Napa County Network Infrastructure Assessment
Opportunity Analysis and Recommendation

Prepared for: Napa County, California

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Contents

Executive Summary

Napa County residents expect robust, reliable internet connectivity for school, work, medical support, recreation and more. They also expect the County to provide online information and remote services in a variety of areas to support residents and businesses—especially in times of emergency. Natural disasters in the past six years have also increased the need to connect with residents and visitors to provide timely information. Most recently, the COVID-19 pandemic has also accelerated the need for telework, online education, telemedicine, and e-business options. A strong and resilient broadband infrastructure is required to allow the County, residents and visitors to digitally interact with each other.

Napa County has numerous opportunities to improve the capacity, reach, and resilience of its network infrastructure, thereby increasing availability and reliability of communications. To determine needs Magellan Advisors gathered information from a wide range of relevant stakeholders—business, education, healthcare, local government agencies, social services, etc.—as well as from numerous emergency response agencies. We then analyzed current assets, building on the *Fiber Infrastructure Engineering Assessment* that we delivered to Napa County in December 2018, to identify opportunities to develop the local network infrastructure. This report describes those opportunities, how they fit together, and what their major costs and benefits might be. We also review the public funds that the County might use to act on these opportunities. Lastly, the report provides a number of recommendations for expanding and strengthening Napa County's network infrastructure.

There are two general sets of opportunities: one for fiber infrastructure and another for radio/wireless infrastructure. While conceptually and physically separate, these opportunities are highly complementary and even interdependent. Wireless connectivity requires fiber, and there are many places in Napa County that fiber cannot practically reach. Both have limited reach and major vulnerabilities. All of Napa Valley, for example, is a network "cul-de-sac," which means a fiber cut in American Canyon could potentially take out all communications in the area.

While many of the assets that make up the County's network infrastructure are privately owned, there are clear actions—and reasons—for the County to improve the situation. Generally, this report approaches network infrastructure as an investment opportunity. By investing public resources in a smart, targeted yet comprehensive and strategic manner, Napa County can attract additional private investment and multiply benefits for the public.

I. Project Overview

This report identifies opportunities and resources to improve the availability and resiliency of communication networks[1] in Napa County. The primary focus of this report is optical fiber infrastructure and the high-speed Internet Protocol-based access services, commonly known as *broadband*, that fiber supports.

A key finding of this report is that most access—the "last mile" of network infrastructure—is via wireless. In addition to cellular and Wi-Fi connections, emergency communications typically occur via radio (hand held/portable radios through radio towers). Further, wired and wireless infrastructures are highly integrated and interdependent. Therefore, the analysis and recommendations consider the full range of communications infrastructure opportunities.

This report is the companion to the *Napa County Fiber Infrastructure Engineering Assessment Report* that Magellan Advisors produced for Napa County in December 2018 (attached under separate cover). The purpose of that study was to determine the extent to which the network was damaged during the fire events in 2017, the current state of the repairs on the network, and to assess the overall quality of the network.

That assessment found approximately 30% of AT&T and Comcast network infrastructure sustained fire damage in the 2017 fires, and that consequent repairs were generally not system upgrades.[2] This infrastructure was architected in a linear rather than circular manner, which does not provide redundancy. The infrastructure was deployed on poles, i.e., was "aerial" infrastructure, which lowers installation and repair costs but increases exposure to the elements. Further, the existing infrastructure required upkeep and a substantial percentage of the utility poles were overloaded.

It is likely that network service providers have made additional repairs, improvements, and extensions to their infrastructure since Magellan completed the engineering assessment. Some update to this information should be included in any future project, e.g., work on any of the opportunities described in this report.

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[1] The original scope of work was for "fiber" infrastructure. Our analysis found critical needs for improvements to radio/wireless infrastructure. Therefore, report more broadly addresses "network" infrastructure.

[2] No information is available about whether or to what extent there have been system upgrades since our Engineering Assessment was completed.

As part of establishing formal governance of network infrastructure development (see recommendation 1 at the end of this report), we recommend Napa County designate an agency and/or position to track communications infrastructure improvements and needs.

A. Methodology

Magellan Advisors approached this portion of the Napa County infrastructure assessment as a design process. The essential question was, "How can Napa County increase availability and reliability of communication, particularly for mass emergencies?" To answer this question, building on the infrastructure assessment, we assessed emergency communications systems, focusing on their resilience. We also focused on priority areas, which were identified based on lack of infrastructure and services.

The full range of emergency stakeholders were engaged in discussions during the summer of 2019 to determine their issues and requirements. Initial discussions focused on first responders: EMS, fire, police, and sheriff. A number of community anchor institutions—education, healthcare, and local governments, particularly Public Works—were also engaged to understand how they were impacted by and involved in emergency communications. We had follow-up discussions with internet service providers and support organizations that manage key assets or play some role in disaster preparedness and response.

Input from these stakeholders, along with data from the County and various other sources, were used to identify critical gaps and weaknesses in the communications systems. We analyzed the communication systems used by each set of stakeholders, their issues with those systems, and their plans for the future. These were translated directly into opportunities for the County. Opportunities were categorized as infrastructure, policies, and systems.

As this study focused on infrastructure, Magellan analyzed that category of opportunities in terms of their complexity, components, costs, funding sources, revenue potential, scope (external or internal to the county), and timeframe to implement. The results of this analysis make up the bulk of this report. We also researched various public funding sources for the County to upgrade its infrastructure, the results of which are included in this report. Other opportunities are outlined in Appendix A, but were not analyzed. Lastly, we provide recommendations on how to prioritize and pursue these opportunities.

B. Key Concepts and Terms

A network is any number of interconnected devices and the infrastructure that connects them. Wired and wireless networks typically use different terms for similar things, and there are various kinds of wired and wireless network technologies. Also, networks have layers: various logical layer networks may operate over any set of physical layer assets. For example, a fiber-optic cable may carry cellular telephone networks, enterprise wide area networks (WAN), and broadband networks.

1. The Basics of Network Architecture

Networks are structured in a hierarchy consisting of a backbone or core network, which interconnects to other networks forming the internet, multiple distribution networks connected via the backbone, and numerous "last mile" access networks, to which subscribers/users connect. Each level has different amounts of capacity or speed because all traffic from access networks is aggregated to distribution, which is then aggregated to the core.

Networks also have geographic hierarchy consisting of local, backbone metro or middle-mile, and long-haul networks. A huge variety of protocols—sets of detailed technical rules and standards—define how these networks operate. The most widely known is the Internet Protocol (IP), which actually consists of many other protocols. Basically, any device running IP is "on the internet." Even traditional "push-to-talk" land mobile radio (LMR) and broadcast radio and TV are increasingly carried via IP.

Devices at the edge of networks are called customer premise equipment (CPE), terminals, or user equipment (UE), depending on the type of network. There are multiple types of devices within networks—access points, gateways, routers, switches, etc.—that move traffic across them. Connections of various types exist between these devices and across networks. Wired connections are often referred to as circuits, which follow physical routes, while wireless connections are typically called links, which follow physical paths.

A hallmark of the internet is that any two devices are connected via multiple routes to increase reliability. Route diversity and redundant connections, along with back-up equipment and connections, are standard tactics for increasing reliability. This is why fiber networks are typically built in rings and wireless networks are sometimes built as a mesh. Diverse, redundant connections can be expensive so they're

relatively rare in access networks, quite common in distribution networks, and abundant in core networks.

2. Broadband and Other Network Trends

Broadband originally referred to a connection that was divided into multiple channels but it now commonly means high-speed internet access. The benchmark set by the Federal Communications Commission for broadband is at least 25 Mbps downstream to the customer/user and 3 Mbps upstream to the internet (i.e. "25/3"). The California Public Utilities Commission has set the bar much lower: It considers any location with 6/1 to be served with broadband and will not provide public funds for broadband development in areas with such minimal service. In many places, 1 Gbps (1,000 Mbps) has become the benchmark for "fast" broadband and anything less than 50 Mbps is considered "slow."

Broadband can be provided by various technologies including cable modem via coaxial cable, digital subscriber line (DSL), Ethernet over twisted pair wires, and optical fiber. Wireless technologies, including cellular data and Wi-Fi, were not traditionally considered to be broadband, although they're often faster than connections via DSL. New wireless technologies are evolving to provide faster and more flexible connections. This has been facilitated by the FCC making additional radio spectrum in the 3.5 GHz band available for broadband, particularly the Citizens Broadband Radio Service (CBRS).[3]

Networks continue to spread but the major trend is densification, which means connecting more users and loading more applications and traffic onto existing infrastructure. Part of the push to densification comes from demand for faster connections. Wireless technologies accomplish this by using high-frequency spectrum, covering smaller areas, which means more antenna. At the same time, radio spectrum is being reallocated to expand access as well as increase speeds.

Another part of the push for densification comes from the economics of fiber, which has conceptually unlimited capacity over strands of glass thinner than a human hair. Basically, the goal is to use any fiber infrastructure for as many applications and as much traffic as possible. The two implications of densification are (1) network investment tends to flow to more densely populated and higher-

[3] For additional information on CBRS, see https://www.fcc.gov/wireless/bureau-divisions/mobility-division/35-ghz-band/35-ghz-band-overview

income areas and (2) more things (including traditionally "dumb" things like appliances and automobiles) are being connected. Remote rural areas are getting more access but it is via lower-bandwidth, lower-cost technologies. Low-power wide-area networks (LPWAN) connect a huge number of devices at low-speeds over very large areas for purposes such as environmental monitoring, meter reading, and vehicle tracking.

3. Network Economics: How to Get the Most Return on Network Infrastructure Investments

Scale and scope are the keys to getting the most return on network investments. ***The more nodes, locations and people on a network, the more valuable it is.*** The same is true of applications. Networks are valuable when many organizations and people use them for many things. Isolated or sole purpose networks may be marginally less costly than interconnected, multipurpose networks but have far fewer benefits. Separate networks for emergency services, hospitals, and schools, for example, would be much more expensive than a single network and would miss the huge benefits from information sharing between these sectors. This is one reason why the internet, as a network of networks, is so valuable.

This simple concept has important implications for network opportunities in Napa County. The first is that ***any investment in network infrastructure should have as many uses as possible***, which clearly relates to emergency communications, agriculture, commerce, education, recreation, tourism, transportation, utilities, and other topics of concern to local government. Each of these sectors has multiple applications, and many of those cut across sectors. Technology for precision agriculture in the wine industry, for example, could have benefits for local stakeholders in other sectors. It is important to cultivate these applications and get commitments from related stakeholders *before* the infrastructure is built, as part of network planning.

The second implication is that ***networks should have regional connections and reach.*** This assessment is focused on Napa County, but Napa County does not exist in a vacuum. Commercial and transportation activities in Napa, for example, spill over into surrounding areas. Practically every facet of modern life requires connectivity and very little of it is limited to a specific geographic area. There is a simple geographic reason for this, too: Several parts of Napa County are physically more accessible via routes outside the County than routes entirely within it. Fiber to antenna on Mt. Vaca, for example, may most economically be routed from the east. A diverse path into Calistoga would naturally run west to Santa Rosa.

It is important to recognize that non-technical factors impact the value of networks. ***Napa County has diverse terrain which drives the benefits and costs of networks.*** The benefits of connecting around and in spite of terrain are clear: It reduces the costs of physically traversing the area to deliver information and enables everyone to access information regardless of geographic barriers. While Napa's mountains can be used to extend radio signals, the area's terrain generally increases the costs to deploy network infrastructure. In several cases, the most economical routes to towers on mountains in Napa County lie outside the County.

The COVID-19 pandemic is another prime example of an external factor impacting the value of networks, and a practical issue for Napa County. ***As the public health crisis has forced people to stay home, it has increased demand for digital connectivity***: Education, healthcare, collaboration and meetings in general have shifted online. At the same time, this has decreased requirements for physical space. In many ways, this is an acceleration of an ongoing trend. For example, as retail has moved to "clicks and order" the whole sector has less need for "bricks and mortar." Face-to-face interactions are sure to rebound after the pandemic but it is likely that digitally supported collaboration and remote work will become the norm. ***Those without readily available, robust connectivity will be at a disadvantage more than ever.*** Thus, the socio-economic value of filling in broadband gaps in Napa County will multiply beyond what it was in the past.

The overall implication for Napa County is that engaging broadly within the County and widely around the region will result in more benefits for everyone. It will also mobilize more resources, making network development more practical. The result will be a more robust and complete network architecture that is better able to accommodate new technologies and support new requirements as they emerge. Thus the network will be more flexible and "future-proof" as well as more useful and impactful.

II. Stakeholder Input Findings

For the purpose of this analysis, *stakeholders* are organizations that have an interest in how Napa County responds to mass emergencies. This includes organizations with assets that might be useful for addressing infrastructure or service gaps that impact response. Magellan Advisors got input from over 50 individuals representing more than 20 stakeholders, including local and state government agencies, non-profit organizations, and private businesses (see Appendix B for a list of contributing organizations).

All stakeholders were highly dependent on cellular data and voice services. Use of cellular data was widespread among public agencies for vehicle location telemetry and remote data access. These stakeholders also made extensive use of land mobile radio (LMR). Information systems, radio systems, and related infrastructure used by stakeholders were moderately fragmented across the area. For example, there were at least seven public service dispatches operating in Napa County, not counting Public Works departments:

- Cal Fire
- California Highway Patrol
- City of Calistoga Dispatch
- City of Napa Dispatch
- City of St. Helena Dispatch
- Napa Valley College
- Napa Valley Transit Authority

Policies to address these issues tended to be informal and inconsistent across jurisdictions. “Dig Once” policies, mass notification media, radio system interoperability, tower permitting and siting, and use of easements are a few examples. Many of the needs and opportunities identified by this assessment are for “comprehensive, integrated” solutions or systems.

Experience with and threats of wildfire elevated the importance of reliability among Napa area stakeholders. Actions by major corporations serving the area, specifically AT&T and PG&E, increased this concern. Information technology and telecom have always carefully planned for uninterruptible power, and highly reliable power can only be delivered with robust information infrastructure. The Public Safety Power Shutoffs (PSPS) instituted by PG&E to reduce chance of wildfires has almost literally thrown a wrench into the machinery. AT&T lost power at its Central Office during a recent seismic event and many of its assets that were damaged or destroyed by

wildfires. Stakeholder input indicated that neither of these issues have been fully addressed.

Beyond issues with specific companies, the larger issue is that communications and power are interdependent. Better power can improve network reliability and network connectivity can be used to make electric grids more resilient. Both power and telecommunications relate directly to mobility and transportation, which are major issues for the area on good days and become critical in a mass emergency. Commuting patterns and tourism are essential to the local economy but exacerbate the issues—and could directly benefit from the solutions. Thus, these issues must be addressed together for a real solution.

