N-73-20. https://www.gov.ca.gov/wp-content/uploads/2020/08/8.14.20-EO-N-73-20.pdf

9 CA Broadband Action Plan 2020: https://broadbandcouncil.ca.gov/wp-content/uploads/sites/68/2020/12/BB4All-Action-Plan-Final.pdf

Table 1. Broadband service availability (6/1 Mbps) in the Connected Capital Area Broadband Consortium Region and by County. Based on 2020 CPUC Data.

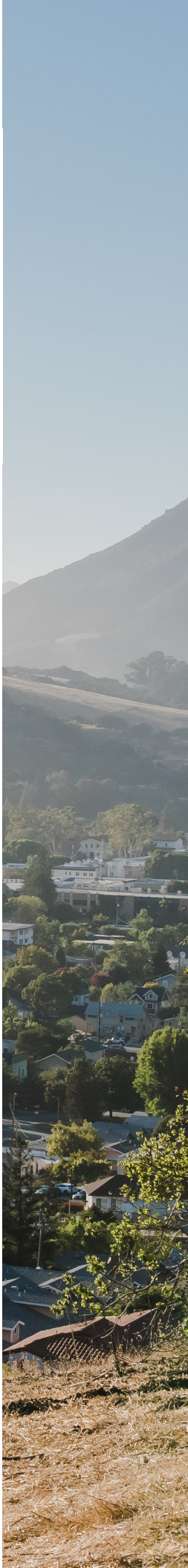
County	Served Households (Speeds at least 6Mbps/1Mbps)		Unserved Households (Speeds less than 6Mbps/1Mbps)		Households to Reach 98% Served	
	Number	%	Number	%	Number	%
CCABC Region	641,411	97.4%	16,919	2.6%	3,752	0.6%
Sacramento	514,838	97.7%	11,967	2.3%	1,431	0.3%
Sutter	31,197	97.0%	957	3.0%	314	1.0%
Yolo	71,010	96.4%	2,638	3.6%	1,165	1.6%
Yuba	24,366	94.7%	1,357	5.3%	843	3.3%

Source: Valley Vision

Table 2. Broadband service availability in the Connected Capital Area Broadband Consortium Region at different speed standards. (CPUC 2020 Data).

Region/ County	Speed Standard	Households (HHs)	Served HHs	%	Unserved HHs	%
CCABC Region	6/1Mbps	658,330	641,411	**97.4%**	16,919	2.6%
	25/3Mbps	658,330	637,670	96.9%	20,660	3.1%
	100/20Mbps	658,330	613,723	93.2%	44,607	6.8%
	1000/500Mbps	658,330	147,829	22.5%	510,501	77.5%
Sacramento	6/1Mbps	526,805	514,838	**97.7%**	11,967	2.3%
	25/3Mbps	526,805	512,504	97.3%	14,301	2.7%
	100/20Mbps	526,805	505,501	96.0%	21,304	4.0%
	1000/500Mbps	526,805	117,904	22.4%	408,901	77.6%
Sutter	6/1Mbps	32,154	31,197	**97.0%**	957	3.0%
	25/3Mbps	32,154	31,012	96.4%	1,142	3.6%
	100/20Mbps	32,154	29,140	90.6%	3,014	9.4%
	1000/500Mbps	32,154	1,306	4.1%	30,848	95.9%
Yolo	6/1Mbps	73,648	71,010	**96.4%**	2,638	3.6%
	25/3Mbps	73,648	69,950	95.0%	3,698	5.0%
	100/20Mbps	73,648	59,380	80.6%	14,268	19.4%
	1000/500Mbps	73,648	27,783	37.7%	45,865	62.3%
Yuba	6/1Mbps	25,723	24,366	**94.7%**	1,357	5.3%
	25/3Mbps	25,723	24,204	94.1%	1,519	5.9%
	100/20Mbps	25,723	19,702	76.6%	6,021	23.4%
	1000/500Mbps	25,723	836	3.2%	24,887	96.8%

Source: Valley Vision



Where are these unserved households?

Figure 2 reflects the data from the previous page in a map. Served areas (green) are made up of major urban areas, such as cities and towns, as well as many rural areas. Unserved areas (yellow and red) are made up of less densely populated and rural areas.

Unserved areas are further subdivided: "Slow service" areas (yellow) have speeds below 6Mbps/1Mbps, and "no service" areas (red) have no reported broadband coverage. In the Consortium region, unserved areas are found in only a few clusters scattered across the region, such as in the Northeast of Yuba, East of Sutter and Yolo, and South and East of Sacramento.

Figure 3 shows the layered coverage at the speed standards mentioned in Table 2. The higher speeds coverage, 100/20 Mbps and Gigabit (in blue and gray, respectively), is mostly available in main urban and densely populated areas across the region. Speeds of 6/1 Mbps and 25/3 Mbps (in light blue and green, respectively) are also available in these areas, and additionally, in suburban and some rural areas.

Are there more unserved households than the reported ones?

It is important to note two aspects: First, the CPUC broadband availability data is self-reported from ISPs and telecom companies. Second, many stakeholders (local governments, communities, residents, and other ISPs) have expressed concerns that some of the data does not reflect what is actually available. To improve data accuracy, the CPUC has implemented several validation methods, such as taking subscribership data into account before registering a census block as "served." Ground truth testing at the address level using speed testing apps (e.g., CalSPEED[10]) is also an important validation method. The Consortium works with local governments and partner organizations across the region to spread the word about downloading and running CalSPEED.

10 The CalSPEED application (www.calspeed.org) is a professional-level broadband testing tool developed at California State University, Monterey Bay and is used by the CPUC for validating broadband coverage from any broadband subscriber location. CalSPEED allows conducting performance testing of both fixed and mobile broadband services, and testing results are displayed in the user device and then sent to a CPUC server for displaying on the California Broadband Availability Map (https://www.broadbandmap.ca.gov/).

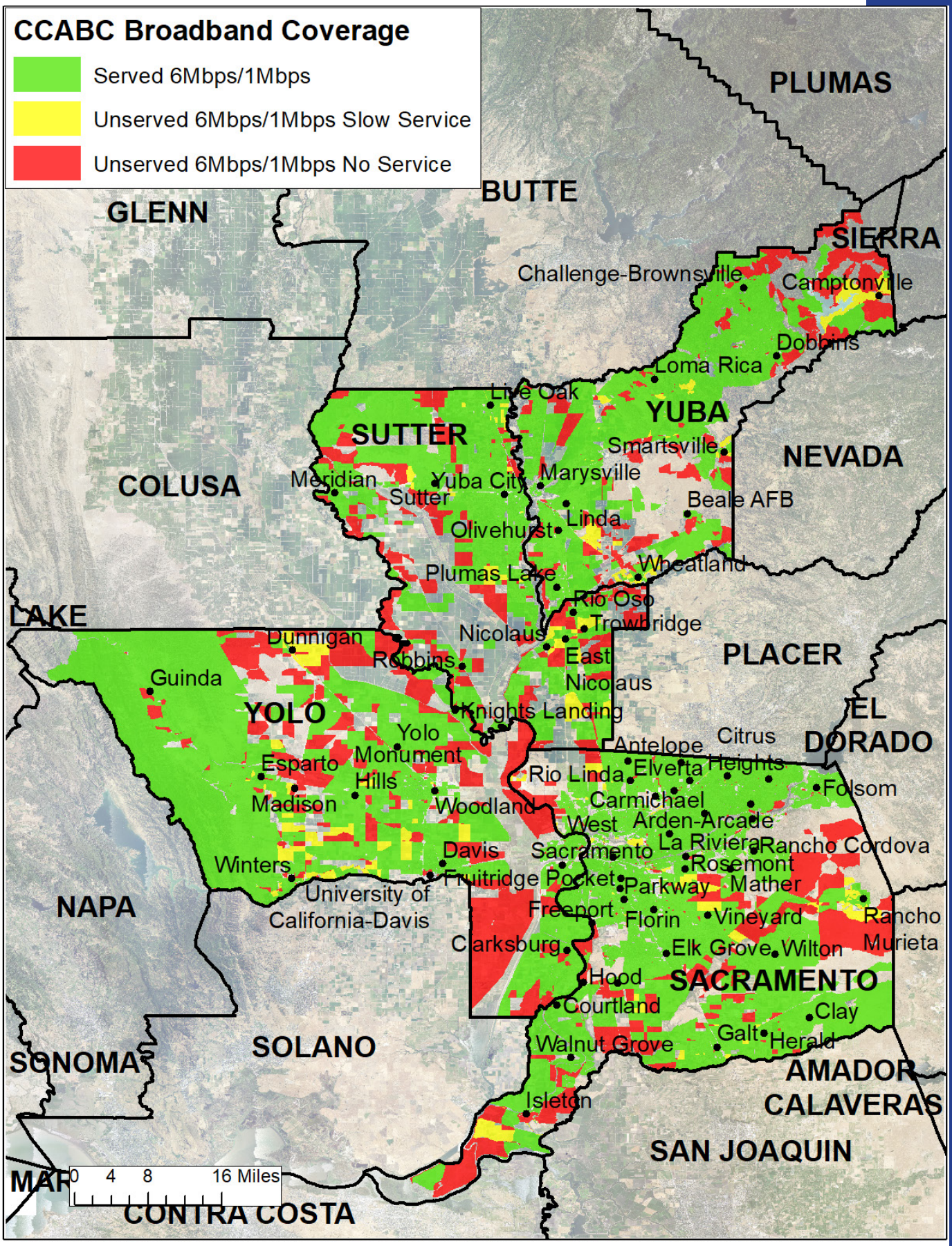


Figure 2. Broadband service coverage in the Consortium region at the California Standard of 6Mbps/1Mbps. Source: Valley Vision.

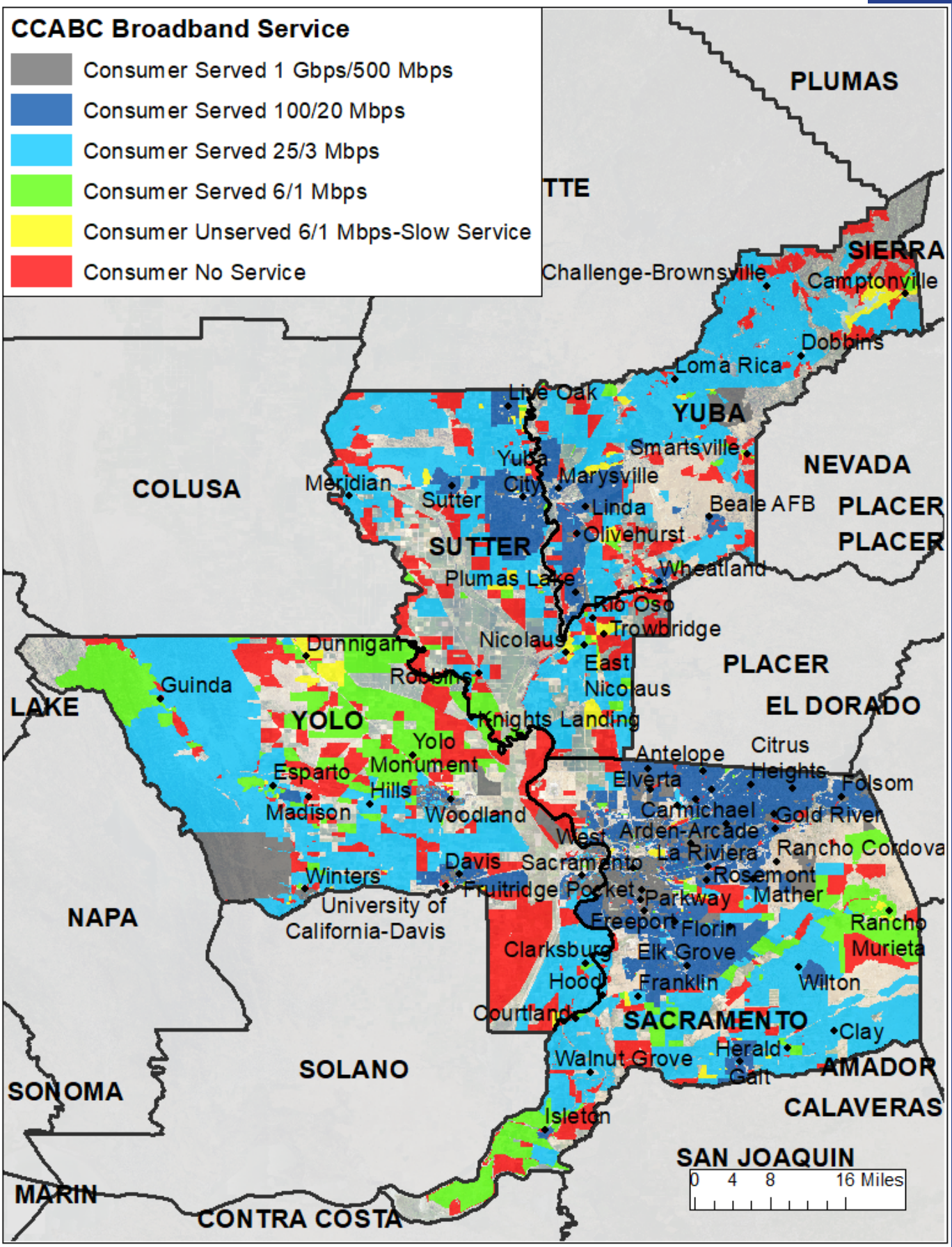


Figure 3. Broadband service coverage in the Consortium region at different speed standards: 1) Gigabit, 2) 100/20 Mbps, 3) 25/3 Mbps, 4) 6/1 Mbps, 5) unserved areas, and 6) no service areas. Source: Valley Vision.

