Mendocino County Digital Infrastructure Plan: 2019 - 2025

Implementation Plan:

Project #3

November 2020

Redwood Valley, Potter Valley, Talmage, Calpella, Ukiah, and outlying areas in Projects 1 and 2

To: Mendocino County Board Supervisors and County Administration

The Mendocino NBNCBC Planning Team is pleased to submit this document as the Project #3 implementation plan. It is one of three project plans for Mendocino County to use in implementing the ***Mendocino County Digital Infrastructure Plan: 2019-2025.*** These three broadband implementation project plans can be used for consideration for future grants, or other means to address the growing need for broadband services throughout the county.

The team has considerable knowledge and experience in Mendocino County, from current or past CASF grant applications; this experience was applied in the creation of this project plan. As a matter of importance, this project plan was built with the assumption that Project #1, currently submitted for a CASF Infrastructure grant by Hunter Communications, must be approved. However, Projects 2 and 3 each can stand-alone but would require some additional costs for electronics and huts, estimated to be $500,000.

In formulating each project plan the team used a desktop method to arrive at all estimates for material, equipment, and construction costs using current market rates and supported by budgetary quotes. Revenue targets, and operating expenses were derived from current market conditions. The team used publicly provided data, mostly provided by the California PUC, to determine eligibility where to build.

These three project plans, although very detailed, are our best effort and should viewed as high-level estimates. They are intended to give the County a solid starting point to pursue implementation of the ***Mendocino County Digital Infrastructure Plan: 2019-2025.***

To know and understand all costs and financial benefits, more detailed engineering estimates will need to be performed to obtain the actual cost of building this broadband infrastructure. Furthermore, the County will need to identify a service provider(s) to undertake this project; this provider(s) will need to adopt their own revenue/cost structure for a complete understanding of the financial implications. If Hunter Communications implements Project #1, for continuity it should have the First Right of Acceptance or Refusal to undertake Projects #2 and #3.

Respectfully submitted by the Mendocino NBNCBC Planning Team,

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Introduction and Overview

Mendocino County is one of the original counties 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 CPUC, 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.

Impact of Telecommunications Outages in Mendocino

In December 2015, NBNCBC and the Broadband Alliance of Mendocino County (BAMC) issued a report titled ***September 2015 Telecommunication Outage and the Impacts on Residents of Mendocino County*.**

In the wake of the devastating wildfires of October 2017, NBNCBC issued a report titled **Telecommunications Outage Report: Northern California Firestorm 2017**.[1] The survey based report assesses and documents the scope of telecommunication outages that affected residents of Mendocino, Napa and, Sonoma Counties during the wildfires, and provides an overview on the state of services/infrastructure in the 3-county region and the impact any outages had on residents, within and outside of burn area.

Results show that in the 3-county area, 66% of residents lost landline services, 74% of residents lost cellular services, and 66% of residents lost Internet services with Napa County experiencing the most severe impacts. The 3-county average of service loss for these combined technologies is 71%. Many of these outages impacted residents that were geographically far from the actual burn areas.

[1] http://www.mendocinobroadband.org/wp-content/uploads/1.-NBNCBC-Telecommunications-Outage-Report-2017-Firestorm.pdf

Development of the Digital Infrastructure Plan

As part of a 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 current status 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."[1]

With a new CASF Regional Consortia planning grant awarded to NBNCBC in 2019, the Mendocino County Team developed a three-year work plan focused on implementing the County's Digital Infrastructure Plan with three projects to be funded by 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 projects areas include:

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

[1] http://www.edfc.org/wp-content/uploads/2015/12/Final-Digital-Infrastructure-Plan-for-Mendocino-County-12.31.18.pdf

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 is being developed 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.

PROJECT #3

Project #3 focuses on strengthening economic vitality in the 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. The Mendocino Team of NBNCBC and a non-profit, WiConduit planned, designed, and engineered Project #3 for implementation, as part of the ***Mendocino County Digital Infrastructure Plan: 2019-2025***[2]. The design, implementation, and cost of Project #3 assume that Project #1 has already been implemented.

Project #3 is estimated to cost **$110,347,182** to implement.

A provider will be selected by the County to implement, manage, and operate the infrastructure and services of Project #3.

We value the support and assistance we have received from a wide range of individuals and entities across the County in developing Project #3, which is designed to complete the implementation of the ***Mendocino County Digital Infrastructure Plan: 2019-2025.***

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

Project Summary

Project Title:	**Mendocino County Project 3:** Redwood Valley, Potter Valley, Talmage, Calpella, Ukiah and outlying areas in Projects 1 and 2
Named Project Location:	Mendocino County
Project Type:	HYBRID: Countywide Backbone, Last-Mile Distribution System and Fiber to the Home (FTTH) Drops
Project Cost:	**$110,347,182**
UNSERVED HOUSEHOLDS INCLUDED IN THE PROJECT	
REDWOOD VALLEY +	391
POTTER VALLEY +	728
CALPELLA	62
TALMAGE	19
UKIAH +	727
TOTAL	1,927

CURRENT MAXIMUM DOWNSTREAM AND UPSTREAM SPEEDS (MBPS)	
COMMUNITY	**PROVIDER AND SPEEDS** - (As reported in the official 2019 CPUC Data Availability and Mapping Report)
REDWOOD VALLEY +	COMCAST----1GIG/35Mbps
POTTER VALLEY +	NO SERVICE -DIGITAL PATH—50Mbps/10Mbps
CALPELLA	COMCAST----1GIG/35Mbps
TALMAGE	COMCAST----1GIG/35Mbps
UKIAH	COMCAST----1GIG/35Mbps
Median Household Income:	$54,278
Estimated Number of Businesses, anchors and Public safety locations:	There are, six (6) anchor institutions, schools and health facilities that could benefit with new services or improved speeds. We have not included public safety until the FirstNet initiative unfolds and we gain a better understanding of where we can provide support. Eighty-two (82%) of the 5,000 businesses in the County have nine (9) or fewer employees. There are approximately 100 plus of these small businesses in these community areas.

