

# **Mendocino County Digital Infrastructure Projects**

*A multiphase approach to implement  
Mendocino County Digital Infrastructure Plan: 2019 – 2025*

**December 2020**

**TABLE OF CONTENTS**

**EXECUTIVE SUMMARY 4**

**INTRODUCTION 6**

MENDOCINO COUNTY BACKGROUND 6

DEVELOPMENT OF THE DIGITAL INFRASTRUCTURE PLAN 6

IMPLEMENTATION OF THE DIGITAL INFRASTRUCTURE PLAN 7

**PROJECT PLANNING ASSUMPTIONS 8**

**BROADBAND NETWORK OVERVIEW 9**

OVERVIEW OF THE NETWORK ARCHITECTURE 9

THE THREE LAYERS OF NETWORK ARCHITECTURE 11

**PROJECT #1 DESCRIPTION 13**

TARGETED COMMUNITIES AND UNSERVED HOUSEHOLDS 13

MEDIAN INCOME, POVERTY AND UNSERVED HOUSEHOLDS 14

PROJECT #1 NETWORK ARCHITECTURE 15

MANAGEMENT, DESIGN, COST, AND TIMELINE 19

**PROJECT #2 DESCRIPTION 20**

TARGETED COMMUNITIES AND UNSERVED HOUSEHOLDS 20

MEDIAN INCOME, POVERTY, AND UNSERVED HOUSEHOLDS 21

PROJECT #2 NETWORK ARCHITECTURE 22

MANAGEMENT, DESIGN, COST, AND TIMELINE 26

**PROJECT #3 DESCRIPTION 26**

TARGETED COMMUNITIES AND UNSERVED HOUSEHOLDS 26

MEDIAN INCOME, POVERTY AND UNSERVED HOUSEHOLDS 27

PROJECT #3 NETWORK ARCHITECTURE 28

MANAGEMENT, DESIGN, COST, AND TIMELINE 32

**THANK YOU 32**

## MAPPING, DATA, AND FIGURES

### MAPPING

Map 1: Mendocino County Broadband Network Backbone	12
Map 2: Project #1 Backbone, Last Mile, and Cabinets	17
Map 3: Project #1 Backbone, Last Mile, and Cabinets	18
Map 4: Project #2 Backbone, Huts, and Cabinets	24
Map 5: Project #2 Backbone, Huts, Last Mile, and Unserved Households	25
Map 6: Project #3 Backbone, Huts, and Cabinets	30
Map 7: Project #3 Backbone, Last Mile, Cabinets, and Unserved Households	31

### DATA

Table 1: Project #1 Broadband Availability Data	13
Table 2: Project #1 Income and Poverty Statistics Overview	14
Table 3: Project #1 Income and Poverty Statistics by Census Block Group	14
Table 4: Project #2 Broadband Availability Data	20
Table 5: Project #2 Income and Poverty Statistics Overview	21
Table 6: Project #2 Income and Poverty Statistics by Census Block Group	21
Table 7: Project #3 Broadband Availability Data	26
Table 8: Project #3 Income and Poverty Statistics Overview	27
Table 9: Project #3 Income and Poverty Statistics by Census Block Group	27

### FIGURES

Figure 1: Network Architecture High Level Overview	10
Figure 2: Project #1 Network Architecture Schematic	16
Figure 3: Project #2 Network Architecture Schematic	23
Figure 4: Project #3 Network Architecture Schematic	29

## EXECUTIVE SUMMARY

The purpose of this document is to provide the County of Mendocino with a high-level overview of three broadband deployment projects. These projects are construction-ready, allowing internet service providers to use each project to apply for broadband infrastructure grant funding. The projects are designed to collectively serve Mendocino County's remaining unserved premises<sup>1</sup> to a resilient and future proof underground fiber-optic based network. An overview of these projects is highlighted in the sections below.

### THREE-PROJECT OVERVIEW

**Management and Design:** The North Bay North Coast Broadband Consortium (NBNCBC) and hired consultants planned, designed, and desktop-engineered Projects #1 #2 and #3 for implementation, as part of the *Mendocino County Digital Infrastructure Plan: 2019-2025*. NBNCBC's Mendocino team and the hired consultants collaborated with Hunter Communications to plan, design, and desktop-engineer Project #1 for implementation. If Project #1 is funded, Hunter Communications will have right of first refusal to implement, manage, and operate the infrastructure and services of Projects #2 and #3, for the sake of continuity. Otherwise, the County will select a provider to implement, manage, and operate the infrastructure and services of Projects #2 and #3.

**Targeted Unserved Households:** The three deployment projects in the *Mendocino County Digital Infrastructure Plan: 2019-2025* are targeted to reach 8,586 of these unserved households. Project #1---3,943 unserved households; Project #2---2,716 unserved households; and, Project #3---1,927 unserved households.

**Network Architecture:** The approach is to bring up to 1 Gbps symmetrical Internet connectivity and voice service to all homes, businesses, towers, and other institutions in the community areas via a robust underground fiber-based last-mile fiber distribution system. The projects have three infrastructure components - "Countywide Backbone"- 648 route miles; "Last-Mile Distribution Systems"- 1,129 route miles, and "Fiber to the Home (FTTH) Drops"-576 route miles.

**Estimated Capital Cost:** Project #1 - \$158,145,578; Project #2 - \$263,291,658; and Project #3 - \$110,347,182. The estimated cost to implement all three projects is **\$521,784,418**.

**Deployment Schedules:** The original deployment schedule for Project #1 assumed a start date of January 2021 and a completion date of January 2025 or a total of 48 months from start to finish, excluding time to process all necessary permits. Depending on the CASF decision for Project #1 and subsequent funding for Projects #2 and #3 the safe assumption is that it will take 48 months to implement each project.

<sup>1</sup> Defined as 6Mbps download and 1 Mbps upload by AB1665 legislation

## MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

### **Community Benefits:**

**Resilience** - By deploying fiber underground, as opposed to aerial, will provide better protected against wildfires, other unforeseen disasters, and outages.

**Tribes** - In addition to providing broadband access to 8,586 unserved households, this project will also serve Native American Tribes located within the County including: Manchester Band of Pomo Indians (Manchester), Round Valley Tribes and Reservation (Round Valley/Covelo), Cahto Tribe and Rancheria (Laytonville), Sherwood Valley Pomo Tribe and Rancheria (Willits), Coyote Valley Band of Pomo Indians (Redwood Valley), Pinoleville Pomo Nation (Ukiah), and Hopland Band of Pomo Indians (Hopland).

**Low-Income** - The total weighted average median household income of the population being served by these projects is below the \$52,500 CASF standard. According to official CPUC data, these projects serve, 3,728 or 43.3% of the households are considered below 200% of Federal Poverty. This project provides broadband services to these qualified households at no more than \$14.99 per month and at speed standards of no less than 25 Mbps download and upload speeds.

**Closing the Digital Divide** - Finally, this project makes a significant contribution to the NBNBCB region achieving the State's 98% access goal for all regions throughout the state.

**NOTE:** This document provides an overview of all three-projects. A more comprehensive and detailed plan for each project, including all relevant data, is available on the Mendocino County Digital Infrastructure Plan: 2019-2025 website.

## INTRODUCTION

### MENDOCINO COUNTY BACKGROUND

Mendocino County is one of the original counties of California created in 1850 at the time of statehood. Located on the north coast of California, it is north of Sonoma County and south of Humboldt County, with Lake, Trinity, and Tehama Counties to the east. The 2019 population was estimated to be 89,009 by the CPUC, where 29,246 resided in the four incorporated cities of Ukiah, Willits, Fort Bragg, and Point Arena, 15,322 lived in 19 census-designated places, and 44,441 were scattered across 28 unincorporated zip code areas.

According to the official *2019 CPUC Data Availability and Mapping Report*, there are an estimated 26,595 out of 35,361 households in Mendocino County, or 75.2 %, served by broadband services that provide a minimum of 6 Mbps download and 1 Mbps upload. Out of California's 58 counties, at 75.2% served households, Mendocino County has the 7th lowest broadband access percentage at the current California speed standards of 6/1 Mbps. AB 1665 called for each state region to attain 98% broadband access by the end of 2022. For Mendocino County to reach 98%, we must deploy infrastructure and services to an additional 8,059 households.

### DEVELOPMENT OF THE DIGITAL INFRASTRUCTURE PLAN

As part of a California Advanced Services Fund (CASF) Regional Consortia planning grant (2017-2018) awarded to the North Bay/North Coast Broadband Consortium (NBNCBC), the Mendocino County team used funding from the consortium grant, as one of NBNCBC's members, to develop the ***Mendocino County Digital Infrastructure Plan: 2019 - 2025***.

An assessment of the broadband availability found there are at least 14 different internet service providers in Mendocino County providing fiber optic cable internet, DSL, fixed wireless, dial-up, and satellite internet. The two largest providers of fiber-based Internet services are AT&T and Comcast, mostly in the more concentrated population areas. Sonic has recently come into Mendocino, offering fiber-based services. In addition to these three corporations, several smaller fixed wireless internet service providers, including North Coast Internet, Mendocino Community Network, 101 Netlink, Willits Online, Further Reach, SeaKay Broadband, and Ukiah Wireless serve niche markets/communities.