As this is an infrastructure assessment, we have identified multiple needs and opportunities for enhancing physical assets. Policies directly impact infrastructure needs and opportunities, so we also consider those. Lastly, systems used by stakeholders determine their infrastructure requirements, so we also identify needs and opportunities for improved or new information and communications systems. All of these are preliminarily categorized as basic needs and opportunities, upon which other needs and opportunities depend. Moderate ones require some investment and coordination. Advanced needs and opportunities require innovative solutions, uncertain investments, and/or strong, unified political will to address.

These needs and opportunities are not mutually exclusive. Indeed, many are complementary and mutually supportive. For example, direct public investment in a redundant fiber route along the Hwy 29 Corridor would enable interconnection of the cities and integration of their systems to better respond to and reduce the risks of natural disasters. It would also enable a range of quality of life and public safety improvements through the corridor.

While the Hwy 29 Corridor may be the easiest and most economical location to deploy fiber, most any public right-of-way can accommodate network infrastructure. Direct public investment in cellular and other wireless facilities could close service gaps and generate public revenue, but also capitalize on a “Hwy 29 Corridor Network.” A general opportunity that links all of these is to catalyze private investment in network infrastructure and services. All of the needs and opportunities identified above either benefit from or feed into this general opportunity.

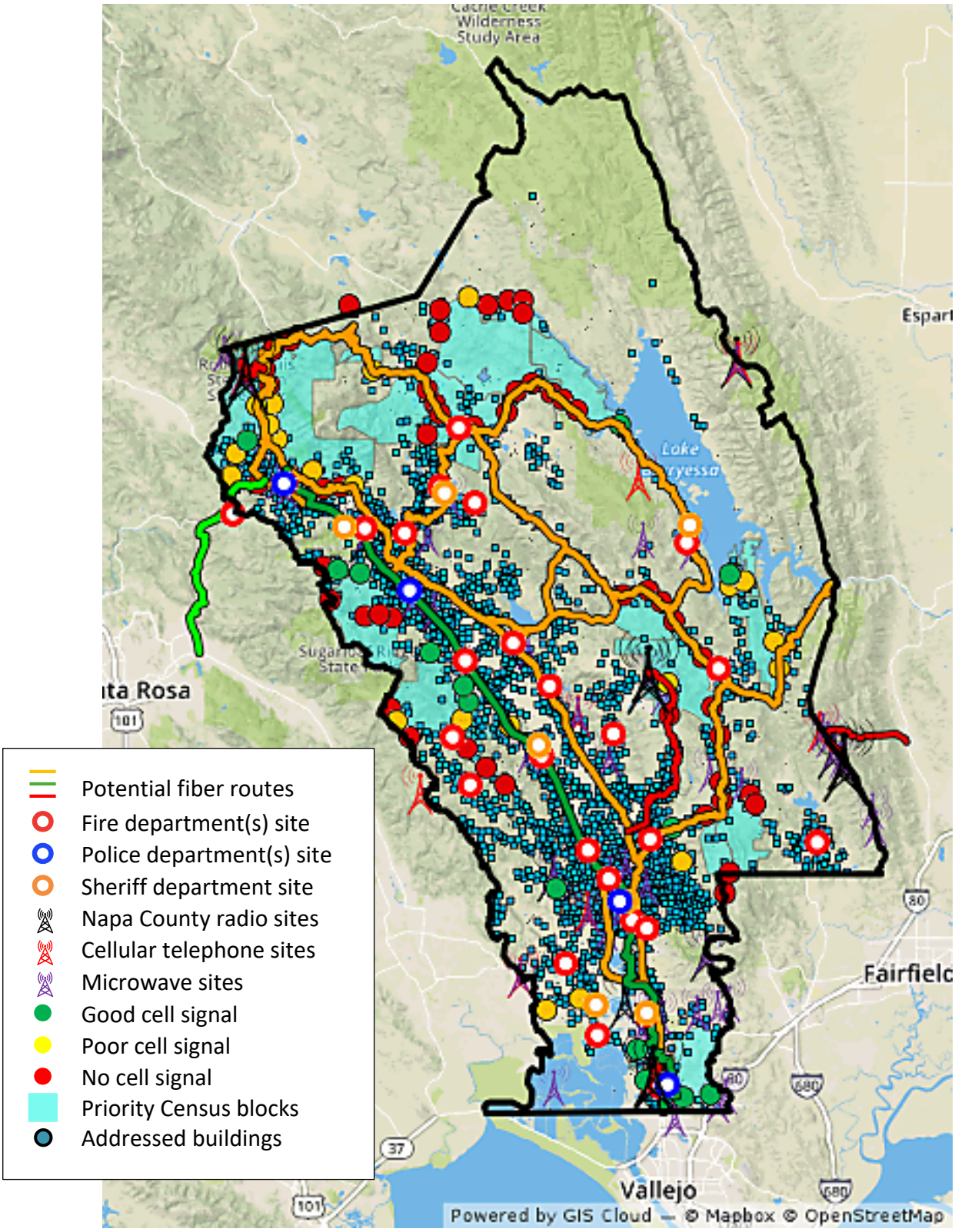

Figure 1. Geographic overview of network infrastructure opportunities in Napa County

III. Napa County Communications Infrastructure Opportunities

Magellan Advisors has assessed emergency telecommunications systems and identified County priority areas. There are multiple gaps and clear risk of other gaps opening up in emergency situations. Figure 1 provides a geographic overview of opportunities to close these gaps, as detailed below.

While wired broadband infrastructure appears to be adequate for non-emergency situations, based on current federal and state standards, both empirical analysis[4] and anecdotal evidence reveal substantial gaps, particularly in priority areas. Napa County's broadband networks—deployed and maintained by private companies—also have major hazard exposure, limited reach, few options, and even fewer backhaul paths with little additional capacity. There are multiple wireless internet services in the County, but their coverage and throughput are limited, particularly for mobile, non-fixed connections.

The largest gaps, though, may be in resilience and risk mitigation. Non-hardened infrastructure is susceptible to failure in natural disasters. Lack of diverse and redundant infrastructure means there is no back up for failed systems or means to route around them. This section identifies opportunities to close these gaps and generate additional, positive opportunities for Napa County, its cities, industries, residents, and visitors.

A critical, general consideration for all of these opportunities is the capabilities required to maintain, manage, and operate the infrastructure. This is complicated by the fact that none of these opportunities fit squarely into existing County functions. All of these opportunities represent expansions or extensions to what the County does currently. A simple solution is to have third parties, such as network service providers, provide the capabilities. Of course, they would expect to be compensated for this, which could be via asset swaps or fee waivers.

A related consideration is how and whether to monetize these opportunities. Most of these are opportunities to generate revenue as well as invest in infrastructure.

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[4] See the *Napa County Internet Survey Results Report*, produced by researchers at Chico State. Napa County also collected data on cell phone coverage, which is analyzed in this report. See "Develop Radio Sites in Under-served Areas," below, for more information. Multiple stakeholder representatives noted broadband and cellular service gaps in the area.

Some are opportunities to attract substantial investments in new technologies for the County, its public sector partners, and its economic anchors. This, too, requires substantial, specialized capabilities. The overall point is that any investment in infrastructure requires complementary investments in people and systems. This is a matter of culture and strategy more than of technology. A fundamental issue for Napa County to address is what, if any, role the County can, must, and should play in broadband development.

The infrastructure opportunities in this report are analyzed in terms of their potential impact and requirements:

- ***Scope*** is the extent of geographic and economic scope for the opportunity.
- ***Complexity*** provides a general sense of the components and dependencies involved in the opportunity. "High" means many components need to be defined, coordinated and integrated for the infrastructure to function. "Mid" means there are a substantial number of components. "Low" indicates few or simple components.
- **Cost** for each opportunity is approximate, intended to convey its rough order-of-magnitude, or ROM costs.
- ***Funding*** suggests the general sources of funds to build the infrastructure.
- ***Revenue*** indicates how much potential the opportunity has to create new revenue for the County (similar to Complexity).
- ***Timeframe*** is a general sense of how long it might take to develop the infrastructure. "Long" is 4 or more years, "Medium" is 2 to 4, "Short" is 1 to 2, and "Immediate" is a year or less, occurring as of the writing of this report.

These provide a basis for comparing and contrasting the opportunities, as well as prioritizing them concerning County strategic goals and issues. More detailed, focused, and thorough analysis (i.e., feasibility studies) would require additional information from the County and its stakeholders.

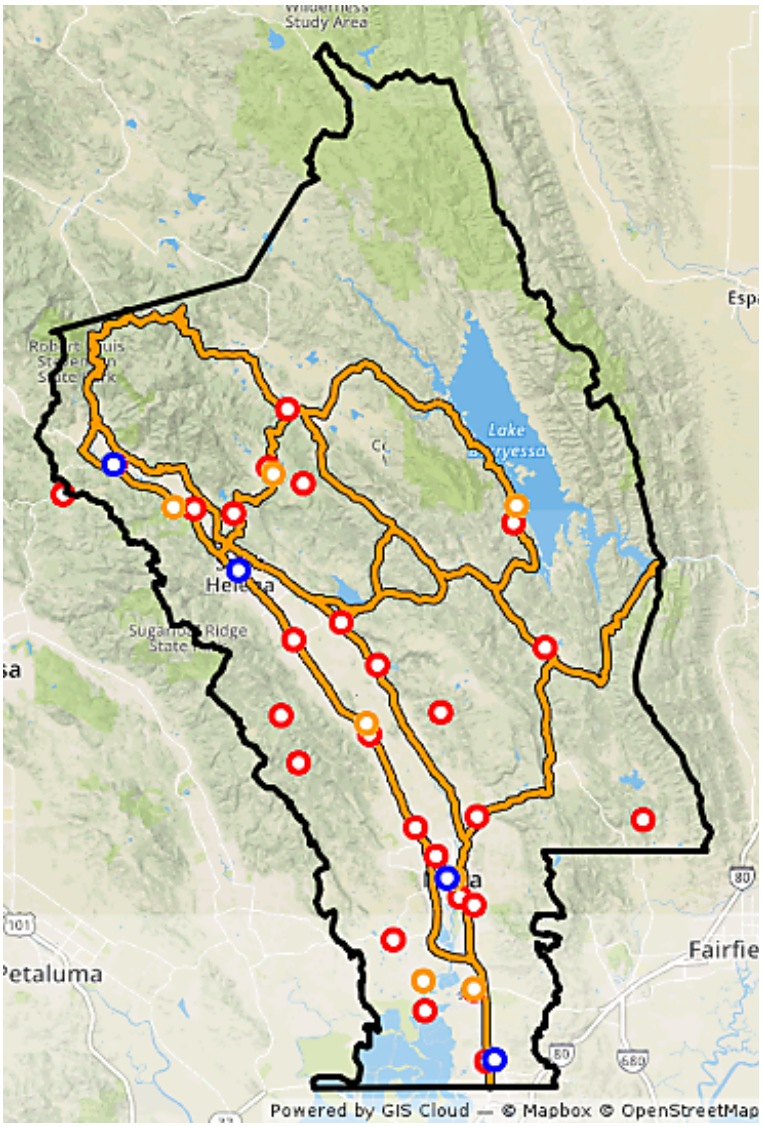
A. Fiber-optic Infrastructure

Fiber-optic cables carry massive amounts of information. In fact, the capacity of a single fiber is conceptually unlimited and practically limited by the devices on each end of the fiber. That said, fiber and the equipment that operates it can be expensive to deploy. It can also be susceptible to damage from fire, heavy equipment, and other means. Therefore, fiber infrastructure must be carefully designed, deployed and maintained.

Fiber cable is deployed either aerially, on poles, or in buried conduit. Connections, including those into customers' premises, must be physically patched or spliced into the network. Connections can be combined, or multiplexed, to use network capacity more efficiently. Cellular, microwave, Wi-Fi, and other wireless communications systems rely on fiber for backhaul to core networks. Fiber is also used for distribution network infrastructure that connects access points and base stations to providers' point of presence in the community.

Opportunity **1. Build a Napa County Backbone Network**

Type *"Metro" Fiber-optic Infrastructure*



- Fiber-optic network route

  Length: 1.26M ft./238.7 mi.
- Fire department(s) site
- Police department(s) site
- Sheriff department site

Overview: A countywide fiber-optic backbone network that interconnects all public facilities and provides a platform for private partners to serve customers.

Rationale: Reduce the barriers to entry for network service providers while decreasing costs and increasing performance of connectivity for the County, and its community anchors.

Scope	Complexity	Cost	Funding	Revenue	Timeframe
Countywide Public-led	Very high	≈$118M	Public/Private	High	Long

Description:

The Napa County Backbone Network is a large-scale, long-term vision of what is possible for the County. It is provided primarily as context for other opportunities. For example, fiber-to-the-antenna and additional radio site opportunities will require backhaul. Other opportunities such as the two "29 Corridor Trunk" options detailed later in this section benefit from comparison to a much larger project.

The goals of the Napa County Backbone Network are twofold. The first goal would be to provide greater connectivity at lower recurring costs for all public institutions in the County. As we only had location data for local fire, police, and sheriff sites, we used these to represent anchor institution sites. Note that most sites would be connected via a relatively small portion of the network. Other sections of the network would serve few if any public sector sites.

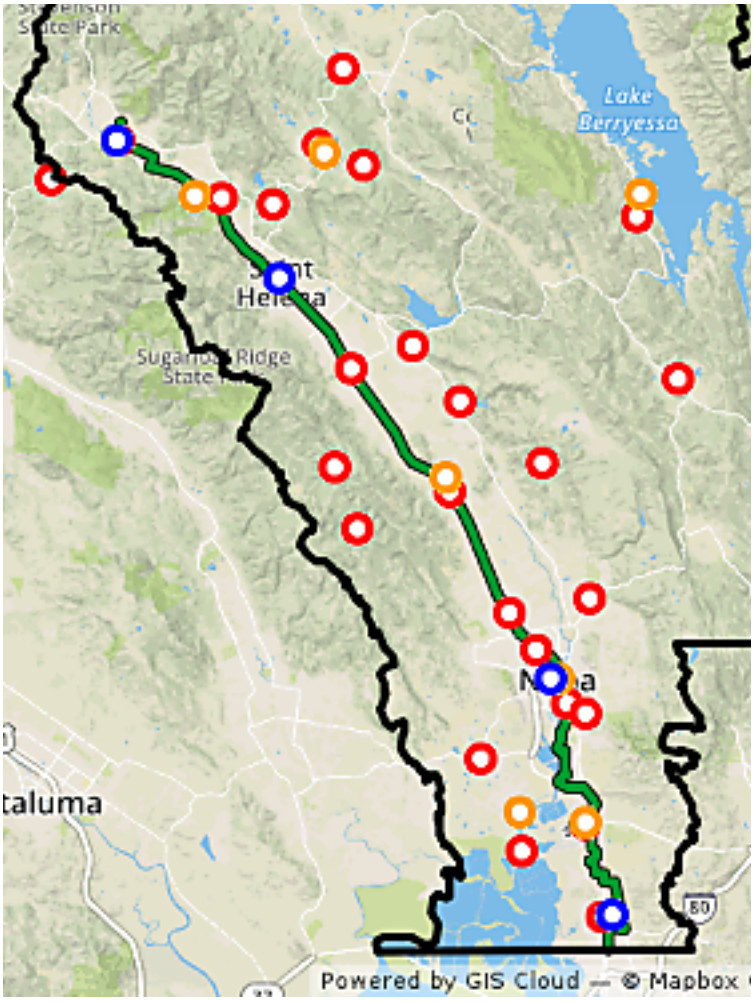
The second goal would be to reduce the direct costs and other barriers network service providers face to entering the local market. The Napa County Backbone Network could act as distribution or even access infrastructure for providers to reach customers and deliver their services. As with public sector sites, the number of prospective customers per route-mile can be quite low. On the other hand, lack of backhaul, which the Napa County Backbone Network would provide, is a major barrier to providing access to these isolated, remote locations.