Description of major infrastructure to be deployed:
The project will provide high-speed Internet, delivered over fiber optic cable to 1,927 unserved households in five communities and surrounding areas including: Redwood Valley, Potter Valley, Calpella, Talmage and Ukiah. A total of 357 miles of underground fiber routes will be deployed across these five areas creating a seamless distribution system, consisting of a county-wide backbone (156 route miles,) and last-mile distribution system (201 route mile,) and drops which we will collectively refer to as “Last- Mile” for the remainder of this document. The last-mile fiber drops to 100% of the 1,927 households, at an average of 400 feet per household, adds another 146 miles.

The fiber design calls for deploying as much fiber underground as possible to preserve 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. None of the underground infrastructure was damaged.[1]

Breakdown of Aerial and Underground installation:	One hundred (100%) percent of the 1,927 households are to be connected via underground fiber installation.
	8 144 Fiber Termination Panels with Connectors 8 Edge Routers 8 GPON Cabinets 1927 XPON OLT Ports 125 XPON Cases and Splitters 482 Hand Holes/Pull Boxes 1927 XPON ONTs w/Router, Battery 357 Miles of Conduit and 144 ct Fiber 188 Vaults and Splice Cases The estimated cost for all this material and equipment is $7,354,306
Estimated construction timeline:	The deployment schedule assumes a start date of January, 20XX and a completion date of January, 20YY or a total of 24 months from start to finish, excluding time to process all necessary permits.

Description of proposed broadband project plan:

The fiber approach is to provide up to 1 Gbps symmetrical Internet connectivity and voice service to all 1,927 homes, plus dozens of small businesses, six (6) anchors, and other institutions in the five community areas via a robust last-mile fiber network. These five community areas include two Native American Tribes including: Coyote Valley Band of Pomo Indians (Redwood Valley) and Pinoleville Pomo Nation (Ukiah).

The selected provider will design, build and operate the Last-Mile distribution system by providing all the necessary equipment to light the 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 manner that minimizes risk.

Unit pricing will be based on research done at the time of implementation taking into account the global economy as well as political issues. The prices on labor and materials may vary greatly depending on the project start date.

The design calls for the FTTx XGS PON network to utilize a passive optical network for residential and small business, and Active Ethernet for larger businesses, cell towers, and WISP's. The provider will utilize this hybrid approach to create a state-of-the-art network designed with the future in mind. This do it right approach will take into consideration minimizing downtime caused by wildfires, future bandwidth needs, and future technological advancements.

Each of the five community areas are planned to have either a hut or cabinet based upon size of the community; these locations will service as the aggregated data center where the Last-Mile distribution system where we plan to place fiber terminals, core and edge routing, and Optical Line Terminals (OLT) and where the infrastructure will be extend via fiber drops to connect the households.

For larger businesses and cellular locations the provider will provision for either a dark fiber or lit service using traditional industry interconnection equipment (small router). The intent is to enable wireless carriers to build out their networks to further enhance voice and data connectivity to this rural and neglected area.

Download speed capabilities of proposed facilities:	The maximum residential service download speeds customers may subscribe to are: **1000 Mbps.** For "low-income" customers (those at or below the poverty line, or any other CASF-mandated requirements) the Download speed will be: **25 Mbps**
Upload speed capabilities of proposed facilities:	The maximum residential service upload speeds customers may subscribe to are: **1000 Mbps.** For "low-income" customers (those at or below the poverty line, or any other CASF-mandated requirements) the Upload speed will be: **25 Mbps**
Preliminary indication of need for CEQA review: The Commission's Energy Division CEQA section will be contacted and consulted with CEQA Staff regarding the process of developing and filing a Proponent's Environmental Assessment (PEA) or other CEQA documents. We are aware of the responsibilities if this proposed project is not exempt from CEQA. We anticipate that parts of the project will require CEQA review and other parts will not, which will also be identified by CalTrans.	
Identification of leveraging existing available facilities:	This project does not anticipate using other providers' facilities for "last mile" connectivity. The cable-based facilities of COMCAST and AT&T are private and they do not share with other providers; North Coast has a private fixed wireless network that they do not share with competitors. In addition, much of the existing infrastructure is dilapidated and requires replacing, including poles. Therefore, there are no existing facilities available for the last-mile needed in this project. As shown in the project expenditure plan, the provider will acquire Internet backhaul capacity for the first five years.

Profile of /County and Project Area

The 2019 County 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. The official 2019 CPUC Data Availability and Mapping Report stated there were 35,361 households in the county. Of that total 26,595 households, or 75.2 percent, had access to broadband services at 6 Mbps download and 1 Mbps upload or better and were deemed served. That leaves 8,766 household unserved. The three deployment projects in the ***Mendocino County Digital Infrastructure Plan: 2019-2025*** are targeting to reach 8,565 of these unserved households.

SUMMARY DATA

As can be seen in Table 1 Project #3 is targeting to reach 1,927 unserved households.
Table 1 Profile Data of Area.

Table 1 Project 3

Community Areas	2019 Est. Population	Number of Households	HHS Served	Targeted 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**
Project #3 Totals	**39,814**	**14,758**	**12,107**	**1,927**

GEOGRAPHY

According to the U.S. Census Bureau, Mendocino County has a total area of 3,878 square miles (10,040 km2), of which 3,506 square miles (9,080 km2) is land and 372 square miles (960 km2) (9.6%) is water. Mendocino County's unique geography includes 130 miles of rugged Pacific Ocean coastline, coastal range mountains, and ancient redwood trees. The inland oak savannas and rolling hills provide the backdrop for the county's most populous city and county seat, Ukiah, CA.

The communities in the county are interconnected by a series of highways. Along the coast, Highway 1 stretches for over 100 miles starting in Gualala and reconnects with Hwy 101 in the town of Leggett. Hwy 101 runs through inland Mendocino County, connecting the cities of Ukiah and Willits, and the towns of Hopland, Laytonville, and Leggett. Highway 20 is a major arterial route that runs from Fort Bragg on the coast east across the county all the way to the border with Lake County. Large rural communities live off of Hwy 20 east in Redwood Valley and Potter Valley and at the end of Hwy 162 in Round Valley/Covelo/Dos Rios. Another major route, Highway 128 runs northwest from Highway 101 in Cloverdale through the Anderson Valley to Albion to connect with Highway 1 on the coast.