## IMPLEMENTATION OF THE DIGITAL INFRASTRUCTURE PLAN

The stated goal of the *Mendocino County Digital Infrastructure Plan: 2019-2025* is to:

“develop the digital infrastructure needed to have available and affordable high-speed internet access for 98% of households by 2025. High-speed Internet, for the purposes of this plan is defined as 100 megabits per second (mbps) download speed and 20 mbps upload speed. This is an ambitious goal, but critical for the economic future of Mendocino County and through advancements in technology it is possible.”<sup>2</sup>

The *Plan* has four long-term objectives:

- 1) Develop Projects to Deploy Fiber-based and Fixed Wireless Technology to Remote and Rural Areas of Mendocino County
- 2) Create Policies that Local Governments can Support to Improve the Network
- 3) Develop Programs to Improve Equity and Inclusion
- 4) Develop Projects that Improve Resiliency and Redundancy in Digital Infrastructure Systems

With a new CASF Regional Consortia planning grant awarded to NBNCBC in 2019, the Mendocino County Team focused on Objectives 1 and 4 of *the Mendocino County Digital Infrastructure Plan: 2019-2025*. In 2020, the major result has been the development of three project plans ready for implementation contingent upon receiving grants from the CASF Infrastructure program and other sources. These projects will deploy broadband infrastructure and services to provide broadband access to unserved households in several communities throughout Mendocino County. These project areas include:

**Project #1:** Round Valley/Covelo/Dos Rios, Laytonville, Willits/Brooktrails, Hopland, and parts of Ukiah/Calpella/Redwood Valley

**Project #2:** Piercy, Leggett, Branscomb, Westport, Cleone, Fort Bragg, Caspar, Mendocino, Little River, Albion, Elk, Manchester, Point Arena, Anchor Bay, Gualala, Comptche, Philo/Navarro, Boonville, and Yorkville (Whitethorn will be developed later as a separate sub-project)

**Project #3:** Redwood Valley, Potter Valley, Talmage, Calpella, Ukiah, and outlying areas in Projects #1 and #2

When all three projects are completed, nearly 9,000 unserved households will have broadband access plus hundreds of small businesses. There will also be a technologically advanced, robust, and diverse fiber-based infrastructure around the County, as depicted on the maps included in this document.

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<sup>2</sup> <http://www.edfc.org/wp-content/uploads/2015/12/Final-Digital-Infrastructure-Plan-for-Mendocino-County-12.31.18.pdf>

## PROJECT PLANNING ASSUMPTIONS

The following are the key assumptions that guided the Mendocino County team in developing the three project plans:

- One hundred (100%) percent of the unserved households are to be connected via underground fiber installation.
- This underground fiber design is to preserve and “future proof” the infrastructure during wildfires and other unforeseen disasters. According to an assessment by Magellan Advisors for Napa County, 30 percent of the telecommunications infrastructure was damaged by the 2017 wildfires. The underground infrastructure was not damaged.<sup>3</sup>
- The deployed fiber-based infrastructure is only designed to reach and serve the unserved households, as defined by the official 2019 CPUC Data Availability and Mapping Report. Currently served households were deemed off-limits.
- These projects do not use backhaul or connect to other providers’ facilities for the countywide backbone or last mile distribution system. The cable-based facilities of COMCAST and the copper and fiber-based facilities of AT&T are private and they do not share with other providers; most of the other providers have private fixed wireless networks that they do not share with competitors. In addition, much of the existing AT&T infrastructure is dilapidated and requires replacing, including poles.
- The fiber approach in all three project plans is to provide up to 1 Gbps symmetrical Internet connectivity and voice service to all unserved households, plus hundreds of small businesses, anchor institutions, and other institutions in the all community areas, via a robust fiber network. Additionally, this network can provide Internet backhaul for WISP’s.
- The projects recognize that Eighty-two (82%) of the 5,000 businesses in the County have nine (9) or fewer employees. As small businesses, they have unique broadband needs.
- The three projects will provide infrastructure and services to the Eight (\*) Native American Tribes located in the County.
- The maximum residential service download and upload speeds customers may subscribe to are: **1000 Mbps**. The standard offering will be **100 Mbps Download and 100 Mbps Upload**.
- For “Low-Income” customers (those below the poverty line as defined by CASF) will receive service with a speed standard no less than **25 Mbps** Download and Upload speeds.

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<sup>3</sup> <http://www.mendocinobroadband.org/wp-content/uploads/Napa-County-Fiber-Infrastructure-Engineering-Assessment-Report.pdf>



## BROADBAND NETWORK OVERVIEW

### OVERVIEW OF THE NETWORK ARCHITECTURE

The approach is to offer up to 1 Gbps symmetrical Internet connectivity and voice service to all homes, businesses, towers, and other institutions in the community areas via a robust last-mile fiber distribution system. The provider will design, build, and operate the entire network by providing all the necessary equipment to light the last-mile network. The primary goal is to provide a reliable high-speed Internet network to all potential users in the communities at a competitive price, encouraging economic development, providing excellent customer service, and doing so in a way that minimizes risk.

Through partners (cable manufacturers, equipment providers), the provider will detail design and build the network utilizing a passive optical network for residential and small business, and active Ethernet for larger businesses. We will utilize this approach to create a state-of-the-art network design with the future in mind. This approach will minimize downtime caused by potential wildfires and other threats, while taking into consideration future bandwidth needs and technological advancements.

The plan for each of the communities is to have either a hut, XPON cabinet, or a passive splitter cabinet, based upon the size of the community and distance reach of optical port cards. In each project, there will be locations with huts or passive XPON cabinets<sup>4</sup>. Both huts and XPON cabinets will be a fully self-contained (backup power, and HVAC/heat exchangers). These locations will serve as the aggregated data center where we plan to place conduit, fiber, fiber distribution terminals, core and edge routing, and Optical Line Terminals (OLT). The cabinets will be supplied with eight-hour back-up power and with quick connect portable generator capabilities. However, there may be a new PUC requirement forthcoming that would require 72 hours of back-up power. All electronics are addressed later in this document.

At each end-user location, we plan to place a fiber drop wire connected from the distribution cable terminal to a point on each location, which typically is a fiber clamshell termination point. From the termination point, we will perform in-house fiber cable installation to a neutral location in the home. At this neutral location, we will place an integrated optical network (ONT) termination device with backup power that provides both fiber light termination and indoor Wi-Fi capabilities; additionally, this device will terminate voice services. This device will have four Ethernet ports and one voice jack in the event a customer wants hard-wired connectivity into the Internet.

For larger businesses, we will provision a dark or lit fiber service using traditional industry interconnection equipment (small router). The intent is to enable wireless carriers to build out their networks to enhance voice and data connectivity to most rural and neglected areas beyond our fiber cable reach.

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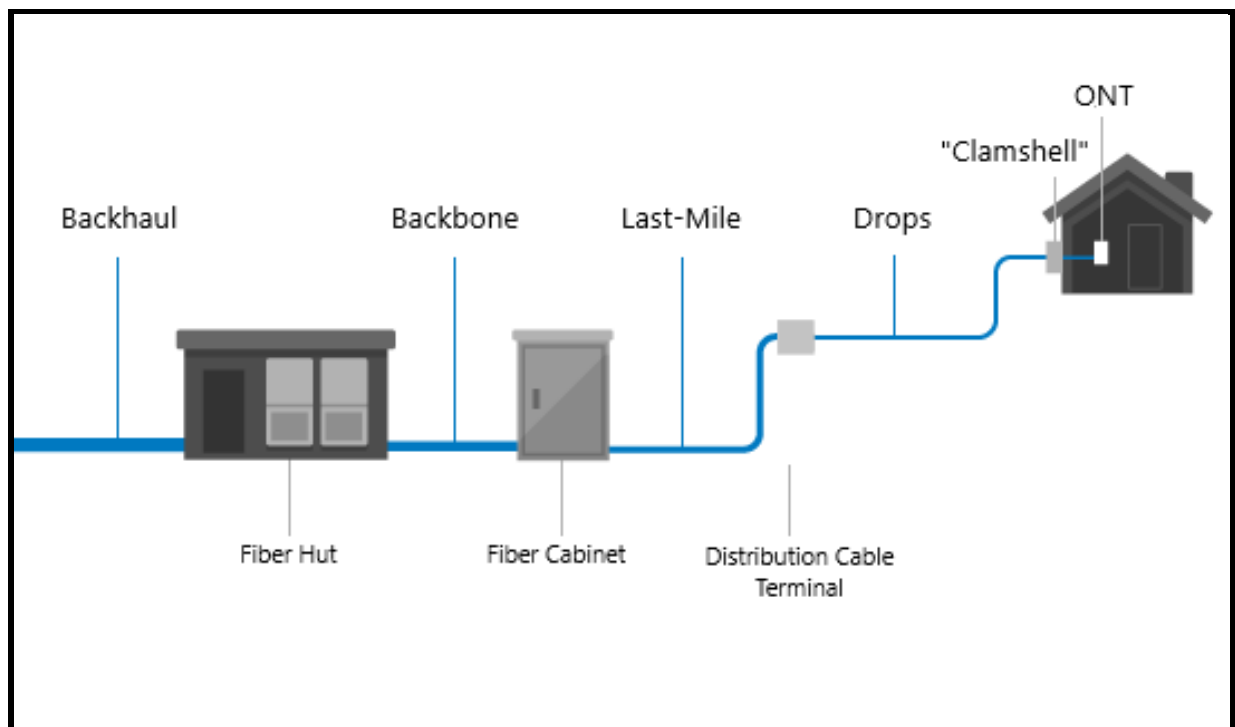
<sup>4</sup> The passive cabinets do not require power as there are no electronics, just fiber splitters.

## MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

Internet peering and voice service (diverse 911 path to Mendocino County PSAP) is planned to be from primary network hut locations in Ukiah (east), Laytonville (north), and Cloverdale (south) as depicted in Project 1. At these locations, we will install fiber and routing equipment that will provide much needed diverse routing ensuring diversity for 911-service as well as internet backhaul.

We have identified carriers that can provide 10 Gbps Internet backhaul capacity and higher when needed, which will provide much needed diversity for this important component of our project. Backhaul providers will be chosen through an open quote process when we get closer to activating the network; pricing varies greatly and is expected to be lower as time goes by. Internet backhaul is designed to be reliable, reduced cost, improve performance and utilization, and predictable performance via purchasing a small amount of bandwidth, but with bursting capabilities on this upstream/downstream component of the network.

*Figure 1: Network Architecture High Level Overview*



## THE THREE LAYERS OF NETWORK ARCHITECTURE

It is important to note that some terms used in Project #1 to identify network architecture changed for Project #2 and #3. For example, in the individual plan for Project #1, there are two main infrastructure components identified as, “Core Arteries and Distribution” and “Last-Mile and Drops”. These two network layers in Project #1 are similar to the “Countywide Backbone” and “Last Mile Distribution” network layers used in Project #2 and #3. For the purpose of consistency throughout the remainder of this document, the network layers for all three projects reference “Countywide Backbone”, “Last-Mile Distribution Systems”, and “Fiber to the Home (FTTH) Drops”. The maps that are included in this document contain these three layers and conceptually represent the planned build-out to reach the unserved households in grant eligible census blocks across the communities listed in each of the project plans.

**Countywide Backbone:** The foundation of the Mendocino County Broadband Network is the Countywide Backbone for all three projects. Map 1 below depicts the entire Countywide Backbone that will have 648 route miles. Project #1 Backbone is identified in **RED**, Project #2 Backbone in **BLUE**, and Project #3 Backbone in **BLACK**.

**Last-Mile Distribution System:** Connected to each project’s countywide backbone is a last-mile distribution system that extends to a fiber terminal in close proximity next to each unserved household. The Last-Mile Distribution System is shown in **RED** on each project plan map. The project maps also show the locations of fiber huts (**GREEN** dots) and cabinets (**RED** dots) where network equipment is located.

**Fiber to The Home (FTTH) Drops:** Connected to each last-mile distribution system is an average drop length of 300-400 feet that terminates at each of the unserved households via a connection to an active or passive cabinet or hut, and relationship to network host electronics. Each project’s maps shows the approximate locations of the unserved households identified as **YELLOW** dots.

# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

Map 1: Mendocino County Broadband Network Backbone



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## PROJECT #1 DESCRIPTION

### TARGETED COMMUNITIES AND UNSERVED HOUSEHOLDS

Project #1 focuses on strengthening the economic vitality in the rural communities and surrounding areas of Round Valley/Covelo/Dos Rios, Laytonville, Willits, and Hopland in Mendocino County. Project #1 will deploy broadband access to **3,943 unserved households** currently with slow service or no service in unserved census blocks. These five community areas include six Native American Tribes including: Round Valley Tribes and Reservation (Round Valley/Covelo), Cahto Tribe and Rancheria (Laytonville), Sherwood Valley Pomo Tribe and Rancheria (Willits), Coyote Valley Band of Pomo Indians (Redwood Valley), Pinoleville Pomo Nation (Ukiah), and the Hopland Band of Pomo Indians (Hopland).

There are 5,689 addresses including 4,610 housing units in the following list. The differential of 1,079 entries can be attributed to addresses of businesses and other non-residential locations. We based this estimate on a master address point data set provided by Mendocino County. While the data set has been determined to be incomplete, the current data set provides the most accuracy. The geographic locations of the households and housing units within the project area are provided as a list in the CASF prescribed format. The list of geographic locations for Project #1 is available on the **Mendocino County Digital Infrastructure Plan: 2019-2025** website.

*Table 1: Project #1 Broadband Availability Data*

Community Areas	2019 Est. Population	Number of Households	HHs Served	Unserved HHs
<b>Covelo/Dos Rios</b>	2,591	1,041	0	991
<b>Laytonville</b>	2,415	1,017	292	720
<b>Willits/Brooktrails</b>	13,716	5,533	3,979	1,501
<b>Ukiah +++</b>		See Project #3		328
<b>Hopland</b>	17,66	645	120	403
<b>Project #1 Totals</b>	<b>20,488</b>	<b>8,236</b>	<b>4,391</b>	<b>3,943</b>

## MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

### MEDIAN INCOME, POVERTY AND UNSERVED HOUSEHOLDS

As shown in Table 2 the weighted median household income for this project area is \$42,780. This is well below the \$51,500 stipulated for this CASF Infrastructure Program. Also, there are 1,955 of the targeted households estimated to be in poverty. In essence, there is a 49.6 percent weighted average of the households at 200 percent below Federal Poverty Level.

*Table 2: Project #1 Income and Poverty Statistics Overview*

Total Project Area - Weighted Average Percent Households below 200% of Federal Poverty Level	Total Project Area - Weighted Average MHI	Total Project Households	Total Project Estimated Households in Poverty
49.6%	\$42,780	3,943	1,955

The 3,943 targeted unserved households in this project are located in 30 Census Block Groups. Table 3 shows the: 1) percentage of households below 200% of Federal Poverty Level, 2) median household income, and 3) the number of eligible households.

*Table 3: Project #1 Income and Poverty Statistics by Census Block Group*

Census Block Group	Percent Households below 200% of Federal Poverty Level	Median Household Income	Project Households Eligible - TOTAL
060450101001	50.5%	\$45,750	232
060450101002	67.3%	\$32,875	325
060450101003	59.2%	\$35,938	413
060450102001	39.3%	\$50,299	258
060450102002	49.0%	\$28,021	13
060450102004	17.2%	\$53,341	163
060450102005	56.7%	\$32,962	356
060450106001	37.8%	\$53,304	458
060450106002	51.1%	\$45,670	226
060450106003	13.7%	\$47,181	35
060450106004	49.0%	\$49,185	413
060450107001	70.0%	\$30,333	33
060450107002	16.0%	\$66,520	7
060450107003	70.3%	\$31,528	27
060450107004	53.5%	\$0	13

## MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

060450107005	61.9%	\$34,511	63
060450107006	45.0%	\$20,707	56
060450107007	59.4%	\$0	122
060450108014	36.8%	\$57,045	55
060450109002	24.2%	\$48,889	2
060450109003	55.4%	\$38,224	3
060450113001	60.1%	\$27,007	14
060450113002	46.9%	\$52,935	19
060450115002	38.3%	\$56,827	1
060450115005	42.7%	\$38,516	68
060450116001	40.3%	\$0	30
060450116003	64.4%	\$27,353	61
060450117005	63.4%	\$80,500	1
060450118001	32.0%	\$62,708	240
060450118002	46.8%	\$51,750	237

### PROJECT #1 NETWORK ARCHITECTURE

Project #1 will interconnect these five (5) communities with the communities in Project #2 and Project #3 via the designed countywide backbone and last-mile distribution systems. Maps 2 and 3 conceptually represent the planned build-out to the unserved households in Round Valley/Covelo/Dos Rios, Laytonville, Willits/Brooktrails, Hopland, and parts of Ukiah/Calpella/Redwood Valley. As mentioned previously, some terms used in Project #1 to identify network architecture changed for Project #2 and #3. For example, in the individual plan for Project #1, there are two main infrastructure components, “Core Arteries and Distribution” and “Last-Mile and Drops”. These two network layers in Project #1 are similar to the Countywide Backbone and Last Mile Distribution network layers used in Project #2 and #3 and will be referenced as such for continuity.