The Napa County Backbone Network could be built incrementally, one section at a time, as opportunities arise. A water main replacement or road widening project, for example, can be an economical way to deploy some conduit as a small step toward the overall vision.

A key question raised by this opportunity is essentially, "Where should public dollars be invested?" Should public funds be used to extend connectivity into areas where prospects for return on investment are very low, i.e., those areas with relatively few assets or sites to connect? Or should investment be driven by prospects for strong return by concentrating on areas with the strongest demand? Should the County play some role to make sure infrastructure and services get to remote, under- and un-served areas?

Opportunity 2. Develop a Redundant "29 Corridor Trunk" Route

Type *"Middle mile" Redundant Fiber-optic Infrastructure*



- Fiber-optic network route, Length: 219K ft./41.5 mi.
- Fire station
- Police department
- Sheriff site

Overview: Redundant fiber-optic network in the Napa Vine Trail easement from Vallejo to Calistoga, interconnecting key city, county, and other anchor institution sites.

Rationale: Uses public assets to increase availability, capacity, and resilience; provides a foundation for private partners to offer additional and enhanced services to key industries.

Scope	Complexity	Cost	Funding	Revenue	Timeframe
Limited, public-led	Medium	≈$20.5M	Public/Private	High	Immediate to Medium

Description: Practically all network services in Napa County depend on fiber infrastructure in Napa-Vallejo Hwy/Hwy 29 corridor. The section of the Napa County Airport and the Hwy 12/221 interchange is particularly critical. If something were to happen to this infrastructure, due to an earthquake or a construction mistake, the whole area could lose connectivity. A redundant route to network interconnection points outside the County would reduce this risk.

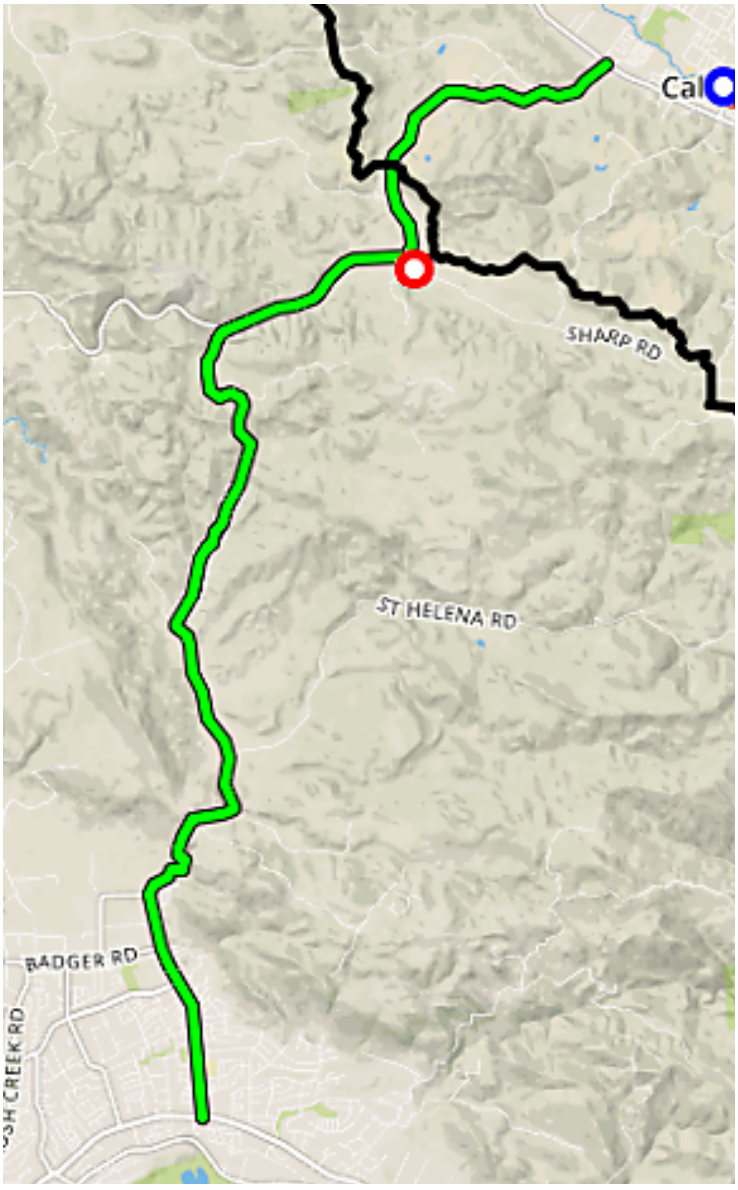
The Napa Vine Trail is being developed in a corridor that is adjacent and parallel to Hwy 29 but separate in most places. It runs directly through populated areas with a high density of prospective customers, including public sector sites, yet has relatively low levels of traffic. Easements for the Trail are controlled by the cities. All of these characteristics could make the Trail corridor an ideal location for buried fiber.

PG&E gas infrastructure is in the corridor and is slated for upgrade between Yountville and Calistoga. Fiber can be collocated with gas lines without any additional risk. Joint builds like this greatly reduce the cost of fiber construction. Wireless and related infrastructure (emergency call boxes, environmental sensors, etc.) could be easily deployed on top of the fiber to financially and practically support the Trail. PG&E is also abandoning pipeline that may be useful network infrastructure. The viability of these options would need to be explored.

As with the large-scale Napa County Backbone Network this “29 Corridor Trunk” could potentially serve many community anchor institutions. It is also central to the more populated portions of the county, meaning it is close to many consumers. Because this fiber laterals adds redundancy as well as capacity into core market areas of Napa Valley, it is likely to be of interest to private investors.

Opportunity 3. Develop a Diverse "Petrified Forest Trunk" Route

Type *"Middle Mile" Diverse Fiber-optic Infrastructure*



- Fiber-optic network route, Length: 61K ft./11.5 mi.
- Fire station
- Police department

Overview: Diverse fiber-optic network route between Calistoga and Santa Rosa, along Calistoga/Petrified Forest Road.

Rationale: Separate network route connecting Napa Valley to provide greater reliability and lower costs for backhaul for anchor institutions and private providers.

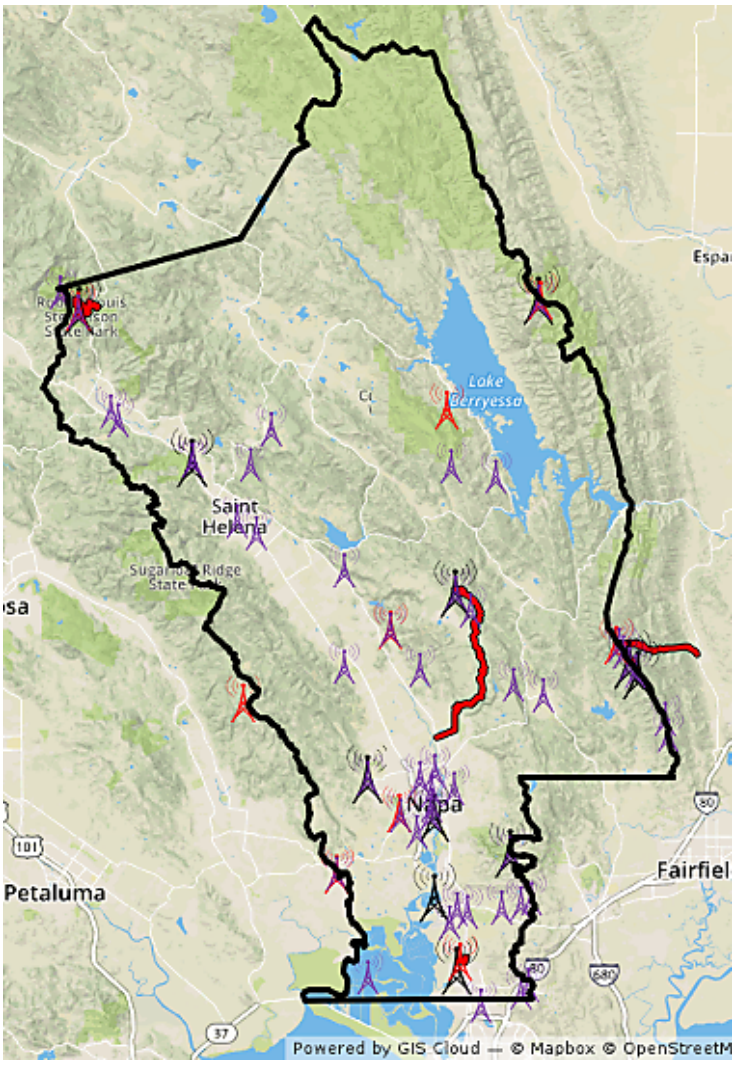
Scope	Complexity	Cost	Funding	Revenue	Timeframe
Limited, public-led	High	≈$5.7M	Public/Private	Moderate	Long

Description: In contrast to opportunity A.2, the "Petrified Forest Trunk" provides a diverse route in and out of Napa Valley, totally separate from the Hwy 29 corridor. It is also envisioned as aerial simply due to the geological characteristics of the route. This exposes the infrastructure to wildfire risks but minimizes risk exposure related to seismic events. Lastly, while the "29 Corridor Trunk" in opportunity A.2 is located in the middle of the County's population centers, this route is rather remote. Indeed, it is more than remote: Most of the route is outside Napa County in Sonoma County. Fortunately, both counties, along with Marin and Mendocino counties, are members of the North Bay North Coast Broadband Consortium, which provides a forum for addressing such opportunities.

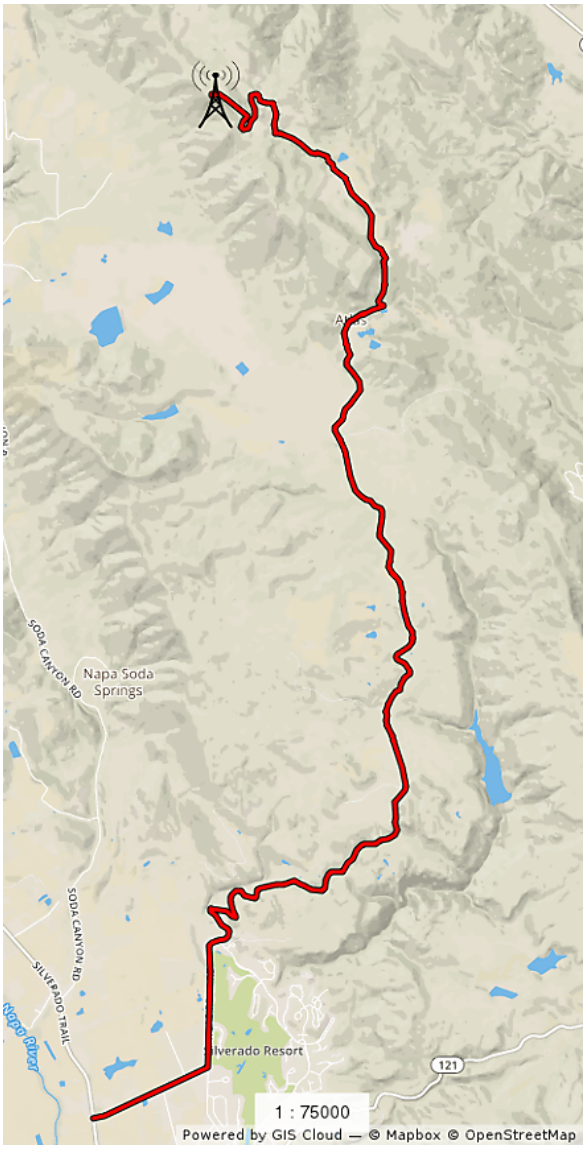
This last characteristic of this opportunity points to a more general issue: Networks don't stop at arbitrary political boundaries. Quite the opposite: The value of networks comes from connecting across boundaries. In this case that is a natural boundary formed by the Mayacamas Mountains, as well as a county line. This route potentially provides means to connect locations in eastern Sonoma County as well as route diversity in and out of Napa County. The key to its value though is reducing risk exposure for connectivity within Napa County.

Opportunity 4. Connect Tower Sites via Fiber Laterals

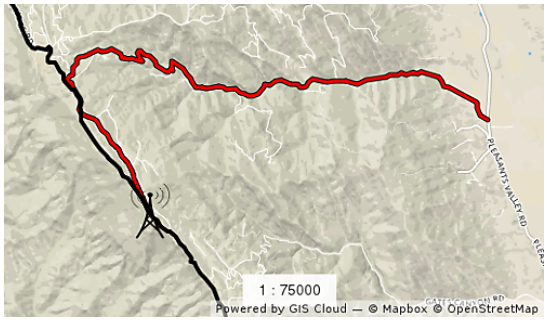
Type *Enhanced Wireless and Fiber Infrastructure*



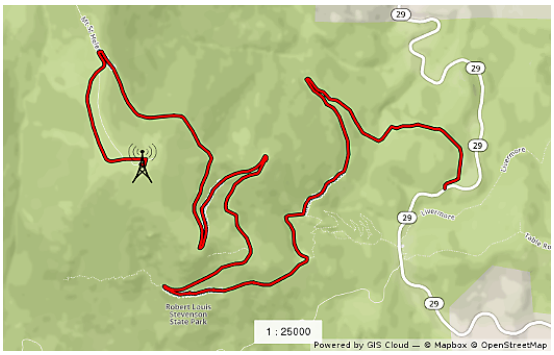
- Napa County radio sites
- Cellular telephone sites
- Microwave sites
- Possible Fiber route



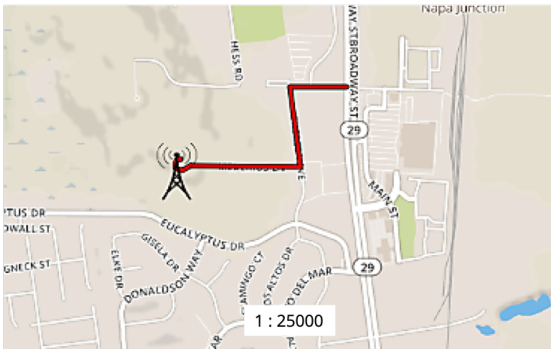
New Atlas Peak: 44,895 ft./8.5 mi. ≈ $4.1M



Mt. Vaca: 33,445 ft./6.3 mi. ≈ $3M



Mt. St. Helena: 23,304 ft./4.4 mi. ≈ $2.1M



Oat Hill: 3,161 ft./0.6 mi. ≈ $290K

Overview: Deploy buried and or fire-resistant fiber-optic cable to at least two tower sites in various parts of the County. Prime sites are New Atlas Peak/Sutro, Mt. St. Helena, Mt. Vaca, and Oat Hill.