ECONOMY

The economy of Mendocino County is constantly evolving. Traditionally, Mendocino County had a natural resource-based economy, dependent on fishing, timber production, and farming. Over-extraction in both timber and fishing has changed the economy; while these are still active industries in Mendocino County, they do not have the same level of economic impact as they once had. Tourism, viticulture, wineries and cannabis production are some of the major economic forces in the county today. Additionally, small niche manufacturing is on the decline in the county. An increasingly important part of the economy is the number of people who work remotely at home as contractors or for businesses and corporations located outside the county.

A unique aspect of the County's economic profile is the number of self-employed and small businesses. According to data provided by the California Employment Development Department's Labor Market Information System, there are over 5,000 employers in the county and over 82% have fewer than 10 employees, 99% have fewer than 100. Most major employers are the school districts, health care (15%), and local governments.

The most visible of these small businesses are typical "mom & pop shops" providing products and services in the downtown areas. However, this is only a small percentage of the small businesses in the county. Mendocino County is home to many professionals and artisans

including everything from luthiers (guitar makers), potters, and basket weavers, to high-tech executives, project managers, and other professionals.

The County has recently launched a major effort to develop an Economic Recovery Resiliency Plan MOVE 2030. Supported by funds from Economic Development Administration and the County, the effort has three outcomes:

- Develop an Economic Recovery and Resiliency Plan
- Complete a broadband implementation plan
- Create Digital Learning Hubs.

CENSUS BLOCK GROUP, MEDIAN INCOME, POVERTY AND UNSERVED HHS

As shown in Table 2 the weighted median household income for this project area is $54,278. This is above the $52,500 stipulated for this CASF Infrastructure Program. Also, 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 2

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 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: Income and Poverty Breakdown 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
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 Description

SCOPE

The maps included in this document conceptually represent the planned build-out to reach the: Redwood Valley/Potter Valley, Potter Valley, Redwood Valley/Ukiah, Potter Valley/Ukiah, Ukiah/Orr Springs, Pinoleville Rancheria, Talmage, Ukiah unserved households in eligible census blocks, as defined by the CPUC. This project has three infrastructure components- "Countywide Backbone", "Last-Mile Distribution System, and "Fiber to the Home (FTTH) Drops." It is important to note the engineering criteria from Project 1 to Project 3 has changed. Whereas, in Project 1 the underground infrastructure was split between last-mile and FTTH, Project 3 now includes all mileage/footages for all underground fiber and conduit infrastructure in the combined Countywide Backbone and Last-Mile Distribution System. Project 3 criteria clearly separates infrastructure from drops and electronics/Cabinets.

Countywide Backbone and Last Mile: The foundation of the Mendocino County Broadband Infrastructure is the Countywide Backbone and Last-Mile Distribution System for all three projects. Map 1 depicts the entire Countywide Backbone that will have 648 route miles, 156 route miles are part of Project 3. The Project #3 portion of this build is shown in BLACK.

The **Last-Mile Distribution System** for Project 3 provides high-speed Internet, delivered over 201 miles of fiber optic cable to 1,927 unserved households in the five (5) communities and surrounding areas, as shown in RED on Map 2. The underground fiber routes are being deployed across the five areas creating a seamless infrastructure, Last-Mile Distribution System. Map 2 also shows the locations of the eight (8) cabinets.

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.

- Redwood Valley + - 391 households
- Potter Valley + - 728 households
- Talmage - 19 households
- Calpella - 62 households
- Ukiah – 727 households

Map 3 shows the approximate locations of the unserved households.

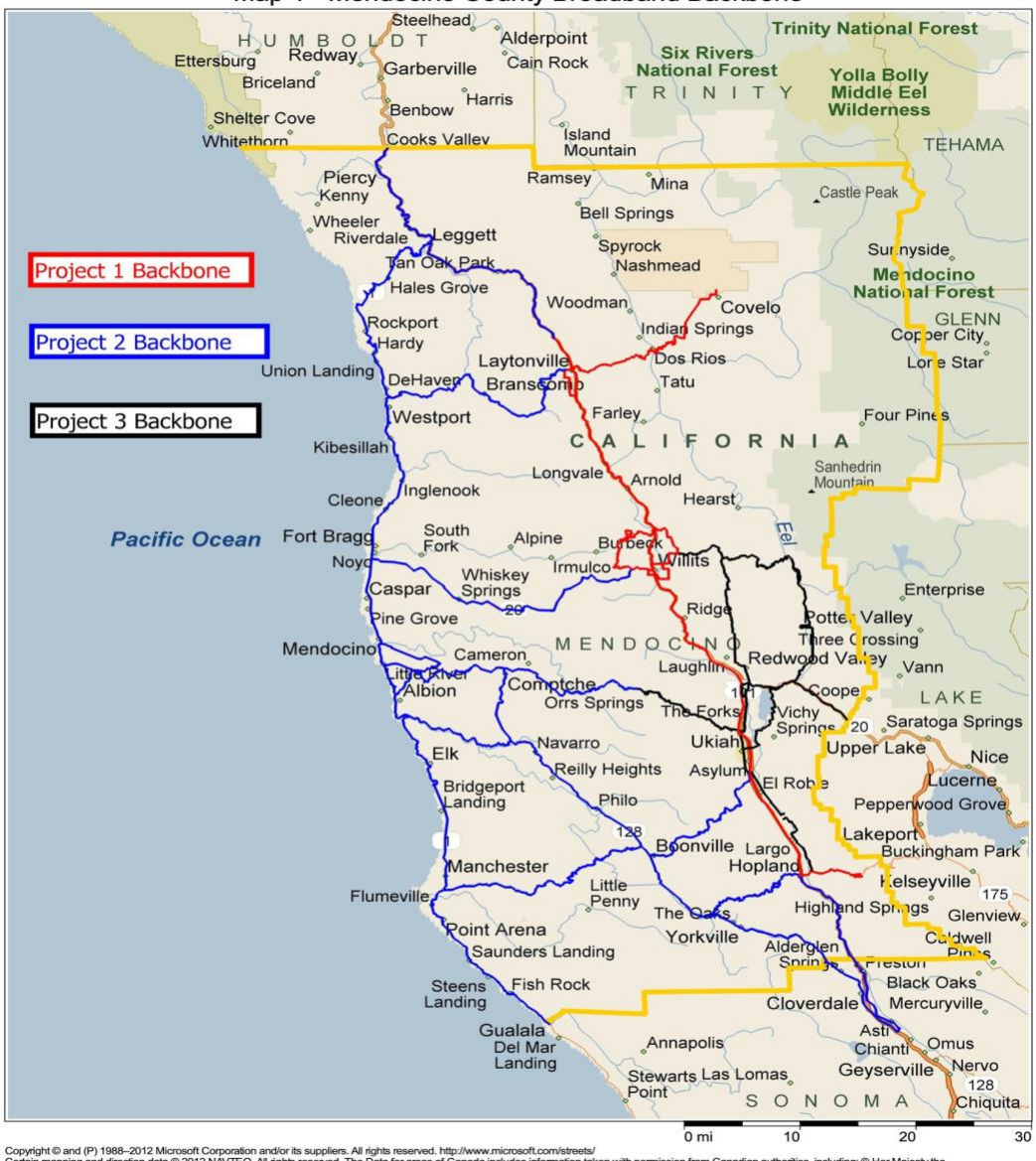
The fiber design calls for deploying as much fiber underground as possible to preserve infrastructure during wildfires and other unforeseen disasters. According to an assessment by Magellan Advisors for Napa County 30 percent of the telecommunications infrastructure was