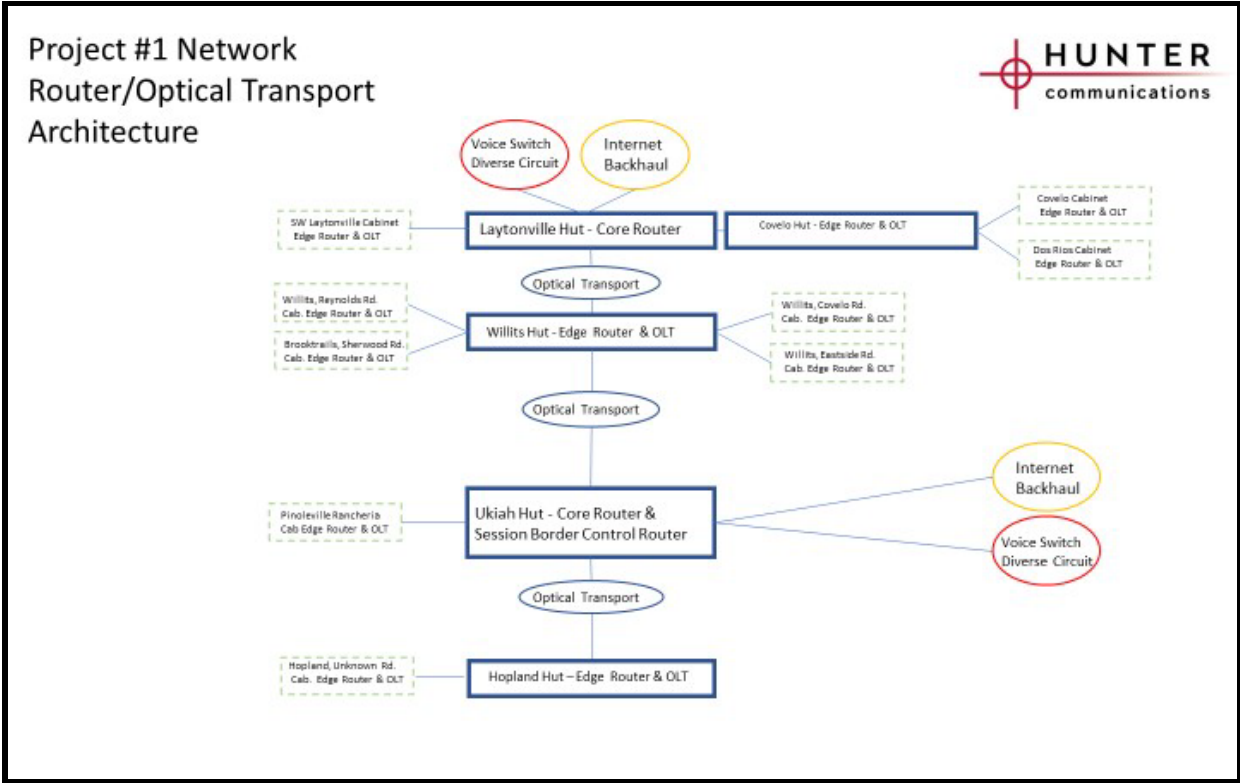
**Countywide Backbone and Last-Mile Distribution System:** As shown in **RED** in Maps 2 and 3, Project #1 has 474 miles of underground fiber backbone and last-mile routes. There are fiber huts located in Laytonville, Covelo, Willits, Ukiah, Hopland and Cloverdale. Fiber cabinets are also located in Laytonville (2 cabinets), Dos Rios, Willits/Longvale, Brooktrails (2 cabinets), and Nacomis Rancheria.

**Fiber to The Home (FTTH) Drops:** The average 300-foot drop between the distribution infrastructure and each of the 3,943 households adds another 224 miles.



# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

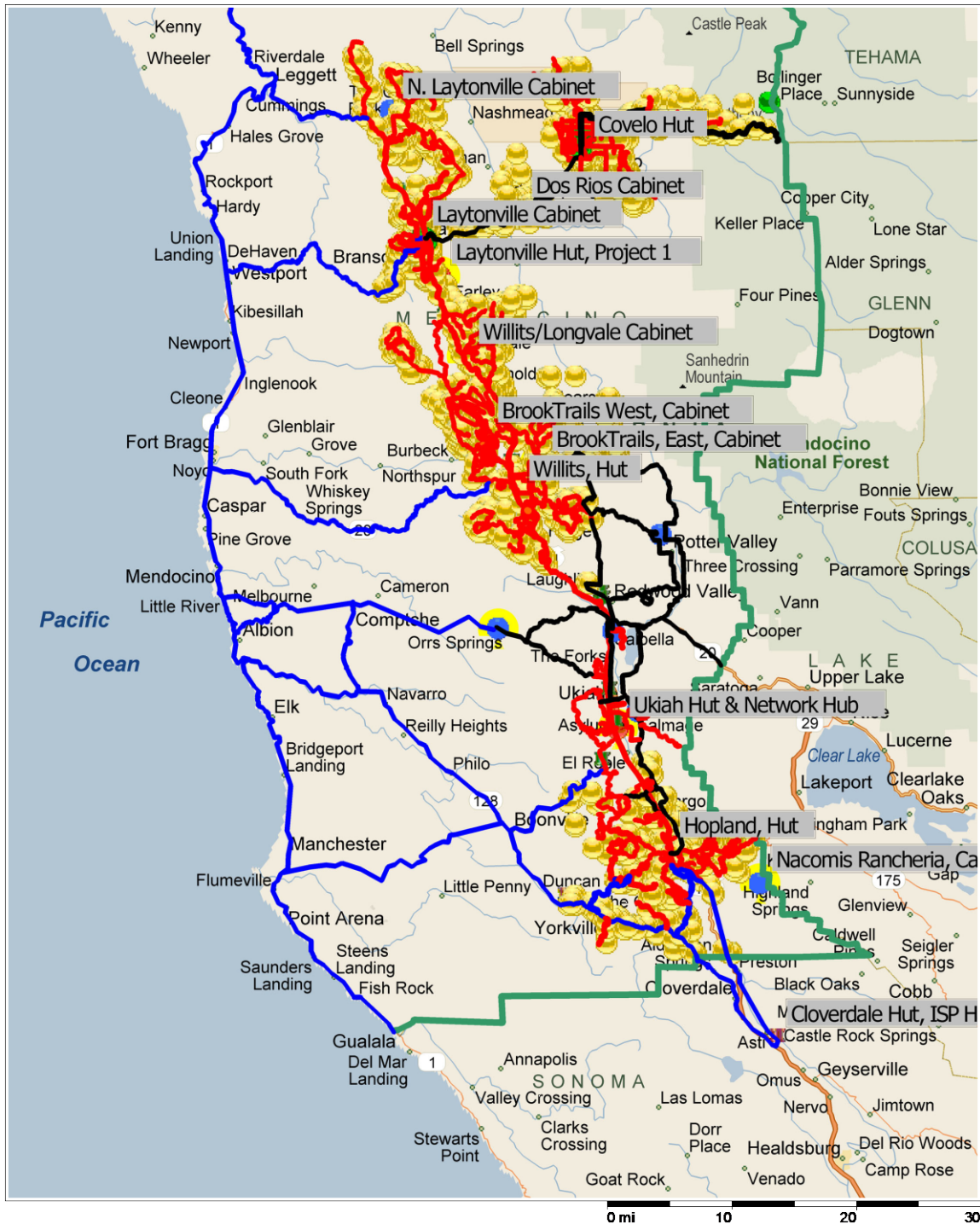
Figure 2: Project #1 Network Architecture Schematic





# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

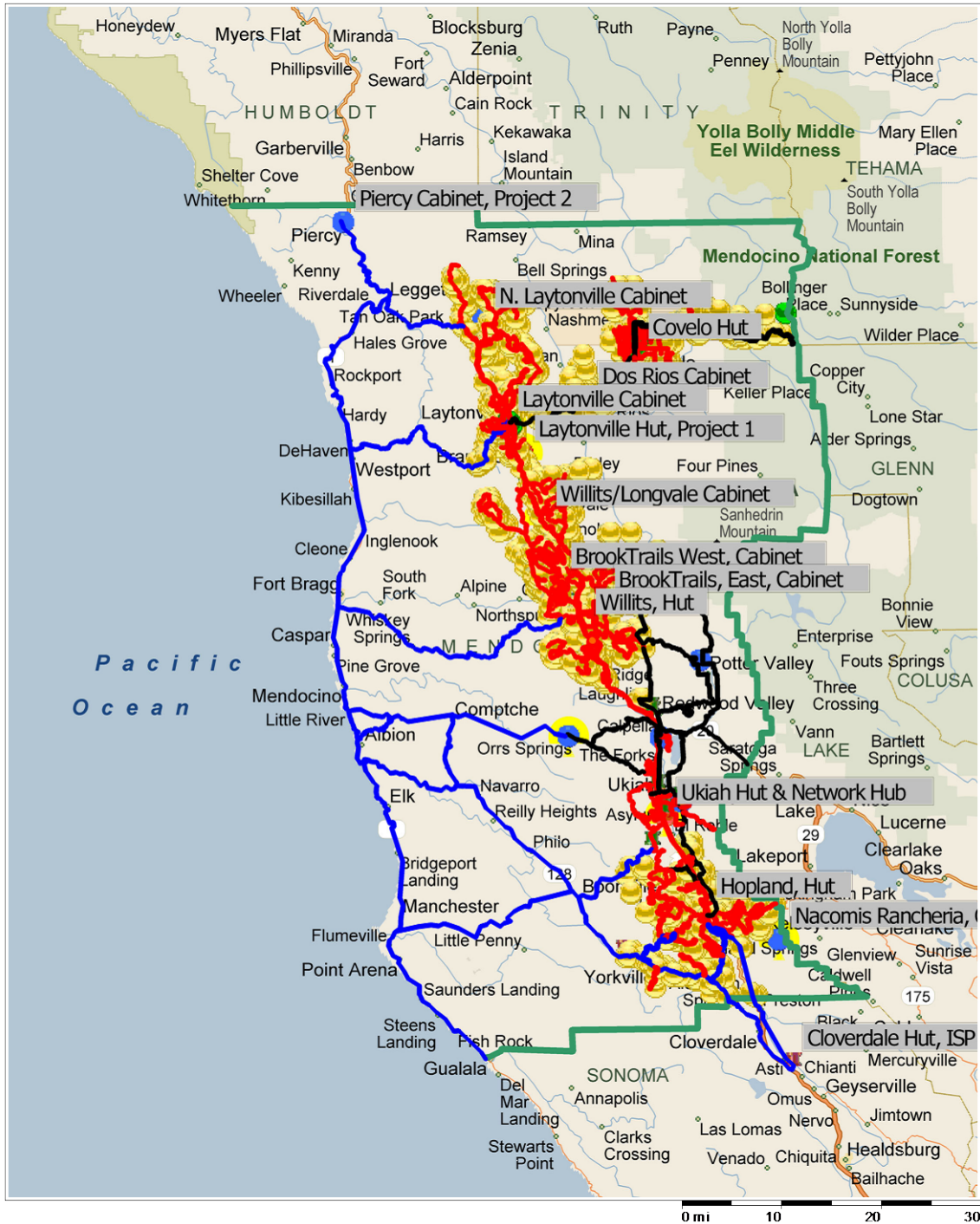
Map 2: Project #1 Backbone, Last Mile, Huts, and Cabinets



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# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

Map 3: Project #1 Backbone, Last Mile, Huts, and Cabinets



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## MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

### MANAGEMENT, DESIGN, COST, AND TIMELINE

**Management and Design:** NBNCBC's Mendocino team and the hired consultants collaborated with Hunter Communications to plan, design, and engineer Project #1 for implementation, as part of the *Mendocino County Digital Infrastructure Plan: 2019-2025*. Hunter is a Southern Oregon based Telecommunications Company, Competitive Local Exchange Carrier ((Phone Service) (CLEC)), and Internet Service Provider (ISP), with offices and facilities located throughout the State of Oregon and Northern California. Since 1994, Hunter has been involved in a variety of cabling and installation services to customers in Oregon and throughout the Pacific Northwest. Currently, Hunter provides high bandwidth and voice service needs to Siskiyou, Humboldt, and Shasta counties in Northern California.