Rationale: Buried fiber infrastructure would increase the resilience as well as capacity to these critical sites, which have multiple towers and tenants so capacity and costs could be shared. Evolving standards call for fiber all the way to the antenna.

Scope	Complexity	Cost	Funding	Revenue	Timeframe
Variable, public-led	High	≈$9.5M	Public-Private	Moderate	Short to Medium

Description: Fiber-to-the-antenna is increasingly standard for radio/wireless infrastructure. If properly deployed, fiber infrastructure can add resilience as well as capacity. This opportunity is intended to do both. This also makes the tower sites more attractive and useful for next generation wireless as described in the "Vine Branches" opportunity (B.2, below).

This opportunity is actually several different opportunities; one for each tower site. We analyzed this opportunity for a few key sites, but this analysis can be extrapolated to other sites. All of these opportunities depend to some extent on opportunities A.1 and/or A.2 for full connectivity. It would be more practical to deploy aerial fiber to most of these sites because the local geology and length of the route would make buried fiber prohibitively expensive. A few, most notably Oat Hill, could be buried fiber, which provides an extra layer of resilience.

Key considerations for these opportunities are the number of antenna/tenants at each site and the availability of "middle-mile" fiber near the site. Mt. Vaca is a prime example. There are numerous antenna on multiple towers at this site (actually, multiple adjacent sites). How many of the enterprises that use the antenna would benefit from additional capacity and resilience? More beneficiaries mean more funding potential.

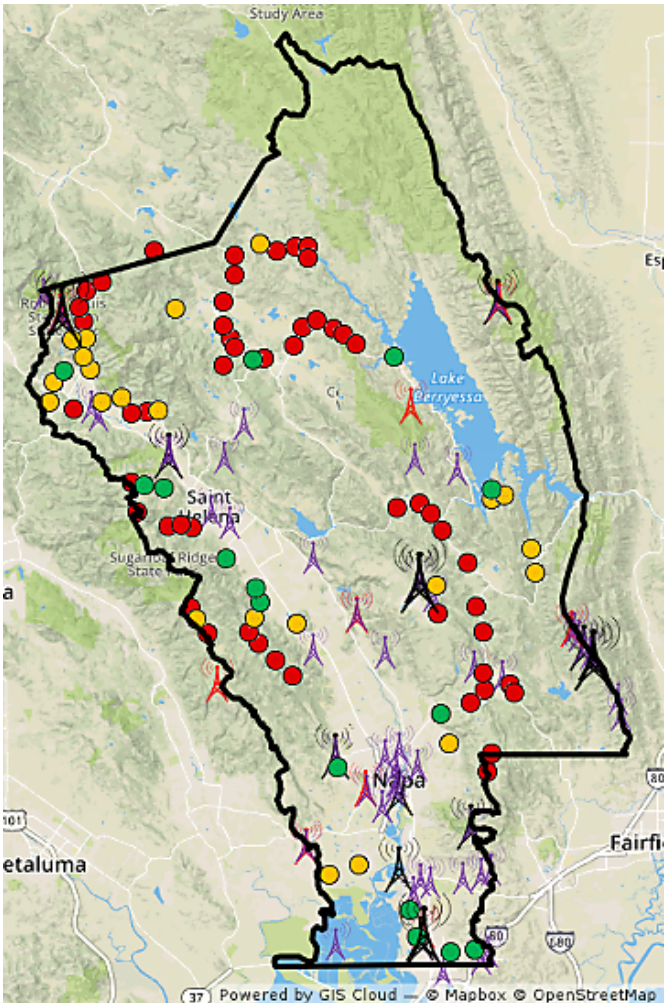
At the same time, the preliminary fiber route to these sites runs east-west along Mix Canyon Rd from the tower site(s) to Pleasant Valley Rd., northwest of Vacaville and outside Napa County. It is unlikely that a fiber interconnect is located at the intersection of Mix Canyon and Pleasant Valley roads. Therefore, additional infrastructure would be required to either (a) interconnect with a local provider's network or, more likely, (b) reach an interconnection point in Vacaville.

Clearly, such a project could be rather complex and would require close coordination or partnership with external stakeholders. If the fiber to the towers on Mt. Vaca could be used for expanding broadband in the area, it might make more economic sense. Of course, this is outside Napa County's sphere of influence, yet the practicality of this opportunity depends on it. Most all parts of this opportunity have similar dynamics as do several other opportunities identified in this report.

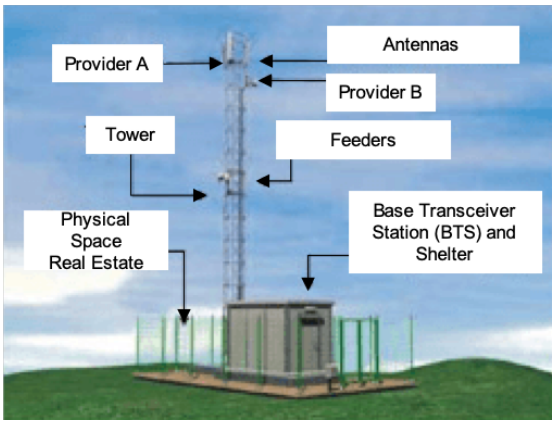
B. Radio Infrastructure

Opportunity 1. Develop Radio Sites in Under-served Areas

Type *Enhanced Wireless Infrastructure*



- Napa County radio sites
- Cellular telephone sites
- Microwave sites
- Location with good service[5]
- Location with poor service[4]
- Location with no service[4]



Components of a cellular radio site

Overview: Identify site locations for cellular, wireless ISP, and similar services. Develop sites with equipment hut/shelter, power, a tower, and other required components in conjunction with providers who would lease the facility for their antenna.

[5] Data provided by Napa County.

Rationale: Reduces the cost of doing business in low-density areas and directs service offerings into priority areas. Creates opportunities for small, local providers.

Scope	Complexity	Cost	Funding	Revenue	Timeframe
Under-served areas	High	$150K -$200K per site	Mostly private, some public	Moderate	Immediate

Description: Data provided by Napa County reveals large swaths of area without cellular coverage. Presuming this extends to wired connectivity, areas in the center of the County, including Aetna Springs, Chiles Valley, Capell Valley, Knoxville, Pope Valley, and Wooden Valley appear to have effectively no broadband.

This opportunity is complex because of the level of planning and coordination required. First, someone has to identify sites that are (a) on public property, (b) practical for a tower and other components, and (c) geographically situated such that signals can cover the surrounding area. Second, prospective lessees/users for the site(s) must be identified, engaged, and sold on the site(s). Third, the sites have to be designed, including backhaul connections, and built. Then, fourth and into the foreseeable future, the sites must be maintained.

Illumination Technologies California (ITC), which is headquartered in Calistoga, has established two sites and proposed approximately 30 more based on no-cost use of public land, building on work its parent company has done over two decades in other countries. ITC does all of the work and installs public safety sirens at each site. The company provides the capital and absorbs the costs but also gets any revenue generated by leasing the sites.

There are at least three critical public considerations for this approach. First is how and whether the sites can be used for public safety communications, including LMR simulcast voters[6] and "Vine Branches" as described below (opportunity B.2). The second is hardening of these sites as described in opportunity B.3: Is it necessary and, if so, who pays for it?

[6] A simulcast voter is an antenna that connects with other antenna to expand coverage for particular channels/frequencies without creating interference from multiple antenna transmitting the same signals.

The third consideration is revenue. Magellan Advisors has analyzed industry information about fees paid to cities and counties for cell site leases.[7] Most of the data points range from $1,500 to $3,000 per month in urban and suburban areas. Anecdotally, clients in California tell us they are getting between $2,500 to $4,500 per month and sometimes as high as $5,000 per month depending on the site. Relatively urban areas with limited available sites can reasonably ask for $4,500 per month while more rural locations can conservatively target $1,500 per month.

There are a complex set of factors, including the availability of sites, the local jurisdiction's ability to negotiate, and the cell site developer's business requirements in the specific market, that determine lease rates. Magellan Advisors recommends valuing cell site leases in Napa County at between $1,500 to $2,500, although this should be considered a conservative range given the nature of the local market. Consider asking for a revenue share from the site developer, possibly in conjunction with a guaranteed base lease rate. Napa County should also consider hiring a valuation consultant to more precisely set lease rates.

An additional consideration is backhaul to connect these into providers' networks. Fiber connectivity makes any given location more valuable and viable. This issue could be resolved by work on opportunities A.1 and A.4. We recommend that the County include public fiber strands in any additional private fiber network infrastructure as an element of any agreement to develop additional sites.

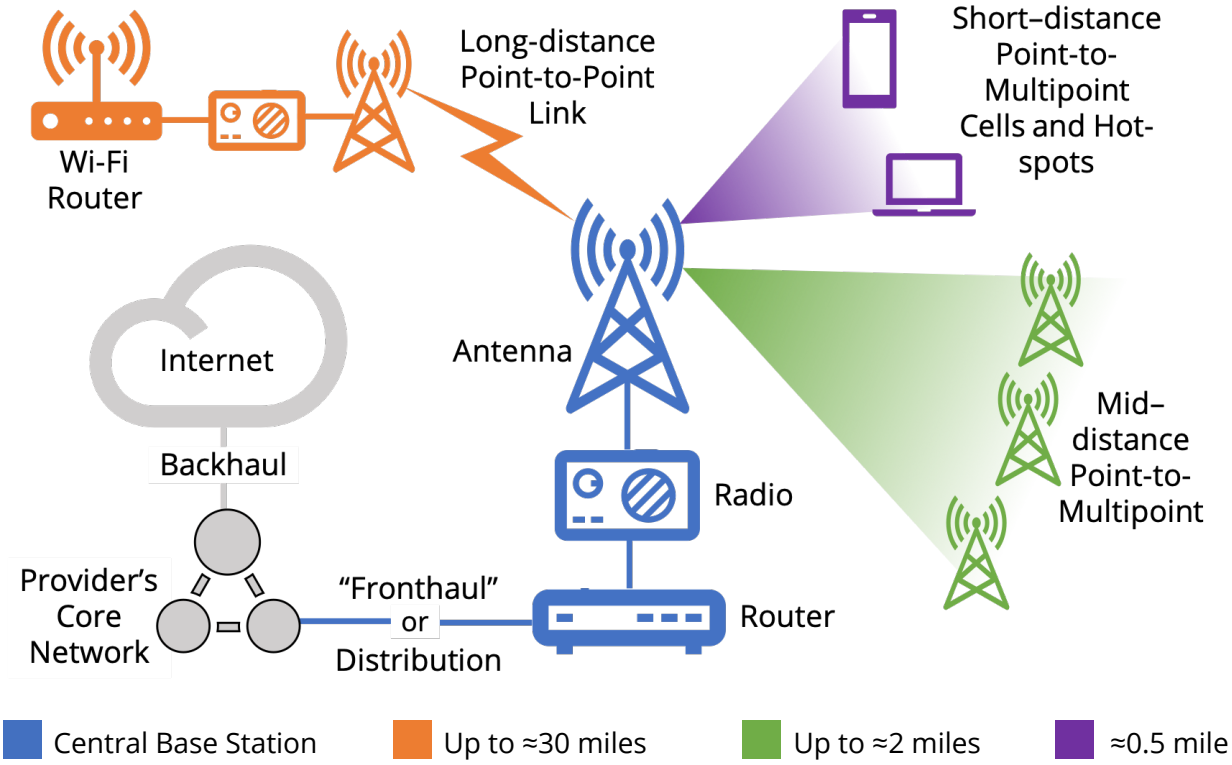
While the County's goal is to expand access into under- and un-served areas, providers will be most interested in sites in populated or heavily trafficked areas. Most of the sites identified for development by ITC are in Napa Valley. While ITC has proposed sites near Lake Berryessa, other areas identified by Napa County personnel as being under-served—including Capell Valley, Pope Valley, and Wooden Valley—would not be covered. Terms of use, including coverage, fees,

[7] Sources include https://www.steelintheair.com/cell-tower-lease-rates/, https://www.celltowerleaseexperts.com/cell-tower-lease/, https://www.airwaveadvisors.com/blog/2020-cell-tower-lease-rates/?gclid=Cj0KCQjwo6D4BRDgARIsAA6uN1-ZW3c1NDz44_IxmzYCVU1lKSp8R26r3NjNnNTf5bYkCOHap7a_4dAaAkLPEALw_wcB, https://www.insideselfstorage.com/cell-towers/determining-true-value-cell-tower-lease-insight-self-storage-property-owners, https://towergenius.com/cell-site-lease-rates/, https://www.cell-phone-towers.com/Cell-Tower-Lease-Rates.html, https://cellsites.com/faq/, and https://magazine.realtor/commercial/feature/article/2018/02/are-cell-tower-leases-in-your-sight.

network infrastructure, and public access, should be tied to achieving this goal. It may be necessary for private partners to be licensed via the California Public Utilities Commission (CPUC) in order to deploy assets in the public right-of-way.

Opportunity 2. Create a "Vine Branches" Radio Access Network (RAN)

Type *Enhanced Wireless Infrastructure*



Overview: Deploy base stations for a radio access network in under- and un-served areas. Work with community stakeholders to establish remote access points.

Rationale: Provides connections to specific sites in support of emergency response and resilience, using relatively inexpensive equipment.

Scope	Complexity	Cost	Funding	Revenue	Timeframe
Under-served areas	Medium	$5K - $10K per site[8]	Combination	Moderate	Short

Description: A RAN spans the space between network users and providers' distribution networks without wires. Typically, RANs are equated with cellular networks in that they're interconnected, overlapping, and users can roam between them. Technically, point-to-multipoint (PTMP) networks are RANs, too, because each radio site can provide connections for numerous remote sites. RANs often have point-to-point (PTP) links that expand their reach, and commonly connect to Wi-Fi access points to create "hotspots." The equipment is becoming quite economical but spectrum can still be expensive. Part of this opportunity arises from Napa County having a license to use 4.9 GHz spectrum for public safety purposes.