damaged by the 2017 wildfires. None of the underground infrastructure was damaged. Furthermore, we note that many existing poles are aged or undersized requiring replacement at a high cost; additionally, pole attachments are a significant drain on operating expenses, a drain that creates a shortfall in revenue due to low subscriber counts.

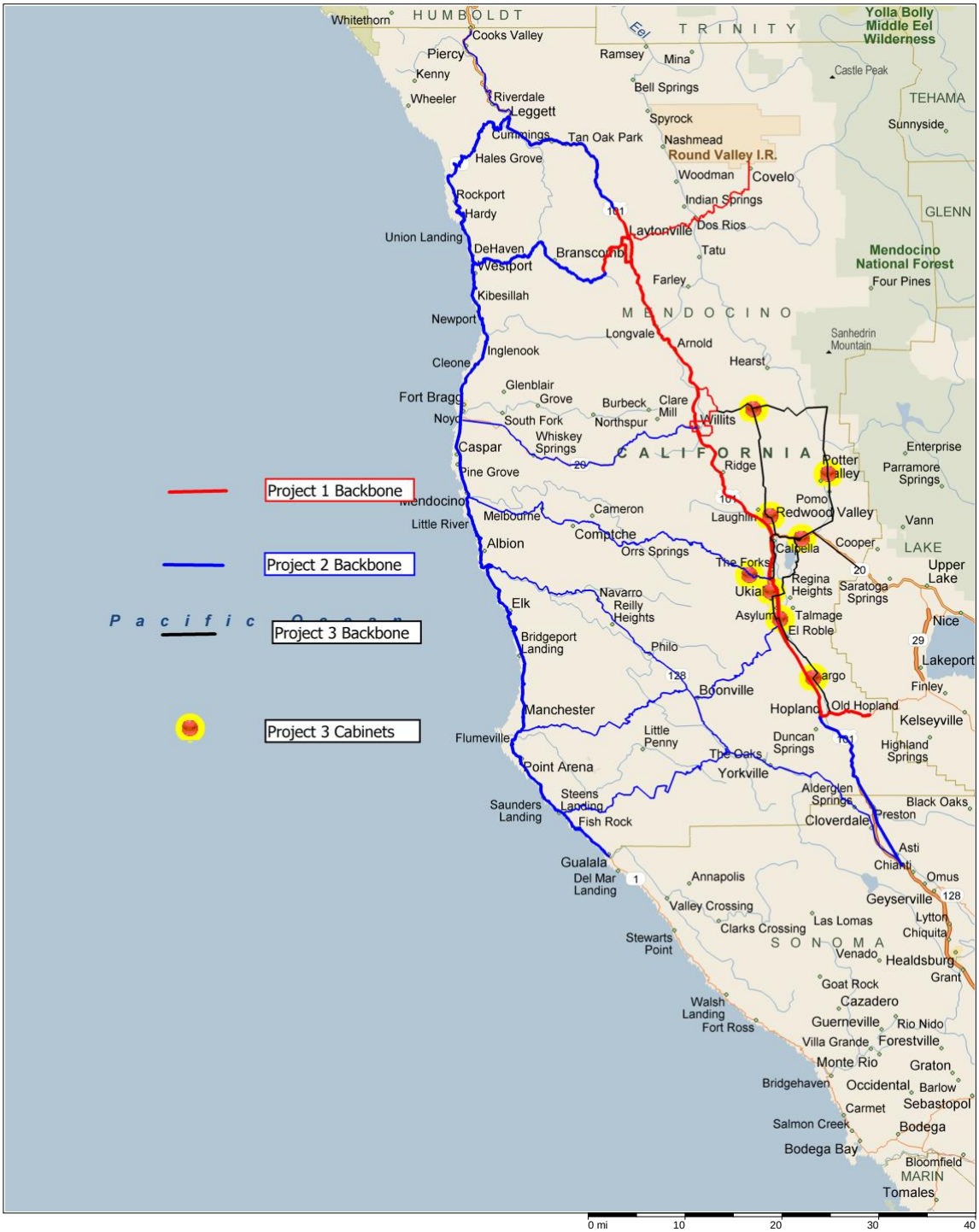
Additional Project #3 deployment design maps are available on the **Mendocino County Digital Infrastructure Plan: 2019-2025 website.**

MAPS

Map 1 - Mendocino County Broadband Backbone



MAP 2, PROJECT 3 BACKBONE, AND CABINETS



MAP 3, - PROJECT 3 BACKBONE, HUTS, CABINETS, LAST MILE AND UNSERVED ...

Overall 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 eight 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 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.

We plan for each of the five communities to have a cabinet based upon the size of the community. 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 generators with quick connect capabilities. The huts will be equipped with stand-by generators and batteries to address long-term power interruptions ensuring service is non-interrupted. 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.