The analysis contained in this Preferred Scenario report uses the CPUC broadband availability data as a baseline for estimating unserved households in the region; it also acknowledges, however, that the number of unserved areas and census blocks is very likely greater.

The Consortium is working with partners and community members to validate and improve actual conditions on the ground. The Governor's Executive Order calls for speeds of 25Mbps/3Mbps, with the goal of 100Mps. The number of unserved and underserved households would increase significantly under the 25Mbps/3Mbps criteria, determined to be the minimum necessary for meeting telework, telehealth, and remote learning needs through the pandemic. Furthermore, for greenfield (brand new) broadband deployments, the consortium supports speeds in the range from 100 Mbps to Gigabits service.

ESTIMATED COST TO REACH 98% BROADBAND SERVICE AVAILABILITY

Achieving the statutory goal of 98% broadband service availability in the Consortium region requires deployments in unserved areas (not available minimum speeds of 6Mbps/1Mbps) across the region. Valley Vision has also conducted a cost analysis for connecting unserved households at the FCC standard (not available minimum speeds of 25Mbps/3Mbps) in the region[11]. Figure 4 shows only the unserved areas, both slow service and no service areas. Unserved areas are located across the four counties and can be grouped in two main geographic terrain types: the valley and in the foothills or mountains, mostly to the East in the Sierra Nevada.

For this analysis, the total cost of required deployments is calculated by first estimating the cost per household. Data of cost per household for broadband deployments can be found in CPUC resolutions of past approved CASF broadband infrastructure projects from 2013 to 2019[12] (shown in Figure 5).

11 Valley Vision conducted a similar analysis for Placer and El Dorado Counties.

12 From CPUC's website – Approved CASF Projects: https://www.cpuc.ca.gov/General.aspx?id=1057

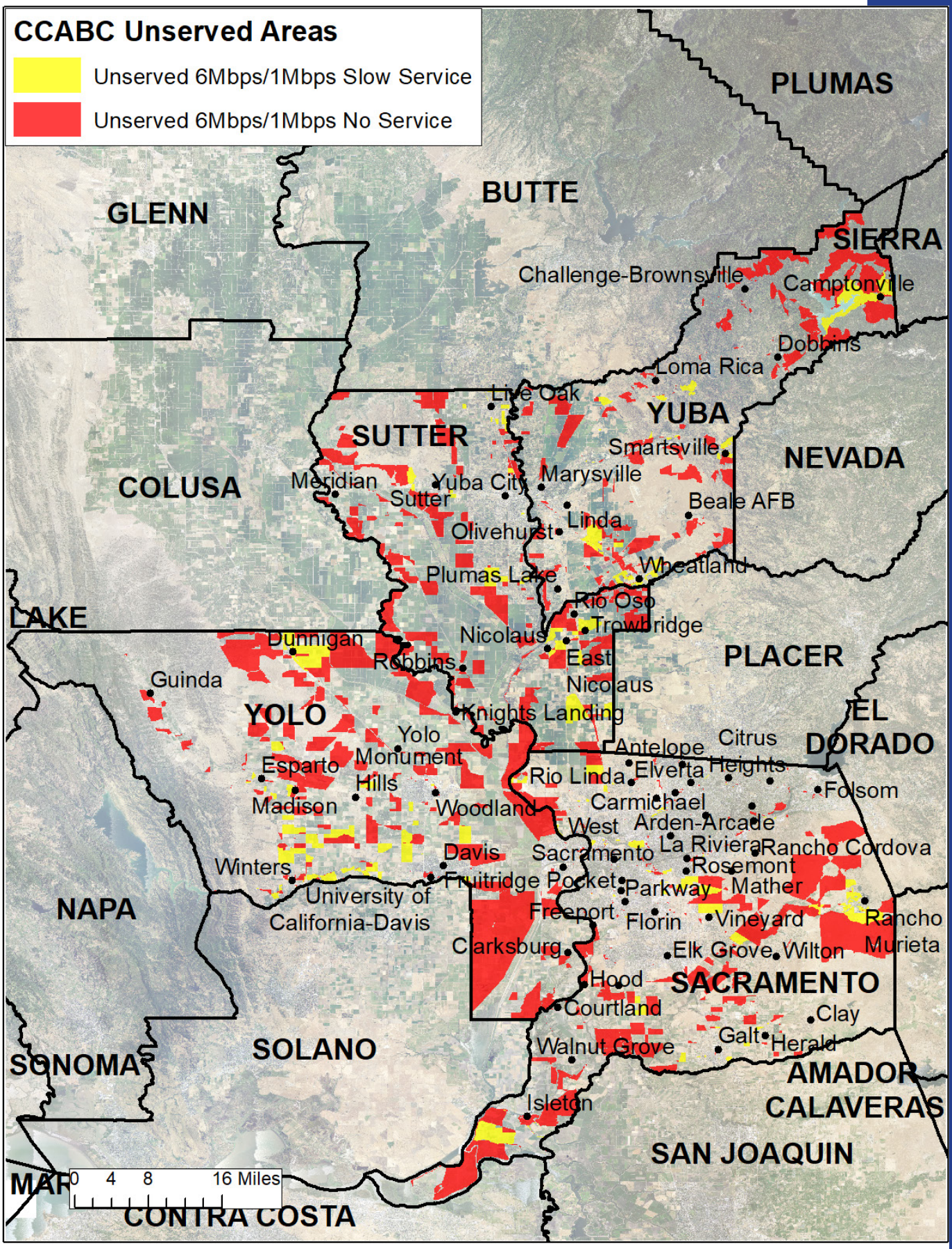


Figure 4. Unserved (slow service and non-service) areas in the Consortium region. These areas are scattered across the region with some clusters in each of the four counties. Source: Valley Vision.

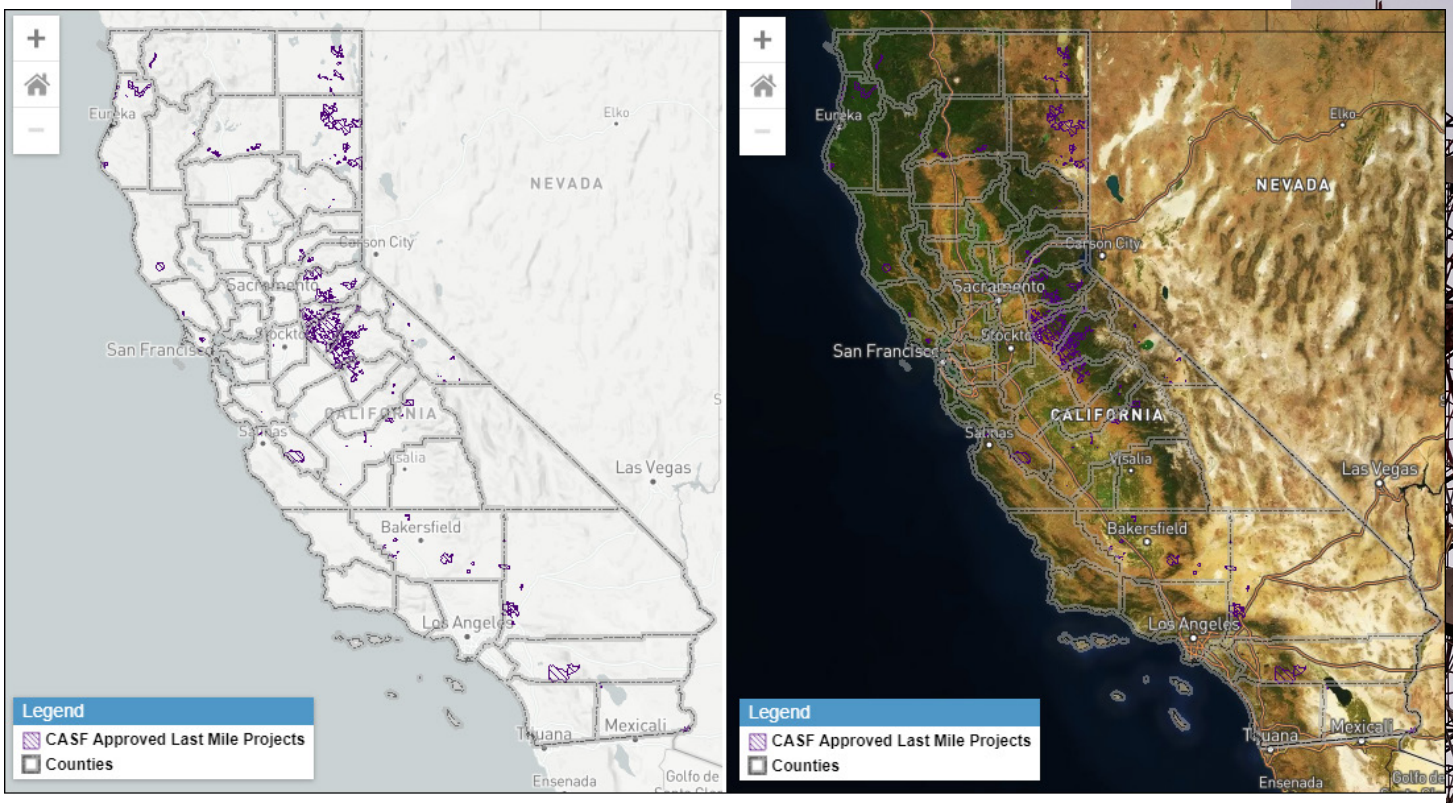


Figure 5. Location of CASF Infrastructure Grant Projects (2013-2019). Gray and satellite backgrounds to highlight geographical terrain. Source: https://www.broadbandmap.ca.gov/.

These aggregated data are used to calculate the average and ranges of the cost per household, factoring in both technology (e.g., fiber-to-the-home and fixed wireless) and geographic area (shown in Table 3). Geographic area is taken into account because, for example, it would be more expensive to deploy in the Sierra Nevada or Cascade Range, versus the flatter terrain in the Valley.

The average cost per household to provide **fiber-to-the-home (FTTH)**, with capability to provide broadband service from **hundreds of Mbps to Gigabits**, in flat terrain with moderate vegetation is $11,550; in mountainous terrain with forests, it is $23,967. To provide **fixed wireless**, with capability to provide broadband service from **tens to few hundreds of Mbps**, the average cost per household is $ 1,303.

Using the data shown in Table 1 and 3, Table 4 shows the total cost for three different deployment scenarios:

1. Deploying only FTTH (100%);
2. Deploying FTTH (75%), complemented with fixed wireless (25%); and
3. Deploying half FTTH (50%) and half fixed wireless (50%).

Table 3. Summary of cost per household for approved CASF Infrastructure Projects 2013-2019

Technology	Minimum Cost per HH	Maximum Cost per HH	Average Cost per HH
FTTH: Flat Terrain-Moderate Vegetation	$8,040	$16,813	$11,550
FTTH: Mountain Terrain-Forest	$11,505	$43,591	$23,967
Fixed Wireless: Mountain Terrain-Forest	$960	$1,645	$1,303

Source: Valley Vision.

In some rural areas with low household density and/or harsh geography, FTTH might be cost prohibitive, or it could take several years before ISPs expand to those areas, even with the help of public infrastructure grants. In those cases, fixed wireless comes as a potential solution. There is a trade off between deployment cost (FTTH more expensive than wireless) and broadband capacity (FTTH up to gigabits and wireless up to few hundreds of Mbps).

For the FTTH cost estimation, this analysis uses Geographic Information Systems (GIS) tools to identify and quantify the number of unserved households located in flat terrain with moderate vegetation, and the number of unserved households in mountainous terrain with dense vegetation. Using this GIS analysis, the proper FTTH cost per household is assigned.