Example of a PtMP RAN antenna.

This antenna, from Mimosa Networks operates in the 4.9GHz public safety and 5.8GHz unlicensed bands, can deliver 2 Gbps throughput to 800 subscribers, and costs about $9,000 including setup.

The opportunity is to construct a number of RANs throughout the County, especially in remote areas and/or locations that vary greatly in population. These RANs can then interconnect with each other. For example, a RAN at a community center could provide a connection to a RAN at an isolated vineyard. RANs could be deployed in locations such as evacuation centers, festival sites, migrant worker centers, and parks that occasionally have large populations. These RANs could be deployed by public sector entities, private enterprises, or non-profits and be flexibly linked together via core networks (the "Vine Network," for example).

The key differences between "traditional" cell RANs and somewhat

[8] Does not include cost of spectrum licenses and related costs.

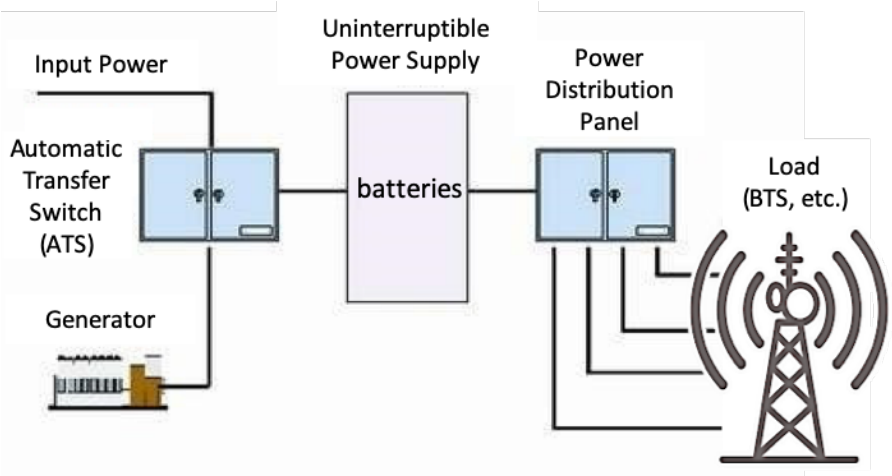
newer PTMP RANs are (a) cells are interconnected by intelligent core networks that track and switch users' connections and (b) PTMP RANs use newer data-centric, rather than voice-centric, protocols which make the cells faster. These distinctions are blurring. Wi-Fi is the prime example: New versions of this protocol support roaming. LTE, which is commonly used with 4G cellular, is now being used for fixed and higher-speed connections. 5G promises to erase these distinctions. "White Space" spectrum between broadcast television channels may extend the reach of RAN.

Spectrum is also a key distinction between older cellular RAN and emerging technologies. Cellular uses lower frequency licensed spectrum that propagates better (travels farther) but has less capacity. Wi-Fi uses unlicensed spectrum that is generally higher frequency. There is now "lightly licensed" shared spectrum in mid-range bands that are allowed to use more power. The emerging generation of LPWAN, exemplified by LoRa, can operate on top of RAN, although it uses different spectrum and requires gateways rather than routers. Counter to common belief, 5G can use a variety of licensed spectrum bands.

Opportunity: ## 3. Harden Radio Tower Sites

Type *Enhanced Wireless Infrastructure*

Fire-resistant equipment shelter ≈$150K installed



Back-up power system ≈$40K installed

Overview: Upgrade to fire resistant equipment shelters, install back-up power systems (up to 72 hours operating time), regularly clear tower areas and access roads, and make other improvements to make sites more resilient.

Rationale: Hardened sites are less susceptible to outages due to disaster and are generally more secure.

Scope	Complexity	Cost	Funding	Revenue	Timeframe
Served Areas	Low	≈$190K per site	Private with public support	Low	Short

Description: Hardening radio tower sites does not directly impact their capacity or coverage. This opportunity is all about reliability and resilience. There are three general components to hardening a site. The first component is clearing the area around the site, including access roads with wireline infrastructure along them. Replacing equipment huts with fire-resistant shelters is the second and most expensive component. The third component, back-up power, can also be quite costly depending on how long it is designed to operate in stand-alone mode. Multiple backup power sources, such as a generator, hydrogen fuel cells, solar cells, and wind turbines can increase reliability but also cost.

Some private companies, such as Valley Internet, have already hardened some of their sites, especially in more remote or risk-exposed areas. Most providers, especially cell companies, lease rather than own their sites and share those sites with competitors, so they don't have much motivation to invest in hardening. That said, providers don't want to have their sites out of commission, let alone destroyed. Therefore, a simple program to promote and coordinate hardening may

be effective, especially if supported by public activities such as brush clearing. Policies to require hardening could even the playing field, especially if accompanied by some form of financial incentive or subsidy. This might simply be a policy of not buying service from providers that have not hardened their sites.

Opportunity 4. Acquire or Lease Access to Portable "Cell on Wheels"

Type *Enhanced Wireless Infrastructure*

Portable cell towers collapsed for storage and transport (left) and deployed in the field (right)

Overview: Portable cell site(s), commonly called "cell on wheels" or COWs, can easily be moved where needed for emergencies and special events.

Rationale: The COWs provide back-up and additional capacity for permanent cellular infrastructure.

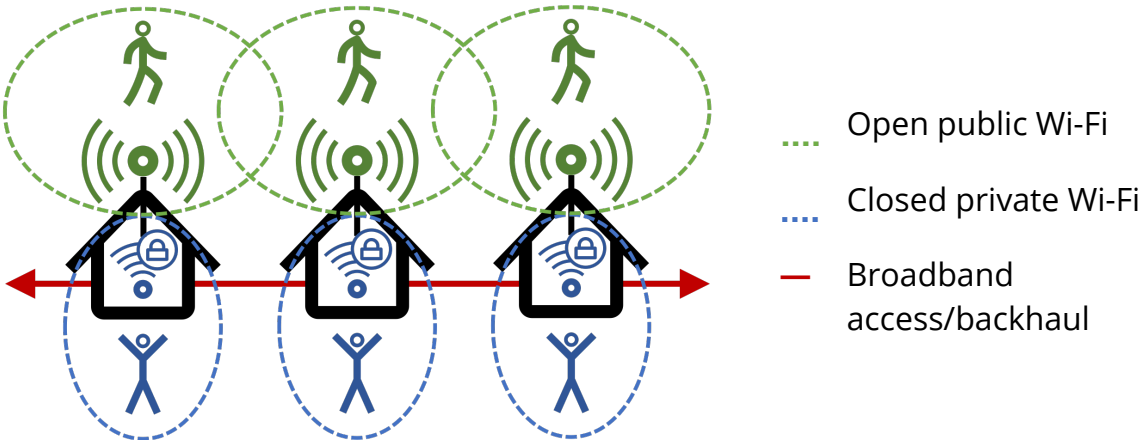
Scope	Complexity	Cost	Funding	Revenue	Timeframe
Limited but flexible	Low	≈$75K-$120K	Public	Moderate	Short

Description: Portable cell sites can be flexibly deployed as/when needed and shared by various providers. They could be owned by the County (or other local governments) or owned/paid for by providers and just stored by the County. The fundamental consideration is that these assets must be dedicated to the County

and ready to go when needed. Of course, this means they have to be maintained, supported, and tested regularly.

Opportunity 5. Create a "Vine Leaves" Community Wi-Fi Network

Type *Alternate Wireless Infrastructure*



Overview: Wireless infrastructure based on open standards—i.e., Wi-Fi—can be shared by multiple applications and users. Private parties can securely open their access for use by the public.

Rationale: Open networks can be a very flexible and inexpensive means for providing access but generally require backhaul to connect outside the area.

Scope	Complexity	Cost	Funding	Revenue	Timeframe
Served areas but flexible	Mid	Low	Private with public support	Low	Immediate

Description: The Community Wi-Fi model is used by major telecom companies such as Comcast, Spectrum, and ViaSat to provide secure access for subscribers via other subscribers' access points. It is also used in campus environments to provide consistent access across facilities and at remote sites. Valley Internet has been using this approach in and around Napa County, and is willing to share the approach openly with others.

Wi-Fi networks are designated by a service set identifier (SSID). Community Wi-Fi is simply a shared SSID that anyone can add to her or his Wi-Fi router. It requires a centralized hotspot server to manage access and connections. Each Wi-Fi router has to be registered with the server, which requires a modicum of technical

knowledge, depending on the server. It is also important to have an acceptable use policy and other mechanisms for ensuring access isn't misused. It is also possible to configure community Wi-Fi as a for-fee service.

IV. Funding Opportunities

With the conclusion of the grant and loan awards established by the American Recovery and Reinvestment Act of 2009 (P.L. 111-5), two primary sources of ongoing federal funding for broadband infrastructure remain:

- The Rural Utilities Service (RUS) Telecommunications Program of the U.S. Department of Agriculture for Broadband Network infrastructure and the RUS Electric Program for Electric Smart Grid Networks, and
- The Universal Service Fund (USF) program under the Federal Communications Commission (FCC).

In addition to regular fiscal year appropriations to USDA-RUS, the Farm Bill appropriates and structures funding for broadband infrastructure and broadband-enabled services for rural areas. The Farm Bill must be reauthorized by Congress approximately every five years.

Other sources of funding may include Congressional appropriations to the U.S. Department of Commerce for Public Works and Economic Adjustment grants to areas impacted by unexpected events, including extreme weather events, military base closings, and closure or downsizing of major employer facilities. The Department of Housing and Urban Development (HUD) may allocate funding from appropriations for support in disaster affected areas to infrastructure resiliency projects to bury electric and communications lines.

Other funding for broadband infrastructure and services may be appropriated to the Institute for Science and Museum Services, the Department of Transportation, the Defense Department, the Department of Military Construction and Veterans Affairs, and the Department of Health and Human. New Markets Tax Credits and State Designed Opportunity Zones are also prime opportunities for funding network infrastructure development.

Additionally, the State of California has a portfolio of technology, telecommunications, and economic development grants and funding opportunities which should be further explored.

A. State of California Funding

1. California Infrastructure and Economic Development Bank (IBank)

The California Infrastructure and Economic Development Bank ("IBank") was created to serve a variety of public purposes including providing an accessible low-cost financing option to eligible borrowers for a wide range of infrastructure projects. To meet this important public purpose, the IBank developed its Infrastructure State Revolving Fund ("ISRF Program"). ISRF Program financing is available in amounts from $50,000 to $25,000,000, with terms of up to 30 years. The interest rate for each financing is set at the time the financing is approved. Applications are accepted on a continuous basis. IBank funds projects for communications including telecommunications services, as well as:

- City streets
- County highways
- State highways
- Drainage, water supply and flood control
- Educational, cultural and social facilities
- Environmental mitigation measures
- Goods movement-related infrastructure
- Parks and recreational facilities
- Port facilities, public transit
- Power and communications facilities
- Public Transit
- Sewage collection and treatment
- Solid waste collection and disposal
- Water treatment and distribution
- Defense conversion
- Public safety facilities
- Military infrastructure
- Industrial, utility and commercial

Eligible Entities:

Eligible entities include but are not limited to any subdivision of a local government, including cities, counties, special districts, assessment districts, joint powers authorities and non-profit corporations (as deemed eligible).

Funding Availability:

Funding availability is $50,000 to $25,000,000 with continuous applications. Applicants must contact IBank prior to applying.

2. Infrastructure and Line Extension Grants

AB 1665 authorized the Commission to award up to $5 million in grants to offset the costs of connecting to an existing or proposed facility-based broadband provider.

Eligible Entities:

An "Eligible Applicant" is the customer residing at the location to be served, who qualifies for the California LifeLine or CARE Program's qualifying income threshold. Applicants who are not enrolled in the CARE or LifeLine programs but have a household income equivalent to the CARE program's income guidelines automatically meet the qualifying income threshold.

A representative, including a facilities-based broadband provider, may apply for service on behalf of an eligible applicant or a group of eligible applicants.

Funding Availability:

- $575M - $2.7B Awarded. Supported 77 projects, approximately 320,000 houses connected.
- Grants up to $5M. Rolling Submittals – June 1, September 1, December 1, 2020

More Information:

- https://www.cpuc.ca.gov/General.aspx?id=976

3. California Advanced Services Fund

CPUC[9] administers California Advanced Services Fund (CASF) to provide broadband access to no less than 98% of California households in each broadband consortium region by 2022.

CASF is funded by a surcharge rate on revenues collected by telecommunications carriers by end users for intrastate telecommunications services.

[9] See https://www.cpuc.ca.gov/casf/ for details.

In order to get funded, the provider must promise to provide minimum services of 10/1Mbps to areas where no providers offer 6/1Mbps.

Eligible Entities:

- Telephone corporation
- Registered wireless carriers
- Facility-based broadband service providers
- Local government agency if no other agency applied

Funding Availability:

$645M - Commission to reserve not more than $30 million of Infrastructure grant funds for infrastructure projects that provide last-mile broadband access to households to which no facility-based broadband provider offers broadband service at speeds of at least 10/1Mbps.

California Public Utilities Commission - SB-1130 Legislation

A proposed senate bill in the State of California will make sweeping changes to the definition and funding of broadband infrastructure throughout the state. The proposed legislation deletes the old 6/1 Mbps standard for "unserved" definition and replaces it with "unserved" and "unserved high-poverty area" definition:

> *(ii) "Unserved high-poverty area" means a census tract with a poverty rate of at least 20 percent, as measured by the most recent five-year data series available from the American Community Survey of the United States Census Bureau as of December 31, 2020.*[10]

The legislation proposes that now an area that lacks 25/25 Mbps low latency broadband is eligible for funding and only projects that provide future proofed infrastructure at a minimum of 100/100 Mbps low latency can receive state financing. It also specifically allows the state to target financing at low income urban neighborhoods that have been left behind.

> *(ii) "Unserved area" means an area for which at least 90 percent of the population has no facility-based broadband provider offering broadband service at speeds of at least 25 megabits per*

[10] Draft Legislation available at *https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB1130*

second (Mbps) downstream, 25 Mbps upstream, and a latency that is sufficiently low to allow real-time, interactive applications.