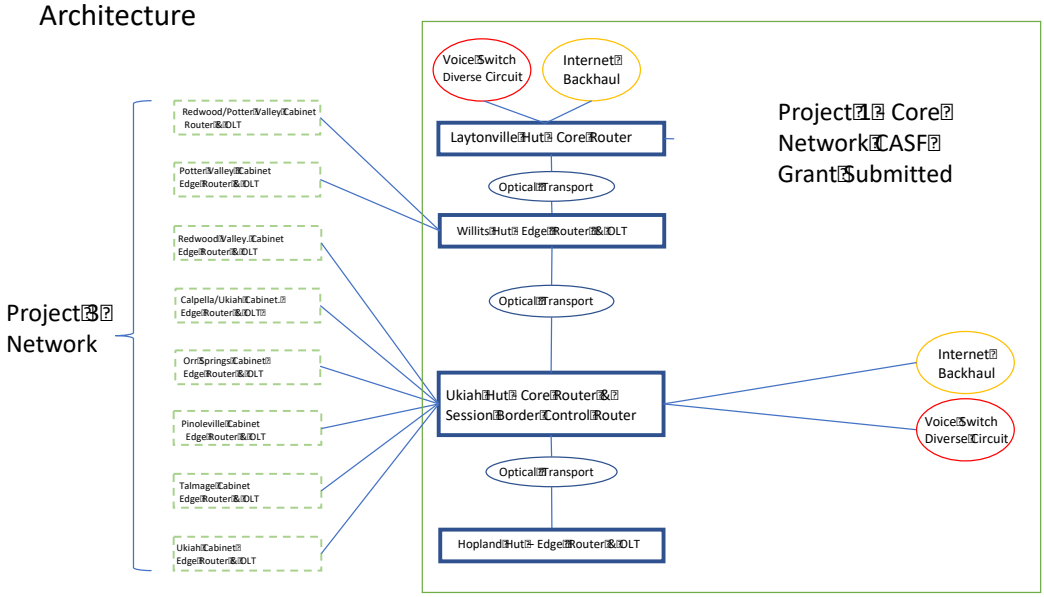
For larger businesses, we will provision a dark or lit fiber service using traditional industry interconnection equipment (small router). The intent is to enable wireless carriers to build out their networks to further enhance voice and data connectivity to most rural and neglected areas beyond our fiber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

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 CASF Grant. 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. The choices will be decided 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.

This project will interconnect these five communities with the communities in Project #1 and Project #2 via the countywide backbone and the Last-Mile Distribution Systems that will be built.

Mendocino Countywide Plan Project 3 Network Cabinet and Edge Router Architecture



GEOGRAPHIC LOCATIONS OF UNSERVED HHS

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 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. This long list of data for Project #3 is available on the **Mendocino County Digital Infrastructure Plan: 2019-2025 website.**

GEOGRAPHIC LOCATIONS OF NETWORK EQUIPMENT

There are eight (8) cabinets to be strategically placed within the Project #3 area. These XPON cabinets will house the Edge Routers; XPON Cabinets, incl. OLT electronics; Splitters; and, Fiber Termination Panels w/Connectors. The table below shows the approximate locations where these cabinets are to be placed. The final determination will be made based on availability and when detailed engineering is completed to start the implementation. Additional details are available on the **Mendocino County Digital Infrastructure Plan: 2019-2025 website.**

Geographic Location of Project #3-Related, Key Network Equipment

Cabinets--Edge Routers, OLT Chasses, and Splitters

Cabinet #1	1	Redwood/Potter Valley	Intersection of Tomki Road and Van Arsdale Road	(39.227° - 123.3106°)
Cabinet #2	1	Potter Valley	NE of 10430 Main St. and East of Powerhouse Road	(39.3267° - 123.1078°)
Cabinet #3	1	Redwood	Located NE of	(39.3267° -

		Valley/Ukiah	intersection of "East Rd" and "D Road"	123.1078°)
Cabinet #4	1	Potter Valley/Ukiah +Calpella	Located at 5000 Vista Del Lago Road in Ukiah	(39.23597° - 123.1747°)
Cabinet #5	1	Ukiah/Orr Springs	Intersection of Orr Springs Road and Running Springs Ranch Road	(39.2242° - 123.3403°)
Cabinet #6	1	Ukiah/Pinoleville	Near intersection of Masonite Rock Road and Orr Springs Road	(39.17728° - 123.2241°)
Cabinet #7	1	Ukiah Network Core Node+Talmage	210 Norgard Lane at Interconnection with NW Corner of Hwy 101	(39.1150° - 123.1905°)
Cabinet #8	1	Ukiah/Hopland	Near intersectionof Henry Station Road and Old River Road	(39.0507° - 123.1156°)

Deployment Schedule

The following schedule portrays the project construction and deployment schedule. Given the time required for permitting and securing CEQA approval is unknown, all activities are shown as starting upon completion of those activities, with total time for completion not to exceed one year beyond the CEQA-approval date.

To accomplish these completion target dates, we have used an estimate of four calendar months from the start date to complete the permitting and CEQA approval processes. Given those estimates for the permitting and approval processes, we propose to assign two “construction spreads” to complete the tasks in the two-year time frame. In the event permitting or CEQA approval requires more than the four months estimated, we will need to adjust the number of spreads we deploy to maintain the two- year prescribed completion date.

