



**BEFORE THE PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA**

Order Instituting Rulemaking  
Regarding Broadband  
Infrastructure Deployment  
and to Support Service  
Providers in the State of  
California.

Rulemaking 20-09-001  
(Filed August 6, 2021)

**COMMENTS OF THE CALIFORNIA BROADBAND COOPERATIVE, INC.**

**I. Introduction**

The California Broadband Cooperative, Inc. (CBC) submits the following comments in response to the Order Instituting Rulemaking Regarding Broadband Infrastructure Deployment and to Support Service Providers in the State of California (Rulemaking 20-09-001).

In the Assigned Commissioner's Ruling the Commission states:

The key provisions of SB 156 require the Commission to: 1) identify existing middle mile infrastructure and areas with no known middle-mile infrastructure that is open access, with sufficient capacity, and at affordable rates; 2) identify priority middle mile locations; 3) identify last mile and anchor institution network end users; and 4) take public comment on the design, technical, business, and operational considerations that would increase the attractiveness and usefulness of the statewide open-access middle-mile broadband network for commercial internet service providers.

CBC believes that its experience as a cooperative made up of local government agencies, hospitals and service providers with middle mile infrastructure in the Eastern Sierra along the Highway 395 corridor will be pertinent to all of the questions posed and implicated in this proceeding.

**II. Digital 395 Is a Model for How Public Investment in Middle Mile Networks Can Provide Value for the State**

CBC is a Member-Owned Public Benefit Telephone Cooperative that is the owner of Digital 395, a middle-mile broadband telecommunications network consisting of 648 miles of fiber serving more

than 250 Community Anchor Institutions (CAIs), tribal governments, wholesalers, cellular and other last mile providers. Construction of the network was 99% funded by federal and state grants to provide broadband infrastructure in economically distressed or economically unviable areas that would not have been built but for the availability of such funds.

CBC formed in July 2009 as California's first and, so far, only nonprofit 501(c)(12) Telephone Cooperative and holds a facilities-based CPCN with the California Public Utilities Commission. It has an 11-seat Board of Directors comprised of representatives from the four membership classes. The membership classes are Class A-County Representatives, Class B-Service Providers, Class C-Government/Education/Medical and Class D -Praxis Founders.

This 62-member Cooperative features a one member one vote structure that was established by its founders in a way so that the network investment would remain a permanent asset to the region with broad participation in planning and governance.

CBC offers broadband connectivity to 278 eligible subscribers (241 CAI's and an additional 37 commercial locations via service providers). Of the 278 eligible subscribers, 193 are taking service on a recurring basis, with an average speed offering of approximately 400 Mbps. CBC also leases out a portion of its dark fiber network to several providers in the form of service agreements or operating leases. Out of the total 33,000 strand-mile network, approximately half (16,500) represent dark fiber under lease agreements known as an Indefeasible Right of Use.

From its inception the State of California's investments in the CBC's network has delivered direct economic benefits in terms of capital, employment and taxes. Initially the State's matching fund support enabled the Cooperative to attract \$81M in federal grant funds which allowed the project to go forward. During construction of the network approximately 1,100 jobs were created during one of the worst economic downturns in recent history. The purchase of the equipment and materials required for the network construction alone generated \$5.7M in state and local sales taxes. Since its inception the CBC network has paid over \$5M in property taxes.

At network operations start up CBC began delivering on its mission to improve internet connectivity and reliability for the eastern Sierra region. In response, service availability improved not only for the CAI's directly connected to the network but more significantly for the service providers serving the consumers through their networks with several providers lifting embargos on new customer connections and bandwidth increases for existing customers.

The Cooperative embraced its public benefit mission in a variety of respects. CBC responded quickly to the current COVID pandemic by vastly increasing bandwidth to its these institutions within hours of the identified emergency, outreaching to hospitals, schools, local government and last-mile service provider partners in the region. During the recent spate of earthquakes and wildfires that plagued the Region in the past five years, CBC supported first responders with much needed on-the-ground communications and helped other service providers with failed equipment and alternative routing for isolated communities. In many instances, CBC's support for public safety is on-going, such as a key role in supporting Caltech develop Early Earthquake Warning (EEW) capabilities and primary research in the field of seismology.