(iii) "Future-proof infrastructure" means data networks that once built do not require new construction that involve significant public works in order to deliver higher speeds that mirror advancements in network equipment. A future-proof infrastructure shall have sufficient capacity to deliver to end users 100 Mbps downstream, 100 Mbps upstream, and a latency that is sufficiently low to allow real-time, interactive applications.[11]

Additional impacts of the bill include: On open access, the legislation would undo the ban on middle mile open access projects receiving funding. It then applies the following two open access prongs to every state financed project.

a) *State financed fiber must be open access for last mile wireless services as the default. This is to make sure state investment here can be synergistic with 5G and other high-speed wireless uses that can leverage the capacity.*

b) *The CPUC would determine if open access for last mile wireline services is necessary to ensure affordable services were delivered, taking into account the need for the applicant to recover their investment costs and other financial challenges with the project area. In effect, this should make it so last mile fiber in more densely populated areas (namely the unserved high poverty neighborhoods) is open for multiple broadband options while recognizing the different picture some rural build out might incur where it might need to be a more limited open access if an insufficient number of customers are available to finance the remainder the state does not cover.*

[11] Draft legislation available at *https://leginfo.legislature.ca.gov/faces/billTextClient.xhtml?bill_id=201920200SB1130*

4. Rural and Regional Urban Consortia Grants

The CASF Rural and Urban Regional Broadband Consortia Grant Account is available for grants to eligible consortia to facilitate deployment of broadband services by assisting infrastructure applicants in the project development or grant application process. The CASF Consortia Grant Account funding is limited to Consortia activities directly related to and in support of CASF infrastructure applications (i.e., an infrastructure application requesting CASF funding, an infrastructure application requesting CASF and non-CASF funding).

Pursuant to rules developed to implement the law, the Commission will consider funding Consortium activities that achieve the following objectives:

- Collaborating with the Commission to engage regional consortia, local officials, Internet Service Providers (ISPs), stakeholders, and consumers regarding priority areas and cost- effective strategies to achieve the broadband access goal.
- Identifying potential CASF infrastructure projects, along with other opportunities, where ISPs can expand and improve their infrastructure and service offerings to achieve the goal of reaching 98% broadband deployment in each consortia region.
- Assisting infrastructure applicants in the project development or grant application process.
- Conducting activities leading to infrastructure applications.
- Assisting the Commission in publicizing requests for wireline testing volunteers in areas, as needed.

Eligible Entities:

An eligible Consortium may include representatives of organizations including, but not limited to:

- Local and regional government
- Public safety
- Elementary and secondary education
- Health care
- Libraries
- Postsecondary education
- Community-based organizations
- Tourism
- Parks and recreation
- Agricultural

- Business
- Workforce organization
- Air pollution control or air quality management districts.

Funding Availability:

$25M total funding available. $17.5M was awarded in 2019 funded and supported nine Consortia to advance broadband in 34 Counties.

The maximum funding cap per year per consortium is $150,000, up until December 31, 2022, plus $10,000 (per consortium for up to five representatives) for attendance at the Annual Public Workshop.

5. Broadband Adoption Account

The Broadband Adoption Account, created via Assembly Bill 1665, provides grants to increase publicly available or after-school broadband access and digital inclusion, such as grants for digital literacy training programs and public education to communities with limited broadband adoption. The CPUC will give preference to programs and projects in communities with demonstrated low broadband access, including low income communities, senior citizen communities, and communities facing socioeconomic barriers to broadband adoption.

Digital Literacy Projects - Digital inclusion projects can include digital literacy training programs and public education to communities with limited broadband adoption, including low-income communities, senior citizen communities, and communities facing socioeconomic barriers to broadband adoption.

Broadband Access Projects - Publicly available or after-school broadband access projects can include free broadband access in community training rooms or other public spaces, such as local government centers, senior citizen centers, schools, public libraries, nonprofit organizations, and community-based organizations. It can also include funding for community outreach, such as analysis, comparison of internet plans with the community, and call centers that will increase broadband access and adoption.

Eligible Entities:

- Local governments
- Senior centers
- Schools
- Public libraries
- Non-profit organizations

- Community-based organizations with programs to increase publicly available or after school broadband access and digital inclusion, such as digital literacy training programs are eligible to apply for grants.

Funding Availability:
The Broadband Adoption Account is authorized $20M to provide grants to increase publicly available or after-school broadband access and digital inclusion.

6. Local and Regional Transportation Funds

Transportation funds are already being used in the Bay area for development of Smart Transit and Smart Streets. Elsewhere in the state such projects involve installing fiber. Napa could begin conversations with Napa Valley Transportation Authority (NVTA) about possible tactics for leveraging regional transportation funding to deploy network assets including antenna, conduit, fiber, and poles.

Measure T Funding Programs

The Napa Valley Transportation Authority (NVTA) is a Congestion Management Agency formed in 1998 as a joint effort by the cities of American Canyon, Calistoga, Napa, St. Helena, the town of Yountville and the County of Napa. NVTA serves as the countywide transportation planning agency. The agency's goals, duties and composition make it easier for local governments to tackle the increasingly complex problem of traffic congestion.[12]

NVTA administers a variety of Measure T funding programs for cities to widen streets, improve intersections, storm damage repair, coordinate signals, and rehabilitate pavement. NVTA also administers regional street and road improvement projects. In order for cities to participate in these programs, cities are required to meet specific eligibility requirements[13] to receive the funds.

One Bay Area Grant program

The One Bay Area Grant (OBAG) is a funding program of the nine-county Metropolitan Transportation Commission (MTC), which is the regional public agency responsible for planning, financing and coordinating for the San Francisco Bay Area. Currently in its second round, it is funding approximately $916M of transportation projects through 2021-22. Actually two programs, the MTC manages

[12] See *https://www.nvta.ca.gov/* for details.
[13] See *https://www.octa.net/m2eligibility/* for details.

regional projects, which have $530M allocated to them over 5 years, and $386M funding is being put into projects managed by the counties, specifically NVTA.

Generally, projects must support Plan Bay Area14, which has a "triple bottom line" approach measuring performance in terms of the economy, environment, and equity. The Plan seeks to balance development with conservation while ensuring a reasonable cost of living, particularly for housing. Network connectivity directly contributes to all three bottom lines and can be essential for balancing them.

Funds are targeted at Priority Development Areas (PDAs) and Priority Conservation Areas (PCAs) designated by the counties. There are two PDAs in Napa, on in the City of Napa: the Downtown Napa and Soscol Gateway Corridor and the Highway 29 Corridor in American Canyon. The MTC is currently planning for Hwy 37 corridor as an OBAG regional project. Napa County should engage the NVTA and MTA around these opportunities to deploy network infrastructure and use it to achieve their overall goals and specific objectives.

7. Governor Newsom's Public Safety Power Shutoffs (PSPS) Program[15]

In October of 2019, Governor Newsom and State Legislation included a $75M one-time General Fund appropriation in the 2019 Budget Act to support state and local government efforts to protect public safety, vulnerable populations and individuals and improve resiliency. Further, the Governor's budget made investments to help the state prepare for wildfires such as $60M, including $10M in FY19 and a revised fee structure that goes into effect next year to upgrade California's archaic 9-1-1 system, and $1M for first responder broadband network and integration with the 9-1-1 system.

Napa County should monitor the appropriations for 2020 and determine if funding will be available and whether Napa County would be eligible for funding for FirstNet or E9-1-1 system upgrades.

[14] For details of the MTA's long-term plan, visit http://2040.planbayarea.org/.

[15] See *https://www.gov.ca.gov/2019/10/25/governor-newsom-launches-75-million-program-for-state-and-local-governments-to-mitigate-impacts-of-power-shutoffs/* for details.

B. Federal Funding Sources

1. Housing and Urban Development (HUD)

HUD – Community Development Block Grant

"The Community Development Block Grant (CDBG) program is a flexible program that provides communities with resources to address a wide range of unique community development needs. Beginning in 1974, the CDBG program is one of the longest continuously run programs at HUD. The CDBG program provides annual grants on a formula basis to 1209 general units of local government and States." [16]

The US Housing and Urban Development issues Community Development Block Grants (CDBG) to support affordable housing and to enhance economic development and jobs creation. CDBG grants can be used towards broadband programs in eligible areas deploy to unserved businesses and also to bury fiber for resiliency. The grants are awarded to state and local jurisdictions.

Access to Grant Funding:

Napa County should coordinate with the Community Development officials in Napa County to submit to the state for funding.

Application Due Dates:

Round 1 Submittal deadline Community Development/Economic Development: June 1, 2020

Round 2 Submittal deadline Economic Development (pending availability of funds): June 15, 2020

OTC project allocation deadline (pending availability of funds): September 15, 2020

California State CDBG Representative for Napa County

Herman Low, Herman.Low@hcd.ca.gov, 916-263-1988

[16] See *https://www.hud.gov/program_offices/comm_planning/communitydevelopment* for details.

HUD – Community Development Block Grant Disaster Recovery (CDBG-DR)[17]

When the President declares a major disaster, Congress may appropriate funds to HUD when there are significant unmet needs for long-term recovery. Specifically, funds may be used for:

- Disaster relief
- Long-term recovery
- Restoration of infrastructure
- Housing
- Economic revitalization

Eligible Entities: Those who receive grant money include state agencies, non-profit organizations, economic development agencies, citizens and businesses.

Access to Grant Funding:

For CDBG-DR, Napa County should coordinate with the Public Safety officials in Napa County to submit to the State for funding.

California Contacts:

Amanda Ohman – CDBG-DR Section Chief – 916-263-6424

Susan Naramore – Sr. Specialist-Disaster Recovery – 916-263-0371

disasterrecovery@hcd.ca.gov

HUD –Neighborhood Networks (Public and Indian Housing)[18]

Neighborhood Networks (Public and Indian Housing) allows Public Housing Authorities (PHAs) to use Public Housing Capital and Operating funds to establish and operate Neighborhood Networks centers. Neighborhood Networks centers provide access to computers, computer training and the internet. Neighborhood Networks centers can also provide a wide range of services to help residents achieve long-term economic self-sufficiency. Funds are used to support broadband adoption, digital skills training, and public computer access.

[17] See *https://www.hudexchange.info/programs/cdbg-dr/* for details.
[18] See *https://www.hud.gov/program_offices/public_indian_housing/programs/ph/ross/aboutnn* for details.

Eligible entities are Public Housing Authorities and funding availability for FY 2020 includes a Capital Fund of $2.8B and an Operating Fund of $4.5B.

2. National Science Foundation (NSF)

Smart & Connected Communities (S&CC)

The goal of the NSF Smart and Connected Communities program solicitation is to accelerate the creation of the scientific and engineering foundations that will enable smart and connected communities to bring about new levels of economic opportunity and growth, safety and security, health and wellness, and overall quality of life.[19] This goal will be achieved through integrative research projects that pair advances in technological and social dimensions with meaningful community engagement. Funds are used to support Smart Cities, evaluation, and research.

Eligible Entities:

- Libraries
- K-12 Schools
- Commercial/internet service providers
- Non-Profit organizations
- Higher education institutions
- Hospitals
- Small businesses, rural recipients
- Public Safety entities
- State and Local governments
- Tribal entities
- Electric utilities/co-ops
- Financial institutions

Funding Availability:

In light of the December 2018-January 2019 appropriations lapse, NSF opted to run a single S&CC competition spanning FY 2019 and FY 2020 in FY 2020. This approach accounts for the variability in investment between FY 2018 and FY 2020. There is approximately $43,000,000 anticipated in grant funding.

[19] See *https://www.nsf.gov/funding/pgm_summ.jsp?pims_id=505364* for details.

3. Rural Utilities Service[20]

The Rural Utilities Service (RUS) is part of the United States Department of Agriculture (USDA) Rural Development program. USDA Rural Development is committed to improving the economy and quality of life in rural America. Rural Development has a multi-billion-dollar loan portfolio and administers billions in loans, loan guarantees, and grants through its programs. Rural Development helps rural individuals, communities and businesses obtain needed financial and technical assistance to address diverse and unique needs through specific programs.

Rural Development programs support such essential public facilities and services as water and wastewater disposal systems, housing, health clinics, emergency service facilities, electric service and telephone/broadband communications service. Rural Development promotes economic development by supporting loans to businesses through banks, credit unions and community-managed lending pools. It offers technical assistance and information to help agricultural producers and cooperatives get started and improve the effectiveness of their operations. In addition, Rural Development provides technical assistance to help communities undertake empowerment programs.

USDA's RUS administers programs that provide much needed infrastructure or infrastructure improvements to rural communities. These include water and wastewater treatment, electric power and telecommunications and broadband services. All of these services play a critical role in helping to expand economic opportunities and improve the quality of life for rural residents.[21] Utilities programs connect rural residents to the global economy by:

- Increasing access to broadband and 21st century telecommunications services.
- Funding sustainable renewable energy development and conservation.
- Financing reliable and affordable electric systems.
- Working to integrate electric smart grid technologies.
- Developing reliable and affordable rural water and wastewater systems.

[20] See *https://www.rd.usda.gov/* for details.

[21] See *https://www.rd.usda.gov/about-rd/agencies/rural-utilities-service* for details.

These investments support the nation's long-term prosperity by ensuring that rural communities have the infrastructure to compete in the global economy.

USDA - Rural Utilities Service - Rural eConnectivity Pilot Program (ReConnect)[22]

RUS uses the Minimum Broadband Service measurement to determine whether a proposed funded service area is served or unserved. Until otherwise revised in the Federal Register, the minimum data transmission rate that qualifies as Minimum Broadband Service is ten (10) megabits per second (Mbps) downstream and one (1) Mbps upstream (written as "10 Mbps / 1 Mbps") for both fixed and mobile broadband service. RUS will determine that Broadband Service does not exist for areas with no broadband access or where access is less than 10 Mbps / 1 Mbps. (currently 10/1 Mbps but expected to be increased to 25/3 in next funding opportunity).

ReConnect offers three types of funding options for broadband infrastructure – grants, grant and loan combinations, and low interest federal loans – to connect rural families, businesses, farms, ranches, schools, libraries, and public safety facilities to modern, high-speed internet.

Funds can be used to construct, improve, and acquire facilities that provide internet services to customers' premises, with reliable technologies that are suitable for the type of rural community and the type of high-speed internet use.[23]

Eligible Entities:

Eligible applicants include an Indian tribe or tribal organization, a state or local unit of government, or other legal entity, including cooperatives, private corporations or limited liability companies organized on a for profit or not-for profit basis.

- Grant awards capped at $25 million. Matching contribution required for 25% of project cost. 100% of serving area must be unserved with broadband at the statutory speed.
- Grant/loan awards capped at $25 million in grant funds, $25 million in direct federal cost of money loans. No match required. 90% of serving area must be unserved with broadband at the statutory speed.

[22] See *https://www.usda.gov/reconnect* for details.
[23] See *https://www.usda.gov/reconnect* for details.

- Loan awards capped at $50 million. No match required. Direct federal cost of money loans. 90% of serving area must be unserved with broadband at the statutory speed.

Competitive awards are based on scoring points. Rural unserved areas with greater numbers of farms, community support organizations and businesses will be ranked higher. RUS will not fund proposals to serve areas currently served by an existing RUS borrower or by a Connect America Fund Phase II Auction winner.