Spreadsheet on Mendocino County Broadband Internet Network Deployment Plan, Project #3:

Project 3 Deployment Schedule

Project 3			Productivity				Each square represents three months, with each month equal to four, six-day work weeks.											
Designated Communities & BB Segment	Miles	Route Feet	Constr. Feet/ Day	Constr. Spreads (Crews)	Constr. Days	Mths to Build	Mth 1-3	Mth 4-6	Mth 7-9	Mth 10-12	Mth 13-15	Mth 16-18	Mth 19-21	Mth 22-24	Mth 25-27	Mth 28-30	Mth 31-33	Mth 34-36
Willits/Brooktrails to Hopland	69.00	364,320	1,000	2	182.16													
Backbone total	69.00	364,320			182.16	7.59												
Designated Communities & BB Segment	Miles	Route Feet	Constr. Feet/ Day	Constr. Spreads (Crews)	Constr. Days	Mths to Build	Mth 1-3	Mth 4-6	Mth 7-9	Mth 10-12	Mth 13-15	Mth 16-18	Mth 19-21	Mth 22-24	Mth 25-27	Mth 28-30	Mth 31-33	Mth 34-36
Potter Valley	42	221,760	1,200	2	92.40													
Redwood Valley	44	232,320	1,200	2	96.80													
Rural Ukiah, East/NE	70	369,600	1,200	2	154.00													
Rural Ukiah, West/NW	69	364,320	1,200	3	101.20													
Calpella/ Rural Ukiah, East/NE	31	163,680	1,200	2	68.20													
Talmage/ Rural Ukiah, East/SE	29	153,120	1,200	2	63.80													
Last Mile Total	285.00	1,504,800			576.40	24.02												
FTTH Households	Feet/Drop	Total Drop Route Feet	Service Order Driven															
1,927	400	770,800																

If you have questions about the construction deployment schedule for Project #3, please contact the County Liaison for the ***Mendocino County Digital Infrastructure Plan: 2019-2025.***

Construction Spread: A large construction project like Project 3 is typically broken into manageable lengths called "spreads". Our Project #3 is divided into 1-2 spreads for underground construction, each with unique activities and challenges, and each awarded to contractors with the experience and expertise to deliver on construction. As additional security, the entire project will be backed by a construction performance and completion bond.

Proposed Project Expenditures

The following table represents the cost expenditures used for this project. We have estimated that it will take **$110,347,182** to implement Project #3.

The expenditures represent soft quotes from multiple project partners, manufacturers, construction companies, and backhaul providers. Hard quotes would be forthcoming following a decision to proceed. The costs are separated by "Countywide Backbone"/ "Last Mile Distribution" and "FTTP Drops" components.

The 'Countywide Backbone"/"Last Mile Distribution" expenditures encompass all OSP underground infrastructure components, and electronics to light fiber and transport data across the Last-Mile Distribution System. OSP Infrastructure components include cabinets, fiber cable, passive materials (splice boxes, pull boxes, manholes, etc.), and the electronics components include fiber terminals, and core routers.

The "FTTP Drops" expenditure table depicts the connection from OSP distribution fiber, passive components/splitters to drops, and terminal equipment at the Household. The "FTTH and Drops" electronics include cabinets with OLT and ONT/Wi-Fi for inside the home.

Both the 'Countywide Backbone"/"Last Mile Distribution" and "FTTP Drops" expenditures include labor costs that include delivery and installation of the conduit and fiber, the most significant percentage (75%) of the total project costs. Associated project management costs, such as project management, construction bonds, and permits are also included.

If you have questions about the expenditure plan for Project #3, please contact the County Liaison for the ***Mendocino County Digital Infrastructure Plan: 2019-2025.***

Mendocino County Broadband Initiative		
Project 3-Redwood Valley, Potter Valley, Calpella, Talmage, Ukiah Rural Surburbs (including Pinoleville and Orr Springs)		
	EXPENDITURE CATEGORY	**PROJECT #3**
	Number of Unserved Households	**1927**
	Route Miles **County Backbone**	**156**
	Last Mile	**201**
	FTTH	**146**
	Total	**503**
	Countywide Backbone and Last Mile	
	OSP Materials--Conduit, Fiber Optic Cable, Splice Vaults and Cases, Pull boxes	**$5,252,009**
	Electronics--Edge Routers, Edge Core Electronics, ROADMs	**$388,000**
	Labor Costs--Route Engineering and Drawings; Delivery and Installation of Conduit, Fiber, Splice Vaults, Handholes, Pull Boxes, Termination Panels, Splice Cases; and Prevailing Wage Kicker	**$83,944,714**
	Project Mgt. and Construction Oversight--Project Mgr, Administrator, Construction Superintendents, Procurement, Accounting, Mapping, and Legal	**$2,559,600**
	Other--Bond, Mobilization, Traffic Control, Tribal, Permits, Easements and CEQA	**$8,661,062**
	Total-Last Mile	**$100,805,385**
	FTTH	
	OSP Materials--HDPE Fiber and Conduit	**$263,613**
	XGS PON-- Cabinets, OLT Ports, CPE ONTs	**$1,514,156**

	Splice Cases, XGS Splitters	**$55,625**
	FTTH Hand Holes/Pull Boxes	**$144,525**
	Labor Costs--Engineering, Permitting, Construction Design; Install FTTH Handholes and Pull Boxes, Conduit, CPE, Cabinets, Electronics; Network Design; Prevailing Wage Kicker	**$7,488,987**
	Project Costs--Tribal Monitoring	**$74,890**
	Total FTTH	**$9,541,796**
	GRAND TOTAL	**$110,347,182**

Economic Life of All Assets

The provider will depreciate its CASF funded equipment using the Internal Revenue Service's Publication 946 "How to Depreciate Property". The following table identifies all the equipment to be funded by type, including the number of units and the economic life of that equipment. According to the publication, Project #3 assets will have the following economic life:

Project 3 Assets:

ASSET CLASS	EQUIPMENT	NUMBER OF UNITS	ESTIMATED USEFUL LIFE
48.34	144 Fiber Terminal Panels and Connectors	8	16.5
48.35	Edge Routers	8	10.5
48.34	GPON Cabinets	8	16.5
48.33	XPON OLTs ports	1927	26.5
48.33	XPON OLCs	1927	26.5
48.33	XPON Splitters	125	26.5
48.33	Hand Holes/Pull Boxes	482	26.5
48.33	Vaults and Splice Cases	188	26.5
48.32	Conduit and 144 Count Fiber (Miles)	357	26..5
48.38	XPON ONTs w/Router, Battery	1927	10

Project Viability

Recommended Pricing Commitment

We are recommending pricing for future service provider serving residential; low-income (those persons at or below the poverty line, along with any other CASF-mandated requirements), commercial customers at the speed and fixed monthly service level subscription rates, as summarized in the table below, for the first 24 months starting from the beginning date of service.