**Estimated Capital Cost:** Project #1 is estimated to cost **\$158,145,578** to implement. Hunter Communications applied to the California Advanced Services Fund (CASF) Infrastructure Grant program on August 7, 2020 to implement, manage, and operate the infrastructure and services of Project #1. A summary of Hunter's grant application can be viewed on the CASF website; the full application is in the possession of Hunter and is not viewable to the public due to proprietary material. On November 13, 2020, CASF deferred award decisions for 39 of the 54 grant applications until March 31, 2021, including Hunter Communications' application.

**Deployment Schedule:** The "Project #1" build out schedule has ten simultaneous construction crews that will begin work in each of the primary communities, using an "inside-out/outside-in" strategy, working towards a meet in the middle; location TBD, and based upon construction crew productivity. Our priority location is the Ukiah Hut, location of Data Center, which will initially connect to the Internet backbone (CenturyLink, AT&T). Additionally, each community will be built out in three phases: **1.)** back towards Data Center from cabinet/hut, **2.)** distribution within each community from the hut or cabinet, and **3.)** rural or far-reaching, last-mile, distribution builds.

As segments are completed, crews will focus on "optical fiber cable drops" to the homes, businesses, and anchor institutions. A separate "drops crew" will follow "construction crew" installing drops from distribution cables, and a separate crew completing premise wiring, and turning-up service; this service activation process is dependent upon, and managed through, the service activation process.

Due to size of this project, we expect to complete Project 1 in 24 months, subsequently to CASF and CEQA approval. Obviously, schedule is dependent upon construction factors including weather, permits, and environmental challenges. The deployment schedule assumed a start date of January 2021 and a completion date of January 2025 or a total of 48 months from start to finish, including time to process all necessary permits. The project timeline may also change depending on when CASF makes the official grant award determination

## PROJECT #2 DESCRIPTION

### TARGETED COMMUNITIES AND UNSERVED HOUSEHOLDS

Project #2 focuses on strengthening economic vitality in the 19 communities and surrounding areas of Piercy, Leggett, Branscomb, Westport, Cleone, Fort Bragg, Caspar, Mendocino, Little River, Albion, Elk, Manchester, Point Arena, Anchor Bay, Gualala, Comptche, Philo/Navarro, Boonville, and Yorkville (Whitethorn will be developed as a separate sub-project). Project #2 will deploy broadband access to **2,716 unserved households** currently with slow service or no service in unserved census blocks. As can be seen in Table 4, Project #2 is targeting to reach 2,716 unserved households in 19 communities.

*Table 4: Project #2 Broadband Availability Data*

Community Areas	2019 Est. Population	Number of Households	HHs Served	Unserved HHs
Branscomb	282	120	0	120
Leggett	524	238	98	140
Piercy	312	156	60	96
Whitethorn*	45	24	0	
Westport	287	129	22	107
Cleone	624	287	260	27
Fort Bragg	14,327	5,998	5,749	249
Caspar	516	255	224	31
Mendocino	2,089	1013	917	96
Little River	936	523	379	144
Albion	980	457	295	162
Elk	343	164	0	164
Manchester	431	203	0	203
Point Arena	1,225	519	0	519
Anchor Bay	344	175	165	10
Gualala	1,926	844	662	182
Comptche	610	227	45	182
Philo/Navarro	1,236	457	291	166
Boonville	1,465	514	432	82
Yorkville	132	58	22	36
<b>Project #2 Totals</b>	<b>28,634</b>	<b>12,361</b>	<b>9,621</b>	<b>2,716</b>
Note: Whitethorn, with 24 unserved households, is not part of the community count for Project 2 plan due to the very remote location of this area. We will prepare a separate sub-project for Whitethorn to be included at a later date				



## MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

The geographic locations of the 2716 unserved households and housing units within the Project #2 area are provided in the CASF prescribed format. There are 4,232 addresses including 3,783 housing units in the list. The differential of 1,516 between households and addresses potentially attribute to addresses of businesses and other non-residential locations. We based this estimate on a master address point data set provided by Mendocino County. While the data set has been determined to be incomplete, the current data set provides the most accuracy.

### MEDIAN INCOME, POVERTY, AND UNSERVED HOUSEHOLDS

As shown in Table 5, the weighted median household income for this project area is \$52,131. This is below the \$52,500 stipulated for this CASF Infrastructure Program. In addition, there are 957 of the targeted households estimated to be in poverty. In essence, there is a 34.9 percent weighted-average of the households at 200 percent below Federal Poverty Level.

*Table 5: Project #2 Income and Poverty Statistics Overview*

<b>Total Project Area - Weighted Average Percent Households below 200% of Federal Poverty Level</b>	<b>Total Project Area - Weighted Average MHI</b>	<b>Total Project Households</b>	<b>Total Project Estimated Households in Poverty</b>
34.9%	\$52,131	2,716	957

The 2,716 unserved households targeted in this project are located in 24 Census Block Groups. Table 6 shows the: 1) percentage of households below 200% of Federal Poverty Level, 2) median household income, and 3) the number of eligible households.

*Table 6: Project #2 Income and Poverty Statistics by Census Block Group*

<b>Census Block Group</b>	<b>Percent Households below 200% of Federal Poverty Level</b>	<b>Median Household Income</b>	<b>Project Households Eligible - TOTAL</b>
060450102001	39.3%	\$50,299	4
060450102002	49.0%	\$28,021	206
060450102003	54.3%	\$77,386	180
060450102004	17.2%	\$53,341	142
060450103001	23.3%	\$44,500	27
060450103002	36.6%	\$50,313	79
060450103003	29.0%	\$67,361	5
060450103004	51.7%	\$29,867	16
060450105001	67.7%	\$36,689	8

## MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

060450105004	53.4%	\$25,325	5
060450106004	49.0%	\$49,185	0
060450110011	35.1%	\$44,167	408
060450110021	15.1%	\$88,824	83
060450110022	13.7%	\$71,572	98
060450110023	38.5%	\$50,151	33
060450110024	52.8%	\$0	3
060450110025	44.7%	\$53,333	53
060450111021	25.0%	\$53,000	282
060450111022	36.1%	\$51,466	545
060450111023	23.9%	\$48,724	104
060450112001	34.7%	\$55,556	322
060450112002	67.0%	\$37,368	44
060450112003	45.6%	\$40,329	43
060450118001	32.0%	\$62,708	16

### PROJECT #2 NETWORK ARCHITECTURE

This project will interconnect these 19 communities with the communities in Project #1 and Project #3 via three-layers of network architecture, including: Countywide Backbone, the Last-Mile Distribution System, and Fiber-to-the-Home (FTTH) Drops.