### **III. The Construction of the Digital 395 Network Was Completed in 17 Months as a Result of Federal and State Grants**

Construction of the network was 99% funded by federal and state grants to provide broadband infrastructure in economically distressed or economically unviable areas that would not have been built but for the availability of such funds. The State of California made significant investments in CBC's construction and continues to support CBC's anchor institution members to connect to the National Internet so that they can bring education and healthcare benefits to communities in the Eastern Sierra. But seeing itself in a much broader role that delivering broadband connectivity, CBC saw its role in the form of a mission.

Specifically, in September 2010, after an extensive application process, CBC was awarded \$81,148,788 by the NTIA BTOP to fund the construction of a (then-cited) 553-mile fiber network; the grant was officially dubbed the Digital 395 Middle Mile. It proposed to directly connect Community Anchor Institutions (CAI) with speeds of 1 Gigabit per Second (Gbps) and service providers at speeds up to 10Gbps. Wholesale access for residential and business communities was expected to be made available via last mile providers; no retail services would be offered. The Public Utilities Commission of the State of California ("CPUC") was a supporting partner of the grant project; in December 2009 the state agreed to contribute \$19,294,717 through its California Advanced Services Fund. Cost overruns (due to unexpected and unanticipated environmental and permitting fees, tribal monitoring expense and mandated re-routing for avoidance of 465 cultural sites) the CPUC approved an additional \$9,928,715 in funding. At the end of the project CBC returned \$2,335,574 in funding to the CPUC, for a total net funding by the CPUC of \$26,887,858.18. In addition to federal and state funding, private



investors contributed \$1,102,403.19. CBC has previously reported on the investment of public funds to the Commission in an extensive Final Report in September 2015.<sup>1</sup>

Construction of the CBC network began in 2012 and continued into the first quarter of 2014. Environmental permits and rights-of-way requirements were required from over 50 local, state, and federal permitting agencies. The project “backbone” was built out to 450 linear miles of 432-strand fiber optic cable, with another 198 linear miles for laterals and distribution to end locations, for a total of 648 linear miles. Over 1.3 billion feet of fiber optic strands were installed, spliced and tested during construction.

The conduit system consists of 668 vaults and 8.6 million feet of conduit, requiring 3.4 million feet of underground plowing, trenching and boring. A total of 11 prefabricated 12' x 25' buildings are used for signal regeneration and central points of local distribution, complete with power systems, security and electronics. Power is provided on a fully redundant basis by a combination of commercial power, batteries, and 75 to 125 kV generators. The transport electronics, using two fibers, operate bidirectionally over on two fibers at 150Gbps.

#### **IV. Following the State Highway Map Would Lead to an Inefficient Network Design and Higher Construction Costs**

The route along Hwy 395, as identified on the State Map provided, does not follow the actual Digital 395 route. Had Digital 395 built to the State Map’s specificity, the route would not function, allotted funding would have been insufficient, and there would be no market for the middle mile services over the route.

Approximately one-quarter of the Digital 395 network follows Highway 395 – 106 miles, precisely. 450 miles is the length of the main backbone, and another 198 miles are either laterals connecting adjacent towns (Mammoth, Boron, Bishop, Lone Pine, Benton, etc.) or CAIs along the way. In most instances we used the Highway 395 corridor as a last resort, finding remote dirt roads, county roads, and existing conduit exchanges to be more compatible with lower costs and construction safety. In some instance, where the Highway 395 was available for use, it was over rocky or volcanic terrain which was cheaper to bypass with many extra miles of conduit and cable. The difference between placing cable by plow (\$5.25/ft) versus hard rock bore (>\$300.00 /ft. can make millions of dollars difference in designing routes. Additional challenges are raised by Caltrans requirements for trench depths, vault locations, as well as special construction and maintenance requirements. We do not find

---

<sup>1</sup> California Broadband Cooperative, Inc., “Digital 395 Middle Mile Project Completion Report.” California Advanced Services Fund, September 1, 2015.

fault with Caltrans requirements, since long-term road maintenance and public safety factors are key considerations. It seems appropriate to add, that in the many miles where we did join the Caltrans alignment it was a choice between two evils: if we did not, we were forced by considerable challenges of being in critical habitat of the Desert Tortoise, an endangered species whose protection was fatal to our project. These, and other factors, entered into our route design.