COMMUNICATIONS' INTERNET SERVICES & MONTHLY PRICING

Plan A (Residential)	**100/100 mbps**	**$49.99**
Plan B (Residential)	**500/500 mbps**	**$69.99**
Plan C (Residential)	**1000/1000 mbps**	**$99.99**
Plan D (Low Income)	**25/25 mbps**	**$14.99**
Plan E (Business)	**100/100 mbps**	**$69.99**
Plan F (Business)	**500/500 mbps**	**$119.99**
Plan G (Business)	**1000/1000 mbps**	**$159.99**

In addition, any installation/service connection charges should be waived during the initial sign up period. In house equipment such as routers will be provided free of charge during the initial sign up period but must be returned to the provider by the customer if they decide to

unsubscribe to internet services. Low -income services will be offered to customers with a median household income no greater than $52,500.

Five Year Financial Projections

Our intent for the future service provider is to offer high-speed Internet service to Mendocino County. The following is a preliminary income statement, but no statement of cash flows, or balance sheet at this time; at this time we do not know the financial contribution or make-up of the future service provider. Since this Mendocino Project 3 business will be a standalone start-up entity, there are no existing financial statements to work from.

The income statement below indicates that sales will begin in year 1, twelve months after the service provider begins constructing and provisioning of the network. Once the service provider is known they will begin the engineering, permitting, and construction phases, which will be simultaneous construction activity between the backbone, last-mile and drop sections. Due to the large amount of construction, the project anticipates several construction crews, many of which we intend to hire locally near the project area.

INCOME STATEMENT (Mendocino - Project 3)					
	Year 1	Year 2	Year 3	Year 4	Year 5
	January Start	Yr 2	Yr 3	Yr 4	Yr 5
REVENUE From RES/BUS	$89,777	$289,930	$439,415	$465,456	$465,456
VOICE SERVICE	$69,637	$136,754	$173,372	$173,372	$173,372
CELL TOWER REVENUE	$39,600	$39,600	$79,200	$79,200	$79,200
TOTAL REVENUE	$199,014	$466,285	$691,987	$718,028	$718,028
COST OF GOODS SOLD	$26,575	$33,257	$38,900	$39,551	$39,551
GROSS PROFIT	$172,438	$433,027	$653,088	$678,477	$678,477
Gross Profit %	87%	93%	94%	94%	94%
Gross Profit Per Cust.	$997	$750	$721	$704	$704
OPERATING COSTS	$386,551	$412,716	$412,716	$445,716	$412,716
EBITDA	-$214,113	$20,311	$240,372	$232,761	$265,761
EBT	-$214,113	$20,311	$240,372	$232,761	$265,761
INCOME TAXES	$0	$6,093	$72,111	$69,828	$79,728
PROPERTY TAXES	$0	$0	$0	$0	$0
NET INCOME	-$214,113	$14,218	$168,260	$162,933	$186,033
Net Income per cust.	-$1,239	$25	$186	$169	$193
Net Income	-$214,113	$14,218	$168,260	$162,933	$186,033
Add: Depreciation Expense	$0	$0	$0	$0	$0
CASH FROM OPERATIONS	-$214,113	$14,218	$168,260	$162,933	$186,033

The total revenue at steady state (year 3) of $692K annually comes mostly from residential and commercial categories (63%), while voice and cell tower revenue comprise the remaining 37%.

Operating expenses in steady state (year 3) total $412,716 annually, which comprises mostly labor for technicians, vehicles, electricity, and cell phones. We anticipate service provider will have existing back office capabilities leveraging existing resources from the provider's current operations and more are not contemplating additional resources; therefore, there are no direct or allocated expenses in this model.

PROJECT ASSUMPTIONS

This project is a mix of residential and small businesses located in Redwood Valley/Potter Valley, Potter Valley, Redwood Valley/Ukiah, Potter Valley/Ukiah, Ukiah/Orr Springs, Pinoleville Rancheria, Talmage, Ukiah and surrounding areas. Additional revenue is forecasted for Cell

Tower connectivity. Connecting these communities occur following tests and turn-up of last mile construction per site. NBNCBC, along with CSU Chico, have determined there are 1927 premises that qualify for CASF Grant funding; this model shows a 50% penetration level.

Assumptions:

- The project requires simultaneous builds starting from last-mile build from Ukiah to Redwood Valley to the north, and Ukiah to the south.
- Installation of new service is anticipated to begin 12 months following engineering and permitting
- The take rate for residential services assumes 20 installs in the first month and 30 installs per month until all forecasted 1,927 units are sold in year 3. The take rate for business services assumes 2 units first month and 3 each month until all 50 units are sold in year 2.
- Construction teams will build the distribution plant, and then connect a drop to the side of each home; a separate crew will complete install within the premise. Home installation costs are included in the grant.

Residential Forecast:

Year 1 (202x	Year 2 (202x)	Year 3 (202x)	Year 4 (202x)	Year 5 (202x)	Total
350	360	204	0	0	914

Commercial Forecast:

Year 1 (202x)	Year 2 (202x)	Year 3 (202x)	Total
37	13		50

Speed and Price Tiers:

Our plan calls for four residential speed/price tiers and three Commercial speed/price tiers, pricing based upon area market rates and surveys:

Residential Pricing Assumptions and Take Rate

Residential Service Plan	Take Rate
LOW INCOME (25/25Mbs) $14.99	46%
REGULAR STANDARD (100/100Mbps) $49.99	43%
REGULAR MEDIUM (500/500 Mbps) $69.99	6%
REGULAR EXTREME (1000/1000 Mbps) $99.99	5%

Commercial Pricing Assumptions and Take Rate

Residential Service Plan	Take Rate
BUS STANDARD (100/100Mbs) $69.99	70%
BUS STANDARD (500/500Mbs) $119.99	15%
BUSINESS EXTREME (1000/1000Mbps) $159.99	15%

Voice Revenue

Voice revenue is projected to be $29.99 per line and assumed to have a 25% take rate from the 1,927 potential subscribers as we expect many customers to port numbers to their new network and depart from their existing voice carriers.

Cell Tower Revenue

$1,100 per site; 3 sites in year 1, growing to 6 total sites year 3-5.

Cost of Goods Sold

Assumes 2.5% of gross revenue per month for marketing expenses for advertisements, door hangers, community sponsorships, and other civic responsibilities, plus $900 per month in incremental backhaul costs; incremental to backhaul provisioned in Project 1.