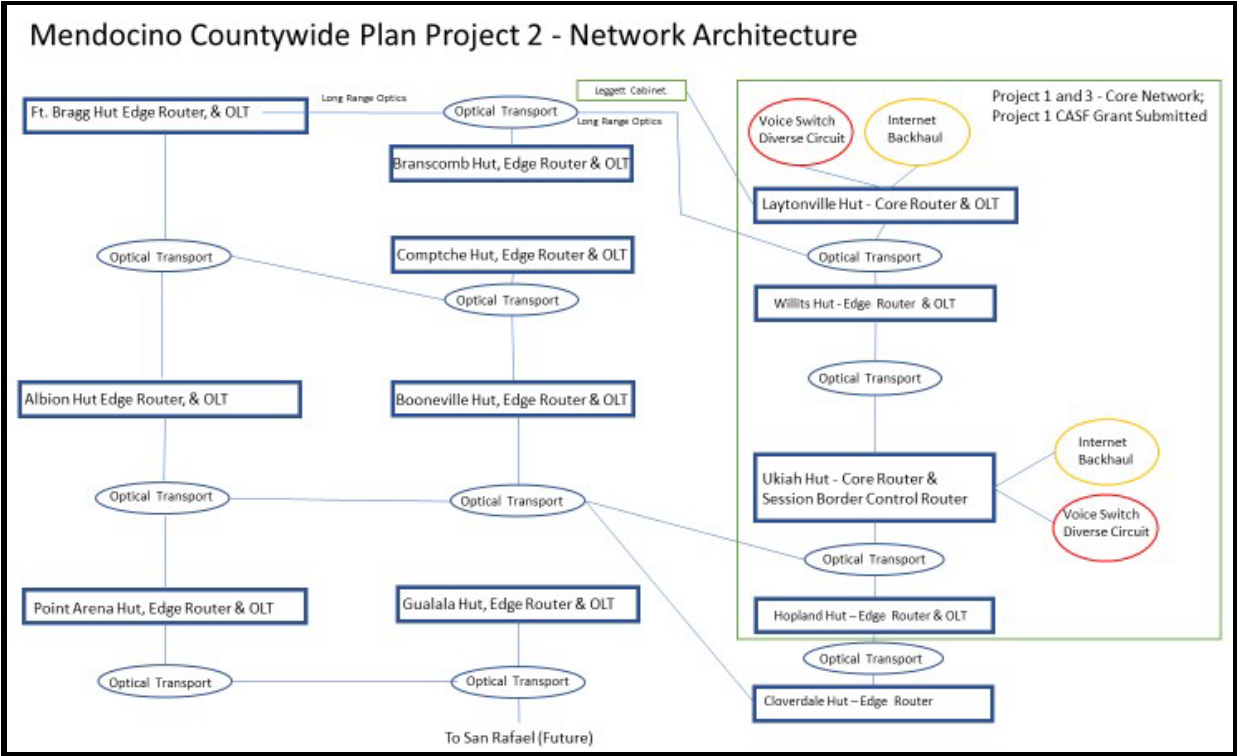
**Countywide Backbone and Last Mile:** The Project #2 backbone shown in **BLUE** on Maps 4 and 5 has 386 routes miles. Along this route, there are 8 fiber huts (**GREEN** dots) located in Fort Bragg, Albion, Point Arena, Branscomb, Comptche, Booneville, Gualala, and Cloverdale. There is also 1 cabinet (**RED** dot) located in Leggett.

**Last-Mile Distribution System:** As shown in **RED** on Map 5, Project #2 has 500 miles of underground last mile fiber optic cable routes.

**Fiber to The Home (FTTH) Drops:** The average 400-foot drop between the distribution infrastructure and each of the 2716 unserved households adds another 206 route miles. Map 5 shows the approximate locations of the unserved households shown as **YELLOW** dots.

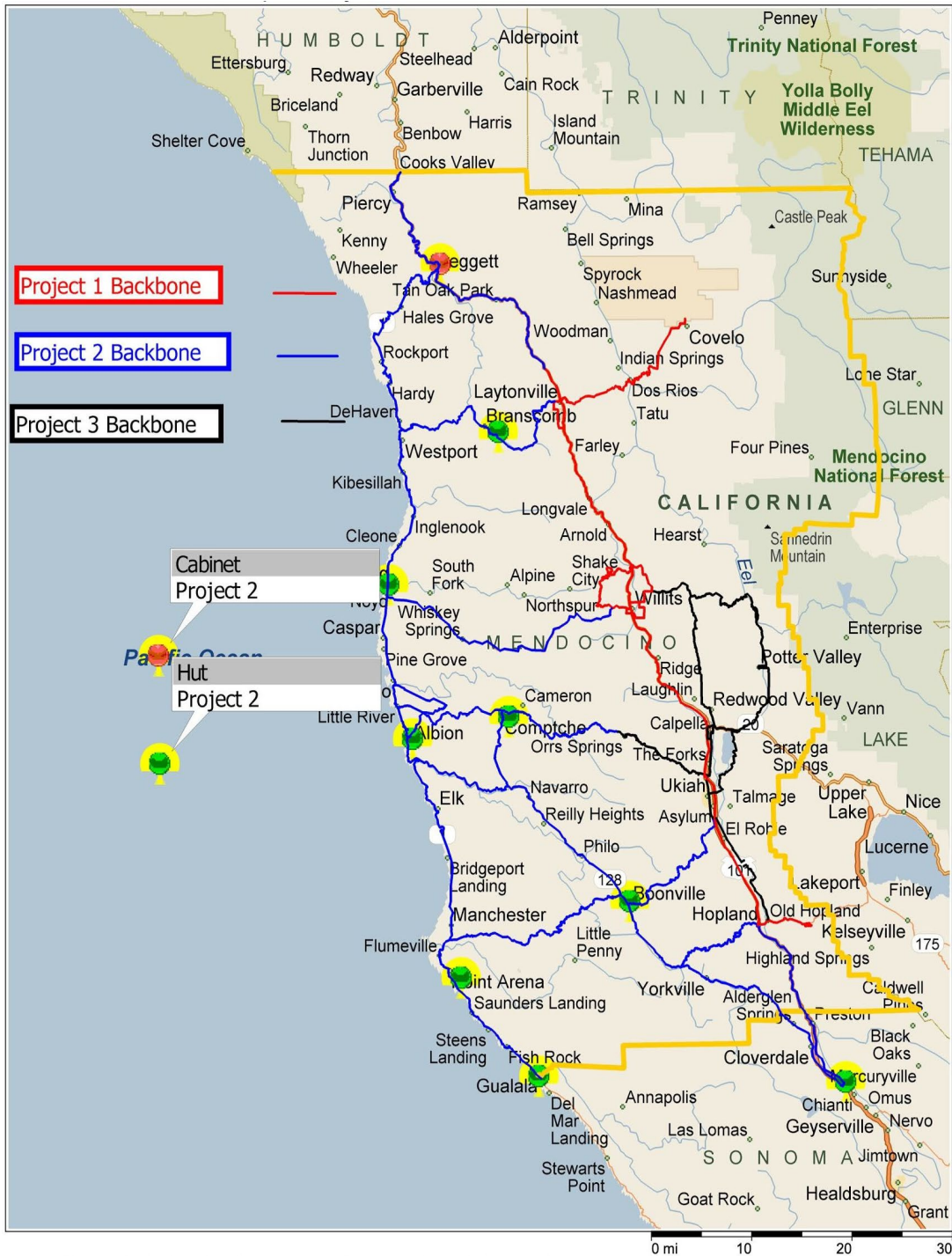
# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

Figure 3: Project #2 Network Architecture Schematic



# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

Map 4: Project #2 Backbone, Huts, and Cabinets

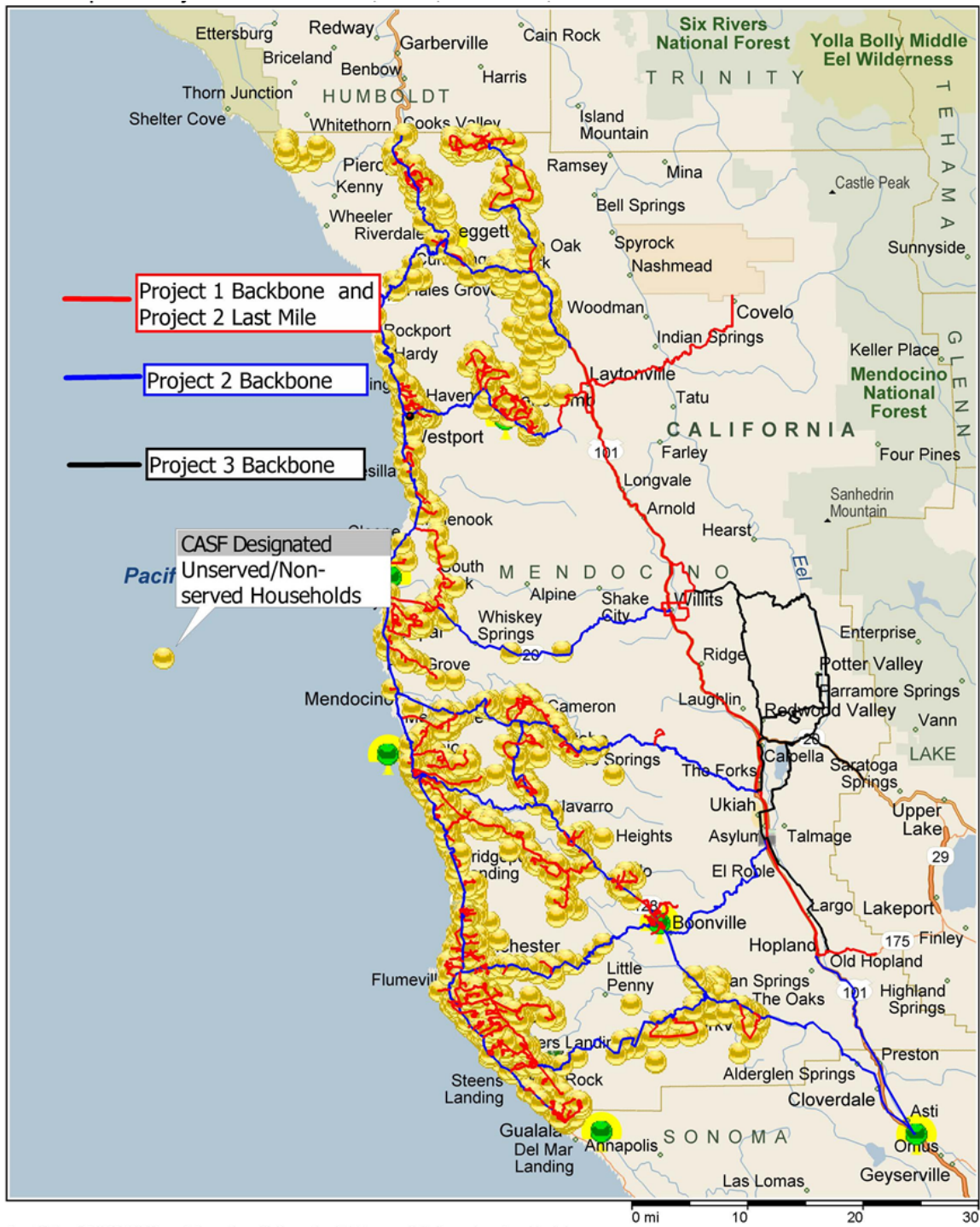


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# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

Map 5: Project #2 Backbone, Last Mile, and Unserved Households



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# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

## MANAGEMENT, DESIGN, COST, AND TIMELINE

**Management and Design:** NBNBCB’s Mendocino team and the hired consultants planned, designed, and engineered Project #2 for implementation, as part of the **Mendocino County Digital Infrastructure Plan: 2019-2025**. The design, implementation, and cost of Project #2 assumes that Project #1 has already been implemented. A provider will be selected by the County to implement, manage, and operate the infrastructure and services of Project #2.