In sum, the total cost (shown in Table 4) for connecting unserved (not available minimum speeds of 6/1 Mbps and 25/3 Mbps) households to achieve 98% and 100% broadband availability is as follows:

- Connecting unserved (6/1 Mbps) households to achieve 98% access ranges from $ 46.4 Million (only FTTH) to $ 25.6 Million (50% FTTH and 50% fixed wireless).

- Connecting unserved (6/1 Mbps) households to achieve 100% access ranges from $ 200.4 Million (only FTTH) to $ 111.2 Million (50% FTTH and 50% fixed wireless).

- Connecting unserved (25/3 Mbps) households to achieve 98% access ranges from $ 93.3 Million (only FTTH) to $ 51.5 Million (50% FTTH and 50% fixed wireless).

- Connecting unserved (25/3 Mbps) households to achieve 100% access ranges from $ 249.3 Million (only FTTH) to $ 138.1 Million (50% FTTH and 50% fixed wireless).

Table 4. Cost to connect unserved (6/1 Mbps and 25/3 Mbps) households to reach 98% and 100% broadband availability in the four counties of the Consortium Region

CA Standard 6/1Mbps	Unserved HHs to 98%	FTTH 100%	FTTH 75% - Wireless 25%	FTTH 50% - Wireless 50%
Sacramento	1,430	$16,515,673	$12,852,552	$9,189,430
Sutter	314	$3,625,797	$2,821,607	$2,017,418
Yolo	1,165	$13,456,291	$10,471,730	$7,487,169
Yuba	843	$12,869,964	$9,926,930	$6,983,897
	CCABC	**$46,467,726**	**$36,072,819**	**$25,677,913**

CA Standard 6/1Mbps	Unserved HHs to 100%	FTTH 100%	FTTH 75% - Wireless 25%	FTTH 50% - Wireless 50%
Sacramento	11,966	$138,208,115	$107,554,011	$76,899,907
Sutter	957	$11,053,415	$8,601,804	$6,150,193
Yolo	2,638	$30,469,080	$23,711,138	$16,953,197
Yuba	1,357	$20,728,441	$15,988,374	$11,248,306
	CCABC	**$200,459,051**	**$155,855,327**	**$111,251,603**

FCC Standard 25/3Mbps	Unserved to HHs 98%	FTTH 100%	FTTH 75% - Wireless 25%	FTTH 50% - Wireless 50%
Sacramento	3,764	$43,473,532	$33,831,246	$24,188,960
Sutter	499	$5,762,560	$4,484,443	$3,206,326
Yolo	2,225	$25,699,364	$19,999,329	$14,299,295
Yuba	1,005	$18,462,912	$14,174,413	$9,885,914
	CCABC	**$93,398,368**	**$72,489,432**	**$51,580,496**

FCC Standard 25/3Mbps	Unserved to HHs 100%	FTTH 100%	FTTH 75% - Wireless 25%	FTTH 50%- Wireless 50%
Sacramento	14,300	$165,165,974	$128,532,706	$91,899,437
Sutter	1,142	$13,190,178	$10,264,640	$7,339,102
Yolo	3,698	$42,712,152	$33,238,737	$23,765,323
Yuba	1,519	$28,235,671	$21,671,567	$15,107,464
	CCABC	**$249,303,975**	**$193,707,650**	**$138,111,326**

Source: Valley Vision.

UNSERVED PRIORITY AREAS IN THE CONSORTIUM REGION

Based on the unserved households in the Consortium region (Table 1 and Figure 2), input from local governments and broadband stakeholders was gathered to identify priority areas for broadband expansion and upgrades. The input was gathered through conference calls and additional follow-up. Table 5 shows an initial list of priority areas in the region and the number of unserved households at 6/1Mbps. It includes both census designated places (CDPs) and unincorporated communities. Figure 6 shows the location of these priority areas and unserved census blocks in the Consortium region.

Table 6 shows the estimated cost to serve the priority areas in the four counties of the Consortium Region. This analysis includes the three scenarios also presented in Table 4, to reiterate:

1. Deploying only FTTH (100%);
2. Deploying FTTH (75%), complemented with fixed wireless (25%); and
3. Deploying half FTTH (50%) and half fixed wireless (50%).

Carrying out infrastructure deployments to achieve 98% broadband service availability and to expand service to all listed priority areas can achieve more planning and deployment synergies and cost-efficiencies by:

- Inventorying known middle-mile fiber routes;
- Inventorying local government assets and developing master lease agreements;
- Coordinating the installation of broadband infrastructure along Caltrans projects in state highways;
- Maximizing planning and coordination of broadband infrastructure projects with CENIC; and
- Assessing the ISPs willingness to participate in the Preferred Scenario.

These will each be discussed in turn in subsequent sections.

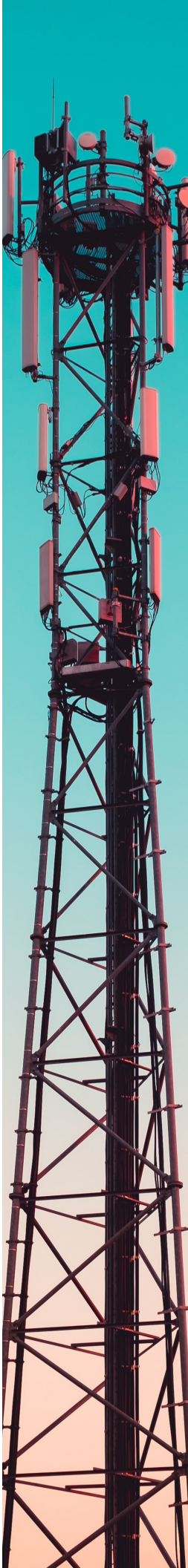


Table 5. Broadband unserved (6/1 Mbps) priority areas in the Consortium Region.

Sacramento County Priority Areas	Unserved HHs	Total
Courtland	8	2919
Elk Grove	191	
Freeport	413	
Fruitridge Pocket/South Oak Park	293	
Garden Hwy area/Metro Air Park (MAP)	216	
Herald	40	
Hood	20	
Isleton	115	
McClellan	610	
Rancho Cordova	585	
Rio Vista	128	
Walnut Grove	193	
Wilton	107	
Sutter County Priority Areas	**Unserved HHs**	**Total**
East Nicolaus/Trowbridge	152	494
Sutter	23	
Sutter Pointe	13	
Yuba City (South of)	306	
Yolo County Priority Areas	**Unserved HHs**	**Total**
Binning	47	262
Capay	25	
Clarksburg	43	
County Airport surrounding homes	35	
Guinda	50	
Monument Hills/Wild Wings/Willow Oak	15	
Rumsey	7	
Yolo	28	
Zamora	12	
Yuba County Priority Areas	**Unserved HHs**	**Total**
Brownsville	135	375
Dobbins	57	
Wheatland	183	

Source: Valley Vision.

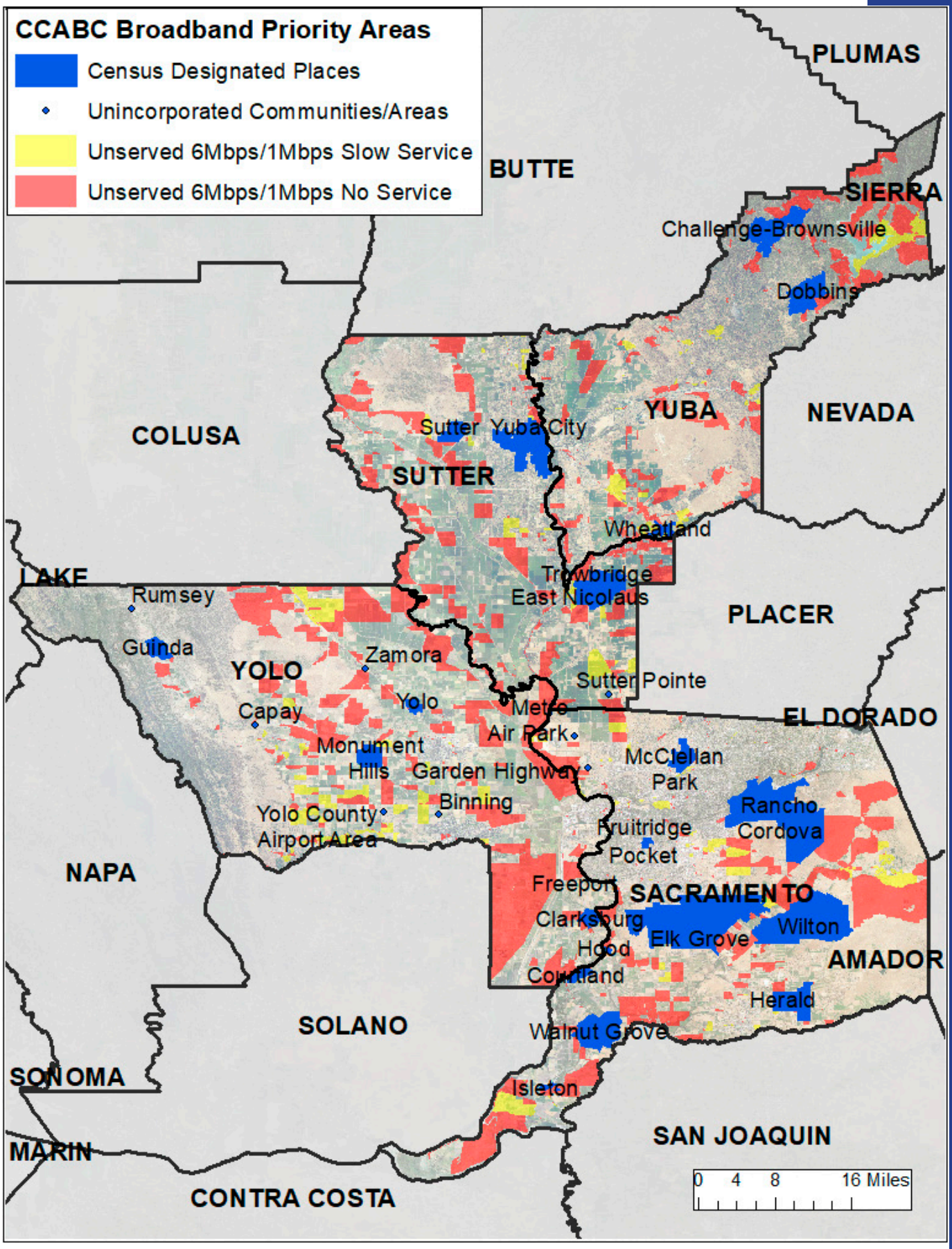


Figure 6. Unserved areas at 6/1Mbps and location of priority areas (census designated places and unincorporated communities). Source: Valley Vision.

Table 6. Estimated cost to serve priority areas in the Consortium Region.

Sacramento County Priority Areas	Unserved HHs	FTTH 100%	FTTH 75%-FW 25%	FTTH 50%-FW 50%
Courtland	8	$92,400	$71,906	$51,412
Elk Grove	191	$2,206,050	$1,724,441	$1,232,585
Freeport	413	$4,770,150	$3,714,709	$2,659,268
Fruitridge Pocket/South Oak Park	293	$3,384,150	$2,636,119	$1,888,088
Garden Hwy area/MAP	216	$2,494,800	$1,941,462	$1,388,124
Herald	40	$462,000	$359,530	$257,060
Hood	20	$231,000	$179,765	$128,530
Isleton	115	$1,328,250	$1,041,334	$744,171
McClellan	610	$7,045,500	$5,487,956	$3,920,165
Rancho Cordova	585	$6,756,750	$5,260,688	$3,764,626
Rio Vista	128	$1,478,400	$1,150,496	$822,592
Walnut Grove	193	$2,229,150	$1,737,294	$1,245,438
Wilton	107	$1,235,850	$969,428	$692,759
	2919	**$33,714,450**	**$26,275,128**	**$18,794,818**
Sutter County Priority Areas	**Unserved HHs**	**FTTH 100%**	**FTTH 75%-FW 25%**	**FTTH 50%-FW 50%**
East Nicolaus/Trowbridge	152	$1,755,600	$1,366,214	$976,828
Sutter	23	$265,650	$214,415	$152,933
Sutter Pointe	13	$150,150	$119,409	$88,668
Yuba City (South of)	306	$3,534,300	$2,755,528	$1,966,509
	494	**$5,705,700**	**$4,455,566**	**$3,184,938**
Yolo County Priority Areas	**Unserved HHs**	**FTTH 100%**	**FTTH 75%-FW 25%**	**FTTH 50%-FW 50%**
Binning	47	$542,850	$430,133	$307,169
Capay	25	$288,750	$227,268	$165,786
Clarksburg	43	$496,650	$394,180	$281,463
County Airport area	35	$404,250	$322,274	$230,051
Guinda	50	$577,500	$454,536	$321,325
M. Hills/Wild Wings/Willow Oak	15	$173,250	$142,509	$101,521
Rumsey	7	$80,850	$70,603	$50,109
Yolo	28	$323,400	$251,671	$179,942
Zamora	12	$138,600	$107,859	$77,118
	262	**$3,026,100**	**$2,401,033**	$1,714,484
Yuba County Priority Areas	**Unserved HHs**	**FTTH 100%**	**FTTH 75%-FW 25%**	**FTTH 50%-FW 50%**
Brownsville	135	$3,235,545	$2,487,633	$872,701
Dobbins	57	$1,366,119	$1,048,823	$371,434
Wheatland	183	$2,113,650	$1,652,535	$1,181,173
	375	**$6,715,314**	**$5,188,991**	**$2,425,308**

Source: Valley Vision.