- A waiver may be requested if the borrower or CAF II auction winner is not meeting statutory requirements for 10/1 Mbps service provision.
- Ninety percent of the households served by any project funded through this program must be unserved or underserved with 10 Mbps broadband downstream and 1 Mbps upstream.
- Any entity receiving funds from the program is prohibited from overbuilding an existing RUS borrower.
- No more than 4% of funds received through the program can be used towards administrative costs.

Funding Availability:

- $550M for year 2020
- Applications accepted until April 15, 2020. Appropriations for 2021 include proposed $500M plus COVID- 19 Stimulus addition of $100M
- Maximum Grant/Loan Amount: $25M
- Matching funds of at least 25% from non-federal sources are required for grant applications.

More Information:

- Visit https://www.usda.gov/reconnect.

USDA - Rural Utilities Service Distance Learning Telemedicine (DLT) Grant Program[24]

The DLT Program provides financial assistance to enable and improve distance learning and telemedicine services in rural areas. The Program targets rural

[24] See *https://broadbandusa.ntia.doc.gov/funding-program-details-funding-guide/usda-rural-utilities-service-distance-learning-telemedicine-0*. for details.

communities of 20,000 or less to overcome the effects of remoteness and low population density.

DLT grant funds support the use of telecommunications-enabled information, audio and video equipment, and related advanced technologies by students, teachers, medical professionals, and rural residents. These grants are intended to increase rural access to education, training, and health care resources that are otherwise unavailable or limited in scope. DLT won't pay for broadband connectivity but will pay for equipment and inside wiring for schools and rural hospitals/clinics for broadband service including:

- Acquisition of eligible capital assets, such as:
  - Broadband transmission facilities
  - Audio, video and interactive video equipment
  - Terminal and data terminal equipment
  - Computer hardware, network components and software
- Inside wiring and similar infrastructure that further DLT services
- Acquisition of instructional programming that is a capital asset
- Acquisition of technical assistance and instruction for using eligible funds

Eligible Entities:

- Most State and local governmental entities
- Federally-recognized Tribes
- Non-profits
- For-profit businesses
- Consortia of eligible entities

Funding Availability:

- FY2020 $71.7M
- Highly competitive grant awards.
- Grant Window Opened February 10th, 2020 and Closes April 10th, 2020
- Awards can range from $50,000 to $500,000. A minimum 15 percent match is required and cannot be from another federal source.

New USDA RUS Future Funding Opportunity

The 2018 Farm Bill Reauthorization allows USDA RUS to provide grant/loan funding for middle mile infrastructure, only, for the first time. All other RUS programs require retail service provisioning to end user premises. The rules are currently under development by the RUS Telecommunications Program, and when completed, funding must still be appropriated. It may take as long as 12 months before a funding opportunity is announced but should be a great benefit for rural

areas where competition is restricted by control of the middle mile network by the incumbent carrier in a region.

Water & Waste Disposal Loan & Grant Program

This purpose of this program is to provide funding for clean and reliable drinking water systems, sanitary sewage disposal, sanitary solid waste disposal, and storm water drainage to households and businesses in eligible rural areas.

The program helps very small, financially distressed rural communities extend and improve water and waste treatment facilities that serve local households and businesses. Good practices can save tax dollars, improve the natural environment, and help manufacturers and businesses to locate or expand operations.

RUS Water and Waste disposal loans and grants may be leveraged to co-locate broadband conduits during trenching. Approximately 80% of the cost of underground network deployment is in the trench. RUS Broadband programs may provide grants for materials and labor to co-locate the conduits during construction.[25]

Eligible Entities:

- Most state and local governmental entities
- Private non-profits
- Federally-recognized tribes

Eligible Areas:

- Rural areas and towns with populations of 10,000 or less
- Tribal lands in rural areas

Funding types include long-term, low-interest loans. If funds are available, a grant may be combined with a loan if necessary, to keep user costs reasonable.

More Information:

Contact your RUS State Director for more information. A list of RUS State Directors may be found at https://www.rd.usda.gov/about-rd/leadership/state-directors.

[25] See *https://www.rd.usda.gov/programs-services/water-waste-disposal-loan-grant-program* for more information.

4. Department of Homeland Security (DHS), Federal Emergency Management Agency (FEMA), Grant Program Directorate (GPD) – Homeland Security Grant Program (HSGP)[26]

The HSGP is composed of three grant programs with the following allocations in 2019:

- State Homeland Security Program (SHSP): $415M
- Urban Area Security Initiative (UASI): $590M
- Operation Stonegarden (OPSG): $90M

California received a $62M SHSP allocation and $123.9M UASI allocation for fiscal year 2019.

These funds are allocated to the states based on three principal elements: risk, vulnerability and consequence to determine the relative risk of terrorism to people, critical infrastructure, and economic security.

2019 allocation project performance time frame is September 1, 2019 through August 31, 2022.

Eligible Subrecipients: Eligible applicants, or subrecipients, include Counties/Operational Areas (OAs), Urban Areas (UAs), State Agencies (SAs), Departments, Commissions, Boards, who have or can obtain appropriate state Department of Finance budget authority for awarded funds, and federally-recognized tribes located in California.

FY2019 Program Priorities included:

- Safety and Security
- Food, Water, Sheltering
- Health and Medical
- Energy
- Communication
- Hazardous Material

Applicant Submission: The application deadline was December 6, 2019 but there may be additional allocations.

[26] See *https://www.fema.gov/homeland-security-grant-program* for details.

HSGP Contact Information:

California Governor's Office of Emergency Services

Olivia Skierka, 916-845-8744

Napa County should coordinate with public safety for application for fiscal year 2020.[27]

C. Federal Communications Commission

The Federal Communications Commission (FCC) is an independent U.S. government agency. The FCC was established by the Communications Act of 1934 and is charged with regulating interstate and international communications by radio, television, wire, satellite and cable. The FCC's jurisdiction covers the 50 states, the District of Columbia, and U.S. possessions.

The Commission staff is organized by function. There are seven operating Bureaus and ten Staff Offices. The Bureaus' responsibilities include processing applications for licenses and other filings; analyzing complaints; conducting investigations; developing and implementing regulatory programs; and taking part in hearings. Even though the Bureaus and Offices have their individual functions, they regularly join forces and share expertise in addressing Commission issues. Through these offices, funding is specifically designed to meet the needs of each applicant.

Universal Service Fund

In accordance with the Telecommunications Act of 1996, the FCC established the following four programs within the Universal Service Fund[28], of which the Connect America Fund, Schools and Libraries and Rural Health Care Programs are focused on expanding accessible, affordable, high-speed broadband service:

- Rural Development Opportunity Fund (Formally Connect America Fund (formally known as High-Cost Support) for rural areas
- Lifeline (for low-income consumers), including initiatives to expand phone service for residents of Tribal lands
- Schools and Libraries (E-Rate)

[27] See *https://www.caloes.ca.gov/cal-oes-divisions/grants-management/homeland-security-prop-1b-grant-programs/homeland-security-grants-program* for details.

[28] See *https://www.fcc.gov/general/universal-service-fund* for more information.

- Rural Health Care

Rural Development Opportunity Fund (RDOF)

The Rural Digital Opportunity Fund is the Commission's next step in *bridging the digital divide*. On August 1, 2019, the Commission adopted a *Notice of Proposed Rulemaking* (NPRM)[29] proposing to establish the $20.4 billion Rural Digital Opportunity Fund to bring high speed fixed broadband service to rural homes and small businesses that lack it. On January 30, 2020, the Commission adopted the *Rural Digital Opportunity Fund Report and Order*[30], which establishes the framework for the Rural Digital Opportunity Fund, building on the success of the *CAF Phase II Auction* by using reverse auctions in two phases.

The Phase I auction, which is scheduled to begin on October 22, 2020, will target over six million homes and businesses in census blocks that are entirely unserved by voice and broadband with download speeds of at least 25 Mbps. Phase II will cover locations in census blocks that are partially served, as well as locations not funded in Phase I. The Rural Digital Opportunity Fund will ensure that networks stand the test of time by prioritizing higher network speeds and lower latency, so that those benefitting from these networks will be able to use tomorrow's internet applications as well as today's.

Wireline and wireless telephone companies seeking to participate in any of the High Cost Program support components must be designated an "eligible telecommunications carrier" (ETC) and meet ongoing requirements by the applicable state or, in cases in which the state does not have jurisdiction over a particular type of provider, the Federal Communications Commission. The FCC provides information about the process to become an eligible telecommunications carrier. Based on currently proposed rules, bidders will have up to 180 days after award to complete the certification process.

RDOF subsidies are offered to telecommunications companies throughout the U.S. to upgrade and expand their networks as required to provision broadband service at a minimum speed of 25 Mbps downstream from the internet to the consumer's premise and 3 Mbps upstream from the premise to the internet.

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[29] See *https://www.fcc.gov/document/fcc-proposes-204-billion-rural-digital-opportunity-fund-0* for more information.

[30] See *https://www.fcc.gov/document/fcc-launches-20-billion-rural-digital-opportunity-fund-0* for more information.

Telecommunications companies accepting RDOF subsidies receive the subsidies over a period of six years to ten years.

Funding Availability:

- $16B for Phase 1
- Reverse Auction begins 10/22/2020 for eligible census blocks.

Figure 2: RDOF Eligible Census Blocks

The figure above shows the eligible census blocks in and around Napa County. There are a number of eligible areas in Napa County that should be explored.

More Information:

https://www.fcc.gov/auction/904/factsheet#deployment

Universal Service Schools and Libraries Program

This program is also known as the "E-Rate" program and is administered by the Universal Service Administrative Company (USAC) under the direction of the Federal Communications Commission. When E-Rate was established in 1996, only 14 percent of the nation's K-12 classrooms had access to the internet. Today, virtually all schools and libraries have internet access. The FCC began updating E-rate in 2010 and in July 2014, and released the E-rate Modernization Order expanding Wi-Fi networks in schools and libraries across America while ensuring support continues to be available for broadband connectivity to schools and libraries.

With new reforms adopted in 2014 aimed at providing tools and competitive options for purchasing fiber broadband connectivity, more schools and libraries are connected to high-speed broadband each year.

The E-Rate Program[31] provides discounts of up to 90% for broadband connectivity to and within elementary and secondary schools (public and private) and public libraries in rural and non-rural areas. Funding is provided through an annual application process with schools, libraries and consortia of schools and libraries applying for funding. A discount increase of up to 10 percentage points is available for schools and libraries in rural areas depending on the poverty level.

Schools may request funding for wireless or wireline broadband services, as well as for unbundled services including leased fiber, as follows:

- Dark fiber leasing
- Lit fiber leasing
- Dark and lit fiber leasing
- Self-provisioned services and services provided over third-party networks
- Transport only
- Internet access only

Schools and libraries have the flexibility to lease dark and provision their own broadband services, allowing for opportunities to share fiber-optic cable with fiber owners in the area.

[31] See *https://www.usac.org/e-rate/* for more information.

Eligibility:

- Schools must provide elementary or secondary education as determined under state law.
- Schools may be public or private institutional day or residential schools, or public charter schools.
- Schools must operate as non-profit businesses.
- Schools may not have an endowment exceeding $50M.
- Libraries must be eligible for assistance from a state library administrative agency.
- Libraries must have budgets completely separate from any schools (including, but not limited to, elementary and secondary schools, colleges and universities).
- Libraries may not operate as for-profit businesses.

Availability of Funding:

Applications to receive funding are accepted on an annual basis. In 2015, the FCC voted to raise the E-Rate's annual spending cap from $2.4B to $3.9B. In the last two funding years, the E-Rate Program has funded $5.6B in funding requests for connectivity to and within schools and libraries, including $2.1B in support for the equipment needed to deploy Wi-Fi to students and library patrons in all 50 states.

More Information:

- FCC E-rate website: https://www.fcc.gov/general/universal-service-program-schools-and-libraries-e-rate
- USAC: http://www.universalservice.org/sl/about/getting-started/default.aspx
- United States Department of Commerce: https://www.commerce.gov/
- Economic Development Administration: https://www.eda.gov/

FCC Chairman, Ajit Pai, announced in December 2019 that he intends to establish the new 5G fund which will issue over $8B in funding for 5G deployments. The FCC has earmarked $1B of that for precision ag connectivity projects. The task force is trying to determine how best to map out agricultural markets that are unserved for funding purposes.[32]

[32] See *https://docs.fcc.gov/public/attachments/DOC-361168A1.pdf* for details.

D. Other Sources

1. Public Works and Economic Adjustment Grants

EDA's Public Works program helps distressed communities revitalize, expand, and upgrade their physical infrastructure. This program enables communities to attract new industry, encourage business expansion, diversify local economies, and generate or retain long-term, private-sector jobs and investment through the acquisition or development of land and infrastructure improvements needed for the successful establishment or expansion of industrial or commercial enterprises.

EDA Public Works program investments help facilitate the transition of communities from being distressed to becoming competitive by developing key public infrastructure, such as technology-based facilities that utilize distance learning networks, smart rooms, and smart buildings; multi-tenant manufacturing and other facilities; business and industrial parks with fiber-optic cable; and telecommunications and development facilities.

In addition, EDA invests in traditional public works projects, including water and sewer systems improvements, industrial parks, business incubator facilities, expansion of port and harbor facilities, skill-training facilities, and brownfields redevelopment.

Eligible Entities:

- District Organization of an EDA-designated Economic Development District
- Indian Tribe or a consortium of Indian Tribes
- State, county, city, or other political subdivision of a state, including a special purpose unit of a state or local government engaged in economic development
- Infrastructure development activities, or a consortium of political subdivisions
- Institution of higher education or a consortium of institutions of higher education
- Public or private non-profit organization or association acting in cooperation with officials of a political subdivision of a state
- **Individuals and for-profit entities are NOT eligible**

Use of Funds: provide investments that support:

- Construction
- Non-construction
- Planning

- Technical assistance
- Revolving loan fund projects under EDA's Public Works program and EAA program (which includes Assistance to Coal Communities).

Criteria for Selection:

- The project's demonstrated alignment with at least one of EDA's current investment priorities as published on EDA's website at http://www.eda.gov/.
    - Includes critical infrastructure, specifically broadband
- The project's potential to increase the capacity of the community or region to promote job creation and private investment in the regional economy.
- The likelihood that the project will achieve its projected outcomes.
- Ability of the applicant to successfully implement the proposed project, including the applicant's financial and management capacity and the applicant's capacity to secure the support of key public and private sector stakeholders.