Expenses

- The assumption is that future provider will operate the network with a combination of on-site technicians and support groups from the existing services, where the additional workload is anticipated to be absorbed into existing business, therefore no additional costs have been allocated or added to this income statement.
- Two Installation and Repair (I&R) technicians will be hired in year 1 prior to the initial launch. I&R technicians will handle service orders and repair activities within a 24-response period. Additional techs can be supplemented from future providers operations during initial rollout as needed. One I&R technician will service the area north of Ukiah, the other south of Ukiah but can be dispatched wherever workload is needed. The I&R salary per tech is estimated to be $23 p/hr. including 20% for benefits; total cost per employee is $57,408, or $4,784 per month. our preference is to hire and train employees locally from the community.
- One Network Technician hired in year 1, will operate and maintain the electronics (routers, fiber terminals, OLT/ONTs) and supplement I&R workload as necessary. Salary is $93k or $45/hr. loaded at 20%; annual salary is $111,600 or $9,300/month
- Vehicle expenses are budgeted at $850 per month per technician, which includes: monthly costs of: $450 for vehicle leasing, $250 for fuel, $100 for insurance and registration, and $50 for maintenance. Three vehicles will be required for I&R and one for the Network Technician. The vehicles for I&R and Network Tech are budgeted in year 1 and are consistent with their hiring
- Electricity is budgeted for $360/month/site and is assumed to cost $18/amp/month; 20 amps are planned for each hut and cabinet location.
- Marketing is budgeted for $2,000 per month and will be used for local advertisements, signage, local sponsorships, community involvement, etc. and is included in the COGs line.
- Tools - A ruggedized PC, OTDR hand-held light meter, and drop kit supplied to each tech and consistent on their hire date; replacement for these budgeted as 4-year replacement.
- Cell Phones are planned for $125/month/tech and will be consistent with hiring.

Expense Categories	Yr. 1	Yr. 2	Yr. 3	Yr. 4	Yr. 5
Labor - I&R Techs, Net. Techs, GM/OSP Mgr., and Customer Support	$217,116	$263,856	$263,856	$263,856	$263,856
Network Support - Vehicles, Electricty, Cable Locates, and OSP Maintenance	$103,080	$120,360	$120,360	$120,360	$120,360
Marketing & Communication	$12,000	$12,000	$12,000	$12,000	$12,000
Administrative - Cell Phones, Tools, Office Eq.	$54,355	$16,500	$16,500	$49,500	$16,500
GRAND TOTAL	$386,551	$412,716	$412,716	$445,716	$412,716

Providing Voice Service

A Voice Network would be included powered by a state-of-the-art Class 5 Metaswitch, an industry leading software manufacturer that is trusted by more than 1000 service providers throughout the global communications marketplace. Voice deployment has a unique combination of VoIP and TDM connectivity that makes our product second to none in reliability and performance.

This would be a fully redundant voice network with automatic failover routing that provides the highest reliability. The system does not have an expected end of life, as it is always upgradeable via software and/or hardware when required.

We will require redundant connections in California to the Intra do emergency network for E-911 services. The redundant connections would allow reliable 911 services for the Mendocino County area. These connections will be transported over the proposed data network infrastructure. Customer equipment battery backups would be available as part of the design of the underlying last mile infrastructure.

Required are three routes, one being a diverse/redundant connection south of Ukiah for backhaul out of Cloverdale where the other two diverse/redundant backhaul connection in Ukiah and Laytonville will be to either AT&T or CenturyLink in California to the SS7 network that will allow for Local Number Portability (LNP) in the 722 LATA. These connections will also traverse the underlying data network design and be connected to a remote media gateway (Metaswitch) in the selected Point of Presents (POP) in the 722 LATA.

CEQA Attestation

We will contact and engage the staff of the Commission's Energy Division CEQA section in advance of proceeding with implementation of this project. We will work with CEQA staff to determine whether or not this project is exempt from CEQA; however, due to the size and scope of the project, we believe some sections of the project will not be CEQA exempt. Part of the consultation is focused on the process of developing and filing a Proponent's Environmental Assessment (PEA) or other CEQA documents.

We are familiar with its responsibilities if this proposed project is not exempt from CEQA. We are prepared to remain CEQA compliant and would hire a professional engineering consultant to assist the project deployment process through the following phases:

- Phase 1: Permitting Feasibility
- Phase 2: Permitting Strategy and Execution
- Phase 3: Permitting
- Phase 4: Transition to Construction
- Phase 5: Post Construction

We are also mindful that we need to address environmental factors associated with the project area to account for environmental risks relative to CEQA review including our review of the overall project relative to:

- Proposed Construction
- Historic/Archaeological Resources
- Affected Environment
- Mitigation

We expect that some of the activities fall within the following classes of projects that are exempt from CEQA and for which neither an Environmental Impact Report nor a Negative Declaration is required.

> **Class 1 Exemption:** operation, repair, maintenance, leasing or minor alteration of existing public or private structures and facilities, with negligible or no expansion of an existing use. This includes existing facilities used to provide public utility services. 14 CCR § 15301.
> **Class 3 Exemption:** construction including water main, sewage, electrical, gas and other utility extensions of reasonable length to serve such construction. This includes the Construction of limited numbers of new small facilities or utility extensions. 14 CCR § 15303. More detailed CEQA Compliance guidelines available in Document 102 found on the **Mendocino County Digital Infrastructure Plan: 2019-2025 website.**

Benefits of the Project

Resilience - By deploying fiber underground, as opposed to aerial, this Last-Mile Distribution System will be better protected against wildfires, other unforeseen disasters and outages.

Tribes - In addition to providing broadband access to 1,927 households this project would also be serving the needs Native American Tribes located within the project area including: Coyote Valley Band of Pomo Indians (Redwood Valley) and Pinoleville Pomo Nation.

Low-Income - With a total weighted average median Household Income of $54,278, this project is serving a population that is above the $52,500 CASF standard. According to official CPUC data this project serves 816, or 42.4% of the households are considered below 200% of Federal Poverty. This project provides broadband services to these qualified households at $14.99 per month for 25 Mbps download and upload speeds.

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