MIDDLE-MILE FIBER ROUTES

Middle-mile fiber infrastructure provides high-capacity transport and transmission of data communications from an aggregation point (i.e., a central office, cable headend, or wireless switching station) to an Internet "POP" (point of presence). The availability, affordability, and access to middle-mile infrastructure are critical to planning last-mile broadband infrastructure projects and providing either wireline or fixed wireless services to residential and business customers.

Figure 7 below shows the middle-mile infrastructure (i.e., fiber-optic backbones) in the Consortium region offered by AT&T, Cal-Ore, Frontier, Integra, Level 3, Zayo, Optic Access Fiber Network, and Vast networks. It is important to note that these fiber-optic carriers do not publish, report, or make available on their websites the fiber-optic routes. The routes presented in the figure were provided by other Regional Broadband Consortia — the Northeastern and Upstate California Connect Consortia, and the Central Cost Broadband Consortium — which have collected the data over the past few years from ISPs, local governments, or other broadband stakeholders with knowledge of fiber-optic deployments.

Based on these fiber optics routes, there are fiber carriers along main highways in the Valley, including I-5, highways 99 and 80. These middle-mile fiber deployments reach main urban centers, cities and towns. **Two areas lacking fiber routes are the Northeast of Yuba County and Southwest of Sacramento County (or the Delta Region).**

Last-mile networks deployed in rural areas to reach unserved households can connect to these high-capacity fiber optic backbones, which will ensure providing high speed service to customers, and handling growth of internet demand (i.e., number of customers, and required speeds) over time.

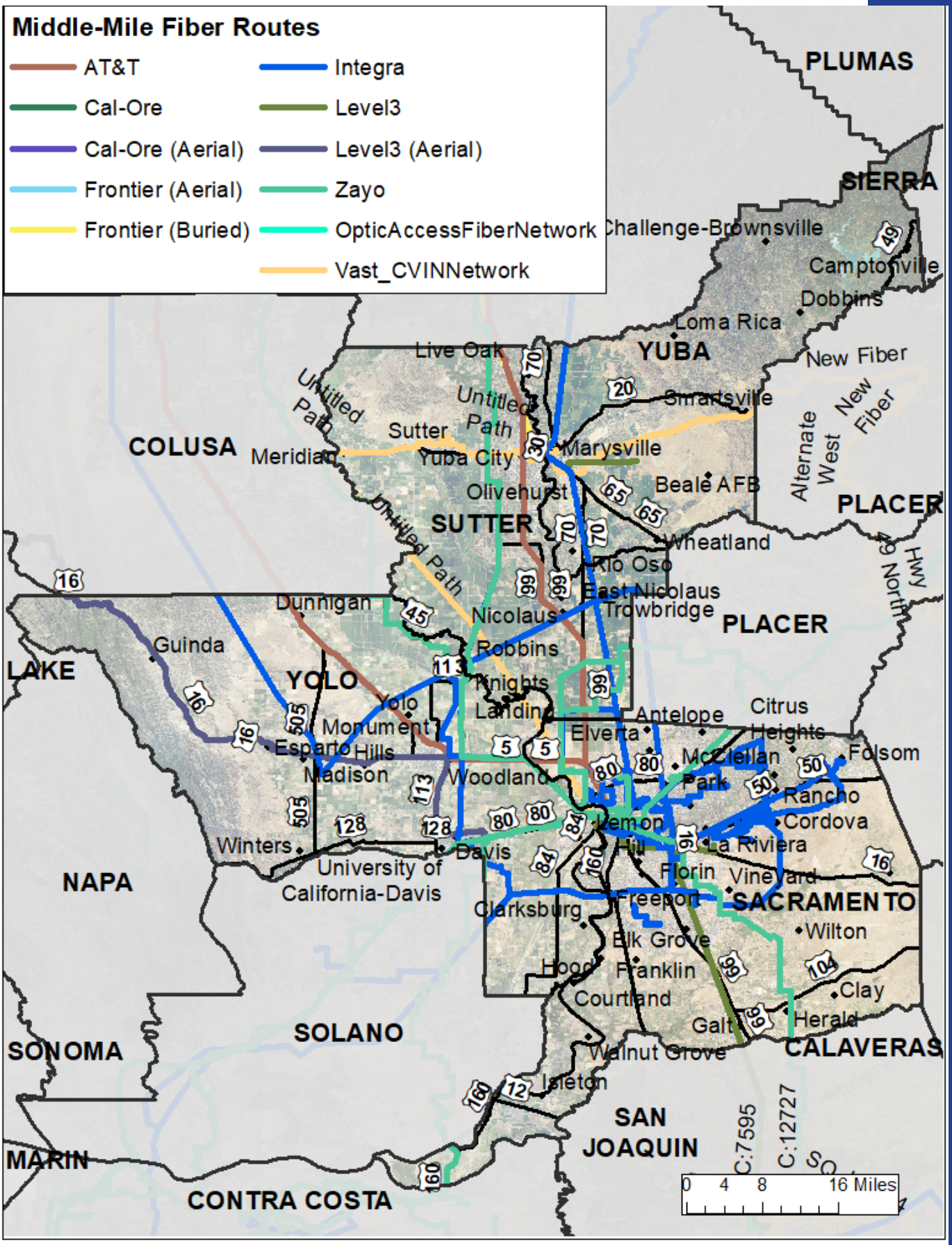


Figure 7. Middle-Mile Fiber Routes in the Consortium Region. Source: NECCC, UCCC, CCBC, and Valley Vision.

ASSET INVENTORY AND MASTER LEASE AGREEMENTS

Cost-efficient broadband deployment can be achieved by establishing partnerships with local governments to access publicly owned assets for installing broadband infrastructure and equipment, particularly to reach unserved and high-cost rural areas. For this purpose, local governments need to develop an asset inventory and an associated master lease agreement, which would allow them to lease these assets to ISPs. Local governments can also explore establishing public-private-partnerships with one or more ISPs and/or infrastructure providers to expand institutional state-of-the-art broadband infrastructure and services for residential, business, farming, and industrial customers across the region.

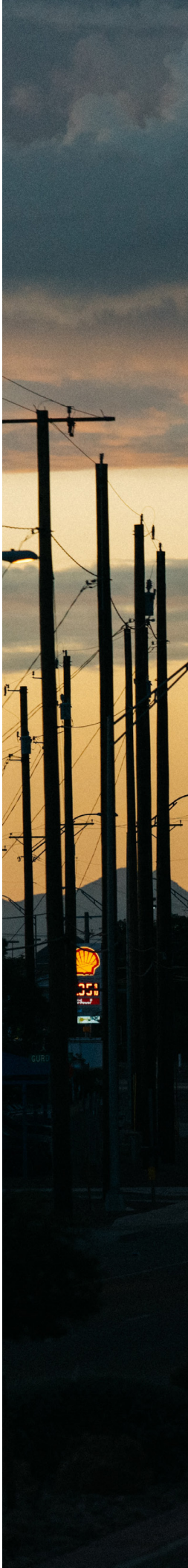
The asset inventory might include the following categories:

- **Mounting infrastructure**, including poles, antennas, towers, buildings and substations to install wireless radios and antennas, aerial fiber optic and coaxial cable, and other broadband or energy equipment.

- **Broadband-related asset**, including underground conduit, fiber optics, and spectrum to pass fiber optics cable or to provide the physical layer for broadband communications.

- **Land and space**, including public-rights-of-way, land, and substations to co-locate or install broadband underground conduit, communications huts, network nodes, equipment, cabinets, racks and servers.

Figure 8 shows land ownership as well as registered towers and electric transmission lines. These are useful when planning deployment in unserved areas. Existing towers can allow for the co-location of fixed and mobile broadband equipment and, as a result, reduce upfront costs, compared to installing a brand-new tower. In the case of an unserved area without any nearby towers, a new tower can be built in city or county-owned land, ideally within the footprint of an energy utility. The location of transmission lines, substations, or footprints of energy companies is useful to assess whether sites are ready for building and powering broadband huts or nodes. It is important to note that the design of brand-new broadband infrastructure should be future-proof, should accommodate for aggregated growing demand in the targeted areas, and should explore shared infrastructure.



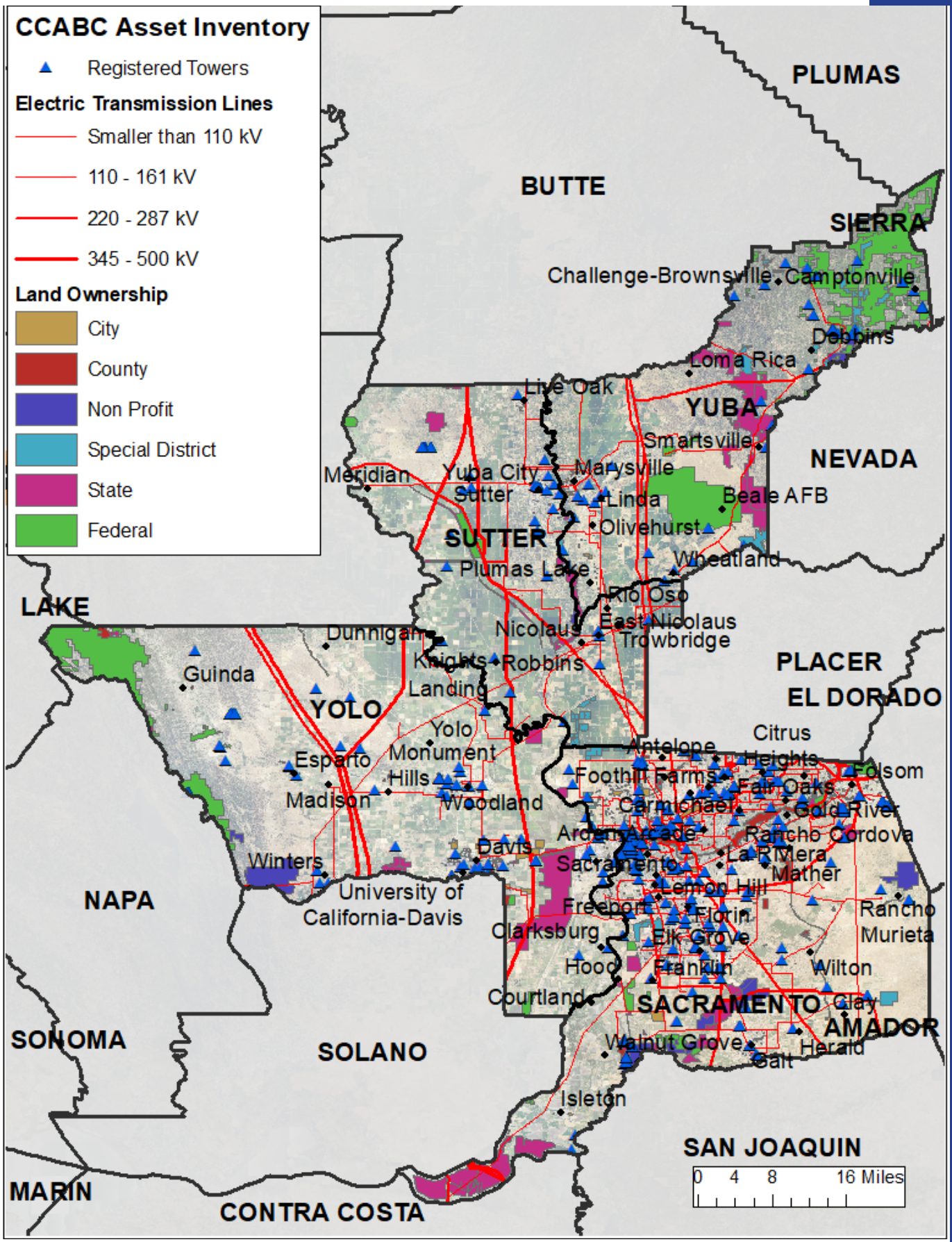


Figure 8. Land ownership, registered towers and electric transmission lines in the Consortium Region. Source: California State Geoportal.