Funding Amount: Grants range from $100,000 to $3M

Funding Availability: Ongoing

In general, EDA's maximum investment rate (percent of the total project cost) is determined by the average per capita income or unemployment rate of the region in which the project is located – Not to exceed 80% of project costs unless deemed special needs. (i.e. cash match must be available)

Applicants are strongly encouraged to contact the EDA representative listed for their applicable State

CARES Act Supplement:

The CARES Act adds a supplemental $1.5B in additional funding to the 2020 appropriations for the EDA's EAA grants to prevent, prepare for, and respond to coronavirus. The rules and regulations from above are the foundation for this funding. The funding will be divided by region:

Seattle Regional Office – $266,000,000 (Includes states of AK, AZ, WA, OR, ID, HI, and NV, as well as California)

- Leonard Smith, Regional Director
  P: 206-220-7660
  F: 206-220-7669
  E: asmith@eda.gov
- Malinda Matson, Northern and Coastal California Representative
  915 Second Avenue

Room 1890
Seattle, WA 98174
P: 916-235-0088
E: mmatson1@eda.gov

2. COVID-19 Stimulus Bill – The CARES Act

Through the recent COVID-19 crisis, Congress passed the CARES act to address economic impacts of the crisis. The funding bill is not an infrastructure bill but includes the following support or additions to funding for broadband, education, telehealth and tribal entities. Details of funding opportunities include the following.[33]

Additional Appropriations to Existing Broadband Support Programs

In addition to regular and supplemental FY 2020 appropriations, the CARES Act included only small incremental appropriations to existing programs:

- $25M for RUS Distance Learning and Telemedicine
- $50M for the Institute for Museum and Library Science
- $100M for ReConnect
- Applicants in previous rounds that were not awarded due to eligibility receive priority. This also included additional funds for the CDBG program and for EDA.

Indirect Broadband Funding for Education

Education Stabilization Fund[34]

There was indirect funding that may be used for broadband service and devices for K-12 students, but it has some strings. $13.5 billion in dedicated funding is set aside for K-12 education through an education stabilization fund, allocated to the states by formula, which may be used to improve the use of technology to support distance education.

The K-12 stabilization money could be used to provide students internet connectivity and internet-connected devices to boost access to distance learning, including for a broad range of education purposes such as special populations - English-language learners and students with disabilities, continuing remote

[33] See *https://www.congress.gov/bill/116th-congress/senate-bill/3548/text?q=product+update* for details.
[34] See *https://oese.ed.gov/offices/education-stabilization-fund/* for details.

educational programs during long-term closures, and mental-health support for students.

In order to access the state education stabilization fund, states would first have to agree to provide funding to education in fiscal years 2021 and 2022 that's at least the same as the average of their education funding over the three prior fiscal years. However, U.S. Secretary of Education Betsy DeVos could waive that requirement.

The package also requires that any state or school district getting money from the stabilization fund "shall to the greatest extent practicable, continue to pay its employees and contractors during the period of any disruptions or closures related to coronavirus."

Governor's Discretionary Funds for K-12 and Higher Education

The plan also includes $3B for governors to use at their discretion to assist K-12 and higher education as they deal with the fallout from the virus.

Indian Schools funded by the Bureau of Indian Affairs (BIA)

$69M is authorized for schools funded by the BIA.

Indirect Broadband Funding for Telehealth

The FCC was provided $200M to support efforts of health care providers to address COVID-19 by providing telecommunications services, information services, and devices necessary to enable the provision of telehealth services. The Act set aside $180M from the $127B increase in funding for the Department of Health and Human Services' Public Health and Social Services Emergency Fund to expand services and capacity for rural hospitals, including telehealth. It also provides $2.15B to the Department of Veterans Affairs for information technology uses to support increased telework and telehealth, including the purchasing of devices and enhanced system bandwidth and support.

Tribal Support Funds

In addition to the $69M authorized for BIA-funded schools, $8B will be allocated to Tribal governments with eligible expenses through the Department of the Treasury, in consultation with the Department of the Interior and Tribal governments.

V. Recommendations

1. Establish local network infrastructure governance, including a lead agency.

Network infrastructure development is a critical issue so there should be formal means for facilitating and monitoring it, especially when taxpayer funds are spent on network infrastructure and services. Governance is the process of ensuring that public investments achieve valued outcomes for the public. Building on the two recommendations above, Magellan Advisors recommends Napa County establish a formal process and inclusive body (a "Broadband Task Force") to acquire resources, guide development, and provide oversight for network infrastructure. We also recommend formally assigning responsibility for promoting and tracking broadband development to a County agency or department.

2. Build an "industrial strength" emergency detection, notification, and response system.

Napa County requires a highly reliable and resilient system for detecting emergency situations, notifying all impacted parties, and responding quickly and thoroughly, including clean-up and recovery. We recommend initially focusing efforts on "last mile" access for remote, under-served areas. Make sure they are connected then work backward, so to speak, to more central, populated areas, expanding and strengthening network infrastructure along the way. This approach is basically "hardest first." Solving the connectivity problems for remote, under-served areas addresses the most critical gaps first. In the process, you develop models and solutions that can be scaled for areas with more population and users. It also provides flexibility for scaling up the capacity of core network infrastructure.

Public Safety, Public Utilities, and Public Works, along with Economic Development, Education, and Healthcare, should be engaged as key stakeholders. There is substantial funding available for public safety focused projects. Public Utilities and Public Works departments have critical interests and roles in emergency detection, preparedness, and response. Their infrastructure often parallels and increasingly requires network infrastructure, and these entities have substantial resources. Economic Development, Education, and Healthcare are in a similar situation: Mass emergencies are huge threats to them.

3. Take an active, comprehensive, regional approach to network development.

All of the opportunities identified by Magellan Advisors are complementary and some depend on others. These opportunities directly enable economic development, education, health, and public safety. Indeed, a wide range of operations and plans require network connectivity. Napa County's businesses, cities, institutions and residents all depend on network connectivity so they should be considered, if not actively involved, in broadband development.

The wine and tourism-related industries that form the bedrock of the regional economy straddle political boundaries, as do disasters and emergency situations. They have many assets, employees and well-heeled supporters. These facts increase the criticality of emergency preparedness and responses. It follows that financial resources should be abundant and reasonably easy to mobilize if the network obviously reduces risks to these sectors.

Beyond emergencies, we recommend including network infrastructure as a consideration in everything from agriculture to zoning. We also recommend engaging the full range of community stakeholders in planning networks. Network service companies should be informed about and involved in planning processes. By the same token, Napa County should be involved in, or at least provide guidance for, network planning by private companies. Napa County has too much riding on their decisions.

Most importantly, we recommend acting on these opportunities. There are resources available, and there are critical gaps and needs. Establish network development goals and objectives by acting on other recommendations of this report, and begin working on them. To be most effective and efficient, integrate that action into existing processes and projects.

4. Prioritize opportunities based on Napa County strategic goals and issues.

While the opportunities described in this report are complementary, resources are limited. It is not practical to pursue all of these opportunities simultaneously. Even specific opportunities will need to be executed in phases. As described above, we recommend putting emergency connectivity for remote areas at the top of the priority list for network development. Beyond that, we recommend prioritizing the opportunities based on their potential impacts on key goals and issues for the County.

For example, if providing baseline internet access for education and workforce in under-served areas is a top priority, then the focus should be on network opportunities B.2 and B.5. Opportunities A.1 through A.3 will provide greater overall capacity and reliability, while B.1 and B.2 will most effectively increase the geographic availability of network connectivity. Our information gathering and analysis focused on wildfire emergencies, but there are a range of other high-priority programs or projects that could benefit from improved network infrastructure.

Where to invest public resources is a strategic decision that should align with and support broader local government strategy. Top county leaders should participate in the prioritization, and those charged with acting on these opportunities should clearly understand how they align with the County's strategic goals. We recommend an inclusive process in which key issues and major goals are presented along with these opportunities and participants directly influence decisions on how to develop Napa's network infrastructure.

5. Engage stakeholders in implementation.

Several County stakeholders are already working on a number of the opportunities in this report. Others are poised to help. Several neighboring communities have similar issues and needs, and there are state, regional, and national entities that could take a stake in Napa's network development. The wine industry, in particular, has a regional presence with a substantial resource base, and network connectivity is a critical issue for this sector. Several other sectors such as Education, Healthcare, Hospitality and Tourism, fit this bill, too. Napa County has a huge general opportunity to tap these stakeholders to develop network infrastructure.

Many of these opportunities simply require a catalyst, which Napa County could easily provide. Other opportunities involve direct public investment. Return on those investments, and capacity to make them, depends on citizens, institutions, private enterprises, and visitors to Napa County. Magellan Advisors recommends Napa County develop organizational capacity to engage these stakeholders around network infrastructure and services. Most of these opportunities may require little or no County investment beyond catalyzing action by its stakeholders.

6. Develop consistent broadband-friendly policies across jurisdictions.

County policies and processes can create barriers to or facilitate investment in network infrastructure. Inconsistent policies regarding local cities and neighboring

counties impedes investment, particularly by smaller, more entrepreneurial and innovative companies. Some outcomes that are important to the public interest, such as connectivity in sparsely populated areas and increasing the resilience of network infrastructure, simply aren't economical for private companies. Local policies can change this calculus to incent private investment while minimizing the need for public investment.

The scope of this assessment did include local policies. But, input from stakeholders and a cursory review of the County code suggests there may be multiple opportunities to promote network development via policy changes. Regulations related to siting towers may be onerous and/or overly complex. There may be ways to better use public properties and rights-of-way for network infrastructure. Various unrelated projects, particularly for transportation and utilities, could be opportunities to develop network infrastructure very economically. The County can use its purchasing power, especially in conjunction with its cities and public institutions, to direct and even drive private investment.

Magellan Advisors recommends Napa County:

1. lead an effort to review local policies across various jurisdictions to ensure they are consistent and sensible.
2. Look for best practices and proven models from other places.
3. Approach network infrastructure as an investment, and the companies that deploy it as investors.
4. Revise policies and processes as appropriate to promote and protect these investments.

7. Identify funding sources to fund projects and initiatives

There are a variety of funding opportunities on the horizon for Napa County, however these will take planning, coordination and execution by staff member(s) at the County. As stated in Recommendation 5, the County should create a Broadband Task Force formally assigned with the responsibility for promoting and tracking broadband development. A member of the Broadband Task Force should be responsible for organizing, coordinating, and executing grant opportunities on behalf of Napa County.

A number of the grant opportunities require coordination among Napa County departments or entities. The Task Force members should begin discussions with the various departments to determine viability. CDBG and CDBG-DR are normally provided to Community Development and Public Safety entities, discussion around

allocation of the grant funds could help Napa County in determining opportunities of using these funds for the Vine Networks. Additionally, the Governor's PSPS appropriations for 2021 and HSGP 2020 will both require coordination with Public Safety officials for grant submittals. It will be necessary to work with water utilities on joint trench opportunities prior to determining the application for the RUS Water and Wastewater Disposal Loan and Grant fund, similarly Traffic and/or Transportation departments should be involved in determining opportunities for the DoT BUILD Program applications. The RUS State Director can provide more information for the water projects, while Napa will be targeting 2021 for roadway projects as the 2020 BUILD grant date has passed (May 18th). Lastly, the CASF Rural and Urban Regional Broadband Consortia Grant Account provides funding up to $150K until December 31, 2022. Sonoma and Mendocino Counties are members of the North Bay/North Coast Broadband Consortium. Napa could look to join them in their endeavors and seek funding for planning a regional network serving the tri-county area.

The RDOF, ReConnect and CASF funding applications require a provider partner. Napa County would need to move swiftly to a competitive RFP process to select an internet services provider to provide last mile services. The RFP and agreement process can take six to twelve months to complete. The RDOF reverse auction will be taking place in October 2020, while ReConnect applications would target April 2021. In addition, having detailed plans and agreements in place assist in application for and award of funding opportunities such as these. This document should assist the County in making a more successful application for Napa County.

Some opportunities require contacting California representatives for more information regarding funding opportunity and/or availability – California Infrastructure and Economic Development Bank "IBank", EDA Public Works and EA Grants, and CARES Act Grant funding.

In summary, there are vast amounts of grant funding available that Napa County could access. However, the processes can be quite arduous. It will be important to lay out the infrastructure and funding opportunities, align them with the County's priorities, and coordinate with a variety of departments and entities to move these processes forward. Napa County should find an individual or consulting partner that could be tasked with the coordination, planning and application processes associated with the funds that are available to ensure the activities are successful.

Appendix A: Other Opportunities

A. Other Infrastructure

- Integrate traffic management infrastructure, particularly for mass evacuation but also to facilitate commuting and visitors.
- Develop interconnected electric micro-grids with alternate energy resources and shared battery back-up.

B. Policy

- Establish consistent broadband-friendly policies across all jurisdictions.
- Relax tower siting regulation and implement systematic cell siting policies and program for public properties, ideally capitalizing on utility and other infrastructure investments.
- Create an "Emergency hub" program to designate locations where people should go in emergencies for communications, connectivity, and power.
- Adopt an integrated, comprehensive strategy for communications-power reliability.

C. Systems

- Adopt simulcast radio for all jurisdictions, with channels allocated for inter-agency communications.
- Coordinate interoperable and integrated radio systems for all agencies and jurisdictions.
- Deploy mobile radio repeaters to be used by CERT members in emergencies to extend current radio infrastructure or fill in for failures.
- Create an open, integrated valley-wide sensor network for the range of natural hazards—earthquake, fire, flood, landslide, etc.
- Establish a countywide integrated emergency alert system, including sirens,[35] visible signals, and other physical mechanisms in addition to Nixle, ReddiNet, and other digital communications media that the County currently uses.
- Integrate CAD, RMS, and other key systems via regional network.

[35] We understand that a siren system is being planned as of the final version of this report.

Appendix B: Stakeholders Engaged

A. First Responders

- Cities
  - American Canyon Fire Protection District
  - Calistoga Police Department
  - Napa Police Department
- Napa County
  - Community Emergency Response Team (CERT)
  - Fire Department
  - Health and Human Services/EMS
  - Office of Emergency Services
  - Sheriff's Office
- State of California
  - California Highway Patrol

B. Other agencies

- Cities
  - Calistoga Mayor
  - Napa Public Works Department
  - St. Helena Public Works Department
  - Yountville Public Works Department
- Napa County
  - IT Department (including Communications Group)
  - Library
  - Napa Open Space District
  - Napa Valley Transportation Authority
  - Public Works Department
- Schools
  - Napa Valley Unified School District

C. Other Stakeholders

- Adventist Health St. Helena
- Auberge Resorts
- Catholic Charities
- Illumination Technologies
- Napa Valley COAD

- Napa Valley College
- Napa Valley Community Foundation
- Napa Valley Expo
- Napa Valley Vintners
- Napa Wine Growers
- Pacific Union College
- Queen of the Valley Medical Center
- Robert Craig Winery
- Up Valley Family Centers
- Valley Internet
- Visit Napa Valley