**Estimated Capital Cost:** Project #2 is estimated to cost **\$263,291,658** to implement.

**Deployment Schedule:** The deployment schedule for Project #2 is dependent on multiple factors including the success of Project #1, available funding, willing providers, award determinations etc. As a result, Project #2’s start and end date is undetermined, but assumes a total of 48 months from start to finish, including time to process all necessary permits.

## PROJECT #3 DESCRIPTION

### TARGETED COMMUNITIES AND UNSERVED HOUSEHOLDS

Project #3 focuses on strengthening economic vitality in the five (5) rural communities and surrounding areas of Redwood Valley, Potter Valley, Talmage, Calpella, Ukiah, and outlying regions of Projects 1 and 2. Project #3 will deploy broadband access to **1,927 unserved households** currently with slow service or no service in unserved census blocks. As can be seen in Table 7, Project #3 is targeting to reach 1,927 unserved households in five communities.

The geographic locations of the 1,927 unserved households and housing units within the Project #3 area are provided in the CASF prescribed format. There are 2,245 addresses including 2,229 housing units in the list. The differential of 318 entries potentially attribute to addresses of businesses and other non-residential locations. We based this estimate on a master address point data set provided by Mendocino County. While the data set has been determined to be incomplete, the current data set provides the most accuracy.

*Table 7: Project #3 Broadband Availability Data*

Community Areas	2019 Est. Population	Number of Households	HHs Served	Unserved HHs
Redwood Valley	5,849	2,143	1,163	391
Potter Valley +	1,714	679	196	728
Talmage	1142	333	314	19
Calpella	686	255	193	62
Ukiah	30,423	11,348	10,241	727
<b>Project #3 Totals</b>	<b>39,814</b>	<b>14,758</b>	<b>12,107</b>	<b>1,927</b>

## MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

### MEDIAN INCOME, POVERTY AND UNSERVED HOUSEHOLDS

As shown in Table 8, the weighted median household income for this project area is \$54,278. This is above the \$52,500 stipulated for this CASF Infrastructure Program. In addition, there are 816 of the targeted households estimated to be in poverty. In essence, there is a 42.4 percent weighted-average of the households at 200 percent below Federal Poverty Level.

*Table 8: Project #3 Income and Poverty Statistics Overview*

Total Project Area - Weighted Average Percent Households below 200% of Federal Poverty Level	Total Project Area - Weighted Average MHI	Total Project Households	Total Project Estimated Households in Poverty
42.4%	\$54,278	1,927	816

The 1,927 unserved households targeted in this project are located in 26 Census Block Groups. Table 9 shows the: 1) percentage of households below 200% of Federal Poverty Level, 2) median household income, and 3) the number of eligible households.

*Table 9: Project #3 Income and Poverty Statistics by Census Block Group*

Census Block Group	Percent Households below 200% of Federal Poverty Level	Median Household Income	Project Households Eligible - TOTAL
060450106004	49.0%	\$49,185	2
060450108011	64.5%	\$29,477	223
060450108012	18.9%	\$54,574	34
060450108013	29.3%	\$75,938	188
060450108014	36.8%	\$57,045	20
060450108021	46.3%	\$53,750	182
060450108022	46.7%	\$54,048	323
060450109001	34.5%	\$54,432	147
060450109002	24.2%	\$48,889	61
060450109003	55.4%	\$38,224	114
060450109004	22.1%	\$59,472	19
060450113001	60.1%	\$27,007	6
060450113002	46.9%	\$52,935	66
060450113003	39.8%	\$44,167	163
060450114003	31.4%	\$64,583	7
060450114004	49.5%	\$50,909	1
060450115001	76.2%	\$29,813	3

## MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

060450115002	38.3%	\$56,827	1
060450115005	42.7%	\$38,516	9
060450117001	24.9%	\$69,659	93
060450117002	17.6%	\$102,443	22
060450117003	16.4%	\$59,417	11
060450117004	51.7%	\$64,444	19
060450117005	63.4%	\$80,500	64
060450118001	32.0%	\$62,708	148

### PROJECT #3 NETWORK ARCHITECTURE

This project will interconnect these five (5) communities with the communities in Project #1 and Project #2 via three-layers of network architecture, including: Countywide Backbone and Last-Mile, the Last-Mile Distribution System, and Fiber-to-the-Home (FTTH) Drops.

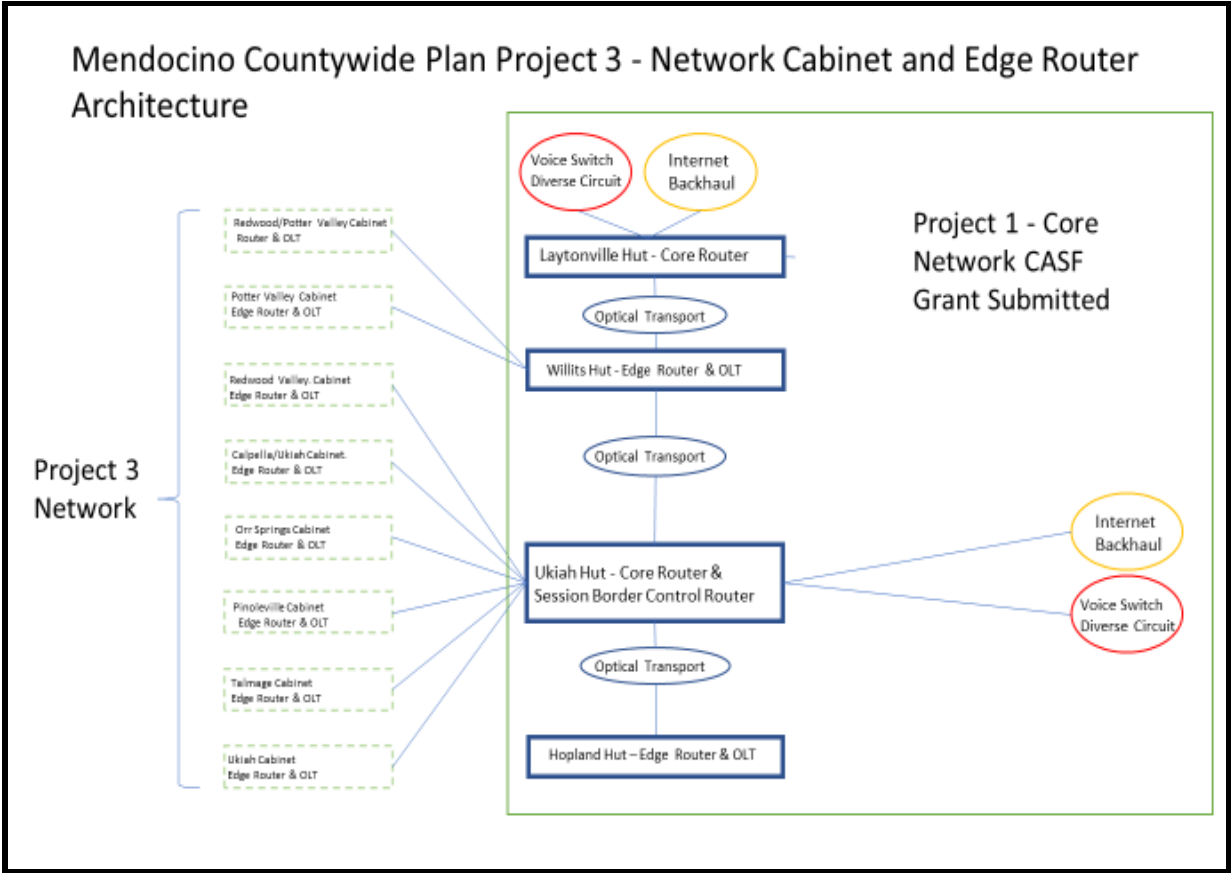
**Countywide Backbone and Last Mile:** The Project #3 backbone shown in **BLACK** on Maps 6 and 7 has 156 route miles.

**Last-Mile Distribution System:** As shown in Map 7, Project #3 has 387 miles of last-mile underground fiber optic cable identified as **RED** lines. Map 6 also shows the locations of the eight (8) cabinets identified as **RED** dots. Two cabinets are located in Redwood Valley, two in Potter Valley, one in Calpella, one in Orr Springs, one in Pinoleville, one in Talmage, and one in Ukiah. Project #3 cabinets are planned to connect to the Project #1 fiber huts located in Laytonville, Willits, Ukiah, and Hopland.