Figure 9 shows public-rights-of-ways along street and road and the location of streetlight poles. Permits along public-rights-of-ways allow for installation of both underground conduit and poles for aerial deployment of fiber optics and coaxial cables. These cables will sustain expansion of wireline, fixed wireless and mobile broadband networks — networks that require high-capacity middle-mile backbones and last-mile segments. Streetlight poles allow for the installation of fixed wireless and mobile broadband equipment, and radios, including micro-, pico-, or femtocells. These create the potential for 5G services, which require fiber, in more densely populated areas. Streetlight poles are shown only for Sacramento County, as this regional asset inventory is work in progress and the Consortium continues gathering data from local jurisdictions across the region.

BROADBAND OPPORTUNITIES WITH CALTRANS PROJECTS

Expanding and upgrading broadband infrastructure is more cost-efficient if it is done in coordination with the infrastructure deployment of federal or state agencies, public utilities, and local public works departments. In California, broadband stakeholders have partnered with the California Department of Transportation (Caltrans) to coordinate installation of broadband infrastructure along projects in state highways, to reach high-cost rural unserved or underserved areas.

This coordination goes beyond traditional requests to access Caltrans rights-of-way to install telecom or broadband infrastructure along highways. California Assembly Bill 1549[13], passed in 2016, requires that Caltrans notify broadband deployment companies and organizations on its website of transportation projects that involve construction methods suitable for the installation of broadband. This notification is carried out during the planning phase of specified Caltrans-led highway construction projects. After receiving notification from Caltrans, companies or organizations working on broadband deployment can then collaborate with Caltrans to install a conduit suitable for broadband infrastructure as part of a project.

13 Assembly Bill No. 1549. https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201520160AB1549.

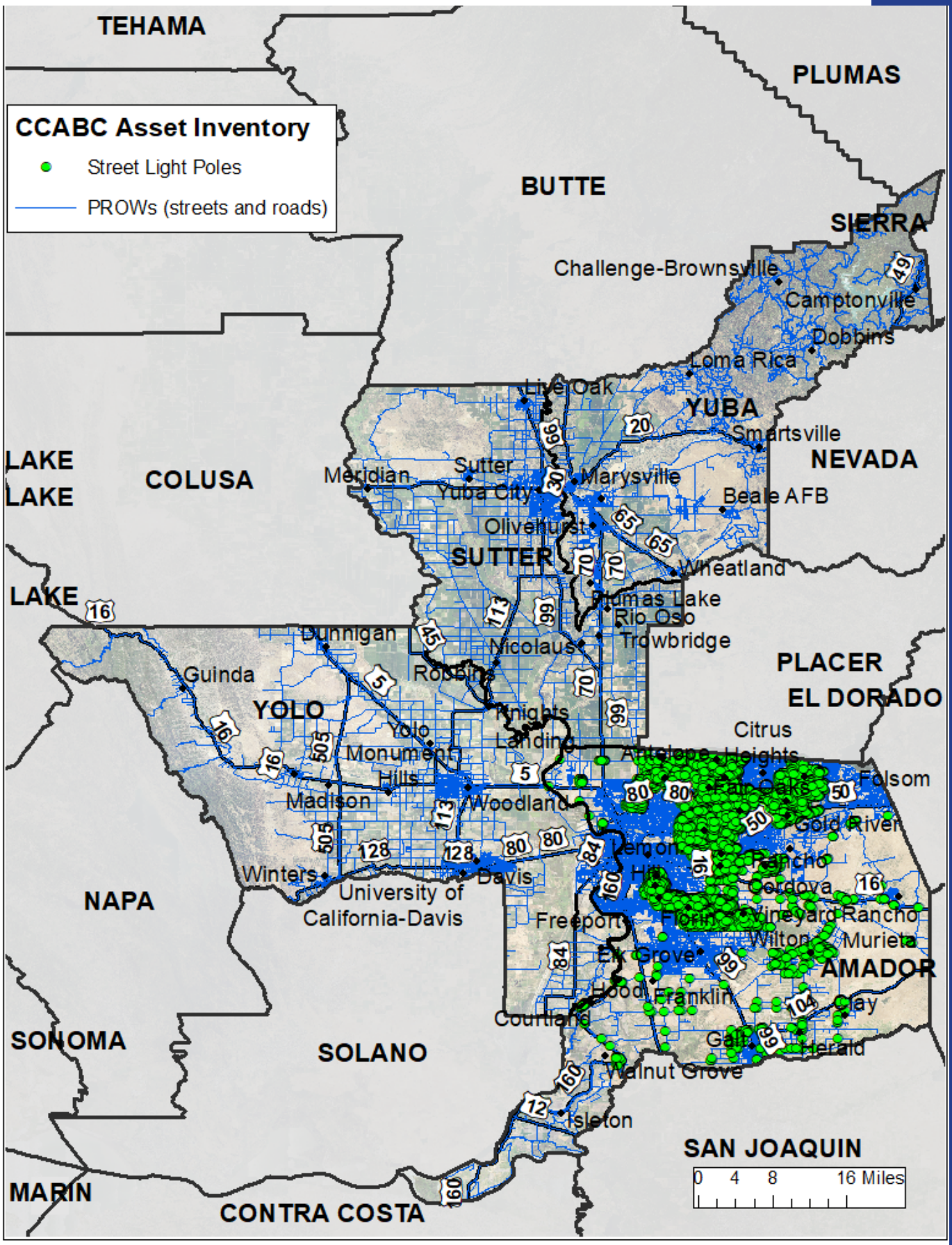


Figure 9. Public-rights-of-way along streets and county roads, and street light poles.
Source: SACOG, California State Geoportal.

AB 1549 also required Caltrans to develop guidelines[14] to facilitate the installation of broadband conduit on state highway rights-of-way. Based on these guidelines, there are two methods by which broadband stakeholders may work with Caltrans, known as "dig once/dig smart" projects:

1. **A stand-alone encroachment permit project**, for broadband deployment companies who prefer to complete the planning, design, and installation of their conduit alone, using contractors of their choice; or
2. **A planned transportation partnering project**, for broadband deployment companies who prefer to work more closely with Caltrans during stages of planning, design, and installation of the conduit, apply for a planned transportation partnering project.

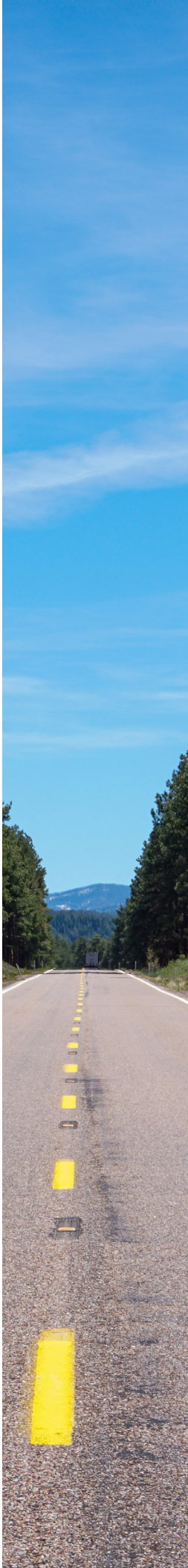
Both cases require broadband stakeholders to complete encroachment permits before proceeding with the broadband conduit installation.

Figure 10 below shows the Caltrans Broadband Partnership Opportunity Map featuring projects in the Consortium region. These Caltrans projects include Project Initiation Documents (PID), and State Highway Operations and Protection Program (SHOPP), among other projects. The map also shows the Strategic Broadband Corridors.

The Strategic Broadband Corridors were submitted by the Regional Broadband Consortia to the California Transportation Commission (CTC) for consideration to become part of the Comprehensive Multimodal Corridor Planning Guidelines. The corridors were selected by each broadband consortium for its region based on the route being needed as a middle-mile infrastructure to provide the following:

1. Backhaul connectivity from unserved areas making it possible for ISPs to more effectively serve last-mile customers.
2. Diverse connectivity routes to ensure better redundancy and resiliency.
3. Backhaul for anchor institutions, county fairgrounds, and/or tribal lands.

These strategic corridors are very important throughout California to facilitate the deployment of broadband infrastructure and affordable services to 98% of the households in each of the consortium regions.



14 Caltrans, User Guide: Incorporating Wired Broadband Facility on State Highway Right-of-Way (2018). https://dot.ca.gov/-/media/dot-media/documents/wired-broadband-facility-user-guide-1st-ed-signed.pdf.

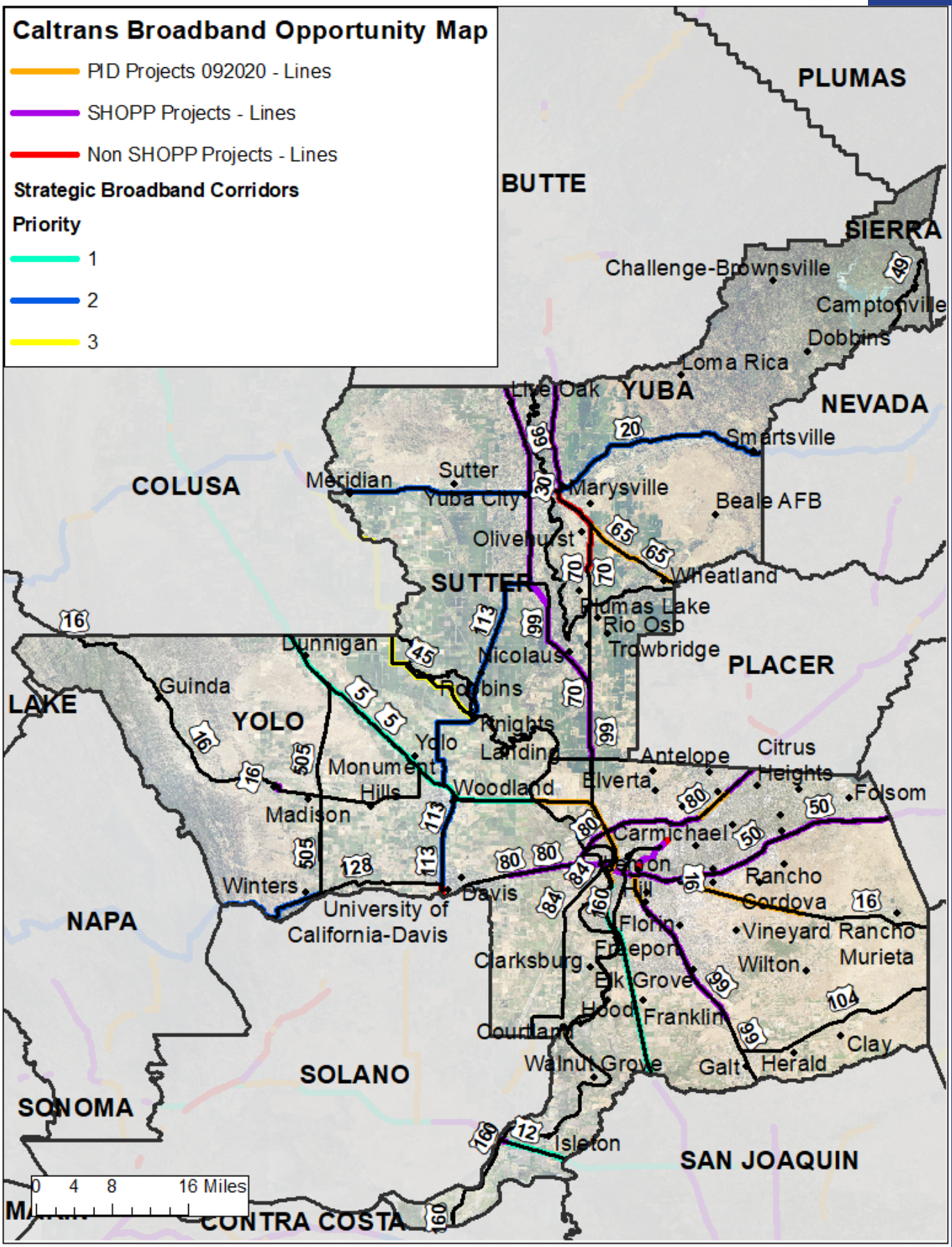


Figure 10. Caltrans Broadband Opportunity Projects and Strategic Corridors in the Consortium Region. Source: Caltrans.