**V. Interconnection to Multiple ISP Carrier Networks is Critical for Diversity, Redundancy, and Network Performance**

For optimal connectivity at the lowest cost, Digital 395 network needed to interconnect to key carriers on the major east-west Internet routes. The closest locations for network peering are in Reno and Barstow. In each location CBC connected to multiple established carriers, so that if one network failed, in both areas, alternative networks would continue to function. This has been a key factor in about a dozen times over the past several years. Also, by connecting both north and south there were no “dead end” routes that could not be bi-directionally fed. In the State Map, connectivity on to the National Internet is not depicted on either ends of Digital 395.

Digital 395 provided a new diverse route between the Reno and Barstow peering points and long-haul carriers see value in this route because it offered diversity low latency, redundancy to other routes, the design of Digital 395, while serving the local Eastern Sierra, also addressed a viable market needed for sustainability. If the Digital 395 middle mile was limited to only serving local needs the high-cost network would have exceedingly less value than it does.

**VI. Operating a Middle Mile Network Has Challenges**

In our experience one of the most difficult phases of during a network start up is making the transition from constructing to operating the network. We believe the CBC also demonstrates operational success.

CBC retains outside management under a Master Services Agreement (MSA) to performs all network planning, network administration, network monitoring, maintenance, as well as customer support. Under the MSA, the vendor interfaces with last mile providers, other long-haul network operators, and manages all aspects of the physical layer of the network – from node generators and security to cable locates, and repairs. A 24/7 Network Operating Center (NOC) controls all activities, while several local residents have been trained and now work on the route as technicians.

The experiences and complexity of managing a facilities-based network are multifaceted and differ significantly from managing a Type II resale network provided by a 3<sup>rd</sup> party, and since that time have amassed more experience on the challenges of 24/7 operations. But there is more to do and CBC

would like to work with the Commission and the State more generally on completing its Mission of fulfilling the broadband needs to the region.

**VII. CBC Must Meet Open Access Requirement to Comply with Its Federal Grant**

The terms “Open Access”, “sufficient capacity” and “affordable rates” mean different things to different middle mile network owners and service providers. When constructed, CBC adopted the NTIA’s required policy of Open Access. We believe this policy provides a clear expectation of behavior from a service provider and support its adoption for the Statewide network model.

**VIII. CBC Has the Ability to Adopt New Technology to Increase the Capacity on Its Optical Network Changes as New Technology Becomes Available**

Over time, CBC has upgraded the electronics in the network so that the installed fiber can support greater amounts of traffic. CBC took care to design its network design for this flexibility before construction.

The question of available capacity on an optical network is relative. It is likely that most facility-based network owners have additional capacity within their existing network although it may not be worth the Commissions time and trouble to determine an appropriate methodology in order tell them how much.

The reason for that is that simply measuring available capacity based on the number of optical fibers on a cable greatly understates its capacity. Most optical fiber carrier systems are only transmitting on a handful of wavelengths. Newer Dense Wave Division transport systems can derive up to 96 channels with each capable of supporting 100 Gb, and recent product releases take this to 800 Gb per channel.

**IX. Conclusion**

We believe that Digital 395 is consistent with the aspirations of SB 156. CBC operates in a fashion that demonstrates that public investment in middle mile networks can result in value for the State.

Our diverse ownership and management has navigated that change in a fashion that ensures Digital 395’s ability to operationally evolve and meet the needs of its members and the region. Our experience is that technology is disrupting the underlying economics of optical platforms, which must be flexibly built and intelligently managed.

These comments reflect how CBC addressed the four questions posed by the Commission. We also believe that they implicate additional issues that the Commission should be concerned with relating

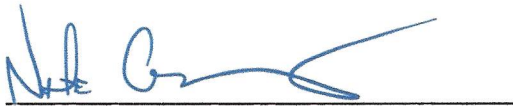


to network design, operational economics, resiliency, sustainability and reliability – particularly in the context of public health crises such as COVID-19, and natural disasters such as earthquakes and wild fires.

We look forward to fully participating in this process, including in any workshops that Commission may hold, to help inform the Commission’s conclusions.

DATED: September 3, 2021

Respectfully Submitted,



**Nate Greenberg**

Chairman  
CBC Board of Directors  
1290 Tavern Road  
Mammoth Lakes, CA 93546  
[ngreenberg@mono.ca.gov](mailto:ngreenberg@mono.ca.gov)



**Robert W. Volker**

Chief Executive Officer  
California Broadband Cooperative, Inc.  
873 North Main Street  
Bishop, California 93514  
[rvolker@digital395.com](mailto:rvolker@digital395.com)