**Fiber to The Home (FTTH) Drops:** The average 400-foot drop between the distribution infrastructure and each of the 1,927 unserved households adds another 146 route miles. Map 7 shows the approximate locations of the unserved households in Project #3.

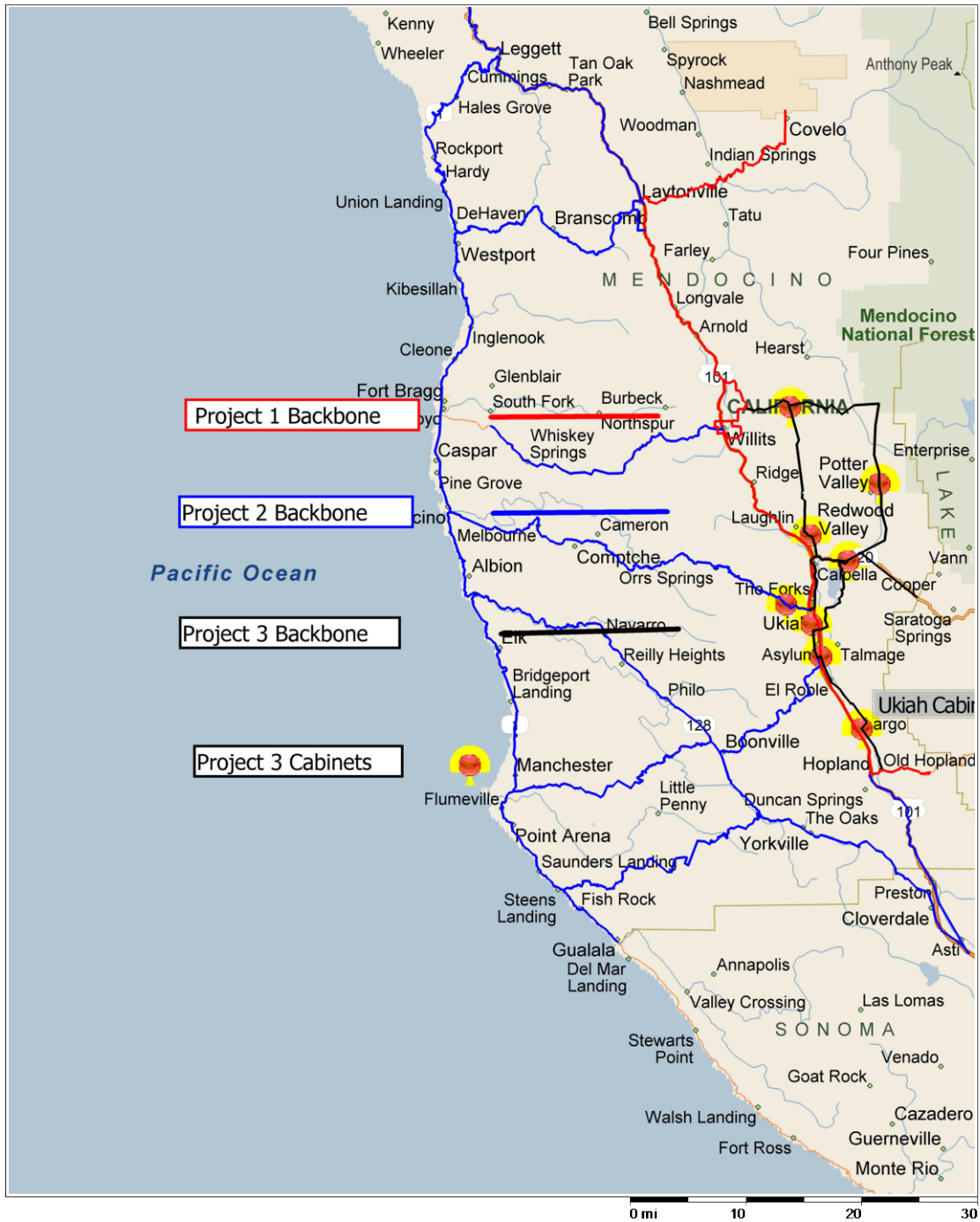
# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

Figure 4: Project #3 Network Architecture Schematic



# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

Map 6: Project #3 Backbone and Cabinets

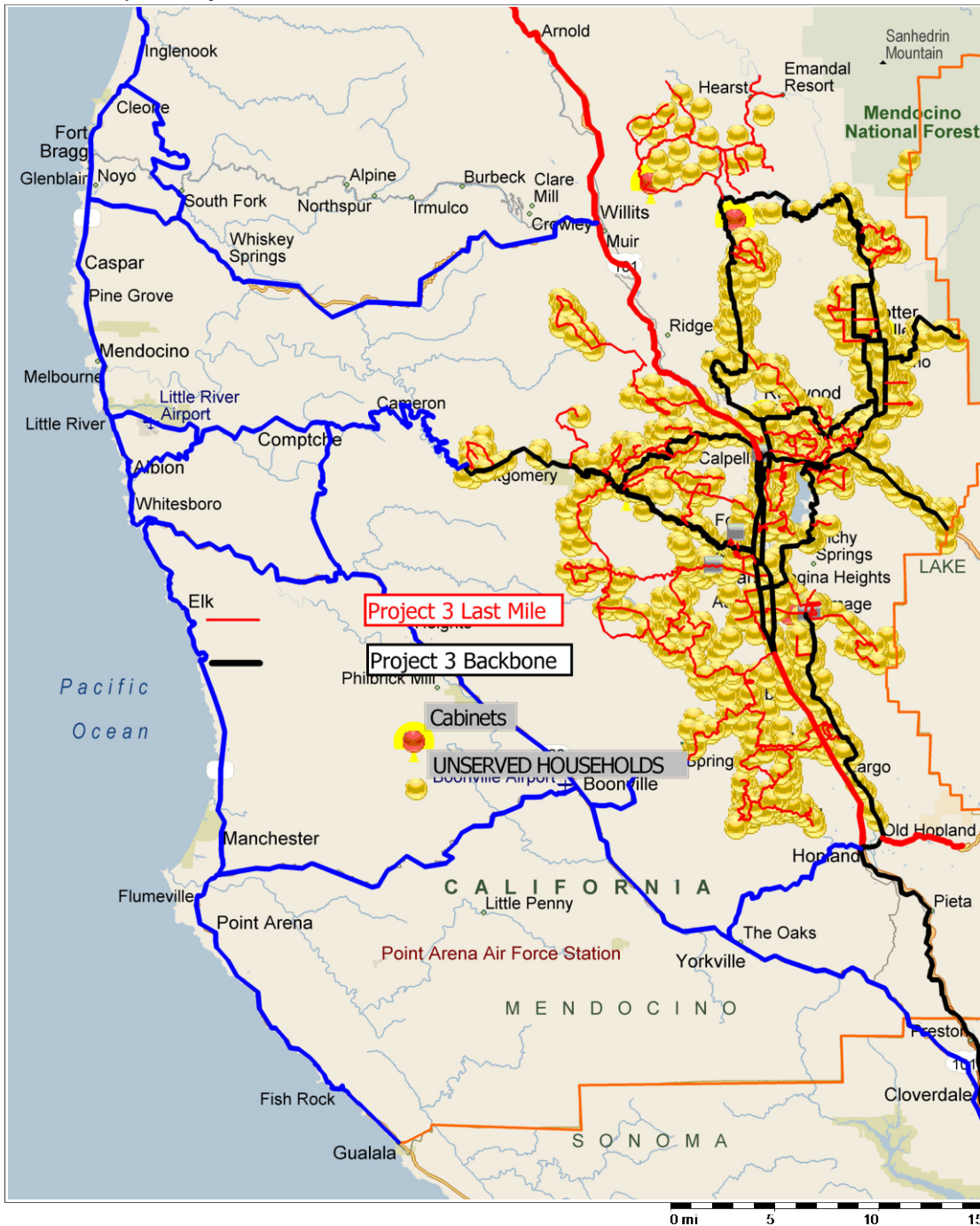


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# MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

Map 7: Project #3 Backbone, Last Mile, Cabinets, and Unserved Households



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## MENDOCINO COUNTY DIGITAL INFRASTRUCTURE PROJECTS

### MANAGEMENT, DESIGN, COST, AND TIMELINE

**Management and Design:** NBNCBC's Mendocino team and the hired consultants planned, designed, and engineered Project #3 for implementation, as part of the ***Mendocino County Digital Infrastructure Plan: 2019-2025***. The design, implementation, and cost of Project #3 assumes that Project #1 has already been implemented. A provider will be selected by the County to implement, manage, and operate the infrastructure and services of Project #3.

**Estimated Capital Cost to Deploy:** Project #3 is estimated to cost **\$110,347,182** to implement.

**Deployment Schedule:** The deployment schedule for Project #2 is dependent on multiple factors including the success of Project #1, available funding, willing providers, award determinations etc. As a result, Project #3's start and end date is undetermined, but assumes a total of 24 months from start to finish, including time to process all necessary permits.

## THANK YOU

We value the support and assistance we have received from a wide range of individuals and entities across Mendocino County in developing these three projects to further implement ***Mendocino County's Digital Infrastructure Plan: 2019-2025***.

Mendocino County NBNCBC Planning Team,

Tom West | NBNCBC | Manager

Victor Braud | Fiber Channels | Consultant

Mitch Drake | City Smart | Consultant

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