BROADBAND INFRASTRUCTURE OPPORTUNITIES WITH CENIC

The Corporation for Education Network Initiatives in California (CENIC) operates "CalREN" (California Research and Education Network), a high capacity computer network with more than 8,000 miles of optical fiber, serving K-12 schools, public libraries, California State University, the University of California, and private universities. CENIC's network and resources provide cost-effective, high-bandwidth networking to support needs of community members (i.e., faculties, staff, students, associated research groups) and innovation.

Partnerships with CENIC in the Consortium region provide opportunities to connect community anchor institutions to the CENIC network at Gigabit speeds, such as the K12 High Speed Network (HSN) which connects schools in California to CENIC. Figure 11 below shows CENIC network and infrastructure in the Consortium region.

It is important to note that most schools purchase high-speed connectivity using Federal E-rate and California Teleconnect Fund subsidies. Based on current federal legislation, connections provided through E-rate cannot extend connectivity beyond school property boundaries. However, opportunities to leverage CENIC network infrastructure and resources might result from expanding and connecting to core network elements (i.e., nodes and links) and identifying synergies with new network deployments, especially in the planning and implementation stages. Figure 12 shows connectivity in the Consortium region based on CENIC data and K12 HSN Data.

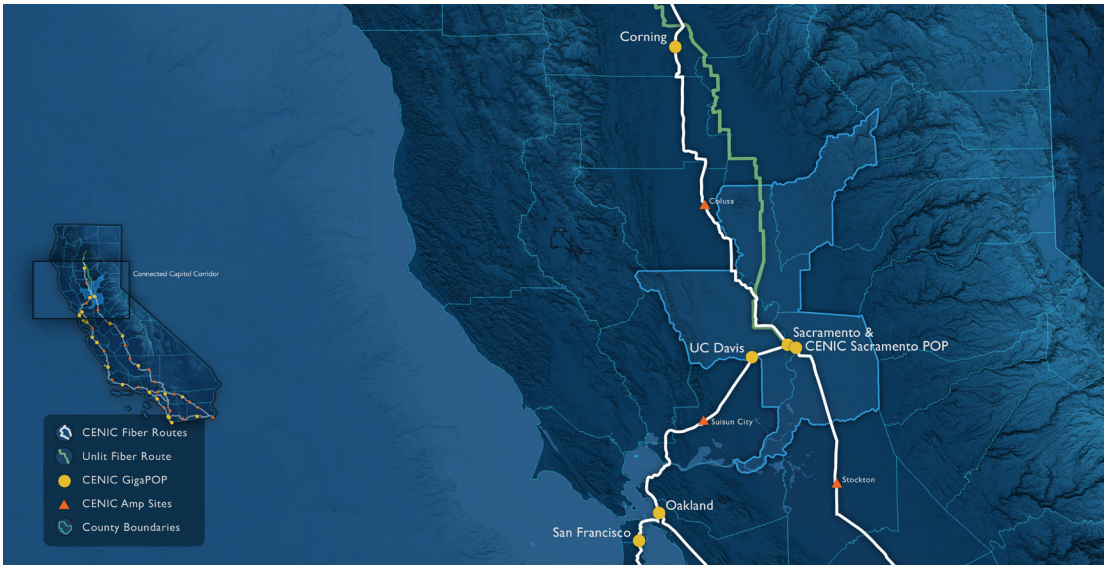


Figure 11. CENIC network infrastructure in the Consortium Region. Source: 2020 CENIC Report.

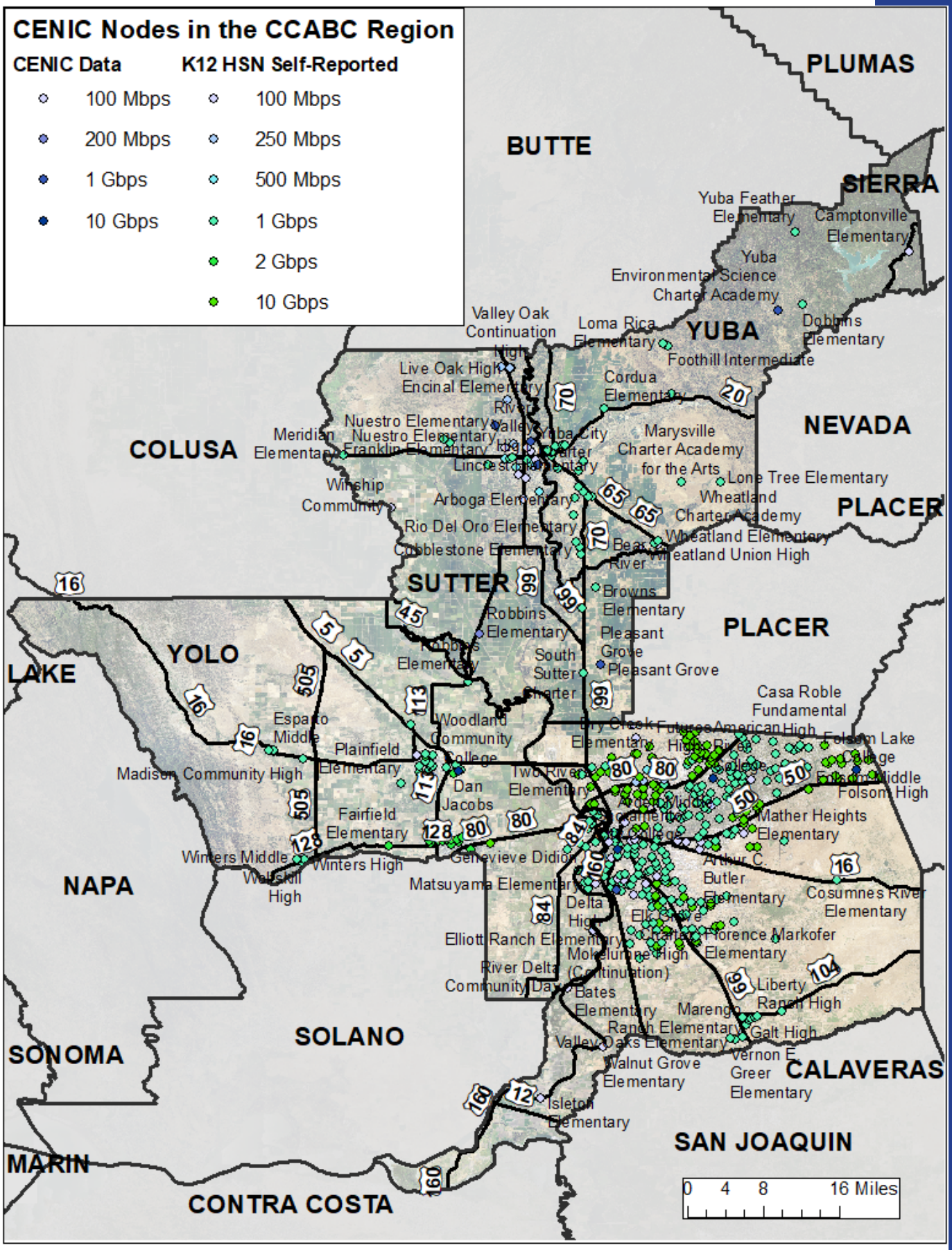


Figure 12. Broadband connectivity in the Consortium Region based on CENIC and K12 HSN Data. Source: CENIC.

WILLINGNESS OF ISPS TO PARTICIPATE

ISPs in the Consortium region have indicated their willingness to participate in the Preferred Scenario and contribute to the accelerated deployment of broadband infrastructure in unserved areas. In October of 2020, Valley Vision, CETF, and the Sacramento Area Council of Governments[15] virtually co-convened broadband partners and stakeholders to discuss how to accelerate broadband infrastructure investments across the region. Participating ISPs and broadband infrastructure providers included Crown Castle, Digital Path, Geolinks, T-Mobile, and Zayo Communications. One of the outcomes of the dialogue was a list of best practices that the ISPs identified as being conducive to deployment:

1. Design guidelines with up-to-date functionality and certainty.
2. Master permits or term permits.
    - Under a master permit, the ISP works with the jurisdictions upfront and agrees upon several criteria (e.g., how many nodes, what the design is going to be, etc.). The jurisdiction then decides what the length of the review and inspection process will be, based on the agreed upon criteria. The jurisdiction also gets paid the fees upfront, so they can make use of the revenue right away. The build schedules are then faster. A jurisdiction can issue an RFP to get an idea of current best practices.
3. Over-the-counter permits for colocation.
4. Public-private partnerships. Also, bring more people into the process, with willingness to explore collaboration opportunities.
5. Having a subject-matter expert within the municipality and making that person's contact information widely known.
    - This staff person would act as a bridge between those working on the technical side of things, and those working on the public works side of things.
6. Having a staff dedicated to processing permit applications and other related matters.
7. Having design standards separate from codes.
8. Allowing electronic signatures, as opposed to having to mail documents with wet signatures.
9. Setting up an escrow account that the city withdraws funds from to process applications.

15 Sacramento Area Council of Government. https://www.sacog.org/.

10. Adopting innovations, such as micro-trenching.

11. Leveraging the topology of the state.

12. Understanding, from a person-to-person perspective, what the impact is of streamlining and other best practices.

- This involves having individual conversations on over-the counter permitting, how to streamline Conditional Use Permits, etc., and allowing these things to happen on a case-to-case basis, as a foundation for formulating broader policies and best practices.
- It is akin to starting something with a pilot, followed by a process to do it at scale.

In 2020, several ISPs applied to state and federal programs for expanding broadband infrastructure in unserved areas in the Consortium Region. The results of these two broadband infrastructure programs demonstrate the willingness of ISPs to expand broadband service in the Consortium region including:

- **California Advanced Services Fund (CASF)[16] :** Frontier and Digital Path applied for a total of three projects. Frontier proposed to deploy FTTH in the areas of Knights Landing, Robbins and Grimes in the Counties of Yolo, Sutter and Colusa. Digital Path proposed to deploy fixed wireless service in the Counties of Sacramento, Sutter and Placer. In December 2020, the CPUC approved the Digital Path project in Sutter and Placer Counties. The other projects are still under review by CPUC.

- **Rural Digital Opportunity Fund:** In December 2020, the Federal Communications Commission (FCC) announced the results of the Rural Digital Opportunity Fund Phase I auction. Winners in the Consortium region include Cal.Net, Geolinks, Frontier, LTD Broadband, and Space Exploration Technologies (Space X). Most locations will be receiving broadband with speeds of 100/20 Mbps, and gigabit-speed broadband.

The diversity of ISPs (i.e., incumbent, regional competitive, new entrants) and broadband technologies (i.e., FTTH, fixed wireless, and LEO satellite) indicates that reaching the 98% goal will be achieved by multiple providers deploying across the region, and there is no one solution-fits-all.

16 CASF Application Project Summaries: https://www.cpuc.ca.gov/General.aspx?id=1040

Demand Aggregation: Community Anchor Institutions and Businesses

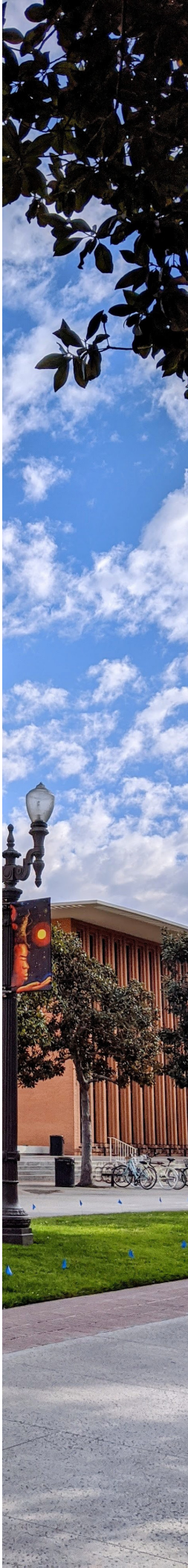
In addition to identifying unserved households and potential broadband infrastructure projects in the region, it is equally important to identify potential broadband demand coming from community anchor institutions and business customers. In many cases the low number of unserved households, and their scattered location across rural areas and rough terrain, will not be sufficient to make a compelling business case for IPSs to deploy broadband infrastructure to these areas; not even with grants or subsidies. The barrier of the high deployment cost can be addressed with federal or state subsidies, but high ongoing operating costs might pose an additional challenge for business sustainability in the long term. In this scenario, demand aggregation of additional potential customers for broadband services comes as a solution to address barriers of both high initial deployment and ongoing operating costs. The same high-capacity middle-mile (backbone) broadband infrastructure can handle the aggregated traffic of several groups of customers (tiers). Most of the last-mile infrastructure (i.e., nodes, cabinets, concentration points, repeaters, etc.) can also be used for serving residential and other customer tiers. The main difference for serving residential and business customers relies on both the end-user-equipment and the configuration (assignment) of traffic and data transmission resources (including service level agreements).

The analysis in this report uses CPUC data of broadband business coverage, reported by ISPs in the region, to identify unserved business areas, with emphasis on areas served and unserved at gigabit and 100/20 Mbps business broadband speeds.

The Consortium has been working with state, regional and local partners to identify demand from the following broadband stakeholders and assessing the existing broadband coverage:

- **Community Anchor Institutions:** These local institutions and agencies (shown in Figure 13) include: airports, bus stations, colleges, emergency broadcast and disaster centers, fairgrounds, ferry ports, fire stations, healthcare facilities, libraries, local governments, power and energy facilities, police stations, public and private schools, among others. Figure 13 shows the business broadband footprint at gigabit and 100/20 Mbps speeds.

- **Businesses:** Local businesses include members of business chambers, chambers of commerce, farm bureaus, and other business associations across the region. Figure 14



shows the members of the Sacramento Metro Chamber of Commerce in the Greater Sacramento region and current business broadband coverage.

- **Agricultural, Commercial and Industrial Facilities:** Figure 15 shows buildings and facilities located in designated agricultural, commercial, and industrial zones in the region (aggregated from several sub-categories). Quantifying the number of buildings in these different zones helps to identify potential demand from business customers operating in these zones. The coverage map shows that most agricultural, commercial and industrial areas are unserved at gigabit and 100/20 Mbps business service in rural areas.

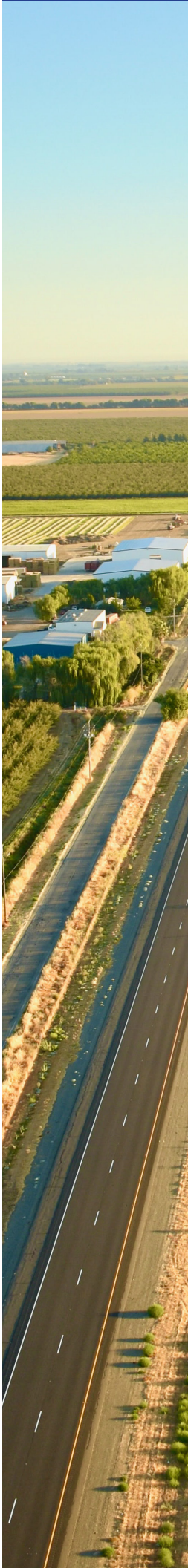
The figures below depict that large geographical areas across the region are unserved for appropriate broadband service (gigabit and 100/20 Mbps) for businesses, and furthermore, it highlights the potential demand from the groups mentioned above. In addition to unserved residential households, altogether this aggregated demand provide a more compelling business case for carrying out broadband deployments in these unserved areas, and achieving a higher return on investment (ROI) than serving only residential customers.

Table 7 below presents the estimated number of unserved buildings and facilities in agricultural, commercial and industrial zones, along with the estimated cost to deploy business broadband service using fiber optics (gigabits capacity) and combination of fiber optics and fixed wireless technologies (hundreds of Mbps capacity). The methodology incorporates using geography, zoning, and deployment specific normalizations for broadband deployments and costs, and common industry infrastructure deployment criteria when serving business customers in open rural areas (mostly aerial fiber) or commercial areas (mostly underground), and distance to an existing business broadband footprint or middle-mile backbone. The cost to serve nearly 28,000 unserved business locations ranges from $332.3 Million to $493 Million.

Table 7. Cost to connect unserved (100/20 Mbps) business facilities in the CCABC region.

County/Region	All Unserved (100/20 Mbps) Locations (Agricultural, Commercial and Industrial)	FTTx 100%	FTTx 75%-Wireless 25%	FTTx 50%-Wireless 50%
Sacramento	11,777	$198,006,701	$167,878,191	$137,749,681
Sutter	5,262	$88,470,006	$75,008,495	$61,546,983
Yolo	5,195	$104,026,229	$86,565,447	$69,104,665
Yuba	3,857	$102,497,609	$83,217,972	$63,938,335
CCABC	**27,824**	**$493,000,545**	**$412,670,104**	**$332,339,663**

Source: Valley Vision.



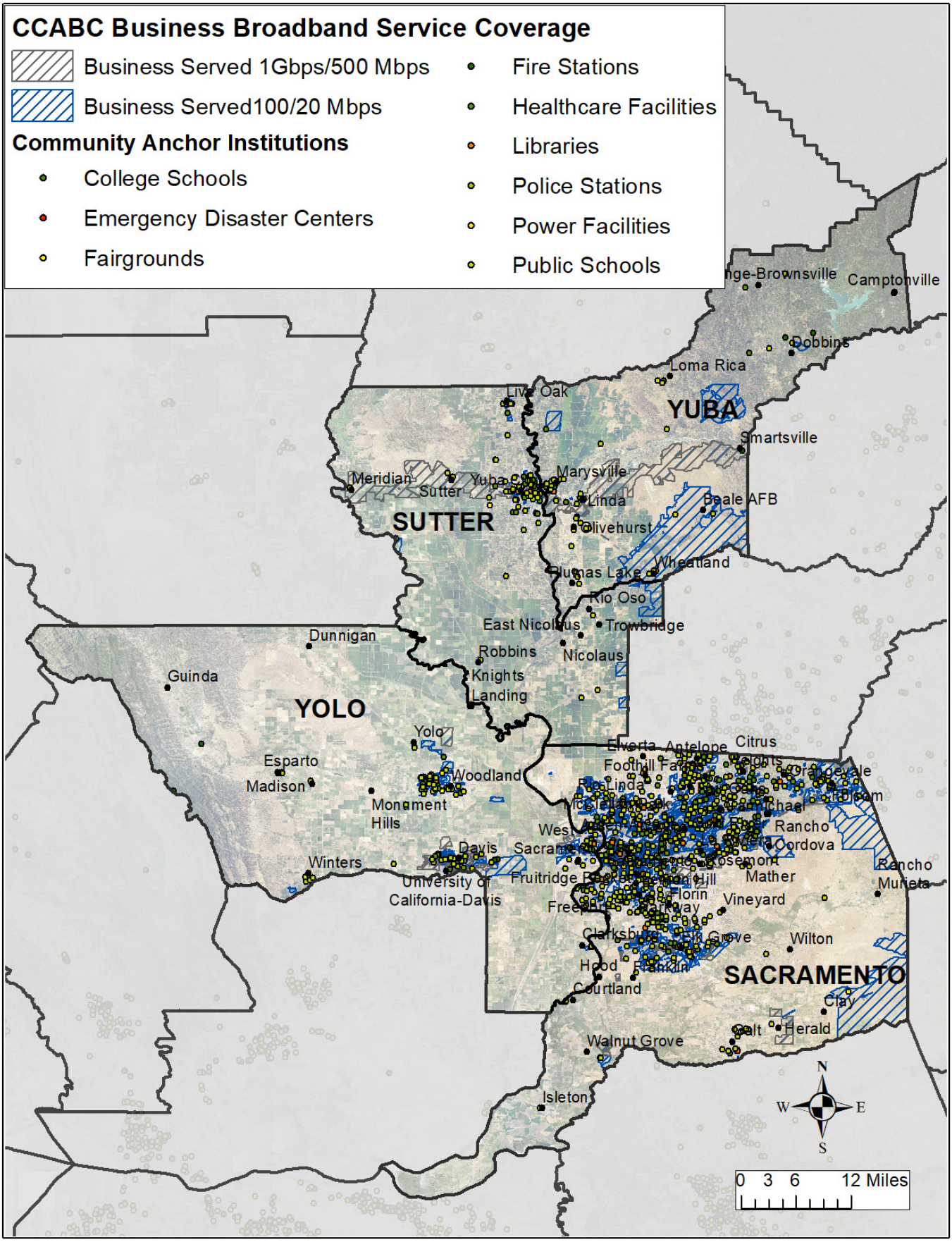


Figure 13. Business tier broadband connectivity (Gigabit and 100/20 Mbps service) in the Consortium Region and Community Anchor Institutions.
Source: CPUC.

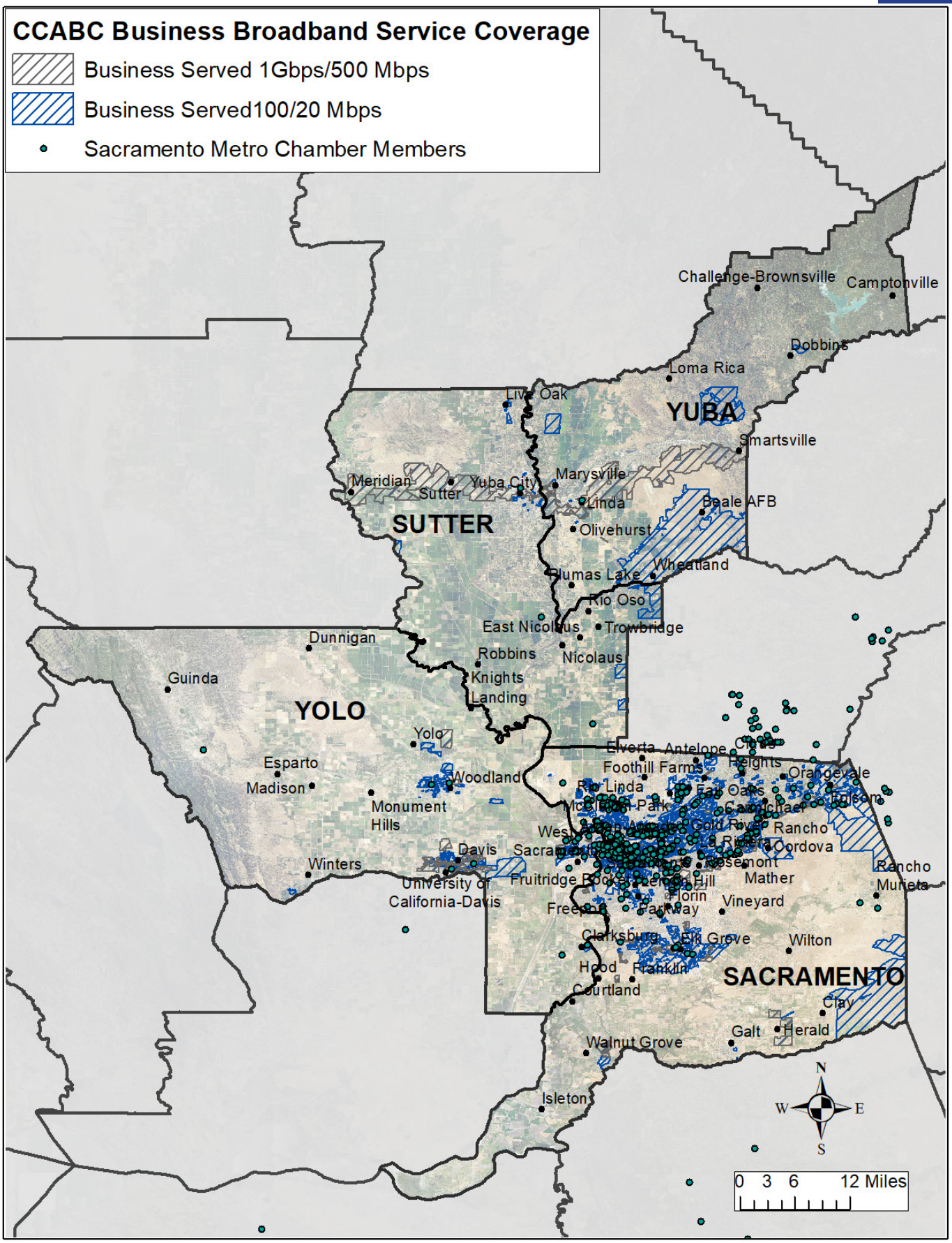


Figure 14. Business tier broadband connectivity (Gigabit and 100/20 Mbps service) in the Consortium Region and Sac Metro Chamber membership.
Source: Sacramento Metro Chamber of Commerce.

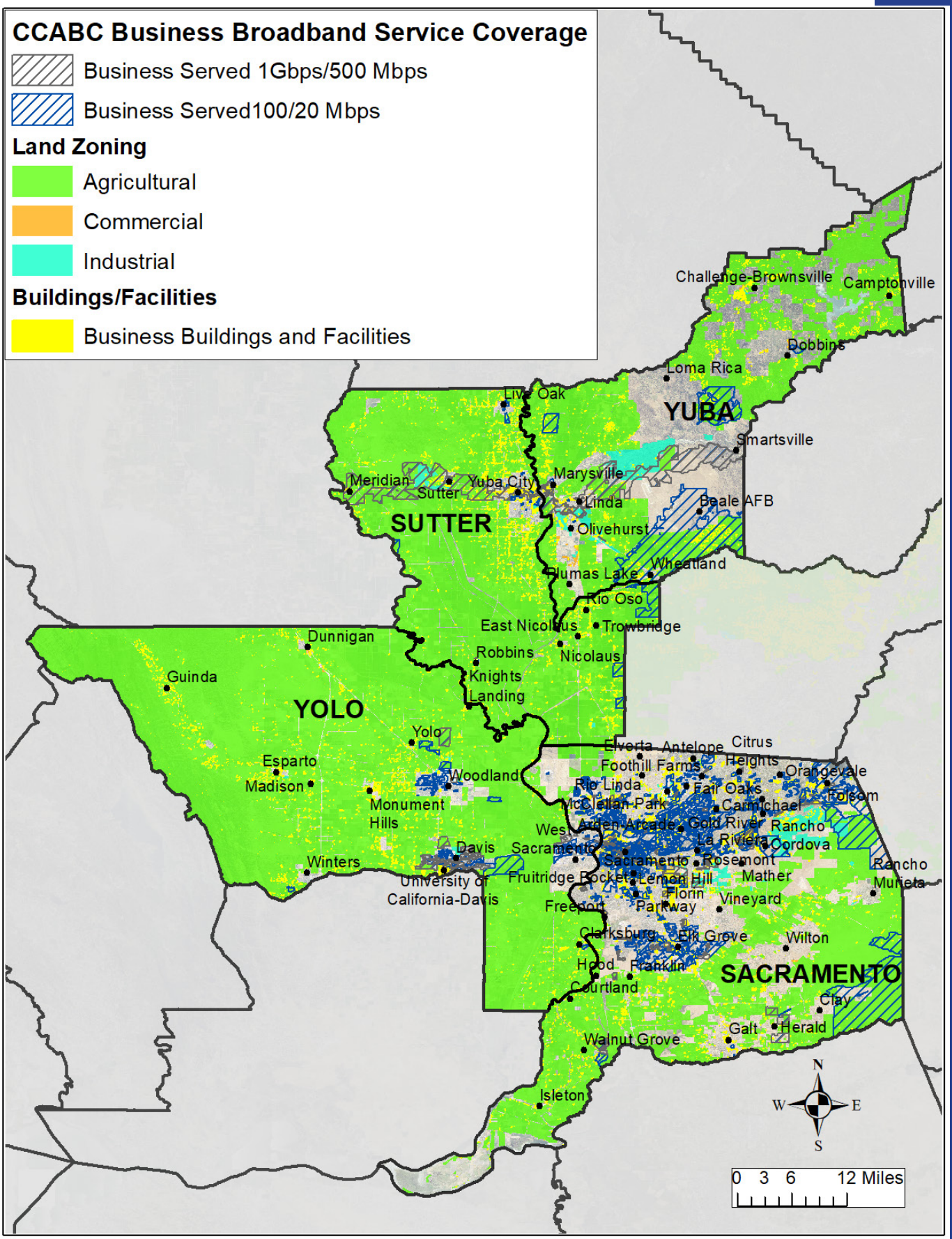


Figure 15. Business tier broadband connectivity (Gigabit and 100/20 Mbps service) in the Consortium Region, land zoning and location of business buildings and facilities.
Source: SACOG and local jurisdictions.

SUMMARY AND CONCLUSION

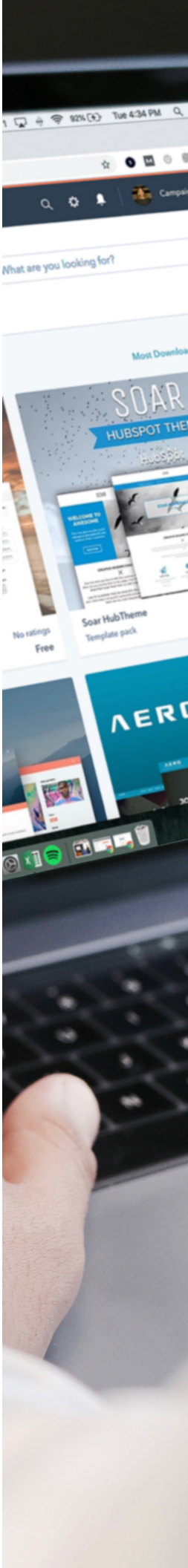
This Preferred Scenario Report identifies gaps in broadband deployment and access throughout the Capital Region to achieve the California goal of 98% broadband service availability to households at 6Mbps/1Mbps. Additionally, the report identifies gaps at the FCC standard of 25/3 Mbps. Furthermore, it delineates and estimates the cost of the last-mile and middle-mile infrastructure that must be constructed to achieve the 98% and 100% availability at both broadband standards. This report also includes the following: 1) asset inventory of publicly-owned assets and other critical infrastructure for broadband deployments, 2) middle-mile fiber optics routes, 3) determines ISPs willing to participate in the Preferred Scenario, and 4) demand aggregation of potential community anchor institutions and business customers.

The Consortium Region is served (at 6/1 Mbps) at 97.4% of households, and service by county ranges from 94.7% in Yuba and 96.4% in Yolo, to 97% in Sutter and 97.7% in Sacramento. The 0.6% needed to reach 98% availability in the region consists of 3,752 households. Reaching 100% availability require deploying broadband service to nearly 17,000 households. At the 25/3 Mbps standard, there are 20,660 unserved households. As highlighted in the report, the actual number of unserved households is greater. Coverage and speed testing is necessary to identify these additional unserved areas.

The technical and engineering cost analysis for this report includes using both fiber-to-the-home (FTTH) and fixed wireless. FTTH might be cost prohibitive, or it could take several years before ISPs expand to rural unserved areas, even with the help of public infrastructure grants or subsidies. In those cases, fixed wireless comes as a potential solution. There is a trade off between deployment cost (FTTH more expensive than wireless) and broadband service capacity (FTTH up to gigabits and wireless up to few hundreds of Mbps).

The estimated cost to deploy broadband to reach 98% of households (unserved at 6/1 Mbps) in the CCABC region, based on three deployment scenarios, is as follows: 1) deploying only FTTH (100%), $46.4 Million, 2) deploying FTTH (75%), complemented with fixed wireless (25%), $36 Million, and 3) deploying half FTTH (50%) and half fixed wireless (50%), $25.6 Million.

The estimated cost to deploy broadband to reach 100% of households (unserved at 25/3 Mbps), based on the same three deployment scenarios, is as follows: 1) deploying only



FTTH (100%), $249.3 Million, 2) deploying FTTH (75%), complemented with fixed wireless (25%), $193.7 Million, and 3) deploying half FTTH (50%) and half fixed wireless (50%), $138.1 Million.

Further cost-efficiencies to carry out these broadband deployments can be achieved by finding synergies and collaboration with other agencies and organizations which are also deploying infrastructure for broadband or suitable for broadband elements. These synergies and collaboration can help to accelerate deployments to unserved areas, and to reduce upfront capital expenditures by sharing costs among parties participating in the infrastructure projects. Recommended partnerships include the following:

- **Middle-mile Fiber Carriers:** The availability, affordability, and access to middle-mile infrastructure are critical to planning last-mile broadband infrastructure projects (wireline or wireless). There are currently fiber optics routes along main highways in the Valley, including I-5 highways 99 and 80, reaching main urban centers, cities and towns. Fiber carriers include AT&T, Cal-Ore, Frontier, Integra, Level 3, Zayo, Optic Access Fiber Network, and Vast networks. Two areas lacking fiber routes are the Northeast of Yuba County and Southwest of Sacramento County (or the Delta Region).

- **Local Governments:** Partnerships with local governments to access publicly owned assets for installing broadband infrastructure and equipment, particularly to reach unserved and high-cost rural areas will accelerate broadband infrastructure investment. Local governments need to develop an asset inventory and an associated master lease agreement which would allow them to lease these assets to ISPs. The asset inventory might include: 1) mounting infrastructure (i.e., poles, towers, buildings and substations), 2) broadband-related assets (i.e., underground conduit, fiber optics, and spectrum), 3) land and space (i.e., public-rights-of-way, land, and substations).

- **Caltrans:** Collaboration is needed to coordinate installation of broadband infrastructure along projects in state highways, to reach high-cost rural unserved or underserved areas. Caltrans informs broadband deployment companies and organizations on its website of transportation projects that involve construction methods suitable for the installation of broadband. Then these companies or organizations working on broadband deployment can participate in the project and install conduit suitable for broadband.

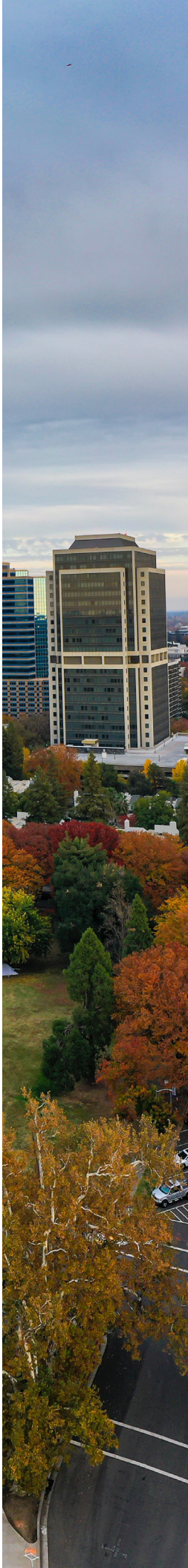
- **CENIC:** Partnerships with CENIC in the Consortium region provide opportunities to

connect community anchor institutions to the CENIC network at Gigabit speeds, such as the K12 High Speed Network (HSN) which connects schools in California to CENIC. Other opportunities to leverage CENIC network infrastructure and resources might result from expanding and connecting to core network elements (i.e., nodes and links) and identifying synergies with new network deployments, especially in the planning and implementation stages.

- **ISPs:** Including wireline, fixed and mobile wireless broadband providers or carriers. ISPs in the Consortium region have indicated their willingness to participate in the Preferred Scenario and contribute to the accelerated deployment of broadband infrastructure in unserved areas. ISPs have also provided input on best policy practices for infrastructure permit process that can help to reduce barriers and deployment timelines. In 2020, several ISPs applied to state (CASF) and federal (RDOF) programs for expanding broadband infrastructure in unserved areas, which demonstrates the willingness of ISPs to expand broadband service in the Consortium region. ISPs applying and/or receiving funding from these programs include: Digital Path and Frontier (CASF), Cal.Net, Geolinks, Frontier, LTD Broadband, and Space Exploration Technologies (RDOF). These ISPs include incumbent, regional competitive, new entrants, and deploying broadband technologies such as FTTH, fixed wireless, and LEO satellite.

- **Community Anchor Institutions (CAIs) and Businesses:** Partnerships with more potential broadband service customers greatly helps to aggregate demand and to build a more compelling case for ISPs to expand service to unserved areas, including rural high cost areas. CAIs include educational, healthcare, safety, first response, colleges, libraries, among other organizations. Partnerships with business organizations are important to identify business and commercial broadband customers within or nearby unserved residential areas. This report identified nearly 28,000 unserved (at gigabit and 100/20 Mbps business broadband speeds) business facilities (locations) in agricultural, commercial and industrial zones across the region. Furthermore, the estimated cost to connect these unserved business customers ranges from $493 Million (only FTTx) to $332.3 Million (50% FTTx and 50% fixed wireless).

The Preferred Scenario report identifies more opportunities for ISPs to propose and deploy broadband infrastructure projects and potentially achieve cost-efficiencies by collaborating and partnering with other agencies and organizations also deploying infrastructure in the region. The expected result will be accelerating broadband expansion and upgrades to reach the 98% broadband service availability to households, and perhaps even 100%. Achieving



this goal will require participation of multiple stakeholders including the ones listed in this report, among other including statewide, regional and local partners. Ubiquitous high-speed, affordable and reliable broadband service shall be provided by multiple ISPs deploying different technologies, and furthermore, using current and also new business models, including private investment, public-private-partnerships and/or municipal networks. This report will help to identify potential opportunities for projects and partnerships in the Capital region, and to bring multiple broadband stakeholders to the discussion.